SOBREVIVENCIA INVERNAL DEL *Aëdes Aegypti* (L.) EN HOUSTON, TEXAS. Stephen P. Hatchett, Servicio de Sanidad Pública de los Estados Unidos. Informes del Servicio 61(34):1234–1244, 1946.

Se emprendió el estudio para conocer los hábitos invernales del *Aedes aegypti* (L.) en una zona en que el invierno consiste alternativamente de días tibios y fríos. El invierno de 1944–45, en que se realizaron las investigaciones fué excepcionalmente benigno, con sólo un día de helada y temperatura mínima de 30° F. Se depositaron aproximadamente 10,000 huevos de hembras criadas en el laboratorio, en los recipientes laterales, sobre la superficie del agua y en papel-filtro, y se colocaron a la intemperie en distintas condiciones durante el período de estudio. Se obtuvo un desarrollo del 43.5 por ciento del grupo de huevos que se mantuvo sumergido en el agua durante el invierno. En unsegundo grupo en que los huevos se hallaban adheridos a la superficie interior de los recipientes y el agua era sólo la normal de lluvia, el nacimiento fué de 28.4 por ciento. En un tercer grupo se permitió incubar los huevos durante 72 horas, manteniéndose después en seco durante varios meses. En este grupo se obtuvo un nacimiento de 21.4 por ciento. En los tres grupos fué más bajo el nacimiento en los recipientes completamente expuestos que en los que contaban con zonas parcialmente protegidas. En todos los casos la temperatura afectó notablemente el nacimiento. Cuando la temperatura media era de 70° F. o más, se aceleraba la tasa de nacimiento, mientras que disminuía notablemente al bajar la temperatura de 50° F. Nació un pequeño número 48 horas después de haber colocado los huevos a la intemperie, mientras que algunos tardaron de 90 a 95 días después de la inmersión. El período medio de inmersión antes del nacimiento fué de 32 días. El período entre la incubación y la salida del adulto varió de 7 a 59 días, y en la mayoría de los especímenes tomó de 2 a 3 semanas. Las larvas recién incubadas y las próximas a convertirse en pupa, fueron especialmente susceptibles a las temperaturas bajas. Las larvas sobrevivían mejor al tiempo frío cuando había una capa de materia orgánica en el fondo del recipiente. En general, la temperatura tenía poco efecto sobre la duración del período de pupa que promedió unos cuatro días. Durante toda la estación aproximadamente la mitad de las larvas se convirtieron en adultos. La mayoría de los que salieron antes del 15 de febrero murieron poco después, mientras que la mayoría de las hembras que apareció después de esa fecha vivió por lo menos lo suficiente para acoplarse, alimentarse y ovopositar.

Se llevó también a cabo una series de experimentos a fin de conocer los efectos del frío artificial sobre los huevos de *A. aëgypti*. Se halló que los huevos expuestos constantemente a la humedad desde el tiempo de la deposición no sobrevivieron al frío artificial de 26° F. después de 24 horas o más. Sin embargo, incubó 10 por ciento de los huevos que se habían mantenido secos anteriormente y luego sumergidos en agua fría y helados a esa temperatura durante 24 horas. Aproximadamente incubó la mitad de los huevos previamente expuestos a frío artificial de 34° F. durante 24 horas.

(Translation of a review by Ralph C. Barnes.)

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RAPID METHOD OF SIMULTANEOUS FIXATION AND SELECTIVE STAINING OF THE INTERNAL ORGANS OF *Culicidae*. Antonio Millares. Revista de Sanidad e Higiene Pública 22(3): 250–257. March 1946.

This article describes in detail the steps necessary for producing differentially stained posterior digestive tracts and reproductive organs of mosquitoes. Dissection technique is discussed and illustrated. According to the author, staining of the digestive tract results in a blue midgut, rose intestine, rose Malpighian tubules with pale blue nuclei and deep blue nucleoles, and violet, blue, and green rectal papillae. The stained reproductive organs show blue ovaries, bluish-black testicles, rose vas deferens, and deep blue seminal vesicles. Briefly, the steps to be followed are:

1. Extraction of organs in a saline solution (6.5 per 1,000). The author prefers this hypotonic sodium chloride solution, although some workers find isotonic saline or even distilled water satisfactory. The midgut should contain no blood.
2. Fixation and staining in a dilution of Giemsa liquid in pure methyl alcohol (2 drops of the former to 1 c.c. of the latter). The preparation should not be over five days old. Slides containing dissected organs should remain immersed in the solution for 30 minutes.
3. Decolorization with pure methyl alcohol.
4. Clearing and elimination of alcohol. Terpinol, a neutral substance, is used.
5. Mounting in cedar oil.
6. Sealing with wax of R. de Noyer.

The author says that this entire operation requires only 40 minutes.

There are three colored figures: (1) the internal organs of a male *Anopheles,* (2) the internal organs of a female *Culex,* and (3) the development of eggs in the ovaries of a female *Culex*.—H. L. T.

MALARIA IN WAR. By J. A. Sinton, Ulster Medical Journal 15(1):3–28, 1946.

In the Robert Campbell Oration, Brigadier J. A. Sinton outlines briefly the effect malaria has had on the fate of wars as well as on the world's history. In some detail he sums up the problem of mosquito control as applied particularly under war conditions. These include

(1) protection from mosquitoes such as repellents, nets, screening, selection of healthy camp sites; (2) DDT residual spraying of adults by airplanes and by spray guns in tents and other types of housing for soldiers; and (3) antilarval measures consisting of draining, filling, flooding, oiling, use of Paris green and DDT, and prevention of man-made and animal-made breeding places. He then launches into a discussion of the control of the malaria parasites. Such methods consist of two principal drugs—quinine and mepacrine. Although for over a century quinine has been the chief standby, Sinton states that from the experience gained in World War II, mepacrine for military purposes is superior to quinine in that it does not interfere with the mental and physical activities of troops, gives longer protection, can be easily tolerated in larger therapeutic doses, causes few undesirable effects over prolonged ingestion, and if continued for a month after leaving malarious areas, it radically cures all malignant (and probably many benign) tertian infections.

He points out that the control of malaria during the second World War was so stimulated that it may be possible by these new methods to exploit to an undreamed of extent, the great natural resources of the tropics for the benefit of all mankind.

(Helen Sollers, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.)

DDT, THE SYNTHETIC INSECTICIDE. By T. W. West and G. A. Campbell. London, 301 pp., 1946.

A valuable book on DDT has been written by these two English chemists who summarize the results of many experiments in various parts of the world. To this detailed treatise they have added much of their own research. They outline the history and development of this insecticide, discuss its toxicity, use in paints, textiles and paper, and its value in controlling numerous pests of man and animals.

In the chapter on mosquitoes DDT is compared with phenothiazine, pyrethrum, and Paris green. The employment of DDT in larvicidal oils, airplane sprays, as a dust, in emulsions, suspensions, and as a residual spray for adults is discussed. In one test in this chapter DDT and pyrethrum are compared as to their effectiveness against larvae and pupae of *Chaoborus punctipennis* Say which is termed a mosquito. Actually this species belong to the family Culicidae but it is a non-biting gnat and reference to it in this part of the book seems a little out of place.

This publication is a good reference work which anyone dealing with mosquitoes would want in his library.

"The Truth About DDT" is a 64-page booklet published by West and Campbell and is an abbreviated summary of the book. Many new pictures, however, are introduced in this publication.

(Helen Sollers, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine.)

AN ANNOTATED BIBLIOGRAPHY OF PAPERS RELATING TO THE CONTROL OF MOSQUITOES BY THE USE OF FISH. By John B. Gerberich. American Midland Naturalist, vol. 36, no. 1, pp. 87–131. July 1946.

"Man's interest in the control of mosquitoes has increased greatly during the second world war. In large measure this is due to his numerous contacts with them in tropical areas. Various control measures have been tried. Of these probably the most permanent and cheapest mosquito control method is the use of fish. The natural habits of both fish and mosquito larvae must be taken into consideration in selecting a species of fish to be used for the destruction of larvae. The problem of attacking the varied species of *Anopheles* is complex. They are commonly found in pools containing much vegetation and may be almost completely hidden by the surroundings. Keeping in mind the habits of the larvae the fish used must be a species that will search for food not only in the shallow water but amid dense vegetation.

"In pools, ponds, swamps and other natural bodies of water an adequate supply of food and the breeding habits of the fish become very important points for consideration. For satisfactory control the fish used must breed rapidly in order that large numbers of them will be present at all times when larvae are apt to occur. Carnivorous fish are preferred to omnivorous feeders. Surface feeders are considered to be most satisfactory, although sun-perch and goldfish under some conditions may be effective. Indigenous fish as a rule are easier to maintain than imported fish.

"Dr. S. F. Hildebrand [1] states that many of the species used in containers at one time or another are utterly worthless in open bodies of water. Virtually any hardy sluggish fish is suitable for mosquito control in containers. In fact, herbivorous species are used with success in barrels and cisterns because they generally are sluggish and will not jump out of the containers. Little or no plant food being available, the vegetarians will feed on wiggle tails. The problem is altogether different in nature, for there any useful species must normally by choice feed on mosquito larvae.

"All available literature dealing with this subject published since Howard, Dyar and Knab's 'The Mosquitoes of North and Central America and the West Indies' up to and including 1942 has been reviewed. The comments given under the references are observations of the respective

[1] S. F. Hildebrand, Fish and Wildlife Service, U. S. National Museum.