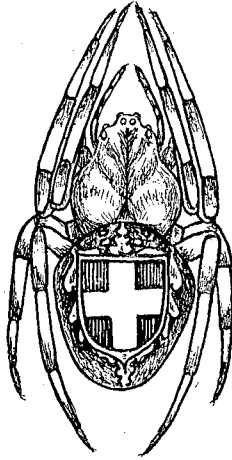


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SEPARATUM

NEOTENY IN OPILIONES

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INTRODUCTION

The arrest in the morphological development of one or various characters during ontogeny, gives rise to a noteworthy divergence (heterochrony) concerning successive development of the body. This phenomenon has been given the name neoteny, KOLLMANN (9), and is applied to those organisms that retain larval characters in the adult stage. Neoteny hold up the developmental process and allows the species to elude excessive specialization. This is opposed to the "biogenetic law" as stated by HAECKEL (7) more than a century ago.

There is a vast amount of literature on the subject, that it has been recapitulated and analysed by DE BEER (1) with examples well known by all biologists. Literature on arachnids is very sparse, being mites the group in which the most neotenic forms have been detected DE BEER (1), HAMMEN (8), etc. A very important contribution is made by FIRSTMAN (3). This author, through the comparative anatomical studies, emphasizes the importance of neoteny in the evolution of entire groups among Arachnida, Merostomata and Pycnogonida. In the opiliones, neoteny has not yet been investigated thoroughly, in spite of being observed by MARTENS (10) in his important study of the genus Ischyropsalis, which includes different zoological aspects, being neoteny one of them.

The aim of this paper is to call your attention to the importance that a correct morphological interpretation, may have in the opilionid systematics. The neoteny mask the phyletic relationship in the Opiliones, owing to diverse morphological reductions.

NEOTENIC PROCESSES

Let us consider the genus Ischyropsalis as an example. These species show marked changes in the sclerotization of the tergites, separation between prosoma and opistosoma (without "scutum magnum") and clear fissures in the last thoracic tergites, which are difficult to fit into other highly developed structures.

Those adult animals, that retain some nymphal characters could be interpreted as primitive forms, but what they really appear to be, are neotenic simplifications of some characters that coexist with others of a more developed nature, which are evidence of an advanced phyletic process. Neoteny in this genus shows itself to be an important phyletic factor in the development of the whole of its species, being greater in the ♀ than in the ♂ and appearing in both sexes or in one of them, in this case it is in the ♀. Its present standing is shown by intermediate states of a certain lability, such as scutum parvum, intermedium, laminatum, disectum and without scutum, studied by MARTENS (10), and MARTENS & SUZUKI (11).

But apart of the genus Ischyropsalis which is already known, neoteny also appears in other very difficult groups. We re-

fer to the genera such as Caddo, Caddella, Acropsopilio, Crosbycus, etc., whose systematics position even today is still very questionable; up to now, few specimens of them were known. However, in the last few years, the collections of BRIGGS (2), MARTENS (12) and SUZUKI (18) in the United States, the Himalayas and Japan respectively, have emphasized the rich cryptozoic fauna of these genera, which is of extraordinary interest, as it concerns forms, that could very well represent the end of ancient phyletic lines, that are about to become extinct. The characteristics are as follows: soft, not very quitinized, small size, very frequent parthenogenesis, morphological structures simplified by neotenic factors, etc.

Intense pressures of adaptations to highly specialized habitats, mask their direct descent, and cause their great systematic difficulty. This has stimulated study on the subject, and excellent papers have appeared from the same authors who discovered it, and from others who made a minute analysis of the morphological structures with obvious efforts to reach a phylogenetic interpretation. With the information supplied by this extensive bibliography, we have taken the liberty of describing some cases which could be interpreted as neotenic forms.

One of these, is the controversial genus Caddo, the subject of many and argued studies, among which the most recent work of GRUBER (5) and SHEAR (16), are outstanding. The latter, suggests the possibility that Caddo pepperella can descent from C. agilis, by neoteny, but does not treat this phenomenon more fully. On the other hand, GRUBER (5), in his fine study on Caddo, clearly demonstrate the close relationship of this genus with others of the subfamily. Oligolophinae, to the point, that it appears evident, that Caddo descends from this subfamily, by neoteny.

Another exemple can be the genera Pentanychus and Isolanus (the latter being monotypical), which are members of the Pentanychidae BRIGGS, 1971, mainly defined by the following characteristics: two supplementary branches on the hind claws, the presence of the 9th tergite and the appearance of lateral sclerites.

It was supposed that these characteristics were primitive, but we believe that, it is rather a question of a neotenic simplification, which retains nymphal characters in the adult animal. Therefore, these are not simple but simplified forms, nor are they primitive, but derived. In this case, as well as in the case of the genus Caddo, the need to separate these genera from the families which they come, can be doubted, as these simplified characters coexist with others well developed, which are characteristic of respective families.

Another clearly neotenic genus is Sabacon. with the same type of deviations as the genus Ischyropsalis, according to SUZUKI (17) and MARTENS (12), having been elevated to the category of monotypical family. Also, in some Nemastomatidae the "Scutum magnum" which is characteristic of the family, does not develop, and individual adults appear to have their development arrested with a nymph like appearance, as the genus Crosbicus. An incorrect interpretation of this phenomenon gave rise to the incorporation into this genus of true

nymphs of already known European species which were erroneously taken as neotenic adults. Also, on account of the absence of the "scutum magnum" the genus Nemastomella M-L, 1936 was created, with a nymph of Nemastoma dubium. These mistakes have been the subject of a review by RAMBLA (14) and (15).

Reduction phenomena also appear in other genera at present excluded from the Ischyropsalididae family, according to GRUBER (6), MARTENS (13) and SHEAR (17). It is due to the heterogeneity which is difficult to interpret, but in which neoteny probably plays a part.

Neoteny is less frequent in other groups living in open habitats, in spite of that, some morphological modifications shown by some genera, as Leioibunum, Nelima and others, can be neotenic.

Owing to the limits imposed on the text, we have exposed only some cases of neoteny in lower groups, such as genus and species, but this phenomenon probably has been involved in the evolution of entire high groups.

Finally, as GADEA (3) successfully pointed out, to achieve a correct morphological interpretation of the different parts of an organism, it is essential to discern between the simple (primitive) and the simplified (derivate). Organisms with a primitive appearance, may be the simplified, secondary and neotenic ones.

CONCLUSIONS

Neoteny is present in different opilionid groups, but especially in those cryptozoic species, which are in most cases, the end of ancient phyletic lines that are about to become extinct. So, the neotenic processes allow these old phyletic species to escape extinction and to return to a primitive organisation.

Logically, the neoteny has "raison d'être", whenever the species take advantage of the environmental circumstances, which permit these to derive towards a new speciation, which don't necessarily always break the phyletic relationship with the initial forms.

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