

LIBRARY OF THE
UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

590.5

FI

v. 42

cop. 3



NATURAL HISTORY,
CLIDVEV

2
4
3

FIELDIANA • ZOOLOGY

Published by
CHICAGO NATURAL HISTORY MUSEUM

Volume 42

AUGUST 22, 1958

No. 4

PHILIPPINE ZOOLOGICAL EXPEDITION 1946-1947

NOTES ON PHILIPPINE MALLOPHAGA, I. Species from Ciconiiformes, Anseriformes, Falconiformes, Galliformes, Gruiformes and Charadriiformes

K. C. EMERSON
AND
RONALD A. WARD

INTRODUCTION

This is the first installment of a report on the Mallophaga collected from avian hosts by the Philippine Zoological Expedition, 1946-47.

Since Mallophaga are obligatory external parasites, and highly host-specific, their distribution is dependent upon the distribution of the hosts. A list of the species of Mallophaga in the Philippines could be compiled by referring to a list of hosts known to inhabit, or migrate through, this region. Such a list has not been included in this paper because many records and descriptions have been based on material obtained from skins in museums or from live hosts in zoological gardens, and many still await confirmation.

This study has arisen as a subsidiary enquiry to bird collecting, and it constitutes the first opportunity to confirm many host records. All records which were obviously mislabeled or mixed during collection have been omitted. Some series have not been given specific determinations because studies now in progress by other workers include several generic revisions.

Library of Congress Catalog Card Number: 58-13345

No. 847

49

NATURAL
HISTORY SURVEY

LIBRARY OF CONGRESS
C3727159
UNIVERSITY OF MICHIGAN

Host determinations and classification are in accordance with those of Delacour and Mayr (1946). The collections were made by G. L. Alcasid, H. Hoogstraal, S. G. Jewett, Jr., and F. G. Werner.

Suborder AMBLYCERA

Family MENOPONIDAE

Actornithophilus bicolor (Piaget)

Colpocephalum bicolor Piaget, 1880, Les Pédiculines, p. 561, pl. 47, fig. 1.

Colpocephalum paetulum Kellogg and Kuwana, 1901, Proc. Acad. Sci. Philadelphia, (1900), p. 157, pl. 7, fig. 4.

Colpocephalum spinulosum obscurum Carriker, 1910, Ent. News, 21: 52.

Colpocephalum oculare Carriker, 1910, Ent. News, 21: 52, pl. 5, fig. 1.

Four males and 10 females from *Arenaria interpres* (Linnaeus) (turnstone) were collected on Ramasamey Island, Puerto Princesa, Palawan.

Ardeiphilus sp.

One female from *Ardea purpurea manilensis* Meyen (eastern purple heron) was collected at Bugasan, Cotabato Province, Mindanao.

Austromenopon phaeopodis (Schrank)

Pediculus phaeopodis Schrank, 1802, Briefs Natur. . . ., p. 361.

Menopon ambigum Nitzsch, 1874, in Giebel, Insecta Epizoa, p. 295.

Three males and 13 females from *Numenius phaeopus variegatus* (Scopoli) (whimbrel) were collected at Madaum, Tagum, Davao Province, Mindanao.

Austromenopon sp.

One female from *Actitis hypoleucos* (Linnaeus) (common sandpiper) was collected in Subic Bay, Luzon.

Colpocephalum sp.

One male from *Egretta i. intermedia* (Wagler) (lesser egret) was collected in the Liguasan Marsh, Cotabato Province, Mindanao.

Two females from *Haliastur indus intermedius* Blyth (Brahminy kite) were collected in the Liguasan Marsh, Cotabato Province,

I
.42
20.4
op. 3

Mindanao, and one female from the same host was collected at Manila, Luzon.

This genus is in need of review, since at least ten names are questionable. A revision cannot be undertaken at this time, so no attempt has been made to name the forms collected.

Kélerimenopon sp.

One female from *Megapodius freycinet cumingii* Dillwyn (incubator bird) was collected at Canigaran, Puerto Princesa, Palawan.

This genus as presently constituted includes forms found on parrots and megapodes. This classification is not accepted, as the forms found on the parrots are generically distinct from those found on the megapodes. A lack of material precludes a revision of the complex at this time.

Kurodaia sp.

One male from *Haliastur indus intermedius* Blyth (Brahminy kite) was collected at Manila, Luzon.

Longimenopon pediculoides (Mjöberg)

Colpocephalum pediculoides Mjöberg, 1910, Ark. Zool., 6, (13), p. 44, pl. 2, fig. 6.

Ten males and 25 females from *Arenaria interpres* (Linnaeus) (turnstone) were collected on Ramasamey Island, Puerto Princesa, Palawan.

This species was originally listed by Mjöberg as having been collected from *Arenaria interpres* (Linnaeus) and *Falco tinnunculus* Linnaeus. Because of the size of this series, it must be accepted that the turnstone is the correct host for the species. It was referred to the genus *Rediella* "with much doubt" by Hopkins and Clay (1952). This conclusion was probably based on an examination of Mjöberg's description and illustrations, since the types have not been located. These specimens agree completely with Mjöberg's description and illustrations, and cannot be referred to the genus *Rediella* as presently defined. This species has a slight "brush" in each posterior lateral angle of abdominal sternite IV, and only a single median prothoracic seta, both of which are characteristic of some members of the genus *Actornithophilus*. The species is somewhat intermediate between *Actornithophilus* and *Longimenopon*; it has been referred to the latter because of the sparse chaetotaxy and the characters of the head.

Menacanthus pallidulus (Neumann)

Menopon pallidulum Neumann, 1912, Arch. Par., Paris, 15: 361, figs. 7-9.

One male and one female from *Gallus g. gallus* (Linnaeus) (red jungle fowl) were collected at San Pedro, Culion, Calamianes.

Menacanthus pallipes (Piaget)

Menopon pallipes Piaget, 1885, Les Pédiculines, Suppl., p. 111, pl. 12, fig. 2.

Two females from *Coturnix chinensis lineata* (Scopoli) (painted quail) were collected at Naic, Cavite.

Menacanthus wernerii, new species. Figure 15, d.

Male: Head triangular with narrow preocular slits. Three long setae on each temple and eight long setae on the occiput. Gular plate indistinct, with four long setae on the lateral margins. The spine-like processes that arise near the base of the palpi are short and stout. Terminal antennal segments undivided, stout and cylindrical.

Twelve long setae on posterior and lateral margins of prothorax. Prothoracic sternal plate bare and indistinct. Eighteen long setae on posterior margin of pterothorax. Mesothoracic sternal plate V-shaped, with twelve long setae. Metathoracic sternal plate diamond-shaped, with eight long setae. Distinct patch of short spines on venter of hind femora.

Abdominal tergites I-VII with 28 to 30 medium-length setae evenly spaced on posterior margins. Pleural plates with a minimum of internal thickening. One long seta in each posterior-lateral angle, eight medium-length setae on posterior margin, and scattered small setae on each pleural plate. Sternal plates with three rows of evenly spaced medium-length setae. Patches of spines on posterior-lateral angles of abdominal sternites IV-VI. Male genitalia as shown (fig. 15, d).

Female: Essentially the same form as in the male, with a minimum of sexual dimorphism. Twenty-two long setae on posterior margin of vulva. Anus entirely ventral, with a marginal fringe of widely spaced small short setae.

MEASUREMENTS

	Male		Female	
	Width	Length	Width	Length
	mm.	mm.	mm.	mm.
Head.....	0.54	0.30	0.52	0.30
Prothorax.....	0.44	0.20	0.40	0.20
Pterothorax.....	0.56	0.23	0.45	0.17
Abdomen.....	0.74	1.36	0.64	1.08
Total.....		<u>2.09</u>		<u>1.75</u>

Type host: *Polyplectron emphanum* Temminck (Napoleon's peacock pheasant).

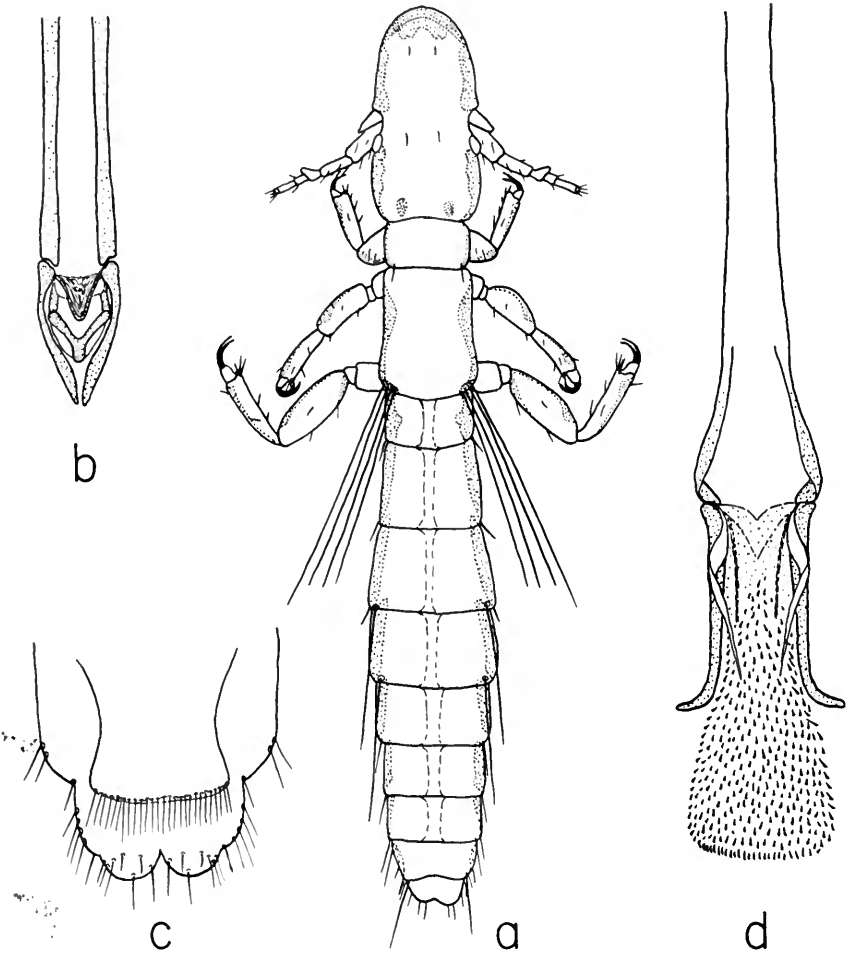


FIG. 15. *a-c*, *Oxylipeurus hoogstraali*, new species: *a*, dorsal view of male; *b*, male genitalia; and *c*, ventral view of female genital region. *d*, *Menacanthus weneri*, new species; male genitalia.

Type material: Holotype male, allotype female and 24 paratypes collected at Lapulapu and the Penal Colony, Iwahig, Palawan.

Menopon clayae Emerson

Menopon clayae Emerson, 1954, Ann. Mag. Nat. Hist., (12), 7: 229, fig. 5.

One male and one female from *Polyplectron emphanum* Temminck (Napoleon's peacock pheasant) were collected at Lapulapu, Iwahig,

Palawan; 16 males and 17 females from the same host were collected at the Penal Colony, Iwahig, Palawan.

The original description was based on two males from this host. Opportunity is taken to present a short description of the female, which except for size and terminal abdominal segments is similar to the male.

Vulva rectangular in shape, with 16 medium-length setae on lateral margins, and 28 small setae on posterior margin. Anus entirely ventral; marginal fringe almost absent, being composed of widely spaced small short setae instead of the characteristic "anal corona."

Menopon gallinae (Linnaeus)

Pediculus gallinae Linnaeus, 1758, Syst. Nat., 10th ed., p. 613.

Nirmus trigonocephalus Olfers, 1816, De Veget. . ., 1: 90.

Liotheum (Menopon) pallidum Nitzsch, 1818, Germar's Mag. Ent., 3: 299.

Menopon productum Piaget, 1880, Les Pédiculines, p. 461, pl. 37, fig. 8.

Menopon productum major Piaget, 1880, Les Pédiculines, p. 462 (not p. 441).

Menopon subaequale productum Piaget, 1885 (not 1880), Les Pédiculines, Suppl., p. 109.

Menopon brevipes Piaget, 1885, Les Pédiculines, Suppl., p. 110, pl. 12, fig. 1.

Menopon longicephalum Kellogg, 1896, Proc. Calif. Acad. Sci., (2), 6: 535, pl. 73, fig. 4.

Menopon lunatale Eichler, 1947, Ark. Zool., 39A, (2), p. 17, figs. 35-38.

Twenty-one males and 12 females from *Gallus g. gallus* (Linnaeus) (red jungle fowl) were collected on the east slope of Mount McKinley, Davao Province, Mindanao; 22 males and 9 females from the same host were collected at Dimaniang, Busuanga, Calamianes; 6 males and 13 females from the same host were collected at Carmelita, Busuanga, Calamianes; and 33 males and 20 females were collected at San Pedro, Culion, Calamianes.

Pseudomenopon sp.

Twelve males and 27 females from *Amaurornis phoenicurus javanicus* (Horsfield) (white-breasted swamphen) were collected at San Pedro, Culion, Calamianes.

Trinoton aculeatum Piaget

Trinoton aculeatum Piaget, 1885, Les Pédiculines, Suppl., p. 136, pl. 15, fig. 1.

Three males and six females from *Dendrocygna arcuata* (Horsfield) (lesser fulvous whistling duck) were collected in the Liguasan Marsh, Cotabato Province, Mindanao.

There appear to be no external characters by which this series can be separated from those normally found on *Dendrocygna viduata* (Linnaeus), the type host of this species.

Family LAEMOBOTHRIONIDAE

Laemobothrion mjöbergi Eichler

Laemobothrion mjöbergi Eichler, 1944, Deutsche Ent. Zeitschr., 1943: 64, figs. 11, 12.

Four males and four females from *Haliastur indus intermedius* Blyth (Brahminy kite) were collected in the Liguasan Marsh, Cotabato Province, Mindanao.

Laemobothrion sp.

One male from *Butastur indicus* (Gmelin) (gray-faced buzzard) was collected at Bugasan, Cotabato Province, Mindanao.

Suborder ISCHNOCERA

Family PHILOPTERIDAE

Craspedorrhynchus pachypus (Giebel)

Docophorus pachypus Giebel, 1874, Insecta Epizoa, p. 71.

One male from *Haliastur indus intermedius* Blyth (Brahminy kite) was collected at Manila, Luzon.

Craspedorrhynchus sp.

Two males and two females from *Spilornis cheela holospilus* (Vigors) (serpent eagle) were collected in Davao Province, Mindanao.

Cuclotogaster acuminatus (Piaget)

Lipeurus acuminatus Piaget, 1885, Les Pédiculines, Suppl., p. 70, pl. 7, fig. 6.

One female from *Coturnix chinensis lineata* (Scopoli) (painted quail) was collected at Naic, Cavite.

Degeeriella sp.

One male and two females from *Haliastur indus intermedius* Blyth (Brahminy kite) were collected in the Liguasan Marsh, Cotabato Province; six males and six females from the same host were collected at Manila, Luzon.

Seven males and three females from *Butastur indicus* (Gmelin) (gray-faced buzzard) were collected at Puerto Princesa, Palawan.

Two males and three females from *Accipiter trivirgatus palawanus* Mayr (crested goshawk) were collected at San Pedro, Culion, Calamianes.

This genus is presently under revision by Miss Theresa Clay, British Museum (Natural History).

Goniocotes gallinae (De Geer)

Ricinus gallinae De Geer, 1778, Mem. Hist. Ins., 7: 79, pl. 4, fig. 15.

Philopterus (*Goniodes*) *hologaster* Nitzsch, 1818, Germar's Mag. Ent., 3: 294.

One male from *Gallus g. gallus* (Linnaeus) (red jungle fowl) was collected at San Pedro, Culion, Calamianes.

Goniodes biordinatus Clay

Goniodes biordinatus Clay, 1940, Proc. Zool. Soc. London, (B), 110: 106, figs. 70b, 71.

Five males and six females from *Megapodius freycinet cumingii* Dillwyn (incubator bird) were collected at Canigaran, Puerto Princesa, Palawan; eight males and seven females from the same host were collected at Mahupa, Culion, Calamianes.

This form is intermediate to *Goniodes minor* (Piaget) and *G. biordinatus* Clay, and is referred to the latter species because the chaetotaxy of segment VIII in the male agrees most closely with Clay's illustration of that species.

Goniodes dissimilis Denny

Goniodes dissimilis Denny, 1842, Mon. Anopl. Brit., pp. 57 and 162, pl. 12, fig. 6.

Goniodes dissimilis bankiva Piaget, 1880, Les Pédiculines, p. 269.

Three males and four females from *Gallus g. gallus* (Linnaeus) (red jungle fowl) were collected at San Pedro, Culion, Calamianes.

Goniodes major (Piaget)

Goniocotes major Piaget, 1880, Les Pédiculines, p. 239, pl. 31, fig. 1.

Six males and five females from *Megapodius freycinet cumingii* Dillwyn (incubator bird) were collected at Canigaran, Puerto Princesa, Palawan; one female from the same host was collected at Mahupa, Culion, Calamianes.

Lipeurus caponis (Linnaeus)

Pediculus caponis Linnaeus, 1758, Syst. Nat., 10th ed., p. 614.

Nirmus tessellatus Denny, 1842, Mon. Anopl. Brit., pp. 57 and 164, pl. 15, fig. 6.

Lipeurus variabilis Burmeister, 1838, Handb. Ent., 2: 434.

Lipeurus antennatus Piaget, 1885 (not Giebel, 1874), Les Pédiculines, Suppl., p. 75, pl. 8, fig. 3.

Lipeurus formosanus Sugimoto, 1929 (not Uchida, 1917), Rep. Dept. Agr. Res. Inst. Formosa, 43: 53.

One male from *Gallus g. gallus* (Linnaeus) was collected on the east slope of Mount McKinley, Davao Province, Mindanao; four males and 12 females from the same host were collected at Carmelita, Busuanga, Calamianes; and 23 males and 20 females were collected at San Pedro, Culion, Calamianes.

Lipeurus sinuatus Taschenberg

Lipeurus sinuatus Taschenberg, 1882, Nova Acta Leop.-Carol., 44: 180, pl. 6, fig. 6.

One male and one female from *Megapodius freycinet cumingii* Dillwyn (incubator bird) were collected at Canigaran, Puerto Princesa, Palawan.

Lunaceps phaeopi (Denny)

Nirmus phaeopi Denny, 1842, Mon. Anopl. Brit., pp. 54 and 144, pl. 10, fig. 7.

Nirmus phaeopodis Giebel, 1874, Insecta Epizoa, p. 166.

Degeeriella oliveri Johnston and Harrison, 1912, Trans. N. Z. Inst., 44: 367, fig. 3.

Seventeen males and 26 females from *Numenius phaeopus variegatus* (Scopoli) (whimbrel) were collected at Madaum, Tagum, Davao Province, Mindanao, and one male and three females from the same host were collected at Puerto Princesa, Palawan.

Oxylipeurus hoogstraali, new species. Figure 15, *a-c*.

Male: Length, 1.85 mm.; greatest width, 0.23 mm. Dorsal chaetotaxy as shown (fig. 15, *a*). Ventrally, one medium pair of long setae on posterior margin of each abdominal sternite. Pro- and metathoracic sternal plates each with one pair of long setae. Male genitalia as illustrated (fig. 15, *b*).

Female: Length, 2.08 mm.; greatest width, 0.30 mm. Antennae filiform. Chaetotaxy same as for male, except for abdominal terminal segments (ventral portion illustrated in fig. 15, *c*).

This species is similar to *O. tropicoperdix* Clay, found on *Tropicoperdix c. chloropus* Blyth. In addition to the differences in chaeto-

taxy and size, the two can be separated by differences in the male genitalia and the shape of the female genital plates. The parameres of the male genitalia are shorter and not curved outward at the tips as are those of *O. tropicoperdix* Clay. Lateral margins of the female genital plate in the new form are not as deeply indented as in *O. tropicoperdix* Clay.

Type host: *Polyplectron emphanum* Temminck (Napoleon's peacock pheasant).

Type material: Holotype male, allotype female, and ten paratypes collected at Lapulapu and the Penal Colony, Iwahig, Palawan.

Quadriceps strepsilaris (Denny)

Nirmus strepsilaris Denny, 1842, Mon. Anopl. Brit., pp. 52 and 135, pl. 2, fig. 4.

Nirmus subcingulatus Nitzsch, 1866, in Giebel, Zeitschr. Ges. Naturw., 28: 372.

Nirmus euprepes Kellogg and Chapman, 1902, Jour. N. Y. Ent. Soc., 10: 21, pl. 3, fig. 1.

Nineteen males and 19 females from *Arenaria interpres* (Linnaeus) (turnstone) were collected on Ramasamey Island, Puerto Princesa, Palawan.

Quadriceps ravus (Kellogg)

Nirmus furvus var. *ravus* Kellogg, 1899, Occ. Pap. Calif. Acad. Sci., 6: 14, pl. 2, fig. 1.

Degeeriella subfusca Blagoveshchenskii, 1948, Mag. Parasit. Leningr. & Moscow, 10: 286, figs. 20, 20a (synonym *vide* Hopkins and Timmermann, 1954, Trans. Roy. Ent. Soc. London, 105: 145 [-146]).

Five males and seven females from *Actitis hypoleucos* (Linnaeus) (common sandpiper) were collected in Subic Bay, Luzon.

Quadriceps sp.

One male from *Charadrius leschenaultii* Lesson (large sand plover) was collected at Bugasan, Cotabato Province, Mindanao.

Two females from *Charadrius dubius* Scopoli (ring-necked plover) were collected at Maloma, Luzon.

Rallicola ortygometrae clayae Tandan

Rallicola clayae Tandan, 1951, Ann. Mag. Nat. Hist., (12), 4: 810, figs. 9-13.

Thirty-two males and 19 females from *Amaurornis phoenicurus javanicus* (Horsfield) (white-breasted swampen) were collected at San Pedro, Culion, Calamianes.

Rallicola sp.

Two males from *Rallus t. torquatus* Linnaeus (barred rail) were collected at Bugasan, Cotabato Province, Mindanao.

Saemundssonina scolopacisphaeopodis (Schrank)

Pediculus scolopacisphaeopodis Schrank, 1803, Fauna Boica, 3: 191.

Docophorus rotundus Rudow, 1869, Beitr. Kenntn. Malloph., p. 11.

Philopterus armatus Johnston and Harrison, 1912, Trans. N. Z. Inst., 44: 370, figs. 7-10.

Thirteen males and 34 females from *Numenius phaeopus variegatus* (Scopoli) (whimbrel) were collected at Madaum, Tagum, Davao Province, Mindanao.

Turnicola angustissimus (Giebel)

Lipeurus angustissimus Giebel, 1866, Zeitschr. Ges. Naturw., 28: 382.

Nirmus angusticeps Giebel, 1874, Insecta Epizoa, p. 154.

Lipeurus platyclypeatus Piaget, 1880, Les Pédiculines, p. 678, pl. 56, fig. 5.

Four males and three females from *Turnix suscitator fasciata* (Temminck) (barred button-quail) were collected at Dimaniang, Busuanga, Calamianes.

REFERENCES

BLAGOVESHCHENSKII, D. I.

1948. Mallophaga from birds of the Barabinsk Lakes. I. [In Russian.] Mag. Parasit. Leningr. & Moscow [Parasitol. Sborn. Zool. Inst. Akad. Nauk SSSR, Leningrad], 10: 259-294, 21 figs.

BURMEISTER, H. C. C.

1838. Mallophaga. Handb. Ent., 2, (2), pp. 418-443.

CARRIKER, M. A., JR., and SHULL, C. A.

1910. Some new species of Mallophaga from Michigan. Ent. News, 21: 51-57.

CLAY, THERESA

1940. Genera and species of Mallophaga occurring on gallinaceous hosts. Part II, *Goniodes*. Proc. Zool. Soc. London, (B), 110: 1-120.

DE GEER, CARL

1778. Mémoires pour servir à l'histoire des insectes. Stockholm, 7: 69-82.

DELACOUR, J., and MAYR, E.

1946. Birds of the Philippines. 309 pp. New York.

DENNY, H.

1842. Monographia Anoplurorum Britanniae. 263 pp. London.

EICHLER, W.

1944. Notulae Mallophagologicae, X. *Anseriphilus* nov. gen. und andere Neuerungen bei Amblyceren Federlingen. Deutsche Ent. Zeitschr., 1943: 56-64.

1947. Dr. E. Mjöberg's zoological collections from Sumatra. 15, Mallophaga. Ark. Zool., 39A, (2), pp. 1-21.

EMERSON, K. C.

1954. Review of the genus *Menopon* Nitzsch, 1818 (Mallophaga). *Ann. Mag. Nat. Hist.*, (12), 7: 225-232.

GIEBEL, C. G.

1866. Die im Zoologischen Museum der Universität Halle aufgestellten Epizoen nebst Beobachtungen über dieselben. *Zeitschr. Ges. Naturw.*, 28: 353-397.
1874. *Insecta Epizoa*. 308 pp. Leipzig.

HOPKINS, G. H. E., and CLAY, T.

1952. A checklist of the genera and species of Mallophaga. 362 pp. London.

HOPKINS, G. H. E., and TIMMERMANN, G.

1954. A revision of the species of *Quadriceps* (Mallophaga) parasitic on *Tringinae*. *Trans. R. Ent. Soc. London*, 105: 131-187, 2 pls., 16 text figs.

JOHNSTON, T. H., and HARRISON, L.

1912. Mallophaga from Keradec Islands. *Trans. New Zealand Inst.*, 44: 363-373.

KELLOGG, V. L.

1896. New Mallophaga, II. From land birds; together with an account of the mallophagous mouthparts. *Proc. Calif. Acad. Sci.*, (2), 6: 431-548.

KELLOGG, V. L., and CHAPMAN, B.

1902. Mallophaga from birds of the Pacific coast of North America. *Jour. N. Y. Ent. Soc.*, 10: 20-28.

LINNAEUS, C.

1758. *Systema naturae*. 10th ed., 1: 611-614.

MJÖBERG, E.

1910. Studien über Mallophagen und Anopluren. *Ark. Zool.*, 6, (13), pp. 1-296.

NEUMANN, L. G.

1912. Notes sur les Mallophages. II. *Arch. Par.*, Paris, 15: 353-384.

NITZSCH, C. L.

1818. Die Familien und Gattungen der Tierinsekten als ein Prodomus der Naturgeschichte derselben. *Germar's Mag. Ent.*, 3: 261-316.

OLFERS, I. F. M.

1816. De vegetativis et animatis corporibus in corpore animato reperiundis. *Goettingae. Dissertation*, pp. 80-97.

PIAGET, E.

1880. *Les Pédiculines, Essai Monographique*. 714 pp. Leiden.
1885. *Les Pédiculines, Essai Monographique, Supplément*. 200 pp. Leiden.

RUDOW, F.

1869. Beitrag zur Kenntnis der Mallophagen oder Pelzfresser. Neue exotische Arten aus der Familie *Philopterus*. *Dissertation, University of Leipzig*. 47 pp. Halle.

SCHRANK, F. VON P.

1802. Briefe naturhistorischen, physikalischen und ökonomischen Inhaltes an Herrn Bernard Sebastian Nau, ehemaligen kurmainzischen Hofgerichtsrath und Professor. pp. 361-363. Erlangen.
1803. *Fauna Boica*. 3, (1), pp. 186-194. Nürnberg.

TANDAN, B. K.

1951. Mallophagan parasites from Inian birds. Part I. New species belonging to the genera *Aquanirmus*, *Quadraceps*, and *Rallicola* (Ischnocera, Philopteridae). *Ann. Mag. Nat. Hist.*, (12), 4: 802-813.

TASCHENBERG, E. O. W.

1882. Die Mallophagen mit besonderer Berücksichtigung der von Dr. Meyer gesammelten Arten systematisch bearbeitet. *Nova Acta Leop.-Carol.*, 44: (1), pp. 1-244.

UNIVERSITY OF ILLINOIS-URBANA



3 0112 027924288