PREVALENCE OF CAPILLARIA NEMATODES OF PIGEONS (COLUMBA LIVIA DOMESTICA) IN DISTRICT NAROWAL, PUNJAB, PAKISTAN

1Malik, S., ¹M.E. Baber, ²A. Ahmad, ³H. Abbas, ⁴S. Zahoor, ⁵H.M. Rizwan, ⁶A. Asif and ⁷N. Nazir

¹Virtual University of Lahore, Pakistan; ²Department of Pathobiology, KBCMA, College of Veterinary & Animal Sciences, 51600-Narowal; ³Department of Microbiology, University of Veterinary and Animal Sciences, Lahore; ⁴Department of Zoology, Lahore College for Women University Lahore, Pakistan

Corresponding author’s email: haider.abbas@uvas.edu.pk

ABSTRACT: Pigeons are omnipresent birds which belong to the order, Columbiformes and cover a large part of every town and city, worldwide. Among the parasites of pigeons, Capillaria is found to be more prevalent in them after Eimeria. These worms penetrate deeply in the intestinal mucosa leading to haemorrhages and epithelial necrosis thereby presenting clinical disease and death occurs if left untreated. The major purpose of this study was to determine the burden of Capillaria spp. in domestic pigeons (Columba livia domestica) of district Narowal. Total 210 fecal samples from pigeon flocks were processed qualitatively through direct microscopy and floatation method while quantitatively through McMaster technique. The parasitic eggs were diagnosed using standard keys. In this study, 154 (73.33%) out of the 210 samples were found infected with Capillaria spp. The quantitative examination presented the lowest eggs per gram (EPG) of 300 in the Narowal tehsil and highest EPG of 800 in Shakargarh tehsil among the study areas. This study will be helpful in raising awareness to pigeon owners to improve pigeons health status through better control of capillariosis.

Keywords: Domestic Pigeons, Capillaria spp., Prevalence, Floatation method, EPG.

(Received 20.06.2019 Accepted 11.03.2020)

INTRODUCTION

Domestic pigeons (Columba livia domestica) belong to pigeon subspecies called rock dove (Blechman, 2007). In rural areas, they are a symbol of tradition and culture. There are three categories of pigeons: poultry pigeons, carrier pigeons and feral and fancy pigeons (Tanveer et al., 2011). Many pigeon breeds have been developed which have importance for human beings. These pigeon breeds are useful for meat production e.g. ‘King pigeon’ for commercial meat production. Domestic pigeons are also being used for research purposes like in lab experiments, biomedicine and cognitive science. Research on pigeons is extensive, enclose and category based (Levi, 1977). These pigeons are being raised for meat purpose, as a source of income and entertainment and religious purposes (Adang et al., 2008, 2010, 2012; Alam et al., 2014). The pigeons are raised in semi-intensive environment or kept in free range giving them opportunity to scavenge and forage on ants, earthworms, termites and other invertebrates prevailing around homesteads. Therefore, these pigeons are predisposed to infective stages of variety of parasites and intrinsic zoonoses (Karatepe et al., 2011, Bahrami et al., 2012). The most dominant factor for reduced productivity and overall health of the pigeons is the pathological lesions caused due to helminthic parasites (Dranza et al., 1999).

Despite ectoparasitic infestations, endoparasites also infect domestic pigeons (Sivajothi and Reddy, 2015). These endoparasites infect the intestine of their hosts reducing the intestinal capacity for absorption of nutrients and vitamins resulting in a condition called endoparasitism thereby reducing the growth and productivity of these pigeons (Duneau and Ebert, 2012). Many GI and hematopoietic infections are as a source of disease transmission to humans and other birds. The dust particles present on feces in cage contaminated by dropping can contribute to disease spread (Marques et al., 2007a). Nematodes present in pigeons are Ascaridia columbae, Dispharynx spp. and Capillaria spp. (Doev et al., 2004; Ejere et al., 2014; Alkarhigy et al., 2018). The Capillaria spp. dominate in pigeons causing chronic gastro-enteritis and anorexia which lead to severe emaciation and mortality (El-Dakhlya et al., 2016). Three species of Capillaria including columbae, obsignata and longicollis affect pigeons. These Capillaria spp. are fine hair like worms present in the digestive tract of pigeons and give rise to lemon like ova having thicker brownish egg shell and bipolar plugs (Rabia et al., 2017).

Many people domesticate pigeons in district Narowal. A good knowledge about the parasitic diseases of the pigeons may help in uplifting of their survival. Only one study about the capillarisis was reported in the Lahore region of Pakistan (Qamar et al., 2017). Therefore, there was need of study on prevalence of capillarisis in district Narowal. The main objective of this study was to investigate the presence of Capillaria spp. in domestic pigeons of district Narowal.
MATERIALS AND METHODS

In this study, total 210 fresh droppings of domestic pigeons from three tehsils of district Narowal including Narowal, Zafarwal and Shakargarh (n=70 from each tehsil) were collected in sterile plastic containers (Figure 1). The sampling was done from May to September, 2018. The samples were processed qualitatively through direct microscopy and floatation method while quantitatively through McMaster technique to assess EPG at the Parasitology Lab, University of Veterinary and Animal Sciences Lahore sub campus Narowal. The parasitic eggs were diagnosed using standard keys developed by Soulsby (1982). The direct microscopy was performed by placing a drop of distilled water on a glass slide and mixed with a small amount of dropping. Then a cover slip was placed on the glass slide and examined on a microscope at 10X and 40X objective lenses (Gupta and Singla, 2012).

For floatation method, about 2 grams of feces were mixed with 15 mL of water and the mixture was strained. This filtered solution was poured into a 15 mL plastic centrifuge tube within ½ inches from the top and centrifuged for 5 minutes at 1800 rpm. After centrifugation, the supernatant was discarded without disturbing the pellet and small amount of sugar solution was added to the tube and mixed properly with pellet. After that tube was filled with sugar solution and centrifuged for 10 minutes at 800 rpm. After the centrifugation has been completed, extra sugar solution was added to create the reverse meniscus and cover slip was placed over it. After 15 minutes, coverslip was removed and placed on microscope glass slide for examination at 10X and 40X objective lenses (Paul et al., 2015).

McMaster egg counting technique was used for the purpose of estimating the number of eggs of parasites present in the droppings. For this technique, 2g of droppings were mixed in 60 ml of saturated salt solution and was strained through strainer. Solution was continuously stirred in the beaker to resuspend and immediately pipetted up the solution and filled in one chamber of 3-chambered McMaster egg counting slide. After at least 5 minutes, chamber was observed under 10X lens for EPG of helminth eggs (Paul et al., 2015).

Statistical Analysis: The prevalence of Capillaria spp. was statistically analyzed using t-test in the three study regions by SAS software package (Schork and Remington 2010). Variables were considered statistically significant at P < 0.05.

RESULTS AND DISCUSSION

The Capillaria spp. was identified in the fecal samples with lemon like bipolar eggs having thicker shell and 50µm x 26µm size. In this study, 154 (73.33%) out of the 210 fecal samples from domestic pigeon flocks were found infected with Capillaria spp. The prevalence of the parasite in the pigeon population of the selected localities of each study region is given in the Table 1. The overall prevalence of Capillaria spp. is found to be 73.33% with highest prevalence in the Shakargarh tehsil (26.19%) and lowest (22.38%) in the Narowal tehsil.

The quantitative examination depicted that lowest EPG of 300 was found in the Narowal region while highest EPG of 800 was found to be in Shakargarh region indicating the more parasitic load in the pigeon population (Table 1).

There was insignificant (P>0.05) difference between prevalence of the Capillaria spp. among the pigeon population of the three study regions and overall prevalence was not statistically associated (P>0.05).

The current research introduces first time the study of intestinal parasites infecting domestic pigeons in district Narowal, Punjab, Pakistan. This research work identified the presence of Capillaria spp. in the study regions and the same parasitic species were observed from pigeons and poultry throughout the world (Mushi et al., 2000; Marques et al., 2007; Adang et al., 2008; Borji et al., 2012; Eljadar et al., 2012 and Hussein et al., 2014; Sood et al., 2018).

The current study dealt with the presence of Capillaria spp. in domestic pigeons which are intestinal worms. These parasites are thread worms and give rise to lemon shaped bipolar eggs. Our results are in agreement with other previously related studies (Fowler, 1996; Muhairwa et al., 2007; Muthusami et al., 2017; Qamar et al., 2017). These gastrointestinal parasites were also detected in domestic chickens.

The similar Capillaria spp. infection has been reported in the pigeons in another study where overall prevalence rate was 57% with 60% in wild pigeons and 55% prevalence in the domestic pigeons (Basit et al., 2006). About 10.1% Capillaria spp. in the domestic pigeons was reported by Khezerpour and Naem (2013) while Patel (2000) reported 53.57% prevalence of Capillaria spp. and Borghare et al. (2009) documented about 56.66% prevalence of Capillaria spp. in pigeons. In a study conducted in Egypt, Capillaria spp. prevalence was reported about 6% (Bahrami et al., 2011). However, one study presented 67.2 % prevalence of Capillaria spp. (Tanveer et al., 2011) and in another study, it was found about 32.56% Capillaria spp. (Marques et al., 2007b). In a study conducted in 2007, of total 103 pigeons of 32 different breeds, Capillaria spp. was found in 36.4% of fancy pigeons and only 3.6% in the carrier breeds (Dehlwi, 2007). In Libya, 4% prevalence of Capillaria spp. in the domestic pigeons was reported (Alkhargy et al., 2018) while 19.9% prevalence was reported in domestic pigeons in Turkey (Sari et al., 2008). The Capillaria spp. among the endoparasites were also
observed in pigeons during race season (Zigo et al., 2019).

The variation in the prevalence observed might be due to differences in the health status of birds studied, climatic and geological conditions in the study areas. These variations reveal that the endoparasitic burden of *Capillaria* spp. in the study regions is higher and should not be ignored. The reason for higher prevalence might be due to the presence of high level of humidity and moderate temperature in the study regions as these are the major factors for the survivability of the parasites.

### Table 1: Location wise prevalence and EPG of *Capillaria* spp. in domestic pigeons.

<table>
<thead>
<tr>
<th>Study Regions</th>
<th>Localities</th>
<th>No. of samples</th>
<th>Sample positive for <em>Capillaria</em> spp.</th>
<th>Prevalence (%)</th>
<th>EPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narowal</td>
<td>Siddique Pura</td>
<td>14</td>
<td>7</td>
<td>10</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Chandowal</td>
<td>14</td>
<td>10</td>
<td>14.28</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Kashmiri Mohalla</td>
<td>14</td>
<td>10</td>
<td>14.28</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Abbas Nagar</td>
<td>14</td>
<td>8</td>
<td>11.42</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Gung Hussainabad</td>
<td>14</td>
<td>12</td>
<td>17.14</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70</td>
<td>47</td>
<td>67.14</td>
<td>---</td>
</tr>
<tr>
<td>Zafarwal</td>
<td>Hussain Town</td>
<td>14</td>
<td>9</td>
<td>12.85</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Jammu gate</td>
<td>14</td>
<td>10</td>
<td>14.28</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Mohalla Bagechi</td>
<td>14</td>
<td>10</td>
<td>14.28</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>Doban Pura</td>
<td>14</td>
<td>11</td>
<td>15.71</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Ahmed Colony</td>
<td>14</td>
<td>12</td>
<td>17.14</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70</td>
<td>52</td>
<td>74.28</td>
<td>---</td>
</tr>
<tr>
<td>Shakargarh</td>
<td>Gamtala Chowk</td>
<td>14</td>
<td>9</td>
<td>12.85</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>Chamal</td>
<td>14</td>
<td>11</td>
<td>15.71</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>Darman</td>
<td>14</td>
<td>12</td>
<td>17.14</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Sargala Colony</td>
<td>14</td>
<td>11</td>
<td>15.71</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>Kot Nainan</td>
<td>14</td>
<td>12</td>
<td>17.14</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70</td>
<td>55</td>
<td>78.57</td>
<td>---</td>
</tr>
</tbody>
</table>

**Conclusion:** It is concluded that present study provides the data of capillariasis in district Narowal which will be helpful in raising awareness to pigeon owners for better control and treatment strategies of capillariasis.

**REFERENCES**


from Kano State, Nigeria. Research J. Parasitol. 12: 45-49.


