

REVIEWS AND ABSTRACTS

J. **BROMELIAD MALARIA IN TRINIDAD, BRITISH WEST INDIES.** By W. G. Downs and C. S. Pittendrigh, 1946. Amer. Jour. Trop. Med., 26(1):47-65, 20 refs., illus. Although much controversy has taken place concerning the possibility of bromeliad-breeding anophelines of the subgenus *Kertzia* being involved in malaria transmission, it has been confirmed by Rozeboom and Laird as well as by Downs, Gill, and Shannon that *Anopheles (Kertzia) bellator* D. and K. is a vector of malaria in Trinidad. Many of the forests there in which this species is found, are man made. They consist of cacao plants interspersed with immortal trees, the latter supporting many species of bromeliads which, through their ability to hold water, are good breeding places of *A. bellator*. Despite the fact that *A. bellator* is a forest species, it is closely associated with man in the cacao areas. It lives in the drier microclimates of the forest but it often leaves the forest for drier conditions offered by the cacao estates and open areas in the villages. The cacao industry has brought relatively large human settlements into immediate contact with the forest of cacao and immortal trees. *A. bellator* breeding is restricted to certain species of bromeliads and does not occur in the drier parts of the island.

Present methods for control of this anopheline are based upon elimination of the bromeliads by hand. This process is hazardous and time consuming. The immortal trees have thorns; the branches break easily; and the cost, varying from \$22 to \$128 per acre, is prohibitive in many areas. Of the chemicals tested to kill the bromeliads, 2 per cent copper sulfate solution has given the best results. This material does not injure the cacao or immortal trees. Since the spray must reach a height of 70 to 100 feet, the equipment found best suited for this purpose is that developed by the United States Department of Agriculture for use in control of the gypsy moth.

The most lasting and economical control measures advocated, however, would be a change in agricultural practices such as the use of windbreaks on the cacao plantation in place of the immortal trees. Trees, such as the mango, used for windbreaks, do not support the great bromeliad flora of the immortal trees and would at the same time have some commercial value. Through such a conversion, the populations of *A. bellator* could be reduced or eliminated.—HELEN SOLLERS, Bur. Ent. and Plant Quar., Agr. Res. Adm., USDA, Washington, D. C.

X **THE MOSQUITOES OF THE SOUTHERN UNITED STATES EAST OF OKLAHOMA AND TEXAS.** Stanley J. Carpenter, Woodrow W. Middlekauff, and Roy W. Chamberlain. The American Midland Naturalist, Monograph No. 3, 292 pp., 155 figs. The University Press, Notre Dame, Ind., May, 1946. \$4.00. Another revision of the mosquitoes of the southern United States might appear to be

unnecessary in view of the recent works of King, Bradley and McNeel, and of Matheson, but the additional information contained in this work, and the quantity and quality of the illustrations fully justifies its publication. It is primarily a taxonomic handbook, designed to aid entomologists and public health workers in the collecting, preparation, and identification of mosquitoes. There is a brief general discussion of the life history and medical importance of mosquitoes, followed by an excellent section of 17 pages on the techniques of collecting, transporting, storing, preparation for study, and equipment for identification of mosquito adults and larvae. Methods for the collection of mosquito eggs are also given, but no suggestion as to how to preserve them. A well illustrated section of 25 pages explains the characters used in the identification of adults, larvae, pupae, and eggs, followed by keys to the subfamilies and tribes of the Culicinae.

The rest of the book, with the exception of a bibliography of 188 titles, and a very complete index, is devoted to the keying and description of the 11 genera and 71 species or subspecies of the region under consideration, with notes on the distribution, biology, and medical importance if any. Page references are given in the keys so that one can turn immediately to the descriptive treatment of the species and the species are arranged alphabetically under each subgenus. Because most of the species are well catalogued in recent works few citations other than the original ones are given under the species. The adult female, adult male, and larva are described for each species. Of particular value are the excellent drawings of adult and larval structures by Mrs. Elizabeth Kaston. These are distributed through the text so that usually one does not have to turn from the description to consult the illustrations, and they are sufficiently large to show all of the structures clearly. The paragraph on distribution gives the over-all range followed by the distribution in the Southern States by state, with bibliographic references to the records. The writers have utilized recent records as much as possible as being more readily available and reliable. The paragraph on biology for each species includes brief notes on feeding habits, breeding places, and seasonal distribution, the latter drawn largely from the unpublished records of the Fourth Service Command Medical Laboratory.

The authors are to be congratulated on preparing this fine manual, and the publishers in getting it out in such excellent style. It is a book that will be of immense value to any who wish to know how to collect, preserve and identify mosquitoes in the South. While there will still be additional species found in the South, this manual will be the most comprehensive and valuable work on the subject for a long time to come.

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