

The *Degeeriella* [Insecta : Mallophaga] parasitic on *Pernis* [Aves : Falconiformes]. By Theresa Clay, *British Museum (Natural History)*, London. (With five text-figures and one plate)

ABSTRACT

A new species of Mallophaga, *Degeeriella mookerjeei*, has been described from *Pernis ptilorhyncus*, and its differences from the allied *D. phlyctopygus*, parasitic on *Pernis apivorus*, have been detailed. *D. mookerjeei* is the only species of the genus, which has sexually dimorphic antennae. The distribution of the species of *Degeeriella* in relation to the distribution of their hosts, has also been discussed.

The fact that two distinct species of *Degeeriella* parasitize two species of *Pernis* may be taken as evidence supporting the ornitho-taxonomic distinctness of the two hosts, but this is considered a unique case in view of the wide distribution of other species of *Degeeriella*.

INTRODUCTION

A revision of the species of *Degeeriella* parasitic on the Falconiformes is nearing completion, but in the meantime it may be useful to describe an interesting new species from *Pernis ptilorhyncus*. This is the only known species of *Degeeriella* which has sexually dimorphic antennae; the females and the other characters of the males, including those of the genitalia, are similar to those of *Degeeriella phlyctopygus* from *Pernis apivorus* in which the antennae are not sexually dimorphic, thus showing once again that this character has little phylogenetic significance.

Definition of terms: A discussion on the morphology of *Degeeriella* will be included in the full revision. In this paper the segments of the abdomen are interpreted as follows: the first apparent segment is II; the second to the seventh (the spiracle-bearing segments) are III-VIII; in the male the eighth segment represents IX-X fused; the ninth is XI; in the female the last apparent segment is IX-XI. The sternites of the female are referred to as follows: the first five apparent sclerites as II-VI; the sixth as the genital plate or VII (Text-fig. 5A, VII). Below the median genital plate is an unsclerotized area of integument, each side of which is a small sclerite, referred to as VIII, the integument passes down to the vulva and turns in to form the ventral wall of the genital chamber on which are two sclerites [perhaps the median sclerites of VIII, here called the inner genital sclerites (Text-fig. 5A, *ig.*)]. On the dorsal wall of the genital chamber there is a sclerite which projects beyond the vulva [perhaps X or IX and X fused, here referred to as the subvulval sclerite (Text-fig. 5B, *sv.*)];

the opening of the spermathecal tube (*os*) lies between the subvulval sclerites in the dorsal wall of the genital chamber. In order to see the outlines of the inner genital sclerites and the subvulval sclerites the specimen should be overstained and the dorsal and ventral walls of the genital chamber dissected apart and mounted separately. For terms used in the description of the head see Clay (1951).

DESCRIPTION OF THE SPECIES PARASITIC ON *PERNIS*

The two known species found on *Pernis* are separable from other known species of *Degeeriella* in the males by the form of the genitalia and in the females by the shape of the head, marginal carina and chaetotaxy of the abdomen.

Degeeriella phlyctopygus (Nitzsch)

Type host : *Pernis a. apivorus* (Linn.).

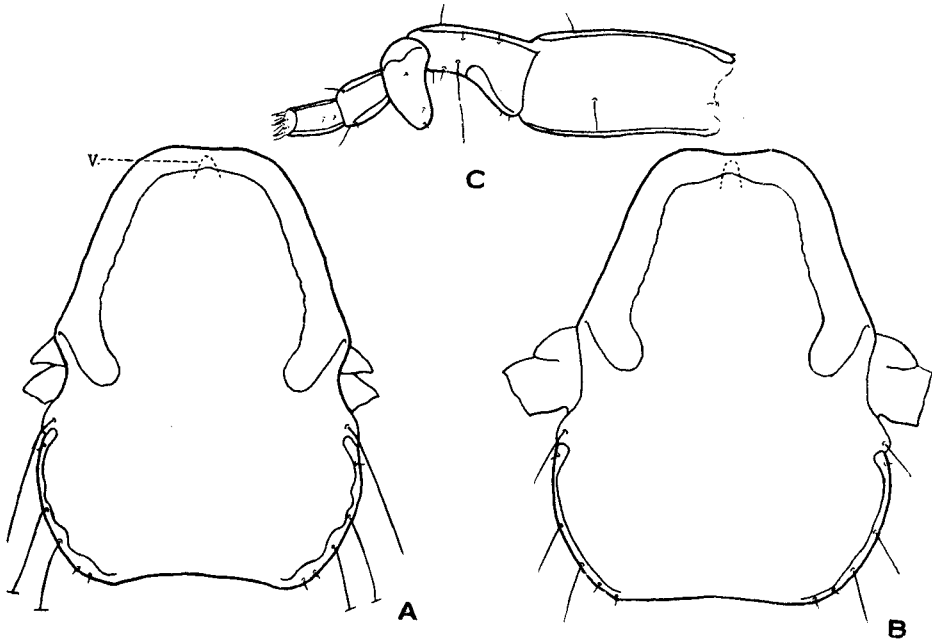
1861. *Nirmus phlyctopygus* Nitzsch, in Giebel, Z. ges. Natwiss., 17: 526. Host: *Pernis apivorus*.

This species is distinguished from *D. mookerjeei* sp. n. in the male by the antennae and details of the genitalia, and in the female by the shape of the head.

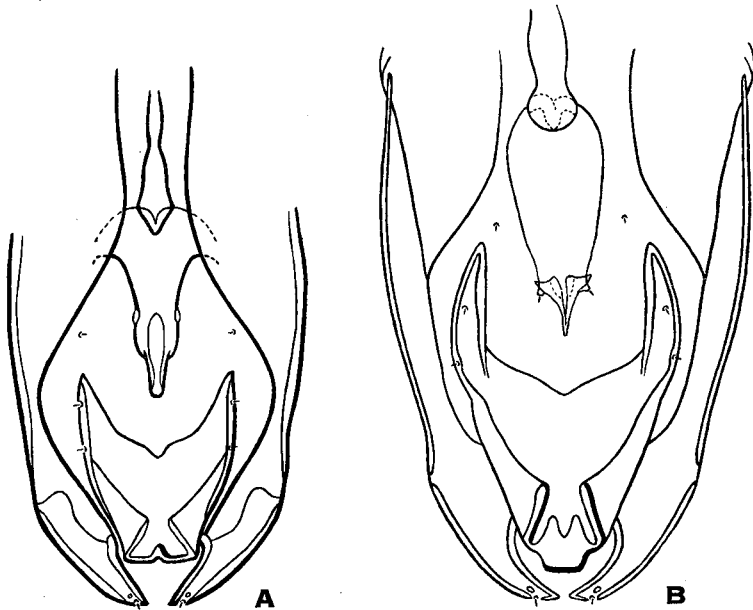
DESCRIPTION :

Male (Pl. 15, fig. 1; Text-figs. 1A, 2A, 3A, 3B, 3C, 3E) : Anterior margin of head (Text-fig. 1A) slightly concave, dorsal marginal carina slightly indented medianly; suture between ventral carinae does not reach anterior margin of head (Text-fig. 1A, *v.*). General appearance of thorax and abdomen as in the typical *rufa*-type of *Degeeriella* (Pl. 15). Shape of thoracic sternal plate and chaetotaxy as in Text-fig. 3C. Tergites II-VIII each in the form of a single undivided sclerite, except for II which is partially divided into two; tergite IX-X arched and narrowed medianly. Pleural thickening of segments III-VI with well developed re-entrant heads (Text-fig. 3B). Sternal plates of II-VI in the form of median sclerites roughly rectangular in shape; sternites VII-XI form a single fused genital plate of irregular outline the shape of which is of no specific significance. The genitalia (Text-figs. 2A, 3A, 3E)* are unlike any other known species of *Degeeriella* except those of *D. mookerjeei*. Post-spiracular setae present on segments III-VIII with contiguous sensilli on segments III-V (see Clay, 1954). Tergocentral setae : II, 5-6 and 2 anterior; III-V, 8; VI, 7; VII, 6; VIII, 6-7; X, 1-2 each side. Pleural setae : II-III, 0; IV-V, 1 each side; VI-VII, 2; VIII, 3; IX, 3-5; X-XI, 0; Sternocentral setae : II, 5-6; III, 6-7; IV-V, 6; VI, 5-6; VII, 2 each side; VIII, 1 each side; near the posterior margin of

* Owing to the small amount of material available it is not possible to be certain of the accuracy of certain details in these figures.



TEXT-FIGURE 1.—*Degeeriella phlyctopygus* and *D. mookerjeei*. Outline of male heads (drawn to same scale) with ocular and marginal temporal setae: *D. phlyctopygus* (A) and *D. mookerjeei* (B); C, male antenna of *D. mookerjeei*. v.—Suture between ventral carinae.



TEXT-FIGURE 2.—Distal part of male genitalia, ventral view (drawn to same scale). A, *Degeeriella phlyctopygus*; B, *D. mookerjeei*.

the last segment is 1 spine-like and 1 elongated seta each side. Total number of marginal setae of last segment dorsal and ventral (1 specimen) : 13.

Female (Pl. 15, fig. 3; Text-figs. 4A, 5) : General characters of head, thorax and abdominal terga II-VII as in male but average measurements are larger. Genital region as shown in text-figs. 5A-B. Post-spiracular setae as in male. Tergocentral setae : II normally 6, range 5-7 and 2 anterior; III-V normally 8, range 7-8; VI range 6-8; VII-VIII normally 6, range 5-6; IX-XI as in text fig. 5C. Pleural setae : II-VIII as in male; IX normally 3 each side, range 3-5; X normally 3, range 2-3. Sternocentral setae : II normally 6, range 4-6; III-IV normally 6, range 6-7; V normally 6, range 5-6; VI range 4-6; VII-XI as in text-figs. 5A-B.

MEASUREMENTS IN MILLIMETRE :

	LENGTH		BREADTH	
	Range	Mean	Range	Mean
Male :				
Head	0.56—0.58	(2)	0.42—0.45	(2)
Prothorax			0.30—0.31	(2)
Pterothorax			0.46—0.47	(2)
Abdomen	1.17	(1)	0.62	(1)
Total	2.10	(1)		
Genitalia	0.42	(1)		
C. I.	0.76—0.77	(2)		
Female :				
Head	0.59—0.63	(11)	0.44—0.48	(11)
Prothorax			0.32—0.34	(8)
Pterothorax			0.49—0.53	(8)
Abdomen	1.23—1.53	(8)	0.62—0.72	(8)
Total	2.22—2.50	(8)		0.68
C. I.	0.74—0.77	(8)		0.75

Number of specimens measured given in brackets. Length of genitalia taken from proximal margin of basal apodeme to posterior margin of endodermal plate.

MATERIAL EXAMINED : 2 ♂♂, 12 ♀♀ from *Pernis a. apivorus* (Linn.) from Scotland, Germany and Italy.

NEOTYPE of *Degeeriella phlyctopygus* (Nitzsch), male, in the British Museum (Natural History), slide no. 20410 a, from *Pernis a. apivorus* (Linn.), Germany (skin).

Degeeriella mookerjeei, new species

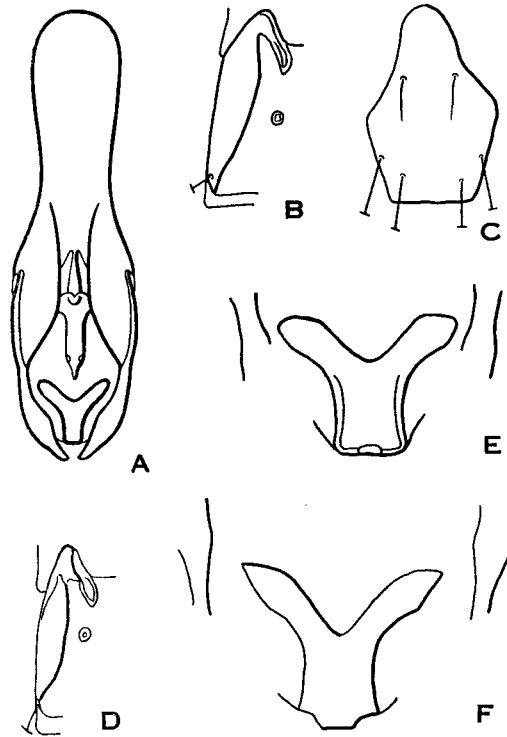
Type host : *Pernis ptilorhyncus gurneyi* Stresemann

The male of this species is at once distinguished from *D. phlyctopygus* and all other known species of *Degeeriella* by the enlarged antennae; the species is further

distinguished from *D. phlyctopygus* in the male by the details of the genitalia, the greater number of marginal setae on the last abdominal segment and the pleural thickening. In the female it is distinguished from *D. phlyctopygus* by the shape of the head.

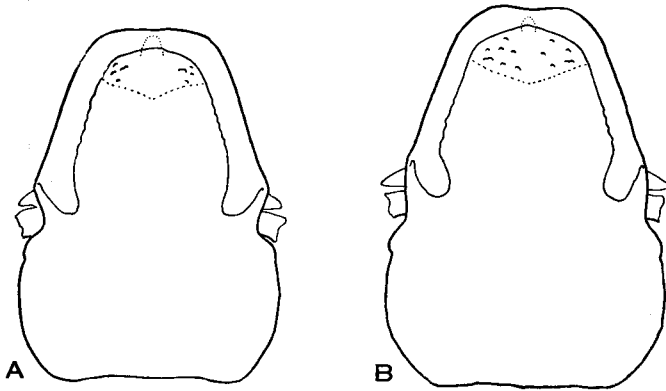
DESCRIPTION :

Male (Pl. 15, fig. 2; Text-figs. 1B, 1C, 2B, 3D, 3F): Marginal carina and ventral suture of head as in *D. phlyctopygus*, shape as in text-figure 1B. Antenna with segment I enlarged and III with distal post-axial angle prolonged (Text-fig. 1C). The ocular and marginal temporal setae are shorter and finer than those of *D. phlyctopygus*, a reduction which may be correlated with the increased size of the antennae. Thoracic sternal plate and chaetotaxy as in *D. phlyctopygus*; there is individual variation in the shape of this plate, and it cannot be used as a specific character in *rufa*-type of *Degeeriella*. Abdominal tergites and sternites as in *D. phlyctopygus*; pleural thickening as in text-figure 3D. Genitalia similar to those of *D. phlyctopygus*, but differ in detail (Text-figs. 2B, 3F); it should be noted that the sclerite supporting the penis is curved dorsoventrally and therefore when pressed flat on a slide is distorted in various ways. Post-spiracular setae and sensilli and pleural setae as in *D. phlyctopygus*. Tergocentral setae: II normally 6, range 6-7 with 2 anterior; III-V, 8; VI-VIII normally 6, range 5-7; X, 1-3 each side. Sternocentral setae; II, 4-7; III-VI normally 6, range 4-6; VII-VIII as in *D. phlyctopygus*; near the posterior margin of the last segment there is either 1 elongated seta each side, or the



TEXT-FIGURE 3.—*Degeeriella phlyctopygus* and *D. mookerjeei*. **A, B, C, D.** *D. phlyctopygus*: **A**, male genitalia; **B**, pleural thickening of segment IV; **C**, male thoracic sternal plate; **D**, *D. mookerjeei*, pleural thickening of segment IV; **E, F**, dorsal arms of endomerale plate (♂ genitalia) in *D. phlyctopygus* (**E**) and *D. mookerjeei* (**F**).

usual 1 elongated and 1 spine-like seta. Total number of marginal setae on last segment, dorsal and ventral: 22-29.

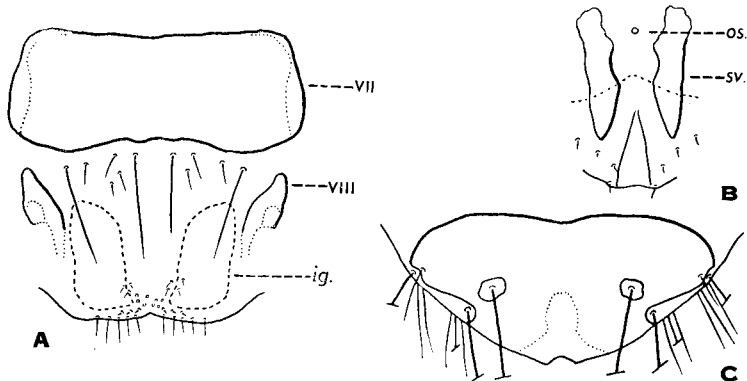


TEXT-FIGURE 4.—Outline of female heads (drawn to same scale).

A, *Degeeriella phlyctopygus*; **B**, *D. mookerjeei*.

Female (Pl 15, fig. 4; Text-fig. 4B): Similar to that of *D. phlyctopygus* but differs in the shape of the head (Text-fig. 4B) and in measurements which average larger. There do not appear to be any constant characters distinguishing the genital region of the two species; there is individual variation in the shape of the

genital plate, number of setae and a small amount of variation in the shape of sclerites VIII-X. Post-spiracular setae as in male. Tergocentral setae: II, 6,



TEXT-FIGURE 5.—*Degeeriella phlyctopygus*. **A**, **B**, genital region; **C**, dorsal view of terminal segments of abdomen.

ig.—Inner genital sclerite; *os.*—Opening of spermathecal tube; *sv.*—Subvulval sclerite.

and 2 anterior; III-V normally 8, range 6-9; VI-VII normally 6, range 4-9; VIII range 3-6; X, 2 each side. Pleural setae II-VIII as in male; IX, range 2-4 each side; X, range 2-3 each side. Sternocentral setae: II, 4-6; III-VI, 5-8.

MEASUREMENTS IN MILLIMETRE :

	LENGTH		BREADTH	
	Range	Mean	Range	Mean
Male :				
Head	0.60—0.63 (9)	0.62	0.45—0.47 (10)	0.46
Prothorax			0.33—0.35 (6)	0.34
Pterothorax			0.49—0.52 (6)	0.50
Abdomen	1.17—1.29 (6)	1.25	0.55—0.62 (6)	0.59
Total	2.21—2.37 (6)	2.30		
Genitalia	0.47—0.49 (4)	0.48		
C. I.	0.73—0.77 (9)	0.75		
Female :				
Head	0.62—0.67 (19)	0.63	0.47—0.50 (17)	0.48
Prothorax			0.34—0.37 (10)	0.35
Pterothorax			0.50—0.55 (10)	0.53
Abdomen	1.55—1.68 (10)	1.60	0.64—0.75 (10)	0.68
Total	2.57—2.78 (10)	2.67		
C. I.	0.745—0.775 (17)	0.755		

MATERIAL EXAMINED : 13♂♂, 18♀♀ from *Pernis ptilorhyncus gurneyi* Stresemann* collected in Thailand by Robert E. Elbel, formerly of the United States Operations Mission of Thailand. 1 ♂, 5 ♀♀ from *P. ptilorhyncus* subsp. from Myitkyina, Upper Burma, collected by H. S. Fuller; 8 ♂♂, 8 ♀♀ from *P. ptilorhyncus ruficollis* Lesson from Nepal (skin).

HOLOTYPE : ♂ in the British Museum (Natural History), slide no 633 from *P. ptilorhyncus gurneyi* Stresemann from Thailand, Loei Province, Dansai district, collected by Robert E. Elbel, 23 October 1954.

PARATYPES : 20♂♂, 26♀♀ from *P. ptilorhyncus gurneyi* and *P. ptilorhyncus ruficollis* with the data as given above.

This species is named in honour of the late Professor Himadri Kumar Mookerjee, D. Sc., F. N. I., Professor of Zoology, University of Calcutta.

HOST DISTRIBUTION

Stresemann (1940, p. 154) divides *Pernis* into three species, namely, *P. apivorus* (monotypic), *P. ptilorhyncus* (with seven subspecies) and *P. celebensis* (with two subspecies). Mallophaga have been seen from two of these species, *P. apivorus* and *P. ptilorhyncus*, each of which has a distinct species of parasite. The distribution of some of the species of *Degeeriella* is rather puzzling and will be discussed elsewhere. In general, it can be said that the species have a wide distribution ; for instance, the bird genera *Falco*, *Buteo* and *Milvus* each have only one species of *Degeeriella*, which except in the case of *Falco*, are not divisible into taxonomically recognizable subspecies; and further the species found on *Milvus* and *Buteo* are

* The form *gurneyi* is doubtfully distinct from *ruficollis*.

also found on other genera of hawks. It is all the more interesting, therefore, that *Pernis apivorus* and *P. ptilorhyncus* should be parasitized by distinct species of *Degeeriella*. This does not necessarily mean that *P. apivorus* and *P. ptilorhyncus* have been separated for a longer period than some of the species of *Buteo*, but that the *Degeeriella* species of this latter genus may be phylogenetically more conservative: this is to some extent confirmed by the fact that the species found on *Buteo* is also found on *Aquila* and other genera of the Falconiformes.

Thus, the presence of different species of *Degeeriella* parasitizing *P. apivorus* and *P. ptilorhyncus* may be taken as supporting to some extent the evidence from ornithological sources of the distinctness of the two hosts. However, consideration of the distribution of other species of *Degeeriella* shows that this is a unique case and that, in general, the species of this genus are phylogenetically conservative with a relatively wide distribution and can only be used to a small extent to show relationships within the genera of the hosts.

ACKNOWLEDGEMENTS

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 STRESEMANN, E. 1940. Zur Kenntnis des Wespenbussarde (*Pernis*). Arch. Naturgesch., **9**: 137—193.

PLATE 15

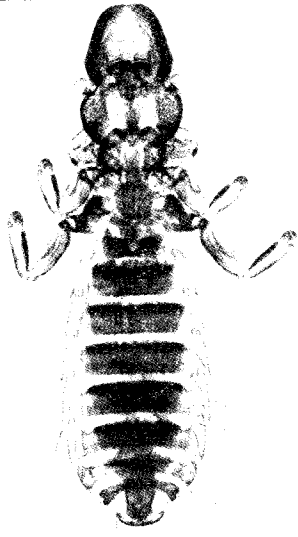
Degeeriella parasitic on *Pernis*

FIG. 1. *Degeeriella phlyctopygus*, ♂.

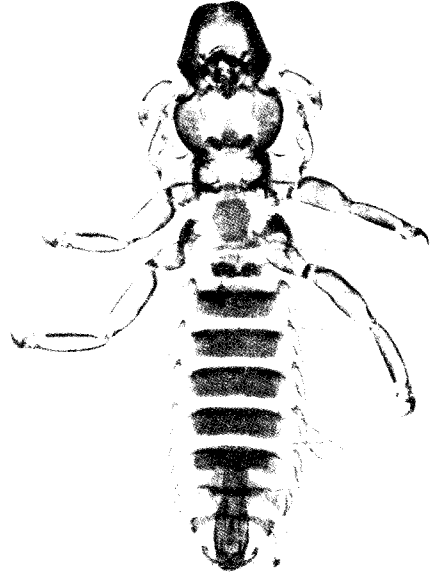
FIG. 2. *Degeeriella mookerjeei*, ♂.

FIG. 3. *Degeeriella phlyctopygus*, ♀.

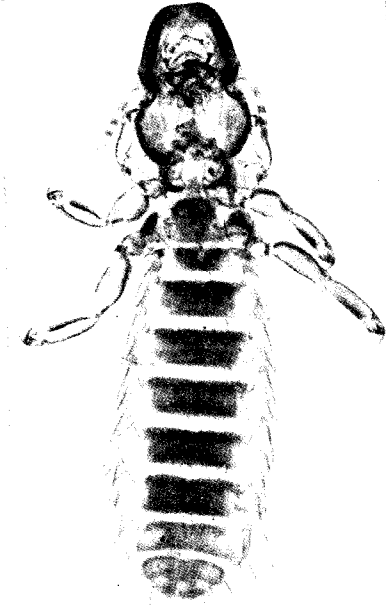
FIG. 4. *Degeeriella mookerjeei*, ♀.



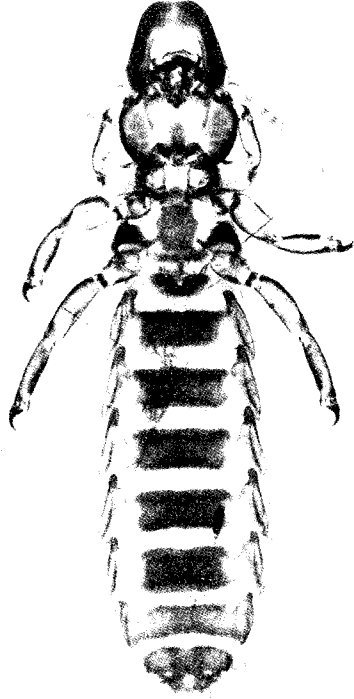
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