# Prevalence and Morphological characterization of intestinal Cestode parasites in Local Chickens (*Gallus gallus domesticus*) and Pigeons (*Columba livia domesticus*) from Misurata, Libya.

*Prevalencia y caracterización morfológica de parásitos cestodos intestinales en pollos locales (Gallus gallus domesticus) y palomas (Columba livia domesticus) de Misurata, Libia.*

**Layla Omran Elmajdoub[1], Mabrooka Mousa[1], Mosaab A. Omar[2,3], Shimaa Sobhy Sorour[4]**

[1]Misurata University, College of Science, Zoology Department, Misurata, Libya
[2]Qassim University, College of Agriculture and Veterinary Medicine, Department of Veterinary Medicine, 51452 Qassim, Saudi Arabia
[3]South Valley University, Faculty of Veterinary Medicine, Department of Parasitology, Qena, 83523 Egypt.
[4]Kafrelsheikh University, Faculty of Veterinary Medicine, Department of Parasitology, 33516, Egypt.

**ABSTRACT.** The parasitic helminths in domestic pigeons and local chickens are global diseases; the aim of this study were at the prevalence rate and described the morphological features of the cestode helminths from infected pigeons and local chickens collected from local markets in Misurata, Libya. A total of 51 domestic pigeons and 100 local chickens were examined for cestode helminths from April to July 2018. The overall prevalence of cestode infection was 62.7 % in domestic pigeons and 11% in local chickens with significant differences. Three genera of cestodes were identified in pigeons and chickens: *Railleitina tetragona*, *Railleitina echinobothrida* in both pigeons and chickens and *Hymenolopis* spp. reported in pigeons, *Cotugnia digonopora* only in chickens. Intestinal parasitic infections are common in pigeons and chickens in Misurata regions. Future studies are needed to determine to which extent the infections affect the mortality and performance of the birds.

**Keywords:** cestode parasites, *Gallus gallus domesticus*, *Columba livia domesticus*, *Railleitina tetragona*, *Hymenolopis spp*. *Cotugnia digonopora* .

**RESUMEN.** Los helmintos parásitos en palomas domésticas y pollos locales son enfermedades globales; El objetivo de este estudio fue la tasa de prevalencia y describió las características morfológicas de los helmintos cestodos de palomas infectadas y pollos locales recolectados de los mercados locales en Misurata, Libia. Se examinaron un total de 51 palomas domésticas y 100 pollos locales para detectar helmintos cestodos entre abril y julio de 2018. La prevalencia general de infección por cestodos fue del 62,7 % en palomas domésticas y del 11 % en pollos locales con diferencias significativas. Se identificaron tres géneros de cestodos en palomas y pollos: *Railleitina tetragona, Railleitina echinobothrida* tanto en palomas como en pollos e *Hymenolopis spp*. reportado en palomas, *Cotugnia digonopora* solo en pollos. Las infecciones parasitarias intestinales son comunes en palomas y pollos en las regiones de Misurata. Se necesitan estudios futuros para determinar en qué medida las infecciones afectan la mortalidad y el rendimiento de las aves.

**Palabras clave:** parásitos cestodos, *Gallus gallus domesticus, Columba livia domesticus, Railleitina tetragona, Hymenolopis* spp*. Cotugnia digonopora*.

**Dirección para correspondencia:** Layla Omran Elmajdoub - Misurata University, College of Science, Zoology Department, Misurata, Libya
**E-mail:** elmajdoublayla@sci.misuratau.edu.ly
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## INTRODUCTION

Cestode parasites are one of the essential infections of birds such as chickens or pigeons. Generally, domestic chickens and pigeons live close and related to human life in different parts of the world [1]. Bird cestodiasis not only cause weight loss but also other problems for birds such as bold loss and reduced production [2].

Usually, these parasites have been more frequent in warm and hot seasons compared with other seasons; also, the birds become infected when contact with intermediate hosts such as beetles and flies [3].

In Libya, domestic chicken (*Gallus gallus domesticus*) and pigeons (*Columba livia domesticus*) are used as a protein source, such as meat and eggs, but data about the prevalence rates of internal and external parasites is scarce [4,5]. The aim of the present work, therefore, is the study of the prevalence rate and the morphological characterizations of the cestode parasites that were isolated from domestic chickens and pigeons from Misurata, Libya.

## MATERIALS AND METHODS

### Sample collection

A total of 100 local chickens and 51 pigeons of different ages, both sexes, were taken randomly from open local markets, from Misurata, Libya, during the period April to July 2018. The digestive system of freshly slaughtered chickens and pigeons was collected in plastic bags and brought to the Research Unit in the Zoology Department at Science College, Misurata University. The examination was done within 12 hours after the slaughter of the host.

### Sample examination:

The intestines were separated into different parts, including the small intestine, large intestine, and caecum; after that, each part was cut, opened by longitudinal incision, and scrapping. Macroscopically visible parasites were collected by forceps, washed with the 0.9% normal saline and kept in a sterile container with 70% Ethanol for further identification. The mucosa of the intestine was washed with a physiological solution, and contents were collected into a Petri dish for examination under the stereomicroscope (40X)[6]. Moreover, after collection, the cestode worms were carried through fixation and staining processes for identification based on the morphological characteristics as described by Soulsby, Yamaguti [7,8].

## RESULTS

The prevalence rate of cestode infection in Pigeons (*Columba livia domesticus*) was higher than in Chicken (*Gallus gallus domesticus*) (62.7% and 11%), respectively. Moreover, based on the statistical results found significant differences between cestode prevalence rates between pigeons and chickens ($P \leq 0.05$) illustrated in Table 1. Four species of cestodes were recorded and identified as *Railleitina tetragona, Railleitina echinobothrida* in both local chicken and pigeons, whereas *Hymenolopis* spp. only infected pigeons and *Cotugnia digonopora* infected local chicken. Table 2 illustrated the prevalence rates of these species; those the *Railleitina echinobothrida* from chicken was the highest infection rate (54.5%), but according to the statistical readings, no significant differences between all cestode species in local chicken and pigeons, (P>0.05).

**Table 1.** Prevalence rates of cestode infection in Pigeon *(Columba livia domesticus)*

| | Pigeons (*Columba livia domesticus*) | | Chickens (*Gallus domesticus* ) | |
|---|---|---|---|---|
| | Examined No. | Infected No. | Examined No. | Infected No. |
| | 51 | 32 (62.7%) | 100 | 11 (11%) |
| Mean± S.E | | 5.3±0.42 | | 1.83±1.04 |
| Significance | | ← | * | → |

*Significant difference P ≤ 0.05.

**Table 2:** Prevalence rates of cestode species in Pigeon (*Columba livia domesticus*) and local Chicken (*Gallus domesticus*)

| | Pigeons (***Columba livia domesticus***) | | | Chickens (***Gallus domesticus***) | | |
|---|---|---|---|---|---|---|
| | Railleitina echinobothrida | *Railleitina tetragona* | *Hymenolopis* spp | *Railleitina echinobothrida* | *Railleitina tetragona* | *Cotugnia digonopora* |
| Prevalence rate | 10 (31.3%) | 12 (37.5%) | 10 (31.3%) | 6 (54.5%) | 1 (9.1%) | 4 (36.4%) |

In terms of the characterization of recorded cestodes: the *Railleitina echinobothrida* measured between 20-25 cm, with spherical scolex in shape, the rostellum was armed with tiny hooks arranged in two rows and lengths range (36 - 56µm), the suckers were rounded in shape and armed with many rows of hooks and lengths range (28 - 40µm). The neck was short and followed by longer segments, the range of lengths (127 -136µm) and the range of widths (16 - 28µm) (Fig 1 A, B).

The adult worm of *Hymenolopis* spp. was slender, measuring about 8 cm. In contrast, the *Cotugnia digonopora* was estimated at 25 cm with a cup-shaped scolex, and the rostellum armed with tiny hooks arranged in a single row, the rostellum lengths ranged between 9µm to 23 µm. The mature segments were squared and lengths range (from 94 - 112 µm) and widths ranged (from 21 -25 µm), as illustrated in Fig 2 (A, B).

## Discussion

The current study aimed at the prevalence and identification of cestode helminths infecting pigeons and local chickens in poultry farms. A high prevalence rate of pigeons may be infected with tapeworms if they are reared in populations, these parasites are found in pigeons (62.7%) more than in local chickens (11%). The prevalence rate in pigeons was higher than that recorded by Elmajdoub and Mshiheet [5] in Misurata (31%), [9] in Tripoli, Libya, and that mentioned by Amin and Kakabwa [10] in Iran. Moreover, the prevalence rate of local chicken was higher (11%) than that reported by Isalam [11] in Bangladesh and Egypt by Shahin [1], in contrast, was similar to the prevalence rate in Egypt by Ahmed [12] and Al–Zubaidei [13] in Iraq. In contrast, it was lower than that mentioned by Yagoob, et al. [14] in Iran and Shiekh et al. [15] in India. There was a significant difference in the prevalence rates of cestodes

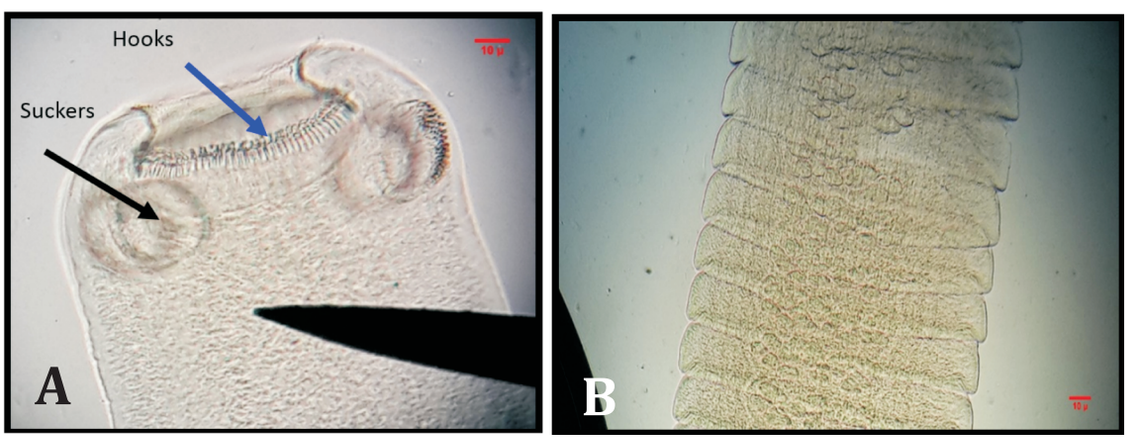



**Fig 1-A.** General View of the scolex of *Railleitina echinobothrida* adult worm. **1 B.** Mature segments of *Railleitina echinobothrida* adult worm.

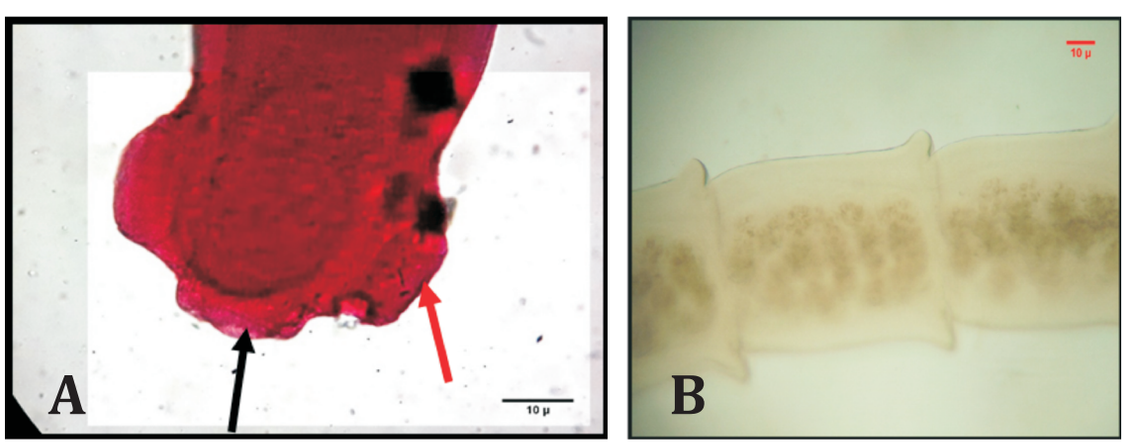



**Fig 2 A.** A general view of the scolex of *Cotugnia digonopora* adult worm showed rostellum with hooks (black arrow), and spherical suckers (red arrow). **2 B.** Mature segments of *Cotugnia digonopora* adult worm.

between the infected pigeons and local chickens. The environment plays a vital role in the occurrence of infective stages with parasites. Besides this, the availability of intermediate hosts is the key factor for the high prevalence of parasitic diseases [16, 17] in pet birds. The pigeons and chickens get infection directly by ingesting contaminated feed, water, or litter or by eating snails, or other insects that can carry an infective stage [6].

The general morphological characterizations of *Railleitina echinobothrida* and *Railleitina tetragona* in the current study correspond with previous descriptions [1, 6, 12, 18]. On the other hand, based on the prevalence rates of cestode species, in this study, the prevalence rate of *Railleitina echinobothrida* was recorded (54.5% and 31.3%) in local chicken and pigeon respectively. This obtained finding in local chickens was disagreed with Shahin et al [1] in Egypt (91.9%), and higher than that recorded by Al-Alousi, [19] in Iraq. Moreover, this result in infected pigeons was higher than mentioned by Al-Marsomy and Al-Hamadaani [20] in Iraq.

Regarding, the *Railleitina tetragona* prevalence rate was higher in the pigeon (37.5%) than that in local chicken (9.1%), this result from the local chicken was similar to the prevalence rate in Egypt by Ahmed and Nabila [12] and Abbas, [21] in Sudan. In contrast, it was lower than those mentioned by various reports [1, 12, 19, 22], in different regions. The findings in pigeons were higher than that mentioned by Alkharigy et al [9] in Tripoli, Libya and M Das et al. [23] in India.

Regarding, these results the *Railleitina echinobothrida* was the most prevalent cestode in pigeons and local chickens, and similar to that mentioned by Ahmed and Nabila [12] in Egypt and Suhaila et al [24] in Malaysia.

The most prevalent cestode helminths in pigeons are the *Railleitina tetragona*, followed by *Railleitina echinobothrida* and *Hymenolopis* spp. whereas, in local chickens, the most prevent by Railleitina echinobothrida, followed by *Cotugnia digonopora* and *Railleitina tetragona*. Shahin et al [1], agreed with the findings mentioned by Amin and Kakabwa [10], and Katoch et al [25] in Brazil. The prevalence rate of *Cotugnia diagnopora* in local chickens is about 36.4% and higher than that by Jaiswal et al [26]. The cestode infections were caused to retarding the growth, enteritis and diarrhoea in pigeons and local chickens [27]. On the other hand, the gastrointestinal cestode confronted in pigeons is a common parasite of domestic chickens that was observed in other studies. On the other hand, the study in Brazil reported by Silva et al [28] found that the most prevalent cestode infection in local chickens was *Hymenolepis* spp. Generally, the parasitic helminths can significantly affect the performance of pigeons and chickens, leads to due cause secondary viral or bacterial infections and act as carriers of other pathogens, [29]. On the other hand, the pollution of the environment and unrestricted foraging behaviour has become an important factor for helminth parasites in the gastrointestinal tract of avian fauna in the study area.

Furthermore, in this study, the absence of trematode infection from pigeons and local chickens corresponds with the finding of Abdul Wahab et al [30] and Suhaila et al [24] in Malaysia. The absence of trematodes in this current study might be due to a lack of intermediate hosts for trematodes in this area.

## Conclusion

Gastrointestinal cestode parasites were studied in domestic pigeons and local chickens, Only 3 genus of cestodes were identified, illustrated as *Railleitina tetragona*, Railleitina echinobothrida in both local chickens and pigeons, whereas *Hymenolepis* spp. only in infected pigeons and *Cotugnia digonopora* in local chickens. This may however increase due to the seasonal or climatic abundance of specific invertebrate hosts. More research is needed to identify all parasites in the study area and to understand the causes of infection, disease and death. It is also required to test integrated control strategies and improve domestic birds' productivity in these areas.

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