THE SYPHACIINAE (OXYURIDAE, NEMATODA) PARASITIC IN RODENTS AND LAGOMORPHA.
NUMERICAL TAXONOMY.
CLADISTIC ANALYSIS OF EVOLUTION

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INTRODUCTION

Two different methods were used to analyze the systematics of the Syphaciinae, a parasitic group of pinworms specific for the Rodents and Lagomorpha. The statistical method permits to build a « phenetic classification »; the cladistic method permits to build a « phylogenetic classification ».

The classification finally proposed is principally found on the results of the morphological study of the parasites, but has also in view the integration of all available data concerning the biology, the biogeography and the phylogeny of the hosts.

MATERIAL AND METHODS

One hundred and one species of pinworms parasitic in rodents and lagomorphs were studied. Morphological characters were...
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RESULTS

1 — The Syphaciinae considered as a monophyletic group

The results of the detailed study of the morphological characteristics of the new systematic subdivisions suggest that they may fit within many small evolutionary lineages which developed homologous anatomical features from the same primitive structures. The Syphaciinae are interpreted as a monophyletic group from which evolutionary branches were successively isolated in association with particular groups of hosts.

2 — Chronology and evolution of the Syphaciinae

An attempt was made to reconstruct the main stages of the evolution of the Syphaciinae using all data concerning the paleogeography of their hosts. When the study of the morphological characters did not furnish sufficient data to justify one hypothesis in preference of another, it was admitted that very close relations have existed between the Syphaciinae and their hosts since the beginning of their respective radiations.

Paleocene. The Syphaciinae colonized the common ancestors of the Glira in Asia. Two principal branches became apparent: — one in the Lagomorpha from which the Pas-salurini were derived, — one which achieved a most impressive diversification within the Rodentia.

Lower Eocene. The Syphaciinae parasitic in rodents began to disperse. Three main groups can be distinguished: — a South-Thetysian group from which the Protozoophagini parasitic on Hystricognathous rodents were derived, — a Northern-Thetysian group from which the Syphaciini and the Acanthoxyurini differentiated and a few relictual forms belonging to the Hilgertiini parasitic on the Ctenodacty-lidae rodents, — a Northern-American group belonging to the Hilgertiini, with a few relict forms remaining in the rodents of the families Sciuridae and Heteromyidae.

Upper Eocene. The Protozoophagini evolved with the Phiomorpha and reached Africa. The Syphaciini began their differentiation with the Muroidea of Asia. The Acanthoxyurini entered Africa with the Anomaluroidea and a capture by a Phiomorpha led to a small lineage still represented by the genus Petronema.

Oligocene. During this period most of the present genera appeared which form two main groups: — the Protozoophagini present in South-America in the Caviomorpha, — the Syphaciini, which evolved concurrently in the Cricetidae and in the Sciuridae in Asia, — the Acanthoxyurini which evolved in Africa with their specific hosts, the Ano-maluridae.

Miocene. Connections between Africa and Eurasia were re-established and allowed two important radiations of the Syphaciini: — one with the Muroidea invading the Paleartic and Ethiopian regions and reaching Australia, — another radiating with the Sciuridae in the arboreal forms both in the Ethipian and the Eastern regions.

Pliocene to present. Two important events occurred during this period: — quaternary glaciations and vicariant events affecting the Syphaciini parasitic in Sciuridae in the sunda islands, and the Acanthoxyurini parasitic in Ano-
maluridae in the Ethiopian rain-forest, — the crossing of
the Bering strait by the Syphacini parasitic in Arvicolidae
and Sciuridae.

CONCLUSION

Distinctive features in the evolution of the Syphaciinae

Evolutionary patterns observed among the Syphaciinae
and in others groups of Phasmidians Nematodes parasitic
in Vertebrates including the following:
— the growth and diversification of a parasitic group
was associated with the colonization of free ecological niches
created during a period of rapid host radiation or dispersal,
— adaptation to the host did not produce evolutionary
change (anagenetic evolution), or else, only by simple and
short ranged speciations as isolations happens in the host's
populations (allopatric speciation).

Evolutionary patterns distinctive of the Syphaciinae but
not observed among other phasmidian groups include the
following:
— host captures, which elsewhere play a fundamental rode,
only weakly affected the evolution of the Syphaciinae; in
this sub-family the captures were few and occurred in the
same host family; the evolutionary changes which resulted
were of weak amplitude,
— the distribution of the Syphaciinae among their spe­
cific hosts appears closely related with the pattern of the
phylogeny of the hosts.

Methodological choices

The two methods which were successively used in this
study have their own advantages, disadvantages and limi­
tations. The very important congruence which can be
observed between the new classification proposed here and
the older classification, indicates that neither refutes the
other. Rather, they can be viewed as two essential and
complementary approaches to the same problem. In any
case, they remain the two principal tools available for the
systematist, and because of their differences, it seems desir­
able that both be used concurrently.

Watever the properties of the different methods of pheno­
typic analysis, the results appear frequently as a multi­
plicity of arrangements, each of which is equally probable
from a logical view point, but contradicting each other.
Only a knowledge of biological mechanisms can allow us
to limit the range of the choices.

REFERENCE

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