

THE SUPERFAMILY LISTROPHOROIDEA
AND THE ESTABLISHMENT OF SOME NEW FAMILIES ¹
(LISTROPHOROIDEA : ACARINA)

BY

Burruss McDANIEL

The characterizations offered in this paper are presented now in order to make the units established conveniently available for a separate detailed discussion on the classification of these mites.

The family Listrophoridae was established by CANESTRINI in 1892. GUNTHER (1942) studied the family and erected four subfamilies : Myocoptinae, Listrophorinae, Atopomelinae and Labidocarpinae. DUBININ (1951) established six superfamilies in the cohort Acaridae which included the elevation of the family Listrophoridae to the superfamily rank. Within this superfamily only the single family Listrophoridae and its four subfamilies, established by GUNTHER (1942), were placed in Listrophoroidea.

YUNKER (1955) proposed three cohorts, Acaridia, Ewingoidia, and Psoroptidia, and placed the Listrophoroidea in his cohort Psoroptidia. BAKER et al. (1958) followed the classification proposed by YUNKER (1955) and placed the Listrophoroidea in the cohort Psoroptidia. The Listrophoroidea now contained the families Listrophoridae and the newly described family Rhynchoptidae Lawrence. HUGHES (1961), following DUBININ 1951, utilized the Acaridae (BAKER et al. (1958), used Acaridae as a supercohort), as a cohort and recognized five superfamilies : Pediculocheloidea, Listrophoroidea, Ewingoidea, Anoetoidea, and Tyroglyphoidea. The superfamily Listrophoroidea of HUGHES (1961) contained only the family Listrophoridae ; the Rhynchoptidae were not considered within HUGHES' (1961) classification of his cohort Acaridae.

In order to reflect the proper morphological relationships within the superfamily Listrophoroidea it is here proposed to elevate the subfamilies of the family Listrophoridae to the level of family. This in the author's opinion will provide a better graded series of categories for the multitude of species still to be discovered.

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Family Labidocarpidae, New Status.

This family is created for the reception of the genera and species included in the subfamily Labidocarpinae of GUNTHER (1942). The family Labidocarpidae is based on the genus *Labidocarpus* Trouessart 1895, the type genus erected within its limits. The family is separated from all other listrophorids by legs I and II being devoid of segmentation and their structure being completely modified into fur clasping organs. The following genera are at present established in the family : *Labidocarpus* Trouessart, *Alabidocarpus* Ewing, *Olabidocarpus* Lawrence, *Eulabidocarpus* Lawrence, *Parakosa* McDaniel and Lawrence, *Dentocarpus* Dusbabek and Cruz, *Lawrenceocarpus* Dusbabek and Cruz, *Histiophorus* Fredrich, *Schizocoptes* Lawrence, and *Paralabidocarpus* Pinichpongse.

Family Atopomelidae, New Status.

The characters that separate the mites heretofore associated in the subfamily Atopomelinae from the Labidocarpidae appear to be of sufficient importance to justify the erection of a family. This family agrees with the Labidocarpidae in having their anterior two pairs of legs modified to grasp the hair of the host, but not to the extent that all segmentation of the legs have been lost. It differs strikingly from Labidocarpidae in the structure of legs I and II having only the tarsus, or at the most the tarsus and tibia modified into claspers. In Labidocarpidae all segments of the first and second legs are reduced to form a clasper. Members of Atopomelidae are also characterized by the posterior legs having four segments distal to the coxae and with at least two pairs of legs with caruncles. This family as known by the author contains 12 genera : *Atopomelus* Trouessart, *Campylochirus* Trouessart, *Listrophoroides* Hirst, *Chirodiscoides* Hirst, *Neolabidocarpus* Gunther, *Austrochirus* Womersley, *Atellena* Domrow, *Centetesia* Lawrence, *Cytostethum* Domrow, *Tenrecobia* Lawrence, *Lemuroptes* Lawrence, and *Chirodiscus* (1) Trouessart and Neumann.

Family Myocoptidae, New Status.

This family is established for the reception of mites that were in the past referred to as members of the subfamily Myocoptinae of GUNTHER (1942). The family is based on the modification of legs III and IV being developed for clasping the hair of its host. The Myocoptidae are compressed dorsal-ventrally. Legs I and II are simple, five-jointed, without claws, and end in a large caruncle. Legs III and IV

1. In a study of the female used by TROUESSART and NEUMANN to describe *Chirodiscus amplexans* the endogynium forms an inverted "V". This would place this genus within the superfamily Analgesoidea according to the Key of BAKER et al. 1958. Also *C. amplexans* was taken from a bird *Podargus strigoides*. The genus *Chirodiscus* will be treated in a forthcoming paper by the author.

are highly specialized for attachment to the hair of its host. In the males of some species only legs III are modified for hair clasping. The specialization involves all the segments of the hind legs with the genu-femur being enlarged in most species. Members of this family are reported to cause a mange condition "mycoptic mange" of white mice.

The species *Myocoptes musculus* (Koch) according to WATSON (1960), should be placed close to the genus *Otodectes* Canestrini in the family Psoroptidae. This would include all members of the subfamily Myocoptinae of GUNTHER (1942) since *M. musculus* (Koch) is the type of the genus *Myocoptes* Claparede. The members within the family Myocoptidae form a homogenous group. The female genital region and the structure of the male aedeagus would exclude the members from being placed in the superfamily Psoroptoidea. The family as known by the author would include the following genera: *Myocoptes* Claparede, *Neomyocoptes* Lawrence, *Trichoecius* Canestrini, *Cryptocoptes* Lawrence, *Gliricoptes* Lawrence.

Several factors have been given consideration in the effort to build up a scheme of classification for the superfamily Listrophoroidea. The ecological relationships of the members of a genus to their animal host, with particular reference to the parts of the host attacked and to the obvious effects on the host. Published information on the life cycle of included species has also been considered in relation to each genus. The principal reliance in this work in the elevation to family status, however, has been from a study of the comparative external morphology.

The host mite relationship is an interesting aspect in the study of this superfamily. The family Labidocarpidae shows a high degree of homogeneity in host specificity since all but two of the genera are found exclusively on members of the order Chiroptera.

The genera *Histiophorus* Fredrich and *Schizocoptes* Lawrence are found on members of the order Rodentia.

The host relationships within the family Atopomelidae have been studied by DOMROW (1958) who gave a synopsis of the then known genera, species and hosts of the subfamily. The genus *Austrochirus* Womersley is quite restrictive in its host preference. DOMROW (1960) in a study of the genus stated that five of the six species were from marsupials. *A. enoplus* Domrow, the only non-marsupial bearing form, was taken from a water-rat (*Hydromys* sp.). This host specificity also applies to the genera *Cytostethum* Domrow and *Centetesia* Lawrence. The former is only recorded from marsupials of the genus *Potorus*, the latter *Hemicentetes* of the Insectivora. The genus *Listrophoroides* Hirst contains the largest number of species within the Atopomelidae. They have been taken almost exclusively from members of the order Rodentia. It is also of interest that the family Atopomelidae to date has a very restricted distribution being for the most part recorded from the Australian and Ethiopian realms.

The family Myocoptidae is predominately found on members of the order Rodentia. The only exception is *Chrysocoptes* Lawrence which is found on a member of the order Insectivora. Members of *Taterobia* and *Chrysocoptes* are unique by having

their legs devoid of any hair-clasping mechanism. They are rather more like those of the bird parasites of the Analgesoidea. LAWRENCE (1953) in his description of *T. longisetosa* stated the possibility of this mite being a straggler from a bird. However, for reasons given in his paper, he discarded the idea of *T. longisetosa* belonging to Analgesoidea. The reference to the similarity of *Chrysocoptes* may in fact enhance the idea that both of these are stragglers. Thus, the removal of *Taterobia* and *Chrysocoptes* would then establish for the members of the family Myocoptidae a homogenous morphological and host-parasite relationship.

The family Listrophoridae Canestrini contains three genera : *Listrophorus* Pagenstecher, *Eurchiroides* Womersley and *Lynxacarus* Radford. The genus *Listrophorus* contains the largest number of species within the superfamily Listrophoroidea. MCDANIEL (1965) in his study of the subfamily Listrophorinae related some problems involved in studying the genus *Listrophorus*. Also a synopsis of the genus *Listrophorus* was given for the world. The genera *Lynxacarus* and *Eurchiroides* are both monotypic. The host relationship for the family Listrophoridae is primarily members of the orders Rodentia and Lagomorpha. One exception is the genus *Lynxacarus* Radford found on a member of the order Carnivora.

The family Rhyncoptidae Lawrence was created for a species of mite found on the cape porcupine. FAIN (1965) reviewed the family and established that *Rhyncoptoides* Fain 1962 was a synonym of *Rhyncoptes* Lawrence 1956. The inclusion of *R. anastosi* (Fain), *R. cebin* (Fain) and *R. cercopithecii* (Fain) extended the hosts of Rhyncoptidae to include South American monkeys. LAWRENCE (1956) stated in the original description, " It is difficult to assign relationships to this mite which seems to differ from all other families of Sarcoptiformes ". The inclusion of Rhyncoptidae within the superfamily Listrophoroidea is based on the structure of the legs I and II being modified for clasping the hair of its host. However, legs III and IV in the female are similar in structure to those of the superfamily Psoroptoidea. The structure of the mouthparts with the presence of the recurved hooks relates it to members of the family Labidocarpidae. In the genus *Alabidocarpus* there are species that have recurved hooks on the anterior portion of the headplate. However, the structure of legs I being modified for hair clasping would relate them to the members of the family Atopomelidae. If the fact that they are dorsal-ventrally compressed is considered, this would relate them to the family Myocoptidae. They have what could be considered a clasping structure located between the head and first pair of legs that would possibly relate them to the family Listrophoridae.

The only structure that tends to point to the placement of this family in the superfamily Psoroptoidea is the structure of legs III and IV of the female. These two pairs of legs are reduced and terminate in a long whip-like setae similar to that found on members of the Psoroptidae. However, from a comparative study of all the structures it is the author's opinion that Rhyncoptidae belongs to the superfamily Listrophoroidea.

Key to the Families of the Superfamily Listrophoroidea Dubinin.

1. Pedipalps modified to clasp hair ; legs with normal segmentations, not modified for clasping hair ; Parasites of the orders Rodentia, Lagomorpha and the genus *Lynxacarus* (Carnivora)..... Listrophoridae Canestrini
Pedipalps not modified to clasp hair ; at least one or more legs adapted for clasping hair 2
2. Legs I & II modified to clasp hair..... 3
Legs I & II not modified, legs III or IV modified to clasp hair ; compressed dorsally-ventrally ; genu-femur of legs III adapted for hair clasping.. Myocoptidae Gunther
3. Legs I and II completely devoid of segmentation ; adapted for hair clasping ; legs III and IV terminating in claws, spines, or caruncles..... Labidocarpidae Gunther
Legs I and II with distinct segmentation ; hair clasping modification involving only certain segments 4
4. Legs without caruncles ; legs I and II adapted for hair clasping ; legs III and IV of female ending with whip-like seta ; mouthparts with recurved teeth.....
Rhyncoptidae Lawrence
Legs I and II with caruncles ; tarsus and tibia adapted to clasp hair ; mouthparts without recurved teeth..... Atopomelidae Gunther

Synopsis of the Families
and Genera of the Superfamily Listrophoroidea.

Superfamily Listrophoroidea Canestrini :

1. Family — Listrophoridae Canestrini

Genera : *Listrophorus* Pagenstecher

Eurchioides Womersley

Lynxacarus Radford

2. Family — Labidocarpidae Gunther

Genera : *Labidocarpus* Trouessart

Olabidocarpus Lawrence

Eulabidocarpus Lawrence

Parakosa McDaniel & Lawrence

Alabidocarpus Ewing

Dentocarpus Dusbabek and Cruz

Lawrenceocarpus Dusbabek & Cruz

Paralabidocarpus Pinichpongse

Histiophorus Fredrich

Schizocoptes Lawrence

3. Family — Atopomelidae Gunther

Genera : *Atopomelus* Trouessart

Atellana Domrow

Campylochirus Trouessart

Listrophoroides Hirst

Chirodiscoides Hirst

Neolabidocarpus (Gunther)

Austrochirus Wormesley

Atellena Domrow

Centetesia Lawrence

Cytostethum Domrow

Lemuroptes Lawrence

Cricetomysia Lawrence

Chirodiscus Trouessart

4. Family — Myocoptidae Gunther

Genera : *Myocoptes* Claparede

Neomyocoptes Lawrence

Trichoecius Canestrini

Gliricoptes Lawrence

Cryptocoptes Lawrence

Taterobia Lawrence (Possible straggler belonging to Analgesoidea)

Chrysocoptes Lawrence (Possible straggler belonging to Analgesoidea)

5. Family — Rhyncoptidae Lawrence

Genus : *Rhyncoptes* Lawrence

Department of Entomology Zoology
South Dakota State University, U.S.A.

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