

SHORT COMMUNICATIONS

IDIOXENIA VERSUS SYNOXENIA IN ECTOPARASITES

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Abstract. Various forms of relationship between parasites and host species are discussed and new terms for some of them are proposed.

The terms sympatry and allopatry, common in zoogeography, were used in parasitology to designate the existence of congeneric species on the same host species or, to the contrary on different host species (e.g. Eichler 1963, Tischler 1975). Kéler (1959) designated the occurrence of two or more congeneric species on one host individual as sympatric distribution and on one host species as parekous distribution. This last term is unsuitable because parekia designates another biological phenomenon viz. companionship with no permanent physical contact (Odening 1976), or tolerated companionship (Tischler 1975). Also the two first mentioned terms do not reflect satisfactorily the true relationship existing in host-parasite distribution in nature, the sympatry having not always exactly the same sense. Eichler (1966) proposed therefore the terms synhospitalic and allohospitalic species.

Recently, Gaud and Atyeo (1976) showed in their interesting study some examples of discordances in the ranges of geographic distribution of feather mites and their hosts. *Proctophyllodes truncatus* Robin and *P. orientalis* Gaud were found to have allopatric geographic distribution on the same host species, *Passer domesticus*, i.e. "sympatric" host occurrence. The same was observed with *Pterophagus strictus* Mégnin and *P. columbae* (Sugimoto) on *Columba livia domestica*. Cases of allopatric occurrence of congeneric species of Mallophaga on one host species were reported by Clay (1976) e.g. for *Strigiphilus aitkeni* Clay and *S. rostratus* (Burm.) on *Tyto alba*, for *Pectinopygus garbei* Pessôa et Guimarães and *P. sulae* (Rudow) on *Sula sula* and *S. leucogaster* or for *Myrsidea arafura* Klockenh. and *M. schizotergum* Klockenh. on *Corvus orru*. These examples confirm clearly the unsuitability of using the terms sympatry and allopatry in relation to host-parasite relationships for non-geographic purposes.

Already Wenzel et al. (1966) proposed to designate species of the same genus, occurring together on the same host species, as synoxenous, and those occurring on different hosts in the same or different geographic areas as alloxenous. Therefore, alloxenous species may be either sympatric or allopatric.

But the above mentioned curious cases of *Proctophyllodes* distribution do not fit under this definition. The mites were found on the same host species but not together. From the original definition it is not quite clear if "together" means on the same specimen or in the same geographic territory. Nelson (1972) interprets synoxenia only as the presence of more than one species of the same genus on one

host species. Therefore, three different types of parasite-host species relationships must be distinguished: 1) occurrence of parasites on the same host individual; 2) sympatric occurrence on the same host species and 3) allopatric occurrence on the same host species.

It is proposed to call simultaneous occurrence of various parasites on a single host individual idioxenia (or idioxeny) analogically as Kisielewska (1970) called a mono-specific assemblage in a single host individual idiohost population, and that of congeneric parasites euidioxenia. Vice versa the occurrence of parasites on the same host species could be termed hospitoxenia.

The original term synoxenia could be reserved for sympatric occurrence of congeneric parasites on the same host species. The term pseudosynoxenia might represent the allopatric occurrence of congeneric parasites on the same host species.

The phenomenon of euidioxenia is not quite common in ectoparasites and is connected with topic specialisation for various ecological niches in body teguments, fur or feathers. It may be observed in various feather mites (Analgoidea) among which the cases of simultaneous parasitization by *Freyana anatina* (Koch) and *F. largifolia* Mégn. et Trt. in various Anatidae are best known (Dubinin 1953). Another case of euidioxenia is the infestation of the South American erethizontid rodent *Coendou villosus* by *Eutrichophilus cordiceps* Mjöberg, *E. minor* Mjöberg and *E. cercolabes* Mjöberg (Bovicolidae) (Werneck 1936). It is quite obvious that the phenomena of euidioxenia and synoxenia are linked by various interstages.

An excellent example of synoxenia (with a part of euidioxenia certainly involved) is reported by Dubinina (1964) who found 12 species of the genus *Histiophorus* Friedrich (= *Schizocarpus* Trouessart) (Chirodiscidae) on the beaver (*Castor fiber*) localized in different body regions in relation with fur texture variations.

An extremely interesting and unique case of speciation on the same host is described by Fain and Domrow (1974). Collections from the potoroo, *Potorous tridactylus*, a macropodid marsupial distributed in south-east Australia and Tasmania yielded altogether 21 morphologically separable species of the genus *Cytostethum* Domrow (Atopomelidae) with both sympatric and allopatric occurrence. The number of species collected from the host in individual localities varied between 3—12.

Similar cases of synoxenia are known in North American muskrats, *Ondatra zibethica*, harbouring 6 species of the genus *Listrophorus* Pagenstecher (Listrophoridae) (Fain and Hyland 1974).

The study of these phenomena, and therefore their correct denomination, is important for our knowledge of parasite-host relationship, geographic distribution and speciation mechanisms in parasites.

ИДИОКСЕНИЯ В ПРОТИВОПОЛОЖНОСТЬ СИНОКСЕНИИ У ЭКТОПАРАЗИТОВ

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Резюме. Обсуждаются разные формы отношений между паразитами и видом хозяина и для некоторых из них предлагаются новые названия.

REFERENCES

- CLAY T., Geographical distribution of the avian lice (Phthiraptera): a review. J. Bombay Nat. Hist. Soc. 71: 536—547, 1976.
- DUBININ V. B., Perevyte kleshchi (Feather mites) (Analgesoidea). II. Epidermoptidae and Freyanidae. Fauna SSSR, Paukoobraznye VI. 6, 412 pp. Izd. AN SSSR, Moskva—Leningrad, 1953. (In Russian).
- DUBININA E. V., Mites of the genus *Histiophorus* (Listrophoridae) — parasites of beavers. Parazitol. sbornik Zool. inst. AN SSSR 22: 111—152, 1964. (In Russian.)
- EICHLER W., Bronns Klassen und Ordnungen des Tierreichs. 5. Arthropoda, III. Insecta, 7b Phthiraptera, 1. Mallophaga, Geest & Portig K. G., Leipzig, 291 pp., 1963.
- , Two new evolutionary terms for speciation in parasitic animals. Syst. Zool. 15: 216—218, 1966.
- FAIN A., DOMROW R., The subgenus *Cytostethum* Domrow (Acari: Atopomelidae): multiple speciation on the marsupial *Potorous tridactylus* (Kerr). Aust. J. Zool. 22: 549 to 572, 1974.
- , HYLAND K. E., The listrophoroid mites in North America. II. The family Listrophoridae Mégnin and Trouessart (Acarina: Sarcophagiformes). Bull. Inst. R. Sci. Nat. Belg. 50: 1—69, 1974.
- GAUD J., ATYEO W., Discordances entre les aires de répartition géographique des parasites et celles de leurs hôtes chez les Sarcophagiformes. Acarologia 18: 329—344, 1976.
- KÉLER S., Über die Wirtstreuung und die Verbreitung der Mallophagen. Z. Parasitenk. 19: 375—410, 1959.
- KISIELEWSKA K., On the theoretical foundations of parasitology. Bull. Acad. pol. Sci. Cl. II., Ser. Sci. biol. 18: 103—106, 1970.
- NELSON B. C., A revision of the New World species of *Ricinus* (Mallophaga) occurring on Passeriformes (Aves). University of California Press, Berkeley—Los Angeles—London, 175 pp., 1972.
- ODENING K., Conception and terminology of hosts in parasitology. Advances in parasitology 14: 1—93, 1976.
- TISCHLER W., Ökologie mit besonderer Berücksichtigung der Parasitologie. Wörterbücher der Biologie, VEB Gustav Fischer Verlag, Jena, 125 pp., 1975.
- WENZEL R. L., TIPTON V. J., KIEWLIOTZ A., The streblid batflies of Panama (Diptera, Streblidae). Ectoparasites of Panama: 405 to 675, 1966.
- WERNECK F. L., Contribuição ao conhecimento dos mallophagos encontrados nos mamíferos sul-americanos. Mem. Inst. Osw. Cruz (Rio de Janeiro) 31: 341—589, 1936.

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N. A. Filippova: Iksodovye kleshchi podsem. Ixodinae (Ixodid ticks of the subfamily Ixodinae). Fauna SSSR, vol. IV, No. 4, Publ. House Nauka, Leningrad 1977, 396 pp., 221 Figs., 106 Tables. Price 4.32 R.

Due to their medical importance, studies on ticks in the Soviet Union have a long tradition lasting several decades. Scores of papers dealing with this group of parasitic arthropods from most different aspects are published annually. A single species, *Ixodes persulcatus*, has been dealt with in over 2,000 papers because of its epidemiologic importance. A far less attention has been paid to the problems of tick taxonomy, although the correct identification of material is the first pre-requisite for its further investigation and evaluation. Likewise, it is impossible to characterize the tick fauna of a certain natural focus, if its representatives in all phases of development are not discerned. The classical monograph of Pomerantsev (1950) could not

fully satisfy the present needs of Soviet acarology any longer. The task of compiling anew and on an up-to-date level this group of parasitic arthropods for the series Fauna of the USSR was undertaken by N. A. Filippova, the outstanding specialist in the taxonomy of Ixodoidea, whose work of many years' standing in this scientific field is world known and appreciated. Due to large material the said volume covers only members of the subfamily Ixodinae, represented by the genus *Ixodes*.

The author first deals with the external structure of ticks. According to the uniform scheme she discusses the character of idiosoma, gnathosoma and legs separately for females, males, nymphs and larvae, paying attention not

only to relevant morphological formations, but also to their sensory equipment. A special section dealing with the internal anatomy has not been included in the book. The ecological part comes next. It is concerned with characteristics, periodization and length of the life cycle, activity, feeding, oviposition and occurrence of ticks in different biotopes and natural zones. This part is accompanied by eight very illustrative somewhat strangely numbered charts which depict the distribution of 28 species in the territory of the USSR. Because of their global concept, of high value are the subsequent chapters, dealing with the distribution of the genus in different zoogeographic regions, with the composition and relationships of the representatives of Palearctic fauna and with the main directions in the evolution and phylogenesis of this genus. The development of Ixodinae system is given in a brief survey. The general part ends with chapters giving brief accounts of the medical and veterinary importance of ticks, of the preventive measures against diseases transmitted by them, and of the control of ticks, methods of collecting, preservation and identification. An extensive list of references of over 20 pages includes quite a number of papers of Czechoslovak ixodologists. The systematic part begins with keys to subgenera and species, separately for females, males, nymphs and larvae. Main bibliography, morphology, species composition and distribution are appended to each subgenus. Each species is provided with a detailed bibliography, information on morphology of all developmental stages, distribution both in the USSR and abroad, ecology, epizootologic and epidemiologic importance, and if necessary there are notes on systematics and nomenclature. This part also comprises a number of charts illustrating the geographic distribution. Numerous detailed tables giving metric characteristics of many morphological features are to be commended.

Within the subfamily Ixodinae the author recognizes a single genus *Ixodes* with 19 subgenera. In contrast to American systematists she considers as fully justified the existence of subgenera *Ixodiopsis* Filippova, 1957, *Trichotoixodes* Reznik, 1961, *Pomerantzevella* Feider, 1965 and *Monoindex* Emelyanova et Kozlovskaya, 1967. The advancement made in the studies on systematics and faunistics of ticks in the USSR since the publication of Pomerantsev's monograph is evidenced by the fact that while in it only 17 species of the genus *Ixodes*, belonging to three subgenera have been described and another three have been briefly mentioned, as many as 34 species of 10 subgenera are discussed in Filippova's monograph. There is a nomenclatoric change: the species heretofore currently called *I. putus* in Soviet literature, is mentioned here under its common name *I. uriae*. The great asset of the author's systematic work is the elucidation of the nomenclature of the species to which representatives of the subgenus *Pholeoixodes* from carnivores belong, this having been a point of controversy until recently.

As a whole, the reviewed monograph is to be assessed very positively. It is of a high professional standard revealing its author as an experienced specialist. The general part, although not too extensive in content, includes all basic data. In the systematic part commendable are morphological sections including all developmental stages and accompanied by numerous excellent figures and tables. No doubt, in its content and importance this monograph exceeds the borders of the Soviet Union and becomes an indispensable publication to all acarologists. It is a treatise which continues the tradition of ixodological research in the USSR in a truly representative way. Therefore, we would like to congratulate the author on its achievement.

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