

## Case Report

**Hadjelia Truncata Infection Among Quails (*Coturnix Coturnix*) In Semnan City, Iran**Maryam Rassouli<sup>1,2\*</sup> , Abbas Oliya Ardekani<sup>2</sup> , Hassan Moazzezi<sup>2</sup>

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**ABSTRACT**

*Hadjelia truncata* is a spirurida nematode with an indirect life cycle that can infect the digestive system of birds. Different beetles can be intermediate hosts. Birds were infected by ingesting beetles containing infective larvae. The worms can be diagnosed by light microscope and molecular techniques. The disease manifestation among birds can range from asymptomatic to severe, leading to death. This report describes the infection of quails' gizzards with *H. truncata* in Iran. Twenty-five referred gastrointestinal tracts of naturally dead quails were inspected. Eighteen *H. Truncata* nematodes were removed from 6 gizzards (24%) of 25 gastrointestinal samples. All the removed worms were located between the submucosal and muscular layers of the infected gizzards. Because of postmortem alterations, the histopathological sections of infected gizzards could not be performed. This report is the first observation of *H. truncata* infection among quails. This worm has been previously reported among pigeons (*Columba livia domestica*) and hoopoes (*Upupa epops*).

**Keywords:** Bird, Gastrointestinal worm, Gizzard, *Hadjelia*, Spirurida

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## Case History

**H***adjelia truncata* is a nematode (round-worm) in the order Spirurida, the family Habronematidae. Birds' digestive tracts, mainly the ventriculus and gizzard, are infected (Anderson, 2000; Senties-Cue et al., 2011; Khordadmehar et al., 2018). *H. truncata* has an indirect life cycle that has not been completely identified. Eggs are shed in bird feces. When intermediate hosts such as some beetles (*Phylan abbreviatus*, *Asida jurinei*, *Asida sericea*, (Anderson, 2000) and *Alphitobius diaperinus* (Alborzi & Rahbar, 2012) ingest the eggs, the infective worms or the third-stage larvae (L3) are formed in the hemocoel of the beetles. If birds ingest infected beetles, the life cycle will be completed, and adult worms will be formed in the gastrointestinal tract (Alborzi & Rahbar, 2012).

Quails (*Coturnix coturnix*, Phasianidae, Galliformes) are grown in different parts of Iran. This report aimed to describe the first quail infection of *H. truncata*.

## Clinical Presentation

Twenty-five naturally dead male quails' gastrointestinal tracts were referred from a quail farm in Semnan City to the Parasitology Laboratory, Faculty of Veterinary Medicine, Semnan University, Iran.

## Diagnostic Testing

All referred digestive tracts were inspected, and 18 *H. truncata* worms were removed and identified from 6 gizzards. Therefore, the infection rate of *H. truncata* among referred quails was 24%. The average number of worms in each infected quail was 3. All the nematodes were located between the infected gizzards' submucosal and muscular layers. The direct swabs of the fecal samples were also examined. *H. truncata* eggs were also observed in the infected quails (Figure 1). The size of the removed worms and their eggs are presented in Table 1.

## Assessments

*H. truncata* has been reported in pigeons' (*Columba livia domestica*) gizzards in Iran (Razmi et al., 2007; Radfar et al., 2011; Alborzi & Rahbar, 2012; Nabavi et al., 2013; Khordadmehar et al., 2018), Iraq (Al-Attar & Abdul-Aziz, 1985), Egypt (Tadros & Iskander, 1975), and Cyprus (Appleby et al., 1995), in gizzard and ventriculus of pigeons in California, US (Senties-Cue et al., 2011; Ochoa & Adaska, 2021). It has also been reported in hoopoe (*Upupa epops*) in France (Anderson, 2000).

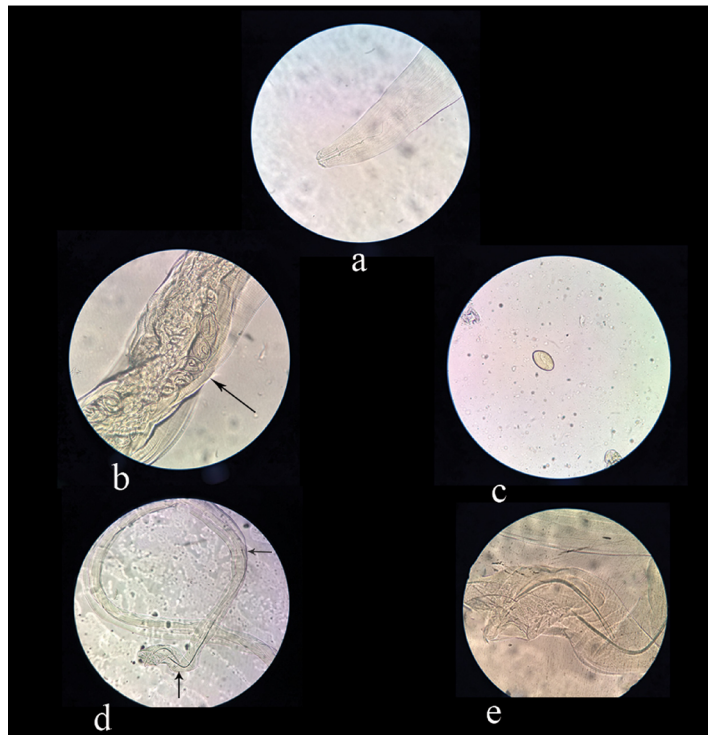
The sizes of male and female *H. truncata* have been recorded in several studies as follows: 7-9 and 13-17 mm (Razmi et al., 2007), 7-11 and 15-20 mm (Khordadmehar et al., 2016), and 6.5-9 and 12-16.5 mm (Senties-Cue et al., 2011), respectively. In this study, the size of male worms was 6-9 mm, and that of female worms was 15-18 mm. The mean lengths of long and short spicules were reported in several studies as follows: 1.26 and 0.34 mm (Razmi et al., 2007), 1.27 and 0.35 mm, respectively (Senties-Cue et al., 2011). In our study, it was recorded as 1.44 and 0.35 mm. The egg size was 20-30×43-45 μm in the Khordadmehar et al. (2016) study and was 22-28×44-47 μm in this study.

The signs of infection are weight loss, weakness, loss of appetite, poor feathering, and diarrhea. However, the disease seems severe and fatal among pigeons (Appleby et al., 1995; Kelly et al., 2013). The histopathologic alterations of previously reported cases of infected pigeons were severe inflammatory cell infiltration with necrosis of mucosal and submucosal layers of the gizzard (Khordadmehar et al., 2018). A polymerase chain reaction technique for detecting *H. truncata* DNA (deoxyribonucleic acid) has also been described (Kelly et al., 2013).

This research is the first report of *H. truncata* infection in quails worldwide. No apparent changes in infected gizzards were grossly observed. It might be because of the low number of worms in each gizzard. The histopathologic sections of gizzards could not be prepared because of postmortem alterations of referred digestive tracts.

**Table 1.** The size of removed *H. truncata* and detected eggs

Male Worm	Short Spicule (Mean)	Long Spicule (Mean)	Female Worm	Egg
6-9 mm	0.35 mm	1.44 mm	15-18 mm	22-28×44-47 μm



**Figure 1.** A) Anterior part of *H. truncata*, mouth surrounded by two lateral lips, trilobed and with a cylindrical pharynx, x400, B) Uterus containing eggs of the female *H. truncata*, black arrow, x1000, C) the egg of *H. truncata* in fecal sample direct smear, containing larva, x1000, D) Posterior part of the male *H. truncata*, note the origin of long and short spicules (black arrows), x400, E) Bursa and spicule end of *H. truncata*, x1000

## Ethical Considerations

### Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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### Authors' contributions

Sample preparation and data collection: Abbas Oliya Ardekani and Hassan Moazzezi; Species diagnosis and writing: Maryam Rassouli.

### Conflict of interest

The authors declared no conflict of interest.

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## گزارش موردی

آلودگی بلدرچین‌ها (*Coturnix coturnix*) به *Hadjelia truncata* در شهر سمنان، ایران\*مریم رسولی<sup>۱</sup>، عباس اولیاء اردکانی<sup>۲</sup>، حسن معززی<sup>۲</sup>

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## چکیده

*Hadjelia truncata* یک نماتود اسپروئید است که می‌تواند دستگاه گوارش پرندگان را آلوده کند و سیر تکاملی غیرمستقیم دارد. برخی سوسک‌ها می‌توانند میزبان واسط باشند. پرندگان با خوردن سوسک‌های آلوده به لارو مرحله ۳ به این کرم آلوده می‌شوند. این کرم‌ها می‌توانند به وسیله میکروسکوپ نوری و روش‌های مولکولی تشخیص داده شوند. بیماری در پرندگان می‌تواند از بی‌علامت تا کشنده متغیر باشد. در این گزارش، آلودگی سنگدان بلدرچین‌ها به *H. truncata* شرح داده شده است. ۲۵ دستگاه گوارش بلدرچین‌هایی که به صورت طبیعی مرده بودند مورد بررسی پس از مرگ قرار گرفت. ۶ سنگدان از ۲۵ نمونه (۲۴ درصد) به کرم *H. truncata* آلوده بودند. در مجموع ۱۸ کرم جداسازی و تشخیص داده شد. کرم‌ها بین لایه‌های زیر مخاط و عضلاتی سنگدان‌های آلوده بودند. به دلیل تغییرات پس از مرگ، مقطع هیستوپاتولوژیک تهیه نشد. بنابراین برای اولین بار در دنیا آلودگی بلدرچین‌ها به *H. truncata* گزارش می‌شود. آلودگی به این کرم از کبوتر (*Columba livia domestica*) و هدهد (*Upupa epops*) گزارش شده است.

کلیدواژه‌ها: پرنده، کرم دستگاه گوارش، سنگدان، *Hadjelia*، اسپروئیدها

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