Proceedings of the 3rd International Congress of Acarology, Prague, 1971

PARASITE-HOST RELATIONSHIPS IN FEATHER MITES

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The feather mites (Analgoidea) make a group characterized by permanent parasitism and consequently closely associated with their hosts. Their occurrence on birds is of ancient date, which fact is confirmed by a considerable morphological and physiological specialization of many species. The beginning of the development and independence of this group from the tyroglyphoid complex dates back to the time between the Secondary and Tertiary Periods and its intensive evolution has been going on since Oligocene (Dubinin,1951).

With respect to hosts the feather mites are characterized by different degrees of specificity, from forms associated with only one host species to forms with a wide host range. According to Dubinin (1950) this host specificity is due, on the one hand, to the influence of environmental conditions under which each species had been developing and, on the other, to the length of the period in which this development took place. Hence it follows that on historically old host groups there exists a large number of closely specialized mite forms and vice versa, in phylogenetically younger host groups there are forms which can transfer even to unspecific hosts. In any case the duration of the biological parasite-host system is of far greater importance than the absolute age of both of them. This is the reason why on various hosts there are species whose specificity is developed to a different degree.

I should like to illustrate examples of the particular degrees of host specificity existing in species and genera of feather mites. The specificity on the level of families is omitted because their systematics is being revised at present. My conclusions are primarily on taxons which have been recently scrutinized or revised. It should be noted that the conclusions concerning supraspecific categories of mites are to a certain extent subjective because they depend on the scope within which e.g. individual genera are considered. To a lesser degree this also applies to some categories of hosts, whose taxonomy is not unanimously understood by all ornithologists.

A) Distribution of feather mite species

1. Monoxenous species are distributed on a single host species. Such an occurrence is well known with many feather mites. For example the latest revision of the genus *Proctophyllodes* has revealed that 47 species out of 123, i.e. 38 %

have been found on a single bird species (Atyeo et Braasch, 1966). The species of scores of recently described monotypic genera have been indicated to be monoxenous as well. Many species of this category also exist among other genera. However advancing research may reveal that many species listed here actually belong to the next group after all.

2. Oligoxenous species are distributed on more than one host species, the lowest degree in this category being bixenous species.

a) Species with monogeneric distribution occur only on members of the same host genus, for example *Diomedacarus gigas* on the genus *Diomedea*, *Avenzoaria totani* on *Tringa*, *Zachvatkinia stercorarii* on *Stercorarius*, *Calcealges yunkeri* on *Zosterops*, *Hemicalcealges schistopygus* on *Lonchura*, *Bregetovia limosae* and *Montchadskiana buchholzi* on *Limosa*, *Ptiloxenus major* on *Podiceps* etc. Sometimes the specificity at the level of subgenus may be observed, such as the occurrence of *Microspalax puffini* on the subgenus *Puffinus*, *M. thyellodromae* on *Thyellodroma* and *M. ardennae* on *Ardenna*, all hosts belonging to the genus *Puffinus*.

b) Species with monofamilial distribution occur on the representatives of host genera of the same family. For example *Ptyctophyllodes trogonis* on Trogonidae, *Freyana anatina* on Anatidae, *Ardeacarus ardeae* on Ardeidae, *Mesalgoides picimajoris* on Picidae, *Psilobrephosceles ortygometrae* on Rallidae, *Proctophyllodes huitzilopochtlii* on Trochilidae, *Zachvatkinia puffini* on Puffinidae, *Gabucinia delibata* on Corvidae. This type of distribution is also quite frequent.

c) Species with monoordinal distribution parasitize the representatives of several families of the same order. This distribution may be observed with *Alloptes tubinarii*, found on Procellariiformes. In many cases this is rather a specific occurrence within the framework of a certain suborder such as *Proctophyllodes cotyledon*, *Pterodectes bilobatus* and *Mesalgoides oscinum* on Passeres, *Diproctophyllodes dielythra* and *Nycteridocaulus tyranni* on Tyranni, or *Uniscutalges elegans* on Pici. This type of distribution on hosts from several families is less frequent.

d) Species with polyordinal distribution parasitizing hosts of various orders, occur very rarely. Older acarological literature contains a number of references to such cases, but these should be taken critically due to possible incorrect data concerning hosts as well as morphological characteristics of the parasite itself. For example in the latest monograph on the genus *Proctophyllodes* (Atyeo and Braasch, 1966) the species *P. anthi* is given as the parasite of hosts of the families Motacillidae, Alaudidae and Jyngidae and *P. polyxenus* of some families of Passeriformes and of Strigidae. It must be noted however that even in recent literature many cases of the occurrence of certain species on hosts from different orders are indicated, but should be regarded as an accidental occurrence or as a result of accidental contamination of the hosts during their collection in the field and examination in the laboratory.

B) Distribution of genera of feather mites

The classification is similar to that of species, the survey does not include monobasic genera.

a) Genera with monogeneric distribution are not so numerous as subsequent categories. For example *Dinalloptes* and *Michaelichus* on the host genus *Phalacrocorax*, *Pseudavenzoaria* on *Tringa*, *Pomeranzevia* on *Numenius*, *Burhinacarus* on *Burhinus*, *Onychalloptes* on *Phaeton*, *Chauliacia* on *Apus*.

b) Genera with monofamilial distribution are quite frequent. For example *Laronyssus* on the host family Laridae; *Geranolichus* on Gruidae; *Tillacarus* on Numididae; *Alloptoides* on Anatidae; *Dichobrephosceles* on Scolopacidae; *Hemicalcealges* on Ploceidae; *Dermonoton* on Strigidae; *Ardeialges* on Ardeidae; *Metanalges* on Rallidae; *Eustathia* and *Neochauliacia* on Apodidae; *Trochilalges* on Trochilidae; *Falculifer* and *Pterophagus* on Columbidae; *Anapodema*, *Calaobia*, *Membranolobus* and *Vexillaria* on Bucerotidae.

c) Genera with monoordinal distribution are also frequent. For example *Kramerella* on the host order Strigiformes, *Grallobia* on Ralliformes, *Hemifreyana* on Charadriiformes. However, in this category the specificity is mostly revealed at the level of suborder, e.g. *Nycteridocaulus* on Tyranni; *Anisodiscus*, *Joubertophyllodes* and *Monojoubertia* on Passeres; *Freyanopterolichus* on Ciconiae; *Avenzoaria*, *Bychovskiata*, *Bregetovia*, *Freyanomorpha* and *Sokoloviana* on Charadrii; *Hyonyssus* on Pici.

d) Genera with polyordinal distribution are also quite frequent on hosts both from 2 orders and from many orders. For example *Zachvatkinia* on Charadriiformes and Procellariiformes; *Homeobrephosceles* on Gruiformes and Charadriiformes; *Uniscutalges* on Piciformes and Coraciadiformes; *Pseudogabucinia* on Ciconiiformes, Falconiformes and Gruiformes; *Coraciacarus* on Coraciadiformes, Cuculiformes, Falconiformes, Apodiformes and Gruiformes; *Brephosceles* on Gaviiformes, Procellariiformes, Anseriformes, Gruiformes and Charadriiformes.

The study of specific and generic specificity may in some cases provide data applicable to ornithosystematics. The occurrence of a certain taxon on certain hosts may indicate their phylogenetic affinities. However, the possibility of their secondary infestation due to ecological and ethological factors should be taken into consideration and individual cases should be considered from all aspects and with regard to other groups of parasites. As a whole the feather mites are a very suitable group for such phyletic conclusions.

References

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