

Original Article

Investigation of the Vaginal and Clitoral Fungi in One-Humped Camels (*Camelus Dromedarius*)

Hosein Kochakzadeh Omran¹ , Massoud Talebkhan Garoussi^{1*} , Ali Reza Khosravi² , Jørgen Steen Agerholm³ , Mehran Dabiri¹

1. Department of Theriogenology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran.

2. Mycology Research Centre, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran.

3. Department of Veterinary Clinical Sciences, University of Copenhagen, Taastrup, Denmark.



How to Cite This Article Kochakzadeh Omran, H., Talebkhan Garoussi, M., Khosravi, A. R., Agerholm, J. S., & Dabiri, M. (2025). Investigation of the Vaginal and Clitoral Fungi in One-Humped Camels (*Camelus Dromedarius*). *Iranian Journal of Veterinary Medicine*, 19(2), 203-210. <http://dx.doi.org/10.32598/ijvm.19.2.1005423>

<http://dx.doi.org/10.32598/ijvm.19.2.1005423>

ABSTRACT

Background: Bacteria and fungi constitute crucial parts of the genital tract microenvironment and participate in mucosal homeostasis. While the genital tract microflora has been studied for several animal species, this is not true for the one-humped camel (*Camelus dromedarius*).

Objectives: This survey aims to investigate the prevalence of vaginal and clitoral fungi in one-humped camels (*C. dromedarius*) from different regions of Iran.

Methods: Dairy camel farms were sampled in Khorasan Razavi, Semnan, Tehran, Qom, and Isfahan Provinces in central and northeast Iran. Two hundred and twenty paired samples were taken from the vaginal and clitoral mucosa of 110 camels and cultured on Sabouraud dextrose agar and CHROMagar™ *Candida*, followed by identification of cultured fungi. Data were analyzed using the Genmod procedure.

Results: Six isolates were identified. Fungi were cultured and isolated from 31% of the camels. *Cladosporium* spp. and *Aspergillus flavus* were the most isolated prevalent. *Aspergillus* was the most frequently recovered species. The presence of fungi was evaluated in camels of different ages, but no correlation was observed ($P>0.05$).

Conclusion: Fungal contamination of the camel's external organs of the reproductive system is very low compared to other domestic animals. It is likely due to the intrinsic immunity of one-humped camel (*C. dromedarius*).

Keywords: *Aspergillus flavus*, Camel, Clitoris, *Cladosporium* spp., Fungi, Vagina

Article info:

Received: 14 Jul 2024

Accepted: 13 Oct 2024

Publish: 01 Apr 2025

* Corresponding Author:

Massoud Talebkhan Garoussi, Professor.

Address: Department of Theriogenology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran.

Phone: +98 (21) 66929532

E-mail: garoussi@ut.ac.ir



Copyright © 2025 The Author(s);

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC-BY-NC: <https://creativecommons.org/licenses/by-nc/4.0/legalcode.en>), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Introduction

In the Middle East and other regions, the one-humped camel (*Camelus dromedarius*) is a local source of milk, meat, and wool. Camel racing is a multi-dollar industry in some regions that emphasizes the overall high value of camel breeding (Noakes et al., 2019). As for other production and sport animals, such as cattle and horses, successful reproduction of camels plays a crucial role in maintaining continuous and good production and subsequent income for breeders.

A normal structure and a functional genital tract is a prerequisite for normal fertility in female camels. Genital tract infection during breeding reduces fertility due to lack of fertilization or embryonic death (Noakes et al., 2019; Gideon et al., 2014; Enany et al., 1990). Investigating fungal contamination in the reproductive systems of animals has received less attention. However, most studies have been conducted in genital systems of animals, such as dairy cows (Dabiri et al., 2020; Talebkhan Garoussi et al., 2008; Talebkhan Garoussi, 2007), buffaloes (Singh et al., 1992), horses (Azarvandi et al., 2017a; Azarvandi 2017b; Róžański ski et al., 2013a; Róžański et al., 2013b), cats (Garoussi et al., 2016), and dogs (Cleff et al., 2005. Khosravi et al., 2008). Fungal agents can affect the placenta, fetus, or both and cause abortion in domestic animals (Antoniassi et al., 2013; Fourichon et al., 2000). However, some investigations have been conducted in bulk milk tanks on dairy farms (Hosseini-Abadi et al., 2022). Fungal agents can invade the genital system and cause reproductive disorders under abnormal conditions (Noakes et al., 2019; Rebhun et al., 1995). However, identification of abnormal microflora requires knowledge of the normal flora. Several bacteriological studies have been conducted on the reproductive system of camels (Ali et al., 2010; Pal, 2015) but the studies conducted on fungal infections of one humped camel reproduction are few (Shokri et al., 2010) although fungi constitute a crucial part of the vaginal microenvironment in animals (Azarvandi et al., 2017a; Azarvandi et al., 2017b; Garoussi et al., 2016; Hopper, 2015; Talebkhan Garoussi et al., 2008; Talebkhan Garoussi et al., 2007; Youngquist & Threlfall, 2006; Heuwieser et al., 2000).

To obtain a basic understanding of the mucosal fungi of the caudal genitals of female one-humped camels, we cultured paired swabs of the vaginal and clitoral mucosa of 110 animals to determine the fungi and study whether the fungi depended on the age of the animal.

Materials and Methods

Study population

From March 2018 to August 2019, dairy camel farms were sampled in Khorasan Razavi, Semnan, Tehran, Qom, and Isfahan Provinces located in central and north-east Iran (Figure 1). These provinces represent major camel-rearing regions in Iran. The study population included 550 clinically healthy female one-humped camels of which 20% were included randomly using a lottery approach, according to Thrusfield and Christley (2018). The age of the sampled camels was determined based on dental characteristics (Hillson, 2009).

The camels were kept in semi-intensive dairy systems with access to pastures. A typical diet consisted of alfalfa hay, corn silage, and concentrates in various proportions using a mixed ration. Average milk production was 5 kg/day with dual milking. Approximately 45% of camels were non-lactating at the time of sampling. However, pregnant camels within the herds were diagnosed using ultrasonography, transrectal palpation, and persistently raised tail (called tashweel) (Noaks et al., 2009; Enany et al., 1990; Merkt et al., 1990; Chen & Yuen, 1984). Vaccination against foot and mouth diseases, *Clostridium chauvoei*, and *Clostridium Septicum*, were performed regularly. All herds used natural breeding.

Sampling and fungal culture

The external genitalia was thoroughly washed with a 5% povidone-iodine solution, and the vulva opening was cleaned with a sterilized tampon before sample collection. The vaginal walls were manually separated to allow the deep insertion of a simple sterile cotton swab without contamination. The cranial part of the vaginal mucosa was gently swabbed before removal of the cotton swab. Then a second swab was taken from the clitoral mucosa using the same technique. The swabs were transferred to a sterilized Stuart transport medium (Difco Laboratories, Detroit, MI, USA) and transported on ice to the Mycology Research Centre, Tehran.

Swabs were spread onto Sabouraud dextrose agar with chloramphenicol (Merck Co., Darmstadt, Germany) and incubated at 32 °C for 48 h under aerobic conditions and on CHROMagar™ Candida (CHROMagar, Paris, France) and incubated at 35 °C for 48 h in the dark. Sugar fermentation and assimilation tests were performed using the RapID™ Yeast Plus System (Thermo Fisher Scientific, Lenexa, KS, USA) according to the manufacturer's instructions for the presumptive identification of



Figure 1. The map of the study area in 5 provinces of Iran

isolated yeasts. Final identification was performed using the germ tube formation test, urease test, and culturing on CHROM agar and corn meal agar medium with Tween 80.

Statistical analysis

The data were analyzed using the Genmod procedure, including the function link logit in the model. Differences at $P < 0.05$ were considered statistically significant.

Results

Culturing revealed fungal growth in 31% of the examined camels. In 11% of camels, fungi were found on both the vaginal and clitoral mucosa, while fungi were only isolated from the clitoral or vaginal mucosa in 11% and 9% of camels, respectively (Table 1).

Several fungal species were found, and in many cases, they were present as monoculture (Table 2). The fungi

of the vaginal and clitoral mucosa seemed to be similar but varied between animals. No single species was consistently isolated from all or most camels. No correlation was found when analyzing the culture results (culture positive vs. negative) against the animals' age (Table 3).

Discussion

A range of different fungal species was isolated from the vaginal and clitoral mucosa of the examined one-humped camels. All species were isolated from both locations, indicating that these fungi can normally inhabit the mucosa of the posterior genital tract. As all camels included in the study were healthy in the genital tract, the isolated fungi probably represent a part of the normal vaginal fungi in camels. However, some fungi are opportunistic pathogens, such as *Aspergillus* spp. and *Candida* spp., and may be involved in the development or progression of an infection. In animals, *Aspergillus can* cause abortion (Constable et al., 2017). *Aspergillus* spp. and *Mucor* spp. have been isolated from the uterus of one-humped camels with endometritis (Refaat et al., 2020; Tibary et al., 2006). As endometritis can originate from ascending transcervical migration of pathogens, therefore, normal vaginal mucosal fungi can cause post-partum uterine fungal infection. Usually, fungi are not vital in the endometritis of camels or other animals, but they sometimes become crucial (Karstrup et al., 2017). Some of the *Aspergillus* spp. that were isolated in this study, such as *Aspergillus niger* and *Aspergillus flavus* are well-known causes of aspergillosis (Sugui et al., 2015), including mycotic placentitis in cattle and horses (Hopper, 2015; Knudtson & Kirkbride, 1992; Murase et al., 2015; Orellana-Guerrero et al., 2019; Youngquist & Threlfall, 2006). Therefore, vaginal and clitoral fungi may serve as sources of genital tract infections in certain circumstances.

Table 1. Isolation of fungi from the clitoral and vaginal mucosa of one-humped camels

Location	No. (%)		
	Positive	Negative	Total
Clitoris	12(11)	26(24)	38(34.5)
Vagina	10(9)	28(25)	38(34.5)
Clitoris and vagina	12(11)	22(20)	34(31.3)
Total	34(31)	76(69)	110

Table 2. Fungal species isolated from the clitoral and vaginal mucosa of one-humped camels

Fungal Species		No. (%)		
		Location		C +V (%)
		C (%)	V (%)	
Yeast fungi	<i>Candida</i> spp.	2(6)	-	2(6)
	<i>A. niger</i>	1(3)	2(6)	2(6)
Filamentous (mold) fungi Mono-culture	<i>A. flavus</i>	2(6)	2(6)	1(3)
	<i>Penicillium</i> spp	2(6)	-	2(6)
	<i>Alternaria Alternaria</i>	2(6)	1(3)	2(6)
Mixed culture	<i>A. niger</i>	3(9)	2(6)	1(3)
	<i>A. flavus</i>			
	<i>Cladosporium</i> spp.	-	3(9)	2(6)
	<i>A. flavus</i>			
Total		12(35)	10(29)	12(35)

C: Clitoris; V: Vagina.

Yeast commonly inhabits the mucosa of the caudal genital tract of camels with the highest load in the vestibulum, and the numbers decrease towards the uterine horns (Shokri et al., 2010). *Candida* spp. are particular prevalent, with *Candida zeylanoides* being the most common in the vagina (Shokri et al., 2010; Sobel, 1988). In the present study, *Candida* spp. was cultured from the vaginal mucosa in 3% of the camels and from the clitoris in 15% of camels and, therefore, not as prevalent as expected from the study by Shokri et al. (2010). The presence of filamentous fungi has not been previously reported, but they occur in both the vaginal and clitoral mucosa at an equal prevalence (Table 2).

In the present study, the fungal isolates showed progressive involvement of different structures of external organs in the female camel reproduction system, thus

confirming the locally invasive nature of different isolates consistent with previous reports that infection did not disseminate (Moradi et al., 2024. Garoussi et al., 2016). Therefore, this fungal group may demonstrate tropism towards this anatomical site in camels of different ages (Table 3). *A. niger*, *A. flavus*. (No. 3, 9%) and *Cladosporium* spp. *A. flavus* (No. 3, 9%), the most frequent fungal species, located in cervical and vaginal tissues, respectively (Table 2). Therefore, they may spread through the male genital system in camels. *Candida* can localize to mucous membranes and skin. It is distributed worldwide in different animals and is most commonly caused by species of yeast-like fungus, *Candida albicans*, *Candida Krusei*, and others (Garoussi et al., 2016).

Table 3. Fungal culture resulting from the clitoral and vaginal mucosa compared to age of the examined one-humped camels

Culture	No. (%)					Total
	Age (y) (%)					
	<5	≥5; <10	≥10; <15	≥15; <20	≥20	
Positive	1(1)	5(5)	7(6)	13(12)	8(7)	34(31)
Negative	7(6)	11(10)	25(23)	22(20)	11(10)	76(69)
Total	8(7)	16(15)	32(29)	35(32)	19(17)	110(110)

This survey showed that the amount of fungal contamination of external organs of the reproductive system in female camels is much lower than in mares (Azarvandi et al., 2017a, Azarvandi et al., 2017b). This may be due to the camel's innate and general immune systems' resistance to fungal infection.

Despite the importance of camels, scientific knowledge of their reproduction and reproductive pathology is limited. Establishing basic knowledge is therefore crucial, but efforts should also be made to improve reproductive efficiency and to increase our knowledge of infections causing reproductive failure, such as embryonic losses, abortion, and subfertility, to prevent such conditions.

Ethical Considerations

Compliance with ethical guidelines

The Animal Experimentation Ethics Committee of the Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran, approved all protocols and procedures under the recommendations for proper care and use of laboratory animals (Code: 28903. 1.2).

Funding

This study was financially supported by the Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran (Grant No.: 28903.1.2).

Authors' contributions

Conceptualization, visualization, and funding acquisition: Massoud Talebkhan Garoussi; Methodology, and software: Hosein Kochakzadeh Omran; Investigation: Mehran Dabiri, and Massoud Talebkhan Garoussi; Validation, and formal analysis: Jørgen Steen Agerholm; Writing the original draft: Hosein Kochakzadeh Omran and Massoud Talebkhan Garoussi; Supervision, review and editing: Massoud Talebkhan Garoussi, and Ali Reza Khosravi.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

The authors would like to appreciate the vice-chancellor for Research & Technology, and Education & Graduate Studies of the Faculty of Veterinary Medicine, University of Tehran (FVM-UT, Tehran, Iran). The authors thank Deldar Talebkhan Garoussi for English language editing of the manuscript.

References

- Ali, A., Al-sobayil, F. A., Tharwat, M., Al-Hawas, A., & Ahmed, A. F. (2010). Causes of infertility in female camels (*Camelus dromedarius*) in middle of Saudi Arabia. *Journal of Agricultural and Veterinary Sciences, Qassim University*, 2(2), 59-66. [Link]
- Antoniassi, N. A., Juffo, G. D., Santos, A. S., Pescador, C. A., Ferreira, L., & Driemeier, D. (2013). *Geotrichum candidum* as a possible cause of bovine abortion. *Journal of Veterinary Diagnostic Investigation*, 25(6), 795-797. [DOI:10.1177/1040638713508284] [PMID]
- Azarvandi, A., Talebkhan Garoussi, M., Khosravi, A., Hosseini, A., & Gharagozloo, F. (2017). Isolation and identification of molds flora in external genital tract of healthy mares. *Journal of Veterinary Research*, 72 (1), 103-110. [Link]
- Azarvandi, A., Khosravi, A. R., Shokri, H., Talebkhan Garoussi, M., Gharahgouzloo, F., & Vahedi, G., et al. (2017). Presence and distribution of yeasts in the reproductive tract of healthy female horses. *Equine Veterinary Journal*, 49(5), 614-617. [DOI:10.1111/evj.12657] [PMID]
- Chen, B. X., & Yuen, Z. X. (1984). Pregnancy diagnosis by rectal examination in the Bactrian camel. In: W. R. Cockrill (Ed.), *The Camelid* (pp. 399-406). (Scandinavian Institute of African Studies, Uppsala, Sweden. [Link]
- Cleff, M. B., Lima, A. P. D., Faria, R. O. D., Meinerz, A. R. M., Antunes, T. D. Á., & Araújo, F. B. D., et al. (2005). Isolation of *Candida* spp. from vaginal microbiota of healthy canine females during estrous cycle. *Brazilian Journal of Microbiology*, 36, 201-204. [DOI:10.1590/S1517-83822005000200018]
- Constable, P. D., Hinchcliff K. W., Done S. H., & Grunberg W. (2017). *Veterinary medicine. A textbook of the diseases of cattle, horse, sheep, pigs and goats*. Missouri: Saunders Elsevier. [Link]
- Dabiri, M., Garoussi, M. T., Mehrzad, J., Tajik, P., & Barin, A. (2021). The effects of cytopathic and non-cytopathic biotypes of bovine viral diarrhoea virus on sperm vitality and viability of Holstein dairy bulls in vitro. *Iranian Journal of Veterinary Medicine*, 15(2), 197-206. [Link]
- Enany, M., Hanafi, M. S., El-Ged, A. G. F., El-Seedy, F. R., & Khalid, A. (1990). Microbiological studies on endometritis in she-camels in Egypt. *Journal of the Egyptian Veterinary Medical Association*, 50, 229-243. [Link]
- Fourichon, C., Seegers, H., & Malher, X. (2000). Effect of disease on reproduction in dairy cows: A meta-analysis. *Theriogenology*, 53(9), 1729-1759. [DOI:10.1016/S0093-691X(00)00311-3] [PMID]
- Garoussi, M. T., Eidi, S., & Mehravaran, M. (2016). Isolation and comparative investigation of vaginal mycoflora in feline population of urban and dairy cattle herds. *Journal de Mycologie Medicale*, 26(1), 22-27. [DOI:10.1016/j.mycmed.2015.10.013] [PMID]
- Garoussi, M. T., Khosrave, A. R., & Hovarashte, P. (2008). The survey of mycotic flora of uterine cows with reproductive disorders and healthy. *Journal of Veterinary Research*, 63(1), 1, 7-10. [Link]
- Garoussi, M. T., Khosrave, A. R., & Havareshti, P. (2007). Mycoflora of cervicovaginal fluids in dairy cows with or without reproductive disorders. *Mycopathologia*, 164(2), 97-100. [DOI:10.1007/s11046-007-9031-x] [PMID]

- Heuwieser, W., Tenhagen, B. A., Tischer, M., Lühr, J., & Blum, H. (2000). Effect of three programmes for the treatment of endometritis on the reproductive performance of a dairy herd. *The Veterinary Record*, 146(12), 338–341. [DOI:10.1136/vr.146.12.338] [PMID]
- Hillson, S. (2005). *Teeth*. Cambridge: Cambridge University Press. [Link]
- Hopper, R. M. (2015). *Bovine reproduction*. New Jersey: Wiley-Blackwell. [Link]
- Hosseinabadi, E., Talebkhan Garoussi, M., Khosravi, A. R., Gharagozloo, F., Khoramian Toosi, B., & Moosakhani, F. (2022). Prevalence of prototheca and fungal contamination of bulk tank milk of industrial dairy cattle herds in Iran. *Iranian Journal of Veterinary Medicine*, 16(2), 155–165. [Link]
- Karstrup, C. C., Agerholm, J. S., Jensen, T. K., Swaro, L. R. V., Klitgaard, K., & Rasmussen, E. L., et al. (2017). Presence and localization of bacteria in the bovine endometrium postpartum using fluorescence in situ hybridization. *Theriogenology*, 92, 167–175. [DOI:10.1016/j.theriogenology.2017.01.026] [PMID]
- Khosravi, A. R., Eidi, S., Ziglari, T., & Bayat, T.M. (2008). Isolation and differentiation of malassezia species isolated from healthy and affected small animals, ear and skin. *World Journal of Zoology*, 3 (2), 77–80. [Link]
- Knudtson, W.U., Kirkbride, C.A., 1992. Fungi associated with bovine abortion in the northern plains states (USA). *Journal of Veterinary Diagnostic Investigation* 4, 181–185. [DOI:10.1177/104063879200400211] [PMID]
- Merkt, H., Rath, D., Musa, B., & El-Naggar, M. A. (1990). Reproduction in camels. A review. *Food and Agriculture Organization of the United Nations*, 82, 19–21. [Link]
- Moradi, M. S., Kamkar, S., Sharifzadeh, A., Hassan, J., Shokri, H., & Abbasi, J. (2024). The in vitro effect of berberine sulfate and berberine chloride on the growth and aflatoxin production by aspergillus flavus and aspergillus parasiticus. *Iranian Journal of Veterinary Medicine*, 18(2), 223–232. [DOI:10.32598/IJVM.18.2.1005399]
- Mshelia, G. D., Okpaje, G., Voltaire, Y. A., & Egwu, G. O. (2014). Comparative studies on genital infections and antimicrobial susceptibility patterns of isolates from camels (*Camelus dromedarius*) and cows (*Bos indicus*) in Maiduguri, north-eastern Nigeria. *SpringerPlus*, 3, 91. [DOI:10.1186/2193-1801-3-91] [PMID]
- Murase, H., Niwa, H., Katayama, Y., Sato, F., Hada, T., & Nambu, Y. (2015). A clinical case of equine fungal placentitis with reference to hormone profiles and ultrasonography. *Journal of Equine Science*, 26(4), 129–133. [DOI:10.1294/jes.26.129] [PMID]
- Noakes, D. E., Parkinson, T. J., & England, G C. W. (2019). *Veterinary reproduction and obstetrics*. Amsterdam: Elsevier. [Link]
- Orellana-Guerrero, D., Renaudin, C., Edwards, L., Rose, E., Aleman, M., & Moore, P. F., et al. (2019). Fungal placentitis caused by aspergillus terreus in a mare: Case report. *Journal of Equine Veterinary Science*, 83, 102799. [DOI:10.1016/j.jevs.2019.102799] [PMID]
- Pal, M. (2015). Growing role of fungi in mycotic abortion of domestic animal. *Journal of Bacteriology and Mycology*, 2(1), 1009. [Link]
- Refaat, D., Ali, A., Saeed, E. M., Al-Sobayil, F., Al-Samri, A., & Elbehiry, A. (2020). Diagnostic evaluation of subclinical endometritis in dromedary camels. *Animal Reproduction Science*, 215, 106327. [DOI:10.1016/j.anireprosci.2020.106327] [PMID]
- Rebhun, W.C., & Guard, C. (1995). *Diseases of dairy cattle*. Pennsylvania: William & Wilkins. [Link]
- Rózański, P., Ślaska, B., & Rózańska, D. (2013). Current status of prevalence of yeast-like fungi in the environment of horses bred in Poland. *Annals of Animal Science*, 13(2), 365–374. [DOI:10.2478/aoas-2013-0016]
- Rózański, P., Slaska, B., & Rózańska, D. (2013). Prevalence of yeasts in English full blood mares. *Mycopathologia*, 175(3–4), 339–344. [DOI:10.1007/s11046-013-9615-6] [PMID]
- Shokri, H., Khosravi, A., Sharifzadeh, A., & Tootian, Z. (2010). Isolation and identification of yeast flora from genital tract in healthy female camels (*Camelus dromedarius*). *Veterinary Microbiology*, 144(1–2), 183–186. [DOI:10.1016/j.vetmic.2009.12.012] [PMID]
- Singh, G., Sidhu, S. S., Jand, S. K., & Singla, V. K. (1993). Mycoflora in uterine swabs of repeat breeder cows and buffaloes. *Indian Journal of Animal Sciences*, 63(5), 528–529. [Link]
- Sobel, J.D. (1988). Pathogenesis and epidemiology of vulvovaginal candidiasis. *Annals of the New York Academy of Sciences*, 544, 547–557. [DOI:10.1111/j.1749-6632.1988.tb40450.x] [PMID]
- Sugui, J. A., Kwon-Chung, K. J., Juvvadi, P. R., Latgé, J. P., & Steinbach, W. J. (2014). *Aspergillus fumigatus* and related species. *Cold Spring Harbor Perspectives in Medicine*, 5(2), a019786. [DOI:10.1101/cshperspect.a019786] [PMID]
- Tibary, A., Fite, C., Anouassi, A., & Sghiri, A. (2006). Infectious causes of reproductive loss in camelids. *Theriogenology*, 66(3), 633–647. [DOI:10.1016/j.theriogenology.2006.04.008] [PMID]
- Thrusfield, M., Christley, R., & Peter, H. B. (2018). *Veterinary epidemiology*. New Jersey: John Wiley & Sons Ltd. [DOI:10.1002/9781118280249]
- Youngquist, R. S., & Threlfall, W. R. (2006). *Current therapy in large animal theriogenology*. Amsterdam: Elsevier Health Sciences. [Link]

مقاله پژوهشی

بررسی فلور قارچی واژینال و کلیتورال شترهای یک کوهانه

حسین کوچک زاده عمران^۱، مسعود طالب خان گروسی^۱، علیرضا خسروی^۲، یورگن استین آگرهولم^۳، مهران دبیری^۱

۱. گروه مامایی و بیماریهای تولید مثل، دانشکده دامپزشکی دانشگاه تهران، تهران، ایران.

۲. مرکز تحقیقات قارچ شناسی، دانشکده دامپزشکی، دانشگاه تهران تهران، ایران.

۳. بخش مامایی و تولید مثل، گروه علوم بالینی دامپزشکی، دانشگاه کپنهاگ، تستروپ، دانمارک.

Use your device to scan and read the article online



How to Cite This Article Kochakzadeh Omran, H., Talebkhani Garoussi, M., Khosravi, A. R., Agerholm, J. S., & Dabiri, M. (2025). Investigation of the Vaginal and Clitoral Fungi in One-Humped Camels (*Camelus Dromedarius*). *Iranian Journal of Veterinary Medicine*, 19(2), 203-210. <http://dx.doi.org/10.32598/ijvm.19.2.1005423>

doi <http://dx.doi.org/10.32598/ijvm.19.2.1005423>

چکیده

زمینه مطالعه: باکتری‌ها و قارچ‌ها بخش مهمی از محیط دستگاه تناسلی را تشکیل می‌دهند و در یک پارچگی مخاطی دخیل هستند. در حالی که میکرو فلور دستگاه تناسلی برای چندین گونه حیوانی مورد مطالعه قرار گرفته است، این مورد برای شتر یک کوهانه (*Camelus dromedaries*) صادق نمی‌کند.

هدف: هدف مطالعه، بررسی شیوع فلور قارچی واژینال و کلیتورال در شترهای یک کوهانه (*Camelus dromedaries*) در مناطق مختلف ایران می‌باشد.

روش کار: نمونه‌ها از مزارع شترهای شیری در استان‌های خراسان رضوی، سمنان، تهران، قم و اصفهان واقع در مرکز و شمال شرق ایران اخذ گردید. تعداد ۲۲۰ نمونه جفتی از مخاط واژن و کلیتورال ۱۱۰ نفر شتر گرفته شد. نمونه‌ها بر روی محیط Sabouraud dextrose agar و CHROMagar™ Candida کشت شد و سپس قارچ‌های کشت شده مورد شناسایی قرار گرفت. داده‌های بدست آمده با استفاده از روش آماری Genmod تجزیه و تحلیل شدند.

نتایج: شش جدایه مختلف در این مطالعه اخذ گردید. قارچ از ۳۱ درصد شترها کشت و جداسازی شد. کلادسپوریوم و اسپریلوس فلاووس شایع‌ترین جدایه‌ها بودند. فراوان‌ترین نمونه‌های بازیایی شده اسپریلوس بود. حضور قارچ در سنین مختلف شترها مورد ارزیابی قرار گرفت، اما ارتباطی وجود نداشت ($P > 0.05$).

نتیجه‌گیری نهایی: نتیجه گرفته می‌شود که آلودگی قارچی اندام‌های خارجی دستگاه تناسلی شتر در مقایسه با سایر حیوانات اهلی بسیار کم است. این مساله احتمالاً به دلیل ایمنی ذاتی شتر یک کوهانه (*Camelus dromedaries*) است.

کلیدواژه‌ها: اسپریلوس فلاووس، شتر، کلادسپوریوم، قارچ، تولید مثل.

تاریخ دریافت: ۱۴ تیر ۱۴۰۳

تاریخ پذیرش: ۲۲ مهر ۱۴۰۳

تاریخ انتشار: ۱۲ فروردین ۱۴۰۴

* نویسنده مسئول:

دکتر مسعود طالب خان گروسی

نشانی: تهران، دانشگاه تهران، دانشکده دامپزشکی، گروه مامایی و بیماریهای تولید مثل.

تلفن: +۹۸ (۲۱) ۶۶۱۲۹۱۹۵

رایانامه: garoussi@ut.ac.ir



Copyright © 2025 The Author(s);

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC-BY-NC: <https://creativecommons.org/licenses/by-nc/4.0/legalcode.en>), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

This Page Intentionally Left Blank