

Stray notes on two phthirapteran species occurring on Indian grey Horn Bill, *Tockus birostris* Scopoli (Coraciformes: Bucerotidae)

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Received: 23 July 2013 / Accepted: 14 November 2013 / Published online: 10 December 2013
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Abstract Two phthirapteran species (an amblyceran *Chapinia clayae* and an ischnoceran, *Buceroemersonia clarkei*) were recovered from eight Indian grey Horn Bills, during 2009 in district Rampur (India). The occurrence of *B. clarkei* on Indian birds has not been noted earlier. The population characteristics of both the species have been recorded. On the basis of crop contents *C. clayae* appeared to be a probable haematophagous. The egg chorion of *B. clarkei* appeared smooth that of *C. clayae* bears sculpturing.

Keywords *Buceroemersonia clarkei* · *Chapinia clayae* · Indian grey Horn Bill lice · Mallophaga · Phthiraptera · *Tockus birostris*

Abbreviations

HW	Head width
HL	Head length
PW	Pro-thorax width
PL	Pro-thorax length
PTW	Ptero-thorax width
PTL	Ptero-thorax length
AW	Abdominal width
AL	Abdominal length
TL	Total length

Introduction

Taxonomic features of lice occurring on different kinds of horn bills have been noted by Elbel (1967, 1976, 1977a, b). However, different bio-ecological aspects of phthirapteran parasitizing horn bills escaped the attention of workers. Present report supplements preliminary information on certain population characteristics, crop contents and egg structure of two phthirapteran species parasitizing Indian grey Horn Bill, *Tockus birostris* Scopoli.

Materials and methods

Eight birds (Indian grey Horn Bill, *T. birostris*) were trapped alive during in 2009. The birds were subjected to delousing by placing in strong polythene bag (after tying the legs) containing a wad of cotton wool soaked in chloroform (head out, allowed to breath). After 10 min the bird was taken out and feathers were fluffed over a white plastic sheet. The louse load so obtained was separated species-wise, sexwise and stagewise. The crops of adult and nymph of both the species were teased under stereozoom trinocular microscope to analyze the crop contents. Feathers bearing eggs of both the species were observed to record the egg structure. Furthermore, eggs of *Chapinia clayae* were subjected to Scanning Electron Microscopy to record the egg morphology.

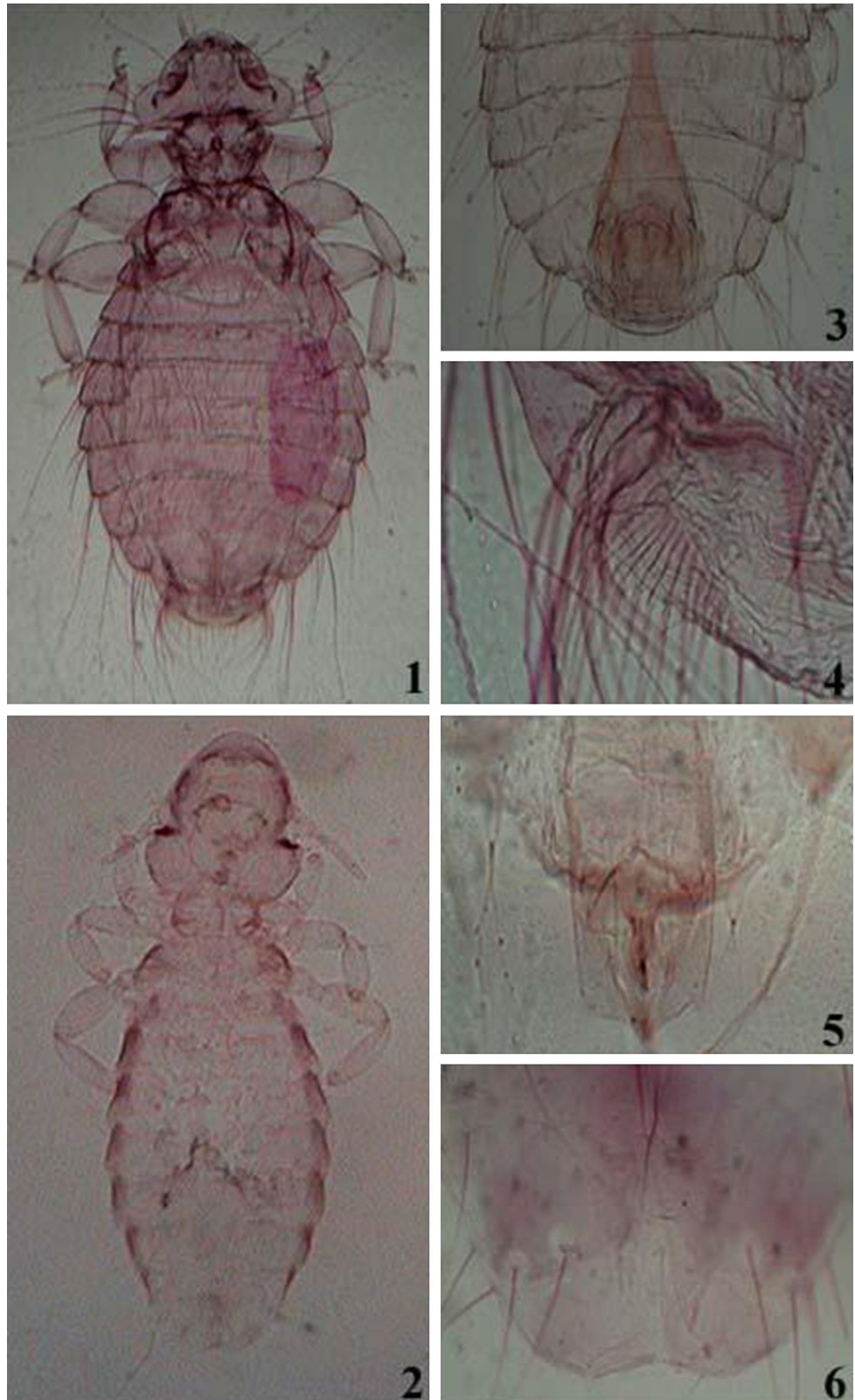
Results

Chapinia clayae Elbel 1967 (Plate 1, Figs. 1, 3 and 4)

Type host: *T. birostris*

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Plate 1 Photos 1–6. **1** LM photograph of adult female *C. clayae* $\times 47$. **2** LM photograph of adult female *B. clarkei* $\times 67$. **3** LM photograph of male genitalia of *C. clayae* $\times 56$. **4** LM photograph of female lateral sclerite of *C. clayae* $\times 390$. **5** LM photograph of male genitalia of *B. clarkei* $\times 535$. **6** LM photograph of female vulval margin of *B. clarkei* $\times 201$



Material studied

32 females, 20 males, 65 nymphs ex. *T. birostris*, INDIA: District Rampur (located at 28°48/N 79°00/E 28.8.1979), 2009, Collected by Aftab Ahmad.

Remarks

Our specimens resemble to *C. clayae* (presented by Elbel 1967) except slight differences in abdominal chaetotaxy (i.e. abdominal sternite II has 39–47 total setae; abdominal sternite VIII with 11–17 setae on posterior margin; anal fringe with 33–36 setae in female and abdominal sternite II with 11–18 total setae in male) and measurements of female [$n = 3$, HW = 0.59 (0.55–0.62), HL = 0.34 (0.33–0.37), PW = 0.41 (0.40–0.44), PL = 0.24 (0.22–0.25), PTW = 0.65 (0.62–0.66), PTL = 0.29 (0.25–0.33), AW = 1.11 (1.07–1.14), AL = 1.34 (1.33–1.36), TL = 2.23 (2.22–2.25)] and male [$n = 3$, HW = 0.54 (0.51–0.55), HL = 0.28 (0.25–0.29), PW = 0.33 (0.29–0.37), PL = 0.23 (0.22–0.25), PTW = 0.46 (0.44–0.48), PTL = 0.24 (0.18–0.29), AW = 0.77 (0.74–0.81), AL = 0.82 (0.77–0.88), TL = 1.59 (1.48–1.70)].

The population characteristics of *C. clayae* have been presented in Table 1.

The crop of most of the lice (both the sexes of adult and the nymphs) carried red content compatible with host blood (along with feather barbules) in their gut indicating that *C. clayae* is probable haematophagous in nature.

The eggs of amblyceran louse, *C. clayae* were found laid mainly on the basal portion of rachis (near the umbilical groove) (Plate 2, photo 2). They are laid in groups (clusters) and glued through enormous secretion which often encircles the entire egg shell (giving the impression of an extra covering). The egg shell is ovoid in appearance (Plate 2, photo 3). Its anterior one fourth portion bears prominent hexagonal ridges (Plate 2, photo 5) which are absent on middle and posterior portion. The hat-shaped operculum bears at least

two rows of hexagonal ridges (Plate 2, photo 4). The apical end of opercular disc is distinctly grooved and devoid of polar thread. The opercular rim is beset with 8–10 micropyles. The basal end the egg bears honey comb like stigma which carries honey comb like structure.

Buceroemersonia clarkei Elbel 1977a (Plate 1, Figs 2, 5 and 6)

Type host: *T. birostris*.

Material studied

48 females, 31 males, 127 nymphs ex. *T. birostris*, INDIA: District Rampur (located at 28°48/N 79°00/E 28.8.1979), 2009, Collected by Aftab Ahmad.

Remarks

The morphological features of specimens resemble to *B. clarkei* (Elbel 1977a) but exhibit marginal difference in measurements of female [$n = 3$, HW = 0.35 (0.33–0.37), HL = 0.44 (0.40–0.48), PW = 0.20 (0.18–0.25), PL = 0.12 (0.11–0.14), PTW = 0.34 (0.33–0.37), PTL = 0.15 (0.14–0.18), AW = 0.50 (0.48–0.51), AL = 0.96 (0.92–0.99), TL = 1.67 (1.59–1.77)] and male [$n = 3$, HW = 0.35 (0.33–0.37), HL = 0.39 (0.37–0.44), PW = 0.20 (0.18–0.22), PL = 0.11 (0.11–0.22), PTW = 0.33 (0.29–0.34), PTL = 0.16 (0.14–0.18), AW = 0.46 (0.44–0.50), AL = 0.75 (0.74–0.77), TL = 1.43 (1.40–1.44)].

An examination of crop contents of several specimens of *B. clarkei* (both sexes of adults and nymphal instars) revealed that it is a feather feeder (crop was found packed with only feather barbules). The presence of red contents compatible with host blood was not detected in any adult or nymphal instar. Furthermore, the crop contents did not show the presence of any triturating agent or parts of lice (indicating that louse is perhaps not involved in cannibalism/predation).

The egg shell of the ischnoceran louse *B. clarkei* appears like miniature rice grain. The egg chorion is quite smooth and devoid of any sculpturing/apophyses. The egg mouth remains covered by a flat opercular disc (unsculptured) which bears 16–18 micropyles along opercular rim (not placed in single line). The eggs of the louse remain scattered on the vane of the feathers (without definite pattern) and are glued through postero-lateral end (Plate 2, photo 1).

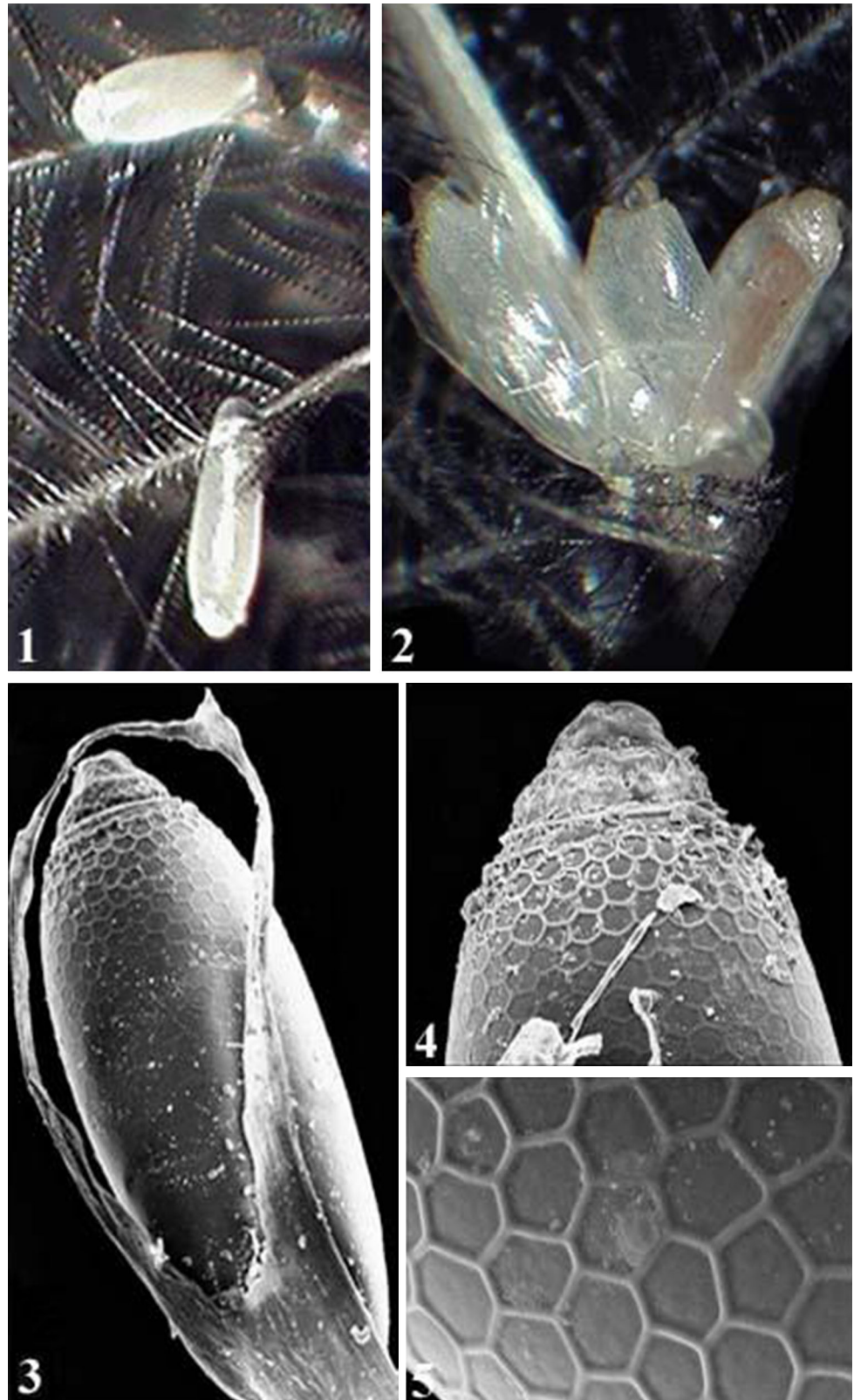
Discussion

Different kinds of horn bills (family Bucerotidae) are known to harbour 42 species of Phthiraptera, belonging to

Table 1 Showing some population characteristics of *Chalinia clayae* and *Buceroemersonia clarkei*

Parameters	<i>Chalinia clayae</i>	<i>Buceroemersonia clarkei</i>
Prevalence	62.5 % ($n = 8$)	75 % ($n = 8$)
Mean intensity	23.4	34.3
Sample mean abundance	14.6	25.8
Range of infestation	14–31	21–54
Male, female ratio (M:F)	1:1.6	1:1.5
Adult, nymph ratio (A:N)	1:1.3	1:1.6
Ratio of the three nymphal instars (I:II:III)	1:0.6:0.8	1:0.8:0.8

Plate 2 Photos 1–5. **1** LM photograph of egg laying pattern of *Buceroemersonia clarkei* $\times 60$. **2** LM photograph of egg laying pattern of *C. clayae* $\times 57$. **3** SEM photograph of egg of *C. clayae* $\times 120$. **4** SEM photograph of anterior portion of egg of *C. clayae* $\times 235$. **5** SEM photograph of anterior egg chorion of *C. clayae* $\times 4$



7 genera (Price et al. 2003). The genus *Tockus* is reportedly infested by nine phthirapteran sp. belonging to four genera (*Chapinia*, *Bucrocophorus*, *Buceroemersonia* and

Buceronirmus). Three phthirapteran species (one amblyceran, *C. clayae* and two ischnocerans e.g. *Buceroemersonia clarkei* and *Buceronirmus albescens* Piaget 1890)

reportedly infest the Indian grey Horn Bills (Price et al. 2003). Lakshminarayana (1979) has listed the presence of only one amblyceran louse, *C. clayae* on Indian grey Horn Bill. The presence of *Buceroemersonia clarkei* on *Tockus birostris* is being recorded in India for the first time. Moreover, the occurrence of genus *Buceroemersonia* on Indian birds has not been noted earlier.

Although the sample size was too small to analyze the population dynamics of the louse, the present study provides preliminary clue that the prevalence and intensity of two phthirapterans, appears to be higher in contrast to other Indian birds, studied so far (Chandra et al. 1990; Trivedi et al. 1992; Saxena et al. 1995, 2007; Gupta et al. 2007; Beg et al. 2008; Rajput et al. 2009; Ahmad et al. 2010; Arya et al. 2010). Since *Chapinia clayae* was found to be a probable haematophagous, its presence in large numbers may create problems, as the blood consuming species do not only affect the vitality and productivity the hosts but may also be involved in the transmission of pathogenic strains among the birds (Price and Graham 1997; Saxena et al. 1985). Phthirapteran egg shell often exhibit sculpturing/ornamentation (Balter 1968a, b, Gupta et al. 2007). Markings present on the egg cases can be used to differentiate the species. The egg shells of *Buceroemersonia clarkei* appeared to be simple structure but the eggs of *Chapinia clayae* exhibit peculiar feature (i.e. extra covering of gluing material and the occurrence of apically grooved operculum).

Acknowledgments The authors are indebted to the Principal, Govt. Raza.P.G. College, Rampur (U.P) for providing laboratory facilities, to Chief Wild Life Warden of U. P. (India) for permission for to catch the birds and to the UGC, New Delhi for providing financial support to Dr. A. K. Saxena, in the form of project no. No 38- 86/2009 (SR).

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