results if a thorough insecticidal treatment is used, but from an environmental and health viewpoint, it is safer to use a predator species. For developing countries, this system has another advantage in that *Tx. brevipalpis* can be reared locally instead of importing insecticides. This is not to imply that pesticides are not useful in an *aegypti* program. However, other means should also be investigated.

There have been no indications of establishment of *Tx. brevipalpis* on St. Maarten. This may be considered appropriate as it is not necessarily desirable to establish this species and have it develop a balanced predator/prey relationship. Bioregulation would be most effective if the predator is used on a repeated basis at pre-determined intervals. This would provide an economically feasible control program with minimum environmental impact.

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NEW RECORDS OF MOSQUITOES IN SUFFOLK COUNTY, LONG ISLAND, NEW YORK

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ABSTRACT. Six mosquito species, *Aedes dorsalis* (Meigen), *Ae. flavescens* (Müller), *Orthopodomyia* sp., *Wyeomyia smithii* (Coquillett), *Anopheles barberi* Coquillett, and *An. walkeri* Theobald, were newly recorded during the period of 1971 to 1977 from Suffolk County, Long Island, N.Y. These records bring the mosquito list of the county to 37 species.

Suffolk County is the easternmost county in New York State. It is more than 80 mi. long and 20 mi. wide (about two-thirds of Long Island) and is surrounded by water except for the western boundry (Fig. 1). The mosquito situation in the county is significant due to the abundance of fresh, brackish and salt water breeding sites. The chance of mosquitoes migrating from outside Long Island to Suffolk County is almost nil. There is no possibility for such migration from the north across Long Island Sound (7–20 mi. wide) since the prevailing winds during spring and summer are mainly southwestern. The only migration would be from the west, New York City or Nassau County. Since Suffolk County serves as a summer resort area, consequently there is a possibility of mechanical introduction of mosquitoes from other localities by summer vacationists.

Mosquito surveillance is a major activity in the control program conducted by the Bureau of Vector Control, Department of Health Services. New Jersey and CDC light traps are operated to study the seasonal prevalence of the different species,

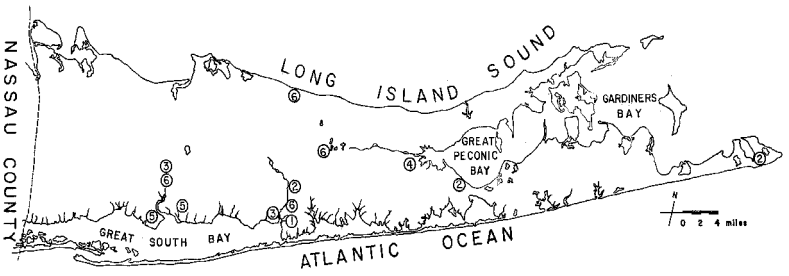

Fig. 1.—Outline map of Suffolk County, Long Island, N.Y. showing locations of the new mosquito records. 1. *Aedes dorsalis.* 2. *Aedes flavescens.* 3. *Orthopodomyia* sp. 4. *Wyeomyia smithii.* 5. *Anopheles barberi.* 6. *Anopheles walkeri.*

to evaluate the control measures, and to collect live mosquitoes for arbovirus detection.

Very few publications dealing with the mosquito species in Suffolk County have appeared in the literature. Barnes et al. (1950) listed all previous records of New York State mosquitoes of which 28 species were reported from the county. Since then, Schober and Collins (1966), Means and Thompson (1971), and Guirgis and Van Orstrand (1976) added 3 more species to the county list. During the last 7 years (1971–1977), 6 other species were recorded mostly from the New Jersey light trap collections.

Aedes dorsalis (Meigen): A single female was taken on August 8, 1977 in a trap located on the east border of Wertheim Estate, Shirley. Breeding sites in this estate are both fresh water swamps and brackish water marshes.

Ae. flavescens (Müller): The first records were in 1971 when a female was trapped from Montauk on May 14, and another from Flanders on June 7. An additional female has since been collected from South Haven on May 25, 1977.

Orthopodomyia sp.: The first female was recorded from Brookhaven on July 9, 1976. In 1977, a trap in Connetquot State Park yielded 1 male on June 27, and 4 females on May 23, June 9 and 27, and September 6, respectively. These specimens are either *Or. alba* Baker or *Or. signifera* (Coquillett) which are indistinguishable in the adult stage. Both species have been reported from N.Y. State and Nassau County (Barnes et al. 1950, Nifbanck 1957, and personal communication, Walter Brower, Mosquito Control Unit, Dept. of Public Works, Nassau County, NY), during the months of August and September. Suffolk County specimens started to show in the traps from as early as the last week of May.

Wyeomyia smithii (Coquillett): Larvae of this species were collected by Mr. Christopher Bowe in December 1976 and April 1977 from the leaves of the pitcher plant, *Sarracenia purpurea* L. in Riverhead. Larvae of the 1st batch were located after thawing the water which had accumulated and frozen in the leaves. They were unable to complete their development under laboratory conditions and died as larvae or pupae. Those of the 2nd batch developed to the adult stage.

Anopheles barberi Coquillett: Two females were trapped from Heckscher State Park, Great River, on August 5, 1976 and West Sayville Golf Course, West Sayville, on September 19, 1977, respectively. These 2 areas have heavily wooded sections where tree holes and stump holes are frequent.

An. walkeri Theobald: Appreciable numbers of this species have been collected from May to September of each year from Connetquot River State Park, Oakdale, a wooded area rich in ponds, streams, and marsh land. Smaller num-

bers were also taken in traps in Manorville and Shoreham in 1972 and Wertheim Estate, Shirley in 1973.

Although *An. barberi* and *An. walkeri* are potential vectors of malaria parasites (Carpenter and LaCasse 1955), *Ae. dorsalis* may transmit Western encephalitis virus (Hammon et al. 1945) and California encephalitis virus (Reeves et al. 1952), no health hazards are expected in the county due to the few records and the limited distribution (Fig. 1.) of most of these species.

The addition of these 6 species brings the mosquito list of Suffolk County to 37. It now includes the following species:

AEDES (*AEDES*)
cinereus Meigen

AEDES (AEDIMORPHUS)
vexans (Meigen)

AEDES (FINLAYA)
triseriatus (Say)

AEDES (OCHLEROTATUS)
abserratus (Felt & Young)
aurifer (Coquillett)
canadensis canadensis (Theobald)
cantator (Coquillett)
dorsalis (Meigen)
excrucians (Walker)
fitchii (Felt & Young)
flavescens (Müller)
intrudens Dyar
sollicitans (Walker)
stimulans (Walker)
taeniorhynchus (Wiedemann)
trivittatus (Coquillett)

COQUILLETTIDIA
perturbans (Walker)

CULEX (*CULEX*)
pipiens Linnaeus
restuans Theobald
salinarius Coquillett

CULEX (NEOCULEX)
territans Walker

CULISETA (CLIMACURA)
melanura (Coquillett)

CULISETA (CULICELLA)
morsitans (Theobald)
silvestris minnesotae Barr

CULISETA (CULISETA)
inornata (Williston)

ORTHOPODOMYIA sp.

PSOROPHORA (GRABHAMIA)
confinnis (Lynch Arribálzaga)

PSOROPHORA (JANTHINOSOMA)
ferox (Humboldt)

PSOROPHORA (PSOROPHORA)
ciliata (Fabricius)

URANOTAENIA
sapphirina (Osten Sacken)

WYEOMYIA (WYEOMYIA)
smithii (Coquillett)

TOXORHYNCHITES
rutilus septentrionalis (Dyar & Knab)

ANOPHELES (ANOPHELES)
barberi Coquillett
crucians Wiedemann
punctipennis (Say)
quadrimaculatus Say
walkeri Theobald

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USE OF A CONTROLLED RELEASE LARVICIDE IN SOUTHERN MARYLAND[1]

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ABSTRACT. A new Dow Chemical Company formulation, DURSBAN® 10 CR was used to larvicide selected sites in southern Maryland during 1977. Excellent control was achieved in properly treated sites for the 12 to 18 weeks of observation with no recorded effect on non-target organisms.

The concept of a controlled release formulation as a mosquito larvicide was explored by the U.S. Army in 1966 and tested periodically by that agency thereafter (Nelson et al. 1976). In August, 1976, Dow Chemical Company, Midland, Michigan, introduced Dursban® 10 CR insecticide[2], a controlled release formulation of 10.6% chlorpyrifos in an inert, pelletized carrier, with an EPA registration. The label states that one application will control early instar mosquito larvae for 1 breeding season by maintaining a level of active ingredient of 1.5 ppm. The material is recommended for use in temporary or permanent pools, or for prehatch or flooded area treatment.

The advantages of a relatively safe, long acting mosquito larvicide, without the stigma of the persistent chemicals of the DDT era are obvious. In the average larviciding program chemicals represent 5 to 10% of costs with the majority of expenses in labor and transportation. Depending on rainfall, many breeding areas require weekly surveys and treatment to prevent hatching.

The mosquito control program in Maryland has been carefully monitored to avoid the susceptibility problems encountered in other areas, and larvicides have been restricted to temephos, Flit MLO, and fuel oil (Joseph 1976). Therefore, the use of a new chemical was approached cautiously.

In 3 southern Maryland counties there are numerous, scattered breeding areas. Surveys for mosquito breeding and application of larvicides are performed by seasonal personnel who are given training by the Area Entomologist.

For the 1977 program, we purchased a small quantity of Dursban® 10 CR for use in southern Maryland. The label has a chart showing pounds of Dursban® 10 CR required to treat various volumes of water in gallons, with instructions for calculating the volume of the breeding area in cubic feet and then converting to gallons. Since the estimation of either gallons or cubic feet would appear equally difficult, the final conversion to gallons appears unnecessary. For our training, a chart was prepared showing the weight of chemical

[1] The opinions presented are those of the author and may not reflect the views of the Maryland Department of Agriculture.

[2] Mention of proprietary products is for identification only and does not imply endorsement by the Maryland Department of Agriculture.