

## Gastrointestinal helminths of the Caspian snowcock (*Tetraogallus caspius*) partridge from the North Khorasan province, Iran

Amin Ahmadi<sup>1</sup>✉, Saeid Yaghfoori<sup>2</sup>, Vali Abedi<sup>3</sup>, Hassan Borji<sup>4</sup>

1 – MS.c, Ph.D Candidate of Veterinary Parasitology, Department of Pathobiology, School of Veterinary Medicine, Shiraz University, P.O. Box 1731, Shiraz 71345, Iran.

2 – MS.c, Ph.D Student of Veterinary Parasitology, Department of Pathobiology, School of Veterinary Medicine, Ferdowsi University of Mashhad, Iran.

3 – D.V.M, PhD. of Veterinary Parasitology, Office of Veterinary Medicine Bojnord – North Khorasan.

4 – Associate professor of Veterinary Parasitology, Department of Pathobiology, School of Veterinary Medicine, Ferdowsi University of Mashhad, Iran.

Correspondence: Tel. +98 9130363668, E-mail Amin\_Ahmadi@shirazu.ac.ir

**Abstract.** The aim of this study was to establish the recognition of the parasitic infection of the Caspian snowcock (*Tetraogallus caspius*) partridge from the North Khorasan province that is one of the provinces located at the north east of Iran. In this study, 180 Caspian snowcock (*Tetraogallus caspius*) partridges were randomly collected from different parts of North Khorasan region, during 2011-2012 to determine the presence and intensity of helminth infections in local Partridge of this geographic region. In the examination of alimentary tracts of these 180 partridges, it was found that 136 partridges were infected with parasitic helminths. At 132 cases were occurred infection with the cestode and 4 were infected with the nematodes. The number of partridges chickens infected with the both cestodes and nematodes were two. This study indicates the severity of the prevalence of gastrointestinal helminth infections in the indigenous Caspian snowcock of the North Khorasan province that has its own agro-climatic characteristics, and the country of Iran with highly diverse geographic and agro-climatic conditions.

**Keywords:** Partridge; *Anonchotaenia globata*; *Raillietina tetragona*; *Ascaridia galli*; *Heterakis dispar*; *Trichostrongylus tenuis*; Iran.

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### Introduction

The Caspian snowcock (*Tetraogallus caspius*) is a common species in Turkey, Armenia Azerbaijan, and throughout the Alborz

Mountains of the North of Iran. It is one of the five species of snowcock in the genus *Tetraogallus*, part of the pheasant family (Phasianidae). The population is thought to be declining, but not sufficiently rapidly to

approach the thresholds used by Bird Life and IUCN as criteria for listing as threatened. Many problems are facing Caspian snowcock which limit its activity, growth and vitality, including competition, predation, parasites, diseases, hunting, accidents and habitat degradation. Caspian snowcock is susceptible to many of the common fowl parasites such as: protozoa, helminths, lice, fleas and mites (BirdLife, 2012).

The gastrointestinal parasites, especially the helminths, are the most common and the most lethal parasites affecting the indigenous birds (Ashenafi and Eshetu, 2004; Mwale and Masika, 2011). It also has been observed that helminth infections that are present in rural free-range chickens may result in subclinical diseases (Magwisha et al., 2002; Mukaratirwa et al., 2001). It is therefore, essential to scrutinize these parasites more closely to minimize the devastating effect they have on the indigenous birds, other birds and humans. Identifying the differences in climate, agro-climatic and geographic condition of the various regions is one way of closer scrutiny (Dube et al., 2010; Magwisha et al., 2002; Saif, 2008).

In general, information about the geographical distribution of parasitic diseases and localization, prevalence and intensity of infection, and information on the life-cycle (where available) in Galliformes such as *Tetraogallus caspius* is still very limited (Akhumyan and Khanbegyan, 1982). Therefore, the study of Caspian snowcock parasite is necessary and important to reduce the impact on this national wealth, to increase the productivity, the possibility of breeding and acclimatization of this bird in new locations, and it plays an important role in spreading diseases and parasites to domesticated birds and even to humans.

The present study was undertaken to evaluate Identification, prevalence and intensity of the gastrointestinal helminths in Caspian snowcock in the different regions of the North Khorasan, Northeast of Iran.

### Material and methods

A total of 180 Caspian stopcock (*Tetraogallus caspius*) partridges were randomly collected

from different parts of North Khorasan region, during 2011-2012 to determine the presence and intensity of the helminthic infections in local partridges of this geographic region.

Under studied area: The North Khorasan province is one of the provinces located at the north east of Iran. The North Khorasan province is located in the mountainous area between 19,56°-43,57° longitude and 13,37°-17,38° latitude. This area, from north east to north west is continuous with Turkmenistan, from west to south is limited to the Razavi Khorasan province and from east and south-east to Golestan and Semnan Provinces.

In the laboratory the partridges were examined internally for presence of parasites after slaying them. The feathers removed for better approaching to abdominal organs and each organ (intestine, liver, gallbladder, lung and trachea) was transferred to Petri dishes containing tap water and examined under a dissecting microscope at 40x magnification. The gastrointestinal tract was removed out from the esophagus to the rectum and opened longitudinally and examined carefully (Avcioglu et al., 2008). The alimentary canals were opened longitudinally. The intestine was opened, and the mucosa was scraped and washed under running tap water in a 100-mesh sieve, in order to recover the smaller helminths. The content was examined under a stereomicroscope and all the parasites were collected. The collected helminths were preserved in 70% ethyl alcohol. For identification purposes, nematodes were mounted in drops of lacto-phenol, where as cestodes were stained by carmine, and both were later examined under the light microscope. The helminths were identified by using the characteristics described according to Soulsby (1982).

### Results

In examining the 180 alimentary tracts of the same number of partridge, it was found that 136 partridges (i.e. 75.5%) were infected with parasitic helminths. 132 were infected with the cestode (73.3%) and 4 were infected by the nematode (2.2%) singly. The number of

partridges infected with both cestodes, and nematodes were two. These findings are summarized in table 1.

**Table 1.** The Prevalence of helminths infection rates in 180 partridge Caspian stopcock from the North Khorana province, north east of Iran

Parasite species	Number of partridge infected	Infection rate (%)
<i>Trichostrongylus tenuis</i>	1	0.5%
<i>Heterakis dispar</i>	1	0.5%
<i>Anonchotaenia globata</i>	132	73.3%
<i>Raillietina tetragona</i>	130	72.2%
<i>Ascaridia galli</i>	2	1.1%

The species and prevalence of parasitic helminths were as follows: the cestoda species *Anonchotaenia globata* and *Raillietina tetragona* were the most abundant and occurred at 73.3%. Of the established species of Nematoda, *Ascarida galli* occurred at 1.1%, *Heterakis dispar* and *Trichostrongylus tenuis*, were low and occurred at 0.5%, which is the least percentage of all. No trematodes were found.

## Discussion

The aim of the present study was to find the prevalence of helminths in *Tetraogallus caspius* partridge. To our knowledge, there is no reported study on the helminths in *Tetraogallus caspius* partridge. Examination of the Caspian snowcock partridge for helminths revealed its infection with cestodes and nematodes, but not with any trematode or acanthocephalan species.

Most worms in our investigation were cestodes. Cestodes are extremely common parasite of birds (Atkinson et al., 2008), reasons might be the geographical variations in the distribution of the parasites or the intermediate hosts of the worms. (Ebrahimi et al., 2014). Adult cestodes may cause damage to the gizzard lining (*Gastrotaenia*), intestinal blockage, localized damage to the intestinal wall at the site of attachment, or irritation of the intestinal lining. Inflammation is the most common host response to cestode infection

and appears to be the most intense where the prolong contact occurs between the host and parasite (Atkinson et al., 2008).

The most prevalent cestodes species identified in the present study were *Anonchotaenia globata* (73.3%) followed by *Raillietina tetragona* (72.2%). The occurrence of *A. globata* is the first record of their presence in partridges from Iran; although, this cestode has been reported in warbler (Alaudidae) and other birds from different regions of Iran (Eslami et al., 2010).

With regard to the species of tapeworms found *R. tetragona*, according to Soulsby (1982) are considered to be harmful to birds. The prevalence of *R. tetragona* is similar to those reported by Shlemon and Saeed (2012) in Chukar Partridge and in chickens (Dube et al., 2010; Eslami et al., 2010; Ebrahimi et al., 2014; Nayebzadeh et al., 2014). Some investigators suggest that a high prevalence of *Raillietina* spp. is related to the close-contact between the birds and the soil for prolonged period, because the soil is suitable environment for intermediate hosts (Ashenafi and Eshetu, 2004; Nayebzadeh et al., 2014).

The findings of three species of nematodes (*T. tenuis*, *A. galli* and *H. dispar*) represent new records in Caspian snowcock (*T. caspius*). In the present study, the prevalence of *H. dispar*, *T. tenuis* was 0.5% and *A. galli* was 1.1%.

The prevalence of *A. galli* agrees with the finding of the several studies conducted on different partridge species (Avcioglu et al., 2008; Madsen, 1941; Rizzoli et al., 1999; Shlemon and Saeed, 2012; Tibbitts and Babero, 1970). *A. galli* endangers the bird by consuming its food, thus causing the bird to face depression, slow growth, low appetite, reduced egg production that might be indicative of its intestinal mucosa being damaged (Permin et al., 2006).

The prevalence of *H. dispar* in this study was low that agrees with the finding of the other several studies conducted on different species partridge and other birds (Gonzalez et al., 2005; Park and Shin, 2010). Moreover, the prevalence of *T. tenuis* infection was similar to

that reported by Millan et al. (2004) and Purdy et al. (2012) and intensity of infection was low. *T. tenuis* can be implicated in outbreaks of severe enteritis in birds. Moderate to severe infections cause diarrhea, which is often fatal. Lighter infections result in a chronic syndrome characterized by anemia and emaciation (Taylor et al., 2007).

The researchers recommend carrying out periodic investigations on helminths of the Caspian snowcock, as well as any other Iran wild species wherever possible. This study sheds new light on the severity of the prevalence of gastrointestinal helminths infections of indigenous Caspian stopcock of North Khorasan region that has its own agro-climatic characteristics, and the country of Iran has highly diverse geographic and agro-climatic conditions. On the other hand this study could be useful to evaluate the wildlife situation and the dangers of dissemination of some of the parasitic species to the economically important animals, pets and humans.

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### References

Akhumyan K.S., Khanbegyan R.A. 1982. The helminth fauna of wild Galliformes in Armenia (*Coturnix coturnix*, *Alectoris graeca*, *Perdix perdix*, *Lyrulus mlokosiewiczzi* and *Tetraogallus caspius*). Zoologicheskii Sbornik, Akademiya Nauk Armyanskoi SSR, Institut Zoologii 18:9-45.

Ashenafi H., Eshetu Y. 2004. Study on gastrointestinal helminths of local chickens in Central Ethiopia. Rev. Méd. Vét. 155(10):504-507.

Atkinson T., Thomas N.J., Bruce H.D. 2008. Parasitic Diseases of Wild Birds. Blackwell, 592 pp.

Avcioglu H., Burgu A., Bölükbas C.S. 2008. *Ascaridia numidae* (Leiper, 1908; Travassos, 1913) in Rock Partridge (*Alectoris chukar*) in Turkey. Parasitol. Res. 102:527-530.

BirdLife I. 2012. *Tetraogallus altaicus*. IUCN Red List of Threatened Species. International Union for Conservation of Nature.

Dube S., Zindi P., Mbanga J., Dube C. 2010. A study of scavenging poultry gastrointestinal and endoparasites in rural areas of Matabeleland Province, Zimbabwe. Int. J. Poult. Sci. 9(9):911-915.

Ebrahimi M., Asadpour M., Khodaverdi M., Borji H. 2014. Prevalence and distribution of gastrointestinal helminths in free range chickens in Mashhad, northeast of Iran. Sci. Parasitol. 15:38-42.

Eslami A., Ghaemi P., Meshgi B., Bhadry Sh.R. 2010. Study helminth infection of warbler (Aulodidae) in golestan. Large Anim. Clinic Res. (Veterinary) 4(12):27-30.

Gonzalez D., Skewes O., Candia C., Palma R., Moreno L. 2005. Estudio del parasitismo gastrointestinal y externo en *Caiquén Chloephaga picta* Gmelin, 1789 (Aves, Anatidae) en la región de Magallanes, Chile. Parasitol. Latinoam. 60:86-89.

Madsen H. 1941. The occurrence of Helminths and Coccidia in Partridges and Pheasants in Denmark. J. Parasitol. 27:29-34.

Magwisha H.B., Kassuku A.A., Kyvsgaard N.C., Permin A. 2002. A Comparison of the Prevalence and Burdens of Helminthic Infections in Growers and Adult Free-range Chickens. Trop. Anim. Health Prod. 34:205-214.

Millan J., Gortazar C., Villafuerte R. 2004. Ecology of nematode parasitism in red-legged partridges (*Alectoris rufa*) in Spain. Helminthologia 41(1):33-34.

Mukaratirwa S., Hove T., Esmann J.B., Hoj C.J., Permin A., Nansen P. 2001. A survey of parasitic nematode infections of chickens in rural Zimbabwe. Onderstepoort J. Vet. 68(3):183-186.

Mwale M., Masika PK. 2011. Point prevalence study of gastro-intestinal parasites in village chickens of Centane district, South Africa. Afr. J. Agric. Res. 6:2033-2038.

Nayebzadeh H., Ahmadi A., Ebrahimi M. 2014. Gastrointestinal Helminthic Infections of Local Chickens, Kept under the Traditional System in the Isfahan Region, Center of Iran. J. Fac. Vet. Med. Istanbul Univ 40(2):237-242.

Park S., Shin S.S. 2010. Concurrent Capillaria and Heterakis Infections in Zoo Rock Partridges, *Alectoris graeca*. Korean J. Parasitol. 3:253-257.

Permin A., Christensen J.P., Bisgaard M. 2006. Consequences of concurrent *Ascaridia galli* and *Escherichia coli* infections in chickens. Acta Vet. Scand. 47(1):43-54.

Purdy D., Aebischer N.J., Davis C. 2012. Comparison of single and split-dose flubendazole treatment for the nematode parasite *Trichostrongylus tenuis* in experimentally infected grey

- partridges *Perdix perdix*. Parasitology 139:1780-1783.
- Rizzoli A., Manfredi M.T., Rosso F., Rosà R., Cattadori I., Hudson P. 1999. Intensity of nematode infections in cyclic and non-cyclic rock partridge (*Alectoris graeca saxatilis*) populations. Parasitologia 41(4):561-565.
- Saif Y.M. 2008. Diseases of Poultry. 12 Edition, Blackwell Publishing Asia.
- Shlemon A.B., Saeed I. 2012. Parasitosis of the Chukar Partridge, *Alectoris chukar* in North Iraq. Turk. Parasitol. Derg. 36:240-246.
- Soulsby E.J.L. 1982. Helminths, arthropods and protozoa of domesticated animals. Baillière Tindall, London.
- Taylor M.A., Coop R.L., Wall R.L. 2007. Veterinary Parasitology. 3 Edition, Blackwell Publishing Ltd, 1184 pp.
- Tibbitts F.D., Babero B.B. 1970. *Ascaridia galli* (Schrank, 1788) from the chukar partridge, *Alectoris chukar* (Gray), in Nevada. J. Parasitol. 55(6):1252.