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Nature and Science

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

FIRST RECORD OF *GONIOCOTES GALLINAE* (DE GEER, 1778), ON *GALLUS SONNERATTI* TEMMINCK, 1813 (GALLIFORMES: PHASIANIDAE) FROM INDIA

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Abstract: *Gallus sonneratti* Temminck, 1813 (Galliformes: Phasianida) reportedly carries four species of Phthiraptera (two amblyceran louse, *Menacanthus pallidulus,* Neumann, 1912; *Menopon gallinae* Linnaeus, 1758 and two ischnoceran louse, *Goniodes dissimilis* Denny, 1842; *Lipeurus caponis* Linnaeus, 1758). During the present studies, one more ischnoceran louse, *Goniocotes gallinae* (De Geer, 1778) was recorded for the first time from the aforesaid host. As a result, the presence of *G. gallinae* (De Geer, 1778) on *G. sonneratti* Temminck, 1813 represents a new host record.

[Aftab Ahmad and Gaurav Sharma. **FIRST RECORD OF *GONIOCOTES GALLINAE* (DE GEER, 1778), ON *G ALLUS SONNERATTI* TEMMINCK, 1813 (GALLIFORMES: PHASIANIDAE) FROM INDIA**. *Nat Sci* 2023, 21(5):41-44].ISSN1545-0740(print);ISSN2375-7167(online).http://www.sciencepub.net/nature 05.doi:10.7537/marsnsj210523.05.

Key words: *Gallus sonneratti*, ischnocera, amblycera, lice, new host record, Phthiraptera,

Introduction:

The genus *Goniocotes* Burmeister, 1838, contains forty-eight species of Phthiraptera that are ectoparasitic on birds in the Phasianidae family (Price et al. 2003). Workers like Ahmad et al. 2014; Ansari, 1955; Clay, 1938; Emerson, 1951, 1956, Emerson, and Elbel, 1957a,b; Khan et al. 2003; Lakshiminarayana, 1971, 1979; Nasser et al., 2014; Naz et al., 2011; Price and Graham 1997; Saxena et al., 2010; Sychra et al., 2008; Trivedi et al., 1991) have described various species of galliformes birds. Price et al. 2003 also reported two ischnoceran species, *Goniodes dissimilis* Denny, 1842, *Lipeurus caponis* (Linnaeus, 1758) and two amblyceran species, *Menacanthus pallidulus* (Neumann, 1912a), *Menopon gallinae* (Linnaeus, 1758) from *Gallus sonneratti* Temminck, 1813 (Galliformes: Phasianida). The presence of *Goniocotes gallinae* (De Geer, 1778) on *Gallus sonneratti* Temminck, 1813 has been documented for the first time in India and the rest of the world.

Material and methods

In the year 2021, ten Grey Jungle Fowl, *Gallus sonneratti* Temminck, 1813 were examined in Odisha's district Gajpati. After tying the legs, each bird was thoroughly searched for the presence of phthirapteran ectoparasites by visual examination with the help of a magnifying lens equipped with a light source. Uninfected birds were released in their respective places, and infested hosts were subjected to delousing by the modified Fairlsle method (Gupta et al. 2007). The entire louse load was transferred to 75% ethyl alcohol and separated by sex, species, and stage of growth. For the SEM study, lice were fixed in 2.5% gluteraldehyde, post-fixed in 0.25 M phosphate buffer, critical dried, mounted on a metal specimen stub using double-sided black tape, coated with gold palladium in the Neo Coater 100-240V, and observed under SEM (Neo JCM-6000). The samples were then observed under SEM at varying magnifications, and selected areas were photographed. Some specimens were treated with osmium tetraoxide (2%) for better results. Measurements are given in millimeters (Table 1).

Results:

Female: (Plate-I, Figs. 1-3)

Head with marginal carina moderately developed; antennae filiform; hyaline margin absent, dorsal carina absent and ventral carina banded around the pulvinus, dorsal preantennal suture absent, ocular seta minute; marginal temporal carina moderately developed.

Pronotum with posterolateral angle slightly protruded and bearing one thick setae on each side. Anterior setae absent.

Pteronotum without any indication of division medially; with 02 long setae on posterolateral angle and one normal and small setae on posterior margin each side. Posterior margin of pteronotum curved or distinctly V shaped. Leg sternocoxal in articulation.

Abdominal terga II comparatively larger; terga II-VIII separately medially; IX-X fused and continuous;

spiracles present, last tergam with 02 long and 3 short to minute setae on each side marginally; vulva small and membranous with 2-3 short spines like each side.

Male: (Plate-II, Figs. 1-3)

Head is long is as broad, nearly quadrate, marginal carina well founded, broader in front, narrow on the sides. Temples strongly angulate with rounded tips. Shape and chaetotaxy of pronotum of male as much as female. Pteronotum bearing two long and three short setae on each posterolateral margin. Terga II-III bearing one long and two short setae and IV to VII one long and one short setae. Pleural plates well developed forming a simple, comma shaped marginal sclerotization. Antennae are simple and do not show sexual dimorphism. The males are distinctly smaller than female. Male genitalia short and simple and comprising segments IX-X, Lateral sclerotic plates present on segment X, posterior margin of the last abdominal segments bear six to seven normal and one micro setae medially and two very long setae at laterally.

Discussion:

Goniocotes Burmeister, 1838 is closely related to *Goniodes* Nitzsch, 1818 and *Companulotes* Keler, 1939 in having of head margin and body shape, filliform and monomorphic antennae, sclerotization on the abdomen, abdominal chaetotaxy, vulval margin, short and simple male genitalia, rounded temples, and small size in generic level. *Goniocotes gallinae* (De Geer, 1778) is similar to *G. maculates* in terms of antennal segmentation, female genitalia, body shape, and an anterior head margin, but can be distinguished by the following characteristics i.e. the pre-antennal region, antennal structure, the occipital angle, the thorax lateral margin, the IIIrd abdominal segment, the tergopleurites, the vulval margina, and the male genitalia. Other than *Goniodes* and *Companulotes*, the members of *Goniocotes* are much smaller and only slightly pigmented. They are often mistaken for nymphal instars of species in the genera *Companulotes* and *Goniodes* and easily distinguish the members of this genus from all others. *G. gallinae* can be distinguished from other Mallophaga species of poultry by the presence of two long setae on the posterior margin of the head and by the lateral margins of the prothorax being extended (Sanders 1960).

Goniocotes gallinae (De Geer, 1778) *is* found worldwide on domestic chickens, the type host, but in the present study this species has also been collected from grey jungle fowl in Odisha, India. It is commonly known as the "poultry fluff louse" and is usually seen attached to the down or fluff at the base of the feathers, or around the vent of the feathers of the hosts, but may occur on feathers on any part of the body. Trivedi et al. (1991) found it to be fairly evenly distributed over the host, with 26% on the back, 27% on the abdomen, and lesser numbers on the breast, tail, and wings. Although generally believed to be an economic pest of chickens, *G. gallinae* (De Geer, 1778) *is* usually considered to be less damaging than some of the other poultry lice (Roberts and Smith, 1956; Furman, 1962). The aim of this study was to provide information on the presence of *G. gallinae* (De Geer, 1778) on *Gallus sonneratti* (Temminck, 1813) along with a description using scanning electron microscopy. The presence of *G. gallinae* (De Geer, 1778) on *G. sonneratti*, Temminck, 1813) is reported for the first time in India.

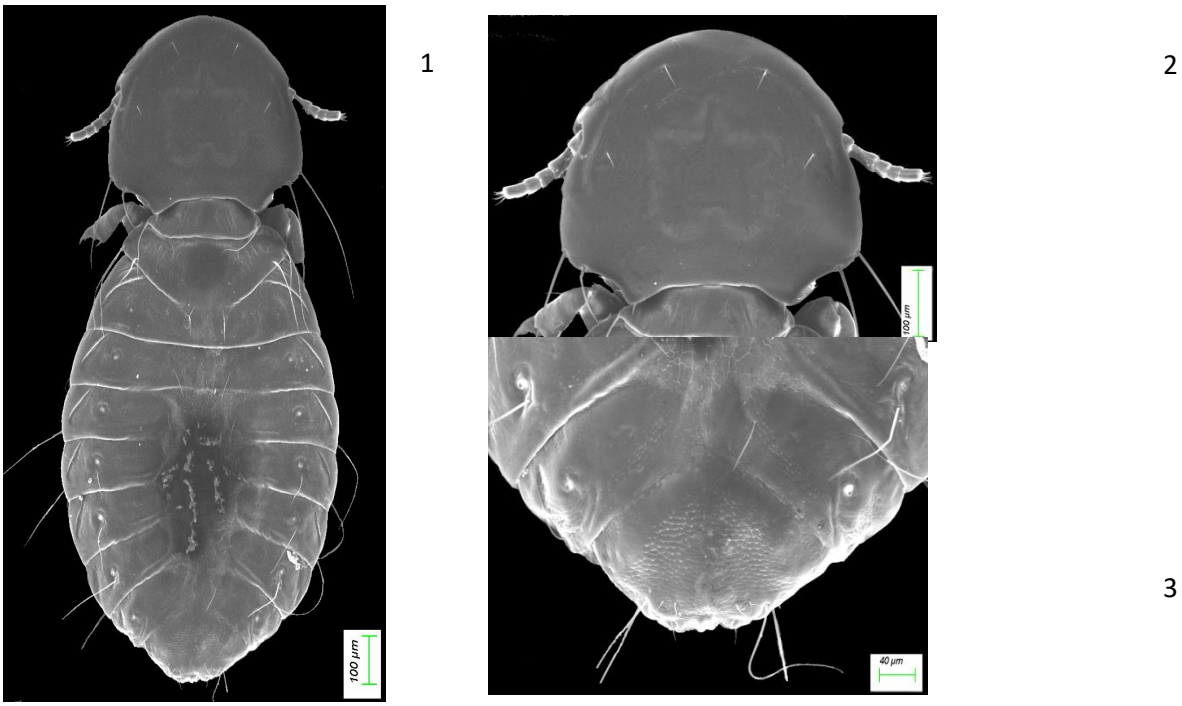
Acknowledgments:

A deep sense of gratitude is expressed to Dr. Dhriti Banerjee, Scientist G and Director of the Zoological Survey of India, Kolkata, for providing opportunity and facilities for the execution of this work. The authors are extremely thankful to Dr. Anil Mohapatra, Scientist "E" and Officer-in-Charge, for extending his valuable and affectionate guidance and suggestions.

Table1: Measurements (m.m.) of *Goniocotes gallinae* (De Geer, 1778) parasitizing the Gallus sonneratti (Temminck, 1813)

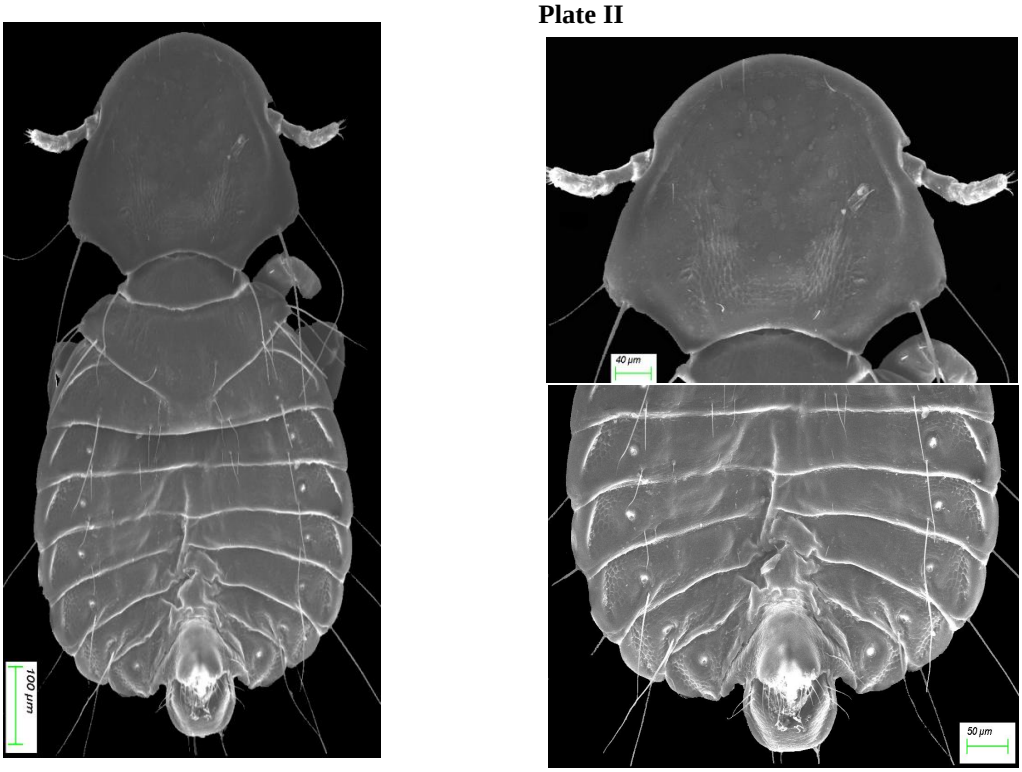
Characters	Female		Male	
	Length	Width	Length	Width
Head	0.38	0.48	0.28	0.38
Pre-antennal	0.14	0.42	0.10	0.30
Post antennal	0.24	0.48	0.18	0.38
Prothorax	0.08	0.27	0.07	0.22
Pterothorax	0.16	0.41	0.12	0.36
Abdomen	0.75	0.68	0.40	0.53
Genitalia	-	-	0.08	0.10
Total	**1.37**		**0.87**	

Plate I



Figs 1-3, Plate I: SEM photographs of adult female *Goniocotes gallinae* (De Geer, 1778) 1. Habitus dorsal view 2. Enlarged view of head 3. Enlarged view of terminalia.

Plate II



Figs 1-3, Plate II: SEM photographs of adult male *Goniocotes gallinae* (De Geer, 1778) 1. Habitus dorsal view 2. Enlarged view of head 3. Enlarged view of terminalia.

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5/22/2023