# REVIEWS AND ABSTRACTS

MAP OF THE WORLD DISTRIBUTION OF MALARIA VECTORS. By Jacques M. May. Geographical Review, pp. 638–639, Oct. 1951. A bird's-eye picture of malaria vectors over the globe may be had by examining this map, 24 x 36 inches, published as Plate 3 in the Society's "Atlas of Diseases." Other sections of the map illustrate the distribution of malaria parasites, species of *Anopheles* locally distributed over Southern Europe, the Near East and Africa. The epidemiology of malaria is given in condensed form and a brief resume is included of the natural history of the total 53 species shown. A selected bibliography by countries is included. This rare contribution will be of much value to health officers, missionaries, explorers, and engineers, who need to know the prevalent vectors in a particular region and the type of malaria they can expect to find there.

The map will be of particular use to teachers who may wish to discuss malaria vectors and the basis for species eradication as well as to geographers who may desire to correlate the predominance of certain species with the geography of a particular region.

The author hopes soon to produce a second map showing the length of the transmission period in each malarious region and still later a map on how the various species of *Plasmodium* are distributed among their human hosts and finally a map showing who has malaria, in what numbers, at what age, and where. Of the 45 countries for which a selected bibliography is given, one cannot but wonder why the western hemisphere is represented by only Argentina.

The Geographical Review may be purchased from the American Geographical Society, Broadway at 156th Street, New York City 32 for $2 a number.—H. H. Stage.

STUDIES ON AQUEOUS SUSPENSIONS OF INSECTICIDES. By A. B. Hadaway and F. Barlow. Bull. Ent. Res. 41(3):603–622. 1951. This well executed work is concerned with the important problem of particle sizes of insecticides (DDT, compound 497, and gammexane) as related to efficiency of their action against 2–3 day-old adult *Aëdes aegypti* females. A description of a plaster of paris block technique for testing purposes is given.

The authors have concluded that " . . . . the probability of a mosquito acquiring a lethal dose from a large number of small crystals distributed over an area is greater than from a small number of large crystals over the same area." They have indicated that the number of crystals of DDT picked up on the mosquito tarsi is dependent on particle size: the smaller the size the greater the pick-up. Apparently small DDT crystals are transferred from the legs to other body parts during cleaning activities. The authors found that mosquitoes which were stationary on DDT treated surfaces of plaster blocks pick up fewer crystals than those which walk over the same surface.

The authors have shown that shape and mass of DDT crystals influence pick-up and determine effectiveness, but that crystal length alone is not a critical factor. The investigation reported that effectiveness of compound 497 and of gammexane was much less influenced by particle size than DDT. The rapid penetration of these two substances makes retention of particles unnecessary.

Significantly the authors write ". . . the inverse relationship between particle size and effectiveness is not dependent on any property of DDT and is not peculiar to this insecticide."

The authors point out the practical applications that can be made from their findings: "Considerable improvement in the efficiency of DDT wettable powders can be achieved by limitation and reduction of the size of the DDT particles to the optimum of 10 to 20 microns. Particles of this size are easily suspended, and even at low dosages are present in sufficient numbers to provide effective and persistent deposits. On the other hand, it may be necessary to include a wider range of particle sizes in BHC wettable powders to obtain maximal efficiency for both initial and residual toxicity."—Jack Colvard Jones, National Institutes of Health, Bethesda 14, Md.

STUDIES ON AQUEOUS SUSPENSIONS OF INSECTICIDES. PART II. QUANTITATIVE DETERMINATIONS OF WEIGHTS OF DDT PICKED UP AND RETAINED. By F. Barlow and A. B. Hadaway. Bull. Ent. Res. 42(4):769–777. 1952. Like the other papers in this series of studies, this paper shows careful planning, precision in execution, and lucidity of expression. Adult *Aedes aegypti* females were exposed for variable periods of contact to deposits of aqueous suspensions of DDT crystals of different particle sizes sprayed onto plaster of paris blocks. The mean pick-up by a single mosquito, determined by the method of Schechter *et al.* (1945) was 0.48 microgrammes of DDT during an exposure of 30 seconds to 10–20 micron DDT crystals at a dose of 25 mg./ sq. ft. (320 mosquitoes tested).

The authors write: "Consideration of the kills in relation to the contact time shows that the 0–10 micron particles are less effective than those in the 10–20 micron range, and above 10 microns there is an inverse relation between particle size and effectiveness. When the amount picked up is taken into account, however, it is found that, weight for weight, the 0–10 micron particles are more effective than the 10–20 micron particles and that there is . . . an inverse relation throughout the range of particle size between particle size and effectiveness."

The authors present evidence to show that the *rate of action* of DDT is related to particle size and they suggest that "the solubility of DDT in

the cuticle waxes, and therefore penetration to the site of action, becomes more rapid as the crystal size decreases."

Significant differences were shown in the pick up of DDT crystals of the same size from different surfaces, *e.g.*, ". . . on plaster blocks, 0–10 micron DDT crystals are less effective than 10–20 micron crystals . . . for short contact periods. The reverse is true . . . when applied to mud blocks." They believe that these findings are due to differences in adhesion and to differences in surface irregularities. DDT crystal pick-up by mosquitoes was four times greater on plaster than on glass.—Jack Colvard Jones.

OBSERVATIONS ON THE MOSQUITOES OF EDOGAWA AREA. I. SEASONAL OCCURRENCE; II. ZOOPHILISM. (In Japanese.) By Sasa, Manabu; Hosoya, Hideo; Kano, Rokuro; Hayashi, Shigeo; Oyama, Kazuo; Miura, Akiko; and Kimura, Mari. Jap. J. San. Zoology (Eisei Dobutsu). 1(1):20–22. 1950. (Pub. by the Japan Soc. of San. Ent., c/o Research Inst. for Nat. Resources, 4-Chome, Hyakunincho, Shinjuku-ku, Tokyo. $2.00.) I. Seasonal occurrence: Adult mosquito collections were made in an industrial zone of Tokyo, using animal traps at night, and a specific type of frequency was noted for each species. Only one peak was noted for each species in a year: for *Culex pipiens* it ran from May through August; for *C. tritaeniorhynchus* it extended from the middle of July to the middle of August; for *Aedes vexans* it ran from the middle of June to the middle of August; and for *Anopheles hyrcanus sinensis* it extended from the middle of June to the beginning of August. II. On the basis of mosquitoes entering animal traps *C. tritaeniorhynchus, A vexans,* and *A. h. sinensis* found the goat most attractive, and the rabbit and hen less so. It was found by examination of engorged mosquitoes that *A. h. sinesis* selected hosts in the following order: goat>rabbit>chicken. *Culex pipiens* did not show distinct host selection among the animals used in baiting the animal traps.—Toychi Okada, Japan, and Don Pletsch, WHO, Taiwan.

ON SOME MORPHOLOGICAL CHARACTERS IN MOSQUITO PUPAE. (In Japanese.) By Asanuma, Kiyoshi. Jap. J. San. Zoology (Eisei Dobutsu). 1(1):15–16. 1950. (For publisher and price, see first abstract of this series.) The postero-median projection of the 8th abdominal tergum and the vertical plate of mosquito pupae were found to be important morphological criteria. The postero-median projection is broad and oblong, not projecting posteriorly in Anophelini, while it is semicircular, hemi-spindle shaped or hemi-elliptical, projecting posteriorly in Culicini. In the Culicini two types are differentiated: the *Aedes* type (*Aedes, Uranotaenia, Armigeres, Tripteroides*) with lateral margin not well developed and posterior margin prominently produced; and the Culex type (*Culex, Theobaldia*) with lateral margin well-developed and posterior margin not prominently produced. In the Anophelini the vertical plate is homogeneous in structure; in Culicini the lateral part is more chitinized than the central part.—Okada and Pletsch.

A REPORT ON THE ERADICATION OF ANOPHELINE LARVAE BY MEANS OF PARIS GREEN, A LARVICIDE, IN THE VICINITY OF HANKOW, CENTRAL CHINA. (In Japanese.) By Mashiko, Kikuya. Jap. J. San. Zoology (Eisei Dobutsu). 1(1):12–13. 1950. (For publisher and price, see first abstract of this series.) In Central China, a swamp covering 4 square kilometers was dusted with paris green 3 or 4 times a month from May 1941 through December 1942. Numbers of larvae were reduced to 6 to 16% of those of the previous year. After the dusting, the larvae did not show any increase even in October, when they would ordinarily have attained maximum numbers.—Okada and Pletsch.

SOME FACTORS AFFECTING THE AVAILABILITY OF CONTACT INSECTICIDES. By F. Barlow and A. B. Hadaway. Bull. Ent. Res. 43(1):91–100. 1952. In this paper the authors indicate that DDT in oil can be crystallised by insects walking over treated surfaces, crystallisation being more rapid with the purity of the DDT, and being more rapid with films than with droplets of oil. After crystallisation on non-absorptive surfaces (glass, wire, etc.) there is a considerable reduction in toxicity, and this work suggests that "It is possible that many of the reported synergistic effects with DDT are due to inhibition of crystallisation . . . by the various materials added."

It was found that oil suspensions of DDT were more effective than crystals alone (optimum size from 10–20 microns) on a non-absorptive surface.

This investigation showed that DDT crystals on compressed fibreboard project upward at right angles from the fibers and are apparently readily available to insects, whereas DDT crystals on glass surfaces lie in the plane of the treated surface and, presumably, are not readily available.

Crystallisations from single drops of 5 percent DDT in kerosene were shown to occur more extensively on fibreboard and filter paper (kind not specified) than with other materials tested. DDT crystals on cardboard, cork, velvet and Essex board were considerably smaller. No detectable crystallisation occurred on mud blocks treated with DDT.

A study of 38 different solvents containing DDT showed that the behaviour of this insecticide on fibreboard depended on the physical characters of the solvent (*e.g.*, volatility) rather than on constitution.

The authors suggest that reduction in availability of insecticides on addition of inert diluents may be a masking effect. Probability of lethal adherence of insecticidal particles becomes less as proportion of inert particles increases.

This paper presents evidence to show that dry DDT dust on plaster blocks is not affected by relative humidity whereas deposits from aqueous suspensions are significantly affected.—J. C. Jones.