

## A note on phthirapteran ectoparasites infesting Yellow-legged Green Pigeon *Treron phoenicoptera* (Columbiformes: Columbidae)

Aftab AHMAD<sup>1</sup>, Gaurav ARYA<sup>1</sup>, Nayanci BANSAL<sup>1</sup>, Oldrich SYCHRA<sup>2</sup>, Arun Kumar SAXENA<sup>1,\*</sup>

<sup>1</sup>Department of Zoology, Government Raza Postgraduate College, Rampur, Uttar Pradesh 244 901 – INDIA

<sup>2</sup>Department of Biology and Wildlife Disease, Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, CZ-61242 Brno – CZECH REPUBLIC

Received: 15.04.2011 • Accepted: 17.01.2012

**Abstract:** The present report records the simultaneous occurrence of ischnoceran lice *Columbicola phoenicopterae* and *Coloceras setosum* on the Yellow-legged Green Pigeon in India. The prevalence, intensity of infestation, range of infestation, and nature of the antennal sensilla of these 2 species on 12 of these pigeons have also been recorded.

**Key words:** Phthiraptera, Mallophaga, Ischnocera, Yellow-legged Green Pigeon lice, *Coloceras*, *Columbicola*

### Introduction

A few papers relating to the population characteristics of phthirapteran ectoparasites of certain common Indian birds have appeared during last 2 decades. These papers concerned the bird species *Acridotheres tristis* (1); *Gallus gallus domesticus* (2,3); *Columba livia* (4,5); *Amandava amandava* (6); *Psittacula krameri*, *Passer domesticus*, *Acridotheres tristis*, and *Halcyon smyrnensis* (7); *Corvus splendens* (8); *Acridotheres ginginianus* (9); and *Pycnonotus jocosus* (10). Marshall (11) reviewed the work done on the population ecology of the parasitic insects. The patterns of abundance of Phthiraptera on the host bird were discussed by Rekasi et al. (12), Rozsa (13), and Reiczigel et al. (14). A survey of the literature showed that there is no information on the population characteristics of Phthiraptera occurring on the Yellow-legged Green Pigeon, *Treron phoenicoptera* Latham. The present report furnishes information on

the prevalence, intensity of infestation, population structure, and nature of the antennal sensilla of 2 ischnoceran Phthiraptera infesting this bird.

### Material and methods

Twelve Yellow-legged Green Pigeons were trapped alive from 2008 to 2010 in the district of Rampur and subjected to delousing using the fumigation method (6). The obtained louse load was stored in 70% alcohol and separated according to species, stage, and sex under a trinocular stereo zoom microscope. The lice were slide-mounted following the technique prescribed by Palma (15). Identification of the chewing lice was based on the papers of Adams et al. (16) and Tendeiro (17). The deloused pigeons were released into the wild. Some of the adult lice were observed with a scanning electron microscope to record the nature of antennal sensilla.

\* E-mail: akscsir@rediff.com

The abbreviations used in this report are as follows: HW = head width, HL = head length, PW = prothorax width, PL = prothorax length, PtW = thorax width, PtL = thorax length, AW = abdominal width of segment IV, AL = abdominal length, and TL = total length.

## Results

### *Columbicola phoenicopterae* (Tendeiro, 1965)

**Type host:** *Treron phoenicoptera*

**Material:** Forty-four females, 33 males, 71 nymphs ex. *T. phoenicoptera*, collected by Aftab Ahmad in the Rampur district of India (28°48'N, 79°00'E) in 2009 and deposited at the Government Raza Postgraduate College in Rampur, Uttar Pradesh, India.

**Remarks:** The specimens resemble to a great extent the original description of *C. phoenicopterae* presented by Adams et al. (16). The setal counts and dimensions are given below.

Female (n = 5): HW = 0.28 (0.25–0.33), HL = 0.58 (0.55–0.62), PW = 0.19 (0.18–0.22), PL = 0.27 (0.25–0.29), PtW = 0.27 (0.25–0.29), PtL = 0.27 (0.25–0.29), AW = 0.40 (0.37–0.40), AL = 1.53 (1.48–1.59), and TL = 2.56 (2.47–2.59).

Male (n = 5): HW = 0.28 (0.25–0.29), HL = 0.53 (0.48–0.55), PW = 0.51 (0.14–0.18), PL = 0.25 (0.18–0.29), PtW = 0.23 (0.22–0.35), PtL = 0.25 (0.18–0.29), AW = 0.39 (0.29–0.48), AL = 1.25 (1.18–1.40), and TL = 2.17 (2.07–2.10).

### *Coloceras setosum* (Piaget, 1880)

**Type host:** *Treron phoenicoptera*

**Material:** Twenty-six females, 16 males, 37 nymphs ex. *T. phoenicoptera*, collected by Aftab Ahmad in the Rampur district of India (28°48'N, 79°00'E) in 2009 and deposited at the Government Raza Postgraduate College in Rampur, Uttar Pradesh, India.

**Remarks:** The specimens resemble to a great extent the original description of *C. setosum* presented by Tendeiro (17). The setal counts and dimensions are given below.

Female (n = 3): HW = 0.80 (0.77–0.81), HL = 0.56 (0.55–0.59), PW = 0.30 (0.29–0.33), PL = 0.18 (0.18–0.18), PtW = 0.53 (0.51–0.55), PtL = 0.25 (0.25–0.25), AW = 1.01 (0.99–1.03), AL = 1.08 (1.03–1.11), and TL = 2.09 (2.07–2.10).

Male (n = 3): HW = 0.61 (0.59–0.62), HL = 0.50 (0.48–0.51), PW = 0.29 (0.25–0.33), PL = 0.18 (0.18–0.18), PtW = 0.48 (0.44–0.51), PtL = 0.22 (0.18–0.22), AW = 0.76 (0.74–0.77), AL = 0.67 (0.66–0.70), and TL = 1.59 (1.55–1.62).

Two ischnoceran Phthiraptera, *C. phoenicopterae* Tendeiro (Figures 1a and 1b) and *C. setosum* Piaget (Figures 1c and 1d), were recovered. Specimens collected during the present study resemble *Columbicola phoenicopterae* in the nature of their genitalia (parameres thickened anteriorly, laterally indented, and mesosome thick and V-shaped) and ventral terminalia (subgenital plate groove ovoid and each side of the plate having 2–5 minute setae).

Tendeiro (17) gave the characteristics of different species of the genus *Coloceras*. The specimens of *Coloceras* collected during the present study resemble *C. setosum* in having head less widened at the temporal angles and clypeal margin widely parabolic. The male genitalia have a long and relatively wide basal plate, and a genital sac with a dense denticulation in the form of rose thorns.

The prevalence of lice on Yellow-legged Green Pigeons in the Rampur district was 75% (n = 12). Since all of the infested birds carried *C. phoenicopterae*, the prevalence of the latter species was 75%. A total of 148 specimens of *C. phoenicoptera* were collected. Thus, the mean intensity of infestation remained at 16.4 per bird while the sample mean abundance was 12.3 per bird (range of infestation was 5–30, n = 9). The sex ratio was female-biased, with a male-to-female ratio of 1:1.3. Nymphal population exceeded the adult population with an adult-to-nymph ratio of 1:0.9, while the ratio of the 3 nymphal instars (first, second, and third) was 1:0.5:0.3.

The prevalence of *C. setosum* on Yellow-legged Green Pigeons was 50% (n = 12). As many as 79 specimens of *C. setosum* were collected from the infested pigeons. The mean intensity of infestation was 13.2 while the sample mean abundance remained 6.6 per bird (range of infestation was 6–21, n = 6). Females outnumbered the males in the natural population, with a male-to-female ratio of 1:1.6. The nymphal population dominated over the adult population with an adult-to-nymph ratio of 1:0.8. The ratio of the first, second, and third instar nymphs was 1:0.8:0.3.

The overall prevalence of lice on the Yellow-legged Green Pigeon was 75%, the mean intensity of infestation was 25.2, and the sample mean abundance was 18.9 per bird (range of infestation was 15–51). Both species of lice were carried by 50% of the infested birds.

The antennae of the male *C. phoenicopterae* have a distinct hook at the anterior margin of the first flagellomere (Figure 1e). The antennae of both sexes carry an apical tuft of 10–12 pegs and the lateral side of the third flagellomere bears a placoid sensilla marked by the presence of concentric ridges (Figure 1f).

In the case of the male *C. setosum*, the second and third flagellomere are reduced in terms of the form

of the ridges (Figure 1g). It lacks placoid sensilla, which are present on the lateral sides of the third flagellomere of the female (Figure 1h). The apical end of the third flagellomere of both the sexes carries 12–14 pegs of varying length (Figures 1h and 1i).

### Discussion

As many as 17 species belonging to 4 genera (*Coloceras*, *Columbicola*, *Hohorstiella*, and *Auricotes*) reportedly parasitize different species of green pigeons of the genus *Treron* (18). Lakshminarayana (19) recorded *Columbicola columbae* Linnaeus and *C. phoenicopterae* from Yellow-legged Green Pigeon, *T. phoenicoptera*, in India. Tendeiro (20) provided the description of *Columbicola* Ewing. Adams et al. (16)

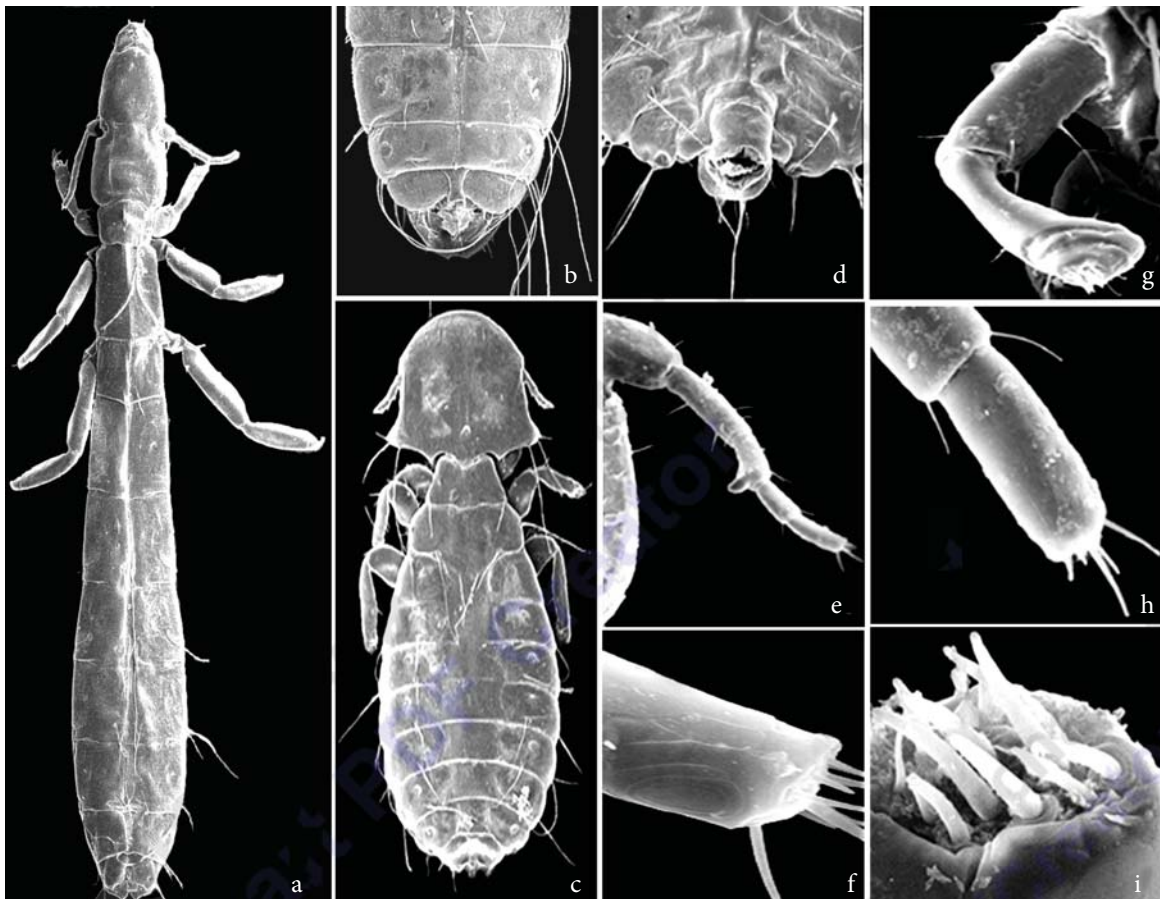


Figure 1. Scanning electron microscope photographs: a) adult female *Columbicola phoenicopterae*, 77x; b) posterior abdominal portion of the adult male *Columbicola phoenicopterae*, 105x; c) adult female *Coloceras setosum*, 50x; d) enlarged view of the posterior abdominal portion of male *Coloceras setosum*, 110x; e) antenna of male *Columbicola phoenicopterae*, 450x; f) apex of the terminal flagellomere of male *Columbicola phoenicopterae*, 1520x; g) antenna of male *Coloceras setosum*, 700x; h) second and third flagellomeres of female *Coloceras setosum*, 825x; i) apex of the terminal flagellomere of male *Coloceras setosum*, 4000x.

further reviewed the genus *Columbicola*. Price et al. (18) listed the other 2 species of lice, *C. setosum* and *C. elbeli*, from the aforesaid bird. The present paper provides further information on the phthirapteran fauna of Yellow-legged Green Pigeons, namely the simultaneous occurrence of 2 ischnoceran lice, and the nature of their antennal sensilla.

The prevalence as well as the intensity of infestation by lice on the Indian Yellow-legged Green Pigeon was found not to be too high as compared to other birds studied so far (1–10). Since both lice occurring on the Yellow-legged Green Pigeon are feather feeder ischnoceran, they may not have much impact as far host health is concerned, in contrast to hematophagous amblyceran species. The ischnoceran

lice seldom go to the skin and are mainly responsible for tolerable destruction of feathers, unless present in enormous numbers.

### Acknowledgments

We thank the Government Raza Postgraduate College, Rampur, for the use of its laboratory facilities; the Chief Wildlife Warden of Uttar Pradesh for permission to catch the birds; Dr Rekasi (Var I. H9090 Pannonhalma, Hungary) for valuable help in identification; and the Council of Scientific and Industrial Research, New Delhi, India, for providing financial support to Dr A. K. Saxena through Project No. 37/1298/07/EMR II.

### References

- Chandra, S., Agarwal, G.P., Singh, S.P.N., Saxena, A.K.: Seasonal changes in a population of *Menacanthus eurysternus* (Mallophaga, Amblycera) on the common myna *Acridotheres tristis*. *Int. J. Parasitol.*, 1990; 20: 1063–1065.
- Trivedi, M.C., Saxena, A.K., Rawat, B.S.: Incidence of Mallophaga on poultry in Dehradun (India). *Angew. Parasitol.*, 1992; 33: 69–78.
- Saxena, A.K., Kumar, A., Singh, S.K., Surman: Prevalence of *Menopon gallinae* Linne. (Phthiraptera: Amblycera) on poultry birds of Garhwal. *J. Parasitic Dis.*, 1995; 19: 69–72.
- Singh, S.K., Surman, Kumar, A., Saxena, A.K.: Population composition of four phthirapteran ectoparasites infesting blue rock pigeon *Columba livia*. *J. Parasitic Dis.*, 1998; 22: 144–147.
- Khan, V., Kumar, S., Gupta, N., Ahmad, A., Saxena A.K.: Prevalence of phthirapteran ectoparasites on poultry. *Indian Vet. J.*, 2008; 85: 447–448.
- Gupta, N., Kumar, S., Saxena, A.K.: Prevalence and population structure of lice (Phthiraptera) on the Indian Red Avadavat. *Zool. Sci.*, 2007; 24: 381–383.
- Saxena, A.K., Kumar, S., Gupta, N., Mitra, J.D., Ali, S.A., Srivastava, R.: Distribution pattern of phthirapterans infesting certain common Indian birds. *J. Parasitol.*, 2007; 93: 957–958.
- Beg, S., Gupta, N., Kumar, S., Khan, V., Bhatnagar, S., Saxena, A.K.: Occurrence of Phthiraptera on the house crow, *Corvus splendens* (Passeriformes: Corvidae). *ENTOMON*, 2008; 33: 75–78.
- Rajput, S., Joshi, V.D., Gupta, N., Khan, V., Saxena, A.K.: Population dynamics of Phthiraptera on Indian Bank Myna, *Acridotheres ginginianus*. *ENTOMON*, 2009; 34: 99–102.
- Arya, G., Bansal, N., Khan, V., Ahmad, A., Saxena, A.K.: Population characteristics of Phthiraptera occurring on Red whiskered bulbul (*Pycnonotus jocosus*). *J. App. Nat. Sci.*, 2010; 2: 263–265.
- Marshall, A.G.: *The Ecology of Ectoparasitic Insects*. Academic Press, London. 1981; 417.
- Rekasi, J., Rozsa, L., Kiss, B.J.: Patterns in the distribution of avian lice (Phthiraptera: Amblycera, Ischnocera). *J. Avian Biol.*, 1997; 28: 150–156.
- Rozsa, L.: Patterns in the abundance of avian lice (Phthiraptera: Amblycera, Ischnocera). *J. Avian Biol.*, 1997; 28: 249–254.
- Reiczigel, J., Lang, Z., Rozsa, L., Tothmeresz, B.: Properties of crowding and statistical tools to analyze parasite-crowding data. *J. Parasitol.*, 2005; 91: 245–252.
- Palma, R.L.: Slide mounting of lice: a detailed description of the Canada Balsam technique. *New Zealand Entomol.*, 1978; 6: 432–436.
- Adams, R.J., Price, R.D., Clayton, D.H.: Taxonomic revision of Old World members of the feather louse genus *Columbicola* (Phthiraptera: Ischnocera), including descriptions of eight new species. *J. Nat. Hist.*, 2005; 39: 3545–3618.
- Tendeiro, J.: Etudes sur les Mallophages. Description d'une nouvelle espece Australienne du genre *Columbicola* Ewing: *C. mckeani* n. sp., parasite d'*Ocyphaps lophotes* (Temminck). *Rev. Cienc. Vet.*, 1973; 6: 525–539 (in French).
- Price, R.D., Hellenthal, R.A., Palma, R.L., Johnson, K.P., Clayton, D.H.: *The Chewing Lice: World Checklist and Biological Overview*. Illinois Natural History Survey Special Publication, Champaign, Illinois, USA. 2003.
- Lakshminarayana, K.V.: A synoptic list of Mallophaga sens. lat. (Phthiraptera: Insecta) from India and adjacent countries together with host and regional indices. *Rec. Zool. Surv. India*, 1979; 75: 39–201.
- Tendeiro, J.: Estudos sobre Malofagos. Revisao monografica do genero *Columbicola* Ewing (Ischnocera, Philopteridae). *Mem. Junta. Invest. Ultramar.*, 1965; 32: 1–460 (in Portuguese).