

SEXUALITY AMONG PROSOBRANCH MOLLUSCS

BY

CLARENCE LEE FURROW

Knox College, Galesburg, Illinois

Until recently studies on the sexuality of the Prosobranch Molluscs have been confined almost exclusively to marine genera. In 1914 Von Kemnitz studied a freshwater Bavarian Prosobranchiate, *Valvata piscinalis*, and concluded that this species offered no unusual deviations with respect to hermaphroditism, which was not already present among the pulmonate gastropods. The literature on the marine Prosobranchiates records many unusual conditions connected with reproductive activity, such as protandry, atypical spermatogenesis, vegetative cannibalism, etc. It was thought that the fresh water Prosobranchiates might offer some clues as to the evolution of the reproductive functions among the few remaining hermaphrodite members of this group.

With this in mind attention was directed to the American species, *Valvata tricarinata*. In 1930-31 the author observed atypical spermatogenesis in this species. The atypical spermatogenesis terminates in the formation of two types of abnormal spermatozoa which deviate in size and form with respect to the normal. Further study on this form revealed that the condition of primitive hermaphroditism exists, and that the female germ cells and male germ cells are clearly stratified in the ovotestes. The female germ cells are restricted to the marginal layer and the male germ cells are confined to the central medullary zone.

In 1931-32 Artom and Cavallini re-investigated the European species, *Valvata piscinalis*, and were able to confirm the observations of Von Kemnitz. In addition they studied *Valvata cristata* which is an Italian species. They found *V. cristata* to differ markedly from *Valvata piscinalis* in that *V. cristata* presented a case of spermatozoon dimorphism. They also found that in this case the general histological and morphological conditions of the gonad resemble those of *Valvata tricarinata*. In the observations on *Valvata tricarinata* the segregation of the male and female germ cells is followed during the sexual phases by a period of reduced protandry during which the animal alternates between a male sexual phase and a female sexual phase. The intervals between the two phases are marked by a restoration and a transition, the transition occurring between the male and female phase and the restoration period occurring between the female and the male phase. The atypical spermatogenesis which occurs in *Valvata tricarinata* and the abortive transformation of the spermatozoa are interpreted as arising from the hermaphroditic condition of the animal, especially in view of the segregation of the male and female zones.