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Original Article

Gastrointestinal Helminths of Magpies (*Pica pica*), Rooks (*Corvus frugilegus*) and Carrion Crows (*Corvus corone*) in Mazandaran Province, North of Iran

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ABSTRACT

Background: Corvidae is a cosmopolitan family of oscine birds including crows, rooks, magpies, jays, chough, and ravens. These birds are migratory species, especially in the shortage of foods, so they can act like vectors for a wide range of microorganisms. They live generally in temperate climates and in a very close contact with human residential areas as well as poultry farms. There is no available information in the literature concerning the parasitic infections of these three species of corvidae in Mazandaran Province, northern Iran, so this study was conducted to clarify this.

Methods: As there are three species of corvid birds in Mazandaran Province, 106 birds including 79 magpies, 11 rooks, and 16 carrion crows were examined between winter 2007 and spring 2008 at post mortem for gastrointestinal helminths. The helminths were drawn and identified morphologically in the Laboratory of Parasitology, Islamic Azad University, Science and Research Branch, Tehran and also partly in the School of Public Health, Tehran University of Medical Sciences, based on the reference books and identification keys like Soulsby, Khalil et al. and Anderson et al.

Results: Four species of nematodes, 2 species of cestodes, 1 species of trematodes and 1 species of acanthocephalans were identified in these three corvid species.

Conclusion: Five species of the helminths are identified for the first time in Iran, and the acanthocephalan species is new host record for rooks. It is clear that these corvid birds have diverse range of helminths and can act as carriers for infecting the domestic fowls.

Keywords: Magpie, Rook, Crow, Helminths, Iran

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Introduction

We have nearly 520 species of birds in Iran and Passeriformes order includes a big population of birds in this fauna (1).

Corvidae family include the biggest birds of Passeriformes and are more developed than other birds of this order, have similar sexes in appearance, and are omnivorous birds. Thirteen species of this family have been identified in Iran until now and three most prevalent of them in north of Iran are *Pica pica* (common magpie, black-billed magpie), *Corvus corone* (carrion crow), and *Corvus frugilegus* (rook) (1). These birds are all in close contact with human residential areas as well as native and industrial poultry and other fowls farms (like ostrich and turkey). The aim of this study was to find out the helminths fauna of these birds and possible importance of them for infecting other birds and fowls.

Materials and Methods

As there are three species of corvid birds in Mazandaran Province, 106 birds including seventy-nine magpies, eleven rooks and sixteen carrion crows were taken from local hunters between winter 2007 and spring 2008 from five locations across Mazandaran Province, north of Iran.

After measuring the weight, body of them was checked for external parasites and then necropsy was done on them.

In the Laboratory of Parasitology of Islamic Azad University, Science and Research Branch, Tehran, the alimentary tract of the birds were examined carefully for gastrointestinal helminths. Helminths of every part of the gastrointestinal tract-mouth, esophagus, trachea, proventriculus, gizzard, intestines, cecum, and bursa of fabricius – were collected separately. After that, the contents of alimentary tract were checked

separately with washing thoroughly under water on the 100 mesh sieves collected helminths were kept in plates containing tap water for relaxation and then based on the type of the helminths the fixation stage was done on them.

For nematodes, acanthocephalans and trematodes after relaxation, the helminths were stored in ethanol 70 percent for identification, but for cestodes, after relaxation in tap water, they were killed and fixed in hot formalin and after a few hours, they were stored in ethanol 70 percent for identification. Nematodes were cleared in lactophenol and cestodes as well as trematodes were stained with acetocarmine.

Helminths were drawn with camera lucida and identified with the help of reference key books (2-4).

Results

Of the 106-corvid birds examined, 90 birds (84.9%) harbored helminth parasites. Helminths were recovered from 88.6% of magpies, 62.5% of carrion crows, and 90.9% of rooks. We found 8 species of helminths including four species of nematodes, two species of cestodes, one species of trematodes and one species of acanthocephalans. Table 1 shows the statistics for the helminth species found in this study.

From nematodes, *Syngamus trachea* (Montagu, 1811) was found in the trachea of two species of corvid birds including magpies and carrion crows. Although the lungs were examined, no worms were present.

Acuaria anthuris (Rudolphi, 1819) an acuarid nematode, was found under the koilin layer of the gizzards of rooks and magpies (Fig. 1).

Microtetrameres spp. was found in the submucosa of proventriculi of rooks and magpies (Fig. 2). They were seen as dark

spots from the mucosal surface. All of the found samples of this nematode were females.

Capillaria spp., one female worm was recovered from under mucosal layer of mouth in only one male rook.

We are not giving an exact determination of species for *Capillaria* and *Microtetrameres*, because no male worms were found for these two nematodes. Forty-five of the magpies (57%) were infected with cestodes. *Passerilepis stylosa* was found in the intestines of magpies (Fig. 3). *Passerilepis crenata* was also found in the intestines of magpies. *Prosthogonimus ovatus* (Rudolphi, 1803), was found in the bursa of fabricius of magpies (Fig. 4).

The only found acanthocephalan, *Sphaerirostris picae* (Rudolphi, 1819) Golvan, 1956 was found in the posterior part of the large intestines of all the three species of studied corvid birds (Fig. 5).

Two hundred and fifty-nine specimens were collected from 79 infected magpies, 16 from 10 crows, and 4 from 2 infected rooks. Large population of the worms was attached tightly with the proboscis to the intestinal mucosa. Our specimens had 31-38 proboscis hook rows on the ovoid anterior proboscis and 27-36 spine rows on the cylindrical- to cone-shaped posterior proboscis, each with 8-10 hooks and 2-5 spines per row, respectively (5). After checking the birds for ectoparasites, none of the birds was infected by any kind of external parasites.

Table 1: Prevalence of different helminths in three bird species

Bird Species	No. examined	Helminths	Infection rate (%)	Intensity range
<i>Corvus corone</i>	16	<i>Sphaerirostris picae</i>	62.5	2-25
		<i>Syngamus trachea</i>	6.25	1
<i>Corvus frugilegus</i>	11	<i>Acuaria anthuris</i>	36.3	1-9
		<i>Capillaria</i> sp.	9	1
		<i>Microtetrameres</i> sp.	90.9	1-70
		<i>Sphaerirostris picae</i>	18.2	1-3
<i>Pica pica</i>	79	<i>Acuaria anthuris</i>	20.2	1-8
		<i>Microtetrameres</i> sp.	13.9	1-8
		<i>Passerilepis stylosa</i>	54	
		<i>Passerilepis crenata</i>	47.6	
		<i>Prosthogonimus ovatus</i>	11.3	1-7
		<i>Sphaerirostris picae</i>	64.5	1-18
		<i>Syngamus trachea</i>	6.3	1-3

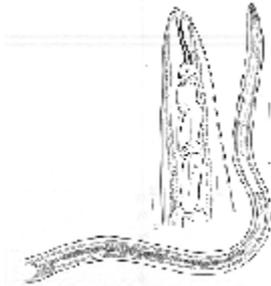


Fig. 1: *Acuaria anthuris*. Female worm from Gizzard

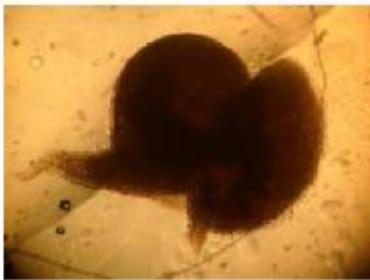


Fig. 2: *Microtetrameres* spp. female from magpie proventriculus



Fig. 3: *Passerilepis stylosa* (*Microsomaacanthus*) cestode from large intestine of *Pica pica*



Fig. 4: *Prosthogonimus ovatus* from the bursa of *Pica pica*



Fig. 5: *Sphaerirostris picae* from intestine of *Pica pica*

Discussion

The birds in the family corvidae are among the most frequent species of wild birds and their free roaming in human residential areas and poultry farms, native or industrial, may be a threat to the health of other birds and to the some extent human beings.

Our findings showed that among three species of examined birds *Pica pica* was the most infected bird, from which eight species of helminths were recorded, whereas four and 2 species were recorded from *Corvus frugilegus* and *Corvus corone* respectively. This might be partly due to the number of

examined birds, feeding habitat or other unknown factors.

None of the helminths found in the examined birds, except *S. trachea* and *Capillaria* sp. has been reported previously from the birds of Iran, therefore other species are reported for the first time from Iran. Meanwhile the intensity range of all helminths was low and no pathogenicity could be considered from them, except for *S. picae*.

There are 20 valid species in the genus *Sphaerostris* (5). None of them have been previously reported in Iran. In this study *Sphaerostris picae* -the type species- was collected from all three species of corvidae.

In *S. pica* of Iran, a new structure inside the proboscis, i.e. receptacle process (RP) was described for the first time. This structure which is a prominent expansion of the dorsal inner receptacle wall of proboscis, is the most prominent feature characterizing *S. picae* from all other species of the genus, that represents a unique structure with unknown utility but with significant taxonomic importance (5).

The highest number of *S. picae* collected from *Pica pica* was 25 and because of the big size of female (5.12-18.87 mm) and male (5.12-13 mm), even 25 worms produced obstruction and blockage of the intestinal lumen.

Capillaria sp. was the only common species among 7 species of helminths reported previously from rooks of Golestan and Isfahan provinces (6) in our study.

Acuaria anthuris has been reported across Europe and Cuba in Corvidae birds (7). It has been reported in the corvid genera *Pica* and *Garrulus* (8), but it seems likely that *Corvus frugilegus* is a new host record for this nematode.

In a similar study, 8 species of helminths were collected from *Pica pica* of Montana, United states (9), among which 4 species including *Capillaria* sp., *Syngamus trachea*, *Acuaria* sp. and *Microtetrameres* sp. were

common with *Pica pica* of Iran. Similarly, in *Pica pica* of Poland, 3 out of 5 species of helminths, *Acuaria anthuris*, *Syngamus trachea* and *Capillaria*, with different prevalent rate (8) were reported in the present study too.

Acuaria anthuris, *Capillaria* and *S. trachea* seems to be the most prevalent helminths of *Pica pica* to be reported from Iran, Montana in United States and Poland, three different geographical zones. Meanwhile, *Pica pica* shares *S. trachea*, *Capillaria* and *Acuaria* with domestic birds of Iran (10, 11).

Among the recorded parasites, cestodes were found only in magpies. This finding cannot be explained fully, and maybe related to host specificity or availability of intermediate hosts to infected birds.

Seasonal fluctuations of cestodiasis in this bird species were higher in spring (40%) and summer (26.7%) than autumn (13.3%) and winter (20%). It can be explained that suitable arthropod intermediate hosts were more available in spring.

Prosthogonimus ovatus a digenean trematode of bursa of fabricius, oviduct and cloaca of domestic fowl (chicken, turkey, geese) and a wide variety of wild birds in Europe, Africa and Asia (12-14) is a pathogenic trematode and can have adverse effects on egg production in infected birds. Meanwhile this trematode was more prevalent in summer due to suitable climatic condition for the activity of dragonflies and snails intermediate hosts (14). Female birds were relatively more (15.8%) infected than male birds (7.3%).

This is also reported from the chicken of Mazandaran (13), so magpies can act as important carriers for infecting domestic fowls. On the other hand there is a case report of the infection of a child in Indonesia with *Prosthogonimus* sp. where the route of infection and zoonotic importance are uncertain (15).

Syngamus trachea the gapeworm can cause clinical signs of disease leading to death. It has been found in different birds (including fowl, pheasant, turkey, goose, guinea fowl, peafowl, emu, quail, starlings, grouse and various other wild birds) (7,16,17).

As *Capillaria* spp. has been found in several domestic (turkey, duck, goose, chicken) and wild birds in Iran (6,10,11,18-20), some phylogenetic studies are needed to find out if the nematode is host specific or can be interchanged among different birds.

None of the helminths reported in this study (except *Prosthogonimus*?) are transmissible to man, but it can be concluded that birds in the family corvidae are the hosts of several species of important helminths, that under some circumstances such as heavy infections, mixed infections, they may be a threat to the health of the infected birds and again they could act as carriers of several helminths to other wild and domestic birds.

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