

## A NOTE OF CATTLE EGRET LOUSE, *CICONIPHILUS DECIMFASCIATUS* (AMBLYCERA : PHTHIRAPTERA : INSECTA)

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(Accepted 18 September 2018)

**ABSTRACT :** *Ciconiphilus decimfasciatus* is known to infest the cattle egret (*Bubulcus ibis*). A look on literature reveals that certain morphological features of the louse deserve redescription. Present report supplements the redescription of the *C. decimfasciatus*. Furthermore, an analysis of the crop content of the aforesaid louse indicates that 69% percentage of the specimen examined contained red content compatible with the host blood. Sex and stage related differences in the degree of haematophagy of the louse have also been noted.

**Key words :** Amblycera, cattle egret louse, *Ciconiphilus*, Haematophagous, Phthiraptera.

### INTRODUCTION

Cattle egret (*Bubulcus ibis*) is known to harbor two phthirapteran species (an ischnoceran louse, *Ardeicola expallidus* Blagou. and an amblyceran louse, *Ciconiphilus decifasciatus* Boisduval and Lacordaire (Price *et al.*, 2003). Lakshminarayana (1979) listed the two species on Indian cattle egrets as *Ardeicola gaibagla* Ansari and *Ciconiphilus decimfasciatus*. Price and Bear (1965) have discussed the genus *Ciconiphilus* and described its characteristics. During present studies specimens of *Ciconiphilus* obtained from cattle egrets of Rampur were subjected to analysis of crop contents in order to ascertain information on the degree of haematophagy of the louse as the haematophagous amblycerans are often convicted to act as transmitter of pathogens among the host birds. Further, information on the morphological features of the louse (based on LM and SEM) are also supplemented.

### MATERIALS AND METHODS

Five birds were subjected to delousing (placed in polythene bag containing a wad of cotton wool soaked in chloroform, after tying the legs, in such a way that head protruded out; after 10 minutes feathers were fluffed manually over a white plastic sheet; deloused birds released in wild). The louse load so obtained was separated stagewise and sexwise. Different stages of the lice were dissected in Stereozoom Binocular Microscope and the crop teased out on glass slide to examine the crop contents. For recording the morphological features, permanent slide of adult lice were prepared (Palma, 1978). Furthermore,

few adult lice were also subjected to Scanning Electron Microscopy (Gupta *et al.*, 2009).

### OBSERVATION

**Female :** (Plate I, Photo 1)

Head with well developed pre-ocular and occipital nodi but weak associated carina (Plate I, Photo 4); front broadly convex, 3 fine and short setae present on upper margin, 2 long and 1 short marginal setae present on lateral margin of the frons; lateral margin angulate on temple. Temple broadly ovate, 4 short and 3 long setae present on sub margin of temple. Occipital margin is slightly convex with 2 long setae. On ventrum of the head labrum short attached with anterior margin of the head having 3 fine and short setae. Mandibular frame work feebly chitinized; mandibles short and adapted for chewing, cutting edge of mandibles sharp and pointed. Maxillary palp and antennae four segmented. Oesophageal sclerites and hypopharynx well developed (Plate I, Photo 5). Semicircular, chitinized, black ocular fleck present at the junction of frons and temple. Gular plate long and straight with 5+5 long setae (Plate I, Photo 6).

Pro-thorax pentagonal, large, protruding, lateral angles obtuse, each with a spine and a long setae; posterior lateral margin straight, each with one medium sized setae; posterior margin straight, with six long setae on each side. Transverse bar distinct. Meso-thorax fused with meta-thorax. Meta-thorax comparatively short in length, trapezoidal in shape; posterior margin nearly straight with six long setae on each side. Meta sternal plate pentagonal

with 3+3 setae. Legs slightly paler than the thorax with roughly scattered short setae. Hinder femora with three rows of ctenidia.

Abdomen long and oval, widest at IVth segment; posterior angles of the all segments projecting, each with a long post-spiracular setae; posterior margin of segments Ist to VIth straight and those of segments VIIth- VIIIth slightly concave (Plate I, Photo 2), each bearing a transverse row of long marginal setae. A patch of ctenidia present on IIIrd abdominal segment (Plate I, Photo 7). Sternal plate well demarcated attached with pleural plates. Sternal brushes absent. 'W' shaped vulvul margin present on terminal segment with 6+6 setae. Setae 26-28 fine and minute setae present in a single row of female genitalia (Plate I, Photo 3). Abdominal chaetotaxy as follows :

**Tergal setae :** (n= 6), I 3-4 (=3.5), II 4-5 (=4.6), III 5-6 (=5.8), IV 5 (=5), V 4-5 (=4.6), VI 3-5 (=4.1), VII 4-5 (=4.1), VIII 3-4 (=3.1) and IX 1 (=1). **Pleural Setae, Anterior setae:** II 4, III 5, IV 3, V 3, VI 2, VII 1, VIII 1 each side. **Marginal setae:** II 5, III 5, IV 5, V 4, VI 4, VII 3 and VIII 2 each side. **Sternal setae, Anterior setae:** II 10-11 (=10.5), III 9-10 (=9.8), IV 14-15 (=14.8), V 13-14 (=13.6), VI 12-13 (=12.8), VII 14-15 (=14.1) and VIII 6-7 (=6.3) each side. **Marginal setae:** I 3 (=3), II 4-5 (=4.6), III 5-7 (=6.5), IV 10-12 (=11.1), V 8-10 (=9.5), VI 6-9 (=8.3), VII 5-6 (=5.6) and VIII 4-5 (=4.6) each side.

**Male :** (Plate II, Photo 1)

Similar to female, but size considerably small. Head longer than broad. Labrum with 2 fine setae. Occipital nodus well chitinized. Mandibles, lingual sclerite and gular plate well chitinized. Abdomen long, elliptical, sternal brushes absent. Last abdominal segment ovate. Abdominal chaetotaxy as follows :

**Tergal setae :** (n= 6), I 3-4 (=3.6), II 4-5 (=4.8), III 5-7 (=6.5), IV 5-6 (=5.6), V 4-5 (=4.6), VI 5-6 (=5.8), VII 4-5 (=4.8), VIII 2-3 (=2.8) and IX 1 (=1). **Pleural Setae, Anterior setae :** II 3, III 6, IV 4, V 4, VI 3, VII 3 and VIII 1 each side. **Marginal setae :** II 5, III 5, IV 5, V 4, VI 4, VII 3 and VIII 2 each side. **Sternal setae, Anterior setae :** I 2 (=2), II 3-4 (=3.8), III 5-7 (=6), IV 6-8 (=7.5), V 6-8 (=7.4), VI 6-7 (=6.8), VII 5-7 (=6.6), VIII 3-5 (=4) and IX 6 (=6) each side. **Marginal setae :** I 1-2 (=1.6), II 7-8 (=7.8), III 3-4 (=3.8), IV 3-5 (=4), V 8-10 (=9.5), VI 7-9 (=8.5), VII 6-7 (=6.1), VIII 4-6 (=5.3) and IX 3 (=3) each side.

**Male genitalia :** Genitalia campanulate, long and reaching the posterior margin of Ist abdominal segment. The basal apodeme is narrow and pointed at anterior end. Parameres short, thin, narrow and curved inward at

posterior end. Endomeres also very short, slender and quite straight. Endomerical plate broad and rectangular. Nature of genital sclerite and basal plate as shown in Plate II, Photo 6.

Measurement				
	Male (mm.)		Female (mm.)	
	Length	Width	Length	Width
Head	0.28	0.48	0.33	0.56
Prothorax	0.17	0.33	0.19	0.37
Pterothorax	0.11	0.41	0.15	0.54
Abdomen	0.98	0.59	1.24	0.81
<b>Total</b>	<b>1.54</b>		<b>1.91</b>	

An analysis of the crop contents of *C. decimfasciatus* reveals that the crop of 69% of specimens examined (200) red pigment (compatible with host blood) in their crops. As many as 92% of the adult females (n=50) contained red pigment in their crops while the percentage of adult males exhibiting such condition was slightly lower (84%; n=50). In contrast to adults, nymph appeared by involved in haematophagy to a lesser extent. The percentage of third instars carrying red pigment in their crops (60%; n=40) was comparatively higher than second instars (46.7%; n=30) and first instars nymph (40%; n=30). So, the data clearly suggest that the amblyceran cattle egret louse, *C. decimfasciatus* is a probable haematophagous in nature. Apart from barbules of host feather and the red content, any other inclusion was never detected in the crop of lice. None of the lice contained parts of lice or other insect in their crop (indicating that lice is not involved in cannibalism/predation), at least *in vivo* condition.

## DISCUSSION

Member of the genus *Ciconiphilus* are known to infest the birds belonging to Ciconiformes and Anseriformes (Price *et al*, 2003). The morphological features of the specimens collected from cattle egrets in Rampur resemble to description given for the *Ciconiphilus decimfasciatus*, to a larger extent (except minor differences in measurements and chaetotaxy). The present report supplements further information on the morphology of aforesaid cattle egret louse.

Avian lice are known to exhibit considerably variation in nature of their crop contents. Certain avian lice (specially the amblycerans) exhibit varying degree of haematophagy. Haematophagous amblycera do not only affect the vitality and productivity of their hosts (Derylo, 1974a and b; Marshall, 1981), but are often able to transmit stains of certain bacterial diseases among the hosts (Derylo, 1969, 70, 72; Derylo and Jarosz, 1972). Certain amblyceran species are also able to act as career of filarial worms and even cestode (Dutton, 1905; Nelson, 1962; Pennington and Phelps, 1969; Seager *et al*, 1976;

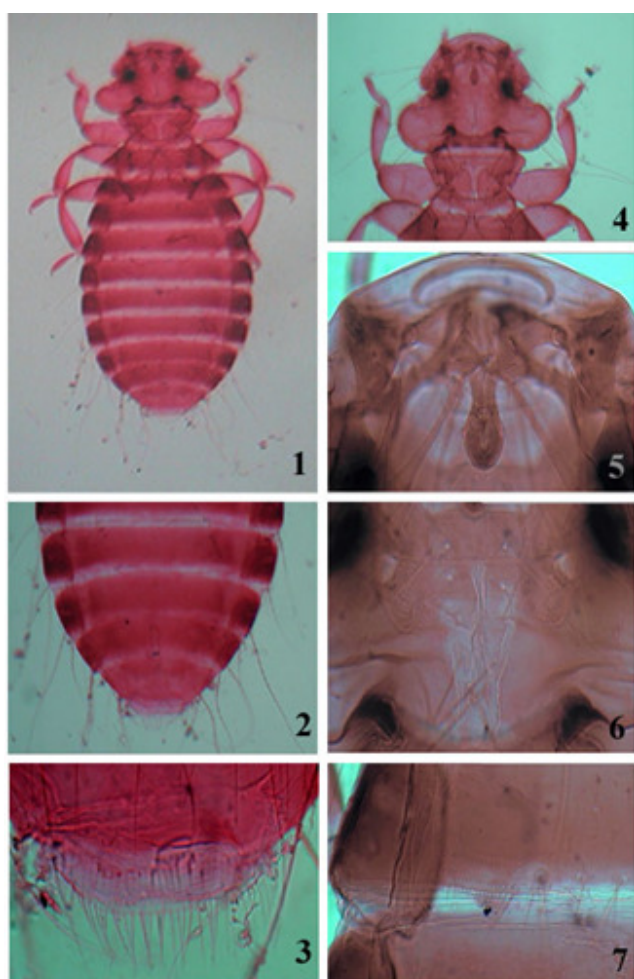


Plate I :

1. *Ciconiphilus decimfasciatus* Boisduval & Lacordaire, female x 48. 2. *C. decimfasciatus*, female, enlarge posterior abdominal segment x 95. 3. *C. decimfasciatus*, female, enlarge vulval margin x 240. 4. *C. decimfasciatus*, female, enlarge head and thorax x 95. 5. *C. decimfasciatus*, female, enlarge head showing mandible and lingual sclerite x 384. 6. *C. decimfasciatus*, female, more enlarge head showing gular plate x 960. 7. *C. decimfasciatus*, female, enlarge III<sup>rd</sup> abdominal segment showing two rows of ctenidia x 95.

Cohen *et al*, 1991; Bartlett, 1993). Death of a white pelican due to heavy infestation of a haematophagous louse, *Piagetiella peralis* has also been recorded (Wobesser *et al*, 1974). Workers like Saxena *et al* (1985a) and Clayton *et al* (2016) have reviewed the work done on pathogenic involvement of avian lice. Three species of the genus *Menacanthus* (*M. stramineus*, *M. eurysternus* and *M. abdominalis*), *Trinoton querquedue* and *Hohorstiella lata* have been found to exhibit varying degree of haematophagy (Kalamariz, 1963; Agarwal, 1983; Saxena *et al*, 1985b; Kumar *et al*, 2016, 2017a and b). The mechanism by which the biting lice are able to secure intake of host blood has been indicated by workers occasionally (Bouvier, 1945; Clay, 1949;

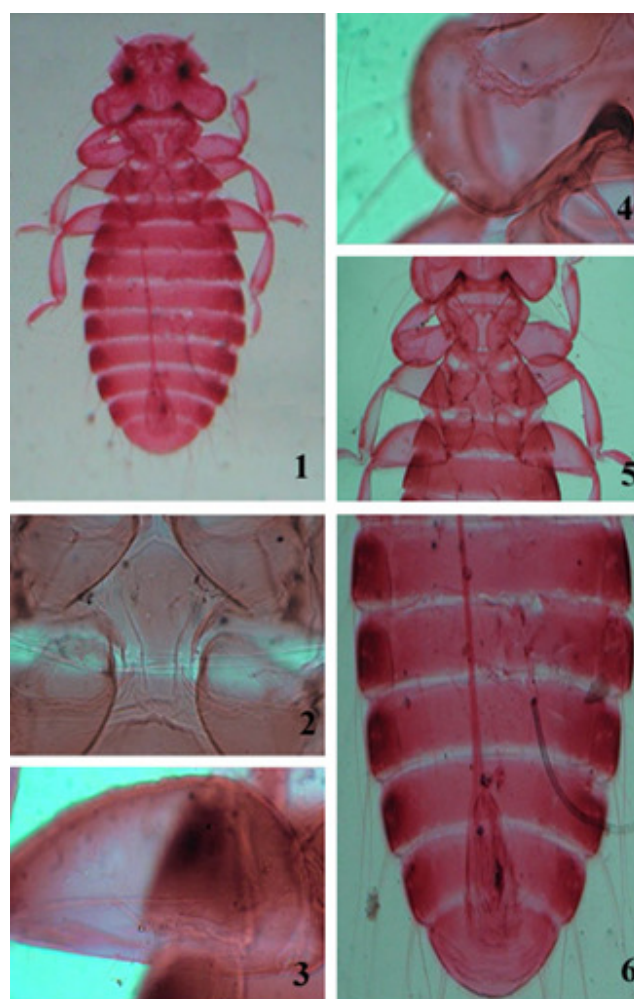


Plate II :

1. *Ciconiphilus decimfasciatus* Boisduval & Lacordaire, male x 65. 2. *C. decimfasciatus*, male, enlarge meta-thorax showing meta sterna plate x 390. 3. *C. decimfasciatus*, male, enlarge III<sup>rd</sup> leg showing three rows of ctenidia x 290. 4. *C. decimfasciatus*, male, enlarge temple showing temporal setae x 422. 5. *C. decimfasciatus*, male, enlarge view of thorax x 135. 6. *C. decimfasciatus*, male, enlarge view of posterior abdominal segment showing male genitalia x 136.

Lavoipierre, 1965; Rao *et al*, 1975; Marshall, 1981). Present studies indicate that cattle egret louse, *Ciconiphilus decimfasciatus* is a probable haematophagous. Difference in degree of haematophagy of sexes of adults of this louse may be circumstantial but nymphs exhibit lesser degree of haematophagy.

#### ACKNOWLEDGEMENT

Authors are thankful to Principal, Government Raza P.G. College, Rampur (U.P.) for providing laboratory facilities and to the CSIR, New Delhi for providing financial support to Dr. Surendra Kumar in form of Project (No 37/1659/15EMR II).

## REFERENCES

- Agarwal G P, Saxena A K and Chandra S (1983) Haematophagous behaviour of *Menacanthus eurysternus* (Mallophaga, Amblycera). *Angew. Parasitol.* **24**(1), 55–59.
- Bartlett C M (1993) Lice (Amblycera and Ischnocera) as vectors of *Eulimdana* spp. (Nematoda: Filarioidea) in charadriiform birds and the necessity of short reproductive periods in adult worms. *J. Parasitol.* **75**(1): 85–91.
- Bouvier G (1945) De l'hémophilie de quelques mallophages des animaux domestiques. *Schweiz Arch Tierheilk.* **87**, 429–434.
- Clay T (1949) Piercing mouth-parts in the biting louse (Mallophaga). *Nature* **164**, 617.
- Clayton D H, Bush S E and Johnson K P (2016) Coevolution of life on hosts: Investigating Ecology and history. The University of Chicago Press, Chicago and London, 1–249.
- Cohen S, Greenwood M T and Fowler J A (1991) The louse *Trinoton anserinum* (Amblycera: Phthiraptera) an intermediate host of *Sarconema eurycerca* (Filarioidea: Nematoda) a heartworm of swans. *Med. Vet. Entomol.* **5**, 101–110.
- Derylo A (1969) Mallophaga as a vector of *Pasteurella multocida*. *Ann. Univ. Mariae Curie-Skłodowska. Sect C Biol.* **24**, 355–366.
- Derylo A (1970) Mallophaga as a reservoir of *Pasteurella multocida*. *Acta Parasitol Polon.* **17**(35), 301–313.
- Derylo A and Jarosz J (1972) Intestinal microflora in some species of hematophagous Mallophaga. *Wiad Parazytol.* **18**(1), 113–119.
- Derylo A and Jarosz J (1972) Intestinal microflora in some species of hematophagous Mallophaga. *Wiad Parazytol.* **18**(1), 113–119.
- Derylo A (1974a) Studies on the economic harmfulness of biting lice (Mallophaga). III. The influence of biting lice infestation on a decrease of body weight in hens. *Medycyna Wet.* **30**(6), 544–547.
- Derylo A (1974b) Studies on the economic harmfulness of biting lice (Mallophaga). II. The influence of biting lice infestation on egg laying and hatching in hens. *Medycyna Wet.* **30**(6), 406–410.
- Dutton J E (1905) The intermediary host of *Filaria cypseli* (Annett, Dutton, Elliot), the filaria of the African swift, *Cypselus affinis*. *J. Trop. Med.* **8**, 108.
- Gupta N, Khan V, Kumar S, Saxena S, Rashmi A and Saxena A K (2009) Egg shell morphology of selected Indian bird lice (Phthiraptera: Amblycera, Ischnocera). *Entomological News* **120**(3), 327–336.
- Kalamar E (1963) Badania i biologia Mallophaga I. The use of  $Fe^{59}$  isotope in studies on food consumption of mallophaga existing on hens (*Gallus domesticus* L.). *Zeszyty. Nauk. Wyzsz. Szkoly. Roln. W Olszt.* **15**, 247–251.
- Kumar S, Ahmad A, Ali R and Kumar V (2016) A note on haemetophagous nature of poultry shaft louse, *Menopon gallinae* (Amblycera: Phthiraptera). *J. Parasit. Dis.* DOI 10.1007/s 12639-016-1760-y.
- Kumar S, Ali R and Saxena A K (2017a) Haemetophagous nature of *Menacanthus abdominalis* (Phthiraptera: Amblycera) infesting *Coturnix coturnix*. *Annals of Entomology* **35**(1), 27–31.
- Kumar S, Ali R, Khan G and Saxena A K (2017b) Extent of Haematophagy of a pigeon louse *Hohorestiella lata* (Amblycera : phthiraptera). *Indian Veterinary Journal* (in press).
- Lakshminaryana K V (1979) A synoptic list of Mallophaga. *Rec. Zool. Surv. India.* **75**, 39–201.
- Lavoipierre M M J (1965) Feeding mechanism of blood-sucking Arthropods. *Nature* **208**, 202–203.
- Marshall A G (1981) *The ecology of ectoparasitic insects*. Academic Press, London.
- Nelson G S (1962) *Dipetalonema reconditum* (Grassi, 1889) from the dog with a note on its development in the flea, *Ctenocephalides felis* and the louse, *Heterodoxus spiniger*. *J. Helminthol.* **36**, 297–308.
- Pennington N E and Phelps C A (1969) Canine filariasis on Okinawa, Ryukyu Islands. *J. Med. Entomol.* **6**, 59–67.
- Price R D and Beer J R (1965) Species of *Colpocephalum* (Mallophaga: Menoponidae) parasites upon the Falconiformes. *Canad. Entomol.* **95**(7), 731–763.
- Price R D, Hellenthal R A, Palma R L, Johnson K P and Clayton D H (2003) The chewing lice: World checklist and biological overview. *Illinois Natural History Survey special Publication*, **24**, X + 501 pp.
- Rao N S K, Khuddus C A and Channabasvanna G P (1975) Mouth parts of Mallophaga (India). *Mysore J. agri. Sci.* **9**, 670.
- Saxena A K, Agarwal G P, Chandras S and Singh O P (1985a) Pathogenic involvement of Mallophaga. *Z. ang. Entomol.* **99**, 294–301.
- Saxena A K, Agarwal G P, Chandras S and Singh O P (1985b) Haematophagous nature of *Trinoton querquedulae* (Phthiraptera: Amblycera). *Angew. Parasitol.* **26**, 205–208.
- Seager W S, Schiller E L, Sladen W J L and Trpis M (1976) A Mallophaga, *Trinoton anserium*, as a cyclodevelopmental vector for a heartworm parasite of waterfowl. *Science* **194**, 739–741.
- Wobeser G, Johnson G R and Acompañado G (1974) Stomatitis in a juvenile white pelican due to *Piagetiella peralis* (Mallophaga: Menoponidae). *J. Wildl. Dis.* **10**(2), 135–138.