REVIEWS AND ABSTRACTS

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A PRELIMINARY ACCOUNT OF THE TRANSMISSION, MAINTENANCE AND LABORATORY VECTORS OF BRUGIA PAHANGI. By Edeson, J. F. B., Wharton, R. H., and Laing, A. B. G. Trans. R. Soc. trop. Med. Hyg. 54(5):439–449. 1960. 10 refs. *Brugia pahangi* occurs naturally in the domestic cat and dog and in several species of forest animals in areas where *B. malayi* is endemic. . . . Feeding experiments with a wide range of mosquitoes showed that *Armigeres obturbans* is a very efficient host. *Mansonia annulatus* is also a good host, but *M. uniformis* is less efficient, and *M. longipalpis* is a comparatively poor laboratory host. *M. (C)crassipes, Anopheles barbirostris, A. umbrosus,* and small numbers of *Aedes aegypti* and *Culex fatigans* also supported development to the infective stage. *M. longipalpis* and *M. annulatus* were proved to be vectors in nature.

The available evidence from blood and mosquito surveys in East Pahangi indicates that *B. pahangi* does not occur in man but the similarity of the microfilariae of *B. maylayi* and *B. pahangi* makes a species diagnosis from stained blood films difficult, especially if only a few micro filariae are present. However, with the very considerable reservoir in animals, the ubiquitous nature of the vectors and the evidence of successful transmission to a human volunteer, further search may well produce evidence of its occurrence in people living in endemic areas. Clearly, such people must receive infective bites and this parasite may play some part in the pathology of the disease even if it does not produce microfilaraemia.—Excerpts from authors' discussion and summary.

STUDIES OF THE BIONOMICS OF MOSQUITO VECTORS WHICH TRANSMIT FILARIASIS IN INDIA. I. ATTACHMENTS OF *Mansonia annulifera* AND *Mansonia uniformis* LARVAE TO HOST PLANTS OCCURRING IN PISTIA TANKS IN KERALA, SOUTH INDIA. By Burton, G. J. Indian J. Malar. 13(2/3):75–115. 1959. 54 figs. This is the first in a series of five papers, each of which is a distinct contribution to the ever-increasing stockpile of information on *Mansonioides.*

In this first paper, Dr. Burton outlines study procedures, describes in detail the photographic equipment used, and explains his methods of making the microphotographs. Having no histological apparatus available, he sectioned plant leaves and rootlets by hand with a sharp razor blade. Photographs include pictures of larvae attached to plants, cross sections showing air-pockets in chambers of plant roots, and the general appearance of the host plants.

Table I is a brief one, showing the number of *Mansonia annulifera* 4th instar larvae still alive after 12 to 60 hours in natural tank (pond) water without host plants. The maximum survival time was between 51 and 60 hours; of 160 larvae, none was alive by the 60th hour. No pupation took place.

Descriptions of the means and methods of attachment by *M. annulifera* and *M. uniformis* to 12 host plants are given in interesting detail. When preparing to attach to a root, larvae backed in, upside down. Older larvae attached to roots, never to rootlets. Larvae when detached did not re-attach to the same place.

II. THE ROLE OF WATER HYACINTH (*Eichornia speciosa* KUNTH) AS AN IMPORTANT HOST PLANT IN THE LIFE CYCLE OF *Mansonia uniformis* (THEOBALD). WITH NOTES ON THE DIFFERENTIATION OF THE LATE EMBRYONIC AND NEWLY HATCHED STAGES OF *Mansonia uniformis* (THEOBALD) AND *Mansonia annulifera* (THEOBALD). Indian J. Malar. 14(2):81–106. 1960. 47 figs. 1 ref.

Water hyacinth in the Cochin area, Kerala State, was the preferred host plant for the attachment of larvae and pupae of *Mansonia uniformis* (Theo.). When *Pistia stratiotes* (water lettuce) was present, *M. uniformis* deposited its egg masses on *Pistia leaves.* Upon hatching, the larvae left the *Pistia* plants and migrated over to attach to the mud-covered roots of water hyacinth. The author attributes this movement to the habit of *M. uniformis* larvae to remain in mud. Because all of the aquatic stages of *uniformis* occur on water hyacinth, Dr. Burton feels that this plant should be considered of the utmost epidemiological importance wherever *uniformis* occurs.

The photographs illustrate attachment methods of *M. uniformis* as well as the development and structures of embryonic and first instar larvae of *uniformis* and *annulifera.*

III. FURTHER STUDIES ON ATTACHMENT OF *Mansonia uniformis* LARVAE TO HOST PLANTS OCCURRING IN *Pistia* TANKS IN KERALA, SOUTH INDIA. Indian J. Malar. 14(2):107–129. 1960. 43 figs. 2 refs. Larvae of *Mansonia uniformis* attached readily to the roots and rootlets of three grasses, and to the roots of an aquatic, leafy herb. Attachment of first instar larvae to the fine roots of an aquatic plant and to the fronds of another species of flowering plant is described, as well as the attachment of older larvae to the nodes and branches of stonewort and hornwort.

"It was established, after months of observations, that attachment to leaves is a *normal,* and not an unusual, form of attachment. . . . as an alternative to the root type of attachment for obtaining oxygen and giving up carbon dioxide."

There is described in some detail the oviposition habits of *Mansoniodes,* and the placement of egg masses on certain species of water plants.

IV. OBSERVATIONS ON LARVIVOROUS ACTIVITIES OF VARIOUS FISHES IN FILARIAL AREAS OF KERALA

STATE, SOUTH INDIA. Indian J. Malar. 14(2):130–156. 1960. 42 figs. 3 refs. Fourteen species of fish and the mosquito larvae found associated with them in the ponds were observed and reports made on the eating habits of the fish. The feeding habits of *Gambusia affinis* (obtained from the Malaria Institue of India, in Delhi) were compared with those of the naturally-occurring species. The photographic illustrations are interesting; they picture the fish feeding on attached and free swimming larvae and on pupae of *Mansonioides,* and on larvae of *Culex fatigans.*

V. FURTHER STUDIES ON ATTACHMENT OF *Mansonia annulifera* TO HOST PLANTS OCCURRING IN TANKS CONTAINING *Pistia stratiotes* IN KERALA STATE, SOUTH INDIA. Indian J. Malar. 14(3):191–218. 1960. 61 figs. 3 refs. Detailed studies were made on the attachment of *M. annulifera* to fourteen additional species of aquatic plants. During the course of these studies, the author collected data that again substantiated his contention that leaf attachment is normal; *M. annulifera* attached to leaves in seven out of the 14 species.

These five papers have been reprinted and bound together in a single, 145-page volume, which should be on every medical entomologist's bookshelf. The results of painstaking investigations are set forth in a clear-cut fashion. The style is excellent, the illustrations abundant, and the photography very good.—H. L. T. Durkee.

A WINDOW-TRAP HUT EXPERIMENT TO TEST THE EFFECTS OF DIELDRIN UNDER LOCAL CONDITIONS IN THE MERAUKE AREA (NETHERLANDS NEW GUINEA). By Assemb, J. van den. Trop. geogr. Med. 11:32–43. 1959. 14 refs. In the Merauke district, abundant populations of anophelines (mainly *A. farauti, A. bancrofti,* and *A. amictus hilli*) still persist though the area has been sprayed three times with dieldrin. A complete control of house-entering anophelines was obtained for about six weeks following spraying, but a decrease then started. After five months only 20 percent were killed. A sufficient kill (assumed to be in the order of 60 per cent) is thus obtained in a three-month period following spraying.

There were no signs of resistance to dieldrin. The daily mortality in *A. bancrofti* and *A. farauti* was estimated to be in the order of 30 percent. Cattle, fowl, and game animals, numerous in the district, are important as tending to keep anophelines away from man.

Under present conditions it must be considered impossible to eradicate the malaria vector (mainly *A. farauti*) by dieldrin indoor spraying only; it is also improbable that the vector's average expectation of life is cut down to a point below the length of the extrinsic cycle of the parasite, the main objective of every spraying campaign.

Nevertheless, dieldrin is of real value in malaria control, as may be concluded from figures given by Metselaar, although it is difficult to separate the effect due to dieldrin alone from that due to climatological influences, and to the administration of drugs.

The effect of dieldrin as referred to above can be explained by the fact that it kills only those anophelines which enter houses. As long as the insecticide is sufficiently active the daily mortality of house-haunting mosquitoes is far greater than the average daily mortality of the entire anopheline population. Assuming that more than half of all malaria infections are aquired indoors, the average mortality of these infective or potentially infective vectors should be computed on the basis of the number of house-entering mosquitoes, and not of the total anopheline population.

If a sufficient control can be achieved for three months per application, the results are likely to be improved if the frequency of spraying is increased. This, however, is economically impossible in this country, because of high labour costs and a considerable loss of productivity due to extremely low density of the population and the primitive transport. Under New Guinea conditions dieldrin has proved to be inferior to DDT as a residual insecticide.—Author's conclusions and summary.

INTERNAL DDE PRODUCTION BY NORMAL AND DDT-RESISTANT LARVAE OF *Aedes aegypti.* By Chattoraj, A. N., and Brown, A. W. A. J. econ. Ent. 53(6):1049–1051. 1960. 11 refs. Larvae of 3 DDT-susceptible strains of *Aedes aegypti* (L.) when exposed to 1 p.p.m. DDT for 24 hours, contained approximately one-tenth to one-quarter as much DDE as larvae of 3 DDT-resistant strains. However, in the naturally-tolerant Penang strain in which the DDT susceptibility levels had been varied by selection or relaxation of pressure, there was little correlation between DDT-resistance and DDE content.—Authors' abstract.

EFFECT OF ABSENCE OF SALIVA ON BLOOD FEEDING BY MOSQUITOES. By Hudson, A., Bowman, I., and Orr, C. W. M. Science 131(3415):1730–1731. June 1960. The salivary glands of *Aedes stimulans* (Walker) are the source of an antigen which produces typical bite reactions in men and laboratory rabbits. If the main salivary duct is cut, the reaction is not produced when the mosquito bites. Lack of saliva does not affect the intake or movement of blood into the midgut, nor does it prevent the development of eggs. The presence of an anesthetic component in saliva is suggested.—Authors' abstract. Editor's note: The excellent study referred to above was carried on at the Department of Biology, Queen's University, Kingston, Ontario, Canada, through grants to Professor Allen S. West. AMCA member Allen West has long been identified with research on mosquitoes and their blood meals. There are several worthwhile facets apparent in the present investigation, and we trust that lengthier reports will be forthcoming.