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Histo-pathological effects of different arthropoda, oocyste and worms infestation on the wild pigeon

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ABSTRACT

*The aim of the study was to observe histo-pathological effects of different arthropoda, oocyste and worms infestation on the wild pigeon naturally infected. Gastro-intestinal tract associated organs were removed from the abdomen and tissue sample of 15 birds were collected and proceed in Haematoxylin and Eosin. Fresh fecal samples were examined by direct smear method whereas egg per gram (EPG) was counted by modified Mc Master Technique and centrifugal flotation method using Sheather's saturated sugar solution. Randomly different for histo-pathological study; these birds also were checked for ecto-parasites. Histopathologicl study shows that degenerative changes in the epithelial tissues of the esophageal and proventriculus gland as well as destructive changes in the epithelium of the esophagus, duodenum and cecum of the pigeons infected with different worms and protozoa. Massive congestion was seen in tissue of pancreas & trachea. In this research, Raillietina spp, Tetramers, Sygnamus, Capillaria, Ascaridia colombae and Oocyste protozoa, Phthiraptera, Ceratophyllus columbae contamination were studied and the frequency were found to be 29%, 5%, 8%, 15%, 4%, 8%, 2% and 5% respectively. Totally, 24% of the pigeons had multiples infection. In this study we collected ectoparasites were included of feather lice (*Phthiraptera*) and pigeon fleas* (Ceratophyllu scolumbae).

The result of this study indicated that the prevalence of ecto and endo parasites of wild pigeon are somewhat different than racing and domestic pigeon in the same area, it could be concluded that the nature and physiological responses of the wild pigeon are responding different to some of helminthes and protozoa than domestic birds in this region and this could be due to immune responses of the birds in the wild than domesticated pigeon.

Key words: Histo-pathology, Tissue, Wild pigeon, worms infestation

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INTRODUCTION

Pigeon serves as host of large number of endoparasites like cestodes, nematodes and unicellular protozoa [1, 2]. Also, helminthes infection exhibits severe effect on host tissue [3]. Poultry industry is the most effective and economical source of animal protein in shortest possible time. Poultry producers are looking for some substitute of chicken meat, which in the future will come in the form of pigeon and quail meat to contribute towards the increase in gross domestic production (GDP) through livestock sector [4,5].

Pigeon are probably one of the most common nuisance birds. Pigeons have adapted to life in the city, and they seem to be everywhere in urban environments. Unfortunately, the bird lovers of the world feed them, and they have developed a dependence upon people, thus reinforcing their dependency upon urban areas. They roost on signs, ledges, almost anywhere, and they bring nesting material and leave droppings everywhere. Pigeons can carry or transmit encephalitis, histoplasmosis, Newcastle disease, pigeon ornithosis, cryptococcosis, pigeon coccidiosis, toxoplasmosis, pseudo-tuberculosis, and salmonella food poisoning. Pigeons can also carry fleas, ticks, mites and other parasites [6, 7, 8].

It was shown that birds harbor ticks, fleas, mites and other ectoparasites. The parasite bites an infected animal and sucks in blood containing the germ. When the bug bites, it passes along the germ to the new victim. This occurs because parasites inject some of their saliva into the host when feeding. Over forty types of parasites live either on the birds or in the places they roost. They are responsible for the transmission of several hundred viral and bacterial agents. These diseases include plague, encephalitis, pox and meningitis. Control of these parasites is a crucial phase of the bird control project. Unless the parasites are exterminated when the birds are excluded from a site, the mites, fleas and ticks will seek to a new host, often the human inhabitants [9, 10, 11]. Therefore, a proper bird control project will always include parasite extermination. The most common worms found in pigeons are roundworms hair worms, stomach wall worms, gapeworms, strongly lids and tapeworms. The symptoms vary with the type of infestation, and conceivably pigeons can live with slight infestations and show no signs of illness. Severe infestations generally cause droopiness, loss of weight and diarrhea. Gapeworms can cause breathing problems. The best way to determine the existence of worm problem is to check the droppings [12, 13, 5, 14].

The most common external parasites that pester our birds are feather lice, red mites, pigeon flies, and mosquitoes. Feather lice chew up holes into the flights or cause other types of visible damage to the feathers. The common red mite can be considered as a real problem if it becomes established. It commonly hides somewhere in the loft during the day and comes out from its hiding place at night to bite and feed on the blood of the birds. They can help to spread an assortment of diseases. The pigeon fly is probably the most dangerous parasite that can attack the birds. It lives most of its life on the pigeons, leaving only to lay its eggs somewhere in the loft. Pigeon flies bite the birds, causing considerable discomfort and may be a major cause of pigeon malaria. Mosquitoes would have to be considered the next worst parasite, they are found in almost all climates [15]. They are the most common carrier pigeon pox virus. There is little report on wild pigeon and the aim of this study is to investigate the oocyst protozoa, helminthes, and other endo-ecto parasites contamination in the fecal samples and their pathological aspect on the wild pigeon tissue glands.

MATERIALS AND METHODS

This research was conducted to complete the previous research conducted by same researcher in the same area, from Jun to October 2012. The number of 125 faecal pigeon samples from mixed companion birds (net trapped) wild pigeon living freely in the old obstructed tunnel (Rano) and rocks of Zakros the most fames mountain in the road between ILam and Aivan city, in the southwest of Iran Ilam province in the lining border with Iraq country. Twenty five birds' specific pathogen free (SPF) from same race were managed in the hygienically environment and care was taken to avoid any contamination from outside as control and were kept in animal house, of private sector farm located in area named Sarab of Ivan, pigeon feed and water ad lab tom from same ration and ingredient.

The fresh faeces were collected (at least 4 grams). Data were collected according to the questionnaire prepared regarding the number of the birds, number of the deaths, number of the sick birds, and race of the birds. The samples were immediately tested in laboratory.

Diagnostic methods

Fecal samples were examined by direct smear method whereas egg per gram (EPG) was counted by modified McMaster technique and centrifugal flotation method using Sheather's saturated sugar solution [10]. The ectoparasites were collected as described by Soulsby [11]. Briefly after killing the pigeons by an aesthesia, they were immediately placed in a polythene bag and the parasites were collected. The ectoparasites were preserved for identification purposes in 70% alcohol. Subcutaneous nodules of each bird were fixed in 10% potassium, heated for 20 minutes in a jar containing water and the sediments were looked for parasite.

Portions of the esophagus, proventriculus, duodenum, jejunum, cecum and pancreas and trachea glands were fixed in 10% buffered formalin. Paraffin-embedded sections were cut at 6-µm thickness, stained with hematoxylin and eosin, and examined under light microscope. Sections were photographed directly using a stereo microscope in 400 high power fields with Microsoft system.

RESULTS

Histopathology findings

The report showed that the liver of infected birds had fatty degeneration and areas of coagulation necrosis of the hepatic cells most predominantly at the portal areas. There were mononuclear and polymorphonuclear cellular infiltrations in the necrotized areas. The liver had congested blood vessels and congested sinusoids. Histo-pathological changes including degenerative changes in the epithelial tissues of the esophageal (fig. 1a, 1b) and proventriculus gland (fig. 2a ,2b), as well as destructive changes in the epithelium of the esophagus (fig. 1b), duodenum and cecum (fig. 3a,3b) were seen in the pigeon infected with different worms and protozoa. The lungs of the infected pigeons had hemorrhagic areas, congested blood vessels and haemosiderosis. There was mononuclear and polymorphonuclear cellular infiltration at the peribronchiolar and interalveolar septae which extended and filled some alveoli. The infected pigeons had necrosis of the intestines that involved the villi, intestinal glands and the muscularis mucosa of the intestines. There were mononuclear and polymorphonuclear cells in the necrotized areas.
Pancreas tissue in the pigeon infected with different worms and protozoa shows massive congestion in the pancreas parenchyma (fig 4). The trachea in the pigeon infected with different ecto endo parasites shows local congestion in the tracheal tissue (fig 5).

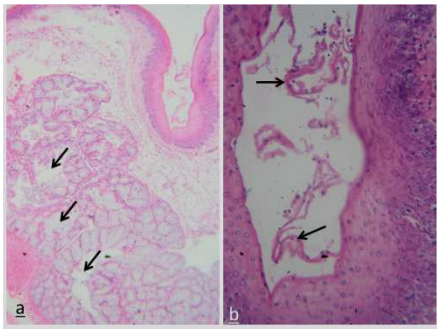

Fig. 1 a): Transverse sections of esophagus in the pigeon infected with different worms and protozoa. The section shows degenerative changes (arrows) in the epithelial tissues of the esophageal gland. b): High magnification of the epithelium of esophagus in the pigeon infected with different worms and protozoa. The section shows destructive changes (arrows) in the epithelium of the esophagus. a): ×200, b): ×400; H & E.

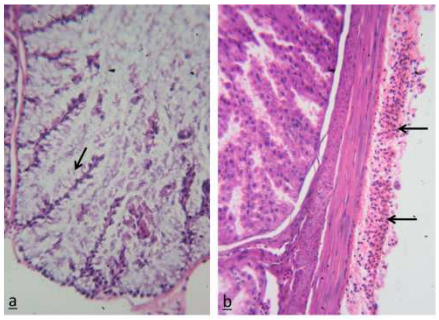

Fig. 2a): Transverse sections of the proventriculus´s gland in the pigeon infected with different worms and protozoa. The section shows massive degenerative changes (arrows) in the epithelial tissues of the glands of proventriculus. b): Transverse sections of the proventriculus in the pigeon infected with different worms and protozoa. The section shows massive congestion (arrows) in the adventitial layer of the proventriculus. a): , b): ×400; H & E.

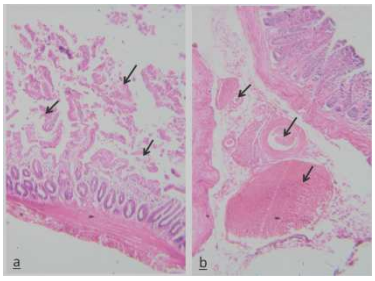

Fig. 3a): Transverse sections of the duodenum in the pigeon infected with different worms and protozoa. The section shows massive degenerative changes (arrows) in the epithelial papillae of the intestine. b): Transverse sections of the cecum in the pigeon infected with different worms and protozoa. The section shows massive congestion (arrows) in the sub-mucusal layer of the cecum. a): , b): ×200; H & E.

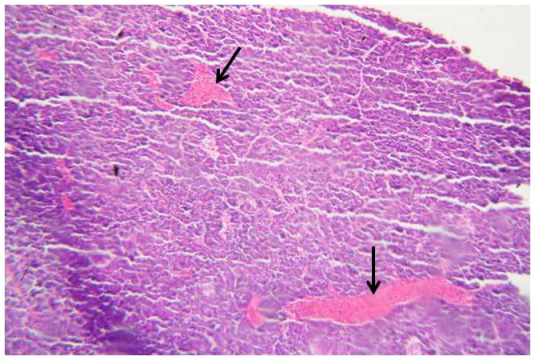

Fig.4) Transverse sections of the pancreas tissue in the pigeon infected with different worms and protozoa. The section shows massive congestion (arrows) in the pancreas parenchyma. ×200; H & E.

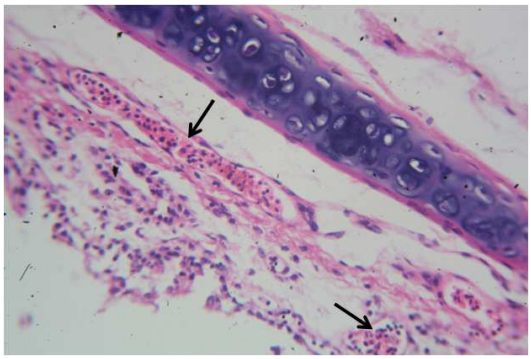

Fig. 5) Transverse sections of the trachea in the pigeon infected with different worms and protozoa. The section shows local congestion (arrows) in the tracheal tissue. ×200; H & E.

TABLE I: Types of parasite ovum in pigeon faeces

Parasite	Percent
Raillietinaspp	29%
Capillaria	15%
Tetramers	5%
Ascaridia colombae	4%
Sygnamus	8%
Oocyste	*8%*
Phthiraptera	2%
Ceratophylluscolumbae	5%
Multiple infection 24%	

Parasites report

Out of 125 feacal samples, all were positive with parasitic infection at least with one of the parasites and 24% were carrying multiple infection. Symptoms of worms consist of weight loss and in the case of sever multiple worm infestation diarrhea were seen in the pigeon. Infected young birds grow slower. The parasites have been identified in this study consisted of *Raillietina* spp, *Capillaria*, *Tetramers*, *Ascaris*, *Sygnamus*,oocyst protozoa, *Phthiraptera*, *Ceratophylluscolumbae*. The prevalence of parasitic infection in pigeon has been shown in table 1.

In this study, the birds above two years (30%) show more resistance against worms' infestation than young birds below two years (70%). The maximum and minimum environmental temperature of the area was set to 24 °C and 36°C and the maximum humidity was 2%.

In this study we collected ectoparasites included of feather lice (*Phthiraptera*) and pigeon fleas *(Ceratophyllu scolumbae).*

DISCUSSION

Bahrami et al., [8] and his colleagues have worked on intestinal parasitic species, composition, prevalence and intensity of infection in racing pigeon in the same area and the rate of Raillietina *achinobothridia*(10.4%), *Sygamus trachea* (8.4%), *Capillaria colombae* (6%), *Ascarididae* colombea (8.4%) and also they reported the rate of

protozoan infection in same group of the pigeon were *Haemoproteus colombae* (20.8%) *Trichomonas gallinae* (26.8%), *Cryptosporidium spp* (1.2%) *Eimeria spp* (21.6%).

The parasites have been identified in this research were *RaeaTenia, Capillaria, Tetramers, Ascaris, Sygnamus ,oocysts*. The obtained results show that introduction of parasitological prophylaxis programs is necessary, especially in the larger birds' farming and zoological shops. Total 5 species of nematodes and cestodes were collected from alimentary canals. *Ascaridia colombae* (16.66%), *Hadjelia truncata* (1.96%), *Cotugnia digonopora* (13.79%), *Raillietina magninumida* (18.62%), *Raillietina achinobothridia* (32.35%) from pigeon in South Khorasan of Iran by Radfar, et al [16].

Dandapat [17] and his coworker reported that pigeons mostly suffered from *Capillarea spp*. and *Ascaridia columbae., coccidian oocysts* and they added that 22.40% pigeon population was found to be carrying coccidian oocysts in their feces.

In this study we collected ectoparasites included of feather lice (*Phthiraptera*) and pigeon fleas *(Ceratophyllu scolumbae).* Bahrami et al., [8] reported ectoparasites including *Lipeurus spp* (3.2%) *Menopen gallinea* (15.2%) *Ceratophyllus colombae* (10.4%) *Louse fly* (12%) from same area in racing pigeon. In other study carried out from same area by [15] and his coworker they conform prevalence of *Raillietina spp, Tetramers, Sygamus, Capillaria, Ascarididae colombea* and oocyst protozoa, *Phthiraptera Ceratophyllus columbae* parasites ovum in pigeon. Radfar, et al [16] reported 4 species of ectoparasites included Pseudolynchia canariensis, *Columbicola columbae, Menopen galline* and *Laminosioptes cysticola* from South Khorasan of Iran.

The present findings are more or less similar pattern was previously observed line with observations by Msoffe et al., [18]. According to the various studies performed in different regions of the world, *Ascaridia columbae, Capillaria, Dispharnyx, Hadjelia truncata, Syngamus* and *Tetrameres* sp. were commonly identified parasites in pigeons [19, 20, 21].

In a study carried out by Balakrishnan and Sorenson [9], brood parasitic birds offer a unique opportunity to examine the ecological and evolutionary determinants of host associations in avian feather lice (*Phthiraptera*). Brood parasitic behavior effectively eliminates vertical transfer of lice between parasitic parents and offspring at the nest, while at the same time providing an opportunity for lice associated with the hosts of brood parasites to colonize the brood parasites as well [9]. Thus, the biology of brood parasitism allows a test of the relative roles of host specialization and dispersal ecology in determining the host-parasite associations of birds and lice. If the opportunity for dispersal is the primary determinant of louse distributions, then brood parasites and their hosts should have similar louse faunas. In contrast, if host-specific adaptations limit colonization ability, lice associated with the hosts of brood parasites may be unable to persist on the brood parasites despite having an opportunity for colonization. Balakrishnan reported lice on four brood parasitic finch species (genus *Vidua*). The molecular phylogeny showed that lice infesting the two avian groups belong to two distinct clades within Brueelia. Likewise, distinct louse lineages within the amblyceran genus Myrsidea were found on estrildid finches and the parasitic pin-tailed whydah (*Viduamacroura*), respectively. Although common on estrildid finches, Myrsidea lice were entirely absent from the brood parasitic indigo birds. The distribution and relationships of louse species on brood parasitic finches and their hosts suggest that host-specific adaptations constrain the ability of lice to colonize new hosts, at least those that are distantly related.

The histo-pathological effects particularly hemorrhagic lesions observed in the esophagus, proventriculus´s gland, pancreas tissue, trachea and intestines, may be linked to the migration of the larvae during the tissue phase of the life cycle. It has been reported by Ikeme [22] that adult worms when present in large numbers, migrated up and down the intestinal lumen. The adults also aggregate in the lower half of the intestine where they cause intestinal obstruction and death of the affected pigeons. In severe infections, intestinal blockage occurred and chickens infected with a large number of *Ascarids*, suffered from loss of blood, reduced blood sugar content, increased urates, shrunken thymus glands, retarded growth, and greatly increased mortality.

[11, 22], reported that in many cases, the intestinal mucosa also reveals inflammatory lesions and focal hemorrhages caused by the burrowing of parasites. This confirms the results of the present study.

It is likely from the present study that helminthes and protozoa infection could have some histo-pathological effects on the pancreas tissue and proventriculus´s gland, though no such reports exist to the best of our knowledge. These being vital organs of the body, such effects on them, could lead to high morbidity or mortality, or could lead to secondary infections or even complicate the courses of other infections or diseases in domestic pigeons. It is hereby

recommended that further research be conducted to ascertain any histo-pathological effects of helminthes and protozoa infection on the different glands, in support of the present study.

CONCLUSION

The result of this study indicated that the prevalence of ecto and endo parasites of wild pigeon are somewhat different than racing and domestic pigeon in the same area, it could be concluded that the nature and physiological responses of the wild pigeon are responding different to some of helminthes and protozoa than domestic birds in this region and this could be due to immune responses of the birds in the wild than domesticated pigeon. It is likely to conclude that helminthes and protozoa infection could have some histopathological effects on the pancreas tissue and proventriculus´s gland, though few such reports exist to the best of our knowledge.

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REFERENCES

[1] Senlik et al, *Turkey. Acta Vet Hung*, **2005**; 53(4): 449-56.
[2] Mushi et al, *Onderstepoort. J Vet Res*, **2000**; 67(1): 75-76.
[3] Hoste, H, *Int J Parasitol*, **2001**; 31(3): 231-44.
[4] Basit et al, *J. Anim. PI. Sci*, **2006**; 16(1-2).
[5] Urquhart, GM., **1996**; 1st. Ed., ELBS, Longman House, Burnt Mill, Harlow, England. 256 - 257.
[6] Balicka-Ramisz et al, *Intestinal parasites of parrots*, **2007**; 53(2): 129-32.
[7] Rehman, R., **1993**; M.Sc. (Hons) Thesis, Univ. of Agric. (CVS), Faisalabad-Pakistan.
[8] Bahrami et al, *Advance in environmental biology* **2012**; 6(2):726-732
[9] Balakrishnan and Sorenson, *Molecular Ecology*, **2007;** 16(1): 217- 229.
[10] Soulsby, EJL., Helminths, Arthropods and Protozoa of domesticated animals. **1982a;** 7th edition Baillieretindall , London . 630- 637, 654.
[11] Soulsby, EJL., **1982b** . Helminths, Arthropods, and Protozoa of Domesticated Animals. 7th Edition. London. 763-777.
[12] Begum, and Sheikh, *Bangladesh Vet J*, **1987***; 21(3-4):89-93.*
[13] Kulisic, Z., *Acta Vet. Belgrade*, **1988**; 38 (1): 37-42.
[14] David, CT., **2003** Pigeon Health and Disease, Lawa stateuniversity press, Ames. Iowa, USA. Haag
[15] Bahrami et al, *International journal of Molecular Microbiology* , **2011;** 1:103-106.
[16] Radfar,et al, *Veterinary Research*, **2011;** 4(1):18-23
[17] Dandapat et al, *J Parasit Dis*, **2012;** 36(1):99–100
[18] Msoffe et al, *Tanzania. Afr. J. Agric. Res*., **2010;** 5: 264-267.
[19] Gicik and Arslan, *Turk. J. Vet Anim. Sci*., **2001**; 25: 169-172
[20] Razmi et al, *Iran. J. Vet. Res. Univ. Shiraz*, **2007;** 8: 175-177.
[21] Sari et al, *Bull. Vet. Inst. Pulawy*, **2008;** 52: 551-554.
[22] Ikeme, MM., *Parasitology*, **1971a;** 63:169-179.
[22] Adang et al, *The Pacific Journal of Science and Technology*, **2010;** 11(2) 511- 515.