

This manual is, as it should be, geared to students who have had some prior instruction in entomology. The text is logically organized, first giving a brief introduction to terms used in morphological descriptions, continuing on to describe collection and preservation techniques, and then proceeding with 17 chapters of taxonomic keys to nearly all arthropod groups of both major and minor medical and veterinary importance. There is also a good chapter on identification of venomous arthropods and mounting and dissection of mosquitoes. The chapter on blood meal and pathogen identification is good on the former and weak on the latter. The last chapter on rearing arthropods is short and will require extensive use of the references listed.

The taxonomic keys are state-of-the-art and fairly current with the latest in systematic thought. Although New World species are the primary emphasis, there is an international flavor to most of the keys presented except in the Diptera in which below family only North American genera and species are well represented. The keys are excellently illustrated although the figures are sometimes awkwardly separated from the pertinent couplets, forcing the would-be taxonomist to use his wits as well as his vision.

Although the manual is well illustrated, some of the terminology used (e.g., habitus and porrect) are unfamiliar and would require ready access to Torre-Bueno's *Glossary of Entomology*. In some keys the descriptive terms are subjective without illustration (e.g., terms such as shaggy and broad), and hence can be misleading.

I have used several of the keys and found most of them to be very workable. Of those keys tested, I found the mosquito keys to be excellent, the tick keys quite good, and the flea keys difficult, partly due to several hard-to-decipher figures with unclear abbreviations. In some cases characteristics such as festoons for ticks and the cleaver cell for tsetse flies were not utilized where they might have been.

Taken in its entirety, the manual is so well done that it left this reviewer wishing for even more, although of course there is a limit to how detailed such a manual can be without losing its general perspective. Additionally, since the manual is excellently referenced, even the specialist can find a source from which to obtain more detailed information.

In summary, I believe most anyone with an inclination to medical or veterinary entomology will want to add this manual to his collection and it should also be strongly considered

for laboratory courses in the same subject areas.—John B. Gingrich, Division of Tropical Public Health, Department of Preventive Medicine/Biometrics, Uniformed Services University of the Health Sciences, Bethesda, MD 20814.

BIONOMICS AND PHYSIOLOGY OF *Culex nigripalpus* (DIPTERA: CULICIDAE) OF FLORIDA: AN IMPORTANT VECTOR OF DISEASES. By J. K. Nayar. 1982. Florida Agricultural Experiment Stations Bulletin 827. 73 pages. Distributed by Florida Agricultural Experiment Stations, Institute of Food and Agricultural Sciences, University of Florida, Gainesville.

We are probably all familiar with papers on the bionomics of some mosquito species. For the most part, these are discussions of the basic biology of the species involved. They typically include such things as descriptions of egg, larval, pupal and adult morphology; rates of egg hatch, larval, pupal and adult survival under different environmental conditions; larval development times; pupal emergence rates; adult physiology and behavior studies; data on oviposition characteristics; and longevity studies. These are normally studies on the basic biology of the mosquito involved. They are essential reading as background for those doing further research or working on control of that mosquito, and are of peripheral interest to others. Nayar's effort goes beyond this.

Although it contains all of the above types of information, it contains more of it than many similar reports. It is really a summary of about 20 years of intensive research on this vector. In addition to the above information, Nayar also includes data on such important topics as larval aggregations, copulation and insemination studies, flight behavior, dispersal, feeding and metabolism, correlations of the daily survival rates with population on density and vector potentials, vector relationships with viruses, malarial and filarial parasites, insecticide resistance and control. This information is all logically arranged in sections on Materials and Methods, Egg, Larva and Pupa, Adult, Vector Relationships and Control.

Because of the length of the work (73 pages) much of the data are presented with little information on how they were obtained, their significance, or comparisons with other species. However, extensive references (over 160 citations) allow the reader to quickly find such information. The text is well organized and written.

Although much of the information in this report is not of direct utility to all mosquito workers, it is obviously of importance to researchers and control specialists in the southeastern United States (particularly Florida), Mexico, the Caribbean, Central America, and northern South America. This is not to say that there is not useful information for any of us in this report. For example, in my studies on the larval alarm reaction in *Aedes aegypti* and *Aedes polynesiensis*, I have never found a healthy indi-

vidual larva which would not dive upon stimulation by a passing shadow or mechanical vibration. However, Nayar briefly presents data in which it appears that the larval alarm reaction is suppressed in *Culex nigripalpus* by overcrowding during the light phase of the light: dark cycle. For the rest, this report could serve as a model for similar work on other mosquito species.—R. E. Duhrkopf, Department of Biology, Grinnell College, Grinnell, IA 50112.

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