

THREE NEW SPECIES OF *DEGEERIELLA* NEUMANN (MALLOPHAGA)
FROM THE FALCONIFORMES (AVES).

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THE three new species of *Degeeriella* described below show an interesting condition of the pulvinus and ventral carinae, and their descriptions are therefore being published in advance of a revision of *Degeeriella* now in preparation.

While attempting to formulate a key to the genera of the Ischnocera it was at one time thought possible to use the characters of the ventral carinae and pulvinus to separate the *Degeeriella*-complex and many of the "lipeurid" genera from the *Brüelia*-complex, the *Cummingsiella* complex and some of the "esthiopterid" genera such as *Ardeicola*. In the former the pulvinus is usually in the form of a simple lobe and the ventral carina either complete or, if interrupted medially, the two carinae pass anteriorly and merge with the general sclerotisation of the head at the anterior edge of the pulvinus; from this point the ventral preantennal suture passes forward either to or near the anterior margin of the head (Clay, 1951: 180, fig. 13). In the *Brüelia*-complex the ventral carina is always interrupted; the two carinae may or may not be continued to the anterior margin of the head, but each always has a flattened edge parallel to that of the opposite carina to which is attached a lobe of the pulvinus (Clay, 1951, Pl. I, fig. 4). However, two of the new species of *Degeeriella* described below, *guimarãesi* and *meinertzhageni*, have the ventral carinae and pulvinus as in some species of *Brüelia*. Further, it is of interest that in the nymphs of *D. rufa* (Burmeister) from *Falco*, but not in the adults, the form of the pulvinus and ventral carinae resembles that of the adults and nymphs of these two new species. Both these species further resemble *D. rufa* in having some indication of the tergal plates of abdominal segment XI¹ in the males, not apparent in any other known species of *Degeeriella* from the Falconiformes except *D. elani* Tendeiro. *D. guimarãesi* also resembles *D. rufa* in the form of the female genital plate, which has a central posterior prolongation, and in the penis not being joined to the basal apodeme by a central sclerite (the penial sclerite); neither of these characters has been found elsewhere among known species from the Falconiformes. In addition to the characters of the pulvinus and ventral carinae, *D. guimarãesi* and *D. meinertzhageni* resemble each other in having the inner genital sclerites (Clay, 1957: 339, fig. 5A, *ig*) of the female genital region fused in the middle. *D. elani* Tendeiro and *D. elbeli* sp. n. show a greater development of the ventral carinae compared to most other species of *Degeeriella*. *D. elani* resembles *D. meinertzhageni* in the presence of small tergal plates on segment XI of the male and in the form of the sclerotisation of the tergum of the last segment of the female abdomen.

¹ The interpretation of the terminal segments of the male abdomen is doubtful; the sclerite or sclerites immediately below the fused IX-X (the first apparent segment being II) are here referred to as the tergites of XI.

Host Relationships.

According to Peters (1931), the hosts of the new species described below are placed in two adjacent subfamilies of the family Accipitridae. The subfamily Elaninae contains three genera, of which *Degeeriella* have been seen from *Elanus* and *Chelictinia*. The subfamily Perninae contains six genera, of which *Degeeriella* have been seen from *Elanoides*, *Aviceda* and *Pernis*. These species of *Degeeriella*, with the exception of those from *Aviceda* and *Elanus*, are markedly different from those on the rest of the Accipitridae, and compared with species found on other subfamilies rather diverse amongst themselves. The differences between the male genitalia of the species from *Pernis*, *Elanoides*, *Chelictinia* and *Aviceda*, for instance, are greater than between those of most of the species from the Accipitrinae, Buteoninae, Circinae and Circaetinae combined. For this reason, only very tentative suggestions can be made about their relationship to each other and hence about the relationships between their hosts. As already shown, *D. elani* from *Elanus* and *D. meinertzhageni* from *Chelictinia* have some characters in common and may be related; the latter species also shows relationship to the species from *Elanoides*. In the Perninae, *D. guimarãesi* from *Elanoides* appears to be related to the species from *Chelictinia* and possibly also to that from *Falco*. The species from *Aviceda* is perhaps related to that from *Elanus*. The two species from *Pernis* (see Clay, 1957) are distinctive and show no obvious relationship to any other.

Thus, with the exception of *Pernis*, the species included in the subfamily Elaninae and Perninae are parasitised by species of *Degeeriella* which appear to form a related group, those from *Elanoides* and *Chelictinia* being the most alike and that from *Aviceda* being the most distinct; the species found on *Falco* may also belong to this group.

***Degeeriella guimarãesi* sp. n.**

(Pl. I, figs. 1, 4; text-figs. 1, 4, 5, 6, 10, 12, 15).

Type host: *Elanoides forficatus forficatus* (Linn.).

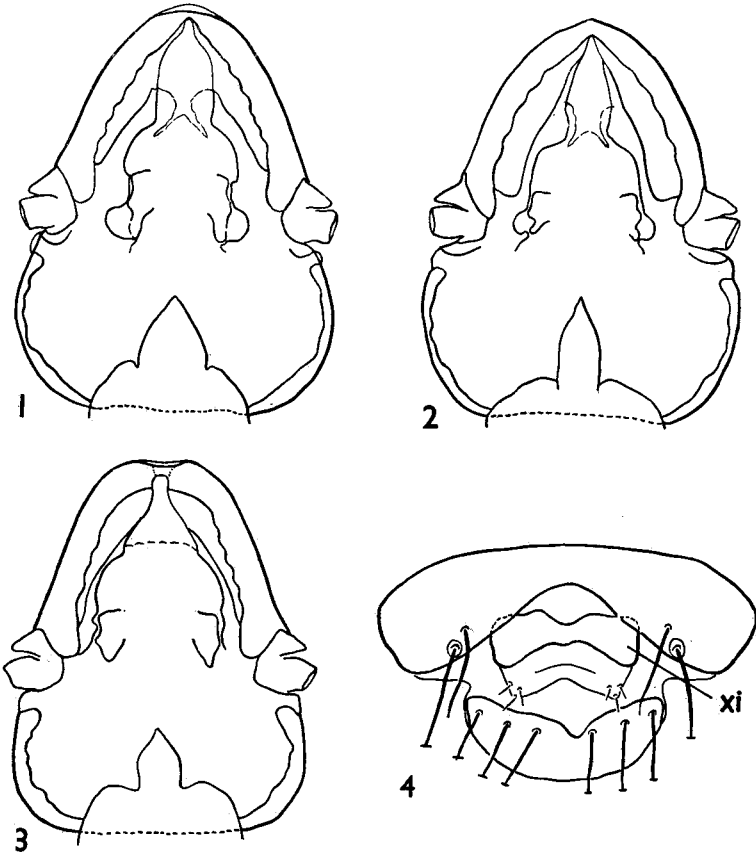
This is a darkly coloured species which differs from *D. meinertzhageni* sp. n. and *D. rufa* (Burm.) in the shape of the head, male genitalia and female genital region; it also differs from *D. rufa* in the form of the pulvinus and ventral carinae.

Male.—Head as in fig. 1; marginal carina reduced centrally with hyaline margin apparent in this area; inner dorsal margin of marginal carina indented medianly; ventral carinae and pulvinus of distinctive form as discussed above; ventral preantennal suture does not reach anterior margin; dorsal preantennal region with sculpturing. Tergites II–III without median indentation, but II usually shows a more lightly sclerotised central concave area; shape of fused terga of IX–X characteristic; tergal thickening of XI present as a single plate which may be interrupted medianly (fig. 4). Pleural thickening narrow (fig. 10).² Genitalia as shown in Pl. I, fig. 4 and text-figs. 5–6; penial sclerite present but not joined to penis; setae usually associated with penial arms absent, there is some individual variation in the length of these arms; dorsal endomerals arms may or may not join parameres (fig. 6).

² Although the breadth of the pleural thickening is a useful character, it must be remembered that this thickening may become distorted in mounting; the exact details of the "head" of the thickening are also affected by mounting and should be ignored in comparisons.

Female.—Similar to male in form of head and thorax. Tergites IX–XI without a single unsclerotised area round the bases of the two lateral setae each side. Genital region as in figs. 12 and 15; genital plate with median prolongation; inner genital sclerites fused in mid-line and inner edge of vulva toothed.

Chaetotaxy of abdomen.—Tergocentral setae of male: 4³; III–IV normally 4, range 4–5;



FIGS. 1–4.—(1–3) Male heads showing details of ventral preantennal region, setae omitted. (1) *D. guimaraesi* sp. n. (2) *D. meinertzhageni* sp. n. (3) *D. elbeli* sp. n. (4) *D. guimaraesi*, terminal segments of male abdomen, dorsal.

V–VI range 4–6; VII–VIII normally 6, range 4–6; X normally 2 + 2, one specimen with 4 + 4. In the female tergo-central setae fewer in number: II–VIII normally 4, range 3–5; X, 2 + 2. Pleural setae: II–V, 0 (two females have one on each side of V); VI–VII, 2 each side; VIII, 3; in the male IX has 2 and X, 0; in the female IX–X, 1–2 each side. Sternocentral setae: II, 2; III–VI normally 4, range 3–4; in the male: VII, 4; VIII, 2; last segment with 1 long and 1 spine-like setae each side; female as in fig. 12. Total number of marginal setae, dorsal and ventral, of the last segment in the male varies from 10–14.

³ The two anterior setae always found on segment II are not included in this and the following descriptions.

Measurements in mm.

Male.

	Length.		Breadth.	
	Range.	Mean.	Range.	Mean.
Head (9) . . .	0.57-0.58	0.575	0.43-0.46	0.44
Prothorax (6) . . .	.	.	0.32-0.35	0.33
Pterothorax (6) . . .	.	.	0.47-0.50	0.49
Abdomen (6) . . .	1.12-1.18	1.15	0.55-0.65	0.60
Total (6) . . .	2.00-2.15	2.08	.	.
Genitalia (2) . . .	0.42-0.44	.	.	.
C.I. (9) . . .	0.74-0.79	0.76	.	.

Female.

Head (10) . . .	0.58-0.62	0.60	0.45-0.48	0.47
Prothorax (10) . . .	.	.	0.33-0.37	0.35
Pterothorax (10) . . .	.	.	0.49-0.55	0.52
Abdomen (8) . . .	1.17-1.38	1.30	.	.
Total (8) . . .	2.20-2.33	2.27	.	.
C.I. (10) . . .	0.75-0.79	0.77	.	.

Number of specimens measured given in brackets.

Material examined: 9 ♂, 10 ♀ from *Elanoides f. forficatus* (Linn.) Florida, U.S.A. (skin) and 1 ♂, 6 ♀ from *Elanoides forficatus yetapa*, São Paulo, BRASIL, lent by Dr. S. R. Guimarães.

Holotype ♂ and *allotype* ♀ in the Meinertzhagen Collection, British Museum (Natural History), slide no. 20584a from *Elanoides f. forficatus* from FLORIDA.

Paratypes: 9 ♂, 15 ♀ from the same host form and from *E. forficatus yetapa*, data as given above.

***Degeeriella meinertzhageni* sp. n.**

(Pl. I, figs. 2, 5; text-figs. 2, 7, 8, 11, 13, 16).

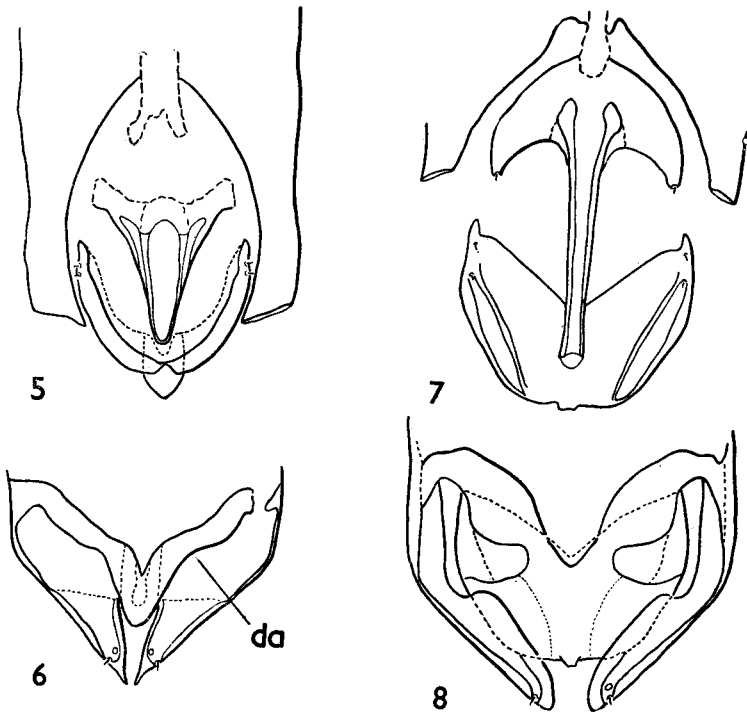
Type host: *Chelictinia riocourii* (Vieillot).

This species is distinguished from *D. guimaraesi* by the shape of the head, the male genitalia and the female genital region.

Male.—Head as in fig. 2; inner dorsal margin of marginal carina indented medianly; ventral carinae and pulvinus as in *guimaraesi*, ventral suture does not reach anterior margin of head. Tergite II with median indentation; sclerotisation of tergum XI in the form of two small plates variable in size and shape. Pleural thickening as shown in fig. 11. Genitalia as in Pl. I, fig. 5 and text-figs. 7-8; there is some variation in the size of the penial arms and in the position of the setae on the ventral endomeral arms.

Female.—Similar to male in form of head and thorax. Tergites IX-XI with a single unsclerotised area round the bases of the two lateral setae each side. Genital plate without median prolongation and with inner genital sclerites fused in the mid-line (fig. 13).

Chaetotaxy of abdomen.—Tergoventral setae: II normally 4, range 3-4; III-VII normally 6, range 3-8; VIII normally 4, range 4-5; X in male has 1-2 each side and in female 2 each side. Pleural setae: II-V, 0; VI-VII one each side; VIII, 3; in the male IX has 2 each side and X, 0; in the female IX and X each have 1-2 each side. Sternocentral setae: II-VI, 4; in the male VII-XI as in *guimaraesi*; in the female as shown in fig. 13. In the male total number of marginal setae of last segment varies from 17-24.



FIGS. 5-8.—(5-6) *D. guimarãesi* sp. n., male genitalia. (5) Ventral view of mesosome. (6) Dorsal view of endomerteral plate and ends of parameres; *da.*, dorsal endomerteral arms. (7-8) *D. meinertzhageni* sp. n., male genitalia. (7) Ventral view of mesosome. (8) Dorsal view of endomerteral plate and ends of parameres. (An irregular interrupted line denotes outline of irregular and variable sclerotisation).

Measurements in mm.

Male.

	Length.		Breadth.	
	Range.	Mean.	Range.	Mean.
Head (16) . . .	0.50-0.56	0.52	0.38-0.44	0.40
Prothorax (10) . . .	. . .	. . .	0.28-0.31	0.28
Pterothorax (10) . . .	. . .	. . .	0.44-0.50	0.47
Abdomen (10) . . .	1.13-1.30	1.22	0.57-0.68	0.63
Total (10) . . .	2.00-2.21	2.08	. . .	. . .
Genitalia (3) . . .	0.48-0.50	. . .	. . .	. . .
C.I. (16) . . .	0.73-0.82	0.77	. . .	. . .

Female.

Head (10) . . .	0.52-0.57	0.55	0.40-0.45	0.42
Prothorax (5) . . .	. . .	. . .	0.28-0.32	0.30
Pterothorax (5) . . .	. . .	. . .	0.46-0.52	0.49
Abdomen (5) . . .	1.37-1.44	1.41	. . .	. . .
Total (5) . . .	2.23-2.37	2.32	. . .	. . .
C.I. (10) . . .	0.73-0.80	0.77	. . .	. . .

Material examined : 16 ♂, 10 ♀ from *Chelictinia riocourii* from Shoa, ABYSSINIA (skin) and from Kagmar, Sudan.

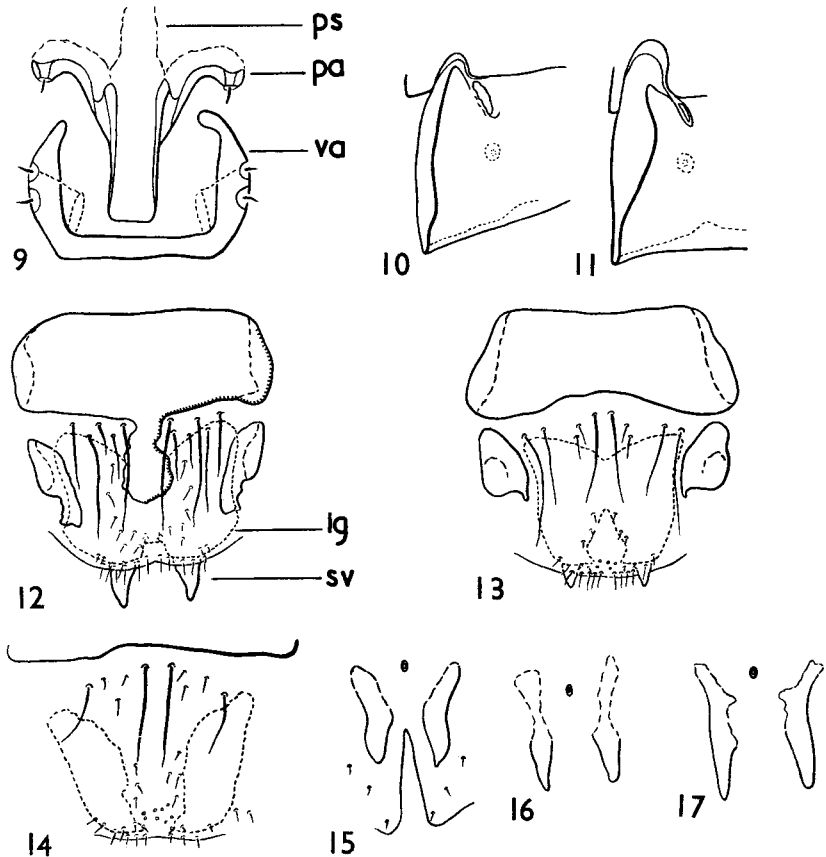
Holotype ♂ and *allotype* ♀ in the Meinertzhagen collection, British Museum (Natural History), slide no. 20583a from *Chelictinia riocourii*, Shoa, ABYSSINIA (Colonel R. Meinertzhagen). *Paratypes* : 15 ♂ 9 ♀, from the same host species, data as given above.

***Degeeriella elbeli* sp. n.**

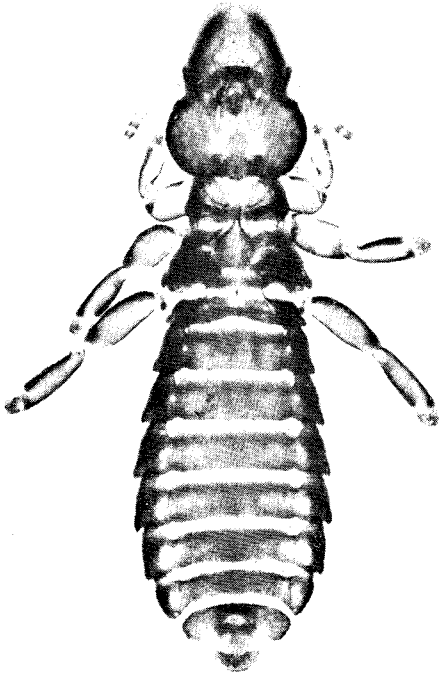
(Pl. I, figs. 3, 6 ; text-figs. 3, 9, 14, 17).

Type host : *Aviceda leuphotes burmana* (Sclater).

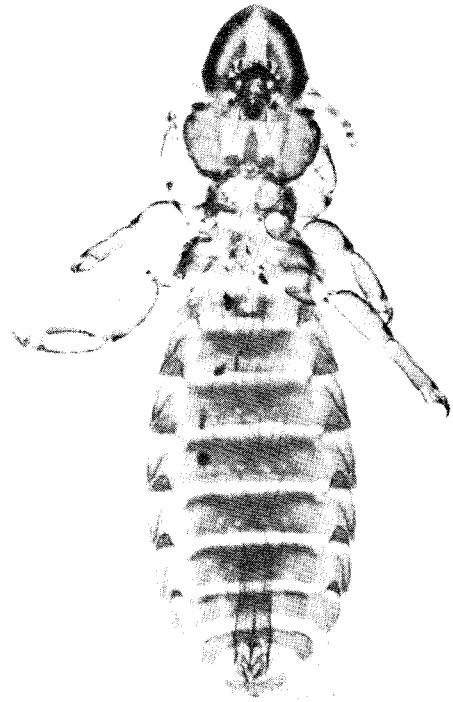
This species resembles *D. elani* in the characters of the ventral carinae, but differs in the shape of the head and the male genitalia. Apart from the form of the ventral carinae, this species also resembles members of the *fulva* species group.



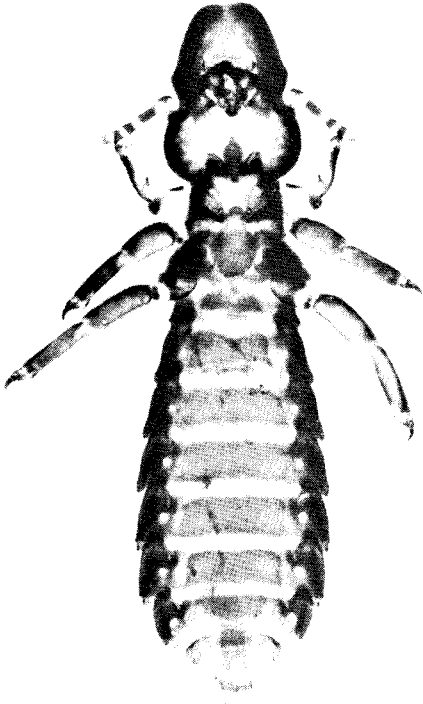
FIGS. 9-17.—(9) *D. elbeli* sp. n., ventral view of mesosome; *ps.*, penial sclerite; *pa.*, penial arm; *va.*, ventral endomerual arm. (10-11) Male pleural thickening of segment IV. (10) *D. guimarãesi* sp. n. (11) *D. meinertzhageni*. (12-14) Female genital region. (12) *D. guimarãesi*; *lg.*, inner genital sclerite; *sv.*, subvulval sclerite. (13) *D. meinertzhageni*. (14) *D. elbeli*. (15-17) Subvulval sclerites and opening of spermathecal tube. (15) *D. guimarãesi*. (16) *D. meinertzhageni*. (17) *D. elbeli*.



1



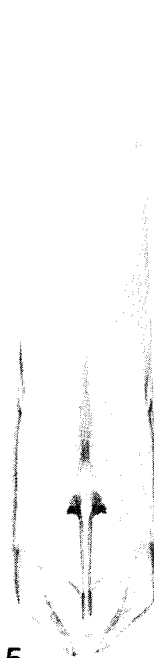
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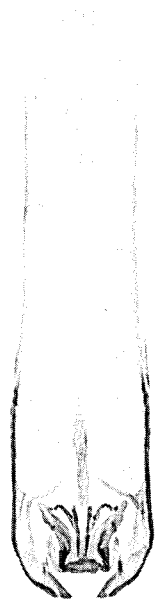
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4



5



6

PLATE I.

Figs. 1-3. Males. 4-5. Figs. 4-6. Male genitalia. 4-5. *D. mormarthogani* sp. n. 6. *D. guianensis* sp. n.

Photographs by M. G. Sawyer

Male.—Head as in fig. 3; inner dorsal edge of marginal carina indented medianly; ventral suture reaches to or in some specimens nearly to the anterior margin. Tergites II and III in the specimens examined show all stages from a slight median concavity to a well-marked slit. Pleural thickening with straight inner margin. Male genitalia as shown in Pl. I, fig. 6 (dorsal) and text-fig. 9 (ventral); dorsal endomeral arms do not join parameres.

Female.—Similar to male in form of head and thorax. Tergites IX–XI without a single unsclerotised area round the bases of the two lateral setae each side. Genital region as shown in figs. 14, 17.

Chaetotaxy of abdomen.—Tergocentral setae: II, 4; III–VII normally 6, range 5–8; VIII varies from 3–7; X in the male with one each side, in female 2 each side. Pleural setae: II–IV, 0; V, 1 each side; VI–VII 2; VIII, 3; in the male IX has 2 each side and X, 0; in the female IX and X each have 1–3 each side. Sternocentral setae: II–VI normally 4; VII–XI in male as in *guimarãesi*, in the female as in fig. 14.

Measurements in mm.

	<i>Male</i> .			
	Length.		Breadth.	
	Range.	Mean.	Range.	Mean.
Head (17) . . .	0.55–0.58	0.57	0.43–0.47	0.450
Prothorax (10) . . .	.	.	0.30–0.32	0.315
Pterothorax (10) . . .	.	.	0.48–0.52	0.505
Abdomen (10) . . .	1.20–1.29	1.25	0.58–0.63	0.620
Total (10) . . .	2.12–2.22	2.18	.	.
C.I. (17) . . .	0.78–0.80	0.79	.	.
Genitalia (3) . . .	0.40–0.42	.	.	.
<i>Female</i> .				
Head (10) . . .	0.59–0.62	0.61	0.47–0.50	0.48
C.I. (10) . . .	0.78–0.81	0.80	.	.

Material examined: 23 ♂, 16 ♀ from *Aviceda leuphotes burmana* (W. L. Slater) from Dansai District, THAILAND, 23.iii.1955 (*R. Elbel*).

Holotype ♂ and *allotype* ♀ in the British Museum (Natural History) collection, slide no. 615 from *Aviceda leuphotes burmana* with the above data. *Paratypes* 22 ♂, 15 ♀ from the same host individual.

REFERENCES.

- CLAY, T., 1951, An introduction to a classification of the Avian Ischnocera (Mallophaga): I. *Trans. R. ent. Soc. Lond.* **102**: 171–94.
 — 1957, The *Degeeriella* (Mallophaga) parasitic on *Pernis*. *Proc. zool. Soc. Calcutta, Mookerjee Memor.* Vol.: 339–347.
 PETERS, J. L., 1931, *Check-list of the Birds of the World*, I. Cambridge, Mass., U.S.A.