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A LIST OF THE BITING LICE (MALLOPHAGA) TAKEN FROM BIRDS AND MAMMALS OF NORTH AMERICA.

BY

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Professor of Entomology, Leland Stanford Junior University.

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A LIST OF THE BITING LICE (MALLOPHAGA) TAKEN FROM BIRDS AND MAMMALS OF NORTH AMERICA.

By VERNON L. KELLOGG, M. S.,
Professor of Entomology, Leland Stanford Junior University.

Within the last few years a beginning in the systematic study of the North American Mallophaga has been made. This study has progressed sufficiently to make it worth while to prepare a list of the Mallophaga so far recorded as having been collected from birds and mammals found in North America.[1] By this is meant the record of collection actually made from American host specimens, and not from host species common to both Europe and America, from which parasites are as yet recorded only from European host specimens. Where Mallophaga have been found common to American and European hosts, the foreign as well as the native hosts are given. As the synonymy for the species of Mallophaga found on American hosts has been given in both Professor Osborn's and my own papers (these papers including practically all the American records), I have not repeated the synonymy in the list. All the American records as originally published are included in the list, no attempt having been made to correct the synonymy. Probably not more than half a dozen species in the list are liable to such correction. The American specimens referred to species originally found on European hosts have been so referred on the authority of the original descriptions and illustrations of European authors. The great importance of the correctness of these determinations, because of the interesting problems in distribution presented by this specific identity of European and American specimens, led me to take to Europe a large number of American specimens for the sake of comparison with the European types. This comparison revealed the fact that these determinations of the identity of the American specimens with European species can be relied on.

In addition to the list of parasites with hosts there is given also a list of hosts with parasites, so that reference to the American records can be readily made from either parasite or host. Students beginning

[1] Some birds from Panama are included in this list. "North America," according to the American Ornithologists' Union check list, "includes the continent of North America north of the present United States and Mexican boundary, and Greenland and the peninsula of Lower California, with the islands naturally belonging thereto."

the study of the Mallophaga will soon discover the advantage of working from the basis of known host.

It is hoped that the list may serve as a convenient basis for the study of the phenomena of the distribution of the Mallophaga, one of the most interesting phases of the study of this group of insects.

Types and cotypes of my own and of Osborn's are now deposited in the U. S. National Museum.

BIBLIOGRAPHY.

There are very few records in the European literature of the Mallophaga of specimens taken from North American hosts. In very rare instances specimens have been taken from the skin of some North American bird in the collection of some European museum, or parasites have been collected in zoological gardens from representatives of some bird species peculiar to North America. For example, Piaget collected two species of Mallophaga from specimens of the Bob White (*Colinus virginianus*) and California Partridge (*Callipepla californica*) in the zoological garden at Rotterdam. I have since found both of these species of Mallophaga on the same hosts in their native habitat. All of these records are referred to in the list. The following are the American papers containing the records upon which the list is based. For an extended bibliography of the foreign and American literature of the Mallophaga see Osborn[1] and Kellogg.[2]

Packard A. S. Certain Parasitic Insects, American Naturalist, 1870, IV, p. 83, ill.

Leidy, J. Proc. Acad. Nat. Sci. Phila., 1878, p. 100.

Osborn, Herbert. Notes on Mallophaga and Pediculidæ, Canadian Entomologist, 1884, XII, p. 197.

The Pediculi and Mallophaga Infesting Man and the Lower Animals, Bull. No. 7, Div. of Ent., U. S. Dept. of Agric., 1891.

Insects Affecting Domestic Animals, Bull. No. 5, new ser., Div. of Ent., U. S. Dept. of Agric., 1896.

Kellogg, V. L. New Mallophaga, I (Contributions to Biology from the Hopkins Seaside Laboratory, IV, 1896).

New Mallophaga, II (Contributions to Biology from the Hopkins Seaside Laboratory, VII, 1896).

Mallophaga from Birds of Panama, Baja California, and Alaska, in New Mallophaga, III (Contributions to Biology from the Hopkins Seaside Laboratory, XIX, 1899).

Kellogg, V. L., and Chapman, B. L. Mallophaga from Birds of California, in New Mallophaga, III (Contributions to Biology from the Hopkins Seaside Laboratory, XIX, 1899).

Chapman, Bertha L. Two New Species of Trichodectes (Mallophaga). Entomological News, 1897, VIII, p. 185, pl. IX.

CLASSIFICATION AND KEYS.

The position of the Mallophaga among insects is discussed briefly in my New Mallophaga.[3] The latest classification of insects assigns to the Mallophaga the position of an independent order. The affinities of the

[1] Insects Affecting Domestic Animals, Bull. No. 5, new ser., 1896, Div. of Ent., U. S. Dept. of Agric., p. 292.

[2] New Mallophaga, I, 1896, pp. 35, 40.

[3] Volume 1, 1896, pp. 57–59.

order are in general with the platypterous pseudo-neuropteroid group comprising the Termites, Psocids, and Perlids, and are in particular with the Psocidæ. In the New Mallophaga[1] I refer to the correspondence between the peculiarly specialized mouth structure of the Mallophaga and the Psocidæ, and the recent careful study by Mr. R. E. Snodgrass[2] on the anatomy of the Mallophaga reveal other particulars of essential structural agreement between the two groups.

As to the arrangement of the members of the order, I have proposed[3] the adoption of a primary grouping into two suborders, corresponding with Nitzsch's original division of the group into two families. In each of these suborders there are two families, one family of each suborder infesting mammals exclusively and comprising but a single genus, the other family of each suborder, comprising several genera, infesting birds exclusively. Mr. Snodgrass's anatomical studies present new and important characters for the subdivision of the order which do not modify the original classification, but strengthen it and put it on a more thoroughly scientific basis. These new characters have been introduced into the following keys. I have made some other changes in the statement of the characters of the subordinate groups, based on my general study of the order and use of the keys as heretofore published.

ANALYTICAL KEY TO SUBORDERS OF MALLOPHAGA.

With filiform, 3- or 5-segmented, exposed antennæ; no labial palpi; mandibles vertical; œsophageal sclerite and accompanying glands usually present and normal; meso- and metathoracic segments fused; crop a saclike diverticulum; ingluvial glands present; testes, four; egg tubes, five ..... ISCHNOCERA.

With clavate or capitate, 4-segmented, concealed antennæ; with 4 segmented labial palpi; mandibles horizontal; œsophageal sclerite and accompanying glands absent or modified; meso- and metathoracic segments with sutural line usually visible; crop, simple; ingluvial glands, absent; testes, six; egg tubes, three to five ..... AMBLYCERA.

ANALYTICAL KEY TO GENERA OF THE SUBORDER ISCHNOCERA.

A. With 3-segmented antennæ; tarsi with one claw; infesting mammals (family Trichodectidæ) ..... *Trichodectes* Nitzsch.

AA. With 5-segmented antennæ; tarsi with two claws; infesting birds (family Philopteridæ).

B. Antennæ similar in both sexes.

C. Front deeply angularly notched ..... *Akidoproctus* Piaget.

CC. Front convex, truncate, or rarely with a curving emargination, but never angularly notched.

D. Species broad and short, with large, movable trabeculæ (at the anterior angle of antennal fossa).

E. Forehead with a broad transverse membranous flap projecting beyond lateral margins of the head in the male, barely projecting in the female ..... *Giebelia* Kellogg.

EE. Without such membranous flap ..... *Docophorus* Nitzsch.

DD. Species elongate, narrow, with very small or no trabeculæ. *Nirmus* Nitzsch.

[1] Volume II, 1896, p. 468. [2] New Mallophaga, III, 1899.
[3] New Mallophaga, I, pp. 59–63.

BB. Antennæ differing in the two sexes.
C. Species wide, with body elongate-oval to suborbicular.
D. Temporal margins rounded; last segment of abdomen roundly emarginated; antennæ of male without appendage, third segment very long ..... *Eurymetopus* Taschenberg.
DD. Temporal margins usually angulated; last segment of abdomen convex, rarely angularly emarginated, with two points.
E. First segment of antenna of male large, sometimes with an appendage; third segment always with an appendage. *Goniodes* Nitzsch.
EE. First segment of antenna of male enlarged, but always without appendage; third segment without appendage; last segment of abdomen always rounded behind. *Goniocotes* Nitzsch.
CC. Species elongate, narrow, sides subparallel.
D. Third segment of antenna of male without an appendage. *Ornithobius* Denny.
DD. Third segment of antenna of male with an appendage.
E. Front deeply angularly notched..... *Bothriometopus* Taschenberg.
EE. Front not angularly notched.
F. Antennæ and legs long; a semicircular oral fossa. *Lipeurus* Nitzsch.
FF. Antennæ and legs short; oral fossa narrow, elongate, extending as a furrow to the anterior margin of the head. *Oncophorus* Rudow.

ANALYTICAL KEY TO GENERA OF THE SUBORDER AMBLYCERA.

A. Tarsi with one claw; infesting mammals (family Gyropidæ) ... *Gyropus* Nitzsch.
AA. Tarsi with two claws; infesting birds (excepting Boopia?); (family Liotheidæ).
B. Ocular emargination distinct, more or less deep.
C. Forehead rounded, without lateral swelling; antennæ projecting beyond border of the head..... *Colpocephalum* Nitzsch.
CC. Forehead without strong lateral swellings.
D. Antennæ projecting beyond border of the head; temporal angles projecting rectangularly; eye large and simple.. *Boopia* Piaget.
DD. Antennæ concealed in groove on under side of the head; temporal angles rounded or slightly angular; eye divided by an emargination and fleck.
E. Mesothorax separated from metathorax by a suture. *Trinoton* Nitzsch.
EE. Meso- and metathorax fused; no suture. *Lœmobothrium* Nitzsch.
BB. Ocular emargination absent or very slight.
C. Sides of the head straight or slightly concave, with two small, laterally projecting labral lobes ..... *Physostomum* Nitzsch.
CC. Sides of the head sinuous; forehead without labral lobes.
D. Ocular emargination filled by a strong swelling; sternal markings forming a quadrilateral without median blotches. *Nitzschia* Denny.
DD. Ocular emargination without swelling, hardly apparent or entirely lacking; median blotches on sternum.
E. Very large; with two 2-pointed appendages on ventral aspect of hind head; anterior coxæ with very long lobelike appendages. *Ancistrona* Westwood.
EE. Small or medium; without bipartite appendages of hind head. *Menopon* Nitzsch.

LIST OF MALLOPHAGA.

Order MALLOPHAGA Nitzsch.

Suborder ISCHNOCERA Kellogg.

Family PHILOPTERIDÆ Burmeister.

Genus DOCOPHORUS Nitzsch.

Docophorus NITZSCH, Germar's Mag. f. Ent., 1818, III, p. 289.

Docophorus kansensis KELLOGG, New Mallophaga, I, 1896, p. 91, pl. III, fig. 8.

From *Colymbus nigricollis californicus* (Lawrence, Kansas).

Docophorus gravicepsis KELLOGG, New Mallophaga, I, 1896, p. 82, pl. III, fig. 3.

From *Urinator pacificus* (Bay of Monterey, California) and *Fulica americana* (Pacific Grove, California).

Docophorus colymbinus DENNY, Monograph. Anoplur. Brit., 1842, p. 80, pl. VIII, fig. 8.—OSBORN, Insects Affecting Domestic Animals, 1896, p. 217.

Recorded by Osborn from *Urinator lumme* (Burnett collection); taken by Kellogg from *Urinator pacificus* (Bay of Monterey, California); this record not before published.

Recorded by European authors from *Colymbus septentrionalis*, *C. arcticus*, *C. glacialis*, and *Tadorna cornuta*.

Docophorus acutipectus KELLOGG, New Mallophaga, I, 1896, p. 84, pl. III, fig. 4.

From *Cerorhinca monocerata* (Bay of Monterey, California).

Docophorus insolitus KELLOGG, New Mallophaga, I, 1896, p. 94, pl. IV, fig. 5.

From *Ptychoramphus aleuticus* (Bay of Monterey, California).

Docophorus montereyi KELLOGG, New Mallophaga, I, 1896, p. 87, pl. III, fig. 6.

From *Ptychoramphus aleuticus*, *Synthliboramphus antiquus*, and *Brachyramphus marmoratus* (all from the Bay of Monterey, California).

Docophorus atricolor KELLOGG, New Mallophaga, I, 1896, p. 93, pl. III, fig. 9.

From *Synthliboramphus antiquus* and *Brachyramphus marmoratus* (Bay of Monterey, California).

Docophorus procax KELLOGG and CHAPMAN, Mallophaga from Birds of California, in New Mallophaga, III, 1899, p. 54, pl. V, fig. 1.

From *Cepphus columba* (Bay of Monterey, California).

Docophorus calvus KELLOGG, New Mallophaga, I, 1896, p. 79, pl. III, fig. 1.

From *Uria troile californica* (Bay of Monterey, California).