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HELMINTHS OF VETERINARY AND PUBLIC HEALTH IMPORTANCE IN IRAN: THE GREAT NEGLECTED PARASITIC DISEASES AS IMPORTANT CHALLENGE FOR THE COUNTRY.

Hosseini, S.H.*, Fathi, S., Jalousian, F

BACKGROUND: Parasitic helminths are considered as a group of infectious disease, which affect animals and human, however, climatic factors limit many species to tropical and subtropical areas and affect host population abundance, parasite transmission and the survival.
OBJECTIVES: This study aimed to review the current statues of *zoonotic helminth* infections in Iran and to highlight their risks.
RESULTS: Zoonotic helminths should be considered as an important issue in Iran by health authorities of the country, because requires the implementation of accurate control strategies at several stages including planning, implementation (attack phase), consolidation and care. A collaborative framework is currently needed to develop database from large-scale studies, where can tackle for pivotal questions in helminth epidemiology and control operations effectively. Further studies (e.g. , climate-based risk models, genomics, proteomics, and metabolomics studies are valuable for in-depth understanding of transmission dynamics of helminthes, population biology, and involved parameters, as well as transmission breakpoints, where will be a significant comprehensive approach to providing the needed data for control strategies. The public health and veterinary authorities should address the neglected helminthiases to markedly facilitate the control and elimination strategies of the *parasitic helminths*.
Keywords: *Zoonotic helminths*, challenges, Iran.

1. Current status of human and animal toxocariasis

According to available information, the prevalence of *T. canis* infection in dogs is estimated to be 4.3% to 43.5% in Iran, depending on the method and region (Zibaei and Sajjadi, 2017). Based on the available data in the literatures, the prevalence of cat infection (e.g., wild cats and stray cats) withT. cati varies from 3.9 to 78% in Iran, depending on a variety of factors, including the area, sampling location and methods used.On the other hand, different paratenic hosts have been previously reported for Toxocara spp. in Iran including rats, gerbils, chicken, and partridge (Oryan et al., 2010; Zibaei et al., 2010; Zibaei et al., 2017; Ebrahimi et al., 2013).
Based on the seroprevalenceof *Toxocara* spp. infection, four important areas have been indicated for human toxocariasis, including the northern areas (e.g., Mazandaran province) northwestern areas (East Azerbaijan and west Azerbaijan provinces), southwestern areas (e,g., Khuzestan province) southern areas (eg., Fars province). Soil contamination rates vary between various areas with frequency ranging from 3% to 63% (Maleki et al, 2018). However, epidemiological data for most regions of country is limited.

Control strategies fortoxocariasis

With regard to the vast range of different reservoirs and routes, controlling toxocara infections in definitive hosts can lead to a reduction in the number of infectious eggs in the environment (Palmer et al, 2008). It should be taken in to consideration that pet dogs and cats (puppies less than 12 weeks old and Kittens), stray cat and dogs should receive *anthelmintic treatment*. Deworming dogs and cats is recommended and this deworming is regularly organized within the framework of the "Child Day Plus", a preliminary plan endorsed by the World Health Organization, UNICEF and the Ministry of Health, Uganda (Hartnack et al, 2017).
Nevertheless, it should be taken in to account that *anthelmintic* therapy for pregnant dogs and cats is not effective, when transmammary and transplacental routs are considered (Ma et al, 2018; Overgaauw, et al, 2013). On the other hand, *Toxocara* species control is very challenging for wildlife.
It should be noted that there are several routes in different regions for the transmission of infection to humans, such as human contact with dogs and neonatal and foodborne transmission .A limited number of data related to toxocariasis in Iran are available that effectively prevent the estimation of the disease burden in different parts of the country.
However, the available information indicates dog and cat infections, as well as environmental contamination with *toxocara* eggs. Human cases are also limited. However, there is still a need for a serious assessment and update of the current state of the disease in different hosts such as dogs, humans (forms of VLM, OLM, covert and neurological toxocariasis) and *paratenichost*, because can be helpful in establishing a *goodnational healthpolicy*. However, it seems that there is not enough awareness among

health-care providers in terms of toxocariasis, where the use of effective educational system will inevitably impact on the consciousness, leading to prevention and control of toxocariasis.

Using educational websites with detailed data can be one of these methods in the country's educational system. Veterinarians can also educate animal owners about the risks and preventive methods (Deutz et al, 2005). The health system does not focus on toxocariasis and attempts to diagnose children and adults with asthma-like symptoms and pulmonary dysfunction (covert or common form of disease) or neurological toxocariasis are not see (Ma et al, 2018). Children are potentially in contact with soils contaminated with *Toxocara* eggs, which should surely prevent such contact. Avoiding consumption of uncooked meat or raw liver play a key role in preventing transmission in endemic countries. Each human toxocariasis case needs serious treatment to prevent larvae attacking the brain and the eyes (Moreira et al, 2014; Ma et al, 2018; Wiśniewska-Ligier et al, 2012).

Health interventions in endemic areas in a number of communities should be considered, such as rural communities and tropical areas. In addition, large populations of cats and dogs should not be forgotten.

It should be taken in to account that not only understanding the biological and epidemiological concepts of parasites, such as risk factors (age, rural and urban, and social status), have a central role in coping with *Toxocara*spp, but also the feasibility and cost estimation of control measures are of key importance in implementing controlling strategies (Ma et al, 2018). To the best of knowledge, the lack of investigations on seroconversion and related risk factors, including the possible virulence factors of *Toxocara*, prevent epidemiological understanding and determining the burden of disease with concept of Quality-Adjusted Life Year (QALY) and disability-Adjusted Life Year (DALY).

2. Distribution of Echinococcosis and Cystic Echinococcosis (CE)

The population of dogs is estimated to be from 3.5 to 11.5 million in Iran, where more than 70-90% of them are estimated as stray dogs (Harandi et al, 2011). Given that anti-helminthic treatment of stray dog and sheepdogs is not common in the country, therefore the unimaginable number *Echinococcus eggs* and other worms' eggs can spread infection in the country, with daily contamination. A *proof of claim* is the study that applied arecoline purgation for farm dogs in 13 provinces of Iran, where 27.2% of 390 evaluated dogs were found to be infected with *E. granulosus* (Eslami and Hosseini, 1998). Canine echinococcosis has been frequently recorded from different regions of Iran including northwestern and northeastern parts (between 17% and 20%) (Beiromvand et al, 2011; Shariatzadeh et al, 2015), five western provinces (between 9% and 31%) (Abdi et al, 2013; Dalimi et al, 2002), central and southern regions (ranging from 6.8% in Kerman to 36.2% in Shiraz), (Arbabi and Hooshyar, 2006; Mehrabani et al, 1999). Based on the available data, livestock infection with CE ranging from 1.3 to 74.4% in sheep, 1.3-40.1% in cattle, 0.4-37.8% in goats, 4.3-31.9% in buffaloes, 8.8-35.5% in camels (Thompson et al, 2017; Ahmadi, 2005; Ahmadi and Meshkehkar, 2011; Eslami et al., 2014). In addition, about 10 million heads of sheep and goats are slaughtered annually in slaughterhouses and about one million sheep for human consumption in illegal and unsanitary conditions. Some slaughterhouses do not have the basic equipment necessary to remove the affected organs.

Slaughtering of animals at homes in villages for religious celebrations and mourning also occurs in completely unsanitary conditions. Such conditions lead to the availability of a large number of organs infected with CE for carnivorous. Researchers believe that Echinococcosis in infected livestock can be considered as a potential reservoir for human infections, which is important in terms of public health and control programs.

There have been reports that demonstrated the occurrence of CE in both rural and urban regions across the country; therefore, can no longer be considered as a rural disease, because of increased *outdoor activities* such as camping. Overall, an annual number of 1,295 surgical CE cases with an average annual surgical incidence of 1.6/105 individualshas been estimated for 2000–2009by Fasihi Harandi et al. (2012). Furthermore, the cost of human CE has been estimated at US$93.39 million and the annual cost of livestock CE was calculated as US$132 million (Fasihi Harandi et al, 2012).

Control strategy

The control and the prevention of Echinococcosis/hydatidosisis of great importance worldwide. Many countries are well aware of this importance and have developed comprehensive programs for control, and prevention of disease such asCyprus, Iceland, Tasmania, Australia, New Zealand and Australia, where have been relatively successful. It is worth noting that becoming *familiar* with *approaches* from other countries affords new perspectives on *thea*uthorities for developing a *control program* and strategic plan in the country. Prevention can be achieved in the frameworkof a 15-20 year long program.This requires cooperation between different institutions such as the ministry of health and medical education, the ministry of agriculture- Jahad, the ministry of interior, municipalities, councils, the me-

dia, the ministry of education, and law enforcement force. In Iran, there has not been a proper control program or it has not been successful due to its long duration and lack of managerial stability and financial support.

Regarding the available data, it is clear that the level of parasitic infection of dogs (other than domestic dogs, which are usually kept under special care) not only has not decreased recently in many parts of the country, but also has increased in some regions. This situation could be due to the lack of adequate educational programs, control and sanitation programs, and limited financial resources of relevant organizations and ministries, as well as *socio-cultural factors*. Considering the above, the following measures should be taken into account in the implementation of the control program for helminthic infection of carnivorous. 1. The precise status of infection at a wider level, especially in areas that have not been investigated so far. 2. The economic and health importance of dog parasites, as a challenge in veterinary and public health, need to be explained for high-level officials and practitioners. 3. Control programs are applicable at several stages including planning, implementation (attack phase), consolidation and care, where this program requires,cost-benefit analysis, the establishment of a control authority, legislation, long-term funding, base-line data (the status of human, dogs and intermediate hosts for CE), Intervention/control measure (technical measures) and educational measures and long-term funding, etc.

3. Echinococcus multilocularis and alveolar echinococcosis

E. multilocularis was first detected in the early 1970s by Mobedi and Sadighian (1971) from the Moghan Plain of North-western areas of Iran, where 10% of the red foxes were found to be infected. Since then a prevalence of 22.9% for red foxes and 16% for jackals have been reported based on necropsy from Ardebil province, northwestern Iran. Nevertheless, metacestode was not found in rodent intermediate hosts in the northwest of Iran (Zariffard and Massoud, 1998).

Older figures from human (37 patients; farmers [38.2%], shepherds [32.6%], workers [11.1%], hunters and housewives [17%]) from Azerbaijan Province, northwest of Iran depicted the endemicity status of northwestern Iran.

Based on the available data, new foci of alveolar echinococcosis (AE) have been documented from Razavi Khorasan province of northeastern Iran (Berenji et al., 2007; Fattahi Masoom and Sharifi, 2007; Raisolsadat, 2010). It is noteworthy that the annual incidence of AE in Iran has been estimated as11Cases (Torgerson et al, 2010).

E. multilocularis worms were detected in wild carnivores including five of 77 dogs (6.5%), nine jackals, one wolf (1 examined wolf) and one hyena (*Hyaena hyaena*) in Chenaran region, Razavi Khorasan province of northeastern Iran (Beiromvand et al., 2011). A number of small mammal including *Microtus transcaspicus*, *Ochotona rufescens*, **Mus musculus, Crocidura gmelini** and Apodemus *witherbyi* have been previously identified as intermediate hosts of *E. multilocularisworms* in this area (Beiromvand et al., 2013), indicating autochthonous transmission of *E. multilocularis* in Razavi Khorasan province.

4. *Taenia saginata* cysticercosis

Human infection with Taenia. Saginata

Taeniasis is known as a zoonotic infection, where pig and cattle play a key role in life cycle of *Taenia solium* and *T. saginata*, as intermediate host, Furthermore, human beings play their role in distribution of both parasites as definitive hosts. *Taenia asiatica* (from pigs), correlated with *T. saginata* is capable of infecting human. The Iranians do not consume pork as Muslim people, except for some religious minorities, thus, allhuman taeniasis is occurred by consuming cysticerci of *T. saginata* in undercooked or raw meat.

T. saginata has distribution through in Iran at prevalence of 1%, which had caused health problems in the past. Overall, increased public health has led to a reduction in infection. Nevertheless, this infection is more common in northern areas of Iran, mainly in areas, where there is a traditional breeding of cattle. The prevalence of the human taeniasis in Golestan Province has been previously estimated as about 1% (Fakhar et al, 2011). It should be taken in to consideration that reports have been sometimes published from different parts of Iran such as Karaj (Heidari et al, 2016), Ilam (Neghab et al, 2006), Golestan (Soosaraei et al, 2017; Fakhar et al, 2011).

Bovine cysticercosis caused by T. saginata

Based on the available data presented in the literatures, few investigations had focused on the situation of T. saginata in various areas of Iran, based on meat inspection (Oryan et al, 1995, Eslami et al 2003, Kia et al, 2005). An old study indicated a prevalence of 7.7% for cattle, where an endemic foci was reported (Oryan et al, 1995).

An epidemiological study has been conducted to determine current situation of *T. saginata* cysticercosis in Iran, based on the use of PCR assay, where of 7371 cattle carcasses inspected, 72 (0.97 %) were found to be positive for *T. saginata*(Hosseinzadeh et al, 2013).Overall, it should be taken in to account that the socioeconomic aspects play a key role in increasing the endemic nature of taeniasis and cysticercosis in Iran. Nevertheless, professional and suitable

meat inspection, sanitation in abattoirs and studies based upon novel molecular approachesare needed in the future for eradicating the disease (Hosseinzadeh et al, 2013).

5. Fascioloasis

Fascioliasisis a *neglected tropical disease* as a food/plant trematode zoonoses that has been widespread in ruminants of Iran for at least 50 years and there has been a high prevalence of infection in the southern and northern regions of Iran, in the coastal regions of the Persian Gulf and the Caspian Sea. The infection rates of 0.1% to 91.4% has been demonstrated based on the available data in different kinds of livestock thorough the country (Ashrafim 2015). Furthermore, first fascioliasis outbreak has been occurred in Guilan in 1988, while second epidemic has been occurred 10 years later (1999). The moist, humid climatic conditions of northern areas of Iran, especially Guilan province is favorable for parasitic diseases and it is considered that almost all livestock are infested with one or more parasites. In addition to numerous water reservoirs, rice fields cover about 60% of the province of Guilan, therefore, it is practically suitable for growth and development of intermediate hosts (Halimi et al, 2015).

Fascioliasis is attributed to direct and indirect losses, where the overall prevalence of Fascioliasis has been considered to be high in Northern areas of Iran at littoral of Caspian Sea with a specific pattern of transmission, namely; Caspian Pattern. It is noteworthy that the disease is considered an important cause of poor herd health, release of local livestock in pastures is commonly occurred.

Previous studies have shown a decrease in the prevalence of infection in Iran compared to the past due to the involvement of the veterinary organization through the treatment of ruminants as well as the awareness of regional farmers. However, the prevalence of Fascioliasis in northern provinces, especially Guilan and Mazandaran, has been higher than in other parts of the country (Majidi, 2018).

No control strategy for animal fascioliasis has been conducted in Iran, a complete epidemiologic understanding can be capable of providing the foundation upon, which suitable control strategy can be implemented. Regarding the latest reports in the northern regions, the proper veterinary control strategy, which includes appropriate treatment of ruminants, can play a key role in controlling the disease. It requires more attention from the veterinary authorities and other organs responsible for public health, since it should be considered as an important zoonotic disease in endemic area, not a neglected disease.

6. *Dirofilariasis*

Dirofilarisis is an emergent parasitic disease in humans and animals. Increasing cases of human dirofilariasis are recorded worldwide, although human dirofilariasis is considered as a rare disease in Iran, where a few reports has been documented (Athari et al, 2003; Mirahmadi et al, 2017). However, the infection of the dog has beenrrepeatedly reported in different parts of the country. Significant changes have been identified in the epidemiological and transmission situations of parasite around the world, and these changes have in turn contributed to changes in the prevalence of canine reservoirs (Simón et al, 2012).

A growing body of evidence suggest that climate changes (e.g., warming; other bioclimatic factors) are capable of influencing the characteristics of this parasite, where population dynamics, life cycle and disease transmission can be affected. Cheng in temperature can likely be associated with higher transmission and infection rates, leading to change in low, moderate and high risk regions.

Remote sensing (RS) and geographic information systems (GIS) can effectively be used to determine the dynamics of Dirofilariasis, as well as to predict its distribution and the probability of presence in new regions; Therefore,a GIS predicting model would be useful in designing control measures.

There is a growing body of evidence that highlights the contribution of *Wolbachia* in immunopathogenic mechanisms of dirofilariasis and in treatment constitutes, where these can be considered as important concept of dirofilariasis research. On the other hand, genomics, proteomics, and metabolomic studies are needed, where can be lead to novel therapeutic and control targets.

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LABORATORY REARING OF FASCIOLA HEPATICA

Mohammad Moazeni1*

1. *Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran

Email: moazeni@shirazu.ac.ir

Introduction

Fascioliasis is not only a major public health concern but also it is an economically serious problem in animal husbandry (Keiser, 2010). *Fasciola hepatica* as the main causative agents for human and animal fasciolosis, is considered as an economic and public health concern all around the world. Scientific studies on different aspects of the disease should be continue, particularly those relating to vaccine development and evaluation of new drugs. In vivo studies on fasciolosis in sheep and cattle are often expensive, complex to perform and time-consuming (Keiser, 2010). Hence, availability of adult *F. hepatica* in the laboratory could be of value for *in vitro* studies on the parasite. By in vitro studies, the scientists can provide information on various aspects of helminth physiology and biochemistry, immunological properties of excretory secretory products of the adult worms and evaluate more easily the effect of new anthelmintics on the parasite (Lehner and Sewell, 1979). Many attempts have been made to culture the metacercariae of *F. hepatica* to maturity *in vitro* in various complex media, sera and cells. In addition many efforts have been made on the maintenance of adult *F. hepatica* under laboratory conditions (Davies and Smyth, 1978; Smith and Clegg, 1981).

Media: The newly excysted metacercaria of *F. hepatica* have been cultivated in vitro in NCTC 135 (Davies and Smyth, 1978), RPMI 1640 (Smith and Clegg, 1981; Ibarra and Jenkins, 1984) and Hanks' solution (Wikerhauser and Cvetnić, 1967). The adult worms of *F. hepatica* have been reared under laboratory conditions in Hedon- Fleig solution (Daves, 1954), basic saline solution (Rohrbacher, 1957; Sewell, 1968), Earle's basic salt solution (Foster, 1970), Earle's balanced salt solution (Ractliffe et al., 1969; Lehner and Sewell, 1979), Medium 199 (Lehner and Sewell, 1980) and RPMI 1640 (Ibarra and Jenkins, 1984).

Supplements: Human, rabbit, sheep and calf red blood cells, human, rabbit, sheep, bovine, chick and horse serum, NaCl, KC1,CaCl2, MgSO4, Na2HPO4, NaHCO3, lactalbumin hydrolysate, yeast extract, vitamins, amino acids, sodium borate, glucose, fructose, glycerol, beef liver homogenate, autoclaved liver extract and bovine embryo kidney cells are among the most frequently used supplements in the culture media for laboratory rearing of *F. hepatica*.

Temperature: *Fasciola hepatica* has been cultured or reared under laboratory conditions at 28 °C (Foster, 1970), 36°C (Stephenson, 1947), 37°C (Lehner and Sewell, 1980; Smith and Clegg, 1981), and 37-38°C (Davies and Smyth, 1978; Osuna, 1974).

pH: The pH of the culture media used for in vitro culturing of F. hepatica have been arranged from 6.9 to 8.6 (Foster, 1970; Stephenson, 1947).

Change of medium: In previous studies, the culture medium of *F. hepatica* has been replaced every 12h (Ractliffe et al., 1969), 24h (Foster, 1970)), 3-4 days (Smith and Clegg, 1981) or even every week (Davies and Smyth, 1978).

Antibiotics: In previous studies, the most frequently used antibiotics in the culture medium were streptomycin and penicillin (Wikerhauser and Cvetnić, 1967; Davies and Smyth, 1978; Smith and Clegg, 1981; Ibarra and Jenkins, 1984; Hegazi et al., 2007), while Foster (1970) has used neomycin and Lehner and Sewell (1979) have used benzyl penicillin, streptomycin and amphotericin B as the more effective antibiotics in their culture media.

Survival time: The newly excysted metacercaria of *F. hepatica* have been reared under laboratory conditions for 14 days (Wikerhauser and Cvetnić, 1967), 54 days (Osuna, 1974), 98 days (Smith and Clegg, 1981) and 108 days (Davies and Smyth,1978).The adult worms of *F. hepatica* have been maintained alive for 2.5 days (Stephenson, 1947), 5 days (Ractliffe et al., 1969; Lehner and Sewell, 1979; Ibarra and Jenkins, 1984), 7 days (Lehner and Sewell, 1980), 13 days (Martinetto and Capucinelli, 1968), 16 days (Foster, 1970) and 30 days (Rohrabacher , 1957).

Conclusion

The survival time of *F. hepatica* under laboratory conditions may increase considerably by (Davies and Smyth, 1978; Smith and Clegg, 1981; Smyth, 1994):

1) Proper sterility before and during the rearing period (several washing of the parasite with isotonic media containing broad-spectrum antibiotics and addition of antibiotics to the culture media).

2) Reproduction of physico-chemical characteristics of the natural habitat of the parasite in the culture system (temperature, pH, gas phase (especially *p* O and *p* Co2),

oxidation- reduction potential (Eh), supporting matrix and osmotic pressure).

3) Feeding the worms with suitable food materials (supplementation of the basic culture media with serum, yeast extract, vitamins, blood cells, etc.)

4) Designing special culture vessels as much as possible similar to the natural habitat of the parasite (size and shape). This may improve the feeding and other biological activities of the worms.

5) Rapid removal of toxic waste products from the culture system by regular renewal of the medium, transfer of the parasites to new medium at intervals or use of circulating or continuous flow culture systems.

6) Agitation may play an important role in the feeding behavior of the worms, since the natural habitat of the parasite is predominantly dynamic rather than to be static.

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A DECADE OF EFFORTS TO PRODUCE AN ANTI-TICK VACCINE (2008-2018)

Nabian, S.*1, Asadollahi, Z.1, Taheri, M.2

1. *Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Rastegar Reference Laboratory, Faculty of Veterinary Medicine University of Tehran, Iran*

Email: Nabian@ut.ac.ir

BACKGROUND: *Rhipicephalus(Boophilus)annulatus* is a one-host tick that can cause important losses to bovine herds. It can cause anemia and transmit some pathogens as *Babesia, Theileria* and *Anaplasma* in animals. Protective antigens are being investigated in order to develop vaccines to avoid the use of acaricides.

OBJECTIVES: Within 10 years, different antigenic aspects of *Rh. annulatus* tick and host immunity tothis tick infestation were investigated.

METHODS: The characters of different antigens of tick were determined and the common proteins in different tick tissues were assigned using SDS-PAGE. A number of proteinases and inhibitors that are important in its biology and physiology were shown by direct and indirect one-dimensional and two-dimensional zymography. The cathepsin, one of these proteins was cloned, sequenced in PTZ57R / T vector and expressed. Aso a potential vaccine candidate of fused cathepsin L and tropomyosin genes of *Rhipicephalus* (*Boophilus*) *annulatus* tick larva was assigned. Then immune reactions of rabbits to cathepsine and multi-epitope genes consisting of immunogenic epitopes of cathepsin and tropomyosin (CaTro) was studied. The results showed that the CaTro protein has a molecular weight of 38kDa which could be a suitable candidate against tick infestation.

CONCLUSIONS: It seems that more knowledge about different tick proteins and their characterization could be useful for the development of anti-tick vaccines.

Keywords: Vaccine, tick, *Rhipicephalusannulatus*, Immunoinformatics, Tropomyosin, Cathepsin

Introduction

Ticks are the most common ectoparasites of mammalian, birds, reptiles and amphibians (Noaman et al., 2004). *Rhipicephalus (Boophilus) annulatus* is one of the most common ticks in the north of Iran (Nabian et al., 2007). This tick due to blood sucking and the transmission of pathogens such as *Babesia*, *Theileria* and *Anaplasma* to animals causes severe economic losses to the livestock industry (Walker et al., 2005). Therefore, their control in tropical and subtropical areas is essential. Tick control is essentially based on the use of chemical compounds, but the use of acaricides cause problems such as environmental contamination, the survival of their chemical residues toxicity in animal products and acaricides resistance by ticks (Prevot et al., 2007). Therefore, the scientists are still trying to find control methods with less risk and more advantage such as vaccine in order to prevent of these drawbacks. The production of vaccine requires the comprehensive identification of tick proteins and especially immunogenic and functional characteristics of these proteins (Rodríguez, 2016). So far, some proteins have been introduced as an anti-tick vaccine candidate by the researchers from the various regions of world (Parizi et al., 2012; Odongo et al,. 2007; Saimo et al,. 2011; Saidi et al,. 2015; Taheri et al,. 2014; Asadollahi et al,. 2018). This paper is explain many efforts which have been done for recognizing important proteins in ticks and introducing them as anti-tick vaccine candidates since ten years ago by parasitology Department, Faculty of Veterinary Medicine, University of Tehran.

Materials and Methods

At the first (2008-2010), each of seven calves was infected experimentally with a dozen larvae of the *Rhipicephalus(Boophilus) annulatus* tick and their humoral immune responses to proteins in various parts of the body, such as salivary glands, ovaries, and larval extract were evaluated using ELISA method. Sera antibodies levels were measured weekly for nine weeks after infection (Nikpay and Nabian. 2008). Afterward (2011), the immunogenic proteins of the mentioned tick were investigated using western blot method. Then, Common antigens in different tissues of tick were identified and suggested as targets for immunization (Nikpay and Nabian,. 2011 , 2016). In 2012 proteomics of immunogenic antigens were examined. Also, a number of proteinases and inhibitors that are important in biology and physiology of the tick were shown by direct and indirect one-dimensional and two-dimensional zymography(Taheri and Nabian, 2012). After that (2015), the cathepsin protein was cloned and sequenced in PTZ57R / T vector and analyzed using immunoinformatic methods. In 2017, this recombinant protein was cloned, expressed and injected to rabbits for antibodies production (SaidiadNabian, 2017). In 2018, multi-epitope genes consisting of immunogenic epitopes of cathepsin and tropomyosin was constructed using immunoinformatic approaches. After the synthesis of the designed structure by Biotech company, the mentioned constructed was cloned, expressed and after purification, was injected into the rabbits Asadollahi and Nabian, 2018).

RESULTS

The results of these studies showed that the sera of infected calves showed similar reactions to all of various tissues extracts, which may be due to the presence of common antigens in these tissues. Also, the results of two-dimensional electrophoresis showed that vitellogenin, tropomyosin and cathepsin proteins could be suitable candidates for the production of the anti-tick vaccine, and the nucleotides length of the cathepsin protein was 999 bp.Immunoinformatic studies showed that the mentioned protein has 332 amino acids with an approximate molecular weight of 36.3 kDa, which includes a peptide signal sequence (18 amino acids), a pre-region (97 amino acids), and an enzyme (217 amino acids). The immunized rabbit's sera reacted to cathepsin andCaTro (fused cathepsin and tropomyosin), but there was no response to the sera of the control rabbits. The CaTro protein has a molecular weight of 38kDa.

Discussion

Rhipicephalus(Boophilus) annulatus is a one-host tick that can cause important losses to bovine herds. It can cause anemia and transmit some pathogens as *Babesia, Theileria* and *Anaplasma* in animals. Protective antigens are being investigated in order to develop vaccines to avoid the use of acaricides.

It seems that more knowledge on different tick proteins, their characterization and role in their biology and physiology could be useful for the development of anti-tick vaccines. In this article we tried to explain 10 years efforts for accessing to a suitable vaccine against ticks.

According to our results obtained over the past ten years, we found that designed vaccine candidate of fused cathepsin L and tropomyosin genes of *Rhipicephalus (Boophilus) annulatus* tick larva could be effective for tick control. Our further study would be determining of host immune reaction against this antigen. The effects of its injection to cattle on tick development characters should be studied.

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FROM MOLECULE TO VACCINE AGAINST CRYPTOSPORIDIOSI

Shayan, P

Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran

Email: pshayan@ut.ac.ir

BACKGROUND: *Cryptosporidium parvum* is a coccidian protozoan parasite causing disease in newborn animals and immunosuppressed human. Vast amount of oocysts of this parasite can be released from the infected individual contaminating the environment. The immunological status of the infected individual determine the severity of the disease. Oocysts of *Cryptosporidium* are extremely resistant to many disinfectant and no effective curative agent against this organism is available.
OBJECTIVES: Therecombinant *C. parvum* P23 was used as vaccine candidate.
METHODS: P23 gene was cloned and the recombinant protein was prepared and used for producing hyper immune eggs and colostrum.
RESULTS: IgY isolated from hyper immune eggs could recognize the P3 protein in lysate prepared from oocysts and could reduce to more than 70% the oocyst shedding in 6-week-old female C57BL/6 mice after challenge with 1×10^4 oocysts. Also orally with $1x10^7$C. parvum oocysts challenged calves consuming hyper immune colostrum excreted oocysts significantly lower than the calves in control group and the number of oocysts excreted by calves in control group was 25 time higher than the passive immunized calves. Interestingly, in contrast to the control group, the calves in the test group showed no clinical signs.
Conclusions: It could be shown that hyper immune colostrum against P23 or IgY against P23 can be considered as a possible passive immunization strategy.
Keywords: *Cryptosporidium*, recombinant protein P23, cloning, passive immunization

Introduction

Cryptosporidium parvum is a coccidian protozoan parasite causing disease in newborn animals and immunosuppressed human (Fayer and Xia 2008). The cryptosporidiosis is accompanied with great economical loss especially in the cattle industry worldwide. There are different *cryptosporidium* species infecting animal and human. Fayer et al., (2007) and satin et al., (2008) reported that the infection with *Cryptosporidium* spp. is age dependent. For example, the pre weaned calves are infected mostly with *C. parvum*, whereas the weaned calves are infected with *C. bovis* and *C. ryanae* and the yearlings and adult cattle with *C. andersoni*. The infection of newborn calves with *C. parvum oocytes* showed severe watery diarrhea 4 days after inoculation continuing for another 8 days and the infection was accompanied with dehydration, depression and decreased appetite of calves (Askari et al. 2016).Unfortunately, the oocysts of *Crysporidium* spp. are extremely resistant to many disinfectant and no effective curative agent against this organism is available. Therefore, control and prevention by vaccination strategy can help to protect the calves against cryptosporidiosis. Number of proteins such as GP900, CP15, GP15, GP40, CSL, TRAP-C1, P23 have been reported to be used as tools for developing a vaccine strategy against cryptosporidiosis (Winter et al. 2000; Tomley and Soldati 2001; Burton et al. 2011, Askari et al. 2016, Avendano et al. 2018). In the presentation, the data dealing with the recombinant P23 was given again.

Materials and Methods

Collection of C. parvum oocysts

C. parvum oocysts from experimentally infected calves were collected and stored as described by Ebrahimzadeh et al.,(2009), Shayan et al.,(2012) and Ebrahimzadeh et al., (2014). The experimental infection was performed with consent given according to institutional guidelines.

Preparation of P23 recombinant protein

RNA isolated from oocyst was used for cDNA synthesis as described by Omidian et al.,(2014). The cDNA was amplified using primers specific for P23 and cloned in expression vector pQE-32. The recombinant P23 was then prepared using Ni-NTA Spin Kit (Qiagen, Hilden, Germany) under denaturing condition, analyzed by SDS-PAGE, Dot blot and western blot assays and the amino acid sequence of the recombinant P23 was determined by mass spectrometry (Cina clone company, Tehran, Iran) and stored as lyophilized in 300 µg portions as described by Askari et al.,(2016).

Anti P23 specific IgY production

Six microgram P23 was used for immunization of each 28-week-old white leghorn hens (Tehran, Iran) and the hens were boosted 14 days and 16 days after the first im-

munization and the eggs were collected 7 days after the third immunization as described by Shahbazi et al. (2009) and Omidian et al. (2014). Subsequently IgY was prepared from egg yolk, analyzed by SDS-PAGE, Dot blot and western blot assay as described by Omidian et al. (2014).

Mouse challenge

Four to 6-week-old female sensitized C57BL/6 mice (Pasteur Institute, Tehran, Iran) were inoculated orally with 10^4*C. parvum* oocysts in 100 mL PBS. P23-specific IgY has been administered to the test group, whereasP23 negative IgY isolated from the healthy donor was administered to the control group 12 h before oocyst inoculation and continued every 12 h for the next 4 days. At day 3 after inoculation of oocysts, the fecal pellets from each group were collected every day for 7 days. Subsequently, the oocytes were counted as described by Omidian et al. (2014).

Immunization of pregnant cows

Five healthy pregnant cows with no or low antibody titer (>1:500) against C. parvum were immunized 70 days before parturition every 2 weeks each time with 300 µg P23 protein for 4 times. The peripheral blood was collected before each immunization and the serum was stored at -20ºC. Non immunized pregnant cows and their newborn calves were used as control group. Each calf received the first milking colostrum of its dam (3L, 2L and 1L) at 2h, 12h and 24h postpartum respectively, and fed second milking colostrum at second day postpartum. The calves were orally challenged with $1x10^7$*C. parvum* oocysts at 12h of age as described by Askari et al. (2016).Every twice day, the clinical signs were evaluated and the fecal samples per calf were collected twice daily from the first day infection until 2 weeks and the mean and standard deviation of the counted oocysts were determined and analyzed with a Student's t test in SPSS package (Kobayashi et al. 2004).

Results

The oocyst shedding in the mice group treated with IgY against P23compared to the control groups showed as expected that the number of excreted oocysts was significantly lower from day 3 to day 10 post-infection (t test: $p< 0.05$). Interestingly the reduction of oocyst excretion of 70% was observed in the test group at day 7 post-challengecompared to the control group. The results showed that the P23 specific IgY can have protective effect in mice against *C. parvum* (omidian et al 2014).

In the experiment with the orallywith $1x10^7$*C. parvum oocysts* challenged calves consuming hyper immune colostrum, the test calves excreted oocysts significantly lower than the calves in control group from day 4 to day 11 post-infection ($P < 0\ 05$). Importantly, the number of oocysts excreted by calves in control group was 25 time higher than the passive immunized calves. The calves in control group showed diarrhea, depression, decreased appetite with sever watery to solid consistency of stool, whereas none of the test calves showed any clinical signs (Askari et al. (2016). Taken together, the results showed that the recombinant P23 protein can be considered as a suitable vaccine against cryptosporidiosis.

Discussion

C. parvum is a coccidian protozoan parasite causing disease newborn animals and immunosuppressed human. Vast amount of oocysts of this parasite can be released from the infected individual contaminating the environment. The immunological status of the infected individual determine the severity of the disease. Oocysts of Cryptosporidium are extremely resistant to many disinfectant and no effective curative agent against this organism is available. Therefore, control and prevention of cryptosporidiosis is very important in the management of the public health. Since hyper immune colostrum can protect the new borne calves against cryptosporidiosis, many investigator used different proteins like whole oocyst antigens (Harp and Goff 1995), P23 (Shirafuji et al. 2005, Omidian et al. 2014, Askari et al. 2016), rC7 (Perryman et al. 1999), and CP15/60 (Jenkins et al. 1998) to generate antibody against *cryptosporidium*.

Our results showed that hyper immune IgY or colostrum against P23 could have protective effect against *C. parvum* in mouse as well as in calves respectively, and confirmed the results achieved by (Shirafuji et al. 2005; Perryman et al. 1996; Takashima et al. 2003, Askari et al. 2016).

Since chicken egg yolk is cheap and can be prepared from convenient source from one site and high amount (100-150 mg) of IgY with 2-10 % specific IgY can be isolated from each egg yolk from other site, the use of IgY against cryptosporidiosis can be recommended for protection against *C. parvum* specially for new borne calves or immune suppressed individium. Also our results showed that the new borne calves consuming hyper immune colostrum against *C. parvum* infected experimentally with *C. parvum* oocysts showed no clinical signs. Furthermore, our results showed that the oocyst shedding in the passive immunized calves was inhibited to over 90% compared to the calves in control group. Taken together, it is to assume that P23 can be considered as a suitable toll for designing a protective immunity strategy against cryptosporidiosis.

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The Epidemiology of Parasitic Diseases

Oral presentation

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EMERGING AND RE-EMERGING PARASITIC DISEASES

***Mohebali, M.*[1]**

1. Professor of the School of Public Health, Tehran University of Medical Sciences (DVM, MPH, PhD)

Background: The term "emerging and re-emerging infectious diseases" have been imputed to a group of infectious diseases which have appeared in a population in the recent past or that have existed but are rapidly increasing in incidence rates or changing their geographic distribution. The parasitic diseases are a significant health problem in both developed and developing countries. Almost 20% of ~ 1750 known infectious agents in humans have parasitic (protozoa and Helminths) agents and almost 9% of them are emerging agents. Altogether, 18% of emerging and re-emerging diseases are parasitic (protozoan: 12%; helminthic: 6%) agents. In Iran, almost 35 pathogenic helminths and 20 pathogenic protozoa were isolated from humans which 7 of them had protozoan and 2 of them had helminthic agents.

The parasitic diseases in the developing tropical countries are spreading to the developed countries by the tourists, soldier, or immigrants. Parasitic diseases such as malaria particularly resistance to anti-malaria drugs, visceral leishmaniasis and cerebral toxoplasmosis particularly among HIV+ patients, cyclosporiosis,Human fascioliasis and human microsporidiosis have been emerged in Iran and other parts of the World during recent years. During the past decade CL has also emerged as a challenging parasitic disease in the form of new outbreaks in areas not identified previously and re-emerged in some parts of Iran such as northwest and southwest of Iran. Emerging and re-emerging parasitic diseases have been divided to the three following groups:

Emerging and reemerging food and water bornediseases (some of them are zoonosis) including:

• Cyclosporidiosis
• Microspoidiosis
• Cryptosporidiosis
• Cerebral toxoplasmosis
• Cysticercosis
• Trematodiasis (Fascioliasis)

Emerging and reemerging vector bornediseases(some of them are zoonosis) including:

• Malaria
• Trypanosomiasis
• Visceral leishmaniasis in HIV+ patients

Emerging and reemerging zoonotic parasitic diseases

• Babesiosis
• Echinococosisis
• Trichinellosis
• Gnathostomiasis
• Angiostrongyliasis

In this lecture, different aspects of above diseases particularly in Iran will be mentioned.

Keywords: Emerging & Reemerging Parasitic diseases, Human, Iran

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DIAGNOSIS AND CONTROL OF ABORTION CAUSED BY *TOXOPLASMA GONDII* AND *NEOSPORA CANINUM* IN SMALL AND LARGE RUMINANTS

Razmi Gh

Department of pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad

Toxoplasma gondii and *Neospora caninum* are two closely related intracellular protozoa which the first protozoa due to abortion in sheep and goats and the latter due to abortion in dairy cows are great importance in veterinary Medicine. According to available information, the high prevalence of abortion is annually causes significant economic losses in ruminants in Iran. Our Studies in the center excellence in ruminant abortion showed that a high percentage of abortion is due to *T.gondii* and *N. caninum* infection among ruminants in Iran. Diagnosis of *Toxoplasma* and *Neospora* abortion is difficult in the farm condition and need to proper sampling and attention in performing and interpreting laboratory results. This speech is focused on the key points about sampling, tests required for diagnosis and follow-up to control and prevention.

Keywords: Diagnose, Abortion, Ruminants, *Toxoplasma gondii, Neospora caninum*

AN INVESTIGATION ON FISH HELMINTH INFECTIONS IN SEYMAREH RIVER IN LORESTAN PROVINCE, IRAN

Hosseinpour, S.[1], Gholamhosseini, A.[2], Nayebzadeh, H.[1*]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Lorestan University, Khorramabad, Iran.*
2. *Department of Clinical Sciences, Faculty of Veterinary Medicine, Shiraz University, Shiraz, Iran*

Email: nayeb.h@lu.ac.ir

BACKGROUND: Today, with the increase in population and the need for protein, the importance of the aquaculture industry is increasing. Parasitic infection is one of the causes of fish loses.Seymareh River is one of the basin areas of three provinces in Iran including Lorestan province.
OBJECTIVES: So far, no studies have been carried out to investigate the infection of the fish parasites in the river. The aim of this study was to investigate the parasitic infections of fish in this river.
METHODS: In the summer of 2018, 100 fish (8 species) were trapped by Salic method from the two stations of the river including Kordestan Catfish (*Glyptothoraxsilviae*), Levantine scraper (*Capoetadamascina*), Longspine scraper (*Capoetatrutta*), Largemouth lotak (*macrostomum-Cyprinion*), Red garra (*Garrarufa*),Shabout (*Tor grypus*), Grass carp (*Ctenopharyngodonidella*) and Wild Goldfish (*Carassiusauratus*). Immediately, after the capture of fish, wet slides were prepared and ectoparasites were examined using a portable light microscope at field laboratory. Samples were sent to Shiraz Veterinary Faculty for identification of endoparasites. The contents of the intestine were sieved and parasites were collected, fixed and examined.
Results: The fish were infected with monogenean parasites, digenean trematodes, copepods, cestodes, and acanthocephala. The highest frequency was observed for *Dactylogyrus*(15%), followed by *Gyrodactylus* (9%), *Lernaea* (4%), *Ligula* (2%), acanthocephalans (1%), and *Hemiurusappendiculatus* (1%). The latter species is reported for the first time in freshwater fish in Iran. All species of fish, except red garraspecies, were infected with helminth parasites. Zoonotic parasites, such as Anisakis were not observed.
CONCLUSIONS: Due to the diverse presence of parasites in the fish of this river, it is recommended that the fish farming areas associated with this river observe all control measures such as the installation of lace at the entrance to the fields and the prevention of entry of native fish to the fields, and farms involved in parasite needed immediate medical treatment.

Keywords: Fish, Parasitic infection, *Hemiurusappendiculatus*,Seymareh River, Lorestan

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RAPID IMMUNOCHROMATOGRAPHIC TEST USING RECOMBINANT GRA7 FOR DIAGNOSIS OF RECENT TOXOPLASMA INFECTION

Morovati, H.[1,4*], SeyyedTabaei, SJ.[1], Gholamzad, M.[2], Arab-Mazar, Z.[3], Eshaghi, A.[4], Morteza Kamalzadeh[4]

1. *Department of Parasitology and Mycology, ShahidBeheshti University of Medical Sciences, Tehran, Iran.*
2. *Department of Microbiology and Immunology, Islamic Azad University, Tehran Medical Branch, Tehran, Iran*
3. *Infectious Diseases and Tropical Medicine Research Center, ShahidBeheshti University of Medial Sciences, Tehran, Iran*
4. *Department of Quality control, Razi Vaccine & Serum Research Institute, Agricultural Research Education and Extension Organization, Karaj, Iran*

Email: h.morovati@rvsri.ac.ir

BACKGROUND: *Toxoplasma gondii* infects all warm-blooded animals including humans, causing serious public health problems and great economic loss in the food industry. Commonly used serological tests using equipment and expert lab technician involve preparation of whole *Toxoplasma* lysate antigens from tachyzoites which are costly and hazardous.
OBJECTIVES: An alternative method for better antigen production involving the prokaryotic expression system and rapid diagnosis without special laboratory tools was therefore used in this study.
METHODS: The dense granular protein, has been reported as markers of recent infection and considered as potential serodiagnostics assays. Recombinant dense granular protein, GRA7, was successfully cloned, expressed, and purified in *Escherichia coli*, Rosetta (DE3) and used it as antigen source in immunochromatographic assay. The potential of this purified antigen for diagnosis of acute human infections was evaluated through chemiluminescent immunoassay (CLIA) against 100 human serum samples.
RESULTS: Results showed 100 and 96.7 % sensitivity and specificity, respectively towards acute infection, in *T. gondii*- infected humans, indicating that this test strip is useful in rapid differentiating recent and past infections.
CONCLUSIONS: Therefore, it is suitable to be used as a reliable rapid serodiagnosis of Toxoplasma recent infection in both humans and animals.
Key words: Rapid Immunochromatographic test, Recombinant GRA7, *Toxoplasma gondii*

PREVALENCE OF *PEDICULUSCAPITIS* INFESTATION AMONG PRESCHOOL AND PRIMARY SCHOOL STUDENTS IN TABRIZ

Norouzi, R.[1], Jafari, S.[1*]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*

Email: Sajjadjafari2018@gmail.com

BACKGROUND: The head louse (*Pediculushumanuscapitis*), is an obligate ectoparasite that is a worldwide public health concern and transmitted mainly through physical contact.
OBJECTIVES: The aim of present study was to determine the prevalence of head lice infestation rate in primary students, in relation to some potential risk factors, in Tabriz City East Azerbaijan province, Iran.
METHODS: The sample size of the study was 3032 students (1515 boys and 1517 girls) in 33 primary schools in Tabriz city who were selected by multi-stage cluster sampling during 2018. Students examined individually and privately by experts. Presence of adult or immature lice or having nits less than 1 cm from the hair basis were defined as positive.
RESULTS: A total of 130 (4.29 %) students were infested with different rates of head lice infestation and the prevalence rate was significantly higher in girls (2.11%) than in boys. In both genders, aged 6 years showed the highest prevalence rates (6.05 %) and students aged ≥ 12 years had the lowest rate of infestation (3.17 %). There were significant relationship between head louse infestation and parent's job and family size as well as combing repetition per day and hair style.
CONCLUSIONS: The prevalence of pediculosis in Tabriz is low, in spite of the low prevalence, it is necessary to find the risk factors of the infection then, screening and treatment for head lice among children should be done continuously in order to decrease infestation rate.
Keywords: *Pediculushumanusvar. capitis*, head louse, prevalence, primary school student, Tabriz, Iran

The Epidemiology of Parasitic Diseases

Poster presentation

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PARASITES OF WILDLIFE BIRDS IN SAMPLES REFERRED TO THE IRANIAN NATIONAL PARASITOLOGY MUSEUM (INPM)

Ahoo, M.B. [1, 2 *]***, Hosseini, S.H.*** [1, 2]***, Mobedi, I.*** [2, 3]***, Fathi, S.***[1]***,Soltani, M.***[4]***,Tolouei, T***[4]***.***

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran*
2. *Iranian National Parasitology Museum.*
3. *Department of Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
4. *Department of Avian Diseases, Faculty of Veterinary Medicine, University of Tehran*

Email: mohammadahoo@ut.ac.ir

BACKGROUND: Birds can be infected with internal and external parasites, such as nematode and protozoa, mite and lice, etc. Birds living in the wild are more likely to develop parasitic infections because of exposure to the environment. Therefore, these parasite organisms in birds can trigger risk of parasitic infections.
OBJECTIVES: The current paper was aimed to report a number of parasitic infections of Iranian wildlife birds.
METHODS: Samples referenced to the Iranian national parasitology museum were tested in different ways according to the type of parasite. Nematodes and acanthocephalanswere cleared in lactophenolandtemporarily mounted by gelatin glycerin. Platyhelminthes were stained with Carmine acid and then dehydrated in various degrees of alcohol and were mounted with Canada balsam. The protozoan parasites were fixed and stained using methanol and Giemsa methods. It is worth noting that the arthropods were first stored in potassium 10% and, after neutralization in 10% acetic acid, were cleared by lactophenol, and temporarily mounted by gelatin glycerin.
RESULTS: In this study, several species of helminthes and external parasites were recorded from eight wild bird species that are as follow: *Cladotaenianepalensis*(Host: *Aquila Nipalensis*), *Dispharynx* Spp. (Host: *Circus pygargus*), *Mediorhyncuspapillosum* (Host: *Sturnus vulgaris*), *Cladotaenianepalensis* (Host: *Aquila Nipalensis*), *Laemobothrion maximum* (Host: *Aquila Nipalensis*), *Falcolipeurussuturalis*(Host: *Aquila Nipalensis*), *Craspedorrhynchus*(Host: *Aquila Nipalensis*), *Spinodiplotrianamochti* (Host: *Acridotherestristis*), *Trichomonas* spp. (Host: *Corvuscorone*), *Dispharynxfalco* (Host: *Falco tinunnculus*), *Heterakisgallinarum* (Host: *Phasianuscolchicus*), *Menacanthuseurysternus* (*Acridotherestristis*) and *Myrsideainvadens* (*Acridotherestristis*).
CONCLUSION: In the current study, a number of parasitic infections of wildlife birds were recorded, where the identification, and pathological outcomes of parasitic diseases are not only effective in the application of therapeutic approaches, but also can be effectively involved in deep understanding of their biodiversity in Iran's ecosystem. Authors believe that describing and evaluating parasites biodiversity will be the basis of future scientific achievements.
Key Words: Parasitic Infections, Wild Birds, Iran

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THE PREVALENCE OF INTESTINAL PARASITES AMONG PET DOGS IN DALAHOO AND SONGHOR CITY, LOCATED IN KERMANSHAH PROVINCE, IRAN

Badparva,E.[1*], Badparva, F.[2], badparva, M.[3]

1. *Associate Professor, Department of Parasitology and Mycology, Lorestan University of Medical Sciences.*
2. *Medical Student of Kermanshah University of Medical Sciences*
3. *Veterinary Student, Azad University, Alborz province*

Email: ebrahimbadparva@yahoo.com

BACKGROUND: The dogs, as one of the animals forming close relationships with humans, are considered to be a major transmitter of zoonoses, where the transmission frequently occurs via the eggs and larvae of parasitic worms living in the soil. The purpose of this study is to investigate the prevalence of intestinal parasites among the pet dogs in two counties located in Kermanshah, Iran.
METHODS: Fifty-four fecal specimens of pet dogs were collected in the mornings during the winter 2016, and analyzed using direct saline and Lugol's iodine wet mount and Formalin-Ether sediment concentration, magnified to the power of 10x and 40x, by means of an optical microscope.
RESULTS: Twenty-eight percent of the fecal specimens were infected with protozoan parasite including *Giardia canis* and *Entamoeba coli*, and parasitic worms including Ancylostomacaninum and various species of *Hymenolepis*, containing 3.75% of each, and 13% of the pet dogs or 46.7% of parasites including *Toxocaracanis* worm. Meanwhile, 73.3% of the infections were caused by parasitic worms, whereas the protozoa account for only 26% of the infections.
CONCLUSION: Pet dogs and farm dogs living in the above mentioned counties were infected almost at the same rate, but compared to the pet dogs of other provinces, the infection rate was higher; however, when compared to the stray dogs which feed on poor-quality foods, while being deprived of veterinary care or antiparasitics, the infection rate is considerably lower. It is recommended that the local veterinary offices regard the findings of these studies as tangible evidence and take proper action for the treatment and prevention of these infections by special medications.
Keywords: Intestinal parasites, pet dogs, Dalahoo city, Songhor city, *Toxocara* spp., Kermanshah province

PREVALENCE OF *LINGUATULASERRATA* IN THE SHEEP AND GOATS OF LORESTAN PROVINCE IN 2017

Beiranvand, M.[1], Azizi, F.[1], Hashemi, S.[2]

1. *Lorestan provincial veterinary service*
2. *University of Boroujerd*

Email: Mb09161610329@Gmail.com

BACKGROUND:*Linguatulaseratais* a parasite of the Pentastomyidae order, which has a global spread and is endemic in Iran.
OBJECTIVE: The dogs are the definitive host, humans and Ruminants are intermediate hosts.
METHODS: From April to July 2017 with frequent visit, a total of 118 samples were collected from the Khorramabad livestock slaughterhouse and transmitted to the lab. At first, each lymph node sample was divided into two equal parts with scissors and then transferred to Petri Dish and added a portion of warm water physiological serum of 55°C were added. Then they were crushed and searched by a stereomicroscope (laboratory loop).
RESULTS: From the 33 samples of goat lymph nodes, 1 sample was contaminated with an absolute frequency of infection of 3.03%. From the 85 samples of sheep lymph nodes, 5 samples were infected with *Linguatula* parasite. The absolute abundance of contamination was 5.88%
CONCLUSION: With a confidence level of 95% by Chi square test, it seems that the prevalence of infection with the species and the genus of animal is statistically significant, meaning that the amount of the substance in the material is higher than that of the male and in the sheep more than the goat.
Keywords: *Linguatulaserata*, goat, sheep, Khorramabad

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THE INFECTION RATE OF *THELAZIA* SPP. IN SHEEP IN KERMAN, IRAN

Ebrahimi, M, F.[1*], Afshari, M.A.[2], SalimiNodoushan, A.A.[3], Khedri, J.[4]

1. *Student of Veterinary Medicine, Faculty of Veterinary Medicine, ShahidBahonar University of Kerman, Kerman, Iran*
2. *Department of clinical sciences, Especial Center of domeseticated animal research, University of zabol, Iran*
3. *Veterinary- Meybod office, Yazd*
4. *Research Center for Hydatid Disease in Iran, Kerman University Medical Science, Kerman, Iran*

Email: f.ebrahimi1@yahoo.com

BACKGROUND: Different groups of nematodes *Thelazia* live in the eyes of mammals on the surface of the eye and in the nasolacrimal duct. There are several species of nematode *Thelazia* in the ruminants. The presence of the parasite on the surface of the eye and its mobility cause tears and inflammation of the surface of the eye.
OBJECTIVES: Nematode Thelazia is mostly detected in cows among ruminants and there are rare cases of infection in sheep. Such reports could be the basis for future research.
METHODS: From April to September 2017, 100 sheep referred to the veterinary clinic of ShahidBahonar University of Kerman, Iran, were examined for the presence of nematode Thelazia. The eyes were thoroughly inspected and signs of infection were also noted. Also, in the case of the presence of nematodes in the eyes, the worms were removed and transferred to alcohol.
RESULTS: Nematodes became transparent in the parasitology lab using lactofenol. Those with characteristic cuticular striationin the anterior part were detected as nematode Thelazia. Of the 100 sheep, only 2 rams brought from Mahan region had *Thelaziainfection*. The infected sheep had tearing symptom.
CONCLUSIONS: The presence of *Thelazia* in the eye of livestock causes inflammation of the surface of the eye, and the movement of the nematode on the eye surface causes tearing in the infected livestock. It is recommended that nematodes be collected from the surface of the eye, which is an appropriate method.
Keywords: *Thelazia*, Sheep, Diagnosis, Kerman

SEROPREVALENCE OF*NEOSPORACANINUM* AND *TOXOPLASMA GONDII* INFECTION IN GOATS IN KHUZESTAN PROVINCE

Gharekhani, J.[1,2*], Yakhchali, M.[1]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
2. *Department of Laboratory Sciences, Central Veterinary Laboratory, Iranian Veterinary Organization, Hamedan, Iran*

BACKGROUND: Small ruminants play an important role as intermediate hosts for *Neosporacaninum* and *Toxoplasma gondii*, parasites of great public health concern.
OBJECTIVES: The main goal of the current survey was aimed to evaluate *N. caninumand T. gondiiinfection* in goats in Khuzestan province, South West of Iran, using enzyme-linked immunosorbent assay (ELISA).
METHODS: In a cross-sectional study in 2016, 185 blood samples were collected in animals from different region of studied area. All of samples examined for presence of *N. caninum* and *T. gondii* antibodies using a commercial ELISA kit (ID-Vet Company, France).
RESULTS: Among 185 goats, 20 (10.8%) and 37 goats (20%) were seropositive for *N. caninumand T. gondii,* respectively. Mixed infection with *N. caninum* and *T. gondii* was 5.4% in goats. Seroprevalence rate of *N. caninum* was significantly higher in goats at <1-year-old (p=0.005). 25% and 50% of animals with history of abortion were seropositive for *N. caninum* and *T. gondii*, respectively (P<0.05). Also, no significant correlation was detected between *N. caninum* and *T. gondii* and mixed infection with gender.
CONCLUSIONS: This is the first report of *N. caninum* and *T. gondii* co-infection in Iranian goats which may partially be responsible for abortion and economic losses in the region.
Key words: *Neosporacaninum,Toxoplasma gondii*, Goats, ELISA, Khuzestan

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INFESTATION RATE OF NATIVE POULTRY WITH RED MITE (*DERMANYSSUSGALLINAE*) IN ZARRINSHAHR CITYFROM2017 TO 2018

Ghasemi, R.[1], Babayi, N.[2],Houshmandpou, P.[2], Khakzadihe, M.[3],BahariBabadi, A[4].

1. *DVM student, Department of Poultry Hygiene and Diseases, Veterinary faculty, Shahrekord University, Shahrekord, Iran*
2. *DVM, Islamic Azad University, Tabriz branch, Tabriz, Iran*
3. *Resident, Department of Poultry Hygiene and Diseases, Veterinary faculty, Shahrekord University, Shahrekord, Iran*
4. *Department of Entomology, Faculty of Agriculture, TarbiatModares University, Tehran, Iran*

BACKGROUND: In this study, the infection rate to *Dermanyssusgallinae* of native and semi-industrial poultry in Zarrin-Shahr city of Isfahan province was evaluated.
METHODS: This study was conducted from November 1396 to July 1397 by collecting samples from the city of Zarrin-Shahr. The total number of the samples was 100, of which 50 were chicken and 50 were rooster in different ages. For microscopic examination of isolated mites, 10% potassium digestion was used.
RESULTS: In this study, the rate of poultry contamination of this city was 60%, of which the most infected were poultry over 1 year old. There was no significant difference between the sexes of the birds in the level of infection by *Dermanyssusgallinae.*
CONCLUSION: The high rate of infection of birds to this mite reveals the importance of controlling and preventing, among native poultry in the city.
Keywords: *Dermanyssusgallinae*, native poultry, Zarrin-Shahr, Mite.

CO-INFECTION OF LEISHMANIOSIS AND TOXOPLASMOSIS IN HOUSE MICE

Jadidoleslami, A.[1*], Moghaddas, E.[2]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Ferdowsi university of Mashhad, Mashhad,*
2. *Department of Parasitology and Mycology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

Email: Iran.Eslami83@mail.um.ac.ir

BACKGROUND: House mice (*Musmusculus*) with a wide distribution in the world is one of the most common human symbiont animals. House mice can transmit pathogens also is a suitable reservoir for zoonotic diseases.
OBJECTIVES: The current study was aimed to found the prevalence of protozoan parasites among Musmusculus in Kerman City.
METHODS: A total number of 80 house mice were captured and euthanized in 2015. Liver, spleen, kidney and muscles samples have been stained and examined as pathologic and parasitology methods.
RESULTS: *Toxoplasma gondii* and Leishmaniaspp were found in 2 (2.5%) of 80 trapped mice.
CONCLUSION: The presence of *Toxoplasma gondii* may be an important source of infection for cats and a reservoir host for human toxoplasmosis in this area.zoonotic parasite in house mice with close life to human specially in cities illustrate the importance of surveillance of zoonotic and rodent borne diseases. Also, *Musmusculuscan* be a new reservoir host for human leishmaniasis in Kerman Province.
Keywords: *Leishmania*, *Toxoplasma*, House mice, Kerman, Iran

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GEOGRAPHICAL DISTRIBUTION OF FRESHWATER SNAILS IN THE WEST AND EAST OF LORESTAN PROVINCE

Jahangiri Nasr, F.[1*], Mirzaei, M.[1], RaziJalali, M.H.[2], Sharifi, H[3].

1. *Department of Parasitology, Faculty of Veterinary Medicine,ShahidBahonar University of Kerman, Kerman, Iran.*
2. *Department of Parasitology, Faculty of Veterinary Medicine, ShahidChamran University of Ahvaz, Ahvaz, Iran*
3. *Department of Epidemiology, Faculty of Public Health, Kerman University of Medical Sciences, Kerman, Iran*

Email: ersi.jahangiri@yahoo.com

BACKGROUND: Snails are present at different ecosystems that some of them are important in veterinary medicine and medicine as intermediate hosts of Digenean trematodes.
OBJECTIVES: This study was conducted to determine the geographical distribution of freshwater snails in western and eastern regions in different seasons of the year in Lorestan province.
METHODS: A total of 1760 samples of freshwater snails were collected using the multi-stage method (stratified, cluster and randomized) from 44 points in two geographical regions in each season and then identified based on their morphological characteristics using diagnostic keys.
RESULTS: The frequency of snails was as follow: Melanopsisdoriae(14.66%), *Theodoxusdoriae*(10.97%), Bithynia tentaculata(33.92%, the dominant species), *Physaacuta*(20.28%), *Lymnaeatruncatula*(20.17%). The geographic distribution of freshwater snails was recorded across two regions in 22 points per region for every season. In the western region, *Melanopsisdoriae* (29.32%), *Theodoxusdoriae* (21.93%), *Bithynia tentaculata*(38.07%), and Physaacutawere foundin all seasons (10.68%). In the eastern region, *Bithynia tentaculata*(29.77%), and *Physaacuta*(29.89%) were detected in all season, while Lymnaeatruncatula was found in the spring, summer and autumn periods (40.34%).
CONCLUSIONS: The results of this study revealed that the awareness of the climatic potential was the main requirement for prevention of parasitic diseases in humans and animals, regarding the diversity of freshwater snail species in that region and their role in the persistence of parasites life cycle.
Keywords: Distribution, Snail, Freshwater, Lorestan

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THE PREVALENCE OF *NEOSPORACANINUM* INFECTION IN DAIRY COWS IN LABAN COMPLEX IN QOM CITY USING ELISA METHOD

JavanShir, A.[1], Azizi, H.A.[*2], Karimi, S.[3], Salimi-Bejestani, M.R.[4], Bahari, A.[5]

1. *PhD student of Veterinary Parasitology, Faculty of Veterinary Medicine, Urmia University*
2. *Associated professor of Pathobiology group, Faculty of Veterinary Medicine, Share Kord University*
3. *MSc student of Veterinary Parasitology, Faculty of BualiSina University of Hamedan*
4. *Assistant professor of Pathobiology group, Faculty of Veterinary Medicine, Semnan University*
5. *Associated professor of Pathobiology group, Faculty of BualiSina University of Hamedan*

BACKGROUND: *Neosporacaninum* is a single-cellular intracellular parasite with a worldwide distribution that is one of the main causes of abortion in dairy cows and to a lesser extent in broiler cows. It also causes economic losses by reducing livestock production, such as reducing milk, weight and producing reproductive problems.The cow is among the intermediate hosts of the parasite. Transmission of parasite to cattle is through the ingestion of oocysts from contaminated water and food sources.
OBJECTIVES: The purpose of this study was to investigate the prevalence of Neosporacaninum infection in dairy cattle in Laban complex in Qom city, using ELISA method.
METHODS: The population of this study was 200 dairy cows without clinical symptoms with a healthy pregnancy or abortion history in 40 breeding units of Laban Complex, during the autumn and winter of 2014. Samples were obtained from caudal vein of dairy cows, sera were isolated to evaluate the infection with *Neosporacaninum* by ELISA method.
RESULTS: The serologic data were analyzed by Chi-square test using SPSS software. The results showed that out of a total of 200 samples, 182 were negative and 18 were positive. On this basis, the infection rate was 9%. T-test was used to compare the mean age in positive and negative groups. The results indicated that the mean age of the negative group was 40.27 months and the mean age of the positive animal was 44 months. Statistical analysis showed a significant correlation between infection and age based on the month (P = 0.025).
CONCLUSIONS: The environmental conditions and other factors such as temperature and humidity play a significant role in the life cycle of the parasite, so that the parasite lifecycle in warm and humid conditions may be severely affected. Therefore, the low prevalence of infection in the Laban complex of Qom city can be directly related to the hot and dry in Qom city.
Keywords: *Neosporacaninum*, ELISA, Dairy cattle

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PREVALENCE OF TOXOPLASMOSIS OF SHEEP AND CATTLE SLAUGHTERED IN BORUJERD COUNTY

Hajikolaiy, M.[1*], Kolivand, A.[2], Mossadegh, M.[3], Hosseini, A.[3],Kamali, A.[3], Fatehi, A.[3], Gholami, M.[3]

1. *Department of Clinical Sciences, Faculty of Veterinary Medicine, ShahidChamran University of Ahvaz, Ahwaz, Iran*
2. *Resident of Internal Medicine, Faculty of Veterinary Medicine, ShahidChamran University of Ahwaz, Ahwaz, Iran*
3. *Ph.D. veterinary sciences, Faculty of Veterinary Sciences, Islamic Azad University, Garmsar Branch, Garmsar-Iran*

BACKGROUND: Toxoplasmosis is a common disease between humans and livestock caused by *Toxoplasmagondii*. There is no comprehensive and valid statistics on the prevalence of this infection in livestock in Lorestan province.
OBJECTIVES: The aim of this study was to evaluate the seroprevalence of Toxoplasmosis in sheep and slaughtered cattle in Boroujerd city in 1396.
METHODS: A total of 386 blood samples, including 236 samples from sheep and 150 samples from slaughtered cattle, were collected from the slaughterhouse in Boroujerd. Serum was isolated in parasitology laboratory and its infection status was evaluated using ELISA method in terms of anti-*Toxoplasma* antibodies.
RESULTS: The seroprevalence of antibodies in sheep was 17.1% and in the bovine population it was 13.56%. There was a significant relationship between the age of the livestock under study and the level of contamination with toxoplasmosis (P = 0.002), so that the prevalence of infection was higher in livestock with higher age.
CONCLUSIONS: The results of this study showed that the prevalence of contamination in the livestock population is lower compared to the livestock of many studied regions in Iran. Of course, due to the bugs of serological tests such as ELISA, a realistic estimate of the prevalence of contamination is feasible.
Keywords: *Toxoplasma gondii*, Seroepidemiology, Sheep, Cattle, Boroujerd

PARASCARIS EQUORUM INFECTION IN EQUESTRIANCLUB HORSES OF HAMEDAN

Yaghoobi Aminloo, H. A[1]., Nourian, A.R[2*]., Rezvan, H[2]., Sadeghi Dehkordi, Z[2]

1. *M.S. student of parasitology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*

BACKGROUND: *Parascaris equorumis* a widespread ascarid of equids, especially in young animals. The parasite is the largest nematode of horse that resides as adult form in the small intestine of the host.
OBJECTIVES: Microscopic study of *Parascaris equorum* infection in fecal samples from horses of Hamedan equestrian clubs.
METHODS: Fresh fecal samples of 97 horses (43 males and 54 females) of various races from equestrian clubs between December 2016 and June 2017 were collected. Egg per gram (EPG) number of *parascaris equorumeggs* was estimated with Clayton Lane method using flotation in saturated salt solution.
RESULTS: No cestode egg and coccidian oocyst infection was detected in the tested fecal samples. Eggs of *parascaris equorum* were found in 18 samples with mean EPG of 31.6. No significant deference was between infection in females (20.37%) and males (16.27%). EPG was significantly higher in females (48.18) than males (5.5, $p< 0.05$).
CONCLUSION: Based on results of the current study and the fact that *parascaris equorum* infection usually occurs through ingestion of eggsfrequently by younger horses in closed places and stables, applying hygiene measures and quarantine program for newly arrived horses as well as performing regular anti-parasitic treatment seems necessary.
Key words: *Parascaris equorum*, horse, equestrian club, Hamedan

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ASSESSMENT OF *STRONGYLUS VULGARIS* INFECTION IN HORSES OF HAMEDAN

Yaghoobi Aminloo, H.A[1].,Nourian, A.[R2*]., Rezvan, H[2]., Sadeghi Dehkordi, Z[2]

1. *M.S. student of parasitology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*

BACKGROUND: *Strongylus vulgaris* is the most important pathogenic species of genus Strongylus. This nematode lives in equine colon and caecum, and its different life stages cause significant damage to the host.
OBJECTIVES: this study was performed aiming microscopic diagnosis and molecular exploring of *strongylus vulgaris* in feces samples taken from Hamedan horses.
METHODS: A total of 140 fresh fecal samples were collected from horses of equestrian clubs and native horses of Hamedanduring November 2016 – September 2017. Egg per gram of sample count (EPG), floating, fecal culture, isolating larvae using Baermannmethod and based on the number, shape and configuration of intestinal cells of the larve and finally molecular technique (PCR) were employed in order to assess the rate of strongylus vulgaris infection.
RESULTS: Strongylus eggs were found in 10 (8.26%) out of 121 fecal samples collected from equestrian clubs with mean EPG count of 62.2% and 3 (15.78) out of 19 samples collected from native horsed with mean EPG count of 24.2%. in addition, the infection rate were 0 and 10.56% for samples collected in cold/wet and warm/dry seasons, respectively. Furthermore, the infection rate was 53.85% and 46.15% in mares and stallions, respectively. All the cultured positive samples contained large strongylus. PCR confirmed the presence of *strongylus vulgaris* in two samples originated from equestrian clubs.
CONCLUSION: considering the presence of *strongylus vulgaris* in the region, it is worthy to prevent economic losses to equine industry by means of applying appropriate preventive and controlmeasures.
Key words: *Strongylus vulgaris*, parasite, horse, equestrian club, Hamedan

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EPIDEMIOLOGICAL STUDY OF CRYPTOSPORIDIOSIS IN NEWBORN CALVES IN LORESTAN PROVINCE

Nuri, M.[1*], Kolivand, A.[2], Mirshahi, S.[3],Afshar, M.[3],SeyyedAbadi, M.[3], Fatehi, A.[3], Borhani, F.[3], Hajinejad, A.[4]

1. *Department of Clinical Sciences, Faculty of Veterinary Medicine, ShahidChamran University of Ahvaz, Ahwaz, Iran*
2. *Resident of Internal Medicine, Faculty of Veterinary Medicine, ShahidChamran University of Ahwaz, Ahwaz, Iran*
3. *Ph.D. veterinary sciences, Faculty of Veterinary Sciences, Islamic Azad University, Garmsar Branch, Garmsar-Iran*
4. *Graduated from veterinary doctorate, Faculty of Veterinary Medicine, Islamic Azad University, Garmsar Branch, Garmsar-Iran*

BACKGROUND: *Cryptosporidium* protozoa is one of the causes of diarrhea syndrome especially calves and is one of the major health problems causing severe economic losses.

OBJECTIVES: The purpose of this study was to determine the prevalence of *Cryptosporidium* in calves with diarrhea in Lorestan province from November 1395 to November 1396.

METHODS: In this study, 423 stool samples from five areas of Lorestan province were collected from calves with diarrhea under two months of age belonging to 15 industrial dairy farms and diarrheal calves referred to private clinics. The samples were collected in formalin and after staining with modified Showing results for modified Ziehl–Neelsen method in the department of parasitology, Faculty of Medicine, Lorestan University of Medical Sciences, and the results were recorded. Data were analyzed by Chi-square test.

RESULTS: From 423 samples, 136 (32.15%) were positive for *Cryptosporidium* protozoa.The results showed that there was a significant difference between the prevalence of disease in different seasons ($p < 0.05$), the highest prevalence was in summer (42.23%) and the lowest was in the winter (27.16%). There was also a significant difference between the prevalence of disease in different age groups ($p < 0.05$), the highest was at 6-8 weeks of age (58.47%) and the lowest was at the age of one week (23.51%). There was no significant difference between the percentage of infection in different regions of the province.

CONCLUSIONS: The results of this study showed that the frequency of infection severity (+, ++, and +++) was 28.23, 31.54 and 34.78%, respectively. Also, the severity of diarrhea was directly related to the severity of infection. Since this parasite is capable of causing a lot of economic losses in herds and since sinceLorestan province is one of the important centers of this infection, therefore, more attention for the control of this infection should be paid by the organization of veterinary medicine and its affiliated institutions.

Keywords: Epidemiology, Lorestan, Cryptosporidiosis, Calves, Diarrhea

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INVESTIGATION OF THE SIMULTANEOUS SIMULTANEOUS PREVALENCE OF HYDATIDOSIS IN THE LIVER AND LUNG AND THE EFFECT OF TEMPERATURE AND HUMIDITY ON IT

MahdaviNekou, M.*[*1], Fathabadi, M.[2], Kefayat, M.[3]

1. *Young Researchers and Elite Club, Islamic Azad University, Karaj, Alborz, Iran.*
2. *DVM student of Islamic Azad University, Karaj, Alborz, Iran*
3. *Assistant Prof., Dept. of Basic Sciences, Islamic Azad University, Karaj, Alborz, Iran*

Email: m.mahdavi 5451@ gmail.com

BACKGROUND: Hydatidosis is one of the most important parasitic diseases that has global diffusion. The cause of this disease is the flatworm named *Echinococcusgranulosus*. This zoonotic malady is endemic in Iran and it causes a lot of economic losses and casualties.This disease has the highest prevalence in humidclimate. The main hosts of this parasite are carnivorous, especially canidaebut it can be seen in cow, sheep, goat, pig, camel and human. Its eggs are excreted in the stool fromthe host as if this egg is very resistant to freezing and chill. But in direct sunlight, the egg loses its ability to connect to the host cell in a few hours. Symptoms of this disease depending on the members involved are jaundice, hepatomegaly, dyspnea, hemoptysis, blurred vision, palpitation, epilepsy and bloody urine.

OBJECTIVES: The purpose of this study is determinationof the relationship between the incidence of Hydatidosis in the liver and lung in slaughtered sheep in the Qom industrial slaughterhouse in the years 1390 to 1394 and their connection with temperature and humidity as well as providing strategies for preventing and controlling disease.

METHODS: In this research 1521130 sheep were examined for liverand lung hydatidosis in the interval between 1390 and1394. The results are3.17,3.09,3.19, 3.54 in the liver and 2.29, 2.10, 2.31,3.01 in the lungin the seasons of spring, summer, autumn, winter, respectively.

CONCLUSIONS: It can be concluded from this statistical study that the prevalence pattern of this disease follows the highest morbidity in the winter and the lowest in the summer. Also, the difference between the disease in the liver and the lungs in the cold seasons is maximum and in the warm seasons is minimum which is completely consistent with the outbreak pattern.

Keywords: Hydatidosis, Sheep, Liver, Lung

A RETROSPECTIVE AND PROSPECTIVE STUDY ON THE PREVALENCE OF LIVER FLUKES INFECTIONS IN SLAUGHTERED SHEEP AND GOATS IN ABATTOIR OF TORGHABEH, KHORASAN RAZAVI, 2008-2017

Mohamadian, M.H.[1*], Borji, H.[2],Mohsenzadeh, M[3].

1. *Student, Faculty of Veterinary Medicine, Ferdowsi University of Mashad-Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, Ferdowsi University of Mashad-Iran*
3. *Department of Food Hygiene and Aquatic Animal, Faculty of Veterinary Medicine, Ferdowsi University of Mashad-Iran*

BACKGROUND: Food-borne trematode infections are endemic diseases caused by helminths in Iran that are responsible for great economic loss and getting public health at risk.

OBJECTIVES: Theaim of this study was to determine the prevalence of fasciolosis and dicrocoeliasis infections in slaughtered sheep and goats in Torghabeh, Khorasan Razavi province of Iran, and to determine relationship between age, sex and season with the infections.

METHODS: This study was conducted in two stages: 1- A retrospective study with a survey of the prevalence of the 10-year period (2007-2018). 2- A one-year cross-sectional study (1396), between age and sex with the trematode infections of sheep and goats using OpenEpifor determining these relationships.

RESULTS: This survey was implemented on 459,135 sheep and goats slaughtered at an abattoir in Torghabeh city, Khorasan Razavi Province, Iran for determining the prevalence of fascioliasis and dicrocoeliosis.Of 459135 sheep and goats slaughtered in Torghabe slaughterhouse, 14575 liver (3.17%) were infected with liver trematodes, of which 12350 liver (2.69%) were infected with dicrocoelium and 2225 liver (0.48%) with Fasciola. The high prevalence was found in winter season and there was a significant difference between different seasons, age and sex with infection ($P < 0.05$).

CONCLUSIONS: According to this study, it seems that Torghabeh, Khorasan Razavi is considered as an endemic region for Fasciola spp. and D. dendriticum infections, where D. dendriticum is the most widespread liver fluke found in sheep and goats.

Keywords: Trematode, Dicrocoelium, Fasciola, Prevalence, Sheep, Goat.

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PREVALENCE OF *LINGUATULA-SERRATA* INFECTION IN GOATS SLAUGHTERED IN MASHHAD ABATTOIR

BorosGhoncheh, J.[1], Moshaverinia, A.[2*], Rajabian, H.[1]

1. *MSc in Veterinary Parasitology*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran.*

Email : moshaverinia@um.ac.ir

BACKGROUND: *Linguatulaserrata* is an important zoonotic parasite which causes visceral and nasopharyngeal linguatulosis in human. Dog and other carnivorous mammals act as definitive hosts while herbivorous mammals are intermediate hosts of *L. serrata*.
OBJECTIVES: The aim of this study was to investigate the prevalence of infection with L. serratanymphs in goats slaughtered in Mashhad abattoir (Northeastern Iran).
METHODS: For this purpose, from June 2014 to April 2015, 384 slaughtered goats were randomly selected and their livers, lungs and mesenteric lymph nodes were sampled. These samples were cut to small pieces and immerse in normal saline (0.9% NaCl) for 6 h to allow nymphs exit the infected tissues. Negative samples in this stage were digested by acid-pepsin solution.
RESULTS: Out of the 384 goats sampled, 172 (44.8%) were found to be infected with nymphal stage of *L. serrata.* Among examined organs, the highest infection rate was observed in mesenteric lymph nodes (32.07%) followed by lung (14.01%) and liver (8.85%). Infection rate among age groups showed significant difference and goats within the age group of >3 yrs. were the most infected. The females goats were more infected than males and this difference was statistically significant (P<0.05).
CONCLUSIONS: The results of this study showed that infection with nymphal stage of L. serrata in goats is high and regarding to importance of this parasite in public health, control measures should be taken to reduce the prevalence of this parasite in this region.
Keywords: *Linguatulaserrata*, Goat, Prevalence, Mashhad.

PREVALENCE OF BLOOD PARASITES IN SHEEP REFERRED TO TORBAT-E- JAM CLINICS FOR SYMPTOMS OF JAUNDICE

Mirhezari, M.[1],Yoosefi, M.R.[2], Naser,A.[3*], Hossein zadeh marzakani,J.[4]

1. *Doctorate student in major of veterinary in Azad University, Babol Branch)*
2. *Parasitology group, Azad University Babol Branch*
3. *Student doctorate specialized in parasitology, Islamic Azad University, science and research branch, Tehran.*
4. *Member of the young researchers' club, Islamic Azad University, Babol Branch)*

Email: Dr.alinesr@yahoo.com

BACKGROUND: There are many ticksthat can transmit important piroplasmaspeciesto domestic and wild animals. Babesia and theileria are among these parasites that are released globally. These parasites are transmitted by hard ticks of Ixodidae family. This disease can cause economic losses in cattle.
METHODS: randomly, blood sample of 500 sheep are taken. 350 sheep were female and the rest were male. Blood samples were evaluated after cultivation and chromatography.
RESULTS: According to the result,of 500 sheep, 8.6% were affected by theilieria, while 19.2 by babesia and 4.4% by anaplasmose.
CONCLUSION: Our experiments showed that parasites existed in forms of clinical and carriers. As husbandry is prevailed in this city, it is necessary that those who are in charge of this city health, pay attention to this issue with more sensitivity.
Keywords: Piroplasma, *Babesia*, *Theileria*, *Anaplasma*, Torbat Jam

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REVIEWING THE PREVALENCE OF CYSTIC ECHINOCOCCOSI-SAND FASCIOLOSIS IN SHEEP AND GOATS SLAUGHTERED IN GACH-SARAN SLAUGHTERHOUSE

Sayyeda U. Al-Banin Ghasemian,[1].,Mokhtari, R.[2],Naser,A[3*]., Ghasemzadeh, F.[4]

1. *Young and Elite Researchers Club, Behbahan Unit, Islamic Azad University, Behbahan, Iran.*
2. *Veterinary Department, Behbahan Unit, Islamic Azad University, Behbahan, Iran.*
3. *Ph.D. student of veterinary parasitology, Tehran University of Science and Research, Iran.*
4. *M.A student of Veterinary Parasitology, Tehran University of Science, Iran.*

Email: dr.alinaser@yahoo.com

BACKGROUND: Slaughterhouse is one of the centers for the tracking of livestock diseases. Careful attention should be paid to the recording and elimination of diseases such as echinococcal and Fasciolosis. If these diseases not identified and removed in slaughterhouses and are consumed by people in the society, they will create massive health problems for the country.
OBJECTIVE: The aim of this study is to determine the prevalence of hydatid cysts and Fasciolosis in Gachsaran's livestock.
METHODS: All liver and lungs of sheep and goats that were slaughtered in Gachsaran city in summer 2012 examined by microscope and touching. Using SPSS 19 and chi-square statistical software, the gathered data were analyzed and a significant level of 0.05 was considered.
RESULTS: totally, 3802 sheep and 7873 goats were slaughtered during the summer and among them 11753 livers and lungs were tested. After test, 1531 were captured and prevented from consumption. The results show that sheep and goat's livers were affected by both parasitic infectionsincludingFasciola, spp. and hydatid cyst (*Fasciola* spp.:9.99%, Hydatid cyst: 20.6%), (*Fasciola* 9.7%, Hydatid cyst: 60.7%); and their lungs were also affected by hydatid cyst (cyst: 4.96% and 4.76%).
CONCLUSION: Given the level of contamination of the above parasites in ruminants is not reduced, it is necessary to maintain the principle of livestock husbandry, especially in nomadic areas of the country, promoting the cultural level of animal husbandry and operators and optimizing the veterinary services, introducing new methods of prevention, inspecting the slaughterhouse health and reducing the number of snails. Therefore, it seems necessary to supervise and control the sanitary status of the related health organizations.
Keywords: Hydatid cyst, Fasciolosis,Gachsaran, Slaughterhouse

GASTROINTESTINAL PARASITE FAUNA OF *SCARDINIUSERYTH-ROPHTHALMUS* (RUDD) IN ANZALI WETLAND

Nikgoo, O.[1*], Pazouki, J.[2], Abbasi, K.[3], Shirali, S.[4]

1. *Department of Veterinary Parasitology, Faculty of Veterinary Medicine, Azad University, Science and Research Branch, Tehran, Iran*
2. *Department of Aquatic Biology and Biotechnology, Faculty of Bioscience and Biotechnology, ShahidBeheshti University, Tehran, Iran*
3. *Department of Ecology, National Inland Water Aquaculture Institute, Anzali, Iran*
4. *Department of Biotechnology, Faculty of Basic Sciences, Ahvaz Azad University, Ahvaz, Iran*

BACKGROUND: Caspian Sea is the largest enclosed inland body of water, and one of the most invaluable fishery resources of Iran and studying its parasitic fauna along other efforts is an important action which helps on fisheries management and protecting resources.
OBJECTIVES: The aim of this study is to identify the gastrointestinal parasites of *Scardiniuserythrophthalus* a freshwater fish of Anzali wetland in southwest of Caspian Sea.
METHODS: Here 263 fish were collected from Anzali wetland from January 2015 to March 2016 and transferred to laboratory. Following biometry and age determination, fish were dissected and their digestive tracts were examined by the stereo microscope and light microscope. Separated nematodes were identified to genus or species level.
RESULTS: According to this study Rudd hosted *Spiroxyscontortus, Cosmocephalusobvelatus, Goeziasp., Agamospirurasp., Raphidascarisacus, Camallanuslacustris, Hysterothylaciumfabri, Contracaecumsqualii, Molnariaintestinalis, paraquimperiatenerrima* and *Rhabdochona denudate*, all belonging to the nematodes and found in 92% of specimens. The highest and lowest rate of infection were found in summer and winter respectively.
CONCLUSIONS: Hereby S. *erythrophthalmus* was introduced as a new host for *Spiroxyscontortus, Cosmocephalusobvelatus, Goeziasp., Camallanuslacustris, Contracaecumsquali*, and *Paraquimperiatenerrima*. All of which were reported for the first time from Iran plus Agamospirurasp., Hysterothylaciumfabri, Molnariaintestinalis. Abundance patterns of some species had significant relation with season and host age, probably due to the host diet and behavior. More studies on newly found parasites and their effects on the fishery resources of the region are required.
Keywords: Fish, Parasite, Nematode, *Scardiniuserythrophthalmus*, Rudd

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AN EPIDEMIOLOGIC SURVEY OF TOXOPLASMOSIS IN SLAUGHTERED CATTLE AND SHEEP AND GOAT BY ELISA IN LORESTANPROVINCE

Goodarzi, R,[1]. Hashemi, S,[1].Nosrati Akhtar,[2]., Z. Beiranvand, M[2].

1. *Islamic Azad University Bruojerd branch*
2. *Veterinary Administration Office Lorestan.*

Email: Z97nosrati@gmail.com

BACKGROUND: Toxoplasmosis is one of the common diseases among livestock animals and humans with the global spread caused by *Toxoplasma gondii*. Regarding the economic losses of the disease, it is also important for human health. The geographical conditions, the climate and the availability of conditions for the life cycle of this parasite in the nature of Lorestan, determine the status of this disease in the province of Lorestan.

OBJECTIVES: In this study, the prevalence and seroprevalence of toxoplasmosis in slaughtered livestock in Lorestan slaughterhouses was carried out from January 2016 to June 2017 based on the characteristics and variables of the species, sex of animals and geographical location.

METHODS: To determine the prevalence of toxoplasmosis in livestock, in a cross-sectional study, 768 blood samples were collected from 216 from cattle, 278 from sheep and 274 from goats. In the parasitology center, the serum samples resolted from blood samples were isolated and their titer was determined by the ELISA method using anti-toxoplas IgG antibody, so that 19.93% positive and 17% were negative were In this study, IgG prevalence of infestation in cattle, sheep and goats was 17/59, 22/66 and 18/97%, respectively.

RESULTS: The statistical analysis showed that there was a significant difference between the species and the genus of livestock, so that the least infestation in the cattle and the highest infection in the sheep were observed. Also, the amount of contamination in the female was more than male and there is a significant difference in geographical area. In the sense that in the northern region (norabad, alshtar and boroujerd) pollution was due to the coldness and high altitude of the location, but in the southern region (Poldokhtar, Chegeni and Kuhdasht) pollution was($p>0/05$) due to the warm and humidity of the place, which has a lower altitude the outbreak was higher.

CONCLUSIONS: Due to the high prevalence of toxoplasmosis in sheep and goats and the importance of meat consumption as one of the most important food sources, it is possible to transfer this parasite to humans through meat and sheep and goats more than cows, Therefore, it is necessary to provide education, information and health care for public health care, community health and disease prevention.

Keywords: *Toxoplasma gondii*, Elisa, Seroepidemiology, Antibody, Lorestan

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INVESTIGATION ON INFECTION OF ECTOPARASITES OF INDIGENOUS-POULTRIES IN RASHT COUNTY IN YEAR 2017

Raoof, P.[1*], Garedaghi, Y. [2]

1. *Graduated from the Faculty of Veterinary Medicine, Islamic Azad University of Tabriz, Tabriz, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, Islamic Azad University of Tabriz, Tabriz, Iran*

BACKGROUND: One of the major problems in indigenous poultry breeding, which also causes damage, is the issue of infection by *ectoparasites*. The reason for this is the low level of health in keeping method, the high population of villagers in Iran, and the traditional way of keeping and breeding poultry. Therefore, identification of pathogens in this category of poultry is important and contributes to the fight against and the prevention of their diseases.

OBJECTIVES: Ectoparasites that are found in indigenous poultry come from different phylum such as fleas, lice, ticks, mites, mange, etc. that by causing harassment, irritation, itching, anemia and restlessness, impose their effects on reducing the conversion factor, reducing weight, reducing meat and egg production to poultry. This research was carried out due to the lack of a history of examination and identification of ectoparasites species of indigenous poultry in the studied area in relation to indigenous poultry in Rasht County in 2017.

METHODS: In a 12-month period, 115 pieces of indigenous poultry in Rasht County completely randomly were studied in terms of infection by ectoparasites. First, the birds were slaughtered and their carcasses were put into plastic bags containing ether for 2 hours. Then, the carcass of each bird was dissected separately to be examined in terms of parasitology. So that, the entire surface of the body, skin, and feathers were completely examined with magnifying glass.The samples were transferred into plastic containers containing 70% alcohol. In order to identify the parasites, slide was prepared from each sample separately and parasites species were detected using optical microscope and valid diagnostic keys (Yamaguti and Walker).

RESULTS: Out of total 115 birds studied, 62 birds (53.91%) were infected, and 53 birds (46.09%) were free of infection. Among infected cases, 29 cases were *Menacanthusstramineus* lice (46.77%), 19 cases were *Menopongallinae* (30.64%), 10 cases were *Goniodesdissimilis* (16.12%), and 4 cases were *Hyalomma* mites (6.45%).

CONCLUSIONS: Ectoparasites cause damage to the bird's wings and feathers, and by irritation and causing skin lesions, reduce the nutritional function in adult poultry and adversely affect the growth of chickens.Indigenous poultry breeding in Iran is done traditionally and often in open or closed systems and away from suitable health conditions, and therefore the level of infection of the small herds of indigenous poultry by parasites, especially ectoparasites, is high. Hence, as a general result, it can be concluded that indigenous poultry in the region of Rasht County are infected with lice and ticks, which requires necessary strategies to control this infection.

Keywords: Ectoparasites, Indigenous poultry, Rasht County. Year 2017

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INVESTIGATION OF COCCIDIASIS INFECTION IN BROILER POULTRY FARMS AROUND THE RASHT COUNTY

Raoof, P[1*], Hashemzadehfarhang, H. [2]

1. Graduated from the Faculty of Veterinary Medicine, Islamic Azad University of Tabriz, Tabriz, Iran.
2. Department of Parasitology, Faculty of Veterinary Medicine, Islamic Azad University of Tabriz, Tabriz, Iran

Email: dr.raoof89@gmail.com

BACKGROUND: *Coccidiasis* is one of the most common protozoan parasitic infections inside the mucosal cells of the intestine of poultries.
OBJECTIVES: A survey on the infection of *Coccidiasis* in broiler chicken farms around the Rasht County was carried out in 2016 for a number of 500 samples.
METHODS: 500 stool samples from broiler chickens, all of which were at the final stage of breeding, were randomly collected and tested in four stages from the north, south, east and west of Rasht County by direct observation with the physiologic serum and Lugol (separately to observe the oocyst of *Eimeria*) and then were tested and approved through the saturated sugar water (about 454 grams of sugar per 355 milliliters of water, and about 6 milliliters of formalin to 454 grams of sugar for preventing fungal infections.
RESULTS: The results and the severity of infection were expressed as follows: 1+ (the average number of oocysts in 20 microscopic fields of view with a magnitude of 1000 between 1 to 5 numbers) and 2+ (the average number of oocysts in 20 microscopic fields of view with a magnitude of 1000 between 6 to 20 numbers) and 3+ (the average number of oocysts in 20 microscopic fields of view with a magnitude of 1000 for more than 20 numbers).From the 125 samples examined in the first stage (north of Rasht), 87 samples (69.6%) were free from oocysts of *Eimeria* infection, and 38 samples (30.4%) were infected. Out of these 38 samples, 22 stool samples had an infection with the severity of + 1 (17.6%), and 16 stool samples had an infection of the severity of +2 (12.8%). Of 125 samples examined in the second stage (south of Rasht), 82 samples (65.6%) were free from oocysts of Eimeria infection, and 43 samples (34.4%) were infected. Out of these 43 samples, 24 stool samples had an infection with the severity of + 1 (19.2%), and a number of 19 stool samples had an infection with severity of +2 (15.2%). Of 125 samples examined in the third stage (east of Rasht), 102 samples (81.6%) were free from oocysts of *Eimeria* infection, and 23 samples (18.4%) were infected. Out of these 23 samples, 10 stool samples had an infection with the severity of + 1 (8%), and 13 stool samples had an infection of the severity of +2 (10.4%). Of 125 samples examined in the fourth stage (west of Rasht), 96 samples (76.6%) were free from oocysts of *Eimeria* infection, and 29 samples (23.2%) were infected. Out of these 29 samples, 23 stool samples had an infection with the severity of + 1 (18.4%), and 6 stool samples had an infection of the severity of +2 (4.8%). A number of 133 samples (26.6%) were positive in 500 samples examined, and oocyst of the *Eimeria* parasitica were observed.
CONCLUSIONS: The results of this study showed that the infection rate was 26.6%. In the fight against *coccidia*, reduction of humidity of the environment, good management, use of coccidio acetate, disinfection of the environment, non-contamination of water and seeds with feces and stools of poultries.
Keywords: Infection, Coccidiasis, Broiler Poultry Farms, Rasht County, Year 2016

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THE PREVALENCE OF FLEA INFESTATION IN INDUSTRIAL POULTRY FLOCKS OF SAVADKOOH CITY (MAZANDARAN PROVINCE)

Vahedi Nouri, N.[1], Razavi, M.[2], Salehi, A.[3*]

1. *Agriculture & Natural Resources Research & Education Center of Mazandaran, AREEO, Mazandaran, I.R. Iran*
2. *Student of Veterinary Medicine, Babol Islamic Azad University, Iran.*
3. *Student of Veterinary Medicine, Babol Islamic Azad University, Iran.*

Email: Alireza.salehi74@yahoo.com

BACKGROUND: *Echidnophagagallinacea* (sticktight flea)has been found worldwide and served as an important flea of poultry. The flea is the cause of severe nuisance, irritation and allergic reactions in both animals and humans. Heavy flea infestation can cause severe anemia or even death in birds and sticktight flea are known vectors of deadly diseases such as the plague and murine typhus. They are also known to be intermediate hosts of dog tapeworms.
OBJECTIVES: This study was carried out to determine the prevalence of this external parasite in industrial farms in the Savadkoohcity.
METHODS:In the present study, 45 industrial poultry units were examined. After collecting samples, the laboratory confirmed the diagnosis.
RESULTS: Results of the survey the samples in the laboratory have shown that 37% of the farms in the study were infected with *Echidnophagagallinacea*.
CONCLUSION: According to the results, and considering the importance of this external parasite in the transmission of pathogens, therefore a relatively highcontamination can be a serious risk in commercial chicken flocks of Savadkooh city in Mazandaran province.
Keywords: Flea infestation, poultry, Savadkooh

A REVIEW ON *CYTAUXZOONFELIS* INFECTION AND CYTAUXZOONOSIS IN CATS IN IRAN AND WORLDWIDE

Rcoky, A.[1*], BoojarZadeh, H.[2], Kalhor, S.[2]

1. *Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Lorestan, Lorestan, Iran*
2. *Student of Veterinary Medicine, Faculty of Veterinary Medicine, University of Lorestan, Lorestan, Iran*

BACKGROUND: Cytuaxzoonosis is an emerging parasitic disease of domestic cats and wild felids which is caused by a protozoan belonging to the *Cytauxzoon* genus. *Cytauxzoonfelis*, the agent of cytauxzoonosis of major concern, belongs to the phylum Apicomplexa, class Sporozoasida, order Piroplasmorida, and family Theileriidae. Historically the parasite causes a fatal disease in domestic cats while wild felids especially bobcats experience a short course of non-life-threatening illness and they serve as reservoirs of the protozoa. Although the parasite has been considered limited to North America, in recent years cases of cytauxzoonosis and *Cytauxzoonfelis* infection have been reported from other geographical regions including Iran.
OBJECTIVES: This article, reviews current understanding regarding *Cytauxzoonfelis* and cytauxzoonosis in felids and covers reports from Iran and other parts of the world as well as disease and infection cases encountered by the authors.
RESULTS: Although scarce reports are available regarding Cytauxzoonfelis infection and cytauxzoonosis in Iranian felids, considering wide geographical range of current reports (Mashad, Tehran and Khorram Abad) it seems *Cytauxzoonfelis* as a less known parasitic infection is present among domestic cats and wild felids in Iran and it is frequently responsible for death of infected animal.
CONCLUSIONS: Regarding severity of the disease in domestic cats and geographical distribution of the parasite, informing veterinarians, pet owners and public is a necessity.
Keywords: *Cytauxzoonfelis*, cytauxzoonosis, domestic cats

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FREQUENCY AND MOLECULAR IDENTIFICATION OF *NOSEMA* SPECIES IN APIARIES OF MAZANDARAN PROVINCE, IRAN

Shirzadi, A.[1], Razmi, Gh.R.[2*]

1. *Graduated from Faculty of Veterinary Medicine(DVM), Ferdowsi University of Mashhad, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran*

BACKGROUND: Nosemosis is one of the most prevalent Honey Bee's diseases that is caused by *Nosemaapis* and *Nosemacerenea*. The common symptoms of disease are diarrhea, reduced longevity, depopulation, decreased production and death in bee colonies.
OBJECTIVES: In this study, the prevalence of *Nosema* spp. infection and species identification have been studiedin apiary of Mazandaran province by molecular and microscopic assays.
METHODS: Samples were collected from 32 apiaries in Mazandaran and transferred to Parasitology laboratory. From each apiary, 10 hives have been randomly selected and from each hive 20 to 30 bees have been collected. For detecting *Nosema* contamination, the *Nosema* spores have been microscopically detected. Then the abdominal content of honey bees from each apiary have been pooled with physiologic saline and their DNAs extracted by feces DNA extraction kits. The DNA products of each sample were examined for identification of *N. cerenea* and *N. apis using* multiplex PCR assay. Also 5 PCR's products of samples with high DNA concentration have been sent to South Korea for Sequencing.
RESULTS: In this study the microscopic result showed that 79.1% of samples were infected with *Nosema*spp while the frequency of *Nosema*spp infection was 84.3% by molecular method. In this study, a fair agreement was obtained between microscopic and molecular methods. Blast analysis of sequenced samples were confirmed the *N. ceranae* infection.
CONCLUSIONS: Based on the obtained results prevalence of *N. ceranae* infection was high in apiaries of Mazandaran province.
Keywords: *Nosema*, Honey Bee, PCR, Mazandaran, *Nosemaceranea*

THE EFFECT OF GENDER ON PREVALENCE OF *HEPATOZOONCANIS* INFECTION IN DOGS IN TEHRAN

Soltani, R.[1*], Dalimi, A.[2]

1. *Faculty of Food Industry and Agriculture, Department of Microbiology, Standard Research Institute (SRI), Karaj, Iran*
2. *Department of Parasitology and Entomology, Faculty of Medical Sciences, TarbiatModares University, Tehran, Iran*

BACKGROUND: Hepatozoonosis is a protozoon tick-borne disease that caused by several species of *Hepatozoon*. This genus is classified in the phylum Apicomplexa, sub order Adeleorina and family hepatozoidae More than 300 species of Hepatozoon have been so far identified that 46 species of them are pathogenic for mammals
OBJECTIVES: To investigate the possible effects of gender on the contamination of dogs with such species of parasites, which have not been investigated in Tehran.
METHODS: In this study, 145 blood samples were collected from the cephalic vein of dogs in Tehran, which included 55 blood samples from male dogs and 90 blood samples belonging to female dogs. In order to detect the *Hepatozooncanis*, PCR-specific primers are used to amplify a single 897 bp fragment of the 18srRNA gene of the *Hepatozoon* species.
RESULTS: According to PCR results, 17 male dogs from 55 dogs and 15 female dogs from 90 dogs were contaminated with *Hepatozooncanis*. Statistical analysis showed that the prevalence of *Hepatozooncanis* in male dogs was 30.9% and in female dogs was 16.7%. However, the statistical findings of the data did not show significant difference at the significance level of 0.05 ($P < 0.05$). Male dogs were more infected with the parasite than female dogs.
CONCLUSIONS: Although the prevalence of contamination in male dogs (30.9%) was higher in female dogs (16.7%), gender differences were not significant in this study ($P < 0.05$). This result is similar to the survey by Aktas et al. And Gomez et al. (2010) the study showed that the dogs did not affect the possibility of contamination with *Hepatozooncanis*.
Keywords: *Hepatozooncanis*, dog, PCR, Tehran

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INVESTIGATION OF *HEPATOZOONCANISINFECTION* IN DOGS OF TEHRAN, IRAN USING PCR METHOD

Soltani, R.[1],Dalimi, A.H.[2*]

1. *Faculty of Food Industry and Agriculture, Department of Microbiology, Standard Research Institute (SRI), Karaj, Iran*
2. *Department of Parasitology and Entomology, Faculty of Medical Sciences, TarbiatModares University, Tehran, Iran*

Email: R_Soltani@Standard.ac.ir

BACKGROUND: Hepatozoonosis is a protozoal disease that infects a wide range of domestic, wild, bird, reptile and amphibian carnivores. This parasite is transmitted by the tick, the main carrier of *Hepatozooncanisis* the brown goat dog (RipiCephalussanguinous).
OBJECTIVES: The aim of this study was to determine the prevalence of *Hepatozooncanis* in relation to dog hepatozoonosis, which has not been investigated in Tehran by any method.
METHODS: In this research, 145 dogs in the city of Tehran, including 42 domestic dogs, 28 shelter dogs and 75 stray dogs, were collected in 55 male dogs and 90 female dogs. In order to detect the *Hepatozooncanis*, PCR-specific primers were used to amplify a single 897 bp fragment from the 18srRNA gene of the *Hepatozoon*spp.
RESULTS: Among 145 studied dogs, 32 dogs were infected Hepatozooncanis.The result of this study revealed that *Hepatozooncanis*infection is common in dogs in Tehran.
CONCLUSIONS: 22.26% of the dogs in the city of Tehran were infected with *Hepatozooncanis*. Contamination in older dogs (26.3%) was higher than young dogs (19.3%), but the results of the statistical analysis did not show a significant difference between them ($P < 0.05$). Also, although the prevalence of infection in male dogs (30.9%) was higher than female dogs (16.7%), gender differences were not significant in this study ($P < 0.05$). In this research, stray dogs showed a higher prevalence contamination (32%) compared to domestic dogs (9.5%) and shelter dogs (14.3%), which was statistically significant at a significant level of 0.05% , difference significance was found between the findings ($P < 0.05$).
Key words: *Hepatozooncanis*, dog, PCR, Tehran

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MOLECULAR STUDY OF *NEOSPORA CANINUM* PREVALENCE IN BOVINE ABORTED FETUSES IN MAZANDARAN PROVINCE

Hosseininejad Z.[1,2*], Sarvi Sh.[1], Daryani A.[1], Salehi B[1,2], Amoueia A[1,2], Hosseini S.A.[1,2], Dodangeh S[1,2], Mizani A.[1], Nayeri Chegeni T.[1,2]

1. *Toxoplasmosis Research Center, Mazandaran University of Medical Sciences, Sari, Iran*
2. *Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran*

Email: hoseini125@yahoo.com

Background: *Neospora caninum* is a protozoan from apicomplexa phylum, which is one of the main causes of abortion of bovine fetus throughout the world. Several studies have been carried out on the prevalence of *Neospora caninum* in the Iranian livestock, which poses neosporosis as an important economic and health problem in the livestock industry. Molecular survey of this infection in aborted fetuses rarely has been done in the country.
Objectives: The present study was conducted to determine the prevalence of *Neospora caninum* parasite in brain specimens of bovine aborted fetuses in Mazandaran province.
Methods: Aborted fetuses of 78 cattle were randomly collected in different stages of pregnancy from different regions of Mazandaran province. Extraction of DNA from the brain of aborted fetuses was done. *Neospora caninum* DNA was detected using the nested-PCR method using NC-5 gene of the parasite.
Results: The 227 bp of *Neospora caninum* DNA was observed and confirmed in 16 samples of 78 fetuses (20.5%).
Conclusion: Our study indicated that infection of *Neospora caninum* could be responsible for bovine abortion and ultimately economic losses in the livestock industry in Mazandaran province. Therefore, further research with higher sample sizes and design of control strategies for improving management of cattle flock seems necessary.
Keywords: *Neospora caninum*, aborted fetuses, cattle, Mazandaran

PILOT STUDY OF INTESTINAL AND HEMOPARASITES OF REFERRED OSTRICHES TO SEMNAN ABATTOIR, IRAN

Khodadi, M.[1*], Rassouli, M.[1,2], Moshtaghi, A.[1]

1. *Faculty of Veterinary Medicine, Semnan University, Semnan, Iran*
2. *Pathobiology Department, Shahmirzad School of Veterinary Medicine, Semnan University, Semnan, Iran*

Email: m.khodadi33@gmail.com

BACKGROUND: Ostrich (*Struthio camelus*, Struthioniformes) is one of the most useful birds. It has variety of products such as egg, low fat and cholesterol meat, anti-inflammatory oil, skin, leather and etc. Parasitic diseases can effect on these products.
OBJECTIVES: The aim of this study was to design a pilot study for referred ostriches to Semnan abattoir and survey on their parasitic infections for further researches.
METHODS: 12 fecal samples were directly collected from ostriches' intestines and 24 blood films were taken in Semnan abattoir. Samples were transferred to parasitology laboratory. Blood films were stained by Giemsa, direct smears of fecal samples were observed then 2% Potassium dichromate were added. The eggs and oocysts of positive fecal samples were counted by Mac-Master technique. Another stool smear was taken and stained by Zeil-Nelson for *Cryptosporidium* detection.
RESULTS: 7 out of 12 (58.3%) were positive for *Eimeria* spp., 11 out of 12 (91.7%) for *Cryptosporidium*, 4 out of 24 (16.7%) for *Haemoproteus*, 5 out of 24 (20.8%) for *Leucocytozoon* and 2 out of 24 (8.3%) for *Plasmodium* infection.
CONCLUSIONS: According to the study, *Cryptosporidium* infection was dominant. Species diagnosis must be done to understand whether is zoonotic or not. Coccidiosis can effect on production reduction most of the times and it needs more researches for pathogenicity and importance of hemoparasites of ostriches.
Keywords: Ostrich, Intestinal parasite, hemoparasite, Iran

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INFESTATION OF DOMESTIC PIGEONS TO ECTOPARASITES IN RASHT CITY

Houshmand, E.[1*], Asadpour L.[2] ,Nikpay, A.[3]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Rasht Branch, Islamic Azad University, Gilan, Iran*
2. *Department of Microbiology, Faculty of Basic Sciences, Rasht Branch, Islamic Azad University, Gilan, Iran*
3. *Department of Pathobiology, Faculty of Veterinary Medicine, Amol University of Modern Technology, Mazandaran, Iran*

BACKGROUND: Infestation with Ectoparasites is always one of the problems of poultry farming, especially in the traditional way. On the other hand, the infection in wild and free birds can lead to a potential risk of infestation of industrial poultry, especially in breeding flocks and laying hens.
OBJECTIVES: The aim of this study is isolation and identification of Ectoparasites of domestic pigeons in Rasht city.
METHODS: From domestic poultry sales centers in different parts of Rasht, a total of 93 pigeons were transferred to the parasitological laboratory for sampling. Following euthanasia, the Ectoparasites were isolated and stored in 70% alcohol containing 5% glycerol and, after preparation, were identified with diagnostic keys.
RESULTS: 76.3% of the samples were infected with at least one of the Ectoparasites. The parasites were identificated including: *Pseudolynchia canariensis* (57%), *Argas reflexus* (15%), *Dermanyssus gallinae* (26.9%), *Megninia cubitalis* (68.8%), *Menopon gallinae* (23.6%), *Menacanthus stramineus* (39.8%), and *Columbicola columbae* (64.5%). The most infestation was with *Megninia cubitalis*, which was isolated from 64 samples. The lowest infestation was with *Argas reflexus,* which is probably due to the presence of this parasite in
the nests' gaps and vents, during the day.
CONCLUSIONS: Worldwide, infection with Megninia and Dermanyssus has been reported as a health problem with high economic losses for the poultry industry. Due to the high infection of the samples examined with Megninia and other Ectoparasites, it is necessary to give pigeon breeders the essential training about the destruction of E toparasites.
Key words: Ectoparasite, Domestic Pigeon, Rasht, Iran

INVESTIGATING WORMINFESTATION OF SMALL RUMINANTS IN AMOL CITY

Vahedi Nouri, N.[1], Razavi, M.[2], Salehi, A.[3*], Behzadi, A.[3], Nikbakht, M.[4]

1. *Agriculture & Natural Resources Research & Education Center Of Mazandaran, AREEO, Mazandaran, I.R. Iran*
2. *Student of Veterinary Medicine, Babol Islamic Azad University, Iran*
3. *Student of Veterinary Medicine, Babol Islamic Azad University, Iran*
4. *Bachelor of Veterinary laboratory science, Babol Islamic Azad University, Iran*

Email: alireza.salehi74@yahoo.com

BACKGROUND: One of the important complications of parasitic infections in small ruminants is their adverse effects on animal production and economic losses. On the other hand, Climate and climatic conditions, livestock feeding, vegetation, etc ... Among the factors, is effective on parasitic infections in each region.
OBJECTIVES: Regarding the importance of parasitic infections (worms) in northern Iran, the aim of this study was to identify common parasites in the gastrointestinal tract of sheep in Amol city.
METHODS: For this purpose, sampling was carried out in two seasons (winter 1396 and spring of 1397) in four areas around Amol (north, south, east and west). In each region, 15 stool specimens were randomly selected from each flock. At first, the samples were examined by Willis method and then cultured for detection of species using Bremen method.
RESULTS: The results show that the parasitic infection rate of the sheep was 100% in both seasons (winter and spring). According to the study of eggs of parasites and culture of stool specimens, the genus Haemonchussp, Oesophagostomumsp, Gongylonemasp, Chabertiasp, Trichostrongylussp, Trichurissp, Nematodirussp, Ostertagiasp, Toxocarasp, Dicrocoeliumsp, Monieziasp, as well as Dictyocaulussp and Protostrongylussp were identified.
CONCLUSIONS: The results indicate thatsheepsin Amol, in addition to high levels of parasitic infection (100%), also have a high incidence of infection (13 Genus). These results are expected due to the geographic conditions of the region (moderate and humid climates of the Caspian Sea, as well as suitable vegetation). On the other hand, lack of sufficient information for livestock breeders on parasitic infections and inappropriate use of anti-parasitic drugs has caused many parasites to be resistant to these drugs and eventually lead to economic losses.
Key words: Worm infestation, Ruminants, Amol

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SEROPREVALENCE OF *NEOSPORA CANINUM* AND *TOXOPLASMA GONDII* INFECTION IN SHEEP IN KHUZESTAN PROVINCE

Jamal Gharekhani[1,2*], Mohammad Yakhchali[1]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
2. *Department of Laboratory Sciences, Central Veterinary Laboratory, Iranian Veterinary Organization, Hamedan, Iran*

BACKGROUND: Small ruminants play an important role as intermediate hosts for *Neospora caninum* and T*oxoplasma gondii*, parasites of great public health concern.
OBJECTIVES: The main goal of the current survey was aimed to evaluate *N. caninum* and *T. gondii* infection in sheep in Khuzestan province, South West of Iran, using enzyme-linked immunosorbent assay (ELISA).
METHODS: In a cross-sectional study in 2016, 550 blood samples were collected in different region studied area. All of samples examined for presence of *N. caninum* and *T. gondii* antibodies using a commercial ELISA kit (ID-Vet Company, France).
RESULTS: Of Among 550 sheep, 37 (6.8%) and 59 sheep (10.8%) were seropositive for *N. caninum* and *T. gondii,* respectively. Mixed infection with *N. caninum* and *T. gondii* was 3.2%. There was significant association between seroprevalence rate of *T. gondii* in sheep with history of abortion (18.2%, p=0.009) and herd size (p=0.001). Also, no significant difference was seen between sex and age groups in both *N. caninum* and *T. gondii* infection (p>0.05).
CONCLUSIONS: This is the first report of *N. caninum* and *T. gondii* co-infection in Iranian sheep which may partially be responsible for abortion and economic losses in the region.
Keywords: *Neospora caninum*, *Toxoplasma gondii*, Sheep, ELISA, Khuzestan

Diagnosis of Parasitic Infection

Oral presentation

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INVESTIGATING THE LOCAL NAMES OF "CEREBROSPINAL COENUROSIS" OF RUMINANTS IN LANGUAGES AND DIALECTS OF IRAN

Houshmand, E.[1*], Eslami, A[2]

1. *Young Researchers and Elite Club, Rasht Branch, Islamic Azad University, Rasht, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: drehooshmand@iaurasht.ac.ir

BACKGROUND: Iranian people are formed of folks who speak different languages and dialects. Villagers and livestock farmers use their own terms for their livestock breeding, and due to the rapid decline in rural populations, some of these languages and dialects are in danger of being extinction.
OBJECTIVES: The study purpose is to collect and register some of these local names as valuable repositories of the area's culture.
METHODS: A questionnaire was prepared about infectious diseases in clouding "cerebrospinal coenurosis" and sent to veterinary departments in 31 provinces of the country that after completing sent back to the department of parasitology, Faculty of Veterinary Medicine, University of Tehran and analyzed.
RESULTS: Totally, 69 local names were recorded from 27 provinces of Iran. From 4 provinces, Alborz, Bushehr, Kohgiluyeh and Boyer-Ahmad, and Lorestan, no dialects have been registered. The most widely used local name in different provinces is "giji/confusion" or terms derived from it, which is used in 26 terms in 17 provinces. The names " ĉarxeši/ rotation", "divânegi/ madness", and "Sar'ʕ/ epilepsy", also refer exactly to the clinical symptoms of the disease. Even names like "owdun and owdune/ water sac" are also referred to shape of this parasite (seeds or bags containing water).
CONCLUSIONS: The results of this study enrich the treasures of Iranian dialects and establish a relationship as a linguistic tool between villagers and those working in the veterinary and health professions.
Key words: Cerebrospinal Coenurosis, Ruminants, Languages, Dialects, Iran

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TRICHOMONADS IN BIRDS: CLINICAL AND MOLECULAR CHARACTERIZATION OF ISOLATES FROM AVIAN HOSTS

Arabkhazaeli, F.1*, Madani, S.A.2, Ghorbani, A.2, Yazadani, A.3

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Animal and Poultry Health and Nutrition, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *Department Avian Diseases, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

BACKGROUND: Trichomoniasis caused by *Trichomonas gallinae* is known as a pathogenenic parasite in Columbiformes and Falconiformes. *Tetratrichomonas gallinarum* mainly found in the ceca of Galliformes is another avian trichomonad lacking thorough description of the infected species, pathogenicity or host specificity. Trichomonads are increasingly being found in different bird species with unfamiliar clinical manifestations.
OBJECTIVES: In this study the prevalence, clinical signs and genetic diversity of trichomonads in various avian species were investigated.
METHODS: In a one-year period from December 2012 to December 2013, upon admission and based on clinical signs, birds were screened for flagellated protozoa via wet mounts Data on bird species, clinical signs, and any identifiable concurrent infection in the prepared wet mount were recorded for further analysis. Swabs from flagellate infected birds were cultured in Modified Diamond's Medium (MDM) and DNA samples from confirmed flagellate positive samples were extracted. Trichomonad-specific primers, were used to amplify the 5.8S rRNA gene and its two flanking areas ITS1 and ITS2.
RESULTS: In this study the occurrence of gastrointestinal trichomonads among 737 birds, containing 28 bird species revealed the overall infection rate of 32.7%. Chi-square statistical analysis proved strong association between bird order/species, diarrhea, yeast infection with the presence of the flagellates (p=.0001). The results demonstrated that in addition to Columbiformes and Falconiformes, Passeriformes and Galliformes are susceptible to clinical trichomoniasis with the involvement of organs other than gastro-intestine. Phylogenetic analysis of complete ITS1-5.8s rRNA-ITS2 sequence from 10 cultured isolates, identified genotypes A and B of *T. gallinae* and genogroups E and D of *Te. gallinarum*.
CONCLUSIONS: To further identify the evolutionary origin of current circulating isolates in different avian species, detailed multi-loci molecular analysis of additional samples from wider localities would be recommended. Additionally studies should investigate the clinical and sub-clinical impacts of *T. gallinae* and *Te. gallinarum* infection in previously less susceptible avian species.
Key words: *Trichomonas gallinae*, *Tetratrichomonas gallinarum*, Avian, Trichomoniasis

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MORPHOLOGIC AND MOLECULAR STUDY OF *HAEMONCHUS* NEMATODES OBTAINED FROM CATTLE IN THE SOUTHEAST OF IRAN

Nabavi R[1*], Hosseini, H.[2], Sanjarani Z.[2], Shariati Sharifi, F.[1]

1. *Department of Pathobiology, Veterinary Faculty, University of Zabol.*
2. *Graduated of Doctor Veterinary Medicine, Veterinary Faculty, University of Zabol*

Email: **Rezanabavi@uoz.ac.ir**

BACKGROUND: *Haemonchus* spp.is one of the most important nematodes in gastrointestinal system of ruminants around the world. Two species including *H. contortus* and *H. placei* have been introduced. These species are very similar in macroscopic appearance, but some differences could be detectablein morphometric and molecular characteristics.

OBJECTIVE: The objective of present study was to evaluate morphological and morphometrical structures as well as molecular assessmentof ITS2-rDNA and Beta-tubuline fragments in *haemonchuses* spp. from cattle.

METHODS: The 50-adult male haemonchuses were collected from the abomasum of cattle in the southeast of Iran. morphological parameters are as follow: Total body length of nematodes, gubernaculum length, right and left spicule length, the distancebetween spicule spine and the spicule posterior end, the distance between anterior cervical spine and the anterior end of nematode. Moreover, the anterior sectionswere observed in order to evaluated the longitudinal cuticular ridges (Synloph). Furthermore, after DNA extraction, the PCR was performed to amplify ITS2-rDNA and Beta tubulin fragments. The fragments were then sequenced and compared with sequences in Gene Bank.

RESULTS: The morphological and morphometrical results revealed that both of *H. contortus* and *H. placei* are present in this area. The molecular investigation showed that all species are mostly similar with *H. placei*.

CONCLUSION: Genetic polymorphism could be detectable in this parasite. Beta-tubuline sequences did not exhibit genetic mutation and all nematodes were detected as Benzimidazole susceptible.

Key words: *Haemonchus*, Morphology, Morphometry, Molecular, Cattle, Iran

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MORPHOLOGICAL AND MOLECULAR STUDY OF *ECHINOCOCCUS GRANULOSUS* STRAINS ISOLATED FROM STRAY DOGS IN TABRIZ

Shariatzadeh, S.A.[1*], Montazeri, F.[2], Gholami, S.[3], Shahbazi, A., Spotin, A[4].

1. *Student of Research Committee, Mazandaran University of Medical Science, Sari, Iran.*
2. *Department of Parasitology, Faculty of Medical Sciences, Tarbiat Modarres University, Tehran, Iran*
3. *Parasitology and Mycology Department, Sari Medical School, Mazandaran University of Medical Science, Sari, Iran*
4. *Department of Parasitology and Mycology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran*

BACKGROUND: Hydatidosis is considered to be a neglected cyclozoonotic disease in northwestern Iran, where caused by metacestode of *Echinococcus granulosus*. Although human hydatidosis is a high public health priority in the region; however there is no more known concern in terms of various features in stray dogs. Therefore, the aim of this study was to investigate the morphometric and molecularof adult *E. granulosus* in order to determine the *Echinococcus* strains taxonomy and genotypic *characteristics* of isolates from stray dogs in Tabriz city.

METHODS: In this descriptive study, a total of 80 collected stray dogs were examined macroscopically during 2013in Tabriz city. The parasites were distinguished by morphometric diagnostic keys including small and large hook length, blade length, gravid proglottides and mitochondrial cytochrome oxidase1sequences.

RESULTS: Sixteen (20%) out of 80 collected stray dogs were infected with E. granulosus. The measurement results of rostellar hook morphology and gravid proglottides were unambiguously shown an intraspecies variation range among isolates ($p<0.05$). Interestingly, the average ratios of blade length to total length in both large and small hooks were explicitly different compared with previous studies, which had conducted on metacestode scolex merely. The phylogenetic analysis of *cox1* sequence revealed firmly the G1, G3, and G6 genotypes along with mixed infection. Based on analyzed sequences 15 haplotypes were identified.

CONCLUSION: This is the first simultaneous investigation, which is developed by employing both morphometric and molecular characterization on adult *E. granulosus* in Iranian stray dogs. It can reflect a better understanding of adult *E.granulosus* features, which should be considered precisely in taxonomy, biology, and monitoring of infected stray dogs in northwestern Iran.

Key words: *Echinococcus granulosus*, dogs, G1-G6 genotypes, Morphometric, Iran.

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COMPARATIVE STUDY OF REAL-TIME PCR AND CONVENIENT PCR AND MODIFIED KNOTT TEST FOR DIFFERENTIAL DIAGNOSIS OF DIROFILARIASIS MICROFILARIA IN DOGS

Manshori ghaishghorshagh, F.[1], Jalousian, F.[2], Hoseini, S.H.[2*], Soltani, M.[3],Gerami Sadeghian, A[2].

1. *Graduated Student, Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran.*
3. *Mycology Research Center, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: Hhoseini@ut.ac.ir

BACKGROUND: Dirofilariasis is considered as one of the zoonotic infection inadvertently affecting the *humans. Dirofilaria* has a worldwide distribution and Iran is one of the endemic area for dirofilariasis.
OBJECTIVE: The purpose of this study was Comparative study of Real-Time PCR and Convenient PCR and Modified Knott test for differential diagnosis of dirofilariasis microfilaria in dogs
METHODS: blood samples with EDTA was collected from 138 stray dogs in Gilan, Mazandaran and Qazvin provinces and evaluated by parasitology and molecular methods.Besides, the presence of wolbachia pippinitis was investigated as an intracellular bacterial coexist with *Dirofilaria immitis* by molecular method.
RESULTS: The results of the current study revealed that 17.4% of samples was positive using modified knott method, while 47.8% was positive by applying PCR method. A partial sequence of coxI of *Dirofilaria immitis* (256bp) and *Acanthocheilonema reconditum* (200bp) was amplified and sequenced, as well as a partial sequence of ftsz gene derived from *Wolbachia pipientis* (267bp). HRM Real-Time PCR was performed using ROTORGEN instrument. The sensitivity of modified knott method was 56.5% and the sensitivity of PCR method was found to be 100%. It is noteworthy that the sensitivity and specificity was calculated based on the gold standard PCR and sequencing results of amplified sequences. Furthermore, the specificity of two methods was found as 100%.
DISCUSSION: Our findings revealed that PCR based on the ftsz gene was more efficient for differential diagnosis. The sequencing results of these samples showed a difference between 1 and 2%, while a 100% homology was achieved after translation of these sequences to amino acids. It is essential to apply molecular methods for diagnosis of the *Dirofilaria* infection; therefore, in this case occult infection can be also detected. HRM Real-Time PCR is capable of distinguishing the Filaria species in carnivores.
Key words: Dirofilariasis, Modified Knott test, CoxI gene, Ftsz gene, HRM Real-time PCR method

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SURVEY OF INTERNAL AND EXTERNAL PARASITIC INFECTION OF BIRDS IN A ZOOS, TEHRAN

Khalilzadeh Houjaghan, M.[1], Salavati, A.[1], Haddadmarandi, M.R.[2], Madai, S.A.[3*], Arabkhazaeli, F.[4]

1. *Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Central Veterinary Laboratory, Tehran, Iran*
3. *Department of Animal and Poultry Health and Nutrition, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
4. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

BACKGROUND: Parasitic infections are pathogens of importance in captive birds. Restricting wild captured birds in populated environment may increase the pathogenicity of parasites. Surveying the presence of parasitic infections can be a good indicator for assessing the success of health management and veterinary preventive measures in any captive environments.
OBJECTIVES: A descriptive cross-sectional study was conducted to investigate the presence of external and intestinal parasitic infections in an aviary in Tehran.
METHODS: Fresh samples of birds' dropping were collected individually or cumulatively from the birds' habitats. The droppings were examined by wet smear, sedimentation and flotation with saturated sugar solution. External parasites detected during clinical examinations were also collected for further identification.
RESULTS: Seventy-two dropping samples belonging to 17 different species of eight bird orders were collected. Helminth infections were detected in 16.67% of samples includingunrecognizable nematode eggs of birds. No cestode or trematode were identified in the examined samples. The presence of fecal flagellates were established in 27.8% of the samples. *Eimeria* oocysts were identified in three samples from two peafowls and a partridge. Furthermore, in a sample from a common mynah, *Isospora* oocysts was detected. Infection with *Argas* soft tick was detected in pheasants and a common buzzard.
CONCLUSION: Various parasitic infections were detected in this study. Due to the subclinical nature of parasitic infections, detection of these infections is possible only by parasitological tests. Based on the results, therapeutic and preventive strategies for controlling subclinical infections were recommended.
Key words: Parasite, Parasitic Infection, Aviary, Bird Intestinal Parasites, Zoo.

SEROEPIDEMIOLOGICAL STUDY OF TOXOPLASMOSIS IN BABOLSAR CITY

Ghasemzadeh, F.[1], Shemshadi, B.[2*], Ghahari, A.[3], Naser, A.[4]

1. *Master of veterinary parasitology, Islamic Azad University of Science and Research Branch, Tehran*
2. *Department of Parasitology, Islamic Azad University of Science and Research Branch,*
3. *Surgical and clinical pathologist, Shahid Beheshti University of Medical Sciences*
4. *PhD student of Veterinary Parasitology, Islamic Azad University of Science and Research Branch, Tehran*

BACKGROUND: *Toxoplasmagondii* is an obligatory intracellular parasite, that is zoonotic. It is seen in humans in two forms: active form (tachyzoite) and inactive cyst (bradyzoites).Two main ways of human contaminating include accidental ingestion of oocysts excreted by cat's stool, eating raw or semi-baked infected meat and conjugation through placenta.
OBJECTIVES: The research was carried out according to the statistics and analysis of toxoplasmosis contamination and factors related to the prevalence of parasites in Babolsar.
METHODS: In this descriptive-analytical cross-sectional study in 2018, 430 patients suspected to toxoplasmosis were surveyed that referred to the diagnostic laboratory of Dr. Azarmeydokht Ghahari in Babolsar. Demographic information was recorded by interviewing them. The TOXO-IgM serological test was measured by luminescence electrochemical method and positive cases were placed in the statistical diagram.
RESULTS: Out of 430 patients, 18 patients (4.18%) had high levels of TOXO-IgM that 11 persons (2.55%) were in rural areas and 7 persons (1.62%) were in the city, and 2 persons (0.46%) had significant lymphadenopathy.
CONCLUSIONS: Based on the results of this study, it is concluded that Toxoplasma infection has high prevalence in Babolsar due to the mild and humid of the climate and the high survival rate of the parasite oocysts, and in rural areas is more than the urban areas because of outdoor works. In children and pregnant women, due to the immunosuppression, on-time identification and treatment is very important.
Keywords: *Toxoplasma*, IgM antibody, Electrochemical Luminescence, Zoonosis, Parasitic disease

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DETECTION OF *LEISHMANIA INFANTUM* INFECTIONS IN ASYMPTOMATIC AND SYMPTOMATIC DOG RESERVOIRS BY USING A MULTIEPITOPE RECOMBINANT PROTEIN (PQ10) IN IRAN

Jameie, F.[1*], Dalimi, A.[1], Pirestani, M.[1], Mohebali, M.[2]

1. Department of Parasitology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
2. Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

BACKGROUND: Visceral leishmaniasis is a neglected disease caused by *Leishmania infantum* and transmitted via female sand flies. Canine visceral leishmaniasis diagnosis should be performed as soon as possible, even on the basis of only a few or even a single clinical sign, to enhance the prediction of disease and to avoid both dog and human transmission and unnecessary euthanasia of apparently positive dogs.
OBJECTIVES: In the present work, we examined whether PQ10 recombinant protein could be suitable for immunological detection of *Leishmania infantum* infection.
METHODS: The coding sequence of PQ10 recombinant protein was sub-cloned in pET28 expression vector and was commercially synthesized by GENERAY Biotechnology, China. In the following process, sequencing with proper primers was done and the expression, optimization of expression and protein purification were performed. The efficacy of PQ10 for serodiagnosis was evaluated with 100 serum samples collected from dogs living in the visceral leishmaniasis endemic areas of Iran. Samples (n=20) of the dogs with other infectious disease were also be collected.The purified recombinant protein confirmed by western blot. The ELISA was performed with PQ10 recombinant protein.
RESULTS: The sensitivity of ELISA that was evaluated with sera from naturally infected dogs was 94%. The specificity value of the ELISA determined with sera from healthy dogs and from dogs with other infectious diseases was 86%. The positive predictive value (PPV) and negative predictive value (NPV) determined 87.03% and 93.47% respectively.
CONCLUSIONS: Our findings indicated to the potential use of this recombinant protein in the diagnosis of canine visceral leishmaniasis.
Key words: visceral leishmaniasis, *Leishmania infantum,* PQ10, recombinant protein, serodiagnosis, dog, Iran

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ISOLATION, CHARACTERIZATION AND MOLECULAR IDENTIFICATION OF *EIMERIA* SPP. CAUSING DIARRHEA IN YOUNG CALVES

Nasiri, V.[1*], Paykari, H.[1], Karimi, G.H.[1], Ashtari, A.[1], Rivaz, SH.[1]

1. Department of Parasitology, Razi Vaccine and Serum Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Alborz, Iran

Email: v.nasiri@rvsri.ac.ir

BACKGROUND: Bovine coccidiosis is the disease caused by *Eimeria* infection in cattle and the most economically important disease of cattle throughout the world. Calves age 3 weeks to 6 months are particularly susceptible to clinical coccidiosis, reflecting preexposed naive states to *Eimeria* infections. Morphological characteristics of oocyst is the common method for the identification of bovine coccidian to the species level.

OBJECTIVES: in this study, the internal transcribed spacer 1 (ITS-1) region of ribosomal RNA genes of six bovine *Eimeria* species; *E.alabamensis*, *E.auburnensis*, *E. bovis*, *E. cylindrica*, *E.ellipsoidalis* and *E. zuernii* analysed by PCR and the results of morphological and molecular methods compared to find any relationship between presences of parasites and diarrheic status.

METHODS: Studies were conducted in calves aged less than 3 months for a period of 2 years. During the study period, 160 dung samples were collected from neonatal calves and examined first microscopically and then by molecular techniques. Stools were analyzed for the presence of Eimeria Spp. oocysts by Sheather's Sugar Flotation Solution method.DNA was extracted and PCR were done to identify six cattle-adapted specie (*E.alabamensis, E.auburnensis, E.bovis, E.cylindrical, E.ellipsoidalis, E. zuernii*).

RESULTS: *Eimeria* spp. infection was detected in 15 (9.37%) of 160 calves without a history of diarrhea infection and pathogenic *Eimeria* spp. was asymptomatic in all animals that was not positively related to the diarrheic status of the calves ($p< 0.05$).According to microscopic analsis 6 species (*E.alabamensis, E.auburnensis, E.bovis, E. canadensis, E.ellipsoidalis, E. zuernii*) identified and with molecular technique 3 species (*E.auburnensis, E.bovis, E. zuernii*) were detected.

CONCLUSIONS: different risk factors were considered to affect the rate of infection of calves with this protozoan parasite. For controlling disease, Immune status of the calves should be improved by providing sufficient amount of colostrum within the first 24 hours after birth and adequate nutrition and good hygiene as well as reducing and monitoring stress levels caused by weaning, a change in feed and overcrowding.

Key words: *Eimeria* Spp., diarrhea, calves

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MOLECULARDETECTION OF *GIARDIA DUODENALIS* IN HOUSEHOLD DOGS' FECES BY NESTED PCR

Hajipour, N.[1], Soltani, M.[2*], Shirazi, Sh.[3], Mostafaee, T.[4]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*
2. *PhD of Veterinary Parasitology. Graduated from Faculty of Veterinary Medicine. Urmia University, Urmia, Iran*
3. *PhD of Veterinary Parasitology. Graduated from Faculty of Veterinary Medicine. Islamic Azad University Tehran Science and Research Branch, Tehran, Iran*
4. *PhD of Veterinary Parasitology. Graduated from Faculty of Veterinary Medicine. Urmia University, Urmia, Iran*

BACKGROUND: The protozoanGiardia duodenalis (syn. *G. intestinalis, G. lamblia*) found in the intestinal tracts of human and most domestic animals, particularly dogs and cats. *G. duodenalis* causes diarrheaand malabsorptionsyndrome in its hostsand transmitted by ingesting parasite cyst, through water andfood and person-to-person contact.
OBJECTIVES: Considering the importance of diagnosing this disease in dogs and possibility of zoonotic transmission, the aim of this study was to diagnose the presence of *G. duodenalis* in household dogs using nested polymerase chain reaction (PCR).
METHODS: In this study for 2 years, one hundred faecal samples were collected from household dogspresented to veterinary clinic for a variety of reasons. Faecal specimens were investigated by direct microscopic examination and culturing in In-Pouch™TV medium. In order tomolecular detection of *G. duodenalis* usednested PCR test, based on conserved small ribosomal subunit (SSU rRNA) gene.
RESULTS: The results showed that from 100 stool specimens of dogs, 3 samples by direct microscopic examination and 2 samples by culturing and PCR assay were positive. Also, one dog isolate harboured a mixed infection of *G. duodenalis* and *Trichomonas* spp. Molecular results showed a, 292-bp fragment of *G. duodenalis* DNA was amplified with RH11 and RH4 primers. The amplicon from this reaction was amplified with a second primer pair (GiarF and GiarR) which with these nested primers, a 175-bp DNA fragment was amplified.
CONCLUSIONS: Due to the increased breeding of dogs at home and their close relationship with humans, they are potential reservoirs of the zoonotic pathogens *Giardia* spp for infections in humans. Therefore, only the microscopic examination should not be tolerated for the diagnosis of giardiasis. These results showed nested PCR has the potential for detecting asymptomatic infection, monitoring the response to therapy, and detecting the organism in environmental sources.
Key words: *Giardia duodenalis*, Diagnosis, Dog, Nested PCR, SSU rRNA gene

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MOLECULAR SURVEY OF *NEOSPORACANINUM, HAMMONDIAHEYDORNI* AND *TOXOPLASMA GONDII* IN FECAL SAMPLES OF DOGS IN NORTHERN IRAN

Nayeri Chegeni, T.[1,2], Daryani, A. [1*], Izadi L[1,2], Sarvi, Sh.[1], Hosseini, S.A.[1,2],Amouei, A.[1,2] , Hosseininejad, Z.[1,2]

1. *Toxoplasmosis Research Center, Mazandaran University of Medical Sciences, Sari, Iran*
2. *Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran*

BACKGROUND: The oocysts of *Neosporacaninum* and *Hammondiaheydorniare* physically and morphologically similar to *Toxoplasma gondii*, and these are indistinguishable from each other.
OBJECTIVES: This study was conducted to investigate the infection rates of *N. caninum, H. heydroniand T. gondii* in dogs fecal using nested PCR.
METHODS: One hundred twentydog fecal samples were collected from farms in north of Iran. The samples were homogenized in 2.5% potassium dichromate (K2Cr2O7) and concentrated with sucrose solution. DNA was extracted from all samples using the Genomic DNA kit.18S rDNA gene was used for screening and detecting all of toxoplasmatinae oocysts. For specific molecular detection of *N. caninum, H. heydorniand T. gondii*, were used N6+/N21+, JS4/JS5 and TOX4/TOX5 primers, respectively.
RESULTS: Overall, 6.66% (8/120) of fecal samples wereinfected with DNA of toxoplasmatinae. Presence of *N. caninumand T. gondii* DNA were confirmed by observation of a 337bp band in 2 samples (1.6%) and 529bp band in 6 out 120 samples (5%). While no contamination with *H. heydorni* was observed in dog fecal samples.
CONCLUSIONS: This is the first study in Iran that provides a data of the epidemiology of oocysts of sub-family toxoplasmatinae in canine feces using PCR method. The presence of *T. gondii* and *N. caninum* in dog feces of northern Iran indicated a risk of transmission of toxoplasmosis and neosporosis infections, which can affect both human and animal health in this area.
Key words: *Neosporacaninum, Hammondiaheydorni,-Toxoplasma gondii*, Dog, PCR, Iran

Diagnosis of Parasitic Infection

Poster presentation

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A STUDY ON GASTRO-INTESTINAL HELMINTHS PARASITES OF SHEEP BASED ON THE MORPHOLOGIC AND MORPHOMETRIC FEATURES

Aghazadeh, F.[1*], Yakhchali, M.[2], Aligolzadeh, A.[3]

1. *MS of Parasitology, Department of Parasitology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran*
3. *PhD student of Parasitology, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran*

BACKGROUND: Despite advances in diagnosis of helminth infection, the diagnosis of gastrointestinal strongyle eggs is difficult on the basis of microscopic characteristics.
OBJECTIVES: The current study was aimed to determine intensity (eggs per gram of feces, EPG) and its association with identified infective larvae and fecal culture was also demonstrated.
METHODS: In this study, 140 fresh feces samples were collected from the rectum of sheep in different regions of Guilan province in Iran from summer 2017 to spring 2018. EPG determined using Clayton-Lane technique. The first stage larvae of respiratory tract parasite were then removed using Baermann method and third stage larvae of the gastrointestinal parasite nematodes were also identified on the basis of morphological and morphometric characteristics by applying fecal culture and Baermann methods.
RESULTS: Our findings indicated thatthe infection intensity ranged from 1 to 100 in the 140 samples of sheep feces (29.42±19.624) under microscopic examination. The identified helminth eggs were included *Marshallagia marshalli* (10.139±4.086), *Nematodirus* (10.71±2.954) *Trichuris* (1.42±0.735), other nematode eggs (23.07±4.923), *Fasciola, Dicrocoelium* and cestode. In fecal culture, infective larvae of *Ostertagia* (20%) and *Haemonchus* (7.5%) was found in abomasum, followed by *Trichostrongylus* (12.5%), *Bunostomum* (7.5%), S*trongyloides* (2.5%), *Cooperia* (7.5%) and *Nematodirus* (12.5%) in small intestine; *Oesophagostomum* (22.5%) and *Chabertia* (7.5%) was also identified in large intestine. The first stage larva of *Protostrongylus* (22.24%), *Dictyocaulus* (55.55%), *Cystocaulus* (16.66%) and *Muellerius* (5.55%) were also identified. Furthermore, mixed infection with two genus (60%) and three genus (20%) were found.
CONCLUSIONS: Our findings revealed that morphologic and morphometric features of tail, tail sheath and tailed filament in nematode larvae were capable of identifying and assessing the pathogenicity of gastrointestinal parasite nematodes and its association with intensity in examined sheep.
Key words: Helminth, Gastrointestinal tract, Sheep

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A STUDY ON GASTRO-INTESTINAL HELMINTHS PARASITES OF CATTLE ON THE BASIS OF MORPHOLOGIC AND MORPHOMETRIC FEATURES

Aligolzadeh, A.1*, Yakhchali, M.2

1. *Ph.D. Student of Parasitology, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran*

BACKGROUND: Despite advances in diagnosis of helminth infection, the diagnosis of gastrointestinal strongyle eggs is difficult on the basis of microscopic characteristics.
OBJECTIVES: The study was aimed to determine intensity (eggs per gram of feces, EPG) and its association with identified infective larvae and fecal culture.
METHODS: In the current study, 140 fresh feces samples were collected from the rectum of cattles in different regions of Guilan province, Iran from summer 2017 to spring 2018. EPG were determined using Clayton-Lane technique. The first stage larvae of respiratory tract parasite were removed using Baermann method and third stage larvae of the gastrointestinal parasite nematodes were identified based on the morphological and morphometric characteristics using fecal culture and Baermann methods.
RESULTS: The infection intensity ranged from 1 to 100 under microscopic examination among 140 samples of cattle feces (7.580±3.242). The identified helminth eggs were included *Marshallagia marshalli* (1.969±0.478), *Nematodirus* (0.779±0.135) *Trichuris* (0.338±0.028), other nematode eggs (4.287±1.5), *Fasciola*, *Dicrocoelium* and cestode. In fecal culture, infective larvae of Ostertagia (37.93%) was most frequently found in abomasum, followed by *Haemonchus* from abomasum (10.34%); *Trichostrongylus* (13.79%), *Bunostomum* (13.79%), *Cooperia* (13.79%) and *Nematodirus* (3.44%) from small intestine; *Oesophagostomum* (3.44%) and *Chabertia* (3.44%) from large intestine. The first stage larva of *Protostrongylus* (44.44%) and *Dictyocaulus* (55.55%) were also identified in the present study.
CONCLUSIONS: Based on the findings presented herein, it was concluded that morphologic and morphometric features of tail, tail sheath and tailed filament in nematode larvae were applicable in identifying and assessment of pathogenicity of gastrointestinal parasite nematodes, as well as its association with intensity in examined cattle.
Key words: Helminth, Gastrointestinal tract, Cattle

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DIAGNOSIS OF TOXOPLASMOSIS IN RUMINANTS ABORTED FETUSES IN MAZANDARAN PROVINCE USING MOLECULAR METHOD

Amouie, A.[1,2,3*], Daryani, A.[1,2], Azimi, K.[1,2], Mizani, A.[1,2], Hosseini Nejad, Z.[1,2], Nayeri Chegini, T.[1,2], Salehi, S.[3], Sadeghi, AR.[3], Bakooie, A.[3]

1. *Toxoplasmosis Research Center,Mazandaran University of Medical Sciences, Sari, Iran*
2. *Department of Parasitology, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran*
3. *Central Laboratory, Mazandaran Provincial Veterinary Service, Sari, Iran*

BACKGROUND: Toxoplasmosis, a cosmopolitan infection in humans and animals, is caused by an intracellular obligatory parasite, *Toxoplasma gondii*. Outcomes of toxoplasmosis in ruminants include fetal death, abortion and neonatal death, that lead to severe economic losses in livestock industry.

OBJECTIVES: The aim of this study was to obtain further information on the role of *T. gondii* infection in ruminant abortion (sheep, goats and cattle) using PCR (Polymerase Chain Reaction)methods in Mazandaran province, northern Iran.

METHODS: Totally, 115 aborted fetuses (58 bovines, 53 ovine, 4 caprine) were collected randomly at different stages of gestation during the lambing seasons in various parts of Mazandaran province. DNA was extracted from all brain of aborted fetuse samples using Phenol-Chloroform-Isoamyl Alcohol instructions. RE gene was used for detection all of *T. gondii* DNA by conventional PCR assay.

RESULTS: The detection of *T. gondii* DNA was confirmed by observation of a 529 bp band in 17 out of 115 fetuses (14.8%). The highest prevalence rate of *T. gondii* were detected from sheep (17%) followed by cattle (13.8%) and goats (0%). The highest prevalence of the infection was observed in east area, while the lowest prevalence of the infection was observed in west area.

CONCLUSIONS: Our study result indicates that *T. gondii* infection may be responsible for causing abortion and economic losses in livestock husbandry in Mazandaran province. Therefore, further studies such as *T. gondii* genotyping and establishing control strategies are required to improve management in livestock flocks are necessary.

Keywords: *Toxoplasma gondii*, Aborted fetus, Sheep, Goat, Cattle, Mazandaran

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SURVEY OF *SARCOCYSTIS* INFECTION IN SLAUGHTERED SHEEP AND CATTLE IN SALEHABAD ABATTOIR IN HAMADAN PROVINCE, IRAN

***Azimi, M.R.*[1*], *Fekri monazah, M.*[2]**

1. *Hamedan Agricultural and Natural resources Research and Education center, Veterinary Department, Iran*
2. *Hamedan Agricultural and Natural resources Research and Education center*

BACKGROUND: *Sarcocystis* infection is one of the most common zoonotic protozoon diseases caused by different *Sarcocystis* spp. Given the importance of this infection in public health, the infection rate of *Sarcocystis* in slaughtered sheep and cattle were determined in Salehabad abattoir in Hamadan province.138 samples of esophagus, heart, diaphragm, tongue and muscle masseter and intercostal of cattle and sheep selected Randomly. In order to find microscopic and macroscopic cysts, the corpses and samples were examined in two ways direct observation, impression smear and. The distinction of microscopic cysts was the preparation of direct tissue impression spreading of samples and then painting them by Giemsa stain. In corpses and samples were observed no macroscopic cysts but microscopic cysts were positive 93.48% in cattle and 86.95% in sheep in impression smear method of sample

OBJECTIVES: The aim of this study were determined the infection rate of *Sarcocystis* in slaughtered sheep and cattle

METHODS: 138 samples of esophagus, heart, diaphragm, tongue and muscle masseter and intercostal of cattle and sheep selected Randomly. In order to find microscopic and macroscopic cysts, the corpses and samples were examined in two ways direct observation, impression smear and. The distinction of microscopic cysts was the preparation of direct tissue impression spreading of samples and then painting them by Giemsa stain.

RESULTS: In corpses and samples were observed no macroscopic cysts but microscopic cysts were positive 93.48% in cattle and 86.95% in sheep in impression smear method of sample. The results showed that there is significant difference among different muscles with microscopic cysts ($p<0.05$). Heart and esophagus were the most infected and tongue the lowest. Infections in males are more than females in both sheep and cattle. Infection in cattle did not have significant difference in various ages, but incidence of prevalence of infection in sheep less than 1 year old was higher than other ages. the infection of male most than female.

CONCLUSIONS: Our findings indicated that the parasites could not detect by macroscopic study, then researcher suggested that people must be avoided of raw or semi raw cattle meat.

Keywords: *Sarcocystis* infection, Zoonotic protozoon, Slaughter house, Sheep and cattle, Hamadan.

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IDENTIFICATION OF *TRICHOSTRONGYLUS* PARASITES SPECIES IN SMALL RUMINANTS OF MAZANDARAN PROVINCE, NORTH OF IRAN

Bakooie, A.[1*], Hoghooghi-Rad, N.[2], Mizani, A.[3], Amouei, A.[3], Laktarashi, B.[4], Mehralinezhad, M[4], Salehi, S.[1], Nayeri Chegini, T[3], Hosseini Nejad, Z.[3]

1. *Central Laboratory, Mazandaran Provincial Veterinary Service, Sari, Iran*
2. *Parasitology Department, School of Specialized Science of Veterinary Medicine, Science and Research Campus, Islamic Azad University, Tehran, Iran*
3. *Department of Parasitology, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran*
4. *Research Center of Poultry diseases, Department of Veterinary Science, Qaem Shahr, Iran*

BACKGROUND: The genus *Trichostrongylus* are primarily parasites of human and herbivores, and are distributed throughout the world. There is limited information about the epidemiology and detection of *Trichostrongylus* species among the infected livestock in Mazandaran Province, northern Iran.

OBJECTIVES: The aim of these study is to identify *Trichostrongylus* spp. among small ruminants using molecular and morphometric methods.

METHODS: A total of 198 *Trichostrongylus* isolates were collected from the small intestine of sheep and goats in Mazandaran province. Primary genus and species identification were done according to V shape excretory pore at the anterior end of the worm and morphometric criteria of spicules and gubernaculum in copulatory bursa of male parasites using identification keys, respectively. DNA from each sample was extracted separately and subjected to PCR. The ribosomal internal transcribed spacer 2 (ITS2) was amplified with specific primers and the PCR products were digested with a restriction enzyme, DraI.

RESULTS: Among the examined samples, 108 hosts (62 of sheep and 46 of goats) were microscopically positive for *Trichostrongylus* genus. Parasite species identified *included Trichostrongylus coluriformis, Trichostrongylus vitrinus*.*Trichostrongylus* parasites were more predominant in goat intestines than in sheep. The *Trichostrongylus*-specific primers successfully amplified a region of approximately 328bp in all Trichostrongylus genus. After RFLP assay, *DraI* produced two different patterns based on previous in silico results for *T. colubriformis* (215, 110 bp) and *T. vitrinus* (185, 145 bp).

CONCLUSIONS: The present study was the first attempt in the last 30 years targeted toward the identification of *Trichostrongylus* species in small ruminants in Mazandaran province. Our resultsconfirmed *T. coluriformis* as the common *Trichostrongylus* species in livestocks. The findings of this study can be helpful for the epidemiological and ecological investigation, establish effective control programs and also achievement of better disease surveillance of gastrointestinal parasites in Mazandaran province.

Keywords: *Trichostrongylus*, small ruminants, PCR-RFLP, Species identification, Mazandaran Province

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FIRST REPORT OF *DICTYOCAULUS FILARIA* FORM COW LUNG IN MAZANDARAN PROVINCE

Beheshi B[1*], Yousefi M.R[2]

1. *Veterinary Parasitology, Islamic Azad University, Karaj Branch*
2. *Department of pathobiology, Veterinary Faculty, Islamic Azad University, Babol Branch*

BACKGROUND: In serve infection, *Dictyocaulusfilaria* cause shortness of breath and increased respiratory movements.
OBJECT: The aim of this study was to evaluate the parasites isolated from cow's lung in Sari slaughterhouse. During the evaluation, in one lung, after laboratory examination, *Dictyocaulus filaria* was isolated.
METHODS: The lungs collected from Sari slaughterhouse and then transferred to parasitology laboratory of Veterinary Faculty Islamic Azad University, Babol Branch. In laboratory, parasites isolated and after clarification, *Dictyocaulus filaria* confirmed by lactophenol reagent.
RESULTS: In this nematode, a longitudinal dark line was observed, and the adult female lays eggs containing fully developed larvae. The larvae have protoplasmic knob and their intestinal cells are filled with dark brown food granules, which can be easily diagnosed.
CONCLUSIONS: This milky-white nematode is an important lungworm in sheep and goal and the causative agent of parasitic bronchitis. This is the first report of *Dictyocaulus filaria* in cow, which reported from Sari slaughterhouse.
Keywords: *Dictyocaulus filaria*, Cow, Lung, Bronchitis

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EVALUATION OF INFECTION RATE AND PATHOLOGICAL COMPLICATIONS OF *HYSTRICHIS* AND *CAPILLARIA* IN DUCK PROVENTRICULUS

Beheshi, B.[1*], Yousefi, M.R.[2], Tabari, M.[2], Ramazanpour, S.[3]

1. *Veterinary Parasitology, Islamic Azad University, Karaj Branch*
2. *Department of pathobiology, Veterinary Faculty, Islamic Azad University, Babol Branch*
3. *Ph.D candidate in Veterinary Pathology, Veterinary Faculty of Tehran University*

BACKGROUND: In this study, we evaluate the pathological complications of *hystrix* and *capillaria* nematodes in proventriculus of 180 ducks slaughtered in Fereydunkenar County, Mazandaran Province. Of 180 ducks, 33.3 was female and 66.7 was male and all of the blow one-year-old. The infection rate of Hystrichis in male and female duck was found to be 48 and 44 respectively, while *capillaria* infection was diagnosed in 58 and 62 male and female ducks, respectively.

METHODS: Proventriculus specimens were preserved in 10% formalin solution and then transfered to the pathology laboratory. It is noteworthy that all parasites were diagnosed with clarification and lactophenol reagent.

RESULTS: Regarding tothe *hystrix* infection, tissue reaction caused circular fibrous texture formation around the parasite due to the presence of the parasite in proventriculus tissue. Inflammatory cell infiltration with increasing eosinophils was observed around the nodule. Due to the presence of fine spine in the anterior end of the parasite, higher hemorrhage was expected to be observed, but parasite contacts with the surrounding tissues were limited probably due to the presence of fibrous nodules around the parasite. Fibrous nodules can disrupt the tissue composition becasu of their large size, especially in the proventriculus.

The following changes were observed in birds infected with *capillaria*: most of the inflammatory cell in infected areas were neutrophils, which can be attributed to high severity of the parasite invasion. In addition, fewer eosinophils were found in affected areas. Presence of parasite in some areas of proventriculus epithelium caused proliferative inflammation with increased mucosal and subcutaneous tissue, as well as invasion of inflammatory cells with bleeding areas. On the periphery of the gland, infection were observed as a multi-core cell invasion and formation of strip-shaped along with the connective tissue cells that make the fibrous wall.

CONCLUSION: Clinical complications in ducks include lethargy and severe weakness, which can be due to the involvement of the proventriculus with these two nematodes.

Keywords: Proventriculus, Duck, Nodule, *Capillaria, Hystrichis*

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STUDY ON THE INFECTION RATE TO DIGESTIVE NEMATODIASIS IN SHEEP FROM TABRIZ CITY, EAST AZERBAIJAN

Cheraghi Habib*[*1], Parsaeimehr Khosrow[1], Imani Baran Abbas[2], Haghi Ali[2]

1. *Lab staff, Faculty of Agriculture, University of Tabriz*
2. *Academic member, Pathobiology Department, Faculty of Veterinary Medicine, University of Tabriz*
3. *Lab staff, Faculty of Veterinary Medicine, University of Tabriz*

Email: cheraghihabib50@gmail.com

Background: Digestive nematodes in ruminants are one of the most important helminthic infections in terms of clinical signs and economic losses. The establishment of the parasite in the gastrointestinal tract causes various lesions, which vary depending on the type of parasite and infection severity. Gastrointestinal Nematodiasis is of specific importance in most parts of the world, including Iran.
Purpose: Regarding the importance of gastrointestinal parasitic infection in Iranian small ruminants, the aim of this study was to determine the prevalence and intensity of infection in sheep to gastrointestinal Nematodiasis in Tabriz city, East Azerbaijan province.
Material and Method: For this purpose, five villages of Tabriz suburb were randomly selected. In the fall of 2017, 862 fecal samples were collected from sheep and examined at the faculty of Agriculture of University of Tabriz. In each sample, the egg per gram (EPG) of feces was determined based on the flotation and Clayton Lane method.
Result: The prevalence rate of infection was 15% and the infection intensity (EPG) was about 15 eggs. The identified nematodes were Nematodirus, Trichuris, Marshallagia and Stroganley spp eggs. The highest rate of infection was related to the first two nematodes.
Conclusion: Although the main reasons for reducing the helminthic infection rate can be attributed to frequent drug treatments and to any management associated with changes in climatic conditions in the last decade, However, it should be noted that if medicinal treatments are unreasonable and repeated with high frequency, they can lead to adverse effects, such as drug resistance to parasitic helminths, Therefore, desirable management in this regard can prevent the occurrence of such a situation in the country.
Key words: Nematodiasis, Prevalence, Intensity, Sheep, Tabriz

INFESTATION OF A LOP RABBIT WITH THE CAT FLEA, *CTENOCEPHALIDESFELIS*: A CASE REPORT

Rostami, A.[1*], Arabkhazaeli, F.[2], Vazifedoost, GH.[3], Dabbaghi, A.[4]

1. *Department of Internal Medicine, Faculty of Veterinary Medicine, University of Tehran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran*
3. *Resident of Small Animal Internal Medicine, Faculty of Veterinary Medicine, University of Tehran*
4. *DVM Student, Faculty of Veterinary Medicine, University of Tehran*

BACKGROUND: Ticks, fleas, mites, lice and some tapeworm cysts may be the cause of parasitic skin diseases in rabbits. The cat flea, *Ctenocephalides felis*, and the dog flea, *C. canis*, can also be encountered in rabbits that live in close contact with dogs or cats or in infested premises.
OBJECTIVES: A4 months old female lop rabbit (*Oryctolagus cuniculus*) was presented to the Small Animal Hospital; Faculty of Veterinary Medicine; University of Tehran with clinical signs of alopecia and severe pruritus on head, sudden movements and lack of appetite. There was a recent history of being outdoors.
METHOD: During clinical examination some ectoparasites was observed on patient's body. The ectoparasites were sampled for further diagnosis.
RESULTS: Ectoparasites isolated from the inspected rabbit, was identified as *C. felis*. For treatment, Ivermectin (single dose, SC, 0.4 mg/kg) was administered. The rabbit owner was also recommended to clean the pet's living environment.
CONCLUSION: Flea infestation in rabbits is severely pruritic. Flea allergic dermatitis in rabbits may also lead to hair loss along the dorsum of the animal. It should be noted that fleas are potential carriers of some viral, rickettsial or bacterial zoonotic agents. Therefore, in addition to making skin problems in the affected animal, they are considered a public health hazard as well. Although wide host range of the fleas and their mobility makes them difficult to control,but due to their potential health issues control and prevention of the infestation should be implemented. Preventing contact with other animal species, treatment of reservoir animals, as well as cleansing and disinfecting the environment with proper insecticides could be recommended.
Key words: Rabbit; lop; ectoparasites; skin disease; flea; *Ctenocephalides felis*

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COMPARATIVE DIAGNOSIS OF ONE-HUMP CAMEL INFECTION TO *TRYPANOSOMAEVANSI* PROTOZOAN AND *DIPETALONEMA EVANSI* MICROFILARIA USING PARASITOLOGY AND MOLECULAR BIOLOGY METHODS

Dadkhahtehrani,S.[1], Pirali,Y.[2], Riahidehkordi,M.[3], Hosseini,S.R.[3*]

1. DVM, Faculty of Veterinary Medicine, Islamin Azad University of Shahrekord, Shahrekord, Iran
2. Department of Pathobiology, Faculty of Veterinary Medicine, University of Shahrekord, Shahrekord, Iran
3. Department of Pathobiology, Faculty of Veterinary Medicine, Islamic Azad University of Shahrekord, Shahrekord, Iran

BACKGROUND: *Trypanosoma evansi* is a camel's blood protozoan and *Dipetalonema evansi* is camel's genital system microfilaria which transmitted by mosquitoes *Aedes* and *Culicoides* spp. current study carried out with comparative diagnosis of these parasites according to various methods in one-humped camels slaughtered in Najafabad slaughterhouse Isfahan province.
OBJECTIVES: The aim of this study was comparative detection of *T.evansi* and *D.evansi* microfilaria in the infected camels by various methods and examine of significantly ($p<0/05$) between our findings in various diagnostic methods and age and sex variables.
METHODS: 200 Blood samples collected in 1396 spring season from one-humped camels slaughtered in Najafabad slaughterhouse and tested by parasitology and molecular biology and biochemical methods. In direct method, smears were prepared and examined by light microscope. In PCR method DNA samples amplificated and tested by special instruments. In mercuric chloride method, one drop of suspected camel's serum added to 1 ml 1: 25000 diluted mercuric chloride solution and results examined. Modified Knott and smears used for detection of *D.evansi* microfilaria.
RESULTS: *T.evansi* infection was found in 3.5%, 12.5%, and 14% of samples by direct smear, mercuric chloride, and PCR methods, respectively. *D.evansi* microfilaria did not see in any direct and Knott methods.
CONCLUSIONS: Our findings indicated that infection with *T.evansi* infection revealed in Najaf abad area and according to biochemical and molecular methods it is high rarely. Statistical examine did not shown any significant relation ($p<0/05$) between age and sex.
Keywords: *Trypanosoma evansi, Dipetalonema evansi*, Camel, Comparative Methods, Najafabad

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EFFECTS OF *ZATARIA MULTIFLORA* AROMATIC WATER AND ESSENTIAL OIL NANOEMULSION ALONG WITH ALBENDAZOLE ON HEPATIC HISTOPATHOLOGY IN MICE INFECTED WITH HYDATID CYST

Delshad, H.[2], Mousavi, Z.[1*], Borji, H.1, Moazzeni, M.[3]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Ferdowsi, Mashhad, Iran*
2. *Student of Doctor of Veterinary Medicine (DVM), University of Ferdowsi, Mashhad, Iran*
3. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Shiraz, Shiraz, Iran*

BACKGROUND: Hydatidosis is one of the most common zoonotic diseases. Albendazole is effective drugs for treating hydatid cyst. But has many side effects such as hepatotoxicity. For this reason, researchers are looking for alternative treatment methods. *Z.multiflora*, is medicinal plants that recently used for treatment of hydatid cyst.
OBJECTIVES: The aim of the study was to investigate the effects of *Z.multiflora* aromatic water and nanoemulsion along with Albendazole to improve the therapeutic effects and reduce the adverse side effects of Albendazole in mice infected with hydatid cyst.
METHODS: Eighty mice were infected intraperitoneally by injection of 1,500 protoscolices. Five months later, the mice were divided into eight groups: G1 (Albendazole 100 mg/kg/day), G2 (*Z.multiflora* 100 ml/liter), G3 (*Z.multiflora* 100 ml/liter and Albendazole 100 mg/kg/day), G4 (*Z.multiflora* 100 ml/liter and Albendazole 50 mg/kg/day), G5 (*Z.multiflora* nanoemulsion 10 ml/liter), G6 (*Z.multiflora* nanoemulsion 10 ml/liter and Albendazole 100 mg/kg/day), G7 (*Z.multiflora* nanoemulsion 10 ml/liter and Albendazole 50 mg/kg/day) and G8 (control). Treatment groups were received *Z.multiflora* and Albendazole in drinking water for 60 days.
RESULTS: Hepatocytes necrosis, congestion, inflammation and hemorrhage were revealed in all groups. However, these changes were decreased considerably in Albendazole + *Z.multiflora* groups compared to Albendazole group. Furthermore, hepatotoxic effects in the nanoemulsion groups, were more reduced compare to the aromatic water groups.
CONCLUSIONS: Our findings indicated that administration of Z. multiflora aromatic water and Nano-emulsion had remarkable effects on reducing liver histopathology changes resulted from hydatid cyst and/or long term administration of Albendazole in mice.
Key words: *Zataria multiflora,* Albendazole, Hepatic Histopathology, Hydatid cyst.

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STUDY OF ALKALINE PHOSPHATASE ENZYME ACTIVITY IN THE LIVER AND *FASCIOLA HEPATICA* PARASITE AS CAUSE OF FASCIOLIASIS DISEASE IN IRAN FOR FINDING SUITABLE DIAGNOSTIC MARKER

Aghaei, S.[1], Farhanak, A.[*1], Gool Mohammadi, T.[2], Eshraghian, M.R.[3]

1. *Department of Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
2. *Department of Biochemistry, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, Iran*
3. *Department of Epidemiology and Statistics, Faculty of Health, Tehran University of Medical Sciences, Tehran, Iran*

Email: Farahnak@tums.ac.ir

BACKGROUND: *Fasciola hepatica* is one of the important helminthes parasite .The presence of *Fasciola hepatica* parasite in the biliary duct and gallbladder human causes fascioliasis disease and liver disorders. Sheep are definitive hosts and snail are intermediate hosts. Human function as accidental hosts. Alkaline phosphatase is a hydrolase enzyme responsible for removing phosphate groups from many types of molecules. ALP is most effective in an alkalin environment.
The aim of this comparative study was to detect ALP enzyme activity level in healthy and infected liver tissue and *Fasciola hepatica* parasite in order to determine of liver infection on ALP activity status and finding of fascioliasis diagnostic marker.
Material and methods: Sheep livers were collected from local abattoir and living *Fasciola hepatica* parasites were isolated and washed 3 times with PBS buffer. Collected healthy and infected liver tissue and *Fasciola hepatica* parasite were homogenized. Finally extract solutions were centrifuged and stored at -20°C. ALP enzymes activity was measured in the extract solutions of samples. Samples protein amounts and protein bands were detected using Bradford and sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) methods respectively. To determine significant difference between two groups, independent two samples T-Test was performed.
Results: The mean values of the assayed ALP specific activities of healthy and infected livers and *Fasciola hepatica* parasite were estimated to be 0.163, 0.133, 0.048 U/ml/mg correspondingly. Protein concentration for Fasciola hepatica parasite and healthy and infected livers were estimated to be 0.457, 0.569, 0.563 mg/ml,respectively. Gel electrophoresis (SDS-PAGE) of *Fasciolahepatica* and sheep liver tissue extracts displayed a protein band of ALP enzyme with MW of 59 kDa. No significant differences were observed between the activity of the enzyme in the healthy liver healthy and infected liver ($P<0.05$).
Conclusion: ALP enzyme has a comparable activity in parasite and host tissue. However, the results of this study show that ALP enzymes in the liver to *Fasciola hepatica* infection in vitro could not be concerned as a diagnostic biomarker in fascioliasis disease.

Key words: Alkaline phosphatase, *Fasciola hepatica*, Liver

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STUDY OF CONTAMINATION OF EXTERNAL PARASITES IN GOLDFISH OF ALBORZ PROVINCE

Rahmati-Holasoo, H.[1], Hadadi, A[1*], Azizi, A.[1], Mohammadian Rasanani, Ali.[1]

1. Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

BACKGROUND: Goldfish *Carassius auratus* is somehow one of the best-selling and most popular ornamental fish in all over the world market including Iran.This fish is from *Cyprinidae* family, and it is over 1000 years old that man has been keeping them. External parasites are one of the most important issues in keepingornamental fish, including goldfish.
OBJECTIVES: Regarding the importance of external fish parasites and the importance of goldfish, the aim of this study was to determine the frequency of external fish parasites in Karaj city.
METHODS: To do this study in December of 2017within 36 days, 100 fish were collected from the production and distribution centers of ornamental fish in Karaj city and were sampled for wet mount from skin and gills of them.
RESULTS: In total, the prevalence of parasitic infections in skin and gill was 31%. Of these, 8 were infected with *Ichthyophthirius multifiliis* (8%), 10 cases with *Trichodinidae* (10%), 8 cases with *Gyrodactylidae* (8%), 3 cases with *Dactylogyridae* parasite in gill (3%), one case with Oodiniaceae (1%) and one case with *Peritrichous* ciliates parasite (1%).
CONCLUSIONS: The results of this study indicate that goldfish can be the host of many external parasites.The high variation in fish parasites that has been reported in numerous studies in the country indicates the necessity of proper quarantine and preventive measures to prevent contamination and fish losses.
Key words: Goldfish, External parasite, Skin, Gill, Karaj

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A STUDY ON THE EFFECTS OF AQUEOUS AND ALCOHOLIC EXTRACTS OF SALVIA MIRZAYANII ON PROMASTIGOTE OF *LEISHMANIAMAJOR* IN VITRO

Faezeh Hassanzadeh[1], Saber Mehdizadeh[2], Fatemeh Ghaffarifar[3]

1. *Msc of Medical Parasitology, TarbiatModares University, Iran*
2. *Msc of Medical Immunology, Iran University of Medical Science, Iran*
3. *Profesor of Medical Parasitology, TarbiatModares University, Iran*

Email: F.hassanzadeh@modares.ac.
S.mehdizade92@yahoo.com
ghaffarifar@modares.ac.ir

BACKGROUND: Leishmaniasis is a collection of parasitic diseases which apear in a range of symptoms includes skin leishmaniasis, mucosal-skin and visceral .skinleishmaniasis is one of the endemic disease is common in some parts of iran. Due to the lack of proper vaccine, medicinal treatments are the only appropriate way to treat leishmaniasis. With the spread of parasite resistance to amphotericin-B and glucocontin drugs and side effects such as headache, coughing and vomiting, the need to expand herbal anti-leishmaniasis compounds with more effectively, cheaply and less toxicity be feeled more.
In this research the effects of aqueous and alcoholic extracts of salvia mirzayanii which is from native plants of iran(anti-bacterial, anti-microbial and antiinflamatory effects of salvia mirzayanii have been studied) is done on promastigote and mastigote of *Leishmaniamajor* in vitro.
Materials and Methods: Aqueous and alcoholic extracts of salvia mirzayanii was prepared. Then the effect of concentrations 12.5, 25, 50, 100, 200, 400 mg/ml of the aqueous and alcoholic extracts on promastigote and macrophages infected with mastigotes were examined. effect of the aqueous and alcoholic extracts on promastigote and macrophages infected with mastigotes was measured using direct counting, MTT and flow cytometry. In all of them, the wells and the microtip were comtainedin the medium and the parasites was considered as control without adding the drug.
Results: The direct counting and MTT results 24 ,48 and 72 hours after the parasit capture showed, the number of promastigotes in the control groups was compared with the treated groups with concentrations of 12.5, 25, 50, 100, 200, 400 mg/ml the aqueous and alcoholic extracts of salvia mirzayanii have a significant difference.results from MTT showed which the aqueous and alcoholic extract of salvia mirzayanii has a minimum of toxicity on macrophages. Flow cytometry results showed 72 hours after parasite calture at a concentration of 400 mg/ml alcoholic extract of salvia mirzayaniiapoptosis about 50% of the parasites. In this study the aqueous and alcoholic extract of salvia mirzayanii on amastigotsleishmaniasis major has a fetal effect but it has no effect on the macrophages.

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HISTOPATHOLOGICAL STUDY OF MIDGUT IN HONEY BEES (*APIS MELLIFERA*) INFECTED BY *NOSEMA* IN TALESH

Jafary, M.[1*], Nabian, S.[2] Gharagozlou, M. J.[3]

1. Veterinary office of Talesh, Gilan, Iran
2. Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
3. Department of Pathology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

BACKGROUND: Nosemosis, is a prominent destructive disease of adult honey bees caused by *Nosema* species and affected their midgut. In severe infestation, production of huge amounts of spores leads to degeneration and destruction of midgut epithelial cells and death of them.
OBJECTIVES: Considering the significance of *Nosema,* its role in the incidence of colony collapse disorders and economic losses and absence of its pathologic study in Iran until, the aim of this study was investigation of histopathology lesions in infected honey bees in Talesh apiaries.
METHODS: Adult honey bees with signs of disease were collected from some apiaries of Talesh (North of Iran) and wet mounts were prepared and the number of Nosema spores were counted with hemocytometer. The species of *Nosema* was identified by PCR. For histological analysis, the samples of the midgut fixed in 10 %formalin solution for 24 h and then samples cut and stained in 4 microne thickness with the hematoxilin eosine (HE) dye.
RESULTS: In molecular study, the only causative agents of nosemosis in sampled adult honey bees was *N.ceranae.* Histopathologic study, showed extra and intra cellular particles along the ventriculus epithelium. Spores in various development stages observe were seen in some cells at the bottom of the cytoplasm whereas many other cells, completely filled with spores.
Immature spores were found as the circular and ovoid particles with the presence of terminal filaments in cytoplasm. In microscopic findings; inflamed and ruptured epithelial cells of midgut spread a large amount of basophilic spores of *Nosemaceranea* inside the lumen. The basophilic organelles of the mature spores with the terminal filaments and centric nucleus were visible in the eosinophylic cytoplasm. According to intensity of infection and liberation of free spores in the lumen of the midgut up to 90% of the luminal content occupied by spores. The spores were ovoid and uniform in shape and size and stained heterogeneously.
In high tissue infection, the infected epithelial cells showed evidence of degeneration and lysis.There were not any histopathologic changes in muscular layers and malpighian tubes.
CONCLUSIONS: In this study we could show for the first time the use of histopathology method to diagnose of *Nosema ceranae* in infected honey bees (*A.mellifera*). This study showed that, severity of lesion in histopathologic samples are coincident with the microscopic findings of wet smears, but we also observed some cases of nosemosis with histopathologic positive results in despite of negative results of wet smear. Therefore, we demonstrated that histopathology could be a sensitive method for the detection of nosemosis.
Key words: *Nosema*, Pathology, Honey bee, Talesh

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SEVERE INFECTION OF A NATIVE GOAT FLOCK WITH *MELOPHAGUS OVINUS* IN KERMAN PROVINCE

Jahangiri Nasr, F.[1*], Afsharimoggadam, A.[1], Shamsi, E.[1], Afsharipour, S.[3]

1. *Department of Parasitology, Faculty of Veterinary Medicine,Shahid Bahonar University ofKerman, Kerman, Iran*
2. *Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Zabol, Zabol, Iran*
3. *Student of Veterinary medicine, Faculty of Veterinary Medicine,Shahid Bahonar University ofKerman, Kerman, Iran*

BACKGROUND: Feeding of ectoparasites, especially ticks from livestock blood, is one of the most important causes of livestock anemia.*Melophagus ovinus* fly is also an external arthropod of goat and sheep that can cause anemia in animals in case of severe contamination.It also has a leather body and no wings that distinguishes it from other flies.
OBJECTIVES: Contamination withbloodthirsty ectoparasites causes anemia and weight loss in livestock. This report is the first report of the contamination of native goats to *Melophagus ovinus* in Kerman.
METHODS: A native goat flock was visited in Baft city of Kerman province with severe itching.A large number of flies without wings were collected from the skin of goats. In this flock, a large number of goats were contamination with these flies.
RESULTS: The flies isolated in the laboratory were examined under the loop, which had a leather body and no wings, and were identified as *Melophagus ovinus* based on their morphological characteristics and using diagnostic keys.
CONCLUSIONS: Contamination with bloodthirsty parasites can over time lead to weight loss andanemia and can lead to death of the livestock in severe contamination. Blood thirsty Flies *Melophagus Ovinus* is one of the most important bloodthirsty flies of small ruminants.There are few reports of these flies. These flies can beeasily transported to other livestock of the same flock and continue bloodthirsty.Based on mentioned points, treatment of infected animals is necessary and different pesticides can be used by spraying.
Key words: Native goat, *Melophagus ovinus*, Kerman

THE FREQUENCY OF *SARCOCYSTIS* SPP. IN SHEEP SLAUGHTERED IN ISFAHAN BY TISSUE DIGESTION AND MOLECULAR METHOD

Kalantari, R[1*], Pestechian. N[1], Yousefi. H.A[1], Keshtkar, M.[2], Esmaeili Fallah, M.[1]

1. *Department of Parasitology and Mycology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran*
2. *Veterinary Doctor, Health Deputy of Veterinary Office of Isfahan Province*

Email: reza.kalantari@mail.mui.ac.ir

BACKGROUND: *Sarcocystis* spp. are intracellular protozoan parasites with an intermediate-definitive host life cycle. Asexual stages develop in intermediate hosts after they ingest the oocyst excreted from definitive host feces and terminate with the formation of intramuscular cysts (sarcocysts).
OBJECTIVES: The aim of this cross-sectional study was to determine the frequency of Sarcocysts ssp. in the infected sheep using tissue digestion and molecular method.
METHODS: Polymerase chain reaction (PCR) was carried out targeting 18S rRNA. Tissue digestion method for detection of sarcocysts was also performed. Suspected and grossly infected samples of esophagus, heart, diaphragm and muscles were collected from sheep slaughtered in the abattoirin Isfahan. The organs were first examined for macroscopic sarcocysts and then subjected to scraping, pepsinization and microscopic examination for the presence of microscopic species of sarcocysts.
RESULTS: Of the 30 heart muscles with no obvious macroscopic cycts, 20 (66%) were positive after digestion, and 27 (90%) were positive by molecular method. Furthermore, of the 52 esophagus muscle, two samples had macrocysts, and both digestion and molecular methods showed 46 positive cases (88%). Of the 44 diaphragm muscle samples, three had macrocysts and 38 (86%) were positive after digestion, and 40 (90%) were positive using PCR method. In six samples (85%) from 7 sheep thighs, sarcocysts were detected with the both digestion and molecular methods.
CONCLUSIONS: Due to the high prevalence of contamination with *Sarcocystis* spp. in livestock, the preventive measures should be applied. People, especially farmers need to be educated and raise their awareness about sarcocystosis, its transmission cycle, and some food preparation modifications in the infection- susceptible groups.
Key words: *Sarcosystis*, Sheep, Isfahan, Tissue digestion, 18S rRNA

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THE PREVALENCE OF SEROPOSITIVITY DUE TO *NEOSPORA CANINUM* PARASITE IN GUARD DOGS IN THE LABAN COMPLEX OF QOM CITY USING ELISA METHOD

Karimi, S.[1], Salimi-Bejestani, M.R.[*2], Javan Shir, A.[3], Azizi, H.R.[4], Bahari, A.[5]

1. *MSc student of Veterinary Parasitology, Faculty of Buali Sina University of Hamedan*
2. *Assistant professor of Pathobiology group, Faculty of Veterinary Medicine, Semnan University*
3. *PhD student of veterinary Parasitology, Faculty of Veterinary Medicine, Urmia University*
4. *Associated professor of Pathobiology group, Faculty of Veterinary Medicine, Share Kord University*
5. *Associated professor of Pathobiology group, Faculty of Buali Sina University of Hamedan*

BACKGROUND: Neosporosis was first identified in 1984 in dogs with symptoms of neuromuscular degeneration. In 1988, Dubey et al., With a retrospective study of dogs that had signs of neuromuscular disease, introduced *Neospora caninum* as definitely new and emerging species. Dogs as the host and intermediate host have a special role in transmitting the disease and life cycle of the *Neoprene caninum* parasite.
OBJECTIVES: The purpose of this study was to investigate the prevalence of seropositivity of *Neospora caninum* parasite in Guard dogs in Laban Complex of Qom city using ELISA method.
METHODS: 50 blood samples were obtained of cephalic or Safin vein of guards dogs of Laban complex during the autumn and winter of 2014. Then sera were isolated to evaluate *neospora caninum* infection by ELISA method.
RESULTS: The serologic data were analyzed by Chi-square test using SPSS software. The results showed that 48 out of 50 samples were negative and 2 were positive in dogs. Hence seroprevalence of *Neospora caninum* in dogs was 4%. This seroprevalence can be due to the vertical transmission of the disease during pregnancy.
CONCLUSIONS: According to the ways of transmission of contamination through oocyst in stools of infected dogs and swallowing by intermediate hosts such as cows, access to dogs, especially puppies, should be avoided in the food warehouse and source of water for cows and other intermediate hosts.
Key words: *Neospora caninum*, ELISA, Guard dogs.

ISOLATION AND IDENTIFICATION OF *CRYPTOSPORIDIUM*SPP. IN YOUNG DIARRHEIC CATTLE

Karimi, Gh. R., Paykari, H., Rivaz, Sh., Nasiri, V., Banani, M., Abdigoudarzi, M.

Department of Parasitology, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran

BACKGROUND: Crytosporidiosis is a parasitic disease caused by the *Cryptosporidium* protozoan in the vertebrate animal. This protozoon is a zoonotic and opportunistic parasite and in humans with immunodeficiency the period of the disease would become prolonged and severe. The infection is widespread throughout the world and in Iran is reported from various species like poultry, cattle, sheep and goats. In addition to its medical significance, infection in animals may cause significant economic losses, due to the high rate of morbidity and sometimes severe loss of growth and overall weight gain losses. The main source of the parasite spread is infectious feces. Oocysts enter new hosts through the host mouth and cause auto-infection in intestinal mucosal layer of the intestinal cells. Enterocyte cells are the target cells of the infection and they would be severely damaged.
OBJECTIVES: The purpose of this project was to isolate and identify the *Cryptosporidium* species by morphological indices in diarrheic calves in order to detect and control the disease.
METHODS: According to the method of Casemore et al., purification of oocysts from feces using flotation technique was carried out. The total of 150 cattle fecal samples randomly collected from Alborz province, stained with modified Ziehl-Neelsen method (Henrisksen method) and identified with diagnostic keys.
RESULTS: 60 out of 150 (40%) calf diarrhea positive samples were detected by modified Ziehl-Neelsen method staining.
CONCLUSIONS: In all fecal samples from calves without diarrhea, the oocyst was not observed. In calves below one month, especially in the first two weeks, 40% of the diarrheic samples were infected. *Cryptosporidium parvum* alone causes clinical disease in young calves, the latent infection time is 3 to 6 days.
Key words: Isolation, Identification, *Cryptosporidium* spp., Calf Diarrhea

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EVALUATION OF HISTOPATHOLOGIC LESIONS IN LIVER OF *DICROCOELIUM DENDRITICUM* INFECTED CATTLE WITH SPECIAL STAINING

Khoshbakht E.[1], Moosavi Z.[2*], Borji H.[2], Heidarpour M.[3]

1. *Student of Doctor of Veterinary Medicine (DVM), University of Ferdowsi, Mashhad, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Ferdowsi, Mashhad, Iran*
3. *Department of clinical sciences, faculty of veterinary medicine, university of Mashhad, Mashhad, Iran*

Background: *Dicrocoelium dendriticum* is a conical resin in bile ducts of wide range of different hosts such as ruminants and humans that causes direct and indirect economic losses to the livestock industry in the world and Iran. Dicrocoeliosis among parasitic diseases of ruminants is a less commonly known disease which generally has no clinical symptoms.

Aim: The purpose of this study was to evaluate the histopathologic lesions of liver in dairy cows infected with *Dicrocoelium dendriticum* that were slaughtered in Mashhad slaughterhouse.

Method: Twenty liver of cattle infected with *Dicrocoelium dendriticum* from Mashhad slaughterhouse during January to March 2018 were collected in the laboratory of pathology of the faculty of veterinary medicine of Mashhad. Four tissue samples from each liver were prepared and the remaining livers were sent to the laboratory of parasitology to determine the type and severity of infection. After tissue processing, the sections were stained with hematoxylin and eosin, PAS and Masson's trichrome staining and were studied under the light microscope.

Results: All the received livers only were infected by *Dicrocoelium dendriticum* and the severity of parasitic load were from 48 to 1656. The parasites were visible in the biliary tract. In the histopathologic study, tissue lesions include infiltration of inflammatory cells, biliary hyperplasia, increase of goblet cells, intense fibrosis around biliary ducts were seen. Increasing goblet cells and fibrosis were manifest in PAS and Masson's trichrome staining. The severity of histopathologic lesions with parasitic infection was increased but this relationship was not significant.

Conclusions: The results of this study indicate that the lesions created in the liver of infected cattle are very severe. Due to the potential impact on liver function and economic losses that can be caused, the disease in cattle is of great importance and should be considered.

Keywords: *Dicrocoelium dendriticum*, histopathology, cattle, liver

SURVEY OF HEMOPARASITES OF WILD PARTRIDGES IN SEMNAN, IRAN

Khodadi, M.[1*], Rassouli, M.[1, 2], Staji, H.[1], Montazeri, S.[1]

1. *Faculty of Veterinary Medicine, Semnan University, Semnan, Iran.*
2. *Pathobiology Department, Shahmirzad School of Veterinary Medicine, Semnan University, Semnan, Iran*

Email: m.khodadi33@gmail.com

BACKGROUND: Partridge (*Perdix* sp., Galliformes) has delicious meat which is grown and hunted by Iranian Department of Environment approval in Iran. There are varieties of different infections among partridges due to their free-living status. There are some hemoparasites in Haemosporidians, Hematozoa and Kinetoplastida groups which can be transmitted to birds through arthropoda.

OBJECTIVES: The aim of this study was to diagnose the hemoparasites of referred samples of wild partridges to parasitology laboratory.

METHODS: 13 blood smears of wild hunted partridges with Iranian Department of Environment approval were referred to parasitology laboratory. The samples were stained by Giemsa and observed for hemoparasites

RESULTS: 3 out of 13 (23.1%) were infected with *Leucocytozoon*, 2 out of 13 (15.4%) *Haemoproteus*, 4 out of 13 (30.7%) *Babesia* and 1 out of 13 (7.7%) *Trypanosoma.*

CONCLUSIONS: According to the results, these observed parasites are not host-specific. The partridges can act as a source of infection for other birds.

Key words: Partridge, Hemoparasite, Iran

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STUDY OF THE AMOUNT OF INFECTION WITH ECTOPARASITES IN THE ORNAMENTAL BIRDS OF ALBORZ PROVINCE

Mehrangiz Kian Ersi [1], Bahar Shemshadi [2], Salomeh Shirali [3]

1. *Graduated in Master's Degree, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*
2. *Dept. of Parasitology, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*
3. *Dept. of Parasitology, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*

BACKGROUND: Ornamental Birds have long been the companion of human. Infection with ecto parasites is among the most wide-spread contaminations in these birds, most of which are common in human and birds, and they can be easily transferred to human such as *Dermanyssus gallinae* which causes discomfort in human. This study was carried out with the aim of recognizing the ectoparasitic contaminations in these birds.

OBJECTIVES: With regard to the importance of the subject of contamination in Iran, this study was conducted aimed at specifying the amount of infection with ectoparasites in the ornamental birds of Alborz province, and also making people aware of the possible risks of keeping ornamental birds.

METHODS: The sampling was carried out by randomly referring to the city Bird Shops. In so doing, some 150 ornamental birds including Finches, Budgerigars, Parrots, Atlantic Canaries and Mynas were studied for the existence ectoparasite infections on their feather and beneath their wings and feet, and an entrapment system was used regarding *Dermanyssus gallinae* mite. Then, the samples were taken to the laboratory and they were clarified by 10% Potassium hydroxide, and after preparing a slide, the samples were observed through a microscope.

RESULTS: The result of tests performed on the ectoparasites' samples showed that 19 Finches (63.3%), 22 Budgerigars (73.3%), 6 Parrots (20%), 26 Atlantic Canaries (86.6%) and 7 Mynas (23.3%) had been infected with *Dermanyssus gallinae* mite, and totally, from among the entire 150 birds, 80 of which (53.3%) were affected by ectoparasites.

CONCLUSIONS: The current study indicated that infection with ectoparasites in the ornamental birds of Alborz province is too high, and since they are much close to people, the ectoparasites in the ornamental birds can be easily transferred to people and exert symptoms such as itching, irritation and swelling in their skin and it might also lead to inflammation. Hence, paying great attention to the health of ornamental birds is an important fact to be observed.

Keywords: Ornamental Birds, Ecto Parasites, Infection, *Dermanyssus gallinae*, Alborz

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STUDY OF THE AMOUNT OF INFECTION WITH FAECAL PARASITES IN THE ORNAMENTAL BIRDS OF ALBORZ PROVINCE

Mehrangiz Kian Ersi [1], Bahar Shemshadi [2], Salomeh Shirali [3]

1. *Graduated in Master's Degree, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*
2. *Dept. of Parasitology, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*
3. *Dept. of Parasitology, Faculty of Veterinary Sciences, Islamic Azad University/ Science & Research Branch*

BACKGROUND: Ornamental birds have a significant popularity among people due to their elegance and delicacy. Because of the noble environmental and climatic conditions of this city, many of the inhabitants of Alborz province have shown special interest in keeping ornamental birds, where they can be found in almost every house. This study was carried out with the aim of recognizing the faecal parasitic contaminations in these birds.

OBJECTIVES: With regard to the importance of the subject of contamination in Iran, this study was conducted aimed at specifying the amount of infection with faecal parasites in the ornamental birds of Alborz province, and also designating the role of ornamental birds in transferring parasitic infections to human or other birds.

METHODS: The samples of 150 ornament birds such as Finch, Budgerigar, Parrot, Atlantic Canary and Myna were collected and transferred to the laboratory, and they were precisely studied for the existence of different parasites' eggs. Finally, a statistical analysis was performed using chi-squared test method.

RESULTS: Totally, from the entire 150 ornamental birds, 36 birds (24%) were infected with *Eimeria* oocyst, 1 bird (0.6%) with *Capillaria* and 1 bird (0.6%) with *Ascaridia galli.* Now if we want to mention those values by the name of the birds, that would be 9 Finches (30%), 3 Budgerigars (13.3%), 1 Parrot (3.3%), 17 Atlantic Canaries (56.6%) and 5 Mynas (16.6%) that were infected with *Eimeria oocyst*, and 1 Atlantic Canary (3.3%) with *Capillaria* and 1 Parrot (3.3%) which was infected with *Ascaridia galli.* Besides, no signs of infection with *Cryptosporidium* and *Giardia* were found.

CONCLUSIONS: The current study depicted that infection with *Eimeria* has a normal status compared to other studies carried out in Iran; however, it has a lower status toward the studies conducted abroad. In the end, this can be inferred that the outbreak of parasitic contamination is much more visible in areas where health principles are not observed. Therefore, in order to prevent parasitic contamination, it is necessary for the breeding areas and cages to be regularly cleaned and supervised.

Key words: Ornamental Birds, Faecal Parasites, Infection, *Eimeria*, Alborz

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INFECTION WITH *RAILLIETINA TETRAGONA* IN A PIGEON REFERRED TO THE CLINIC OF VETERINARY MEDICINE FACULTY, TEHRAN UNIVERSITY: A CASE REPORT

Karimi, V.[1*], Komijani, M.[2], Asghari baghkheirati, A.[3], Ahmadi, A.[4]

1. *Department of Avian Health and Diseases, Associated Professor, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *DVM student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *DVSc student of Avian Health and Diseases, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
4. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

BACKGROUND: *Raillietina tetragona* is one of the longest tapeworms found in birds, with a length of 25 centimeters and width of 3 millimeters. This parasite inhabits in the distal part of the gastrointestinal system and can infect a variety of species of birds. Transmission of the parasite from pigeons to other poultry can lead to major direct and indirect economic losses.
OBJECTIVES: Detection and diagnosis of a tapeworm found in the GI tract of a dead pigeon referred to the clinic of Veterinary Medicine Faculty of Tehran University.
METHODS: A 17 centimeters-long and 2.5 millimeters-wide tapeworm was discovered in the jejunum during the necropsy. The worm was studied under a light microscope after Schneider staining.
RESULTS: Observation of unilateral genital pores, a small protruding cirrus pouch in the front one third of each proglottid, and also conversion of uterus to egg capsules in the gravid proglottids lead to a diagnosis.
CONCLUSIONS: GI parasites in birds can cause reduction in absorption of nutrients, obstruction of the GI tract, diarrhea, dehydration, anorexia, loss of energy and protein in the body, and death. The most important means to prevent these types of infections include maintaining good hygiene and keeping the birds from feeding in an open environment. Also, broad-spectrum antiparasitic drugs can be beneficial in the treatment of possible infections in poultry and companion birds.
Keywords: *Raillietina tetragona*, Pigeon, Parasitic infection

EVALUATION OF KNEMIDOCOPTIASIS OCCURRENCE IN THE BUDGERIGARS (*MELOPSITTACUSUNDULATES*) REFERRED TO THE CLINIC OF VETERINARY MEDICINE FACULTY, TEHRAN UNIVERSITY

Karimi, V.[1*], Komijani, M.[2], Asghari Baghkheirati, A.[3], Rahimi Pirmahaleh, F.[3]

1. *Department of avian health and diseases, associate professor, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Dvm student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *Dvsc student of avian health and diseases, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

BACKGROUND: *Knemidocoptes* is the only burrowing mite in birds which spends its life cycle in the profound parts of stratum corneum. The clinical signs include deformity and thickening of the leg (scaly leg), inflammation, and hyperkeratosis of the beak (scaly face). Infection caused by this parasite can also lead to uncontrolled growth of beak and nails.
OBJECTIVES: In this survey, the Knemidocoptiasis occurrence in the budgerigars referred to the clinic of faculty of veterinary medicine University of Tehran was studied, due to the importance of parasitic diseases and the necessity of their differentiation from other agents infecting the skin and its appendices.
METHODS: Sampling from 140 budgerigars was performed during Shahrivar of 1396 till Shahrivar of 1397. In order to diagnose the causative agent, skin lesions were individually scraped and moved to a tube, which was later filled with a 10% solution of KOH, centrifuged and eventually the sediments were studied under light microscope. RESULTS:5 samples out of 140 (3.5%) were positive for knemidocoptes.
CONCLUSIONS: Although the frequency of knemidocoptiasis incidence in companion birds is not high, lack of knowledge in detecting the infection may lead to unsuitable diagnosis and even treatment. So, paraclinical tests are substantial for an accurate diagnosis of knemidocoptiasis and also differentiating it from other skin abnormalities. In order to prevent parasitic infections, maintaining good hygiene, educating the owner, and periodic application of Ivermectin is recommended.
Key words: *Mite, Knemidocoptes*, Budgerigar

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THE FIRST IDENTIFICATION OF *LYMNAEA GEDROSIANA* SNAIL AS THE INTERMEDIATE HOST OF *SCHISTOSOMA TURKESTANICUM* IN BOROOJERD REGION OF LORESTAN PROVINCE, IRAN

Mirfendereski, R.*[1]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Islamic Azad University, Science and Research Campus, Tehran, Iran.*

Email: ramlee.mf@gmail.com

BACKGROUND: Some important vector-borne diseases are transmitted by snails. Freshwater snails act as intermediate hosts for trematode parasites. The role of these snails as the intermediate hosts has got the importance from the viewpoint of environmental safe systems and public health. These snails are from family Lymnaeidae. One type of *Lymnaea* snails that is very significant from the medical and veterinary perspectives is *Lymnaea gedrosiana* which acts as the intermediate host of *Schistosoma* and *Fasciola.*
OBJECTIVES: According to the previous studies, the most prevalent *Lymnaea* species snail of Iran is *Lymnaea gedrosiana*. However, itwasnot reported to be identified in Boroojerd region of Lorestan province. Therefore, the purpose of this study was to identify this specific type of snail in that region.
METHODS: In this field of study, it was decided to collect 1200 samples of *Lymnaea* species from different areas of Boroojerd region in Lorestan Province. The samples were transported to the Department of Parasitology in Razi Vaccine and Serum Research Institute.
RESULTS: In the laboratory, 32.08 percent of all collected samples were identified as *Lymnaeagedrosiana.* In addition, *Lymnaeagedrosiana* comprises 64.16 percent of Lymnaea samples in Silakhor Plain (P<0.05). The results indicate that the frequency of *Lymnaeagedrosiana* has a significant relationship with the climate condition.
CONCLUSIONS: All in all, the researcher has come into conclusion that some of the most parasitological diseases of this region are due to the transmitted infection of this snail. This study is the first case of identification and classification of Lymnaeagedrosiana in Boroojerd region of Lorestan Province of Iran. Based on the results of the present study, the need to great changes in previous studies conducted by veterinary parasitology scholars is expected.
Keywords: Snail, *Lymnaea gedrosiana*, Intermediate Host, Boroojerd, Lorestan

DETECTION OF DIPLOTRIAENA SPP., A NEMATODE PARASITE, FROM THE BODY CAVITY OF MYNA (*ACRIDOTHERES TRISTIS*) IN ZAHEDAN, IRAN

***Moflehi, E.*[1*], *Afsharimoghaddam, A.*[2], *Saravani, L.*[3], *Salimi Nodoushan, A.*[4]**

1. *Student of Veterinary Medicine, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran*
2. *Faculty of Veterinary, University of Zabol, Zabol, Iran*
3. *Central Laboratory Veterinary Sistan & balouchestan Office*
4. *Veterinary-Maybod.yazd*

Email: moflehi.elahe@yahoo.com

BACKGROUND: A large number of ornamental birds are kept at homes, some of which have imitative skills. Myna is a small bird with great imitative skills, which have led many bird lovers to keep and breed them. This bird is from the starling family (Sturnidae) and it is found both tame and wild. There are several reports on Myna's parasites. There have been reported many cases of *Diplotriaena* spp.
OBJECTIVES: Due to the difficulty of access to wildlife birds, the reports of parasitic infection of these birds are very important and can prepare the Hypothesis for future research
METHODS: Two Myna birds that died in Zahedan's bird selling shops were autopsied. A few white and thread-like worms were observed in the abdominal area. Isolated worms were stored in alcohol in the laboratory and worms were cleared in lactophenol.
RESULTS: They had appendages on the anterior side of their head. Comparing with the detection key, the isolated nematodes were detected to be *Diplotriaena* spp.
CONCLUSIONS: There are reports on Myna parasites. There are also several reports on the isolation of Diplotriaena from Mynas in Mashhad, Zabul, and Kerman that match our report. According to the results, it can conclude that birds in nature can be a proper host for different parasites.
Keywords: Myna, Zahedan, Nematode, *Diplotriaena* spp.

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COMPARATIVE ASSESSMENT OF THE SENSITIVITY AND SPECIFICITY OF *FASCIOLA HEPATICA* RECOMBINANT IMMUNOGENIC PROTEINS WITH AN AVAILABLE COMMERCIAL KIT IN SERODIAGNOSIS OF *OVINE FASCIOLOSIS*

***Mokhtarian K.*[1*], *Falak R.*[2]**

1. *Clinical Biochemistry Research Center, Basic Health Sciences Institue, Shahrekord University of Medical Sciences, Shahrekord, Iran*
2. *Immunology Research Center, Iran University of Medical Sciences, Tehran, Iran*

BACKGROUND: Laboratory diagnosis of sheep fasciolosis is commonly performed by coprological examinations; however, this method may lead to false negative results during the acute phase of the infection. The poor sensitivity of coprological methods is also a paradox in diagnosis of the chronic phase of the infection.
OBJECTIVES: In this study, we determined the potential of the recombinant forms of *F. hepatica* immunogens in detection of fasciolosis. Moreover, following development and optimization of specific immunoassays, we compared the findings with the obtained results from an available commercial kit (DRG, Germany).
METHODS: Immunoreactivity and specificity of recombinant forms of *F. hepatica* antigens, including fatty acid binding protein (FABP), glutathione-S transferase (GST), and cathepsin L-1 (CL1) proteins in serodiagnosis of the chronic form of sheep fasciolosis were studied by ELISA and the results compared. The cut-off values were determined by receiver-operator characteristic (ROC); furthermore, the specificity and sensitivity of the assays were assessed by Youden's J.Serologic cross-reactivity was evaluated using samples from healthy sheep (n=40), *Fasciola* infected sheep (n=30), and sheep with other parasitic infections (n=43).
RESULTS: DRG KIT had suitable sensitivity (97.5%) and specificity (100%) in comparable to the studied recombinant immunogenic proteins.FABP showed more than 95% sensitivity in serodiagnosis of *F. hepatica*. The most desirable diagnostic recombinant antigen was rCL1, which showed 100% sensitivity and 97% specificity in ELISA and was capable to discriminate the positive and negative samples by maximum Youden's J values.
CONCLUSIONS: We concluded that due to high specificity and sensitivity, rCL1 is capable to be lonely applied in serodiagnosis of chronic fasciolosis. Thus, may provide us comparable results as obtained by expensive commercial kits for routine serodiagnosis of fasciolosis. Therefore, it could be advantageous in development of novel immunoassays for screening of ovine herds in *Fasciola*-endemic areas and as a reliable agent for detection of fasciolosis in non-endemic regions.
Keywords: Fatty acid binding protein (FABP), Glutathione S transferase (GST), Cathepsin L1 (CL1), Fasciolosis, Indirect ELISA

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SARCOPTES SCABIEI INFESTATION: A RARE PRESENTATION OF IMPLICATED IN A FAMILY

Norouzi, R.[1], Mousavi, Sh.[*2]

1. Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran
2. Department of Food Hygiene and Aquatic Animals, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran

BACKGROUND: *Sarcoptes scabiei* is a microscopic parasiticarthropod that penetrates into epidermis of the skin and causes scabies disease. Scabies is one of the most common causes of itching dermatosis in the world and is a contagious disease, which causes lesion typically on hands, elbows, arms, feet, ankles, abdomen, buttocks, and genital area. In the majority of cases, scabies is diagnosed in overcrowding, poor personal hygiene, poverty, ignorance and poor education condition as well as common in rural regions.
OBJECTIVES: This case report describes a severe case of *Sarcoptes scabiei* infestation from a family with five membership.
METHODS: The scraping and biopsy were carried out from pruritic, nodules and popular rash and cleared by 10% KOH solution, then examined under low power of microscope. In scraped tissues of patients were found various stages include, eggs, nymphs and adults of *Sarcoptes scabiei.*
RESULTS: The confirmation diagnosis of scabies lesions was done by the identification of the itching mite by microscopically and histopathological examining scrapings from the scabies scraps. After treatment by Crotamiton the symptoms were completely resolved within a one week.
CONCLUSIONS: In spite of the low prevalence documented of scabies, it is necessary to apply prevention programs continuously by reducing overcrowding, improving health education, personal hygiene, improving the diagnostics tools, screening and treatment of high-risk populations.
Keywords: *Sarcoptes scabiei*, family, Kurdistan province, Iran

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THE EFFECT OF RAW ONION IN DIET, ON INTESTINAL PARASITES AND BLOOD PHASE OF ADULT SHEEP

Parsaeimehr, K.H.[1*], Cheraghi, H.[1], Hoseinkhani, A.[1], Shadman, M.[2], Dibamehr, A[3]

1. *Department of Animal Science, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
2. *Ph.D. student of veterinary parasitology, University of Tehran, Tehran, Iran.*
3. *PhD student of animal and poultry nutrition, University of Urmia. Urmia.iran.*

BACKGROUND: The onset of parasites in the gastrointestinal tract cause various lesions, which vary depending on the types and numbers of parasites and its severity of the disorders that can be included diarrhea, anorexia, weakness, weight loss, reduced livestock production, reduced intake of food and also in the forms of acute and super-acute causes of death.
OBJECTIVES: The gastrointestinal parasite in sheep is one of the most important contaminations for this reason the aim of this study was to evaluate the effect of raw garlic on sheep intestinal parasites.
METHODS: This experiment was conducted in November and December for 2 months. Treatments consisted of sixteen sheep at 58.5 kg (Averaged) were used in this project. Animals were divided into 4 groups: 1- control group (without additive) 2- control group (Anti-parasitic medicine) 3- 7.5 g garlic (per head) 4- 15 g of garlic (per head). In this study, in addition to counting EPG by the Clayton-Lin method, the Japanese Famacha test and hematocrit test. In this research, a completely randomized CRD design was used to analyze the data.
RESULTS: Results indicate that the counting number of EPG in sheep at the first month as well as the end of experiment was significant, so that the anti-parasitic medicine reduced the number of EPG, but on the other hand, the feces of the sheep in group receiving 15 grams onions had less parasite eggs than the other two groups. Also, based on the Famacha test, in the end of the experiment the sheep receiving the anti-parasite medicine and 15 grams onion represents “not anemic” but other two groups are shown “anemic” and the results of hematocrit test represented that sheeps fed with the treatment containing 15 gr onions had more blood cell counts than other groups.
CONCLUSIONS: The data of this study demonstrated that the rate of EPG in contaminated sheep which did not use anti-parasitic drugs is very high. For this purpose, we must use anti-parasitic drugs or herbs in contaminated. In this project, the use of high levels of raw onions in the diet decreased gastrointestinal parasites and increased the sheep blood mass as well.
Key words: Raw onion, intestinal parasites, blood phase, adult sheep

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COMPARISON OF DIFFERENT GENOMIC TARGETS (18S RDNA, ITS2, 16S RDNA, MSP4) FOR MOLECULAR IDENTIFICATION OF PREVALENT BLOOD PROTOZOA IN IRANIAN CATTLE

***Reza Nabavi* [1*], *Atefeh Fathi* [2]**

1. *Associate Professor of Parasitology, Department of Pathobiology, Veterinary Faculty, University of Zabol.*
2. *Student of Doctor Veterinary Medicine, Veterinary Faculty, University of Zabol*

Email: Rezanabavi@uoz.ac.ir

BACKGROUNDS: The cattle blood protozoa are very important for animal health and infection with them may be very dangerous and cause economic lost. The most important genes are *Theileria, Babesia* and *Anaplasma.* However, the disease that they induce accompanied with different clinical signs but in many times some of symptoms are similar and finding accurate identification of species with classic identification methods is difficult. Using molecular methods like PCR for accurate identification are highly efficient.
OBJECTIVE: Finding the suitable molecular targets in order to accurate identification of cattle blood protozoa.
METHODS: In present study vein blood specimens achieved from cattle with clinical symptoms of bovine Theileriosis, Texas Fever and Anaplasmosis. Firstly, the blood parasites have been identified with Giemsa staining method. Secondly the genomic targets (18s rDNA, ITS2, 16s rDNA,MSP4) of each parasite have been amplified with PCR. The fragments have been sequenced and compared with such sequences in gene bank.
RESULTS: The results of present study showed that the suitable molecular targets for species identification of the *Theileria annulate, Babesia bigemina, Anaplasma marginale* and *Anaplasma phagocytophilum* are 18s rDNA, ITS2, Msp4 and 16s rDNA, respectively.
CONCLUSION: These 4 species are the most prevalent blood protozoa in Iranian cattle and using PCR and choosing specific primers in mentioned targets could be very useful for identification.
Key words: Blood protozoa, Genomic targets, Cattle, Iran

GENOTYPING *FASCIOLA HEPATICA* BY PCR METHOD IN SLAUGHTERHOUSE LIVESTOCK IN LORESTAN PROVINCE PCR-RFLP

***Parsa F.*[*]**

Email: faparsa2007@yahoo.com

BACKGROUND: *Fasciola* is one of the most common traumatic contaminations of livestock. This parasite causes a lot of problems in animals. It is very difficult to identify species of the parasite morpholigically and it is sometimes impossible due to different inter species forms in this genus.
OBJECTIVES: In this study, we used morphological and molecular methods to identify parasites.
METHODS: A total of 90 *Fasciola* species were obtained from livestock of Boroujerd and Khorramabad slaughterhouses. A small portion warm edge was removed to extract DNA and the rest of the worm is closed between lamella and fixed by formalin solution (10%). Then were stained to measure the morphological their indicators by alum color. DNA was extracted by Sina Coulin Company Kit and ITS1 was amplified from the ribosome DNA by PCR method. Rsal enzyme was used to investigate the RFLP pattern.
RESULTS: The characteristic pattern of species of *Fasciolahepatica* and *F. gigantica* is quite distinct from each other and it was fully compatible with morphological indicates, but no cross-species was detected.
CONCLUSIONS: This molecular technique seems to be very accurate and fast, and an appropriate method for identifying the species of *Fasciola.*
Keywords: *Fasciola*, Identification, Molecular, PCR

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MOLECULAR DIAGNOSIS OF *SARCOCYSTIS* SPP. AMONG MACROCYSTS OF ESOPHAGUS MUSCLES OF REFERRED SHEEP TO SEMNAN ABATTOIR, IRAN

Estiri, M. [1]***, Rassouli, M.*** [1,2*]***, Salimi-Bejestani, M.R.*** [1]

1. *Pathobiology department, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran.*
2. *Pathobiology department, Shahmirzad School of Veterinary Medicine, Semnan University, Semnan, Iran*

Email: Mrvpar@semnan.ac.ir

BACKGROUND: *Sarcocystis* is a protozoan parasite, phylum Apicomplexa which needs two different hosts in its life cycle. Final hosts dominantly are canids and felids and intermediate hosts are herbivores. Schizogony phase passes in intermediate host, gametogony and sporogony phases pass in definitive host. Sarcocystosis in sheep causes abortion, production reduction and carcass condemnation of infected carcasses to macrocysts in abottairs. Species of *Sarcocystis* can be dignosed by electron microscopy and molecular studies.
OBJECTIVES: The aim of this study was molecular diagnosis of *Sarcocystis* macrocysts in esophagus muscles of referred sheep to Semnan abattoir.
METHODS: In this study 30 infected esophagi to *Sarcocystis* out of 107 inspected samples from referred sheep to Semnan abottair were isolated and studied by RAPD-PCR to diagnose the species of *Sarcocystis*.
RESULTS: All of the samples were diagnosed as *S.gigantea*. The prevalence of this infection was estimated 28.04% (19.6-36.5%; 95%CI) among referred sheep to Semnan abottair.
CONCLUSIONS:*S.gigantea* is nonpathogenic and non-zoonotic species of *Sarcocystis*. Therefore, it is recommended that the species of the parasite diagnosed and carcass condemnation prevented by freezing the infected meat and the meat is sent to meat processing factories.
Keywords: *Sarcocystis*, Sheep, Semnan, Iran.

ESTIMATION OF CONGENITAL TRANSMISSION RATE OF *NEOSPORA CANINUM* IN DAIRY CATTLE OF TORBAT-E- HEYDARYEH AREA

Shahidi, M.[1]***, Razmi, G.R.***[*2]***, Seifi, H.*** [3]

1. *Graduated from Faculty of Veterinary Medicine, Ferdowsi University of Mashhad*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad.*
3. *Department of Clinical Science, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad*

Email: Razmi@um.ac.ir

BACKGROUND: *Neospora caninum* is an important cause of abortion in dairy cattle.
OBJECTIVES: The objective of this study was to estimate the rate of vertical transmission of *N. caninum* in dairy cattle in Torbat-e-Heydareih area.
METHODS: In this study, 280 serum samples were collected from two dairy herds and examined by ELISA method for detection of antibodies against *N.caninum*. After birth, the colostrum and the blood samples of pre-colostral calves of seropositive dairy cattle were collected and were examined to detect antibodies against *Neospora* by ELISA.
RESULTS: The frequency of *Neospora* infection were determined 16.5% and 12.12% in farms number 1 and 2, respectively (P>0.05). In this study, there was no significant difference in the frequency of *N.caninum* infection in different age groups and number of births in dairy cattle (P>0.05).The results showed that all calves born from seropositive cattle had antibodies against *Neospora caninum,* whereas, only 13.3% of colostrum samples from infected dairy cattle were positive. In this study, there was a significant correlation between the optical density value of the sera of the mothers and the calves (P<0.05), whereas these results were not significant between the optical density measurements of the mothers and calves' sera with colostrum of mothers.
CONCLUSIONS: Considering the significant frequency of *Neospora* infection and the high percentage of vertical transmission rate in dairy farms of Torbat-e- Heydaryeh area, it seems that Neospora infection is of great health importance in dairy farms in this area.
Key words: *Neospora caninum,* congenital transmission, cattle

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SLAUGHTERHOUSE SURVEY OF PARASITIC CAUSES OF LIVER CONDEMNATION IN SLAUGHTERHOUSE INSPECTION, RAY CITY, IRAN

Rostaei, M.M.[1], Jamshidi, K.[2*], Shabani, Z[1].

1. *Student, Faculty of Veterinary Medicine, Islamic Azad University, Garmsar Branch, Iran.*
2. *Department of veterinary pathology, Faculty of Veterinary Medicine, Islamic Azad University, Garmsar Branch, Iran.*
3. *Student, Faculty of Veterinary Medicine, Islamic Azad University, Garmsar Branch, Iran.*

Email: drjamshidi2000@gmail.com

BACKGROUND: Parasitic infection of the liver is of particular importance, and can be identified by a definite diagnosis in slaughterhouse by autopsy or post-mortem inspection.
OBJECTIVES: The current study was aimed to evaluate parasitic causes of liver condemnation during slaughterhouse inspection in the slaughterhouse of Ehsan Rey, in the city of Ray.
METHODS: In this research, the liver belonging to 1,041 heads of sheep slaughtered were examined during the fall of 2016.
RESULTS: A total of 116 livers (11.41%) were recorded, of which 94 cases (81.33%) were infected with *Dicrocoelium dendriticum*, followed by *Fasciola hepatica* (7 cases; 6.03%), hydatid cyst (9 cases;7.76%), and *Cysticercus tenuicollis*(6 cases; 5. 17%). The results of this study showed that *D. dendriticum* was the most common parasitic causes of liver condemnation among slaughtered sheep in Ray city (81.33%).
Key words: Sheep, Slaughterhouse, Liver, Parasite.

THE FIRST REPORT OF THEILERIOSIS IN A DROMEDARY CAMEL FROMKERMAN PROVINCE

Saafizadeh, Z.[1], Samimi, A.S.[1*]

1. *Department of Clinical Science, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran.*

BACKGROUND: Theileriosis is one of the most important tick-transmitted infectious diseases, which can results in anemia, shock and death.
OBJECTIVES: There have been no previous reports of theileriosis in the dromedary camelfrom Kerman province till now.
METHODS: An 8-year old female dromedary camel (*Camelus dromedarius*) which was about 350 kilogram with a one-day history of anorexia, weakness, low body condition score and muscle tremorwas referred to the specialized veterinary hospital. The clinical signs were as follow: decrease inrectal body temperature, increase in heart and respiratory rate, hyperemia/yellowish mucosa membrane (oral cavity, eyes and vagina) and increase in capillary refill time. In clinical examination enlargement of periscapular lymph nodes, conjunctivitis, keratitis, corneal opacity, lacrimation, dyspnea, bilateral frothy nasal discharge, presence of petechial and ecchymotic hemorrhage on mucosal membraneand presence of several ticks on different parts of the camel body surface were observed. Hematological findingsrevealed hemolysis (PCV = 19%), acute inflammation and toxemia (increase in the number of white blood cells, neutrophils and band cells)
RESULTS: In blood and lymph node smear and Giemsa-staining, cytoplasmic schizonts of Theileria were observed in red blood cells.
CONCLUSIONS: *Theileria camelensis* which causes camel theileriosis is anintracytoplasmic of red blood cells *protozoan*. It also causes extravascular hemolysis, toxemia and endothelial damages. Furthermore, icteric *mucus membranes and large vessels endothelium were seen as a result in extravascular hemolysis (in lymph nodes). Camel*theileriosis is a tick-bornedisease which transmitted by *Hyalomma anatolicum* and *hyalomma dromedarii*. It seems this is the first report of theileriosisin a dromedary camelfrom Kerman province.
Key words: Theileriosis, dromedary camel, Kerman

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IDENTIFICATION OF ECTOPARASITES OF CAMELS IN SABZEVAR CITY, IRAN

Shamsi, L.[1*], Samaeinasab, S[2]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.*
2. *Young Researchers and Elite club, Sabzevar Branch Islamic Azad University, Sabzevar, Iran*

Email: layashamsi@gmail.com

BACKGROUND: Ectoparasite infestation can transmitted pathogens. They also cause economic losses and sometimes can cause calf mortality and reduce growth rates.
OBJECTIVES: The objective of the present study was the determination of ectoparasite infestations on camels (*C. dromedarius*) in Sabzevar city, Iran.
METHODS: This survey was conducted from April 2017 to March 2018. A total of 75 camels were examined for ectoparasite infestation. All ectoparasites were collected in vials containing ethyl alcohol (70 %) and brought to the laboratory.
RESULTS: The results showed that 25 camels (33.33%) were infested by hard ticks. There was not any infestation by other external parasites (mite, lice, flea, myias). The whole detected ticks were 130. The hard ticks on camels were identified as follows: *Hyalomma dromedarii* (34.61%),*Rhipicephalus bursa* (27.69%) and *Hyaloma anatolicum.anatolicum* (37.69%).
CONCLUSIONS: In conclusion, appropriate tick control programs in Sabzevar city would seem a prerequisite for progressing camel milk and meat production.
Key words: Ectoparasite, Tick, Sabzevar, Camel

ANTIBODY SEROCONVERSION AGAINST *TOXOPLASMA GONDII* IN HUMANS IN BARDSIR CITY IN 2017

Sheibani, S.*[*1], Nourollahifard, S.R.[2], Behzadi, GH.[3], Sakhaee,E.[4]

1. *MSc of Veterinary Medicine, Shahid Bahonar University of Kerman*
2. *Department of pathobiology, School of veterinary medicine, Shahid Bahonar University of Kerman*
3. *Veterinary Bardsir Office, Kerman*
4. *Department of Clinical sciences, School of veterinary medicine, Shahid Bahonar University of Kerman*

BACKGROUND: *Toxoplasma gondii* is an intracellular protozoon.*Toxoplasma* is a zoonotic parasite. Human may be the intermediate host of Toxoplasma. Infection of human beings, particularly pregnant women lacking antibody titers against *Toxoplasma*, may cause dangerous complications.
OBJECTIVES: The aim of this study was to determine the sero-prevalence of toxoplasmosis in women of Bardsir city.
METHODS: Sampling of women referred to Bardsir Central Hospital and Laboratory was performed. After their consent, characteristics such as age and level of education were recorded. Blood samples were taken from the hand vein and the serum was separated by centrifugation. The obtained results and the relationship of infection with age and education were analyzed by Chi-square test using SPSS software.
RESULTS: In our research conducted in Bardsir city, 190 women were sampled. Of these samples, 28 had IgG titers against *Toxoplasma*(14.73%). Of these 28 samples, 10 (35.71%) were educated higher than diploma including associate and bachelor degrees. 18 samples (64.22%) had diploma and under the diploma education. Also, the subjects were divided into 3 age-groups including under 20 years of age, 20 to 40 years of age and over 40 years old. The most seropositivity was in the age group of 20 to 40 years that were 17 samples (%71/80). The group under 20 years of age had the lowest infected samples (4 /28). There was a significant relationship between age and infection (P <0.05). Also, there was no significant relationship between education level and parasitic infection.
CONCLUSIONS: Considering the low level of infection among women in Bardasir city with toxoplasmosis, but educating the people at risk is one of the most important factors in reducing the disease.
Keywords: Bardsir, Prevalence, Toxoplasmosis, Serology, ELISA

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THE EFFECT OF GENDER ON PREVALENCE OF *HEPATOZOON CANIS* INFECTION IN DOGS IN TEHRAN

***Soltani, Z*[*1], *Dalimi, AH*[2]**

1. *Faculty of Food Industry and Agriculture, Department of Microbiology, Standard Research Institute (SRI), Karaj, Iran.*
2. *Department of Parasitology and Entomology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran*

Email: R_soltani@standard.ac.ir

BACKGROUND: Hepatozoonosis is a protozoon tick-borne disease that caused by several species of *Hepatozoon.* This genus is classified in the phylum Apicomplexa, sub order Adeleorina and family hepatozoidae. More than 300 species of *Hepatozoon* have been so far identified that 46 species of them are pathogenic for mammals.
OBJECTIVES: The aim of this study was investigate the possible effects of gender on the contamination of dogs with such species of parasites, which have not been investigated in Tehran.
METHODS: In this study, 145 blood samples were collected from the cephalic vein of dogs in Tehran, which included 55 blood samples from male dogs and 90 blood samples belonging to female dogs. In order to detect the *Hepatozoon canis,* PCR-specific primers are used to amplify a single 897 bp fragment of the 18srRNA gene of the *Hepatozoon* species.
RESULTS: According to PCR results, 17 male dogs from 55 dogs and 15 female dogs from 90 dogs were contaminated with *Hepatozoon canis*. Statistical analysis showed that the prevalence of *Hepatozoon canis* in male dogs was 30.9% and in female dogs was 16.7%. However, the statistical findings of the data did not show significant difference at the significance level of 0.05 ($P < 0.05$). Male dogs were more infected with the parasite than female dogs.
CONCLUSIONS: Although the prevalence of infection in male dogs (30.9%) was higher than female dogs (16.7%), gender differences were not significant in this study ($P < 0.05$). This result is similar to the survey by Aktas et al. And Gomez et al. (2010) the study showed that the dogs did not affect the possibility of contamination with *Hepatozoon canis*.
Key words: *Hepatozoon canis*, dog, PCR, Tehran

GENOTYPING OF *BLASTOCYSTIS* SP. IN LIQUID CULTURE MEDIUM

***Taji elyatow, R.*[1*]*,Sadraei, S.*[2]*, Pirestani, M.*[2]**

1. *MSc Student at Tarbiat Modarres University*
2. *Associate professor of Tarbiat Modarres University*

BACKGROUND: The parasite of *Blastocystis* is a cosmopolitan intestinal protozoan parasite mainly found in humans and animals. Approximately 17 subtypes of the parasite have been identified, nine of which are prevalent in human. In terms of morphological diagnosis, it has less sensitivity, use of molecular methods are more suitable for diagnosis. The parasite is more prevalent among immunocompromised patients, graft recipients and mentally- retardedindividuals.
OBJECTIVES: The purpose of this study is the genotyping of *Blastocystishominis* in liquid culture medium.
METHODS: Samples were collected from health centers and hospitals and checked by microscopic detection with *Lugol*'s iodine. Afterwards, the samples were washed with physiological saline solution and then about 500µL of the sample were inoculated to the LE medium to culture the parasite. To have an axenic culture, the samples were cultured in the Robinson's medium. Specimens were infected by fungi omitted and finally PCR method was used for the remaining specimens.
RESULTS: From 6 obtained specimens, 3 cases were ST3 and other 3 cases were not subtyped.
CONCLUSION: Genotyping of *Blastocystis* from liquid medium was successful.
Key words: *Blastocystis*, subtypes, culture medium.

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DOMESTIC PIGEONS INFECTED WITH *ARGASREFLEXUS* TICK IN THE CITY OF KERMAN

Tokasi, M.[1*], Radfar, M.H.[2], Saravani, L.[3], Molaei, R1.,Kargar, R.[1]

1. *Student of Veterinary Medicine, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran*
3. *Central laboratory veterinary at Sistant, Balouchestan office*

Email: Iran.mahya_78@yahoo.com

BACKGROUND: Domestic pigeon breeding has long been popular in various parts of the world. There are many different breeds of domestic pigeons throughout the world. Infection of pigeons with the *Argas reflexus* tick leads to atrophy, anemia, and eventually their death.
OBJECTIVES: Infection of pigeons with *Argas reflexus* ticks causes anemia, and in severe cases, death, and their early treatment eradicates these ticks. There are very few reports on infection of pigeons with *Argas reflexus* tick.
METHODS: The present study was conducted in spring in Kerman. A total of 200 pigeons (100 male and 100 female) were examined for *Argas reflexus* tick. Different parts of the birds were examined including under the wings, back of the neck and under the thighs.
RESULTS: 6 (%6) male pigeons, and 7(%7) female pigeons were infected with *Argasreflexus* tick. A large number of mature ticks were isolated from the pigeon nests, which were identified as *Argas reflexus* by microscopic examination. Red colored spots were observed at the site of tick bites.
CONCLUSIONS: Poultry ticks can easily feed on the birds' blood and cause itching, anemia, and scaring on the birds' body. The *Argas reflexus* ticks are specific to pigeons, and severe infection with these ticks causes immobility and death. It is recommended that all infected pigeons be treated with a certain amount of topical pesticides.
Key words: Pigeon, *Argas reflexus*, Itching, Anemia, Death.

NEMATODE INFECTION OF A LION WITH *TOXASCARIS LEONINA* IN KERMAN ZOO, IRAN: A CASE REPORT

Tokasi*[*],M.[1], Akhtardanesh,B.[2], Khedri,J.[3], Alipour,A.[1]

1. *Student of Veterinary Medicine, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran*
2. *Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran*
3. *Research Center for Hydatid Disease in Iran, Kerman University of Medical Sciences, Kerman, Iran*

BACKGROUND: *Toxascaris leonina* is a gastrointestinal nematode in dogs and cats and other carnivores with a direct and indirect life cycle. There are few reports on the prevalence of these parasites in carnivore zoo animals.
OBJECTIVES: This case is reported due to the severity of the infection of this lion, and the importance and rarity of this event.
METHODS: A lion that was euthanized due to severe hand infection, was autopsied in the autopsy hall of School of Veterinary Medicine in Shahid Bahonar University, Kerman, Iran. The stomach and then all parts of the digestive tract were examined. In the intestines, a large number of white and thread-like nematodes were observed in lengths of 5 to 8 cm.
RESULTS: The nematodes were isolated and transferred into normal saline, and after some hours, they were transferred into 70% alcohol. *Toxascaris leonina* was diagnosed due to the head fins,the host, and morphological characteristics. Two other lions in the zoo were treated periodically and regularly with anti-parasite Albendazole.
CONCLUSIONS: The present report suggests that zoo carnivores should be regularly tested for parasitic infections, especially for the presence of Ascaris sp. because severe infections with these nematodes will obstruct the intestines, resulting in the death of the animal. The main importance of digestive Ascaris sp. is in creating zoonosis visceral larva migrans (VLM) and ocular larva migrans (OLM). Periodical and regular treatment with anti-parasitic drugs are hence recommended.
Keywords: Zoo,Carnivores, Lion, *Toxascaris leonina*, Parasitic Infections

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MOLECULAR EVALUATION OF THE SNAILS WITH MORPHOLOGICAL SIMILARITY TO *GALBATRUNCATULA* BASED ON THE SEQUENCE OF ITS-1 GENE IN MAZANDARAN, IRAN

Majid Yazdani Borji.*[*1], ParvizShayan.[2], Shahrokh Ranjbar Bahadori[3].

1. *Faculty of Veterinary Medicine, Karaj Branch, Islamic Azad University, Karaj, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran.*
3. *Department of Parasitology, Faculty of Veterinary Medicine, Garmsar Branch, Islamic Azad University, Garmsar, Iran*

Email: yazdanimborji@gmail.com

BACKGROUND: Lymnaea species are of great importancebecause of their role as the intermediate host of the flukes of the genus Fasciola. Physiological distinction among some Lymnaea species is difficult. However, identifying these snails is important in transmission, epidemiology, and control of the infection.
OBJECTIVE: The current study was aimed to identify *Galbatruncatula* from other similar species in farms and plains of Mazandaran province, Iran using the molecular approach.
METHOD: Based on the similarity of the snails to the *Galba truncatula*, about 500 Samples were collected from farms and plains in Mazandaran and then sent to the laboratory. Afterward, 100 samples were selected based on the *morphologicalidenti*fication *keys* of the *Galba truncatula.* Furthermore, PCR primers were designed based on the *Galba truncatula* gene (rDNA ITS-1), and DNA was next amplified using PCR and semi-nested PCR methods. Subsequently, the PCR product was purified and sequenced.
RESULTS: Based on the findings presented herein, 82% of samples in PCR and semi-nested PCR were found to be *Galba truncatula*. After sequencing, findings indicated taht samples were consistent with both *Galba truncatula* and *L. schirazensisbecause* of the morphological similarity and genetic overlapping, Discrimination of these two species is difficult; therefore,use of *several different* types of genes are needed.
CONCLUSION: Since the Lymnaea species, as intermediate host, have morphological similarity and genetic overlapping, identifying and categorizing them by molecular and morphological methodsis prioritized for epidemiology and controlling infection.
Keywords: Snail،*Galba truncatula, L.schirazensis,* ITS-1, Mazandaran Province

MOLECULAR IDENTIFICATION OF *EIMERIA* SPECIES IN BROILER, LAYING AND BREEDER CHICKENS FARM IN MASHHAD AREA

***Razmi, GH.*[1*], *Zolfaghari, S.*[2]**

1. *DVM, PhD, Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran*
2. *DVM, Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran*

Email: razmi@um.ac.ir

BACKGROUND: Coccidiosis is one of the most important protozoa diseases in poultry production worldwide, causing many losses annually due to the loss of or loss of production in the poultry industry.
ABJECTIVES: Due to the importance of contamination in Iran,the aim of this study was to identify of *Eimeria* species from poultry breeder, laying and broiler chicken farm in Mashhadarea by molecular methods.
METHODS: 42 litter samples of poultry farms were sampled, and then OPG (oocyst per gram)of positive samples were determined using McMaster's method. Genomic DNA was extracted from a portion of sporulated oocysts of infected samples using a DNA extraction kit. Finally, each sample was examined by Nested –PCR method.
RESULTS: In this study, a total of 42 poultry farms, *Eimeria* spp oocysts was observed in nine litter samples during microscopic examination. Molecular results showed that four species of Eimeria spp such as, Eimeria acervulina, Eimeria tenella, Eimeria maxima and Eimeria mitis in broiler farms, five species of *Eimeria* spp such as, *Eimeria acervulina, Eimeria tenella, Eimeria maxima, Eimeria brunetti* and *Eimeria mitis* in laying farms, and five species such as, *Eimeria acervulina, Eimeria tenella, Eimeria maxima, Eimeria necatrix* and *Eimeria brunetti* in breeder farms were presented.
CONCLUSIONS: According to the molecular results, at the first time, *Eimeria acervulina, Eimeria tenella* and *Eimeria maxima* were identified in all three farm fields and *Eimeria necatrix* only in the breeder farm in Mashhad area.
Key words: Eimeria, Molecular Identification, Poultry, Mashhad area

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MORPHOLOGICAL IDENTIFICATION OF *EIMERIA* SPECIES IN BROILER AND LAYING CHICKENS' FARMS IN MASHHAD AREA

Razmi, GH.[1*], Zolfaghari, S.[2]

1. *DVM, PhD, Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran.*
2. *DVM, Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran*

Email: razmi@um.ac.ir

BACKGROUND: Coccidiosis is one of the most important protozoa diseases in poultry production worldwide, causing many losses annually due to the loss of or loss of production in the poultry industry.
OBJECTIVES: Due to the importance of contamination in Iran, the aim of this study was to identify *Eimeria* species in the broiler and laying chicken farm in Mashhadarea by microscopic method.
METHODS: 40 litter samples of poultry farms including 33 broiler farm and 7 laying farm were sampled and then OPG (oocyst per gram)of positive samples were determined using McMaster's method. The oocysts were washed and cultured in 2.5% dichromate potassium solution in wet incubator. After oocyst sporulation, the size of oocysts was measured using light microscope and micrometric slides.
RESULTS: In this study, *Eimeria* infection were identified in 4 broiler farms and 4 laying farms. *Eimeria tenella, Eimeria acervulina, Eimeria mitis, Eimeria maxima, Eimeria necatrix, Eimeria paracox* and *Eimeria brunetti* in broiler chickens farm, *Eimeria Tenella, Eimeria acervulina, Eimeria mitis, Eimeria maxima, Eimeria necatrix,* and *Eimeria brunetti* in laying chicken
CONCLUSIONS: In this study, the most Eimeria species except the Eimeria paracox were common in broiler and laying farms. Among *Eimeria species, Eimeria maxima, Eimeria mitis* and *Eimeria Tenella* were microscopically identified.
Key words: *Eimeria*, Morphology, broiler farms, Laying farms, Mashhad area

USING THE VERTICAL SIEVE SCREENING IN ORDER TO RECOVERY OF *TOXOCARA* SPP. EGGS FROM SOIL SAMPLES

Zibaei, M.[1*], Bahadory, S.[1], Sadjjadi, S.M.[2], Heidari, A.E[1], Hosseini, H.[1]

1. *Department of Parasitology and Mycology, Faculty of Medicine, Alborz University of Medical Sciences, Karaj, Iran*
2. *Department of Parasitology and Mycology, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran*

BACKGROUND: Nowadays, different methods are used to recovery of eggs parasites from soil samples. Therefore, in order to reduce the amount of mistakes caused by the artifacts (waste and disposable materials for diagnostic purposes), it is necessary to design and usage a special device to collect more and more accurately the eggs of helminthic parasites. OBJECTIVES: The purpose of this study was to design and using a rapid method for collecting different Toxocara spp eggs in order to determine the prevalence of soil contamination.
METHODS: In this study, a total of 200 collected soil samples for recovery of *Toxocara* parasite eggs, a sieve screen was used with plastic body (polyvinyl chloride compressed plastics) in a cylindrical shape with a mesh of 150 µm (can be changed), as well as the cap and holder, the use of sucrose floating method to isolate and identification.
RESULTS: In the current study single cell, multicellular and infective *Toxocara* eggs were recovered from collected soil samples. The results of prevalence of *Toxocara* eggs in collected soil specimens showed that 77 samples (38.5%) were recovered using vertical sieve screening and using traditional technique and flotation methods were 43 samples (21/5%), which showed a significant difference between the two groups ($p<0.05$).
CONCLUSION: Using sieve screen, in addition to the recovery of *Toxocara* parasite, it can use in epidemiological studies to investigate the presence of eggs of nematode parasites such as *Ascaris lumbricoides* and *Trichocephal*, as well as other eggs of zoonotic helminths in soil samples, and the percentage of true eggshell parasites In the soil samples in epidemiological studies.
Key words: *Toxocara* egg, helminthic parasite, sieve screen

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MORPHOMETRIC STUDY ON RADULA STRUCTURE IN CONICAL AND DISCOID FRESHWATER SNAILS

Jamshidy Deilamy, L[1*], Yakhchali, M[1]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Urmia, Urmia, Iran*

Email: drljamshidy@gmail.com

BACKGROUND: The phylum mollusca consist of snails, slugs, oysters and so on. These animals have certain characteristics in common. Many species of land and freshwater gastropods occurs in Iran.
OBJECTIVES: Based on this, it aimed to study radula structure of conical and discoid snails, microscopic and morphometric differences in radula of both freshwater-snails and dental appearance.
METHODS: For these porposes, a total number of 850 snails were collected in fall 2010 and transferred to Mlacology Lab. After snail fixation, it was disectiond in head-foot part and buucal mass removed. Then, it was digested in NaOH 7.5% overnight and stained using Mallory II. Mounted radula including central, lateral and marginal teeth observed in shape details and measured using digital analyzer camera.
RESULTS and CONCLUSIONS: In present study, it seems that there were differences among dental morphology, numbers and sizes for each examined snail radula. On the other hands, radula examination in both land and aquatic snails could be useful to diffrenciate species. It is concluded that radula examination is applicable to identify freshwater snails, especially, Helicella spp., Helix spp., Lymnaea spp. and Physa spp.
Keywords: snaile; radula; sodium hydroxide; Mallory.

INTRA-SPECIES VARIATION OF *DICROCOELIUM DENDRITICUM* ON THE BASIS OF MORPHOLOGICAL CHARACTERIZATION

Modabbernia, G.[1], Meshgi, B.[1*]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran-Iran (Center of Excellent of Ecosystem and Ultrastructural changes of Helminthes)*

Email: Bmeshgi@ut.ac.ir (B. Meshgi)

BACKGROUND: Recently, inter and intra species variation determination on different helminth parasites has been considered as highly important in taxonomic-phylogenetic studies of populations.
OBJECTIVES: The principle purpose of this study was assessment of intra-species diversity of *D.dendriticum* in different definitive hosts from Iranian isolates.
METHODS: Adult small liver fluke were collected from naturally infected cattle and sheep from different geographical regions. Samples (n=200) were morphologically diagnosed according to the morphometric parameters. Body length, body width, maximum diameters of testes and ovary, size of anterior and ventral suckers as well as vitellin glands of single worm separately were measured. The measurements of variables were made with a calibrated microscope.
RESULTS: According to morphometric results, the mean body length of *D.dendriticum* derived from sheep and cattle isolates were 7.67 and 10.70 mm, those of maximum body width were 1.48 and 1.82 mm as well as those of maximum diameter of oral sucker were 378 and 435.37 µm, respectively. On the other hand there were statistically significant differences ($P<0.05$) only in these 3 variables between sheep and cattle isolates.
CONCLUSION: This study shows that variation of *D. dendriticum* is a multifactorial phenomenon including complexity of life cycle, plurality and diversity of intermediate hosts and worm adaptation with various conditions, as well.
Key words: *Dicrocoelium dendriticum*, Variation, Morphology

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CORNEOSCLERAL NEOVASCULARIZATION AND PANNUS DUE TO THELAZIASIS IN A DROMEDARY CALF

Saafizadeh, Z[1], Samimi, A.S.[1*]

1. Department of Clinical School of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran.

BACKGROUND: Pannus is an abnormal layer of fibrovascular tissue or granulation tissue. Common sites for pannus formation include over the cornea, over a joint surface (as seen in rheumatoid arthritis), or on a prosthetic heart valve. Infestation is often clinically inapparent but they may also cause severe ocular diseases.
OBJECTIVES: To the best of our knowledge, there is no previous report regarding the corneoscleral neovascularization and pannus due to thelaziasis in camels.
METHODS: A 6-month-old male calf-camel (*Camelus dromedarius*) was referred to the Veterinary Hospital because of anorexia, photophobia and excessive unilateral ophthalmic mucopurulent discharge during the last 14 days. Clinical examination revealed a normal heart rate, respiratory rate, and body temperature but ophthalmic mucous membrane was hyperemic in the right eye. Keratoconjunctivitis beside corneoscleral neovascularization and pannus formation in the right eye were detected on a precise ophthalmic examination. Incidentally, the clinicians noticed the large number of round worms in the right eye.
RESULTS: Based on microscopic examination of the worms and after comparing the morphologic characteristics with standard helminthology keys, the parasites were identified as *Thelazia rhodesi*.
CONCLUSION: In those species of the genus Thelazia that have been reported, the lifecycles are indirect with muscid flies, particularly the face fly *Musca autumnalis*, being the intermediate hosts. The flies deposit larvae in the conjunctiva when feeding on fluids around the eye. The disease is most frequently seen in summer and autumn when the flies are active. It is usually more common in ruminants than in horses. This is the first report of corneoscleral neovascularization and pannus due to thelaziasis in a dromedary calf.
Key words: Thelaziasis, neovascularization, pannus, Dromedary calf

Zoonotic Parasitic Diseases and Their Role in Public Health, Foodborne and Waterborne Parasites, Tick-bornepArasites

Oral presentation

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HELMINTHS OF VETERINARY AND PUBLIC HEALTHIMPORTANCE IN IRAN:THE GREAT NEGLECTED PARASITIC DISEASES AS IMPORTANT CHALLENGE FOR THE COUNTRY

Hosseini, S.H.*, Fathi, S., Jalousian, F.

Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Email: Hhoseini@ut.ac.ir Tel: +98-21-61117161

BACKGROUND: Parasitic helminths are considered as a group of infectious disease, which affect animals and human, however, climatic factors limit many species to tropical and subtropical areas and affect host population abundance, parasite transmission and the survival.

OBJECTIVES: This study aimed to review the current statues of *zoonotic helminth* infections in Iran and to highlight their risks.

RESULTS: Zoonotic helminths should be considered as an important issue in Iran by health authorities of the country, because requires the implementation of accurate control strategies at several stages including planning, implementation (attack phase), consolidation and care. A collaborative framework is currently needed to develop database from large-scale studies, where can tackle for pivotal questions in helminth epidemiology and control operations effectively. Further studies (e.g. , climate-based risk models, genomics, proteomics, and metabolomics studies are valuable for in-depth understanding of transmission dynamics of helminthes, population biology, and involved parameters, as well as transmission breakpoints, where will be a significant comprehensive approach to providing the needed data for control strategies. The public health and veterinary authorities should address the neglected helminthiases to markedly facilitate the control and elimination strategies of the *parasitic helminths.*

Keywords: *Zoonotic helminths*, challenges, Iran.

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LABORATORY REARING OF FASCIOLA HEPATICA

***Mohammad Moazeni*[1*]**
*1*Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran*
Email: moazeni@shirazu.ac.ir

Introduction: Fascioliasis is not only a major public health concern but also it is an economically serious problem in animal husbandry (Keiser, 2010). Fasciola hepatica as the main causative agents for human and animal fasciolosis, is considered as an economic and public health concern all around the world. Scientific studies on different aspects of the disease should be continue, particularly those relating to vaccine development and evaluation of new drugs. In vivo studies on fasciolosis in sheep and cattle are often expensive, complex to perform and time-consuming (Keiser, 2010). Hence, availability of adult F. hepatica in the laboratory could be of value for in vitro studies on the parasite. By in vitro studies, the scientists can provide information on various aspects of helminth physiology and biochemistry, immunological properties of excretory secretory products of the adult worms and evaluate more easily the effect of new anthelmintics on the parasite (Lehner and Sewell, 1979). Many attempts have been made to culture the metacercariae of F. hepatica to maturity in vitro in various complex media, sera and cells. In addition many efforts have been made on the maintenance of adult F. hepatica under laboratory conditions (Davies and Smyth, 1978; Smith and Clegg, 1981).

Media: The newly excysted metacercaria of F. hepatica have been cultivated in vitro in NCTC 135 (Davies and Smyth, 1978), RPMI 1640 (Smith and Clegg, 1981; Ibarra and Jenkins, 1984) and Hanks' solution (Wikerhauser and Cvetnić, 1967). The adult worms of F. hepatica have been reared under laboratory conditions in Hedon- Fleig solution (Daves, 1954), basic saline solution (Rohrbacher, 1957; Sewell, 1968), Earle's basic salt solution (Foster, 1970), Earle's balanced salt solution (Ractliffe et al., 1969; Lehner and Sewell, 1979), Medium 199 (Lehner and Sewell, 1980) and RPMI 1640 (Ibarra and Jenkins, 1984).

Supplements: Human, rabbit, sheep and calf red blood cells, human, rabbit, sheep, bovine, chick and horse serum, NaCl, KC1,CaCl2, MgSO4, Na2HPO4, NaHCO3, lactalbumin hydrolysate, yeast extract, vitamins, amino acids, sodium borate, glucose, fructose, glycerol, beef liver homogenate, autoclaved liver extract and bovine embryo kidney cells are among the most frequently used supplements in the culture media for laboratory rearing of F. hepatica.

Temperature: Fasciola hepatica has been cultured or reared under laboratory conditions at 28 °C (Foster, 1970), 36°C (Stephenson, 1947), 37°C (Lehner and Sewell, 1980; Smith and Clegg, 1981), and 37-38°C (Davies and Smyth, 1978; Osuna, 1974).

pH: The pH of the culture media used for in vitro culturing of F. hepatica have been arranged from 6.9 to 8.6 (Foster, 1970; Stephenson, 1947).

Change of medium: In previous studies, the culture medium of F. hepatica has been replaced every 12h (Ractliffe et al., 1969), 24h (Foster, 1970)), 3-4 days (Smith and Clegg, 1981) or even every week (Davies and Smyth, 1978).

Antibiotics: In previous studies, the most frequently used antibiotics in the culture medium were streptomycin and penicillin (Wikerhauser and Cvetnić, 1967; Davies and Smyth, 1978; Smith and Clegg, 1981; Ibarra and Jenkins, 1984; Hegazi et al., 2007), while Foster (1970) has used neomycin and Lehner and Sewell (1979) have used benzyl penicillin, streptomycin and amphotericin B as the more effective antibiotics in their culture media.

Survival time: The newly excysted metacercaria of F. hepatica have been reared under laboratory conditions for 14 days (Wikerhauser and Cvetnić, 1967), 54 days (Osuna, 1974), 98 days (Smith and Clegg, 1981) and 108 days (Davies and Smyth,1978).The adult worms of F. hepatica have been maintained alive for 2.5 days (Stephenson, 1947), 5 days (Ractliffe et al., 1969; Lehner and Sewell, 1979; Ibarra and Jenkins, 1984), 7 days (Lehner and Sewell, 1980), 13 days (Martinetto and Capucinelli, 1968), 16 days (Foster, 1970) and 30 days (Rohrabacher , 1957).

Conclusion: The survival time of F. hepatica under laboratory conditions may increase considerably by (Davies and Smyth, 1978; Smith and Clegg, 1981; Smyth, 1994):

1) Proper sterility before and during the rearing period (several washing of the parasite with isotonic media containing broad-spectrum antibiotics and addition of antibiotics to the culture media).

2) Reproduction of physico-chemical characteristics of the natural habitat of the parasite in the culture system (temperature, pH, gas phase (especially p O and p Co2), oxidation- reduction potential (Eh), supporting matrix and osmotic pressure).

3) Feeding the worms with suitable food materials (supplementation of the basic culture media with serum, yeast extract, vitamins, blood cells, etc.)

4) Designing special culture vessels as much as possible similar to the natural habitat of the parasite (size and shape). This may improve the feeding and other biological activities of the worms.

5) Rapid removal of toxic waste products from the culture system by regular renewal of the medium, transfer of the parasites to new medium at intervals or use of circulating or continuous flow culture systems.

6) Agitation may play an important role in the feeding behavior of the worms, since the natural habitat of the parasite is predominantly dynamic rather than to be static.

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ZOONOTIC PARASITIC INFECTIONS OF CAMELS

Sazmand, A.

Unit of Parasitology, Department of Pathobiology, Faculty of Veterinary Sciences, Bu Ali Sina University of Hamedan, Hamedan, Iran

Email: Alireza.Sazmand@basu.ac.ir

BACKGROUND: Camels can act as carrier or reservoir for the transmission of several zoonoses. They have a close association with humans in arid and semi-arid areas of the world however, apart from brucellosis and the Middle East respiratory syndrome coronavirus (MERS-CoV) information about camels' infections with zoonotic agents are scarce.
OBJECTIVES: Considering the importance of camel parasitic infections in terms of animal and public health, this study aimed to enlist reported parasites from one-humped camels (*Camelus dromedarius*) worldwide and define parasites with zoonotic potential.
METHODS: Literature search was performed in English, French, German and Persian languages among documents from 1900. Protozoan, helminth and arthropod parasites reported from camels were extracted and possibility of human infection was checked for individual parasite.
RESULTS: Infection of camels with over 300 species and genera of parasites were documented from which 286 (33 protozoa, 118 helminths, 135 arthropods) were found valid by searching in taxonomy databases. In the case of protozoa and helminths, 50 species and genera have been reported in human infections and majority of arthropods attached to or flying around camels are vectors of many pathogenic agents.
CONCLUSIONS: Although Trypanosoma evansi, *Cryptosporidium, Giardia, Toxoplasma, Sarcocystis, Balantidium, Echinococcus, Fasciola,* mange mites and Linguatulaserrata are well-known as parasites with zoonotic potential, application of molecular based techniques for the diagnosis of these infections and characterization of the pathogens in camels are scarce and so suggested to researchers.
Keywords: Parasite, Zoonoses, *Camelus dromedarius,* one-humped

GIS MODELLING OF LARGE LIVER FLUKEIN THE NORTHERN PARTS OF IRAN

Majidi-Rad, M.[1], Rasoli B, N.[1], Neisi, S.[1], Hanafi-Bojd, AA.[2], Meshgi, B.[3,4*]

1. *Veterinary Organization of Iran, Tehran, Iran*
2. *Department of Medical Entomology & Vector Control, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
3. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran-Iran*
4. *Center of Excellent of Ecosystem and Ultrastructural changes of Helminthes, Tehran, Iran*

Email: Bmeshgi@ut.ac.ir

BACKGROUND: Different climatic, geographical and social factors are implicated in distribution pattern of fascioliais at the littoral of the Caspian Sea.
OBJECTIVES: The aim of this study was to determine a bioclimatic distribution pattern and risk factors for *Fasciola* sp. in the northern parts of Iranusing Geographical Information System (GIS).
METHODS: We try to predict the spatial distribution of fascioliasis based on the geographical and climatic factors using the maximum entropy modeling method (MaxEnt). Stool samples were collected from cattle and sheep in Gilan, Mazandaran and Golestan provinces. Samples were tested using flotation method, and then the number of parasite egg per gram (EPG) of feces was recorded.
RESULTS: The GIS-based results suggested that rain fall-related parameters such as precipitation of coldest quarter, precipitation of driest quarter, annual precipitation and precipitation of driest month were significantly correlated with the presence of the *Fasciola* at the littoral of the Caspian Sea. The receiver operator characteristic (ROC) graph was plotted based on the data obtained in southern Caspian Sea littoral. An AUC value of 0.976 suggested an acceptable predictive model. The analysis of stool samples indicated the higher rates of *Fasciola* infection in both hosts in Gilan province as compared to other provinces under study, while the lowest was observed in Golestan province.
CONCLUSION: The findings of the jackknife analysis suggested that the three parameters of temperature, relative humidity and annual rainfall could be linked to the occurrence of the disease in both cattle and sheep infection.
Keywords: Liver, Trematode, GIS, the littoral of the Caspian Sea, Iran

Zoonotic Parasitic Diseases and Their Role in Public Health, Toodborne and Waterborne Parasites, Tick-borne Parasites

Poster presentation

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DETECTION OF *THEILERIA* ORGANISMSIN *HYALOMMA* TICKS (ACARINA: IXODIDAE)IN SOUTHWEST OF IRAN

Asadollahi, Z.1*, Razi Jala, M.H.2, Alborzi, A.2, Hamidinejat, H.2

1. *Graduate of Parasitology, Department of Pathobiology, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran. Current address: Institute of Parasitology, Department of Pathobiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Pathobiology, School of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran*

Email: Asadollahi.z@ut.ac.ir.

BACKGROUND: Tropical theileriosis caused by *Theileriaannulata,* results in serious economic losses in cattle industry in Iran. *Hyalomma* ticks are known as vectors of parasites such as Theileria spp.
OBJECTIVES: The aim of this study wasto detect Theileria organisms in *Hyalomma* spp. salivary glands gathered from cattle in Khuzestan province, Iran.
METHODS: Totally, 655 *Hyalomma* ticks were collected from infested cattle in five geographical districts of the area under study. The salivary glands of ticks were stained by Methyl green/Pyronin method. The infection intensity and the prevalence rate in ticks were statistically analyzed using Chi-square test based on the difference in species and the gender of the ticks.
RESULTS: The most prevalent species was *Hyalomma anatolicum anatolicum* (59.54%), followed by *Hyalomma anatolicum excavatum* (21.83%), *Hyalomma asiaticumasiaticum* (10.38%), *Hyalomma detritum* (5.2%), and *Hyalomma dromedarii* (3.05%). Microscopic study of acini in *Hyalomma* (H) ticks showed 67 (10.22%) infections with *Theileria*spp. The average number of infected acini per infected ticks was 14.3 in *H. anatolicum anatolicum,* 6.5 in *H. anatolicum* excavatum, 4 in *H. detritum*, 7.2 in *H. asiaticum asiaticum*, and 3 in *H. dromedarii*.
CONCLUSIONS: The results revealed that the highest prevalence of infection with *Theileria* organisms belonged to *H. anatolicum anatolicum*. However, more precise molecular methods are needed to confirm.
Keywords: *Theileria,* Salivary glands, *Hyalomma*, Methyl green/Pyronin, Iran

MOLECULAR CHARACTERIZATION AND ZOONOTIC POTENTIAL OF *CRYPTOSPORIDIUM* AND *GIARDIA* IN HOUSEHOLD DOGS AND CATS IN SOUTHEAST OF IRAN

Homayouni, M.M.[1], Razavi, S.M.[2], Shaddel, M.[1], Asadpour, M.[1,2*]

1. *Department of Parasitology and Mycology, School of Medicine, AJA University of Medical Sciences, Tehran, Iran*
2. *Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran*

BACKGROUND: *Giardia* and *Cryptosporidium* are common zoonotic protozoan parasites with worldwide distribution. There is no data on their molecular characterization in household dogs and cats in Iran.
OBJECTIVES: This research was performed to study the molecular epidemiology of *Cryptosporidium* and *Giardia* in household dogs and cats in South of Iran.
METHODS: Fecal samples were collected from 615 household dogs (315) and cats (300) and tested by microscopic and molecular tools for detecting oocysts. A nested-PCR followed by sequence analysis was performed on the ssu-rRNA locus for genotyping *Cryptosporidium* in microscopic-positive samples. Furthermore, molecular characterization of *Giardia* was done by 16s rRNA and β-giardin (bg) genes, followed by sequence analysis.
RESULTS: *Cryptosporidium* and *Giardia* oo/cysts were identified in 0.6% (2/315) and 1.9% (6/315) of dogs and 0.7 % (2/300) and 1.3% (4 of 300) of cats, respectively. Sequence analysis at the ssu-rRNA locus revealed the presence of *C. canis* (n=2) in dogs and *C. felis* (n=2) in cats. *G. intestinalis* assemblage D (n=2), assemblage C (n=3), and zoonotic assemblage A (n=1) were identified in dogs; and *G. intestinalis* host-adapted assemblage F (n=3) and zoonotic assemblage A (n=1) were detected in cats. The highest prevalence was observed in 1-year animals with diarrhea and those kept out-door.
CONCLUSIONS: Our findings revealed that household dogs and cats play a minor role in zoonotic transmission of these parasites in this area. Further studies are need to reveal the role of these animals in zoonotic cryptosporidiosis and giardiasis in different regions of Iran.
Keywords: *Cryptosporidium*, *Giardia*, Dogs, Cats, Assemblage

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CONTAMINATION RATE OF *TOXOCARA*SPP. EGGS IN THE PARKS SOIL OF ZANJAN

Jafari, S. [1*]***, Norouzi, R.*** [1]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*

Background: Toxocariasis is a parasitic disease which caused by larvae of Toxocaracanis in human. The soil as a source of the eggs of T. canis important in distribution of this disease, because dogs and cats that are infected with Toxocara can shed Toxocara eggs in their feces. Considering the numerous stray dog and cat population in Zanjan city determined the need to evaluate the contamination of public areas in Zanjan with Toxocara spp. eggs, which was the objective of the present study.
OBJECTIVES: The aim of present study was to determine the contamination rate of Toxocara spp. eggs in the parks soil of Zanjan province, Iran.
METHODS: In the present cross-sectional study, 90 soil samples were taken from 18 public parks in Zanjan during the winter year of 2014. Samples were tested by the Clayton –lane method and examined by the microscopic examination.
RESULTS: The results of this study showed that from a total of 18 examined parks, 14 parks (77.77 percent) were contaminated with Toxocara spp. and contamination of Toxocara eggs in the park pathways and setting grounds of parks is higher than other sites
CONCLUSIONS: As the soil of public parks are highly contaminated with Toxocara spp. eggs, in Zanjan province control and prevention measures is necessary.
Key words: Toxocara spp. egg, Public Parks, Zanjan province, Iran

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PREVALENCE AND FERTILITY RATE OF HYDATID CYST IN SHEEP AND CATTLE SLAUGHTERED IN KERMAN CITY: AN EPIDEMIOLOGICAL STUDY

Malekpour, H.[1], Asadpour, M.[1*], Foroodi, HR.[2]

1. *School of Veterinary Medicine, Shiraz University, Shiraz, Iran*
2. *School of Veterinary Medicine, Bahonar University, Kerman, Iran*

Email: m.asadpour65@gmail.com

BACKGROUND: Cystic Hydatodosis (CH) is a zoonotic disease which caused by the *Echinococcus granulosus* tapeworm. It is one of the major zoonotic parasitic disease with worldwide distribiution.
OBJECTIVES: The major purpose of this study was to determine prevalence, fertility, and viability rates of cystic echinococcosis in sheep and cattle in Kerman city.
METHODS: Liver, lungs and spleen of slaughtered animals were examined for hydatid cysts by visual inspection, palpation, and serial cuts of the organs. When cysts were found, the infected organs were collected, put in plastic bags separately, labelled and sent to the Laboratory of Parasitology and Parasitic Diseases, Faculty of Veterinary Medicine, Kerman University. The cysts were taken and their viability was determined based on the protoscoleces activity and eosin dye uptake.
RESULTS: Out of the total 258 cattle and 712 sheep slaughtered in Kerman were investigated for hydatid cysts. The infection rate of hydatidosis was 9.5% in cattle and 7.6% in sheep. The infection rate was 12% in female cattle and 4.9% in male cattle while the rate was 4.5% in female sheep and 2.23% in male sheep. From the total of 390 hydatid cyst counted in cattle, 149 (38.20%), 42 (10.76%), 12 (3.07%) and 187 (47.94%) were found to be small, medium, large and calcified cysts, respectively. The distribution of charectrized cysts in different organs based on their size was found to the statistically significant ($P<0.05$). In addition, out of the total 390 cysts collected, 23 (5.89%) were fertile, 180 (46.15%) sterile, and 187 (47.94%) calcified or purulent cysts. The rate of calcification was higher in the liver than in the lung. There was a significant difference in the fertility of the cyst from different organs ($P<0.05$); fertility rate was higher among the cysts of the liver. Hydatid cyst viability rate 16 (69.56%) was observed. In infected sheep, cysts were encountered in the livers of 81.2%, in the lungs of 16.6%, and in the spleen of 2.2%.
CONCLUSIONS: Both species of animals slaughtered for human consumption and included in this study, were infected with cysts. Because of the higher frequency and intensity of the infection and the higher proportion of fertile cysts, of the both species, sheeps probably act as the main reservoir of infection (most important intermediate host) in maintaining and perpetuating the domestic life cycle of *E. granulosus* in the region of Kerman.

Keywords: Hydatidosis, Cattle, sheep, Fertility, Viability, Kerman

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INFLUENCE OF HYDATID DISEASE ON THE PREGNANCY OUTCOMES IN BALB/C MODEL

Moazeni, M.[1], Asadpour, M.[*1], Malekpour, S.H.[1]

1. *Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran*

Email: m.asadpour65@gmail.com

BACKGROUND: Hydatid disease may lead to various complications in both mother and child during pregnancy. Accordingly, enough knowledge is required to manage these complications.
OBJECTIVES: This study was done to evaluate the interaction between hydatid disease and pregnancy in laboratory mice.
METHODS: Twenty female BALB/c mice (*Mus musculus*) were divided into test and control groups (10 animals in each group). The mice of the test group were infected intraperitoneally by injection of 1000 protoescolices. Six months after infection, the mice of test and control groups were mated with male mice for a week. After parturition, the size and weight of babies were measured and compared between two groups.
RESULTS: While all the mice of control group delivered healthy babies, 3 out of 10 mice of test group showed no pregnancy. The infected mice delivered lower number of babies than the mice of control group. The mean size of fetuses or babies obtained from the infected mice were statistically lower than those obtained from the mice of control group (P = 0.000). The weight of babies delivered by the infected mice not only at the time of birth (P = 0.005), but also 10 days after birth (P = 0.021) were significantly lower than those delivered by the mice of control group. The level of progesterone and estradiol in the mice of test group were significantly lower (P = 0.009) and higher (P = 0.043), respectively, in comparison to the mice of control group.
CONCLUSIONS: Hydatid disease during pregnancy may considerably affect the pregnancy outcomes.
Keywords: Experimental study, Hydatid disease, laboratory mice, pregnancy

A CROSS-SECTIONAL STUDY OF ZOONOTIC *HELMINTH INFECTIONS* IN PET DOGS, SHELTER DOGS, AND PEDIGREE DOGS IN TEHRAN AND ALBORZ PROVINCES

Shilan Baghaei Kia[1], Shahram Jamshidi[2*], Fatemeh Jalousian[3], Saeid Fathi[3], Abas Gerami Sadeghian[3]

1. *Veterinary student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Internal Medicine, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: shjamshidi@ut.ac.ir

BACKGROUND: The desire of today's society to keep dog pets and the lack of awareness of their owners of the *echinococcosis* transmission has been led to various questions about the disease. This highlights the need for research in this field to raise awareness of pet dog owners. The main question of the research is whether domestic dogs are infected with zoonotic helminths?
MATERIAL AND METHODS: Fecal specimens were collected directly from the rectum of pet dogs referred to the Veterinary Clinic of the University of Tehran (65 collars). *Shelter dog* (15 collars) and pedigree dogs (22 collars) were also sampled. Using the Willis method, fecal specimens were microscopically evaluated for the presence of helminth *eggs.*
RESULTS: The findings of fecal examination exhibited that pet dogs, shelter and pedigree dogs (102 samples) were negative for *helminth parasites*.
CONCLUSION: The results of this study demonstrated that there were no helminth *eggs* in stool specimens collected from dogs that used anti-parasite tablets in the market, which consisted of three drugs: *fenbendazole,* pyrantel *pamoate* and *praziquantel*. Taking anti-parasitic drugs is effective in removing *helminth parasitesin* dogs. Although stray dogs are reported to be infected with *helminth parasitesin* Iran, dogs treated with common anti-parasite drugs can be cleansed of infection.
Key words: Intestinal *helminth* parasites, Pet dogs, Shelter dogs, Pedigree dogs

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STUDY ON THE INFECTION RATE TO *TOXOCARA* SPP EGGS IN THE PASSAGEWAYS AND ALLEYS OF TABRIZ CITY

***Cheraghi, H*[*1], *Parsaeimehr, K.*[1], *Imani Baran, A.*[2], *Haghi, A.*[2]**

1. *Lab staff, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
2. *Academic member, Pathobiology Department, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*
3. *Lab staff, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*

Email: cheraghihabib50@gmail.com

BACKGROUND:*Toxocariasis* is a zoonotic parasitic infection between humans and animals and has a cosmopolitan distribution. Its agents are *Toxocara canis* and *Toxocara cati* from nematoda helminthes. The dogs and cats play as the main hosts.
OBJECTIVE: With regard to the importance of *Toxocariasis* in Iran, this study was conducted to determine the infection rate of the passages and main ways of Tabriz city to *Toxocara* spp eggs.
METHODS: In this cross-Sectional study, from June to September 2017, 75 soil sample infected to dog and cat faces were collected from 15 locations of Tabriz city. Each sample was randomly taken from five different part of sampling sites (passages and main ways under trees). Thereafter, were evaluated based on flotation protocol and light microscopic examination.
RESULTS: In current study, only out of 5(6.7%) soil samples were infected to Toxocara spp eggs. Even that the observation of single egg was considered as positive infection.
CONCLUSION: The low rate of infection to *Toxocara* spp eggs in different passages and pathways of Tabriz city comparing to the other parts of the world may be due to the low population of dogs and also the cultural differences of Tabriz city with the other studied regions.
Key words: *Toxocara* spp., Dog, Cat, Tabriz city

INVESTIGATING IN VITRO ANTI-LEISHMANIAL EFFECTS OF SILIBININ AND SILYMARIN ON *LEISHMANIA MAJOR*

***Faridnia, R.*[1], *Kalani, H.*[2], *Fakhar, M.*[3*], *Akhtari, J.*[4]**

1. *Student Research Committee, Mazandaran University of Medical Sciences, Sari, Iran*
2. *Infectious Diseases Research Center, Golestan University of Medical Science, Gorgan, Iran*
3. *Molecular and Cell Biology Research Center, Mazandaran University of Medical Sciences, Sari, Iran*
4. *Immunogenetic Research Center, Mazandaran University of Medical Sciences, Sari, Iran*

BACKGROUND: The *Leishmania major* parasite is the cause of a zoonotic disease called cutaneous leishmaniasis that is endemic in Iran.
OBJECTIVES: Investigating in vitro anti-leishmanial effects of silibinin and silymarin on *Leishmania major*.
METHODS: The promastigotes and amastigotes of this parasite were treated with the two medications, silibinin and silymarin, in several concentrations (25-100 µM) at 48 and 72 hours and lethal concentration of 50% (LC_{50}) and selectivity index (SI) of the drugs was assessed.
RESULTS: The highest effect on promastigotes was for silymarin in concentration of 100 µM with 90% and 91% death rate at hours 48 and 72, respectively. Regarding amastigotes, the highest effect at 48 hour was for silibinin in concentration of 100 µM with 35% death rate. However, at 72 hour, silymarin showed the highest effect with 63% death rate in concentration of 100 µM. The highest LC_{50} for promastigotes was observed for silymarin with 19.34 µM at 48 hour and 18.22 µM at 72 hour. Likewise, the highest LC_{50} for amastigotes was observed for silymarin with 191 µM at 48 hour and 24.27 µM at 72 hour.The selectivity index of silibinin for LC_{50} of 66.12 µM was 3.19 and regarding silymarin it was 17.51 for LC_{50} of 24.27 µM.
CONCLUSIONS: Both drugs have the same efficacy as Glucantime® in vitro on *Leishmania major*, and since silymarin showed a SI above 10, it indicates the selectivity function on the parasite and has a negligible effect on the cell and can be used in the complementary or alternative therapies after in vivo study.
Key words: *Leishmania major*, Silibinin, Silymarin, in vitro

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EVALUATION OF WISTAR RAT AND BALB/C MOUSE AS ANIMAL MODELS FOR CONGENITAL, CEREBRAL AND OCULAR TOXOPLASMOSIS

Sharif, M.[1], Faridnia, R.[2], Sarvi, S.[1], Gholami, S.[1], Kalani, H.[3], Daryani, A.[1]

1. *Toxoplasmosis Research Center, Mazandaran University of Medical Sciences, Sari, Iran.*
2. *Student Research Committee, Mazandaran University of Medical Science, Sari, Iran*
3. *Infectious Diseases Research Center, Golestan University of Medical Science, Gorgan, Iran*

Email: Daryani@yahoo.com

BACKGROUND: Toxoplasmosis is a disease caused by *Toxoplasma gondii* parasite that trigger cystic form in brain and the eye and its congenital form is very important. OBJECTIVES: Evaluation of Wistar rat and BALB/c mouse as animal models for congenital, cerebral and ocular toxoplasmosis.

METHODS: The rats and mice were considered as cerebral and ocular toxoplasmosis model, that were intraperitoneally infected with different doses of the parasite; their brain and eyes were examined using microscopic and bioassay method to find the cysts. Additionally, pregnant rats and mice, considered as congenital toxoplasmosis model, were intraperitoneally infected with the parasite and their infants were examined as described above.

RESULTS: The best result for cerebral toxoplasmosis model was observed in the infected rats infected with the 10^7 parasites in which all rats (100% infection rate) were positive using the bioassay method. No microscopic examination of samples was positive for ocular toxoplasmosis in mice and the highest infection rate of eye was 50% in rats infected with the 10^7 parasites. Furthermore, the best result for congenital cerebral toxoplasmosis with 100% infection rate was also observed in infant rats born from the pregnant mothers infected with the 10^7 parasites.The best result for ocular congenital toxoplasmosis was also observed in the latter group with 20% infection rate.

CONCLUSIONS: Since infants born from pregnant rats infected with 1×10^7 parasites were infected 100% by brain cysts, this group is introduced as a congenital cerebral toxoplasmosis model, and adult rats infected with 1×10^7 parasites were introduced as a cerebral toxoplasmosis model. In this study, there was no suitable model for congenital ocular toxoplasmosis or ocular toxoplasmosis. Mouse is not a suitable model for the study of toxoplasmic cysts.

Key words: Wistar rat, BALB/c mouse, congenital, cerebral, ocular, toxoplasmosis model

EVALUATION OF SEROPREVALENCE OF TOXOPLASMOSIS IN WOMEN REFERRED TO HEALTH CENTERS OF MIANDOAB CITY BYCHEMILUMINESCENCE IMMUNOASSAY METHOD

Firouzivand, Y*

Department of Parasitology, Malekan Branch, Islamic azad University, Malekan, Iran

BACKGROUND:*Toxoplasma gondii* is an intracellular parasite that causes infection in humans and warm-blooded animals.Human contamination occurs by swallowing oocytes, eatingLow-cooked or raw meat, contaminated vegetables, raw milk and congenital.Serologic evidence indicates the high prevalence of toxoplasmosis in all parts of the world.

OBJECTIVE: The aim of this survey was seroprevalence of toxoplasmosis in women referred to health centers of Miandoab city.

METHODS: This descriptive cross-sectional study was conducted in 2016.200 blood samples were taken randomly from women. After separating serum and completing the questionnaire, IgM and IgG antibodies against *Toxoplasmagondii* were tested by Chemiluminescence method. Statistical analysis was performed by Chi square test.

RESULTS: The results showed that 46 (23%) and 5 (2.5%) samples were positive for IgG and IgM titer respectively. There was a statistically significant relationship between the prevalence of toxoplasmosis and age, education, meat consumption, habitat and consumption of vegetables but there was no meaningful relationship between the contact with the cat.

CONCLUSIONS: This study indicate that 74.5% of women referring to health centers do not have antibodies against *Toxoplasma*.Therefore, it can be concluded that a large percentage of married and fertility women in Miandoab are susceptible to acute Toxoplasmosis infection.It seems that the use of meat and vegetables plays an important role in the transmission of *Toxoplasma* in patients. In order to prevent the infection, public health education and appropriate health advice should be provided.

Keywords: Toxoplasmosis, Seroprevalence, IgM, IgG, Chemiluminescence, Miandoab

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INVESTIGATION OF FREQUENCY OF INTERNAL AND EXTERNAL ZOONOTIC PARASITES OF STRAY CATS IN KARAJ

Hamzehali Tehrani, M.[1*], Hosseini, S.R.[2], Karimi Naghlani, S.[1], Ebrahimi, M.[2]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Science and Research Branch, Islamic Azad University, Tehran, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, Islamic Azad University, Karaj, Iran*

Email: miladhamzehalitehrani@gmail.com

BACKGROUND: Stray cats come to humans because of their lives in the vicinity of humans as potential carriers of parasites. As a result, testing for parasitic infections of these animals is always important because of the transmission of common parasitic diseases between humans and animals.

OBJECTIVES: In each native area, the prerequisite for any prevention program is to have sufficient knowledge of how and how the disease is transmitted.

METHODS:From the 22 Dec 2015 to the 22 Oct 2016 (Ten months), the ghostly cats were collected using live traps, and from each area, 2 adult female cats were randomly injected with Tranquilizer, Blood samples were taken from the vein and cervical vertebrae using rectal swabs to determine the presence of cysts and protozoal oocysts from the cats stool. The blood sample was tested by Giemsa staining and the rectal swab specimens were used to expand and colorize, and the skin surface was examined for the presence of foreign parasites.

RESULTS: Out of 50 cat collars, 19 cases of *Otodectes cynotis* infection in the ear canal, 8 cases of *Notoedres cati* infection and 6 cases of *Ctenocephalides cati* (Cat Flea) infection and 14 cases of *Toxoplasma gondii* Oocyst were observed in fecal specimens and 4 cases of *Hemobartonella felis* infection. The number of negative samples (free from parasitic infection) was 7 collars.

CONCLUSIONS: Parasitic infections are very important in stray cats in the city of Karaj, so parasitic treatments of these animals are important in controlling common parasitic diseases between humans and animals.

Key words: Stray cats, zoonotic protozoa parasites, External parasites, toxoplasmosis, Karaj

FIRST RECORD OF HUMAN UROGENITAL MYIASIS CAUSED BY PSYCHODA ALBIPENNIS LARVAE (DIPTERA: PSYCHODIDAE), TABRIZ, EAST AZERBAIJAN PROVINCE, IRAN: A CASE REPORT

Hazratian, T.[1*], Dolatkhah, A.[1], Hazratian, E.[2], Ghasemikhah, R.[3], Naghili Hokmabadi, B.[4]

1. *Department of Parasitology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran.*
2. *Student of Medicine, Faculty of Medicine, Yuzuncu Yil University, Turkey*
3. *Department of Parasitology, Faculty of Medicine, Arak University of Medical Sciences, Arak, Ira*
4. *Department of Infectious and Tropical Diseases, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran*

Email: hazratian2@gmail.com

BACKGROUND: Myiasis is the infestation of human and vertebrate animals' tissues and organs with fly larvae feeding from live, necrotic or dead tissues and in the case of gastrointestinal myiasis from host food. This case was about 9-yr old girl from Miandoab, was referred to the health center after observing larvae in her urine, and was diagnosed with a kind of blood filariasis, and Mebendazole was prescribed. Due to lack of recovery, duration of observing larvae in urine and stomach ache, she was referred to Sina Hospital in Tabriz. In the hospital her urine sample, containing 3 larvae was referred to Entomology lab of the Medical Faculty for identification and characterization.

OBJECTIVES: This report aims to present a case of urogenital myiasis caused by the larvae of *Psychoda albipennis* (Diptera: Psychodidae) for the first time in Iran.

METHODS: According to morphological factors, the larvae were identified to approximate size of 8-10 mm long, white to gray color, thorns and pale scales, and a siphon at the posterior end of the body. They wereidentified as *Psychoda albipennis*.

RESULTS: for the first time in Iran, the agent of urogenital myiasis was determined and the larvae of *Psychoda albipennis* was diagnosed belonging to Psychodidae family, Diptera order.

CONCLUSIONS: Comparing the larvae with the reported cases from Turkey, diagnosis of *Psychoda albipennis* was confirmed.

Key words: Myiasis, Urogenital Myiasis, *Psychoda albipenis*, Iran

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MOLECULAR CHARACTERIZATION OF *GIARDIA DUODENALIS* GENOTYPES IN DOGS FROM AHVAZ, KHUZESTAN

Jafari, H.*[*1], Derakhshan, L.[2]

1. *Assistant Professor of Parasitology, Razi Vaccine and Serum Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Ahvaz, Iran*
2. *Graduated Student of Parasitology, Veterinary Medicine, Shahid Chamran University of Ahvaz, Iran*

Email: hedieh_jafari@yahoo.com

BACKGROUND: *Giardia duodenalis* is an intestinal protozoan parasite and has a wide range of host species in both humans and animals. It is considered as a species complex, comprising at least 8 distinct genetic groups, referred to as assemblages A to H. Assemblages A and B have zoonotic potential in human and number of other mammalian host infections. Assemblages C, D, E, F, G, and H appear to be host-restricted to domestic and wild animals.

OBJECTIVES: The aim of the presented study was to genetically characterize of isolates of *G. duodenalis* from dogs in Ahvaz, Iran.

METHODS: A total of 117 dog fecal samples were obtained from Ahvaz clinics, during May 2017 to April 2018 and examined by the flotation technique with saturated glucose, and all isolates were genotyped by PCR amplification using 18S rRNA and PCR-RFLP of GDH genes as molecular markers.

RESULTS: Results showed that 12% (14 /117) samples were found to be infected with *Giardia duodenalis*. Sequencing analysis of 18S rRNA genes and PCR-RFLP of GDH showed samples were infected by assemblage C 64.2% (n=9) and assemblage D 35.7% (n=5). The 18S rRNA PCR protocol was the most successful followed by the GDH (amplifying from 95 %, 62% of samples respectively).

CONCLUSIONS: Our findings indicated that G. duodenalisfrom dogs in Ahvaz province had no zoonotic risk but this parasite may play a role on enteric disorder of dogs. The different success rates for the loci, multi loci genes (MLG) should be targeted for more accurate genotype characterization.

Key words: *Giardia duodenalis*, Genotype, Dog, zoonosis, Ahvaz.

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TOXOCARIASIS INFECTION IN PETS AND THEIR OWNERS BY PARASITOLOGICAL METHOD

Rezaei, L.[1], Jalousian, F.[2], Jamshidi, S.[3*], Shahbakhsh, M.[4], Grami Sadeghian, A.[5]

1. *Veterinary student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Member of the faculty of parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *Member of the faculty of Internal Medicine, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
4. *Ph.D Student, Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
5. *Laboratory of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: shjamshidi@ut.ac.ir

BACKGROUND: Domestic dogs and cats can play an important role in the transmission of *zoonotic helminths- such as Echinococcus, Toxocara*, and hookworms. Gastrointestinal parasites are the most common parasites in small domestic animals, especially in dogs.

OBJECTIVE: The aim of this study was to investigate *Toxocara* infection of pets and their owners as well as to determine the role of pets in the distribution of this infection to pet owners who referred their pets to the Small Animal Hospital of Tehran University.

METHODS: Fecal samples were collected from domestic cats and dogs. Fecal samples were transferred to laboratory in plastic bags and then stored at 4 ° C until processing. Then, samples were examined for *Toxocaraspp* by ZnCl2-solution based on the use of sedimentation and flotation method. This study was performed as a single-blind trial; thus, the experiments of pet owners were not presented to the project implementer. After obtaining all results from the pet and their owners, the findings were analyzed. Blood samples were taken from 30 pet owners and serum was then analyzed using anti-*Toxocara* antibodies.

RESULTS: The findings of the current study depicted that all dogs and cats were found to be negative for *Toxocara species*. Other parasitic *helminths* and *protozoan infections* were also not observed in these animals. These results indicated the proper use of antiparasitic drugs.Serological examination did not show any infection among pet owners. Of the 30 cases tested, only one positive case was reported that a 10-year-old girl had her dogs at home.

CONCLUSION: Close relationship between animals and humans can lead to social benefits, mental health, and physical well-being. However, they also increase the risks of zoonotic disease. Recent studies in Australia and the United States have shown that the prevalence of *Toxocaracanis* and *Toxocaracati* has declined significantly over more than two decades. Reduced prevalence of these parasites seems to be due to extensive use of antiparasite drugs by pet owners. With regard to the lack of *Toxocara* infectionin domestic pet (dogs and cats), it can be claimed that keeping pet cannot be considered as a risk factor for pet owners. The anti-parasitic drugs used have had acceptable efficacy. A child was found to be positive for Toxocara, while her domestic dog and her mother's tests showed negative result for *toxocariasis*. This child may be infected via soil or food contaminated with parasite eggs or her dog has already been infected. The pet may potentially play a role in the transmission of human infection, but is not greater than other factors.

Keywords:Toxocariasis, pets, pet owners

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EVALUATION OF THE EFFECTS OF KEEPING DOGS AND CATS ON THEIR OWNERS' INVOLVEMENT WITH TOXOCARIASIS

***Mohammadi, F.*[*1], *Bavandpouri Ahmadi, Z.*[2]**

1. *Agriculture Faculty, Veterinary Department, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran*
2. *Medicine Faculty, Laboratory Sciences Student, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran*

Email: Forogh_mo58@yahoo.com

BACKGROUND: *Toxoplasma* infection is one of the most prevalent parasitic infections in human beings and other warm-blooded animals in a universal scope. Toxocariasis is a zoonosis disease which is created by migration of *Toxocara canis* larvae or *Toxocara cati* to tissues or organs. Individuals are infected by having contaminated food with parasite eggs or raw meat containing parasite larvae.

OBJECTIVES: The present study was conducted by aiming at determining the infection rate to *Toxocara* sp. in owners of dogs and cats and comparing it to the rate of infecting individuals which have experience of touching or keeping the animals in Kermanshah city.

METHODS: The present study was a descriptive-analytic study. Among individuals between 5 to 25 years old in Kermanshah city in 1396, 604 people (374 female and 230 male) were selected randomly and sampling was done. 404 people of these numbers (66.8%) had no contact with dogs and cats and 200 people (33.1%) of them had touched these animals. Serum samples were evaluated due to anti-toxocara antibody by applying ELIZA method. The obtained data were analyzed by using Chi-Square test.

RESULTS: among 604 samples, 198 people (32.7%) had anti-toxocara antibody. From all people which had positive antibody, 105 people (53%) had touched and 93 people (47%) were not in touch with dogs and cats. It is worth mentioning that there was not a significant statistical relationship between the extent of infection with *Toxocara* and sexuality.

CONCLUSION: Regarding to the obtained results from this study, the highest percentage of this infection is in individuals who keep these animals and are in touch with them. Teaching the individuals who take care of these animals and are in touch with them, can be effective in raising awareness and preventing toxocariasis infection.

Keywords: Parasitic diseases, Kermanshah, Toxocariasis, Dog, Cat

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PREVALENCE OF *DICROCOELIUM* SPP. IN SLAUGHTERED SHEEP IN KHORASAN RAZAVI PROVINCE AND ITS RELATIONSHIP WITH METEOROLOGICAL PARAMETERS USING GEOGRAPHIC INFORMATION SYSTEM (GIS)

Mohamadian, M.H[1], Mohsenzadeh, M.[2*], Borji, H.[3]

1. *MSc Student, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*
2. *Department of Food Hygiene and Aquaculture, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*
3. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*

Email: mohsenzadeh@um.ac.ir

BACKGROUND: GIS is a powerful tool for working with spatial data and shows the relationship of geographical factors by producing smart maps.
OBJECTIVES: The aim of this study was to determine the prevalence of *dicrocoelium* spp. in sheep and to show its relationship with meteorological parameters using GIS in Khorasan Razavi province.
METHODS: Two retrospective and cross-sectional studies were performed. In retrospective study, we select 14 cities with synoptic stations in the province; the prevalence of *dicrocoelium* and meteorological parameters was collected during the period of 5 years (1966-2014) by referral to the statistical system. In a cross-sectional study of the one-year period (2017) in Torqabeh local cache, a more limited level in the city of Mashhad was evaluated by preparing GIS maps using Kriging interpolation. Furthermore, the SPSS 16.0 software was used to determine the significant correlation.
RESULTS: Out of 7327011 slaughtered sheep, 470404 liver (5.9%) were infected with *Dicrcoelium* spp. The highest infection rate belonged to Nishaboor, Chenaran and Quchan cities. Based on the *interpolation* method for making prediction *maps, findings revealed* that the rainfall rate, the number of days of rainfall and rate ofmoisture were reduced from north and northwest to south and southeast of the province. The infection rate of trematodes was found to be reduced, whereas the infection rate of trematodes was increased by decrease of environmental temperature. There was a significant relationship between the meteorological parameters and *Dicoroelium* spp. infection ($P < 0.05$). Moreover, in the cross-sectional study, (2017) predicted map was prepared at the level of villages in Mashhad, which follows almost the same provincial pattern.
CONCLUSIONS: Regarding to the findings, the relationship between infection and environmental and seasonal parameters, it is necessary to implement predictions and control plans on this basis.
Keywords: *Dicrocoelium*, Prevalence, Sheep, GIS, Khorasan Razavi

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SPATIAL DISTRIBUTION OF THE SEROLOGICAL INFECTION OF *CANIS LUPUS FAMILIARIS* TO *LEISHMANIA INFANTUM* IN NORTHWEST OF IRAN

Moradi Asl. E. [*1], Mohebali, M.[2], Rassi, Y.[3], Hanafi-Bojd, A.A.[3], Vatandoost, H.[3]

1. *Department of Public Health, School of Public Health, Ardabil University of Medical Sciences, Ardabil, Iran.*
2. *Department of Medical Parasitology& Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
3. *Department of Medical Entomology &Vector Control, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

Email: moradiasl83@yahoo.com

BACKGROUND: Visceral leishmaniasis (VL) is the zoonotic disease that currently occurs in some port of Europa, Asia, Africa and America. There is a direct correlation between visceral leishmaniasis in human and infected dogs. Canine are main reservoir hosts for visceral leishmaniasis. OBJECTIVES: This review study was performed to determine the prevalence of canine visceral leishmaniasis (CVL) in Ardabil province of Iran.
METHODS: Data were collected from 1994 to 2017 in Ardabil province on the electronic databases. A total of 23 articles concerning dogs reporting the prevalence of CVL from different regions of Ardabil province.
RESULTS: Totally, 9088 dogs were examined and the overall prevalence rate of CVL in Ardabil province was estimated in dogs 14.56%.The most ecologically suitable areas of CVL occurrence were identified in four hotspots in Meshkinshahr, Germi and two spots in Parsabad counties. Results of jackknife test showed that, the environmental and climate variables with highest gain when used in isolation was Isothermality,Bio3, Bio13 and Bio 4.
CONCLUSION: The results of studies in Ardabil Province show that a widely epidemic is emerging among dogs which will be makes a lot of risks on inhabitants of this areas and increases the probability of an outbreak of visceral leishmaniasis in human.
Keywords: Visceral leishmaniasis, Dog, DAT, Ardabil, Iran

TOXOCARIASIS AND CENTRAL NERVOUS SYSTEM DISEASES IN HUMAN

Safora Ghasemi. S[1], Samira Poursalim. S[1], Shirzad Fallahi.[2], Hassan Nayebzadeh[1*]

1. *Department of Parasitology, Faculty of Veterinary Medicine, Lorestan University, Khorramabad, Iran*
2. *Department of Parasitology, Faculty of Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran*

Email: nayeb.h@lu.ac.ir

BACKGROUND: Toxocariasis is a zoonotic disease. Human infection occurs via the eating the embryonated eggs of Toxocara species. Several studies have examined the relationship between toxocariasis and central nervous system diseases such as epilepsy, schizophrenia, and depression, where some cases revealed a significant relationship.
OBJECTIVES: The present study was aimed to evaluate the association between toxocariasis and neurological disorders in patients with Alzheimer's disease and Parkinson's disease, as well as to investigate seroepidemiology of toxocariasis.
METHODS: A total of 200 patients with Alzheimer's and Parkinson's patients who referred to the Neurology Department of Khorramabad Hospitals in 2016 were selected within 3 months. One hundred non-Alzheimer's and Parkinson's patients were also considered as control group. The form containing information such as age, sex, type of nutrition, type of symptoms, etc. was filled in for all participants. Blood samples were taken from case and control groups. Serum samples were then frozen at -20 ° C. It is worth noting that IgG anti-Toxocara canis antibodies were detected using ELISA kit. Moreover, the results were analyzed statistically.
RESULTS: Eight (8.6%) patients with Parkinson's disease and 3 (3.2%) of Alzheimer's patients had specific level of Toxocara antibodies. Among all samples obtained from control group, 3 were positive for toxocariasis. Given that the 95% confidence intervals for odds ratios was 1, it can be concluded that there is no significant correlation between Parkinson's and Alzheimer's disorders and toxocariasis infection. The odds ratio (95% CI) for Parkinson's and Toxocariasis was detected to be 2.82 (0.72, 11.00), while was determined as 1.00 (0.20, 5.09) for Alzheimer's and Toxocariasis.
In order to achieve a better understanding of the relationship between toxocariasis infection and neuropsychiatric disorders (e.g., Parkinson's and Alzheimer's disease) more research is needed with larger sample sizes.
Keywords: Toxocariasis, Alzheimer's disease, Parkinson's disease, zoonosis, Central nervous system diseases

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PARASITIC CONTAMINATION OF SOIL IN PUBLIC PARKS OF TEHRAN

Nikgoo, O.[1*], Shirali, S.[2], Rounaghi, H.[1]

1. *Department of Veterinary Parasitology, Faculty of Veterinary Medicine, Azad University, Science and Research Branch, Tehran, Iran*
2. *Department of Biotechnology, Faculty of Basic Sciences, Ahvaz Azad University, Ahvaz, Iran*

BACKGROUND: Soil considered as a rich source for some stages of parasites life cycle like eggs, larvae and oocyst. Animals like stray cats and dogs have a major role in contaminating soil through defecation. Public parks have thousands of visitors daily, who might have direct contact with soil. Therefore, parasitic contamination of parks considered as a serious risk for parasitic infection in human and animals.

OBJECTIVES: Due to the high population of stray animals in metropolises like Tehran, the aim of this study is to study parasitic contamination of soil in parks of Tehran.

METHODS: During summer 2018 a total of 120 samples were collected from 60 parks throughout Tehran and divided into five groups: northern, southern, eastern, western and central parks. Parasites were isolated by flotation using sucrose saturated solution. Then they were examined by the light microscope.

RESULTS: Here 78% of parks had parasitic contamination and in 65% more than one parasite was found. Which include eggs of *Toxocaracati* 51.6%, and *T. canis* 26.6%, Cestode eggs 5%, species of Oribatidae (soil mite) 53.3%, *Dipylidium caninum* egg packets 5%, and a parasitic nematode 6.6%.

CONCLUSIONS: Our findings indicate that the parasite transmission through the soil is high and increases the risk of toxocariasis (60%) and hydatidosis (5%) in human, and children in particular due to their higher contact with the soil. Consequently, personal and environmental hygiene become very important, as they are main factors for prevention of soil contamination and controlling the transmission and dissemination of soil-borne parasitic infections.

Keywords: Tehran, Soil, Park, Parasite

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EPIDEMIOLOGICAL CHARACTERISTIC OF CUTANEOUS AND VISCERAL LEISHMANIASIS IN LARESTAN COUNTY IN SOUTHERN IRAN, 2012 - 2016

Rahmanian, V.[1], Bokaie, S.[*2], Hatami, [1,3], Safari, Kh.[4]

1. *PhD Candidate in Epidemiology, Department of Epidemiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Professor of Epidemiology, Department of Epidemiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *MSc of Epidemiology, health center, Larestan university of Medical Sciences, Larestan, Fars, Iran*
4. *BSc of public health,health center, Larestan university of Medical Sciences, Larestan, Fars, Iran*

Email: sbokaie@ut.ac.ir

BACKGROUND: Leishmaniasis is a zoonotic disease that has three forms: visceral (also known as kala-azar), cutaneous, and mucocutaneous. This disease puts a vast financial burden especially in developing countries.
OBJECTIVES: This study was carried out to investigate the epidemiological status of cutaneous and visceral leishmaniasis in Larestan county of Fars province in southern Iran.
METHODS: The present cross-sectional study was performed on the basis of secondary data analysis and information in the Cutaneous and Visceral Leishmaniasis Surveillance System of the Health Deputy of Larestan University of Medical Sciences from 2012 to 2016.
RESULTS: In total 1273 patients with CL and 7 patients with VL in Larestan county during the 5-year study period were investigated. Results showed that 50% of CL patients were female, 64.3% were villagers, 72.3% of the lesions were secretion; in addition, 9% of the subjects had another CL patient in their family. The mean age of the patients was 18±19.08 years. Hand and face were the most affected body parts with 40% and 31%, respectively. Also 52% had one lesion (with an average diameter of 1.53±1.01cm). The periodical prevalence of CL in Larestan has had a growing trend since 2012 (115 per 100,000), and it reached its peak (238 per 100,000) in 2016. Out of the 7 patients with VL, 6 patients were in the age group of 1-3 years and villagers, in 71% of the patients, the IFA test was used for diagnosis and the most common clinical manifestations were fever, splenomegaly, sweating, hepatomegaly and anemia, respectively.
CONCLUSION: Cutaneous and visceral leishmaniasis is more common in lower age groups and rural areas in Larestan. Therefore, increasing the knowledge of population at risk about leishmaniasis, is essential for controlling CL and VL.

Keywords: Epidemiology, Leishmaniasis, Zoonosis, Larestan

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CASE REPORT OF AMOEBIC ABSCESS IN LIVER TISSUE OF SHEEP IN SEMNAN, IRAN

Rassouli, M. [1,2*]***, Darvishi, M.M.*** [2]***, Kordi, H.*** [2]

1. *Pathobiology department, Faculty of Veterinary Medicine, Semnan University, Semnan, Iran*
2. *Shahmirzad School of Veterinary Medicine, Semnan University, Semnan, Iran*

Email: Mrvpar@semnan.ac.ir

BACKGROUND: *Entamoeba histolytica* is a zoonotic and the most pathogenic species of parasitic amoeba, Rhizopoda phylum, protozoa. It is transmitted directly via fecal-oral route. It can infect intestine, liver, lung, brain, spleen and etc.
OBJECTIVES: The aim of this survey was to diagnose the pathogenic agent of a referred liver of a sheep from Semnan abattoir which contained some white projections on it.
METHODS: In January 2018, this referred liver was inspected in parasitology laboratory of Shahmirzad School of Veterinary Medicine. Some small white projections on the liver tissue (abscesses) were amputated.
RESULTS: Interestingly a lot of *E.histolytica* trophozoites were observed under light microscope.
CONCLUSIONS: This observation confirmed that *E.histolytica* can infect ruminants as carnivores, primates and human. Because of zoonotic potential, the inspectors in abattoirs should be trained for diagnosis and true condemnation of the infected livers.
Keywords: *Entamoeba histolityca*, amoebic abscess, sheep, liver, Iran

TRYPANOSOMIASIS IN AN IRANIAN BADGER: CASE REPORT

Rocky, A. [1*]

1. *Department of Clinical medicine, Faculty of Veterinary Medicine, University of Lorestan, Lorestan, Iran*

BACKGROUND: Trypanosomes are long flagellated protozoa commonly found in blood of domestic and wild animals in different parts of the world.
OBJECTIVES: Due to importance and necessity of diagnosis and fight against wildlife diseases in protecting them and prevention of extinction of endangered species, in this report for the first time clinical and laboratory aspects of *Trypanosoma* infection in an Iranian badger is described.
METHODS: Following presentation of an Iranian badger to veterinary hospital of Lorestan University by Iranian Department of Environment due to lethargy, clinical and hematological examinations were performed. Complete blood count was performed manually and blood smear stained by Giemsa after preparation.
RESULTS: Hematological analysis revealed a mild hypochromic anemia. *Trypanosoma* were seen on blood film; regarding morphological characteristics and reports on trypanosomiasis in European badgers, *Trypanosoma* specie was diagnosed as *T.pestanai*.
CONCLUSIONS: To protect wildlife, recognition and fighting against their diseases including parasitic diseases which in some cases threaten human and domestic animals' health, is a necessity. As regard to researches in other parts of the world, badgers are known to harbor many internal and external parasites. Until now, there is no comprehensive research about parasitic infections in Iranian badgers available. In this report, *Trypanosoma pestanai* infection was described in an Iranian badger for the first time.
Keywords: *Trypanosoma pestanai*, Trypanosomiasis, Iranian badger, hematology

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SEROLOGIC STUDY OF ANTIBODY IGG AGAINST *TOXOPLASMA GONDII* IN WOMEN IN JIROFT IN 1396

Saafizadeh, Z[1*], Radfar, M.H.[1],Golchin, M[1], Saravani, L[1], Ebrahimi Meimand, H.[1]

1. *Department of Clinical Science, Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran*

Email: zahrasafi5675@gmail.com

BACKGROUND: One of the most important parasitic diseases in the world is Toxoplasmosis. Its prevalence in different regions is different. This parasite is a protozoan, its intermediate host are the range of ruminants and birds as well as humans. Cats are the definitive host although cats can be intermediate hosts.
OBJECTIVES: Our study was conducted to determine the prevalence of *Toxoplasma gondii* infection in women referred to the Central Laboratory and Health Centers in Jiroft, Kerman province, south of Iran in 1396.
METHODS: At first, satisfaction was obtained from the women for taking samples. Then their profile, such as age, level of education, history of abortion and pregnancy, were recorded in special forms. Subsequently, intravenous bleeding was performed to take 2 cc of blood to isolate. The blood was transferred to the laboratory and placed in a centrifuge serum was isolated. Serums were stored in a freezer at -20 ° C and in the cold chain transferred to the parental chemistry laboratory of the Faculty of Veterinary Medicine, Shahid Bahonar University of Kerman and ELISA test was performed on them. Statistical analysis was performed using Chi-square test and SPSS software.
RESULTS: Of the 200 females, 41 (20.5%) had IgG antibodies against *Toxoplasma gondii*. 8 (%19/51) of them were aged 20 to 40 years old and 33 (%80/48) were over the age of 40 years. There was a significant relationship between age, abortion and education level of Toxoplasmosis infection (P<0/05). Also, there was no significant relationship between occupation and pregnancy with toxoplasmosis infection (P> 0.05).
CONCLUSIONS: Due to the risk of this disease for pregnant women and people with weakened immune systems, the awareness of individuals, especially pregnant women, about the dangers of this disease is essential.
Keywords: Toxoplasmosis, ELISA, women, prevalence, Jiroft

THE FIRST REPORT OF *ENCEPHALITOZONCANICULI*(PROTOZOA) IN RABBIT IN HAMEDAN

Sadeghi Dehkordi, Z[1*]., Noorian[2], A., Kordi, B.[2], Rezaeian, H.[1]

1. *Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*
2. *PhD student of parasitology, Ferdowsi University, Mashhad, Iran*

BACKGROUND: Encephalitozoonosis is a zoonotic disease among human and mammals such as monkeys, carnivores and rabbit, caused by an obligative intracellular protozoa, Encephalitozoon cuniculi which is a member of microsporidia family. Infection with this parasite leads to paralysis, convulsions and death in rabbits. Different laboratory methods such as molecular techniques are used to detect the infection.
OBJECTIVES: The aim of this study was to investigate prevalence of *Encephalitozoon cuniculi* in domestic rabbits of Hamedan using PCR and histopathology methods.
METHODS: A total of 48 domestic rabbits were euthanized, and brain tissue samples were tested for parasite DNA by PCR technique, and brain and kidney samples were analyzed histopathologically for detection of the parasite.
RESULTS: Results of PCR showed that 27 samples out of 48 (56.25%) were infected with *Encephalitozoon cuniculi*. Results of histopathology revealed that 2 samples (4.16%) were positive, and parasite was not observed in histopathologic sections of kidney and brain of samples which were positive with PCR.
CONCLUSIONS: The results of this study showed that *Encephalitozoon cuniculi* infection exists in domestic rabbits of Hamedan, and compared to histopathology method, the PCR technique has more sensitivity for detection of this parasite in tissues of rabbits.
Keywords: Rabbit, *Encephalitozoon*, Hamedan

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MOLECULAR DETECTION OF *SARCOCYSTIS* SPP. IN PIGEON

Shahbazi, P.[1], Alizadeh Sefat, M.[2], Katiraii, F.[1]

1. *Department if Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*
2. *M.Sc. graduated, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*

Email: P.shahbazi56@gmail.com

BACKGROUND: *Sarcosystis* is one of the most common coccidian parasites that can cause cysts in grasshoppers, birds, humans, rodents and reptiles. 36 species of *Sarcocystis* are recognized in birds that for 12 species of these, birds act as the final host, for 22 species as intermediate host and for two species can be both.
OBJECTIVES: Some species of *Sarcocystis* have a high pathogenicity in birds and some of them such as *Sarcocystis kalaschi*, have been reported commonly in birds. According to the importance of pigeon as a reservoir of contamination, this study is carried out on pigeons for the first time in Iran.
METHODS: In November 2015, 30 pigeons were randomly selected from dovecote in Tabriz with different ages and between healthy and sick ones with symptoms. Samples collected from brain and muscles of pigeons and examined for Sarcocysts macroscopic and microscopically. At the next step, Semi-nested PCR was performed by using six primers (A, S7, H3, S3, S4, and B). According to the results of sequencing, phylogenetic tree accomplished by using of UPGMA method and Mega5 software.
RESULTS: Digestion method exhibited %80 positive results, and in molecular method 88.33% of the samples were positive that 100% of brain and 66.76% of muscle samples were implicated by the parasite. According to the results of sequencing and phylogenetic tree, found species showed 99% similarity with *Sarcocystis kalaschi* species.
CONCLUSIONS: This study is the first detection of *Sarcocystis* in birds in Iran. Detected species in pigeon have a high pathogenicity and mortality and is transmissible among different birds.
Key words: *Sarcocystis*, Pigeon, Molecular detection, phylogenetic tree

PREVALENCE OF CUTANEOUS LEISHMANIASIS DURING THE YEARS 2013 TO 2016 IN THE CITY OF SABZEVAR

Shamsi, L.[1*], Samaeinasab, S[2]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
2. *Young Researchers and Elite club, Sabzevar Branch Islamic Azad University, Sabzevar, Iran*

Email: layashamsi@gmail.com

BACKGROUND: Leishmaniasis is Protozoan disease between human and animal that was seen in the forms of cutaneous, subcutaneous and visceral. The disease is transmissible between humans and many animals, including rodents and dogs that was transmitted by sandflies.
OBJECTIVES: The aim of the present study was determining of the prevalence of cutaneous leishmaniasis in Sabzevar city in 4 years.
METHODS: Referring to the health center of Sabzevar city, information on all patients had been treated with a diagnosis of cutaneous leishmaniasis was investigated during the years 2013 to 2016.
RESULTS: The number of patients with cutaneous leishmaniasis between years 2013 to 2016, were 783. The number of patients was 54 in 2013, which 21 (38%) were men, 33 (61%) were women. In 2014, the number of patients was 111 that 80 (72%) were men and 31 (27%) were women and in 2015 the number of patients with cutaneous leishmaniasis were 75, 58 (61%) were men and 17 (18%) were female. In 2016, patients with cutaneous leishmaniasis were 543, 96 (32/82%) were women and 447 (67/17%) were men. 588 (75/09%) patients were in rural areas and 195 (90/24%) patients were in urban area. Most of lesions (60%) were on the hands and the lowest (3/57%) were on the trunk.
CONCLUSIONS: According to the obtained results showed that the incidence of the disease had increased compared with previous years. So reducing the adverse effects are necessary.
Keywords: Prevalence, Leishmaniasis, Cutaneous, Parasite, Sabzevar

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THE SIGNIFICANCE OF INFECTION OF SARCOCYSTOSIS IN MEAT OF DOMESTIC ANIMALS FOR SLAUGHTERING IN SLAUGHTERHOUSE

Shekarian, M.[1*], Jamshidy Deilamy, L.[2], Shafiei Sheykhani, H.[3]

1. *Doctorate in Veterinary Science (D.V.Sc.), Large Animal Internal Medicine, Rasht, Gilan, Iran*
2. *Doctorate of Veterinary Medicine (DVM), Veterinarian of Private Sector, Rasht, Gilan, Iran*
3. *Doctorate in Veterinary Science (D.V.Sc.), Obstetrics and Reproductive Diseases, Rasht, Gilan, Iran*

Email: Drshekariandvsc@gmail.com

BACKGROUND: Meat and its products are important sources of proteins in human nutrition. With increasing population in the world demand for protein foods has increased. As a result, Food hygiene, public hygiene, healthy and prevention of diseases it occurs in the consumption of food are very important.
Sarcocystis is an intracellular protozoan parasite belongs the phylum apicomplexa. *Sarcocystis* needs two definitive and intermediate hosts during its life cycle. Some species of *Sarcocystis* are zoonotic. Different *Sarcocystis* can be generated infection. It occurs worldwide and can be generated important healthy and economic loss when causing clinical and subclinical disease. There are reports of the transmission of the diseases by the consumption of undercooked or raw beef with infected cysts in humans. Parasites exits in bovine, ovine and goat muscles and fascia as a cystic form and may be seen in different organs. Judgement should be made on macroscopic presence of cysts. in heavy and widespread infestation with the visible cysts the whole carcass is removed. In lighter infestation those parts of the carcass which are not affected are passed for human consumption.
CONCLUSIONS: Considering the importance of zoonotic disease and the removal of contaminated carcasses from the perspective of veterinary, public health and economic, thus the aim of this study is overview of important of sarcocystosis in slaughtered domestic animals.
Key words: Meat,Domestic Animals, Parasite,*Sarcocystis*

INVESTIGATIION OF THE CAUSES OF CUTANEOUS LEISHMANIASIS IN BABOLSAR

Ghasemzadeh, F.[1], Shemshadi, B.[2*], Ghahari, A.[3], Naser, A.[4]

1. *Master of veterinary parasitology, Islamic Azad University of Science and Research Branch, Tehran, Iran*
2. *Department of Parasitology, Islamic Azad University of Science and Research Branch, Tehran, Iran*
3. *Surgical and clinical pathologist, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
4. *PhD student of Veterinary Parasitology, Islamic Azad University of Science and Research Branch, Tehran, Iran*

Email: bshemshadi@yahoo.com

BACKGROUND: Leishmaniasis is a parasitic disease common in human and animal obligate intracellular zoonosis. The transition factor is a kind of sand flies that enter the leishmania parasite with bite. Based on clinical symptoms, we have four types of leishmaniasis: 1.Cutaneous leishmaniasis. 2.Mucocutaneous leishmaniasis 3.Visceral leishmaniasis 4.Dessiminated leishmaniasis.
OBJECTIVES: In Mazandaran, due to the eradication plan of malaria (DDT) in previous years, there was a decrease in the population of sand flies. In this article, the causes of re-occurrence of leishmaniasis have been investigated in Babolsar city.
METHODS: A total of 22 patients that referred to a dermatologist with skin lesions (papules) in 2017-2018, were selected for direct sampling, giemsa staining and microscopic observation.
RESULTS: In 2017, 5 patients (22.7%) had positive in leishmaniasis, 3 of them had a wet type of *L.major* (60%), and 2 Dry Type *L.tropica* (40%). In 2018, 2 patients (9%) were positive for leishmania, 1 for *L.tropica* (50%) and 1 for L.major (50%). Prevalence of leshmaniasis in Babolsar were from that people travel to contaminated areas (71.4%), immigration from contaminated areas (28.6%), children (14%) and men (86%).
CONCLUSIONS: According to the results of this study, it is concluded that the incidence of leishmaniasis in Babolsar as a result of traveling to infected areas is the second most contributing cause for the dissemination and migration of people. The need for personal care in travels, referring to disease control centers after insect bites, confirmatory tests and timely treatment of leishmaniasis are control strategies.
Key words: Leishmaniasis, zoonosis, Babolsar, sand fly, Parasitic disease

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PREVALENCE OF *LINGUATULA SERRATA* IN GOATS SLAUGHTERED IN LORESTAN PROVINCE, WESTERN IRAN

Valinejad, M. R.[1], Shokrani H.R.[1*], Farjanikish G.[1]

1. Department of Pathobiology, Faculty of Veterinary Medicine, Lorestan University, Khorramabad, Iran

BACKGROUND: *Linguatula serrata* is a cosmopolitan zoonotic parasite. Infective nymphs of the parasite localize in mesenteric lymph nodes of herbivorous intermediate hosts. Humans can be occasionally infected with both adult and nymphal stages of the parasite.
OBJECTIVES: This cross-sectional study was conducted to determine the prevalence of linguatulosis in goats slaughtered in Lorestan province.
METHODS: Mesenteric lymph nodes of 240 goats were collected randomly from three different slaughterhouses of Lorestan province during a one-year period. Lymph nodes were examined macroscopically. Furthermore, an acid-pepsin digestion method was applied for investigation of negative samples.
RESULTS: One hundred and twenty-seven out of 240 goats (52.91 %) were infected with *L. serrata* nymphs. The prevalence of infection increased in summer and was highly significant ($p<0.01$), while the intensity of infection was not significantly associated with seasons.
CONCLUSIONS: High prevalence of infection in goats suggests possibility of infection in humans inhabiting these regions. Preventing the consumption of raw visceral organs of goats by dogs can help reduce the infection in humans and intermediate hosts.
Keywords: linguatulosis,lymph node,digestion method, goat, Lorestan

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EVALUATION OF THE EFFECTS OF AQUEOUS AND ALCOHOLIC EXTRACTS OF *FUMARIA* ON *LEISHMANIA MAJOR* PROMASTIGOTE AND AMASTIGOTE GROWTH UNDER IN VITRO CONDITIONS

Simin, A.[1], Ghaffarifar, F.[2]

1. *M.Sc in parasitology, Faculty of medical sciences, Tarbiat Modarres university, Tehran, Iran*
2. *Professor, department of in parasitology, Faculty of medical sciences, Tarbiat Modarres university, Tehran, Iran*

Email: a.simin@modares.ac.ir
ghaffarifar@modares.ac.ir

BACKGROUND: Leishmaniasis is a collection of parasitic diseases that have widespread clinical symptoms such as cutaneous *Leishmania*, muco-cutaneous *Leishmania*, visceral *Leishmania*. Nowadays there are many advances in use of herbal medicines, because of the harmlessness, the cheapness, the availability and the resistance of parasites to the existing drugs in comparison with the chemical drugs such as Glucantime, Amphotricin B, etc.
OBJECTIVE: In the present study the effect of aqueous and alcoholic extract of *Fumaria* which is a native Iranian herb (Anti-bacterial, Anti fugal, Anti arrhythmic effects of the plant has been studied) on the promastigote and amastigote under in vitro condition are evaluated.
METHODS: The aqueous and alcoholic extract of the plant was prepared, then the effect of different concentrations of (1,2,4 mg/ml and 500,250,125,62.5,31.25,15microgr/ml) of aqueous and alcoholic extract under in vitro condition, on the growth of the promastigotes of *Leishmania* and infected macrophage with amastigotes was evaluated by direct count and MTT assay and flow cytometry. In each test, wells and microtubes containing culture media and parasites without drug and were considered as the control group.
RESULTS: The MTT and direct count results indicated a significant difference among the number of promastigotes in the control groups or the treated groups, with mentioned concentrations of aqueous and alcoholic extract of the *Fumaria* within 24-48 and 72 hours after parasite culture. The MTT result indicated that aqueous and alcoholic extract of the *Fumaria* is not effective in killing macrophages. The flow cytometry results indicated that in the concentration of 4mg/ml of alcoholic extract, it has the highest amount of apoptosis and necrosis on parasites, 72 hours after parasite culture.
CONCLUSIONS: The aqueous and alcoholic extracts of *Fumaria* is effective in killing *Leishmania major* promastigotes and infected macrophages with amastigotes.
Key words: *Fumaria, Leishmania major*, Amastigote, Promastigote

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MOLECULAR CHARACTERIZATION OF THE HUMAN ISOLATES OF *ECHINOCOCCUS GRANULOSUS* FROM MAZANDARAN PROVINCE (NORTHERN IRAN)

Dodangeh S[1, 2*], Hedayati Z [1, 2], Sarvi S[1], Daryani A[1]

1. *Toxoplasmosis Research Center, Mazandaran University of Medical Science, Sari, Iran*
2. *Student of Research Committee, Mazandaran University of Medical Science, Sari, Iran*

Background: The larval stage of the tapeworm (cestode) *Echinococcus granulosus* is the etiological agent of hydatidosis or cystic echinococcosis, the zoonotic parasitic disease causing morbidity and mortality in both humans and livestock.
Objectives: Due to a lack of accurate data on the human isolates of *E. granulosus* in Mazandaran Province, northern Iran, the current study surveys the population genetic pattern of cystic echinococcosis isolated from humans by sequencing the mitochondrial genes of NADH dehydrogenase subunit 1 (nad1).
Methods: 47 formalin fixed paraffin-embedded tissue (FFPT) blocks were collected from patients' files in various pathology departments of Mazandaran Province. Polymerase Chain Reaction (PCR) was performed to amplify a 398 bp DNA fragment of the mitochondrial NADH dehydrogenase 1 (nad1). The PCR products were sequenced by Bioneer Corporation (South Korea), and the resulting data were analyzed via relevant software to determine the genotypes.
Result: Overall, 66.6% and 33.3% of the isolates in the studied area displayed the G1 and G2-G3 genotypes, respectively.
Conclusion: This study may provide the foundation for further studies in revealing the regional transmission patterns and also in designing adequate control procedures.
Keywords: *Echinococcus granulosus*, Molecular characterization, NADH dehydrogenase 1, Iran

MORPHOMOLECULAR CARACTERIZATION OF *ECHINOCOCCUS GRANULOSUS* FROM WILD SHEEP ISOLATE IN IRAN

Ghorbani, F.[1], Meshgi, B.[2*] E,slami, A.[2]

1. *DVM Student, Faculty of Veterinary Medicine, University of Tehran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran-Iran (Center of Excellent of Ecosystem and Ultrastructural changes of Helminthes)*

Email: Bmeshgi@ut.ac.ir (B. Meshgi)

BACKGROUND: Parasites play an important role in regulate host population in a natural environment, therefore having enough knowledge about the helminthes infections of wildlife in every area is essential.
OBJECTIVES: The aim of the present study is to determinate the characteristics of genotype and phenotype of *E.granulosus* derived of wild sheep (*Ovis orientalis*) and to compare those with strains of sheep-dog (G1) and camel-dog (G6) in Iran.
METHODS: In the National Park of Khojir near the Tehran in the liver of the died wild sheep harbored a fertile hydatid cyst. The number of protoscoleces (6000) was enough for experimentally infection in a dog. For the determination of *E.granulosus* genotype, 20 adults *E.granulosus* were collected from experimentally dog. In the second internal transcribed spacer (ITS2) of nuclear ribosomal DNA (rDNA) and cytochrome c oxidase I subunit (COI) of mitochondrial DNA (mtDNA) were amplified from individual adult worm by polymerase chain reaction (PCR) and the PCR product sequenced.
RESULTS: The characteristics of large and small hooks of metacestode were statistically determined as dog-sheep strain (G1) but not the camel-dog strain ($P<0.5$). The length of the ITS2 and COI sequences were 378 and 857 bp, respectively, for all sequenced samples. The amplified DNA sequences from both ribosomal and mitochondrial genes showed high similarity (99% and 98%, respectively) with that of ovine strain in the GenBank database.
Conclusion: The results of the present study indicate that morpho-molecular and the characters of *E.granulosus* from Iranian wild sheep were those of to the universal sheep.
Keywords: *Echinococus granulosus*, Wild sheep, Morphology, Molecular, Iran

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INVESTIGATION ON THE EFFECT OF ALCOHOLIC EXTRACT OF HENNA ON LEISHMANIA MAJOR IN LABORATORY CONDITIONS

HerminehGholizadeh [1], FatemehGhaffari Far [2*], AbdolhosseinDalimi [3]

1. *MSc Medical Parasitology, Department of Parasitology, Faculty of Medicine, TarbiatModares University, Tehran, Iran*
2. *Department of Parasitology, Faculty of Medicine, TarbiatModarres University, Tehran, Iran*
3. *Department of Parasitology, Faculty of Medicine, TarbiatModares University, Tehran, Iran*

Email: Ghaffarifar@modares.ac.ir

Background and Purpose: The cause of the disease is leishmaniasis, a leishmania major, which has a worldwide spread. The disease is a type of animal-borne illness, with clinical manifestations ranging from rash to visceral disease. Currently, five-component of antimony are known to be the primary treatment of leishmaniasis, but use of these compounds has limitations. Due to the prevalence of leishmaniasis in Iran and the history of traditional treatments, herbal medicine studies and herbal treatments for treating wound healing and appropriate replacement therapy are considered today. This research was conducted to determine the effect of Henna extract on Leishmaniamajor parasite compared to glucantime control on strains of standard Leishmania major in laboratory conditions.

Materials and methods: In this study, the strains of standard Leishmania major were cultured in a culture medium temperature of 20-25 ° C. Subsequently, the parasites were exposed to various concentrations of 6.25- 400 extracts Blue and alcoholic Henna leaves were compared to glucantime control drug. The effect of parasite extract on parasite count was determined in neobar lamella. Then, using the MTT colorimetric method, the effects of the same concentrations in the two external conditions (on the Leishmania parasite in the logarithmic phase) and on the intraocular conditions (on the macrophage cells in the laboratory), were measured by the ELISA reader Measured and calculated IC50. Then, a flow cytometry test was performed and a diagram of necrosis and apoptosis was drawn. At the end of the study, the effect of henna extract on the mastigot of the parasite in the macrophage salutis was carried out under laboratory conditions. Using the Giemsa coloring, the inhibition of the extract on the parasite Cell was observed.

Results: The results of parasite counting as well as the MTT test result from the effect of Henna extract on the major leishmaniasis after 72 hours compared with glucantime showed the inhibitory strength of the extracts at 400 mg / ml concentration. While the extracts had no fungal effects on macrophage cells. Also, the result of flow cytometry at 400 mg / ml concentration also showed the highest incidence of apoptosis and necrosis.

Conclusion: Henna alcoholic extract on Leishmania parasitic virus does not have a good inhibitory effect, but has the inhibitory effect on growth and preventing parasite proliferation in the tissue.

Vocabulary: Mantistegot, Leishmaniamajor, Henna, Herbal Extract

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THE EFFECT OF DIFFERENT CONCENTRATIONS OF HONEY ON LEISHMANIA MAJOR IN LABORATORY CONDITIONS

HerminehGholizadeh [1], FatemehGhaffari Far [2*], Abdul Hussein DalimyAsl [3]

1. *MSc Medical Parasitology, Department of Parasitology, Faculty of Medicine, TarbiatModares University, Tehran, Iran*
2. *Department of Parasitology, Faculty of Medicine, TarbiatModarres University, Tehran, Iran*
3. *Department of Parasitology, Faculty of Medicine, TarbiatModares University,Tehran, Iran*

Email: Ghaffarifar@modares.ac.ir

Background: One of the most common diseases in the tropical and subtropical regions of the world. Our country is also known as endemic cutaneous leishmaniasis. Leishmaniasis is a disease caused by a sandfiy bite and is a protozoan agent of the kinteplascidae. In Iran, Leishmaniamajor (rural type) and Leishmaniatropica (Urban Type) are known. The first line of treatment in these infusions is the five-component antimony that due to complications. Today, researchers are seeking more compatible and more effective compounds Treatment for leishmaniasis. In this study, different concentrations of honey were studied on Leishmaniawort parasites.

Materials and Methods: In this study, the strain of standard Leishmania major was cultured in RPMI culture medium at 20-25 ° C. Subsequently, the parasite was cultured in a multiplication phase under various concentrations of 6.25 -800 honey was compared with glucantime control drug. The effectiveness of parasite honey was determined by counting the parasite in neobar lamella. Then, by using MTT colorimetric method, the effect of the same concentrations in two external conditions (on the leishmania parasite in the logarithmic phase) and mastigotconditions (on macrophage cells in the laboratory), which measured the absorbance of the light by the ELISA reader And calculated at IC50. Then, a flow cytometry test was performed and a diagram of necrosis and apoptosis was drawn. At the end of the study, the effect of honey on the formulation of the parasite gastritis in the macrophage saloons was carried out in laboratory conditions. Using Giemsa staining, the degree of lethality of the extract on the intestinal parasite was observed.

Results: The results of parasite counting as well as MTT test results from the effect of honey on leishmania major after 72 hours compared with glucantime showed a potentiality in 800 mg / ml concentration. While the extract had no fungal effects on macrophage cells. Also, the results of flow cytometry at 800 mg / ml showed the highest incidence of apoptosis and necrosis, with only 10% of the parasites surviving.

Conclusion: This study showed that honey on Leishmania parasitic infestation has a beneficial effect on fecundity, and if further studies can be done, it can be used as an alternative to treating human leishmaniasis.

Keywords: Leishmania major, Leishmaniasis, Sickle, Honey

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IN VIVO AND IN VITRO EVALUATION OF IMMUNE RESPONSES AGAINST *TOXOPLASMA GONDII* STRAIN RH

Faridnia, R.[1], Mohaghegh, M.A.[2], Kalani, H.[3]

1. *Student Research Committee, Mazandaran University of Medical Science, Sari, Iran*
2. *Department of Laboratory Sciences, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran*
3. *Infectious Diseases Research Center, Golestan University of Medical Science, Gorgan, Iran*

BACKGROUND: *Toxoplasma gondii*, an obligate intracellular parasitic protozoan, is capable of infecting a wide range of warm-blooded vertebrates.
OBJECTIVES: In vivo and in vitro evaluation of immune responses against *Toxoplasma gondii* strain RH.
METHODS: *Toxoplasma gondii* lysate preparations (TLPs), excretory/secretory antigens (ESAs) from cell free medium and a combination of them (TLP+ESA) were prepared and encountered with the isolated murine peritoneal leukocytes and then the IFN-γ and IL-4 levels were measured using ELISA technique in the harvested cell culture supernatants. In addition, 35 BALB/c mice in 5 groups were immunized with the above antigens or combined antigens (TLP+ESA) in two separate times with Freund's complete adjuvant and Freund's incomplete adjuvant, respectively, and their survival rate were recorded after challenge with *T. gondii*. Their spleen size was measured after death as well.
RESULTS: The results showed that the level of IFN-γ had a significant difference statistically among TLP+ESA and TLP group ($P < 0.05$) while there was not a statistical significant difference for IL-4 among groups. The Pearson's correlation coefficient results showed that there was a significant correlation between the mice survival time and the spleen size ($P < 0.05$) that the largest size of spleen was observed in TLP+ESA group.
CONCLUSIONS: In the present study, TLP+ESA showed the most potent immune responses followed by ESA and TLP groups, respectively.
Keywords: Immune responses, *T. gondii*, RH strain, in vitro, in vivo

Drug Eesistance, Vaccine and Immunology

Oral presentation

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FROM MOLECULE TO VACCINE AGAINST CRYPTOSPORIDIOSIS

Shayan, P

Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran

Email: pshayan@ut.ac.ir

BACKGROUND: *Cryptosporidium parvum* is a coccidian protozoan parasite causing disease in newborn animals and immunosuppressed human. Vast amount of oocysts of this parasite can be released from the infected individual contaminating the environment. The immunological status of the infected individual determine the severity of the disease. Oocysts of *Cryptosporidium* are extremely resistant to many disinfectant and no effective curative agent against this organism is available.
OBJECTIVES: Therecombinant *C. parvum* P23 was used as vaccine candidate.
METHODS: P23 gene was cloned and the recombinant protein was prepared and used for producing hyper immune eggs and colostrum.
RESULTS: IgY isolated from hyper immune eggs could recognize the P3 protein in lysate prepared from oocysts and could reduce to more than 70% the oocyst shedding in 6-week-old female C57BL/6 mice after challenge with 1×10^4 oocysts. Also orally with $1x10^7$C. *parvum* oocysts challenged calves consuming hyper immune colostrum excreted oocysts significantly lower than the calves in control group and the number of oocysts excreted by calves in control group was 25 time higher than the passive immunized calves. Interestingly, in contrast to the control group, the calves in the test group showed no clinical signs.
Conclusions: It could be shown that hyper immune colostrum against P23 or IgY against P23 can be considered as a possible passive immunization strategy.
Keywords: *Cryptosporidium*, recombinant protein P23, cloning, passive immunization

A DECADE OF EFFORTS TO PRODUCE AN ANTI-TICK VACCINE (2008-2018)

Nabian, S.*[*1], Asadollahi, Z.[1], Taheri, M.[2]

1. *Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Rastegar Reference Laboratory, Faculty of Veterinary Medicine University of Tehran, Iran*

Email: Nabian@ut.ac.ir

BACKGROUND: *Rhipicephalus(Boophilus)annulatus* is a one-host tick that can cause important losses to bovine herds. It can cause anemia and transmit some pathogens as *Babesia, Theileria* and *Anaplasma* in animals. Protective antigens are being investigated in order to develop vaccines to avoid the use of acaricides.
OBJECTIVES: Within 10 years, different antigenic aspects of *Rh. annulatus* tick and host immunity tothis tick infestation were investigated.
METHODS: The characters of different antigens of tick were determined and the common proteins in different tick tissues were assigned using SDS-PAGE. A number of proteinases and inhibitors that are important in its biology and physiology were shown by direct and indirect one-dimensional and two-dimensional zymography. The cathepsin, one of these proteins was cloned, sequenced in PTZ57R / T vector and expressed. Aso a potential vaccine candidate of fused cathepsin L and tropomyosin genes of *Rhipicephalus (Boophilus) annulatus* tick larva was assigned. Then immune reactions of rabbits to cathepsine and multi-epitope genes consisting of immunogenic epitopes of cathepsin and tropomyosin (CaTro) was studied. The results showed that the CaTro protein has a molecular weight of 38kDa which could be a suitable candidate against tick infestation.
CONCLUSIONS: It seems that more knowledge about different tick proteins and their characterization could be useful for the development of anti-tick vaccines.
Keywords: Vaccine, tick, *Rhipicephalusannulatus*, Immunoinformatics, Tropomyosin, Cathepsin

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ANTHELMINTICS RESISTANCE IN NEMATODES OF VETERINARY IMPORTANCE: A STATUS REPORTAND HOW TO OVERCOME IT?

***Borji, H.*[1]**

1. *Department of Pathobiology, School of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*

Email: hborji@um.ac.ir

BACKGROUND: Anthelmintic resistance has increased to become a major worldwide problem to livestock industry. Beginning of anthelmintic resistance with phenothiazine in the 1950s, followed by the benzimidazoles in the 1960s, the imidazothiazole–tetra-hydropyrimidines in the 1970s and the avermectin–milbemycins in the 1980s was introduced into the marketplace each decade.
OBJECTIVES: Drug resistance have been reported in livestock host worldwide. In someareas, the markedly high prevalence of anthelmintic resistance has been found in small ruminants, where the most considerable changes are needed for nematode control.
RESULTS: It has been observed that frequent usage of the same group of anthelmintic; use of anthelmintics in sub-optimal doses, prophylactic mass treatment of domestic animals and frequent and continuous use of a single drug have contributed to the development of anthelmintic resistance in helminthes. Targeted selective treatments attract the interest of parasitologists towards maintaining parasites in refugia, seems to be a key point in controlling and delaying the development of resistance. Modern strategy for nematode control should not rely on sole use of anthelmintics. Therefore, it is needed to use novel non-chemical approaches that decrease the need for treatment including parasite resistant breeds, nutrition, pasture management, nematode-trapping fungi and anti-helminthic vaccines.
Keyword: Anthelmintics resistance, veterinary importance

MOLECULAR INVESTIGATION OF BENZIMIDAZOLES RESISTANCE IN ABOMASAL NEMATODES ISOLATED FROM SHEEP IN NORTH OF IRAN

***Bahari, A.*[1*], *Nemati, R.*[2], *Mahmoodi P.*[2], *Sazmand, A.*[2]**

1. *Department of Clinical Sciences, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*

Email: aliasghar.bahari@basu.ac.ir

BACKGROUND: Resistance to benzimidazole (BZ) compounds is common in gastrointestinal nematodes such as *Teladorsagiacircumcincta* and *Haemonchuscontortus* in sheep and goats worldwide. Although BZs resistance has been reported from Iran so far there is no much information based on molecular epidemiology in sheep.
OBJECTIVES: Given the importance of anthelmintic resistance and shortage of information about status of prevalent abomasal nematode, aim of this study was to investigate single nucleotide polymorphisms (SNPs) in sheep of northern Iran.
METHODS: From June to September 2016, abomsa of 139 sheep of both sexes and different ages in Amol slaughterhouse were examined for isolation of nematodes. Totally, 45 male *T.circumcincta* and 5 male *H. contortus* that were confirmed by both microscopical and nested-PCR-RFLP methods were included in this study. Susceptibility or resistance of each single nematodes worm to benzimidazoles was performed using allele-specific PCR.
RESULTS: Frequency of genotypes in *T. circumcincta* was 33.33% heterozygote BZ and 66.67% BZ homozygote sensitive. In examined *H. contortus* 40% were heterozygote BZ and 60% BZ homozygote sensitive. No homozygote resistant worm was found.
CONCLUSIONS: Resistance against BZs in *T. circumcincta* and *H. contortus* of sheep has occurred at a low prevalence in the north of Iran. However, mutated genes might get dominant under drug selection in future. Hence, periodic investigations for early detection of mutated alleles in nematode populations using accurate and sensitive molecular methods are recommended.
Keywords: Anthelmintic Resistance, Benzimidazole, Sheep, *Teladorsagia*, *Haemonchus*,Single nucleotide polymorphism (SNP), β-tubulin

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PROTEOMICS ANALYSIS OF THE ANTIGENIC PRODUCTS DERIVED FROM ADULT STAGE OF TOXOCARACATI

Mehr Soleymani.[1*], Borji, H.[2], Abnous, K.[3]

1. PhD Student, Department of Veterinary Parasitology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran
2. Professor Department of Veterinary parasitology, Faculty of Veterinary Medicine Ferdowsi University Of Mashhad, Iran
3. Professor of Medicinal Chemistry, Mashhad University of Medical Sciences, Mashhad, Iran

Email: nooshinmehr.soleymani@mail.um.ac.ir

BACKGROUND: Toxocariasis is a neglected zoonotic disease, caused by the infective larvae of *Toxocaracatiand T. canis.* Diagnosis in humans is usually based on clinical symptoms and serology. Serological diagnosis is performed by an enzyme-linked immunosorbent assay for *T. canis*. Differences in the antigens of the two *Toxocara* species may influence the diagnostic sensitivity of the test.
OBJECTIVES: In this study, *T. cati* somatic antigens produced by adult worms were evaluated. Identification of proteins of *T.cati* can be useful for the development of new diagnostic strategies since few proteins have been described so far.
METHODS: Herein, we report the results obtained by proteomic analysis of somatic proteins using a mass spectrometry (LC–MS/MS). Somatic proteins were separated by two-dimensional SDS-PAGE and then analyzed by LC–MS/MS. The MS/MS spectra were compared with a database of protein sequences deduced from the genome sequence of *Toxocara*.
RESULTS: A total of 10 proteins were identified. It worth noting that identified proteins were extracellular and cytoplasmic or nuclear localization, while 2 proteins were unknown.
CONCLUSION: This study provides additional information about the proteins of *T. cati*, which can lead to the development of new diagnostic strategies.
Keywords: Proteomics, *Toxocariasis*, zoonotic,mass-spectrometry, SDS-PAGE

COMPARATIVE INVESTIGATION OF MOLECULAR DETECTION AND MODIFIED KNOTT TEST IN IDENTIFYING *DIROFILARIAIMMITISIN* STRAY DOGS IN KHORRAMABAD, IRAN

Ramezani, M.[1], Nayebzadeh, H.[2], Jalousian, F.[3*], Jamshidi, S.[4]

1. *Graduatedin D.V.M, Faculty of Veterinary Medicine, University of Lorestan, Khorramabad, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Lorestan, Khorramabad, Iran*
3. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
4. *Department of Internal Medicine, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: jalousian_f@ut.ac.ir

BACKGROUND: *Dirofilariaimmitis* is one of the important zoonotic infection, in which the human serves as an accidental host.Iran has been one of the important endemic regions in Asia for *Dirofilariaimmitis*
OBJECTIVES: The purpose of this study was to compare the Modified Knott test and molecular method for the diagnosis of *Dirofilariaimmitis* in stray dogs in Khorramabad, Iran.
METHODS: In this study, 99 blood samples were collected from stray dogs in Khorramabad, Iran. The blood samples were examined by Modified Knott and molecular methods (PCR with universal primers of cox I sequence). PCR products were sequenced and compared with the sequences released in Gene Bank.
RESULTS: In this study, none of the positive samples were detected with Modified Knott test but 7 cases (7.07%) were positive with PCR method. The amplified partial sequence of cox I showed 99-100% similarity with sequences released in Gene Bank.
CONCLUSIONS: This study showed that the Modified Knott test does not have acceptable sensitivity Due to false negative results,but molecular methods showed acceptable sensitivity and accuracy for diagnosis different microfilers of filarial worms that infected dogs.
Keywords: *Dirofilariaimmitis*, Stray dog, Khorramabad, PCR, modified Knott test

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SUBTYPE IDENTIFICATION OF *BLASTOCYSTIS*SP. ISOLATED FROM PATIENTS REFERRING TO MEDICAL LABORATORY, KASHAN, IRAN 2017-2018

KhodabakhshArbat, S.[1], Hooshyar, H.[1,2*], Sadeghi, H.[1], Delavari,M. [1], Arbabi, M. [1]

1. *Department of Parasitology, School of Medicine, Kashan University of Medical Sciences, Kashan, Iran*

BACKGROUND: *Blastocystis*species are one of the most common protozoan infection in human and some animals worldwide. Molecular studies have shown that there is a high level of genetic variation among *Blastocystisspp*. isolates.

OBJECTIVES: The aim of this study was to identify subtypes of *Blastocysis* sp. isolates in patients referred to Kashan medical diagnostic laboratories.

METHODS: This cross-sectional study was carried out on 1118 patients, during December 2017 to June 2018. Fecal specimens were examined microscopy. Positive samples were cultured in Robinson media. After massive growth and DNA extraction, a 550 bp sequence the SSUrRNA gene was amplified by PCR for the subtype's identification. 51 PCR products were sequenced, identified and compared at the NCBI website. The results were analyzed by descriptive statistics using SPSS 16 software.

RESULTS: In this study, the prevalence of *Blastocystis* sp.was determined as 8.58% (C.I. = 6.94% -10.22), from which 73(76%) were men and 23(24%) were women. In 51 PCR products, 21(41.2%) ST3, 20(39.2%) ST1, 6(11.8%) ST3 and 4(7.8%) mixed isolates were identified as Mix. ST3 and then ST1 were the most common subtypes.

CONCLUSIONS: The prevalence of *Blastocystis*sp. in our study is lower than that reported in other countries. The most common subtype found in this study was subtype 3, followed by subtype 1, which was similar to most studies in Iran and around the world.Also, ST14, which was seen exclusively in animals, was reported mixed with other subtypes in this study.

Keywords: *Blastocystis*sp., subtype, Iran, human, Kashan.

CURCUMIN AS CANDIDATE AGENT AGAINST CUTANEOUS LEISHMANIASIS

Ghasak Aqeele[1,2] , Parviz Shayan[1,3], Elahe Ebrahimzade Abkooh[1, 4], Mahdi Mohebali[5], Sara Khalili[1]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Microbiology, Faculty of Medicine, University of Wassit, Iraq.*
3. *Institute Molecular Biological System Transfer (MBST)*
4. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*
5. *Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

Objective: Leishmaniasis is a poverty-related disease with two main clinical forms: cutaneous leishmaniasis and visceral leishmaniasis. *Leishmania* sp. infects 0·7–1 million new cases/ per year in about 100 endemic countries in the tropics, subtropics, and southern Europe. Prevention and control of leishmaniosis are very difficult because of the complexity of *L. major* epizoology, and there are only a few approved therapy, no prophylactic drug and vaccine. Meglumine antimoniate is the first choice of anti-leishmanial drug, has earnest side effects. Therefore, there is an urgent need for more safe, effective and economically convenient drugs for the treatment of leishmaniasis. Curcumin has antiprotozoal and anti-proliferative effects. Since curcumin is not toxic, it can be used as a safe alternative therapeutic agent.

Materials: 2.5× 10^6 cell/ml promastigotes on the logarithmic phase of the Iran's Standard Strain L. major (MRHO / IR / 75 / ER) treated with (5 µM, 10 µM, 20 µM, 40 µM and 80 µM) of curcumin for12 h and 24 h in vitro. The evaluation of parasite survival was determined by using Giemsa staining, MTT, Trypan blue staining. For analysis the viability of the promastigotes, the living and dead cells and morphological alterations of promastigotes were analyzed in treated and untreated cultures in the giving times. All tests repeated three times.

Results: The results showed that morphological change of the flagellum and cell shape increased with increasing concentration of curcumin. The promastigotes were susceptible against curcumin in dose and time dependent manner.

Conclusion: Our results revealed that curcumin can be considered as a safe candidate against cutaneous leishmaniasis.

Drug Resistance, Vaccine and Immunology

Poster presentation

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BIOLOGICAL CONTROL OF THE *HYALOMMAMARGINATUM* TICK BY *METARHIZIUMANISOPLAE* ISOLATED DEMI 001 IN LABORATORY CONDITIONS

Ahmadi Saleh Baberi, N.[1*], PiraliKhirabadi,Y.[2]

1. *Student of veterinary Parasitology(Ph.D), Faculty of the Veterinary Medicine, University of Ferdowsi, Mashad, Iran*
2. *Professor, Faculty of the Veterinary Medicine, University of Shahrekord, Shahrekord, Iran.*

BACKGROUND: Ticks are the most important vector of pathogens because a large number Bloodthirsty of host and are able to adapt to their environmental conditions. Control of animal parasites through chemical pesticides has included problems such as pesticide resistance. The effects of pesticides on livestock production and their risks to human health are another pesticide exposure associated problems. Furthermore, the environmental impacts of pesticides, the cost of rial and foreign exchange costs for importing pesticides and the provision of raw materials for pesticides are another problem.A review of the research shows that the most important controlling factors are some of the fungi including the genus *Metarhizium*.

METHODS: For testing, suspensions containing $2/4 \times 10^7$, $2/ 4 \times 10^9$ and $2/4 \times 10^{11}$conidium per ml were prepared from the *DEMI 001* isolate and then stored in a refrigerator at a temperature of 4 ° C. For the fungal isolate, three treatment groups from each test species were considered in most of the 10 tick groups, Also, 30 ticks were used as negative control groups in three groups of 10, in total, 120 ticks of adult *Hyalommamarginatum* were used. The ticks were immersed for 3 to 5 seconds in the fungal suspension and in the negative control group, the ticks were immersed in sterile distilled water withTween 80 non-spore. After immersion, the ticks were transferred to petri dishes containing a wet wip filter paper. Then they were placed in a germinator at a temperature of 25 ° C and a Moisture of 70%. It should be noted that Wattman paper was used before autoclave, and each day after studying the ticks, a few drops of distilled sterilized water were added to the dishes to provide moisture. All of the tested groups were observed daily for 20 days and the mortality and growth fungi of their daily were recorded.

RESULTS: *DEMI 001* isolate at concentrations of 2.4×10^7, 2.4×10^9 and $2/4 \times 10^{11}$conidium per ml infected 100%,70% and 93.4% of ticks respectively. The average percentage of mortality from *DEMI 001* with concentrations of 2.4×10^7, $2/4 \times 10^9$ and $4/2 \times 10^{11}$conidium per ml was 73.4, 43.4 and 80%, respectively.

Keywords: Biological control, *Metarhiziumanisoplae,* Hyalommamarginatum

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COMPARISON OF PROINFLAMMATORY GENE EXPRESSION IN LESION CAUSED BY *LEISHMANIAMAJOR* INFECTION IN BALB/C MICE

Akhzari, S.[1], Rezvan, H.,[2*], Zolhavarieh, M.[3]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Science, Bu-Ali Sina University, Hamedan, Iran*
3. *Department of Clinical Sciences, Faculty of Veterinary Science, Hamedan, Iran*

BACKGROUND: Leishmaniasis is a dermal disease common between humans and animals, which is now accounted as a health problem, after malaria, in the world. Characterization of inflammatory responses produced in cutaneous leishmaniasis has not yet been completed.
OBJECTIVES: The aim of this study is to investigate and understand the pro-inflammatory gene expression pattern in various stages of development and progression of cutaneous leishmaniasis to provide a standard framework for the diagnosis of various stages of the patient's recovery process.
METHODS: In this study, $10^7 \times 1$ for intradermal *Leishmaniamajor* in two groups of BALB / c mice and then injected at intervals of a week, the expression of cytokines IL-12p35, CCL3, CCL4, IL-12p40, TNF-α, CCL5, IL -1α, IL-1β, IFN-γ and CCR5 in lesion were examined.
RESULTS: According to the leishmaniasis is a chronic disease, extensive tissue destruction associated with. Garlic is different cytokine changes in *Leishmania* from early stage to improve.
CONCLUSIONS: Accordingto Process the expression of the proinflammatory genes can say Cytokines IFN-γ, IL-12, TNF-α is the important factor affecting the immune response. So reducing the expression of these genes causes lesions in advanced.
Keywords: Leishmaniasis, Proinflammatory Gene Expression, lesion

A REVIEW OF THE STATUS OF ANTIPARASITIC DRUG RESISTANCE IN SHEEP IN IRAN

Dehesh, P.[1], Bokaei, S [2*]

1. *Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of food hygiene, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

BACKGROUND: Resistance to anti-parasitic drugs is reduced in the sensitivity of a parasite to the effect of a drug. The anti-parasitic drug resistance of small ruminants is a global and growing problem that can only slow down the process, but it does not stop.
OBJECTIVES: Although, anti-parasitic drugs use widely in Iran, there has been little research on resistance to these drugs. The aim of this survey was a review the status of antiparasitic drug resistance in sheep in Iran.
METHODS: A literature search was done on Science Web and database by special key word. In this respect, a treatise was published in Mashhad and three other articles have found. After evaluating these articles and reviewing the results of these studies, the combination of the results of studies to investigate the resistance to antiparasitic drugs in Iran was carried out.
RESULTS: Hossein Hosseini and coworker studied on the evaluation of the drug resistance of triclalbindazole and albendazole (*in vitro* production) against *Fasciola* species in Guilan sheep, found that triclalbindazole was 100% effective on *Fasciola*, while albendazole had no significant effect on *Fasciola* and other gastrointestinal nematodes (P>0.05).Abbas Gholamian and other colleagues studied on a resistance to albendazole in gastrointestinal nematodes of sheep in Khuzestan province, showed resistance to the albendazole in 27% of the herds and 53% suspected of resistance.GholamrezaRazmi and Hasan Barji in 2000 showed that there is resistance in a number of sheep gastrointestinal nematodes against levamisole in Mashhad and Gorganprovinces.Abbas Gholamian and coworker indicated resistance to albendazole and levamisole in 6.5% of the herds due to the development of resistant *Ostertagia* isolates.
CONCLUSIONS: Our findings indicated thatresistance to the albendazole and levamisole have been increased. In this regard, more monitoring is needed on the use of these two drugs.
Keywords: Drug resistance, Antiparasitic drugs, Sheep, Iran

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COMPARATIVE ASSESSMENT OF *ORIGANUMVULGARE*, AND *ARTEMISIA* SIEBERI EFFECT ON *EIMERIA* SHEDDING IN BROILER CHICKENS

Gholami-Ahangaran, M[1*], Ahmadi-Dastgerdi, A.[2], Farhangi, S[3]

1. *Shahrekord Branch, Islamic Azad University,Department of Poultry Diseases, Faculty of Veterinary Medicine, Shahrekord, Iran*
2. *Ardestan Branch, Islamic Azad University, Department of Food Science and Technology, Ardestan, Iran*
3. *Shahrekord Branch,Islamic Azad University,Undergraduate of Veterinary Medicine Faculty, Shahrekord, Iran*

BACKGROUND: Coccidiosis is one of main parasitic disease in poultry production. This disease commonly controlled with chemical compound. This compound can residue in egg and meat and it can cause of risk in consumer health.
OBJECTIVES: The aim of this study is Experimental comparitive of Origanumvulgare, and Artemisia sieberi effect on *Eimeria* shedding in broiler chickens
METHODS: For this purpose, in present study, we compared the effect of *Origanumvulgare, Artemisia sieberi* and toltrazuril in reducing of oocyte shedding in experimental coccidiosis. For this purpose, 360 chicks were divided in 10 groups with 3 replicate. In 21 days old, 5 groups challenged with mix Eimeria oocytes and 5 groups without challenge reared as negative control. The groups were treated with *Origanumvulgare, Artemisia sieberi,* mixing of *Origanumvulgare* and *Artemisia sieberi*, and toltrazuril. The OPG were determined before and after treatment. Furthermore, the pathological feature of intestine was examined. The growing indices were compared in all of chickens.
RESULTS: The results revealed that the administration of *Origanumvulgare* and *Artemisia sieberi* mix can control coccdiosis as same as toltrazuril in all studied indices.
CONCLUSIONS: Therefore, the mixing of these herbs can effective in control of coccidiosis in organic poultry without consuming of chemical anticoccidiosis compounds.
Keywords: *Origanumvulgare*, *Artemisia sieberi*, Chicken, Coccidiosis.

STUDY OF ANTI-LEISHMANIAL AND TOXIC EFFECTS OF CM11 PEPTIDE: COMPARISON WITH GLUCANTIME

Khalili, S.[1], Ebrahimzade, E.[*2], Mohebali, M.[3], Shayan, P.[1]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran*
3. *Department of Medical Science, School of Public Health, Tehran University of Medical Science, Tehran, Iran*

BACKGROUND: Cutaneous leishmaniasis is one of the important health problems of the tropical and subtropical countries over the world, including Iran.The use of glucantime drug is still the first line treatment for leishmaniasis, but drug resistance and some of serious side effects have been reported. In this study the peptide, a small peptide composed of 11 amino acids, which is a hybrid of two peptides cecropin and melittin, has been used.
OBJECTIVES: The aim of this study is to determine the effects of anti-leishmanial and toxic effects of CM11 peptide and its comparison with glucantimeagainst Iranian strain of *L. major*.
METHODS: The effects of different concentrations of CM11 peptide (8, 16, 32, 64, 128 µM) and glucantime at concentrations (30/87, 61/75, 123/5, 247 µM) were evaluated for 24, 48 and 72 hours after exposure on amastigote *L. major* using different methods including Giemsa and DAPI (4',6-diamidino-2-phenylindole) stainingin vitro. In addition, MTT assay was used to determine the cytotoxic effects of CM11 peptide and glucantime on murine fibroblast (L929) and macrophage (RAW264/7) cell lines.
RESULTS: The results showed that, anti-leishmanialeffects ofof 8 µM of CM11 peptide and 123.5 µM of glucantime has a significant difference compared with the negative control group in 24 hours($p<0.05$(. On the other hand, the 8 µM concentration of the peptide did not have any toxic effect on the murine macrophage and fibroblast cell lines.While glucantime at a concentration of 123.5 µM has toxic effects on both cell lines.
CONCLUSIONS: It seems that the CM11 peptide has significant potential as a new anti-leishmanial agent.
Keywords: *Leishmania major*, Amastigote, CM11 Peptide, Glucantime,Toxicity.

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THE EFFECT OF FERULA ASSA-FOETIDA EXTRACT ON HYDATID CYST PROTOSCOLICESIN *VIT-RO*

***Mousavi, Sh.*[*1],*Norouzi, R.*[2]**

1. *Department of Food Hygiene and Aquatic Animals, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*
2. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*

BACKGROUND: *Echinococcusgranulosus* is the causative agent of cystic echinococcosis (CE), which is distributed all around the world. This parasite causes hydatid cysts that can lodge at different organs of host such as liver, lung even in heart and brain which may lead to death. The current methods for treatment of human CE include surgery. Presently, numerous scolicidal chemical agents have been administrated for inactivation of the hydatid cyst contents. Recently, there is a high tendency among researchers to evaluate and present herbal plants as alternative option due to being inexpensive, easy available, low side effects and toxicity.
OBJECTIVES: This study was undertaken for the first time to evaluate the scolicidal effect of hydro alcoholic*Ferula assa-foetida extract in vitro*.
METHODS: The scolicidal activities of the extract were tested in concentrations of 50, 100, 150, 200 and 250 mg/ml following 10, 30 and 60 min of incubation and tests were repeated three times. Data were analyzed by SPSS software.
RESULTS: The results showed that the hydro alcoholic extract of Ferula assa-foetida at the concentration of 100 mg/ml leads to killing all ofprotoscoleces at 60 minutes, then this investigation is recommended to use this plant as a scolicidal plant.
CONCLUSIONS: Our results suggest that using of *Ferula assa-foetida* extractasscolicidal agent is practical.
Keyword: Hydatid cyst, Scolicidal, *Ferula assa-foetida*, *in vitro*

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IN VITRO STUDY OF ANTITRICHOMONAL ACTIVITY OF CHALCONE DERIVATIVES ON *TRICHOMONASGALLINAE* TROPHOZOITES

Nikpay, A.1, Kashani, E.2,Soltani, M.3*

1. *Department of Pathobiology, Faculty of Veterinary Medicine, Amol University of Special Modern Technologies, Mazandaran, Iran*
2. *PhD of Organic Chemistry. Graduated from Department of Chemistry, Urmia University, Urmia, Iran*
3. *PhD of Veterinary Parasitology. Graduated from Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*

Email: Maryamsoltani64@gmail.com

BACKGROUND: Avian trichomonosis is a parasitic disease, caused by the flagellated protozoa *Trichomonasgallinae*, animportant parasite whichcommonly infects the upper digestive tract and various internal organs of a wide range of birds includingcolumbids, birds ofprey and passerines (such as finches and sparrows). Metronidazole and a related 5-nitroimidazole, tinidazole,are the only drugs recommended for the treatment oftrichomoniasis.However, resistant against metronidazole is frequently reported. Therefore, it is necessary to search for effective alternative drugs. Chalcones (1, 3-diaryl-2-propen-1-ones) and their heterocyclic analogues, belong to the flavonoid family, which possess a number of interesting biological properties such as antioxidant, cytotoxic, anticancer, antimicrobial, antiprotozoal, antihistaminic and anti-inflammatory activities.

OBJECTIVES: The present study was carried out to investigate the *in vitro* effects of different concentrations of chalcone ((1E, 4E)-1, 5-diphenylpenta-1, 4-dien-3-one)on *T. gallinaetrophozoites*.

METHODS: *T. gallinae* (1×10^7trophozoites/ml) were cultured in a Hollander's modification of TYM medium. The effects of different concentrations of chalcone (10, 5, 2.5, 1.25, 0.625, 0.312, 0.156 mg/ml) at different time points (after 24, 48 and 72 h) were determined. Also, morphological changes were reported by scanning electron microscopy (SEM).

RESULTS: The different concentrations of chalcone tested exhibited different degrees of growth inhibition activity on trophozoites of *T. gallinae*. The minimal lethal concentration(MLC) ofchalcone was 10 and 5 mg/ml after 48 h incubation. Also, SEM study of trophozoites treated by chalcone showed considerable damage of the membrane system of the trophozoites.

CONCLUSIONS: The present study is the first in vitroinvestigation evaluating the efficacy of chalcone against T. gallinae trophozoites. Our findings indicated thatsome chalcone derivatives have same effect with standard drugs. Due to the biologicalpotential, and the easy syntheticroutes for synthesisof chalcones, we can suggestuse of chalcone for treating metronidazole-resistant isolates of *T. gallinae*.

Keywords: *Trichomonasgallinae*, Drug resistance,Chalcone, Metronidazole, SEM.

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THE EFFECT OF USING RAW GARLIC IN DIET, ON GASTROINTESTINAL AND BLOOD LIFE CYCLE OF PARASITES OF ADULT SHEEP

Parsaeimehr, K.H.[1*], Cheraghi, H.[1], Hoseinkhani, A.[1], Shadman, M.[2], Dibamehr, A[5]

1. *Department of Animal Science, Faculty of Agriculture, University of Tabriz, Tabriz, Iran*
2. *Ph.D. student of veterinary parasitology, University of Tehran, Tehran, Iran*
3. *PhD student of animal and poultry nutrition, University of Urmia, Urmia, Iran*

BACKGROUND: The present of parasites in the gastrointestinal tract cause various lesions, which vary depending on the types and numbers of parasites and its severity of the disorders that can be included diarrhea, anorexia, weakness, weight loss, reduced livestock production, reduced intake of food and also in the forms of acute and super-acute causes of death.

OBJECTIVES: Thegastrointestinal parasite in sheepis one of the most important contaminations for this reasonthe aim of this study was to evaluate the effect of raw garlic on sheep intestinal parasites.

METHODS: This experiment was conducted in November and December for 2 months. Treatments consisted of sixteen sheep at 58.5 kg (Averaged) were used in this project. Animals were divided into 4 groups: 1- control group (without additive) 2- control group (Anti-parasitic medicine) 3- 7.5 g garlic (per head) 4- 15 g of garlic (per head). In this study, in addition to counting EPG by the Clayton-Lin method, the Japanese Famacha test and hematocrit test was done. In this study, a completely randomized CRD design was used to analyze the data.

RESULTS: In general, the results of egg parasite count (EPG) indicate that sheep infection rates were significantly higher in eggs during the first month as well as in the end of the experiment, so that the antimicrobials reduce the number of eggs, but on the other hand The feces of sheep receiving 15 grams of garlic had less contamination than the other two groups. Also, based on the Femacha test, adding 15 grams of garlic in the diet caused lactation in the diet, and the hematocrit test showed that sheep fed with 15 grams of garlic treated had more blood masses than other groups.

CONCLUSIONS: The data of this study demonstrated that the rate of EPG in contaminated sheep which did not use anti-parasitic drugs is very high. For this purpose, we must use anti-parasitic drugs or herbs in contaminated. In this project, the use of high levels of raw garlic in the diet decreased gastrointestinal parasites and increased the sheep blood mass as well.

Key words: Raw garlic, intestinal parasites, blood lifecycle, adult sheep

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A SURVEY OF GASTROINTESTINAL NEMATODES AND COCCIDIA CO-INFECTION IN SHEEP AND CATTLE OF GUILAN AND MAZANDARAN PROVINCES, NORTH OF IRAN

Pourdehghan, P.[1], Arabkhazaeli, F.[2*], Meshgi, B.[2], GeramiSadeghian, A.[2], Ahmadi, A.[2]

1. *MSc Graduate, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: farab@ut.ac.ir

BACKGROUND: The nematode and coccidia co-infection commonly occurs in livestock, and alters various biological aspects in the host.
OBJECTIVES: In the present study, the infection status of intestinal parasites in cattle and sheep in Guilan and Mazandaran provinces were investigated and correlation ofnatural co-contamination, in the above-mentioned animals were preliminarily evaluated.
METHODS: In this study, 823 stool samples, comprised of 452 sheep and 371 cattle samples, were collected. The presence of nematode eggs and oocysts were investigated and statistically analyzed.
RESULTS: In Guilan province, sheep nematode and Eimeria infestation rates were 48.5% and 41.9%, respectively. The infestation rate in Mazandaran province was 59.2% and 28.9% for nematodes and Eimeria, respectively. Generally, the frequency of contamination in the cattle was lower than sheep. In cattle, *Eimeriabovis*, *E.canadensis* and *E. Zuernii* were the most prevalent species. *E. ahsata* and *E. carandallis* were identified as the most abundant species in sheep. Nematodes and coccidia co-infection in cattle and sheep in Guilan province showed a significant statistical correlation, so that infected animals with nematodes, were more likely infected with coccidia. Likewise, animals not infected with nematodes, were more likely to be free of *Eimeriaparasit*e. However, this association was not observed in Mazandaran province.
CONCLUSIONS: Researchers have proven a positive correlation between nematode and coccidiaco-infection. If no prevention is administered, escalation of parasites pathogenesis and prevalence, would be predictable. Although strategic deworming, may synergistically reduce the prevalence and the negative effects of both parasites, on the other hand the side effects of widescale drug administration, especially the risk of drug resistance emergence, cannot be overlooked.
Keywords: Co-infection,Nematode, *Eimeria*, Cattle, Sheep,

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A REVIEW OF THE DRUG RESISTANCE OF *TRICHOMONASVAGINALIS* TO METRONIDAZOLE AND ITS REPLACEMENT WITH VARIOUS HERBAL EXTRACTS

Rostaei, M.[1], Payandeh, M.[2], Ronaghi, H.[3*]

1. *Student, Faculty of Veterinary Medicine, Islamic Azad University, Garmsar Branch, Iran*
2. *Student, Faculty of Veterinary Medicine, Islamic Azad University, karaj Branch, Iran*
3. *Department of veterinary parasitology, Faculty of Veterinary Medicine, Islamic Azad University, Science and Research Branch, Iran*

BACKGROUND: Trichomoniasis is one of the most common sexually transmitted diseases caused by *Trichomonasvaginalis* parasite. According to various observations and researches using methods such as PCR, it has been shown that the resistance of this protozoa to various chemical drugs has been increased day by day due, such as metronidazole. The use of plant compounds and medicinal plant extracts can be a suitable alternative to counteract with this parasite.

OBJECTIVES: The aim of this study was to evaluate the resistance of *Trichomonasvaginalis* to metronidazole and to replace this drug with plant extracts and to investigate the effect of these plants in comparison with metronidazole. In this study, extracts of Artemisia, Eucalyptus, Ovis, Mountain tea, Lavender, Fennel, Case, Yarrow and Anguar mentioned parasite were studied on the above.

METHODS: In this study, various articles have been reviewed in recent years in relation to the subject matter in Google Scholar search engine. Totally 25 papers were selected as the main source of the study.

RESULTS: The results of the research show that exposing parasites medicinal herbs to metronidazole had a significant impact on parasite, also metronidazole-resistant parasites were killed when exposed to plant extracts.

CONCLUSIONS: Drug resistance is a problem that has been encountered today, and various microbes become more resistant day-to-day. *Trichomonasvaginalis* is one of the parasites that has been proven to be resistant to metronidazole during several studies by methods as PCR. Based on various findings, the effect of medicinal plants on *Trichomonasvaginalis* is significant and can be used for the treatment of Trichomoniasis. The efficiency of these plants is not altered by resistance of parasites and they are effective in low doses and at a lower cost than other drugs. These interpretations suggest further studies are required in laboratory animals and human cases infected with *trichomonas* to gain more confidence about the lack of resistance and their effectiveness.

Keywords: *Tricomonas*, herbal extract, drug, extract, anti-parasite.

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THE EFFICACY OF FENBENDAZOLE (ANTHELMINTIC DRUG) IN NATIVE FOWL IN CITY OF SARI

SaemiSoudkolaei, A.[1*], Borji, H.[2], Kalidari, G.A.[3]

1. *1Graduate studies of Doctorate in Veterinary Medicine, Faculty of Veterinary Medicine, University of Ferdowsi of Mashhad, Mashhad, Iran*
2. *2Department of Pathobiology, Faculty of Veterinary Medicine, University of Ferdowsi of Mashhad, Mashhad, Iran*
3. *3Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Ferdowsi of Mashhad, Mashhad, Iran*

Email: atefesaemi70@yahoo.com

BACKGROUND: Parasitic diseases are common in rural chickens due to scavenging habits in free range. Treatment of these infection is extremely varied.Fenbendazole as anthelminthics drug is used for gastrointestinal helminth of poultry.

OBJECTIVES: This study is designed to evaluate the efficacy of fenbendazole in domestic chickens.

METHODS:Three flocks were selected around the city of Sari. Chickens of each flock were divided into 1 treatment groups and control group. Afterward, fecal samples were taken from every chickens and number of eggs per gram of feces (EPG) were determined by using Clayton-Lane method. Then,fenbendazole (5mg/kg for 3 continuous days) was orally given to the treatment group, while control group did not receive any anthelminthic drug.After 14 days, fecal samples were obtained again from chickens and EPG determined, where efficacy of anthelminthic drug was evaluated.

RESULTS: Mean EPG in intervention group before and after treatment was determined to be 183.3 and 100.35, respectively. Overall, the mean efficacy of fenbendazole was calculated as 52.94%.Furthermore, weak and suspicious efficacy was obtained as 11.76% and 35.29%, respectively.

CONCLUSIONS: Based on the findings presented herein, a decrease level of efficacy was determined for Fenbendazole

Key words: Fenbendazole, Efficacy of anthelmintic drug, Domestic chicken, Sari, EPG.

REVIEW SURVEY OF IMMUNOPATHOGENESIS OF ATOPIC DERMATITIS IN ORDER TO INTRODUCE THIS DISEASE FOR WORM THERAPY STUDIES

Salavati, A.[1], Sarbakhsh, T.[1], Jalousian, F.[2*], Hoseini, S.H.[2], Jamshidi, S.[3]

1. *DVM Student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Parasitology Department, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
3. *Internal Medicine of Small Animals Department, Faculty of Veterinary Medicine, University of Tehran,Tehran, Iran*

Email: jalousian_f@ut.ac.ir

BACKGROUND: Atopic dermatitis in dogs is caused by many factors, and a specific and unique cause for it has not been identified. Disturbances in cytokine balance, increased eosinophils and mast cells, increased secretion of basophils and IgE production are among the factors that have been introduced for the onset of atopic dermatitis. Complications of T cells are one of the most important factors in the disease. Th2 and Th1 cells are involved in pathogenesis, with acute ulcers induced by Th2 interference and chronic wounds with Th1 interference.

OBJECTIVES: The purpose of this study was to examine the pattern of immunology of atopic dermatitis and the introduction of lectin-type worm proteins in order to maintain the balance of $CD4^+$ / $CD8^+$ in the disease.

METHODS: A comprehensive survey was carried out in databases for articles related to this issue, published in the period 2008-2018.

Results: The results of several studies on atopic dermatitis have shown that IgE levels in the blood of infected patients increased by 8-10 times more than the control group and the mean percentage of T cells ($CD4^+$) also increased that indicates Th2 cell involvement. Also IL-13, IL-5, IL-6, IL-5, IL-4, IL-6, IL-5, IL-4 has increased. $CD4^+$ / $CD8^+$ ratios in atopic dermatitis have been shown to be significantly higher than those of witness group. The results of studies on lectins - type C-parasitic worms also showed that these peptides affect immunization with Th2 and Treg interactions.

Conclusion: lectins - type C-parasitic worms, inhibit the activation of Th2 and also increase TGFβ, thus the $CD4^+$ / $CD8^+$ ratio will be balanced, which can lead to a reduction in the effects of atopic dermatitis in the acute phase. It seems that atopic dermatitis can be considered as a candidate for worm therapy studies.

Keywords: Atopic dermatitis, Worm Therapy, Lectin-type C, Th2 cells

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ANTICIPATION OF THE EFFECT OF C-TYPE LECTIN PROTEIN OF *TOXOCARACANIS* ON THE IMMUNE SYSTEM IN ORDER TO USE THIS PROTEIN IN MODULATING THE IMMUNE SYSTEM OF MOUSE USING BIOINFORMATICS TOOLS

Shahbakhsh, M.[1], Jalousian, F.[1*], Hosseini, S.H.[1], Moghadasi, A.N.[2], Etebar, F.[1]

1. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Neurology, Tehran University of Medical Sciences, Tehran, Iran*

Email: jalousian_f@ut.ac.ir

BACKGROUND: C-type lectin protein *Toxocaracanis* contains 4 types. Types 1 and 4 are excretory-secretory proteins. On the other hand, this protein is Calcium binding and It is possible to control it in laboratory conditions. This protein plays a role in immunomodulatory and reduces the inflammatory responses in the host. Therefore, this protein can be considered for immunomodulatory studies, and in particular for helminth therapy.
OBJACTIVE: The object of the present study was to compare the C type lectin *T. canis* with this protein in mice in order to predict the effect on miceimmunomodulation.
METHODS: In this study, with the use of bioinformatics softwares, the similarity of C type lectin *T. canis* with mammalian lectins as well as other nematodes was investigated. The sequence for type-C lectin *T. canis* with access number AF0411023 was similar to the BLAST tool, and especially its similarity to the protein in mouse was evaluated. The open sequence for type-C lectin *T. canis* with access number AF0411023 was investigated using the BLAST tool in terms of similarity to this protein in mice. Using the EXpasy software, the amino acid sequences were extracted and then was performed blast. Antigen prediction was then performed. Hydrophobic and hydrophilic points were determined in this sequence.
RESULTS: Amino acids sequence of type C lectin *T. canis* showed a similarity of 29.3% with collectin protein in mice and 30.3% with type C lectin in humans. CTL-1 is aexcretory_secretory protein. This sequence has 10 hydrophilic sections. *T. canis* CTL gene was 657 bp in length and encoded a protein with 219 amino acids. This protein are very similar in various species of the *Strongylida* order. Its C type lectin showed a higher similarity with asialoglycoprotein receptor (AS-GPR), macrophage lectin, dendritic cell-specific intercellular adhesion molecule 3-grabbing nonintegrin (DC-SIGN), MINCLE receptor of mouse and human.
CONCLUSION: C Type lectins are a family of carbohydrate-binding proteins. These proteins involved in processes including vertebrate immune cell signaling, activation of innate immunity in both vertebrates and invertebrates and induced haemostasis. Helminth CTLs sharing sequence and structural similarity with mammalian immune cell lectins for example mouse. Therefore, the performance of this protein in mouse cells is predictable. CTL-1 has the highest concentration in the parasite excretory_secretory fluid. This protein is superficial and delivered to cellular and homoral immune system.
Keywords: *Toxocaracanis*, C-type lectin protein, nematods

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NEOSPORACANINUM VACCINE- AND IMMINENT OUTCOMES

ShahbaziKordlar, Z.[1], Parize, F.[1], Arabkhazaeli, F.[2*]

1. *DVM student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: farab@ut.az.ir

BACKGROUND:*Neosporacaninum* is an intracellular protozoa with several hosts such as ruminants, perissodactyls and dogs. This parasite has a tendency to produce cysts in the brain and is considered as the leading causes of infectious abortion in cattle.
OBJECTIVES: Due to the economic effect of this protozoa and its worldwide distribution, the purpose of this study is to review the published studies on the provision of vaccines to prevent neosporosis abortion in cattle.
METHODS: Published reports on designed and tested vaccines in clinical and laboratory trials, the were searched using "vaccine", "*Neosporacaninum* ", "neosporousis", "cow", "dog" and "abortion" keywords in the accessible databases. The results of available studies are presented succinctly.
RESULTS: Killed, live attenuated, and recombinant subunit vaccines are used in neosporosis. In the past, whole killed (Neogaurd®) or lysates of the parasite were used for vaccination, but later it was considered to cause abortion. Afterwards the use of live naturally attenuated isolates (Nc-Nowra and Nc-Spain1H) or the reduction of the parasite virulence by means of irradiation, certain chemicals or transgenic methods were investigated. Many studies have shown this type of vaccines to successfully prevent infections of the brain, and prevent abortion. Regardless of the high efficacy of live vaccines, they have some adverse aspects in terms of safety and stability. Recombinant subunit vaccines, develop different efficacies depending on the composition of the antigens, the type of adjuvant and the inoculation route.
CONCLUSION: Regarding the high rate of abortion due to *Neospora* in some parts of Iran (up to 33%) and regarding the better efficacy of live attenuated vaccines, the production of these kind of Neospora vaccines are proceeding.
Keywords: *Neosporacaninum*, Vaccine, Abortion, Live attenuated

TREATMENT OF ORNAMENTAL FISH INFECTED WITH LERNAEA PARASITE WITH TABLE SALT

TalebipourFarsangi, S.1*,NourollahiFard, S.R.2, Saravani, L.3,AfshariPour, S.3,Molaei, R3.

1. *Student of Veterinary Medicine. Veterinary Faculty of shahidbahonar university of kerman, Kerman, Iran*
2. *Department of Pathobiology,School of Veterinary Medicine,ShahidBahonar University of Kerman, Kerman, Iran*
3. *Central laboratory of Veterinary, Sistan and balouchestan office*

Email: saeedehtalebipour97@gmail.com

BACKFGROUND: The cultivation of ornamental fish in Iran is of particular importance. This profession also has its own problems, especially the various diseases that cause damage to this industry. Parasitic diseases are one of the most important diseases of ornamental fish in freshwater, which if parasitic infection is severpotentially lead to the death of fish and pave the way for secondary infections.
OBJECTIVES: The purpose of this study was to find a suitable method fortreatmentornamental molly fish infected with lernaea parasite.
METHODS: In this experiment, ornamental molly fish were divided into two groups of five and placed in two 1/2 liter bowls. All fish were infected with 4 to 7 *lernaea*. One spoonful of iodine-free salt was gently added to the first bowl and half a spoonful to the second, and then stirred. The fish were left in these bowls for 15 minutes. This procedure was repeated three times a day for three successive days.
RESULTS: The fish in the first bowl that received one spoonful of salt recovered after three days, and *lernaea*separated from the end part. Of the five second bowl fish that received half a spoonful of salt, only three were cured and parasite was eradicated in them.
CONCLUSIONS: It can be concluded that iodine-free salt may be used for the treatment of molly fish infected with *lernaea*or for rinsing an infected aquarium.
Key words: Treatment, Parasite, Ornamenta

Future Challenges, Foresight and Futures Studies in Parasitology, Emerging and Reemerging Parasitic Diseases, and Bioterrorism

Oral presentation

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THERAPEUTIC POTENTIAL AND HELMINTHS: THE NEED FOR AN INTERDISCIPLINARY ATTITUDE TOWARDS BIOLOGICAL SCIENCES.

Fathi, S

Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

BACKGROUND: Helminths are considered as a normal part of the ecosystem of our body, where their ability for activating immunoregulatory circuits and control immunity has been revealed.

OBJECTIVES: I try to explain some novel opportunities for Helminth-derived molecules as well as to indicate necessity for an interdisciplinary attitude towards biological sciences.

RESULTS: It is noteworthy that composition of the human immune response is affected by the evolutionary co-adaptation of parasites. Therefore, eliminating the regulatory effects of parasites from human populations can lead to imbalances in the immune system, resulting in an increased sensitivity to immune-mediated disease. Therefore, compelling evidence suggests that *parasitic helminths* are likely to produce beneficial effects rather than harmful pathogens. A strong body of evidence suggests that excretory–secretory (E/S) components and helminth-derived synthetic molecules are capable of treating and or preventing inflammatory diseases including inflammatory bowel disease (*IBD*), *type 1 diabetes*, rheumatoid arthritis (*RA*), *multiple sclerosis* (MS), and asthma in mouse models. It has been indicated that therapeutic effects of helminthes products in human trials for many disease such as Ulcerative colitis (UC), RA, Crohn's disease (CD), MS and celiac disease; although findings are not striking when comparing with mouse disease models. E/S components are potentially considered as immunomodulatory molecules that are capable of treating and preventing allergy and autoimmunityin animal models of as compared with helminth infections.Human disease models performed in less predictive animal models are addressed to be inappropriate as limitations of these studies. Therefore, the non-animal human tissue or cell-based models can be potentially capable of depicting the downstream application of animal models. In this regard, forthcoming trials are needed to assess the limitations in the near future. Recently, exosome-like extracellular vesicles (EVs) are involved in delivering bioactive macromolecules for intercellular communication, and other molecules (e.g., proteins, Lipids, and nucleic acids) have been considered as an effective vehicles for mediating the immune system. Helminth-derived molecules have been revealed their potential as novel opportunities for development of favorable and controlled therapeutics and innovative research strategies. However, *biological sciences* are now in need of an interdisciplinary studies, since the scope of biological sciences is not limited to a specific discipline, and the advancement of scientific issues requires not only the cooperation of other biological sciences, but also even other sciences. The interdisciplinary approach provides the opportunity to cross the traditional disciplinary structure of research in order to achieve the desired outcome in a discipline. In other words, an interdisciplinary domain consists of "integrating the knowledge, methods, and experiences of two or more scientific and specialized fields" for understanding and solving a complex and multifaceted problem.

CONCLUSION: Therefore, our attitude must be directed towards colleagues outside our specialty in our country.

Keywords: Helminth-derived molecules, worm-derived excretory–secretory (E/S) components, therapeutic opportunity,interdisciplinary attitude

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KNOWLEDGE AND PRACTICE OF SMALL RUMINANT FARMERS ABOUT VECTORS AND HOSTS OF PARASITES IN SOME PARTS OF IRAN

Hatami Z.[1], Yadi J.[2], Eila N.3, Laven R.A.[4], Soleimani P.[5], Jafari-Ghavam Abad. A.[*1], Jafari-Gh. S.[5], Moazez Lesku M.[5], Sinafar M.[1], and Heidari E.[5]

1. *Young Researchers and Elites Club, Karaj Branch, Islamic Azad University, Karaj, Iran*
2. *Department of Veterinary Sciences, Islamic Azad University, Saveh Branch, Saveh, Iran*
3. *Department of Animal Science, Faculty of Agriculture and Natural Resources, Islamic Azad University, Karaj Branch, Karaj, Iran*
4. *Institue of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand*
5. *Animal Science Association, Islamic Azad University, Karaj Branch, Karaj, Iran*

Email: ali.jafari.gh@gmail.com

BACKGROUND: Knowledge and practice of farmers about vectors and hosts of parasites such as ticks, flies, snails, dogs and sheep was assessed during the summer of 2017.

OBJECTIVES: Management and control the vectors and hosts of parasites is the main core of fighting against zoonotic and non-zoonotic parasitic diseases.

METHODS: A standard questionnaire was used to collect data during face-to-face interviews with 113 farmers in Alborz and Qazvin provinces, Iran. Preventive practices and knowledge of farmers about probable threats of such vectors and hosts as tick, fly, snail, dog and sheep was evaluated.

RESULTS: Results show a lack of knowledge and practice toward managing and controlling the aforementioned animals. Approximately 24% referred to the fact that dogs can transmit parasites to sheep, while 25% and 26% administered antihelminth to their dogs and sheep respectively on a regular basis. Only 5% of farmers stated that parasitic diseases such as fascioliasis and lung worm can be transmitted via snails. Participants were more aware of the threats that flies can impose on sheep and 40% believed that flies can cause parasitic diseases in their animals. Practice of farmers regarding management and control of ticks was the best among other vectors and hosts since almost 96% would spray pesticides on a regular basis. Many farmers reported that the local veterinary office provided them with free pesticides to fight ticks and fleas. Additionally, 35% would also use flames to control ticks. However, this satisfactory practice does not reflect a high level of knowledge. Approximately 8% and 21% of participants stated that ticks can transmit a kind of disease and can transmit theileriosis. In fact, farmers would mainly fight against ticks and fleas because these would bite the farmers and their families.

CONCLUSIONS: Outcomes of this research prove that different interventions such as providing free pesticides or antihelminths and educational interventions can improve the knowledge and practice of farmers regarding management and controlling parasitic diseases.

Key words: Internal parasites, external parasites, theileriosis, fascioliasis, coenuruses

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PREVALENCE OF INTESTINAL PARASITES IN CATTLE AND SHEEP IN KHORRAMABAD CITY: A SILENT EPIDEMIC FOR *EIMERIA* SPP.

Kalani, H.1, Sepahvand, A.2, Zivdari, M.2, Faridnia, R.3, Mohaghegh, M.A.4*

1. *Infectious Diseases Research Center, Golestan University of Medical Science, Gorgan, Iran*
2. *Department of Parasitology and Mycology, Isfahan University of Medical Science, Isfahan, Iran*
3. *Student Research Committee, Mazandaran University of Medical Science, Sari, Iran*
4. *Department of Laboratory Sciences, TorbatHeydariyeh University of Medical Sciences, TorbatHeydariyeh, Iran*

Email: m ohaghegh1982@yahoo.com

BACKGROUND: Livestockgastrointestinal parasites include a wide variety of parasites that cause weakness, malabsorption, and weight loss in livestock thereby reducing the production efficiency.
OBJECTIVES: This study was conducted to evaluate the prevalence of intestinal parasites in cattle and sheep in Khorramabad city.
METHODS: A total of 200 stool samples from 140 slaughtered sheep and 60 slaughtered cattle were collected in Khorramabad slaughterhouse. All samples were examined by direct smear and formalin-ether sedimentation methods, and the parasites found were recorded in each sample.
RESULTS: A total of 10 genera and species of parasites were found in cattle and sheep samples that include *Trichostrongylus* spp., *Moniezia* spp., *Nematodirus* spp.,*Trichuris* spp.,*Capillaria* spp.,*Dicrocoeliumdendriticum*, *Fasciola* spp., *Cryptosporidium* spp., *Eimeria* spp., and *Giardia* spp., of which Fasciola spp. was found only in cattle and Capillaria spp. and Trichuris spp. were found only in sheep. The most prevalent parasite in sheep was *Eimeria* spp. (97.9%) and the lowest prevalence was related to *Capillaria* spp. and *Trichuris* spp. (both 0.7%). Furthermore, in samples from cattle the most prevalence was related to *Eimeria* spp. (90%) and the lowest to Monieziaspp. (1.7%).
CONCLUSIONS: In the present study, the prevalence of several species of parasites in cattle and sheep indicates a poor health in the livestock farms, and this economically produces significant losses to the livestock industry. Also, the prevalence of *Eimeria* spp. in cattle and sheep was expected to be too high, and the infection with this parasite is often neglected due to the absence of specific clinical symptoms, and it suggests the presence of silent epidemic for this parasite.
Key words: Intestinal parasites, Cattle, Sheep, Khorramabad city, *Eimeria* spp.

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BIOLOGICAL CONTROL OF ECTOPARASITES

Tavassoli, M.

Professor of Parasitology, Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia Iran

Current pest control methods are still heavily dependent on the use of synthetic chemical acaricides but several problems which have been generated by these chemicals including resistance in pest populations, safety risks for humans and domestic animals, contamination of ground water, decrease in biodiversity, and other environmental concerns, have prompted interest in the development of more environmental friendly alternative strategies such as biological control. There are several methods through which biological control of parasites could be achieved, including the use of predators (such as arthropods, mites, flies, beetles, amphibians, fish, birds, rodents, etc.), parasites (parasitoids) and pathogens (such as fungi, bacteria, viruses and virus-like particles, protozoa and nematodes). This paper would explore the advantages and disadvantage of biocontrol, types of biological control agents and future perspective (biotechnology, nanotechnology, microencapsulation). The history and current situation of biological control in agriculture and veterinary of Iran would also be discussed. Additionally, biological control of important veterinary ectoparasites of dogs, cats, cattle, sheep, goats and poultry will be explained. Finally, the expectations from biological control of veterinary parasites would be discussed.

Keywords: Biological Control, Veterinary, ectoparasites

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OXIDATIVE STRESS: A MECHANISM FOR PATHOGENESIS OF PROTOZOAN PARASITES

Razavi, SM.1*

Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran

Email: Mrazavi@shirazu.ac.ir

BACKGROUND: Protozoan parasites can be directly responsible for oxidant release through degradation products of their own metabolism. Accumulation of oxidative damage may ultimately lead to degenerative pathologies and shortened lifespan. Organisms minimize these harmful effects through antioxidant defenses, which consist of endo- and exogenous compounds that inhibit oxidant chain reactions by directly deactivating the oxidants. An imbalance in favor of oxidants over antioxidants represents the oxidative stress. The harmful effect of free reactive oxygen species(ROS)and reactive nitrogen species (RNS)radicals causing potential biological damage is termed oxidative stress and nitrosative stress, respectively. The free radicals can inflict direct damage to macromolecules, such as lipids, nucleic acids, and proteins.
OBJECTIVES: Evaluation of factors associated with oxidative stress in bovine& ovine theileriosis, coccidiosis and cryptosporidiosis.
METHODS: Blood and tissue samples were collected from infected animals. The activity of superoxide dismutase(SOD), glutathione peroxidase (GPX), catalase and the level of total antioxidant capacity (TAC) were measured with appropriate commercial kits. Malondialdehyde was assessed by a modified high performance liquid chromatography (HPLC) method.
RESULTS: The occurrence of oxidative stress by decreased antioxidant capacity (SOD, GPX, Catalase and TAC) and increased MDA was confirmed in theseinfections.
CONCLUSIONS: It seems that concomitant with etiological treatment, adding some plants with high level of antioxidants into food may improve animal health and cause sooner recovery from protozoal infections.
Keywords: Oxidative Stress, Antioxidant, Pathogenesis, Protozoa

MOLECULAR DETECTION OF *TOXOPLASMA GONDII* AND *NEOSPORACANINUM* IN HOODED CROWS (CORVUSCORNIX) AND HOUSE SPARROWS (*PASSER DOMESTICUS*) IN TEHRAN, IRAN

Abdoli, A.[1,2], Pirestani, M.[3], Dalimi, A.[3], Arbabi, M.[4], Mirzaghavami, M.[3]

1. *Department of Parasitology and Mycology, School of Medicine, Jahrom University of Medical Sciences (JUMS), Jahrom, Iran*
2. *Research Center for Noncommunicable Diseases, School of Medicine, Jahrom University of Medical Sciences (JUMS), Jahrom, Iran*
3. *Department of Parasitology, Faculty of Medical Sciences, TarbiatModares University, Tehran, Iran*
4. *Department of Parasitology and Mycology, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, Iran*

Email: a.abdoli25@gmail.com.

Background: *Toxoplasma gondiiand Neosporacaninumare* two important protozoan parasites which can infect a wide variety of intermediates hosts.
Objectives: Molecular assessment of *Toxoplasmagondii* and *Neosporacaninum* in the brain samples of hooded crows (*Corvuscornix*) and house sparrows (*Passerdomesticus*) in Tehran, Iran.
Material and method: DNA was extracted from 55 and 217 brain samples of hooded crows and house sparrows, respectively. Molecular assessment was performed by the Nested-PCR method targeting the GRA6 and NC5 genes for detection of T. gondii and N. caninum, respectively.
Results: T. gondii DNA was detected in 16.3% (9/55) and 7.8% (17/217) of the crow and sparrow samples, respectively. N. caninum DNA was detected in 9.9% (5/55) of crows and 3.68% (8/217) sparrows. Sequencing analysis of the genomic DNA revealed 97% – 99% similarity with similarity with *T. gondii* and *N. caninum* sequences that deposited in the GenBank.
Conclusion: The results of this study indicate that hooded crows and house sparrows may have a putative role in transmission of *T. gondii* and *N. caninum* to felines and canines as definitive hosts, respectively.
Key words: *Toxoplasma gondii, Neosporacaninum,* crow, house sparrow, Tehran.

Future Challenges, Foresight and Futures Studies in Parasitology, Emerging and Reemerging Parasitic Diseases, and Bioterrorism

Poster presentation

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ZOONOTIC PROTOZOA AS BIOTERRORISM FACTORS

Hajipoor, N.[1], Soltani,M.[2]

1. *Department of Pathobiology, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran*
2. *PhD of Veterinary Parasitology. Graduated from Faculty of Veterinary Medicine. Urmia University, Urmia, Iran*

Email: n.hajipour@tabrizu.ac.ir
Email: Maryamsoltani64@gmail.com

BACKGROUND: Bioterrorism not only includes the intentionally propagating of biological agents, such as microorganisms (bacteria, viruses, fungi) and biological poisons in the form of military weapons , but also includes the propagating of parasitic zoonotic protozoa such as *Giardia*, *Entamoebahistolytica, Cryptosporidium parvum* in to food and water whose gradual and long-term destructive effects are more than other biological agents and can be recognized in human resources after referring to hospitals and health centers.

OBJECTIVES: Considering the increasing threats of bioterrorism, biological agents and their use by some colonial countries, it is necessary to identify these factors and also to identify ways to prevent them.

METHODS: Based on a systematic study, keywords such as bioterrorism, biologic and zoonosis protozoa were searched in reliable databases including, Pub Med, Science Direct, Elsevier, SID, Magiran, Irandoc and Google Scholar and then the related topics were studied.

RESULTS: Out of 300 articles 2 articles were related to parasitic bioterrorism (parasitic worms), 5 articles were related to food bioterrorism and 293 articles were related to the prevalence and parasitic contamination in animals and humans.

CONCLUSIONS: The results of this study show that in addition to bacteria, viruses, and their toxins, zoonotic protozoa such as *Giardia intestinalis*, *Entamoebahistolytica*, *Cryptosporidium parvum,* and *Toxoplasma gondii* can play a role as dangerous biological agents in bioterrorism and can be transmitted through food and water.

Keywords: Bioterrorism, Parasite, Zoonosis, Biologic.

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ASSESSING KNOWLEDGE, ATTITUDE AND PRACTICE OF NOMADIC AND SEMI-NOMADIC PASTORALISTS ABOUT PARASITIC DISEASES IN ALBORZ AND QAZVIN PROVINCES, IRAN

Soleimani P[1]., Yadi J.[2], Eila N.[3], Laven R.A.[4], Hatami Z.[5], Jafari-Gh. A[*5]., Moazez Lesku M.[1], Jafari-Gh. S.[1], Sinafar M.[5], and Heidari E.[1]

1. *1Animal Science Association, Islamic Azad University, Karaj Branch, Karaj, Iran*
2. *2Department of Veterinary Sciences, Islamic Azad University, Saveh Branch, Saveh, Iran*
3. *3Department of Animal Science, Faculty of Agriculture and Natural Resources, Islamic Azad University, Karaj Branch, Karaj, Iran*
4. *4Institue of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand*
5. *5Young Researchers and Elites Club, Karaj Branch, Islamic Azad University, Karaj, Iran*

Email: ali.jafari.gh@gmail.com

BACKGROUND: Knowledge, attitude and practice (KAP) of 113 sheep and goat farmers about five internal and external parasitic diseases were evaluated during the summer of 2017.

OBJECTIVES: Regarding the essential role of farmers in controlling and treating animal diseases, the aim of this study was to evaluate the KAP of small ruminant farmers about five common parasitic diseases in the region.

METHODS: A standard, pre-designed questionnaire whose validity and reliability had been proved was utilized to collect data during in-depth face-to-face interviews with 113 rural farmers and nomads in Alborz and Qazvin provinces. Afterwards, a protocol was designed to score knowledge and practice of farmers in a range of 0-10, while their attitude was assessed during interviews by a 4-scale Likert system from "not important at all" to "very important". Finally, the impact of socio-demographic factors on KAP of participants was evaluated. Microsoft Excel and SPSS software were used to analyze data.

RESULTS: Outcomes of the analysis shed light on the positive attitude of farmers toward parasitic diseases since the mean score was 2.64 with minimum and maximum scores of 1 and 4. Additionally, the mean knowledge score was 3.24 ranging from zero to 7.63, while the practice score had an average of 3.04 ranging between 0.7 and 5.78. The level of literacy had the most influence on knowledge of participants about parasitic diseases ($p=0.013$), while total number of animals had an almost significant impact on knowledge as well ($p=0.095$). Other socio-demographic factors such as age, system, and union membership had no effect on KAP of farmers.

CONCLUSIONS: Findings of this research illustrate limited knowledge and undesirable practice of farmers, despite the dwelling of some eminent national research and educational centers in Alborz province. Less than 14% of interviewees had ever participated in an educational course, justifying the difference in the minimum and maximum scores. Researchers of this study believe that educational interventions can hinder the occurrence of parasitic diseases in the region and avoid the waste of national assets.

Key words: Internal parasites, external parasites, sheep, goat, KAP

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ASSESSMENT OF EFFECTS OF DIFFERENT FACTORS (SEASON, TYPE OF BED, AGE OF HERDS) ON THE PREVALENCE OF COCCIDIOSIS IN BROILER CHICKENS IN MAZANDARAN PROVINCE

Haghighi, F.[1], Rajabi, A.R.[1], BavandAbbasabadi, L.[2], Mehrkish, M.[3], Aghajanpour, F.[4], RanjbarMalidare, N.[5*]

1. *DVM student, Azad University of Babol*
2. *Clinician of Technical Laboratory of Veterinary Medicine Day-Babol*
3. *DVM student, Azad University of Babol*
4. *University of Mazandaran, Babolsar, Non-Communicable Pediatric Diseases Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran*
5. *DVM, Teacher of AZAD University of Babol, Technical Assistant of Technical Laboratory of Veterinary Medicine Day-Babol*

Email: naser.ranjbar@gmail.com

BACKGROUND: Coccidiosis is one of the most common parasitic diseases in the poultry. The agent of the disease belongs to *Apicomplexa* branch and the genus *Eimeria* which is one of the largest protozoan groups. The disease can be seen in any type of race and age in the poultry, causing mortality, reduced production, and disturbance in the rate of conversion of food and growth in industrial poultry.
OBJECTIVES: The purpose of this study was to investigate the prevalence of coccidiosis in different beds and seasons of the year and different ages as well as their correlation with the incidence and prevalence of coccidiosis.
METHODS: In this research that was conducted on broiler chickens which were sent to Day veterinary laboratory, during one year, slide of coccidiosis samples were collected from different parts of the intestine and After coloring in 5% potassium permanganate, the count was carried out under the neobar slide and the rate of infection was declared 0 to +3.
RESULTS: According to the obtained data and statistical analysis performed with Chi-square test, the results indicate that the prevalence of coccidiosis in broiler chickens has a significant relationship with the type of litter and different seasons, as well as different parts of the intestine.
CONCLUSIONS: The results of this study indicate that the prevalence of coccidiosis in broiler chickens in autumn and sawdust litter is much higher than other seasons and the recycled paper roll litter, the prevalence of coccidiosis in the intestinal cecum has been higher than other parts of the intestine ($p<0.05$). Furthermore, the results showed that the prevalence of coccidiosis was not significantly correlated with age ($p>0.05$).
Key words: Coccidiosis, Broiler Chickens, Season of Year, Recycled paper roll -Sawdust litter, Mazandaran

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THE EFFECT OF ENVIRONMENTAL AND CLIMATIC FACTORS ON THE DISPERSION AND TRANSMISSION OF ECHINOCOCCUSGRANULOSUS AND ECHINOCOCCUSMULTILOCULARIS

Sarbakhsh, T.[1], Salavati, A.[1], Jalousian, F.[2*]

1. *DVM Student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Parasitology Department, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*

Email: Jalousian_f@ut.ac.ir

BACKGROUND: Most of the world's climate in recent decade has been on warming up, reducing water resources and annual precipitation, these changes affect the transmission pattern of parasitic infections.
OBJECTIVES: In this article, a review of the impact of environmental and climate changes on the distribution and transmission of *Echinococcusspecies* has been addressed.
METHODS: In this study, library research and the search for specific keywords associate with *Echinococcus* sp. related to climate and environmental changes was usedin databases such as PubMed, Google Scholar and Science-Direct.
RESULTS: The results of studies have shown that the ideal temperature for growth and survival levels of E. *granulosus*' eggs is 0 to 10 ° C. Although these eggs can be survived for long time at a temperature of minus 30 to 30°C. While, the eggs of *E. multilocularis* remain actively for 478 days at 4 ° C. Eggs are more durable in wetlands. Increasing domestic livestock breeding leads to the expansion of grasslands and the convertion of vegetation to a suitable environment for the life of small mammals and rodents. Annual precipitation as one of the natural causes, increasing the risk of transmitting disease through water and, on the other hand, makes the final host's excrement less accessible to the intermediate host. In the results of these studies, an increase in the annual precipitation rate has led to an increase in the prevalence of *E. multilocularis* in red foxes. The results of the study of the effect of urbanization as one of the anthropogenic factors which affects these parasites showed that urbanization has increased the collision of humans with wild hosts and increased zoonoses. Urbanization has led foxes to enter the human environment, so the prevalence of *E. multilocularis* infection has increased. In the cities, domestic dogs are the main host of *E. granulosus*.
CONCLUSIONS: In Iran, in addition to the impact of climate changes on the spread of common contamination, by increasing the maintenance of dogs as pets and the expansion of cities, it is anticipated that contamination of Echinococcosisin humans enters to a new stage and should be given more attention. In anthropogenic factors, urbanization has a significant effect.
KEYWORDS: *Echinococcusgranulosus, Echinococcus-multilocularis*, Climate change, Environmental changes

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TOXOPLASMA INFECTION IS A HAZARD TO SCHIZOPHRENIA

Zarrabi, M. [1*]

1. Graduated of Veterinary Medicine.

Email: Zarrabi_mina@yahoo.com

Schizophrenia is a comprehensive neurological disorder of underlying causes that affects approximately 1% of the adult population in the United States and Europe. Genetic factors play a role and some of the predisposing genes have been identified. Environmental factors are also important. *T. gondii* is an intracellular parasite in Apicomplexa. Its lifecycle is only completed in cats and other sexes, which are the definitive host. However, *T. gondii* also infects a variety of intermediate hosts, including humans. In many mammals, *T. gondii* is an important cause of abortion and neonatal mortality and selectively infects the brain tissue. In animals, infection with *Toxoplasma gondii* can alter the behavior and function of the nerve. In humans, acute infection with *T. gondii* can produce similar psychosomatic symptoms of those who show schizophrenia. Showed that exposure to cats in childhood was a risk factor for the development of schizophrenia. Some drugs used to treat schizophrenia inhibit *T. gondii* in cell culture. In humans, *Toxoplasma* is a major contributor to abortion and the birth of newborns after infected mother-in-law. The organism can also cross the placenta and infect the fetus.Signs of congenital toxoplasmosis include abnormal changes in head size (hydrocephalus or microcephaly), intracranial calcification, deafness, seizure, cerebral palsy, retina damage, and mental retardation. Some consequences of congenital toxoplasmosis are unclear at birth and are not recognizable until the second or third decade of life. Although the symptoms of schizophrenia generally do not manifest until late adolescence or early onset, the disease progresses in the early stages of brain development. Therefore, the ability of *Toxoplasma* tumors to contaminate the perinatal brain is consistent with this aspect of the pathogenesis of schizophrenia. Given the presence of *Toxoplasma gondii* antibodies, evidence of previous infection is a risk factor for the development of schizophrenia. Maternal cytokines, including interleukin 8, also increase significantly in pregnancies that cause schizophrenia prevalence. It has been shown that parasite-blocked cells in the brain of rodents infected with *Toxoplasma* have high levels of dopamine and encodes a parasite that limits the rate of enzyme in the synthesis of this neurotransmitter. After a brief phase of acute *toxoplasmosis*, the infection is uncountable, and in the central nervous system and muscle tissue, it is likely to be infected throughout the host's life. The parasite has the ability to change the behavior of its average host to increase its transmission. Dopamine is in infected individuals, which can lead to personality changes, psychotic symptoms, and in some cases neuropsychiatric disorders. This can have important implications for *T. gondii* infection in humans. The impact of *Toxoplasma* infection on each person may vary, depending on factors such as individual genetic characteristics, immune status, dose, infected strains, timing (e.g., infection in the first trimester of pregnancy). After acute infection with *Toxoplasma,* parasites create wall cysts in the brain, leading to chronic maternal infections and resistance to conventional disinfection drugs. Chronic infection is more closely studied and is strongly associated with the progression and severity of schizophrenia. Toxoplasmagondii is associated with several neurological disorders. A study on the serology of *T. gondii* and schizophrenia showed a threefold increase in the incidence of infection in schizophrenic patients. The dopamine imbalance between the mesolocytic and mesocorticular regions in the suspicious brain is related to the role of schizophrenia, which can explain the observed association between schizophrenia and *toxoplasmosis*.

Keywords: *Toxoplasma*, Schizophrenia, Dopamine, Parasite, Pregnant

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THE EFFECT OF DIFFERENT NUTRITIONAL MATERIALS ON GROWTH GROWTH AND DEVELOPMENT OF EARTHWORM

Zarepour Shob, S.[1], Meshgi, B.[2*]

1. *PhD Student of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran (Center of Excellent of Ecosystem and Ultrastructural changes of Helminthes)*

Email: Bmeshgi@ut.ac.ir (B. Meshgi)

BACKGROUND: Although, there are more than 7000 species of earthworm in the word, but *Eisenia foetida* is one of the most important for soil fertility. Of course, several studies showed which earthworms the variety of activities such as healthy food as well as in medicine.
OBJECTIVES: The aim of this study was to assess, the influence of different waste such as vegetable, paper, banana, carrot, bread wastes on the growth and development of *E. foetida*.
METHODS: The effect of various wastes on growth, reproduction and adult's weight of an earthworm E. foetida was studied under identical laboratory conditions.
RESULTS: In the use of banana peel, flour and paper filings baby number from 500 respectively has risen in 2000, 1800 and 1500. The maximum amount of vermicomposted soil compared with controls, were related to the paper filings and lettuce (respectively 145 and 106 g).
CONCLUSION: Generally the earthworm population, weight of adults and the amount of soil vermicompost, showed that paper filings and banana peel were the best medium for earthworm *E. foetida*.
Key words: Nutritional materials, Growth, Development, Earth worm

HELMINTH PARASITES OF LABORATORY MICE AND RATS

Ahmadi, A.[1], MootabiAlavi, A.[1], Malekpour, H.[1], Fakhr-ahmad, F.[1]

1. *Department of Pathobiology, School of Veterinary Medicine, Shiraz University*

Email :Ahmadi.a63@gmail.com

Background: Laboratory animals can get infected by many diseases and results in consequent loss of time, money and research effort. Like all animals kept in captivitylaboratory animals become a prime target for parasite infection if appropriate preventive measures are notpracticed (Tanideh et al., 2010), about 150 to 200 diseases may be transferred from laboratory animals to human (zoonoses). They canbe heavily parasitized both externally and internally. There is only little information available regarding laboratory animal situations inlabratorian animals (including animals such as mice and rat than other laboratory animals) of iran.So, the aim of present study was evaluation of helminthic infections andidentify of gastrointestinal helminths of laboratory animal School of Veterinary Medicine, Shiraz University.
Material and method: A parasitological survey of laboratory animals from two animal labratory in School of Veterinary Medicine, Shiraz University.Seventy laboratory animals including Balb/c mouse (n=60) and rats (n=10), were randomly selected and examined for any helminthic infections.
Results: BALB/C mice were infected with *Hymenolepis nana* (9%), *Hyminolepisdiminuta*(21%), *Aspiculuris* sp. and Syphacia sp. (95%).80% rats were infected with *Syphacia* sp ,*Aspiculuris* sp, 30% were infected *Hymenolepisdiminutaand* 1.66% of mices were infected with *strobilocercusfasciolaris*.
Conclusion: The fact that many laboratory rodent colonies were found to be parasite contaminated, suggests a need for eradication and improvment of the quality of laboratory rodents.This results of the study indicate the need of massive investment on laboratory animal science and technology in the animal houses for enhancement of quality of living laboratory animals for biomedical research and decrease of infection transmission to human as well as other laboratory animals.
Keywords: Helminth ,Parasite, Mice ,Rat

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SURVEY INFESTATION OF ECTOPARASITE IN PETS WITH USE ULTRASONIC TICKLESS

Malekzadeh, p.[1*], ElahiMoloudavval, A.[2]

1. *Ph.D student of Veterinary Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
2. *Master of Mechanical engineering, Faculty of Engineering, Islamic Azad University of Damavand, Tehran, Iran*

Email: parmida.malekzade@ut.ac.ir

BACKGROUND: dogs live with humansthat the close communicationbetween humans and dogs potentially permits the sharing of micro organism such as parasites.
OBJECTIVES:attention of important transmissible disease between animal and human , in this study infestation of ectoparasite in pets with use ultrasonic tickles were surveyed.
METHODS: 15 ultrasonic tickless that made in Italy buy from Turkey and use them for kind of breeds , age , and sex of dogs.
RESULTS: In the kind of 15 dogs that use ultrasonic tickless one of them with shihtzu breed, female and it's age is 8 years old that for walking go to park every day but after 10 days the owner change it's place to a new park.after a day the owner were found one ectoparasite between it's hairs and cames to clinic.we observed tick between it's hair but tick don't suck dog's blood and ultrasonic tickless dizzy for tick because tick were confused.
CONCLUSIONS: This study help us to know the ultrasonic tickless able to comparison with tick but ecology, epidemiology and load of ticks in the kind of places is important for control of tick and most important for control of tick borne disease.
Keywords: Tick, Flea, Ectoparasite, Dog,Ultrasonic tickless