

A NEW GENUS AND SPECIES OF MALLOPHAGA

By THERESA CLAY, B.Sc.

*From British Museum, Natural History**Chelipster*

(With 7 Figures in the Text)

ELSEWHERE (paper in the Press) the author has shown that the majority of species originally described under *Goniodes*, although somewhat diverse in form, are fundamentally similar and cannot be separated generically. However, there are certain species originally placed in *Goniodes* which are generically distinct and should be separated. Among these is a group of species, forming the new genus described below, which is distinguished in both sexes by the small size of the first segment and the characters of the terminal segments of the abdomen and in the male by the form of the clavi.

***Virgula* n.g.**

Description of the genus. Head circumfasciate and somewhat diverse in shape with the form of the male clavi being the most constant and typical generic character. The clavi (= *zapfen* of Kéler) are transparent and consist of a basal portion which is prolonged distally into a fine point (Fig. 2a); in the female the clavi are normal. In the known species the antennae are sexually dimorphic, the male having the distal pre-axial angle of the third segment produced to a greater or less extent. In *Goniodes*, on the other hand, in the sexually dimorphic antennae, it is the distal post-axial angle which is produced.

Pterothorax comparatively large with straight divergent lateral margins and a central sternal plate bearing hairs.

Abdomen elongated and somewhat pointed posteriorly with segment I (= true II) small in both sexes (compare *Goniodes*). In the male segments VIII and IX (= true IX and X) are fused and elongated in an antero-posterior plane. The terminal bilobed portion of the abdomen is probably formed from segment X (= true XI). In *Goniodes* segments VIII and IX are small and not fused and segment X is probably associated with the genital opening which lies on the dorsal surface. In this genus however the genital opening is ventral. Paratergal plates well marked with complicated re-entrant heads. Sternal thickening of segments I-VI in the form of lateral plates; sternites of VIII and IX fused and giving rise to an elongated finger-shaped appendage bearing minute spines especially numerous on the terminal area. At the base of this appendage the chitin is modified to form what is apparently a hinge and there are supporting struts passing in towards the appendage from each lateral margin.

In the female of *Goniodes* segments VIII and IX (=true IX and X) are fused and surround the small remnant of segment X (=true XI). In the genus *Virgula*, it appears that segment X is comparatively large and has well-marked tergal plates separated medianly and that it is not surrounded by but is posterior to the segment formed from the fusion of VIII and IX. The genital region is without particular distinguishing marks and there is a single row of hairs on the posterior margin of the vulva.

Genotype. *Goniodes meleagridis* (Linné) from *Meleagris gallopavo domestica*, the domestic turkey.

This genus contains species from *Meleagris*, *Agriocharis*, *Lerwa*, *Oreophasis*, *Pauzi*, *Ortalis*, *Chamaepetes*, *Crax*, *Penelope*, *Penelopina*, *Dendrortyx*, *Callipepla* and *Odontophorus*. The distribution of this genus is therefore somewhat curious, occurring as it does on the Meleagrididae, on one genus of the Phasianinae (*Lerwa*), on the Odontophorinae and Cracidae. It may also of course be found to occur on other families of birds. This distribution cannot indicate any close affinities between the families and subfamilies mentioned above but may possibly be due to the fact that the genus was once widespread throughout the Galliformes and has since died out in the intervening genera. The diversity of the species of the genus lends support to this theory.

Virgula meleagridis (Linné), 1758 (Figs. 1-4)

Pelliculus meleagridis Linné, 1758, p. 613. Host: *Meleagris gallopavo domestica*.

Goniodes stylifer Nitzsch, 1818, p. 294. Host: as above.

Rhopalocerus styliferum Taschenberg, 1882, p. 47, emend. for *stylifer* Nitzsch.

This is a distinct and characteristic species separable from the other species of the genus by the temples in both sexes being greatly prolonged backwards and by the characters of the male genitalia.

Male. Head as shown in Fig. 1a. First segment of antennae enlarged and bearing a small thickened process; third segment has the distal pre-axial angle slightly prolonged and the distal dorsal margin bears a small thickened process, giving rise to three small hairs. Temples expanded and produced backwards each side.

Thorax with lateral margins of pro- and pterothorax divergent. Sternal plate triangular in shape and bears six stout elongated hairs each side (Fig. 2b). Dorsal chaetotaxy as in female.

Abdomen somewhat elongated with segment I the shortest and with segments VIII and IX enlarged. Tergal plates I-VI are separated widely; those of the terminal segments being transversely continuous. Paratergal plates well developed with large beak-like re-entrant heads. Sternal thickening of segments I-VI in the form of individual lateral plates; that of segments VII and VIII in the form of single central plates. The ventral abdominal appendage arises from segment VIII and bears numerous spine-like hairs on the distal portion (Fig. 1b). On the dorsal surface of the abdomen segments

II-VI have one long lateral hair each side; segment I has six central hairs; segments II-VI with number of hairs variable in number, ranging from seven to ten; segment VII has two central hairs. On the ventral surface segment I

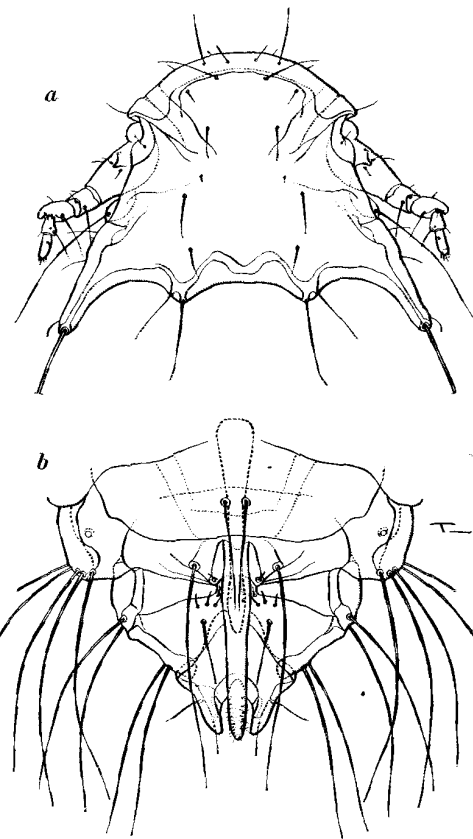


Fig. 1. *Virgula meleagridis*, ♂. a, head; b, terminal segments of abdomen.

has two central hairs; segments II-V have a variable number of hairs on each segment, ranging from eight to ten; segment VI has four hairs. Terminal segments as shown in Fig. 1b.

The genitalia (Fig. 2c) have been fully described by Cummings (1916, p. 292).

Female. Head as shown in Fig. 3 and differs from that of male in the absence of the modified clavi and enlarged antennae.

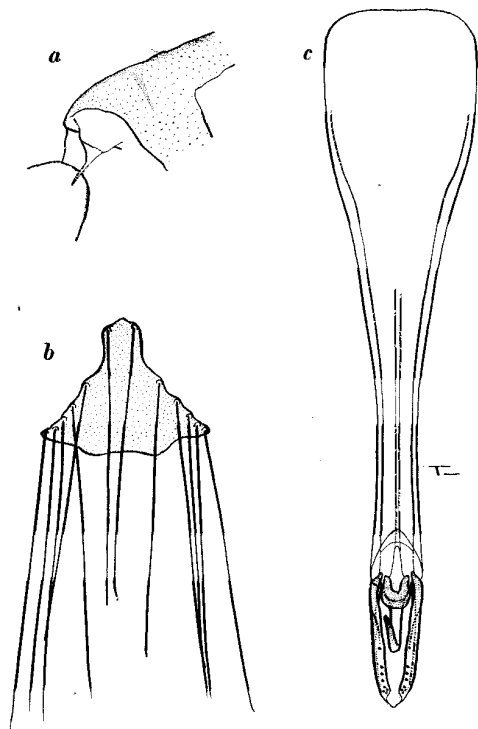


Fig. 2. *Virgula meleagridis*, ♂. a, clavi; b, sternal thoracic plate; c, genitalia.

Thorax and abdomen as shown in figure. On the ventral surface segment I has two central hairs; segment II has fifteen to eighteen hairs across the segment; segments III-V have seventeen to twenty hairs; segments VI-VII have two central hairs. Chaetotaxy of vulva and terminal segments as shown in Fig. 4.

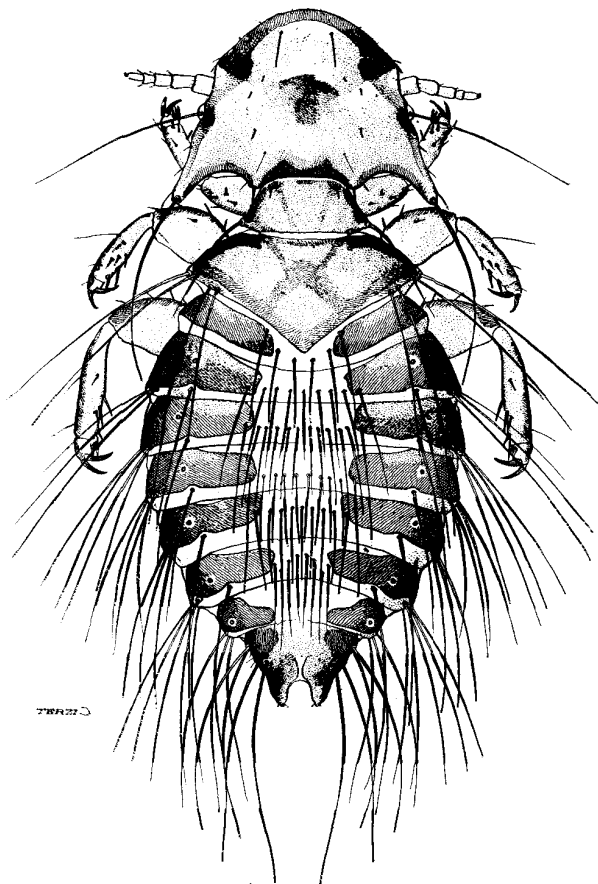


Fig. 3. *Virgula meleagridis*, ♀.

Table 1

	Male		Female	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head	0.76*	1.28	0.81	1.44
Prothorax	0.40	0.66	0.31	0.66
Pterothorax	0.62	1.13	0.68	1.22
Abdomen	2.25	1.50	2.19	1.76
Total	3.85		3.54	
Cephalic index	1.68		1.78	

Total length of genitalia 0.825 mm.

* Measurements taken from anterior margin to mid-line of occiput.

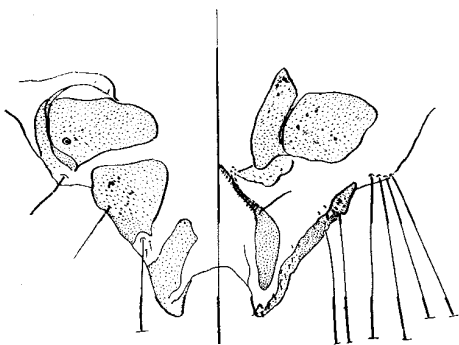


Fig. 4. *Virgula meleagridis*, ♀. Terminal segments of abdomen.

Specimens examined. 10 ♂♂, 8 ♀♀ from *Meleagris gallopavo domestica* from various localities; 9 ♂♂, 5 ♀♀ from skins of *M. gallopavo merriami* Nelson from Texas; 5 ♂♂, 6 ♀♀ from skins of *Agriocharis ocellata* (Cuvier).

Neotype. ♂ in the British Museum Collection, no. 1906-174, from *Meleagris gallopavo domestica* from Roumania. *Neoparatypes.* 9 ♂♂, 8 ♀♀ from the same host from various localities.

Taschenberg (1882, p. 47) included this species in his genus *Rhopaloceras*, for which he made no genotype. Harrison (1916, p. 24) designated *Goniodes aliceps* Nitzsch from *Tinamus tao* as genotype of *Rhopaloceras*, which means that this genus is quite distinct from that described above.

Virgula lervicola n.sp. (Figs. 5-7)

This is a distinct species not closely resembling any other known species of the genus. The diagnostic characters are the shape of the head and terminal segments of the abdomen in both sexes and the male genitalia.

Description of male. Head with narrow clypeal band and transparent pointed clavi characteristic of the genus; antennae with first segment enlarged

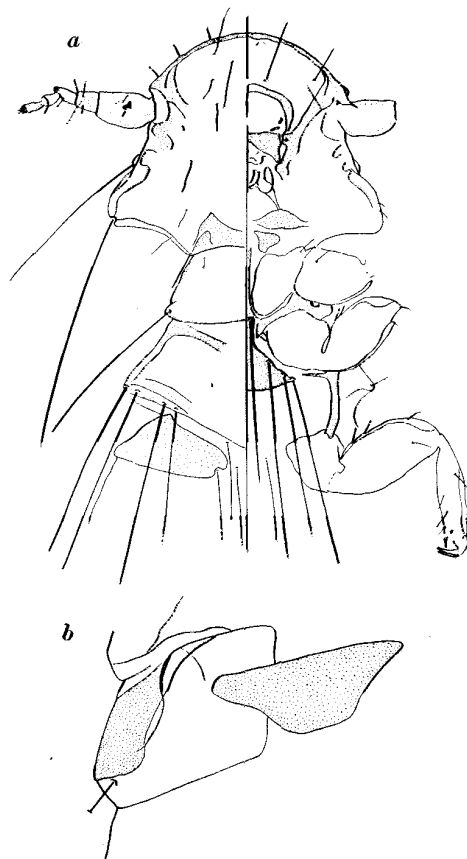


Fig. 5. *Virgula lervicola*, ♂. a, head and thorax; b, paratergite and sternite of fourth abdominal segment.

and bearing small thickened process and with distal pre-axial angle of third segment prolonged slightly with thickened distal end. Temples with angles curved slightly posteriorly and bearing thickened elongated hair (Fig. 5a).

Thorax as shown in Fig. 5a, with irregular triangular sternal plate bearing four stout elongated hairs each side.

Abdomen somewhat elongated in shape with segment I small and segments VIII and IX enlarged, the latter being deeply bilobed posteriorly and with the distal point of each lobe greatly thickened. Tergal plates I-VI widely separated; plates VII and VIII transversely continuous. Paratergal plates of characteristic form (Fig. 5b). Sternal thickening of segments I-VI in the form of individual lateral plates and that of segment VII as a continuous plate

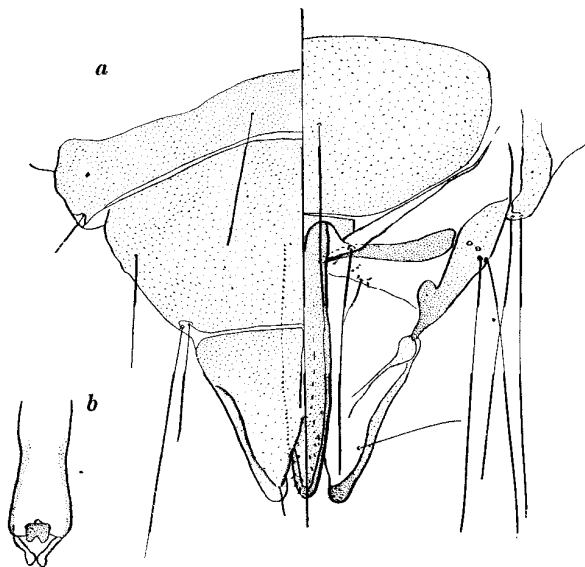


Fig. 6. *Virgula lervicola*, ♂. a, terminal segments of abdomen; b, genitalia.

across the segment. Ventral abdominal appendage arises from segment VIII and does not reach beyond the posterior margin of abdomen (Fig. 6a). Abdominal chaetotaxy as shown in table given below.

Genitalia comparatively small with basal plate swollen proximally and paramera club-shaped (Fig. 6b).

Description of female. Head differing in shape from that of male (Fig. 7a) and with clavi somewhat transparent and not projecting laterally.

Thorax as in male.

Abdomen with first segment short and terminal segment enlarged, and broadly bilobed. Tergal plates I-VII separated medianly; paratergal plates

as in male; sternal thickening on segments I-VII in the form of lateral plates. Posterior margin of vulva bilobed and set with short hairs (Fig. 7b). Abdominal chaetotaxy as shown in table.

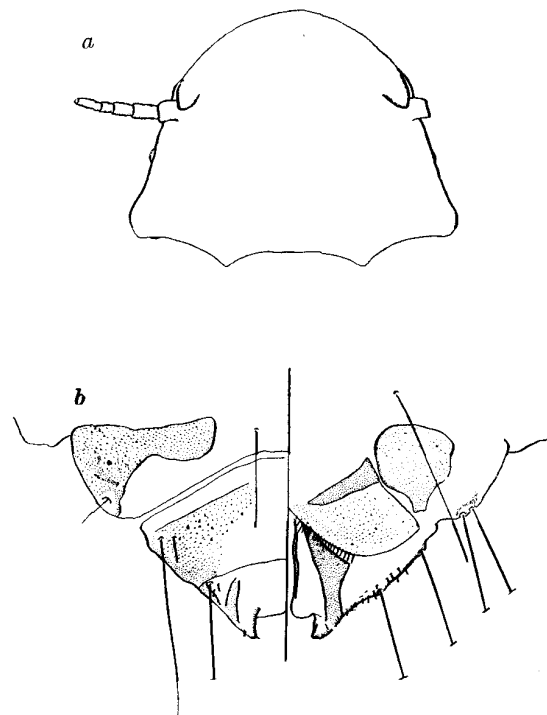


Fig. 7. *Virgula lervicola*, ♀. a, outline of head; b, terminal segments of abdomen.

Table 2. Abdominal chaetotaxy

	Male			Female		
	T.	S.	P.	T.	S.	P.
I	6	2	0, 0	8	2	0, 0
II	1, 6, 1	6-8	1, 1	1, 10-14, 1	10-12	1, 1
III	1, 6, 1	6-8	1, 1	1, 10-14, 1	10-12	1, 1
IV	1, 6, 1	6-8	1, 1	1, 10-14, 1	10-12	1, 1
V	1, 6, 1	6-8	2, 2	1, 10-14, 1	10-12	2, 2
VI	1, 4, 1	2	2, 2	1, 8, 1	2	2, 2
VII	2	2	2, 2	Fig. 7b	Fig. 7b	2, 2
VIII	4	Fig. 6a		Fig. 7b	Fig. 7b	
IX	4	Fig. 6a				

T. = tergal. S. = sternal. P. = paratergal.

Table 3

	Male		Female	
	Length mm.	Breadth mm.	Length mm.	Breadth mm.
Head	0.60-0.65	0.78-0.86	0.69-0.70	0.94-0.97
Prothorax	0.24-0.26	0.48-0.50	0.22-0.24	0.52-0.54
Pterothorax	0.36-0.40	0.72-0.79	0.36-0.38	0.79-0.83
Abdomen	1.42-1.55	0.98-1.09	1.29-1.42	1.11-1.30
Total	2.57-2.87		2.54-2.65	
Cephalic index		1.30-1.32		1.37-1.39

Total length of genitalia 0.385 mm.

Described from 13 ♂♂ and 18 ♀♀ from skins of *Lerwa lerwa* (Hodgson) from Sikkim.

Holotype. ♂ in the Meinertzhagen collection, slide no. 3119. *Paratypes*. 12 ♂♂ and 18 ♀♀.

The following species should also be included in *Virgula*:

Goniodes longipes Piaget.

Goniodes longipes Piaget, 1880, p. 253, pl. XX, fig. 7. Host: *Pauzi pauzi* (Linné). (*Crax galeata*.)

This species is represented in the Piaget Collection in the British Museum by two males and two females and in the Leiden Museum by two females. It is hoped in a subsequent publication to give figures and a description of this species.

Goniodes bicolor Rudow.

Goniodes bicolor Rudow, 1869, p. 26. Host: *Penelope marail* (Müller). (*Penelope Macalli*.)

Taschenberg (1882, p. 34), who saw Rudow's specimens, considered this species to be identical with *longipes* Piaget. It can therefore be assumed that the two species are congeneric, but without material from the type host of *bicolor* it is not wise to assume that *bicolor* and *longipes* are conspecific.

Goniodes eximius Rudow.

Goniodes eximius Rudow, 1869, p. 25. Host: *Oreophasis derbianus* Gray. (*Oreophasis Derbyanus aus* Guatemala.)

This species was described and figured by Taschenberg (1882, p. 35, pl. III, fig. 1) from Rudow's original specimens and is a typical *Virgula*.

Goniodes diversus Rudow.

Goniodes diversus Rudow, 1870, p. 484. Host: *Penelopina nigra* (Fraser). (*Penelope nigra*.)

Taschenberg (1882, p. 37), who saw a single example of this species from Rudow's collection, considered that it was most probably conspecific with *eximius*. Therefore it can be assumed, as in the case of *bicolor* and *longipes*, that *diversus* and *eximius* are congeneric although not necessarily conspecific.

Goniodes rotundus Rudow.

Goniodes rotundus Rudow, 1869, p. 28. Host: *Penelopina nigra* (Fraser). (*Penelope nigra*.)

It does not appear from the description that this species is conspecific with *diversus*, and it is difficult to say to what genus it does belong. The name must therefore be ignored until sufficient material from *Penelopina nigra* has been examined and the species occurring on this host known.

Species included in the genus *Virgula*

Type Host

<i>Virgula meleagridis</i> (Linné).	<i>Meleagris gallopavo domestica</i> .
<i>Virgula lervicola</i> n.sp.	<i>Lerwa lerwa</i> (Hodgson).
<i>Virgula longipes</i> (Piaget).	<i>Pauzi pauzi</i> (Linné).
<i>Virgula bicolor</i> (Rudow).	<i>Penelope marail</i> (Müller).
<i>Virgula eximia</i> (Rudow).	<i>Oreophasis derbianus</i> Gray.
<i>Virgula diversus</i> (Rudow).	<i>Penelopina nigra</i> (Fraser).

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