

Paperback Re-issue

This book published in 1987, reviews and illustrates the structure, as seen by the scanning and transmission electron microscopes, of the spermatozoa of insects, centipedes, millipedes and onychophorans. Virtually every reference in the large literature on sperm ultrastructure in these groups is cited and many new observations are included. The spermatozoa of spiders and other arachnids and crustaceans are also briefly treated.

The remarkable diversity of sperm structure in arthropods is shown to have great value for the study of taxonomic and evolutionary relationships. Study of this diversity clarifies the interrelationships of chelicerates; supports a new theory of the relationships of onychophorans with earthworms; shows the distinctive variety of aflagellate sperm in millipedes in contrast with the flagellate and sometimes dimorphic sperm of centipedes; and confirms, in these and insects, that sperm structure is specific at all taxonomic levels. Sperms vary from those with the normal complement of organelles to those with no acrosome, no nucleus, or no flagellum; some have two to many flagella; others have the flagellar doublets multiplied from the basic nine to as many as a thousand or have other more bizarre modifications. These variations and omissions have important lessons for students familiar with the more orthodox sperm of mammals. Giant sperm reaching a length of 15 mm, much longer than the male fly, are described for *Drosophila* and the genetic control of sperm structure and its manipulation by x-ray irradiation and hybridization, with implications for control of lepidopteran insect pests, is discussed.

The book ends with a summary of insect sperm structure and its relevance to the phylogeny of the various orders. The book will continue to hold scholarly value for entomologists, physiologists, geneticists and all who are interested in the functional ultrastructure of animal cells.

Cover photograph *Heliothis punctigera*: testicular parasperm in transverse section, $\times 53\ 000$

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