

Regressive Evolution und Phylogenese – Heft 3 der Fortschritte in der zoologischen Systematik und Evolutionsforschung. Mit Beiträgen von : C. Schemmel, J. Parzefall, N. Peters und G. Peters, H. Wilkens, W. Villwock, D. Zander, M. Dzwillo. Hamburg, Berlin: Paul Parey 1984. 126 pp., 52 figs., 2 tabs. Soft bound DM 54,-.

The phenomenon of regressive evolution (=reduction of characters as an adaptive reaction to modified conditions of life) had been a centre of the research work of the German zoologist C. Kosswig. The original plan to accumulate his and his students' observations on regressive evolution in a comprehensive single volume failed after Kosswig's death in 1982. However, now the formerly intended contributions of his coworkers are updated and completed by the authors. This collection of papers has now been published as the third supplementary volume of "Zeitschrift für zoologische Systematik und Evolutionsforschung". These contributions discuss the problem of regressive evolution from genetic, ecological and ethological points of view, respectively.

In this book review a citation of the titles of the different articles may be sufficient to give some insight into the content of this volume: "Regression, compensation and progression in evolutionary processes" (Schemmel, Ch.); "Regressive evolution and behaviour in cave living animals" (Parzefall, J.); "On the ontogenesis of rudiments" (Peters, N. and Peters, G.); "The evolution of polygenic systems, studied on epigeal and cave populations of *Astyanax mexicanus* (Characidae, Pisces)" (Wilkens, H.); "Scale- and ventralfin-reductions in old world Cyprinodontids (tribe Aphanini) (Pisces: Cyprinodontidae), phenomena of regressive evolution" (Villwock, W.); "Ecological factors and regressive evolution" (Zander, C. D.) and "Regressive evolution in the phylogeny of animal kingdom" (Dzwillo, M.).

Kosswig and his coworkers used the cavernicolous *Astyanax mexicanus* as an example to integrate the phenomena of regressive evolution in the overall pattern of phylogenetic processes and to understand their genetic and developmental principles. Therefore, crossing experiments between these highly specialized cave-dwelling fishes and their closed relatives living at the surface play an important role in the studies discussed in this volume. Regressive evolution takes place either as adaptive reduction by dynamic selection (disadvantageous characters) or as degeneration caused by mutation pressure and non-existing stabilizing selection (useless characters). This statement can be demonstrated and confirmed in various ways – for example with different patterns of behaviour in the cave habitat (circadian rhythm; fright reaction; schooling, aggressive and feeding behaviour).

An interesting point in the discussion of regressive evolution will be the ontogenesis of rudiments. Here some regularities can be observed even when comparing very different rudiments: 1. Allometric growth of the rudiment. 2. Correlation between its size and structure. 3. Definite dependence between the development or degeneration processes of its component parts.

Reductions in parasites and cavernicolous animals are well known and most clearly expressed. But the development of polymorphic and colonial organisms and the decrease in body size during evolution too have been connected with the reduction of complex morphological structures.

For many characters with special relevance for the phenomena of regressive evolution (eye-disposition, melanophores/morphological colour change, taste bud apparatus and feeding behaviour for the populations of *Astyanax mexicanus* and scales, teeth and ventral fins for Anatolian aphanine species) a polygenic inheritance can be shown.

Considering regressive evolution from an ecological point of view the speciation seems to be mainly influenced by the competition between organisms. An annidation to habitats without competitors often leads to a reduction of ethological, physiological and morphological characteristics.

A combination of these last two aspects (polygenic inheritance and ecological point of view) may initiate extended studies in the field of ecological genetics – for example investigations on clinal variation. But this perspective has not been worked out too much in the papers of this volume.

Another critical comment deal with methodological aspects: many of the results and conclusions can be precised by applying the well-known procedures of quantitative genetics and by estimating and testing appropriate genetic parameters. In our opinion this lack must be considered as a considerable disadvantage and weak point of the papers in question.

For each publication consisting of contributions by various authors it is often very difficult to get a coincidence of emphasis and a homogeneous style of presentation. In this volume the uniting idea of problems and concepts of regressive evolution provides a sufficient and satisfactory manner of representation.

Some of the articles of this volume are extremely specialized. Therefore, they may be of special interest only for those zoologists working in the same field. But some of the papers – for example those of C. Schemmel, H. Wilkens, C. D. Zander and M. Dzwillo – are of general interest and can be read with profit also by the non-specialists. Finally, this volume can be recommended for all those who are interested in problems and concepts of regressive evolution.

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