



# A New Chewing Louse (Phthiraptera: Amblycera: Menoponidae) of *Anas platyrhynchos* (L.) from Karachi, Pakistan, having Parasitic Impact

Saima Naz\* and Syed A. Rizvi

Department of Zoology, University of Karachi, Karachi-75270. Pakistan

**Abstract:** A new species of the genus *Holomenopon* Eichler (Phthiraptera: Amblycera: Menoponidae) has been described on the Common Duck, *Anas platyrhynchos* (L.), with special reference to its chaetotaxy and male, female genitalia. It has been compared with its closest species, *H. leucoxanthum* (Burmeister), on the same host. It is the first record of this genus from Karachi, Pakistan. The prevalence of the new species has been discussed, which is 4.8-37.3% and 9.2-35.9% in male and female ducks, respectively. The intensity of infestation has also been recorded, that is 27.9-88.2% in two different localities of Karachi, Pakistan. The holotype and paratype are deposited in Natural History Museum, Department of Zoology, University of Karachi, Karachi, Pakistan.

**Keywords:** *Holomenopon*, new species, common duck, prevalence, intensity, Pakistan

## 1. INTRODUCTION

The genus *Holomenopon* Eichler [1] is a common but specific ecto-parasite of duck in Pakistan. It is represented by 16 species, and found on 81 species of Anatids (Anseriformes: Anatidae) worldwide. It is the host-specific genus and all its species have been recorded on family Anatidae only [2, 3].

The common duck, *Anas platyrhynchos* (L.) accommodates seven species of Mallophaga (Phthiraptera) throughout the world, viz. *Anaticola crassicornis* (Scopoli), *Anatoecus dentatus* (Scopoli), *A. icterodes* (Nitzsch), *Holomenopon leucoxanthum* (Burmeister), *H. maxbeieri* Eichler, *H. transvaalense* (Bedford) and *Trinoton querquedulae* (L.). Ansari [4] reported only two species, *Anaticola crassicornis* and *Anatoecus dentatus*, from *Anas platyrhynchos* from Lyallpur (now Faisalabad), but no chewing louse species of the common duck has yet been reported from Karachi [4-10].

It is the first record of the genus *Holomenopon* on *Anas platyrhynchos* from Karachi, Pakistan.

## 2. MATERIALS AND METHODS

The Common Duck has been observed for its lice species at two localities of Karachi (i.e., Safari Park, Gulshan Iqbal Town and Qaide Azam Park, Bin Qasim Town). Overall, about 780 specimens of lice have been collected from 15 birds.

The chewing lice were collected by using the pyrethroid sprayed in feathers of the bird, kept on a white paper sheet in the small cage. After 10 to 15 minutes, lice were shed off the bird by sprinkling the wings and feathers on to the sheet. They were preserved in 85% EtOH solution, mounted in Canada balsam by the standard method and microscopic investigations were undertaken by using the latest literature.

Illustrations and dimensions were made by using micro ocular graticule in light microscope and photographs were made by using Nikon P7000 digital camera through stereomicroscope, at 100x for whole mount and 400 x for terminalia and male genitalia. Measurements are given in millimeters (mm). Holotype and Paratypes were deposited in

Natural History Museum, University of Karachi (NHMUK).

Abbreviations used in this manuscript are: TL for total length, HL for head length, POW for preocular width, TW for temporal width, PL for prothorax length, PW for prothorax width, ML for metathorax length, MW for metathorax width, AL for abdominal length, GL for genitalia length and GW for genitalia width at the anterior end of parameres.

### 3. RESULTS

#### 3.1 *Holomenopon fatemae* sp.n. (Fig. 1-13)

Type Host: *Anas platyrhynchos* (L.)

Dimensions: (♂: n=3, ♀: n=4) TL: ♂ 1.47 (1.475–1.482), ♀ 1.82 (1.772–1.885); HL ♂ 0.27 (0.269–0.286), ♀ 0.307 (0.286–0.338); POW ♂ 0.46 (0.429–0.50), ♀ 0.408 (0.403–0.416); TW ♂ 0.56 (0.55–0.58), ♀ 0.58 (0.57–0.59); PL ♂ 0.21

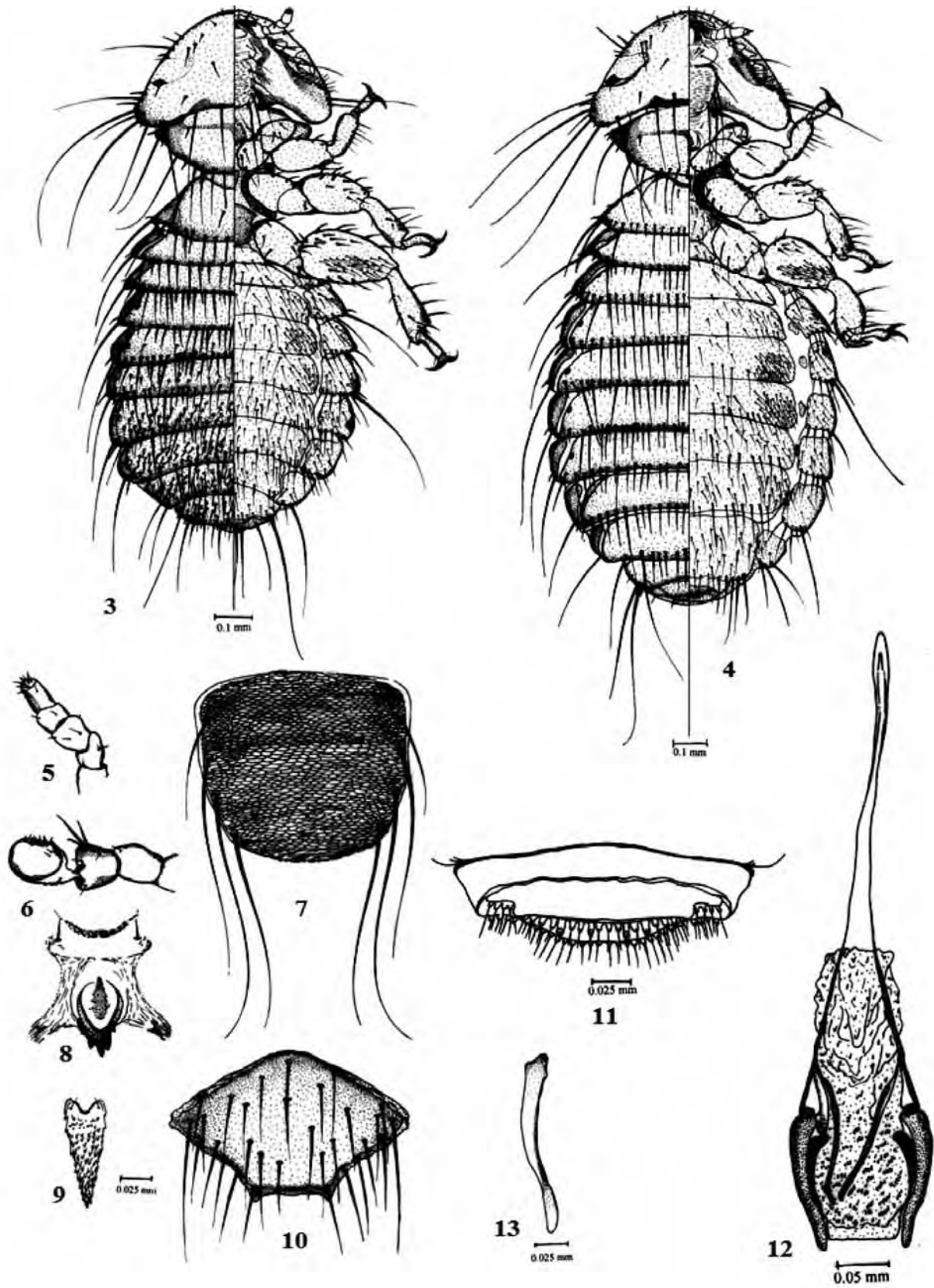
(0.201–0.213), ♀ 0.236 (0.215–0.26); PW ♂ 0.438 (0.43–0.443), ♀ 0.463 (0.455–0.468); ML ♂ 0.14 (0.115–0.156), ♀ 0.16 (0.155–0.169); MW ♂ 0.48 (0.472–0.507), ♀ 0.537 (0.527–0.546); AL ♂ 0.85 (0.845–0.855), ♀ 1.2 (1.10–1.28).

#### 3.1.1. Head (Fig. 1-7)

Anterior margin evenly rounded dilated posteriorly; dorso-lateral margin straight; DHS 9 very long and marginal; DHS 8, 10 and 11 short but 11 very much shorter; DHS 14–16 together in a line; DHS 17 widely separated from sensilla *d*, DHS 23 short, in temporal region, near to seta 22; hypopharynx developed; subocular seta longest; maxillary palpi (Fig. 5) short; antennal groove short and shallow; antennae (Fig. 6) short, with small, rounded flagellomere II, bearing two subterminal setae and terminal disc at very lateral side; gular plate (Fig. 7) rounded, sculptured with scaly texture, posterior gular setae very long (0.15–0.17).



Fig. 1-2: *Holomenopon fatemae* sp.n. 1 Male, 2 Female.



**Fig. 3-13:** *Holomenopon fatemae* sp.n. 3. Male, 4. Female, 5. Maxillary Palp, 6. Antenna, 7. Gular Plate, 8. Prosternal Plate, 9. Mesosternal Plate, 10. Metasternal Plate, 11. Female Vulval Margin, 12. Male Genitalia, 13. Paramere enlarged.

### 31.2. Thorax (Fig. 1-4, 8-10)

Pronotal anterior seta 2 evident in female; pronotal marginal setae 1, 2, 4, 6, 8 short and setae 3, 5, 7, 9, 10 long in female; pronotal marginal setae 1, 3, 5 short and setae 2, 4, 6-9 long in male; prosternal plate (Fig. 8) weakly sclerotized, roughly triangular, anteriorly membranous, bearing two anterior fine setae, posterior margin well sclerotized, with three-four dentations, lateral margins weakly developed; mesonotum very short; mesosternal plate (Fig. 9) elongated, characteristically speculated, with anterior margin shallow concave and one pair of microsetae at antero-ateral corners; metanotum large, two anterior metanotal setae present; posterior marginal metanotal setae 1, 4, 5 short and setae 2, 3, 6-10 long in male; marginal metanotal setae 1, 4, 5, 7-9, 11 shorter and 2, 3, 6, 10, 12-14 long in female; metasternal plate (Fig. 10) squat, large, bearing twenty nine thick, long and fine setae; cox I laterally expanded, bearing five posterior setae and four anterior setae; trochanter II and III with three microsensillae on each; femur III bears a large brush of spiniform microsetae; euplantula III dilated.

#### 3.1.3. Abdomen (Fig. 1-4)

Male Abdomen: Shorter than female abdomen; tergites I-VII more or less equal in width, tergite VIII shorter; tergal marginal setae alternately long and short, in single row on tergites I-VIII: 20, 30, 30, 33, 31, 34, 20 and 16 respectively; anterior tergal setae densely present on tergites VI-VIII only; sternite I well developed, bears few setae at posterior; sternites III and VI with very thin setal brushes, sternites IV and V with relatively thick setal brushes; sternal chaetotaxy as on sternites I-VII: 9, 12, 14, 22, 30, 58 and 50 respectively; sternites usually separated from pleurites by a very small pleuro-steal sclerite.

#### 3.1.4. Male Terminalia

Tergite IX larger than very short tergite X; tergite IX bearing thirty three scattered setae, two pairs of lateral setae, one long and one short, nine alternately short and long marginal setae at posterior margin present; sternite VIII separated from subgenital plate; anal margin with six normal fine posterior

marginal setae and two very long latero-posterior setae.

#### 3.1.5. Female Abdomen

Broad and oblong; anterior tergal setae usually absent; tergal marginal setae on tergites I-VIII: 24, 28, 31, 36, 34, 29, 28 and 14 respectively; sternites with irregularly scattered thin fine setae; sternite IV and V with thick setal brushes; sternal marginal setae on sternite I-VII: 9, 22-25, 47, 16, 27, 66-68 and 70 respectively; pleuro-sternal sclerites relatively larger than male; pleurites with six-seven fine posterior marginal setae.

#### 3.1.6. Female Terminalia

Tergite IX larger with trapezoidal shape, without anterior and marginal setae; two pairs of long to very long lateral setae present (0.335 inner seta and 0.455 outer seta); dorso-posterior margin with six very short microsetae; subgenital plate wide and large (Fig. 4), with wavy posterior margin, bearing five pairs of long fine latero-posterior setae and thirty nine-forty median to posterior scattered, short fine setae; anal margin (Fig. 11) oval, narrow; anterior fringe of anal margin bearing four atypical setae among the twenty two normal setae, attached on hyaline base and thirty similar setae in posterior margin.

#### 3.1.7. Male Genitalia (Fig. 12-13)

Dimensions: GL: 0.63 (0.630-0.640); GW 0.14 (0.141-0.142).

Basal apodeme elongated, narrow to tapering anteriorly into blade like end; parameres (Fig. 12) elongated, measure 0.1425 (0.140-0.145), rod like, broader anteriorly, slightly curved posteriorly, reaching behind the posterior margin of endomere; endomeral plate narrower, with posterior margin very straight; genital sac with very minute fine spicules; genital sclerites two elongated, narrow, rods, more or less V-shaped, in median to posterior position, measuring 0.12-0.125.

#### 3.1.8. Material Examined

HOLOTYPE: 1♂, on *Anas platyrhynchos*, niche:

**Table 1.** Number of chewing louse, *Holomenopon fatemae* sp. n., its prevalence and mean intensity on common Ducks, *Anas platyrhynchos* (L.), in Karachi, Pakistan.

Locality	Ducks Examined				No. of lice collected from total ducks	Prevalence (%)		Mean Intensity
	Male ducks	No. of lice	Female ducks	No. of lice		Male ducks	Female ducks	
Qaid Azam Park, Bin Qasim Town, Karachi	A1	12	A5	29	251	4.78	11.55	27.88
	A2	24	A6	23		9.56	9.16	
	A3	13	A7	37		5.18	14.74	
	A4	28	A8	41		11.16	16.33	
			A9	44		17.53		
	Total Lice	77	TotalLice	174		100	100	
Safari Park, Gulshan Iqbal Town Karachi	A10	77	A13	102	529	35.48	32.69	88.16
	A11	81	A14	98		37.33	31.41	
	A12	59	A15	112		27.19	35.90	
		Total Lice	217	Total Lice		312	100	

wing and ramp feathers; Karachi, Pakistan; 02-I-2007; leg. S. Naz. PARATYPE: 3♂, 3♀, on *Anas platyrhynchos*, same data.

### 3.1.9. Etymology

This new species of the genus *Holomenopon* has been given the name in the credit of first author's daughter, Fatema Naaz.

## 4. REMARKS AND DISCUSSIONS

The *Holomenopon fatemae* sp.n. is closely related to the *H. leucoxanthum* on the basis of some specific characters, which lay this species in the *leucoxanthum* group of the genus. It resembles in the characters given by Price [2], including female anal fringe with at least four a-typical setae; without mid-dorsal setae adjacent to sensilla *d*; TW less than 0.7; mesosternal and metasternal plates are almost similar as in Price [2: Fig 7, 8]; posterior postmental setae always long; metanotum with two anterior setae; male genital sclerites have similar shape in both species [2, 11]. But the present species can easily be separated from *H. leucoxanthum* by having shape of anal opening and arrangement of anal setae with base more protruded in *H. fatemae*, number of metasternal setae fifteen–twenty five in *H. leucoxanthum* and twenty nine–thirty one in *H. fatemae*.

The male genitalia are also clearly variable in having more extended endomerical plate, with posterior margin slightly concave; parameres more broader and expanded antero–laterally and more narrow posteriorly; genital sac sclerite anteriorly curved, shorter (0.1–0.125) in *H. leucoxanthum*, whereas in *H. fatemae*, the genital sclerite more expanded anteriorly, longer (0.13–0.135); endomerical plate less expanded, with even corners and clearly straight posterior margin; parameres spatulate anteriorly and slightly narrow mid–anteriorly, posteriorly curved inward outside, as described above.

Besides the above characteristic differences the present species is successfully grown up on the host, *Anas platyrhynchos* in the region, and designated as a new species of the genus *Holomenopon*.

During the present study, 15 birds were examined at two localities of Karachi, infested with total of 780 specimens (251 and 529 respectively) of *Holomenopon fatemae* sp.n. (Tab. 1). These ducks were examined in two very different localities of Karachi region, Safari Park at Gulshan Iqbal Town and Qaid Azam Park at Bin Qasim Town.

In Qaid Azam Park, male ducks (n=4) harbor 77 lice. Their infestation with maximum number of lice was recorded 28 and minimum infestation was recorded 12, with the prevalence ranges

from 4.78–11.16%. The female ducks (n=5) were more infested (174 lice) than their males, with maximum 44 and minimum 23 lice per bird. Their prevalence ranges 9.16–17.53%, showed low rate of infestation.

In Safari Park, 6 ducks examined for their lice with total Male ducks (n=3) harbor 217 lice specimens and found maximum infestation was 81 (37.33% prevalence) and minimum infestation was 59 (27.19% prevalence). In this locality, female ducks (n=3) were again highly infested (312 specimens of lice), with maximum 112 and minimum 98 lice. Their prevalence ranges 31.41–35.90% that showed medium rate of infestation on these quite healthy ducks, *Anas platyrhynchos*. However, in this group of ducks, the common duck louse *H. leucoxanthum* (Burmeister) was also recorded in few numbers (5–9) on only two birds from Safari Park, Gulshan Iqbal Town, Karachi.

The mean intensity of parasitism in ducks of both localities ranging 27.88–88.16, and prevalence on male and female ducks ranging 4.78–37.33 % and 9.16–35.90 % respectively.

Overall infestation of both *H. leucoxanthum* and *H. fatemae* and their parasitic intensity found very low to medium in the region, hence no significant parasitic effect showed in ducks [10, 12, 13].

## 5. REFERENCES

- Eichler, W. Zur Klassifikation der lauskerfe (Phthiraptera Haeckel: Rhynchophthirina, Mallophaga und Anoplura). *Archiv für Naturgeschichte* 10(3): 345-398 (1941).
- Price, R.D. A review of the genus *Holomenopon* (Mallophaga: Menoponidae) from the Anseriformes; *Annals of the Entomological Society of America* 64(3): 633-646 (1971).
- Price, R.D., D.H. Clayton, R.A. Hellenthal, K.P. Johnson & R.L. Palma, The chewing lice: world checklist and biological overview. *Illinois Natural History Survey, Special Publication 24*: 1–105+X (2003).
- Ansari, M.A.R. Mallophaga (Ischnocera) infesting birds in the Punjab (India). *Proceedings of the National Institution of Science, India* 13(6): 253-303 (1947).
- Ansari, M.A.R. Studies on the Amblyceran Mallophaga infesting birds in Pakistan. *Proceedings of the 7<sup>th</sup> Pakistan Scientific Conference, Agriculture, Bahawalpur, Pakistan*, pp. 51–57 (1955).
- Ansari, M.A.R. Some new Ischnoceran Mallophaga in the Zoological Survey Department, Karachi. *Pakistan Journal of Scientific Research* 8(1): 10-22 (1956 a).
- Ansari, M.A.R. Description of some new Amblyceran Mallophaga from the Zoological Survey Department, Karachi. *Pakistan Journal of Scientific Research* 8(2): 57-61 (1956 b).
- Ansari, M.A.R. Studies on the Ischnoceran Mallophaga infesting birds in Pakistan. *Proceedings of the 7<sup>th</sup> Pakistan Scientific Conference, Biology, Bahawalpur, Pakistan* 42: 42-62 (1957).
- Lakshminarayana, K.V. A synoptic list of Mallophaga sens. lat. (Phthiraptera: Insecta) from India and adjacent countries together with host and regional indices. *Records of the Zoological Survey, India* 75: 39-201 (1979).
- Naz, S., S.A. Rizvi & O. Sychra, *Anaticola crassicornis* (Phthiraptera: Ischnocera: Philopteridae) on wild geese from Pakistan; *Zootaxa* 2659: 60-66 (2010).
- Burmeister, H.C.C. Mallophaga. 418-443, In: *Handbuch der Entomologie* 2(1): Berlin: Enslin (1838).
- Broderson, D., A.G. Canaris, & J.R. Bristol, Parasites of waterfowl from Southwest Texas: II. The shoveler, *Anas clypeata*. *Journal of Wildlife Diseases* 13: 435-439 (1977).
- Canaris, A.G., A.C. Mena, & J.R. Bristol, Parasites of waterfowl from Southwest Texas. III. The green-winged teal, *Anas crecca*. *Journal of Wildlife Diseases* 17: 57-64 (1981).