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## NEW DISTRIBUTION RECORDS OF MICHIGAN MOSQUITOES, 1948-1963

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The following records result from data accumulated from the years 1948-63. A total of more than 175 field samples, usually from different locations, have been taken from 27 counties in the upper and lower peninsulas of Michigan. The total of 2199 specimens includes 241 larvae, 452 adult males, and 1506 adult females.

The usual techniques were employed in collecting samples. Adults were taken while biting or resting, and a few were captured in a simplified light trap. Large numbers of larvae and most of the pupae were reared. In case of any doubt, sex was confirmed by genitalic examination.

These records are compiled from data accumulated since Obrecht (1949), the only exception being some records from 1947 that I have incorporated to provide more precise information about seasonal appearance. The "County Records" cited in the present paper are supplementary to those in Obrecht (1949).

*Anopheles earlei* Vargas: Records of this species are few, and remain confused due to an uncertain taxonomic status. Specimens previously reported (Obrecht, 1949) as *A. occidentalis* are found to be *A. earlei*. Other collections, such as Pederson (1947), Sabrosky (1946) and Irwin (1941) should be included here. The extensive distribution of *A. earlei* is substantiated by its frequent appearance on Isle Royale (Beadle, 1963). A single county record is reported here. COUNTY RECORD: Muskegon.

*Anopheles punctipennis* (Say): From these and previous records,

the species seems to be well distributed throughout the lower peninsula, and is also recorded from upper Michigan. Relative abundance on Isle Royale is noted by Beadle (1963). Larvae were collected through the middle of October, and adults during August and September. Four females were found among a large number of resting adults, in association with *A. quadrimaculatus* and *Culex pipiens* in the basement of a farmhouse in Shiawassee County on 25 November 1950. Adults were frequently encountered in 'biting' collections taken during later evening hours. Larvae were collected from permanent and semi-permanent ponds choked with *Lemna* sp. One sample of third and fourth instar larvae was taken from an unused metal tank containing about 12" of water supporting a luxuriant growth of algae. COUNTY RECORDS: Calhoun, Crawford, Gogebic, Oakland, Oceana, Shiawassee.

*Anopheles quadrimaculatus* Say: Large numbers of biting and resting adults were found throughout the southern lower peninsula. Biting specimens were taken in early evening from dusk until after dark. Resting adults were found in outbuildings frequented by humans. One collection was made from a recently occupied doghouse. Adults are most commonly associated with *Mansonia perturbans* and *Aedes vexans*, such anophelines as *A. punctipennis* and *A. walkeri*, and to a lesser extent with *A. stimulans* and *A. fitchii*. Adults occur from mid-May until the latter part of October, although resting insects have been taken indoors in late November, as noted also in the case of *A. punctipennis*. COUNTY RECORDS: Calhoun, Muskegon, Oakland, Oceana, Shiawassee.

*Aedes abseratus* (Felt and Young): Because of the extreme similarity of females of this species to those of *A. punctator*, only one record is included here. A single male was reared from a larva found in a small bog-mat hole on 14 May 1953, and was verified from both larval and genital characteristics. COUNTY RECORD: Oakland.

*Aedes aurifer* (Coquillett): Most collections represented here are from southern Genesee County, with only two other counties reported. From records of Beadle (1963) and others, this species appears to be distributed throughout the state, sometimes becoming locally abundant. I have not yet found *A. aurifer* larvae, and these records are of adults taken in wooded localities having either permanent or semi-permanent pools. Adults were found from late May through early August. COUNTY RECORDS: Genesee, Gogebic, Oakland.

*Aedes canadensis canadensis* (Theobald): One of Michigan's most common mosquitoes, this species is widely distributed over the entire state, frequently becoming a considerable pest. It occurs from the end of April often until late August. COUNTY RECORDS: Antrim, Delta, Emmet, Midland, Oakland, Ontonagon.

*Aedes cinereus* Meigen: Adults have been found in most counties of both peninsulas of Michigan by myself and others. The species may appear in such great numbers as to constitute a serious problem around wooded areas. Adults are frequently present from early May into the first part of September. Only a single larval site was located in a small

hole in a bog mat, where this species was associated with *A. canadensis* and *A. abserratus*. COUNTY RECORDS: Allegan, Cass, Midland, Oakland, Oceana, Ontonagon.

*Aedes dorsalis* (Meigen): Three adult collections were taken from two rather widely-spaced localities. On May 8, 1949, a single biting female was collected during mid-afternoon at a Genesee County lake-shore. Identity was verified by Dr. Allan Stone. Adults were obtained upon two subsequent occasions. One of these was a male specimen sent to me from Allegan County by Mr. Fred Ohlmacher. It was collected during the evening of August 31, 1953, along with *A. cinereus*, *A. vexans*, *C. territans*, and *U. sapphirina*. This species appears to be extremely uncommon in Michigan. Previous surveys, however extensive, have failed to turn up even an isolated record, other than that of one adult from a light trap at Isle Royale (Beadle, 1963). COUNTY RECORDS: Allegan, Genesee.

*Aedes excrucians* (Walker): This species has been found to be abundant over the entire state. Adults emerge about the same time as *A. stimulans*, and somewhat later than *A. fitchii*; it commonly associates with both species. COUNTY RECORDS: Calhoun, Eaton, Emmet, Isabella, Midland, Oakland.

*Aedes fitchii* (Felt and Young): Common throughout the state. Larvae appear early in the spring, the adults often becoming a serious nuisance from about the first of May, frequently persisting into the first week of September. COUNTY RECORDS: Calhoun, Isabella, Midland, Oakland, Oceana.

*Aedes punctor* (Kirby): More frequent in the northern part of the state, this species at times may constitute a "major annoyance" (Beadle, 1963). It has not been reported, however, in the southern counties. On May 23, 1952, I was able to obtain one male and one female among a mixed series of resting adults that included *A. excrucians*, *A. fitchii*, and *A. stimulans*, on the outside of several frame buildings at Lake Fenton, in Genesee County. Both specimens were confirmed by Dr. Stone. COUNTY RECORD: Genesee.

*Aedes riparius* Dyar and Knab: This insect appears in only two collections, both of which contained numerous other species. In a biting collection taken during early May, *A. riparius* was associated with at least eight other species of *Aedes*, the most common being *A. aurifer*, *A. canadensis*, *A. sticticus*, *A. stimulans*, and *A. vexans*. In another early May collection, a single female was found close to the wooded margin of a Buttonbush (*Cephalanthus occidentalis*) marsh. In this instance, at least six other *Aedes* spp. and one adult female *A. quadrimaculatus* were taken together. COUNTY RECORD: Oakland.

*Aedes sticticus* (Meigen): One of the more common mosquitoes of the state, this species is represented in more than one-third of the counties studied. The adults are troublesome biters, appearing from mid-May through mid-August in biting swarms with *A. canadensis*, *A. cinereus*, *A. fitchii*, *A. stimulans*, *A. vexans*, and *M. perturbans*. COUNTY RECORDS: Cass, Delta, Eaton, Isabella, Keweenaw, Livingston, Oakland, Ontonagon.

*Aedes stimulans* (Walker): Abundant over the entire state, *A. stimulans* has been found in nearly one-half of the counties sampled. COUNTY RECORDS: Alger, Antrim, Calhoun, Cass, Emmet, Isabella, Livingston, Midland, Oakland, Ontonagon.

*Aedes trichurus* (Dyar): Although it appears to be widely distributed over the entire state, this species does not seem to be particularly common in the southern portion. *A. trichurus* may become a serious pest in the upper and northern lower peninsulas (Beadle, 1963). Along with other early-season forms such as *A. excrucians*, and *A. stimulans*, biting females were taken in rather dense hardwood stands during May and early June. Male specimens were identified by genitalia. Dr. Stone has checked the adult females. COUNTY RECORDS: Crawford, Emmet, Oakland, Osceola.

*Aedes triseriatus* (Say): Larvae were taken from typical tree-hole situations in several localities from mid-May through mid-July. Biting females appeared during dark evening hours, and in daytime in densely shaded, deciduous woodlots from early June through the first of September. COUNTY RECORDS: Oakland, Emmet.

*Aedes trivittatus* (Coquillett): Other than a report of one adult specimen from the "vicinity of Marquette, Michigan" (Wallace, 1960), I do not know of another published record of this species for the state. The 1944-45 mosquito surveys conducted by the Michigan Department of Health (Pederson, 1947), yielded a total of 122 females and three larvae of *A. trivittatus* from twenty-four counties in the upper and lower peninsulas. I understand that these records still remain unpublished. I collected one biting female inside a tent at night in Gogebic County on August 20, 1949. Specimens from Calhoun and Oceana Counties were sent to me by Mr. Fred Ohlmacher. Adults of this species were taken during late August and early September, and were in each instance associated with *A. vexans*. COUNTY RECORDS: Calhoun, Gogebic, Oceana.

*Aedes vexans* (Meigen): Occurring in considerable numbers throughout most of the summer over the entire state, particularly in southern counties, *A. vexans* frequently becomes a most serious pest mosquito. It has been collected from the end of May through late October. Specimens were taken while biting and resting, as well as in light traps. This species seems to bite under nearly all conditions, having been found both inside and outside buildings, in wooded areas, and in the open during midday as well as in the evening. Adult *A. vexans* may be found with most other local species of *Anopheles*, *Aedes*, *Culex*, and *Mansonia*. In the event of heavy middle or late summer rainfall, this species may appear in a second peak of abundance. During the month of October, 1950, such a situation developed in southern Genesee County, and the species became extremely troublesome inside and around dwellings. COUNTY RECORDS: Allegan, Calhoun, Eaton, Gogebic, Jackson, Livingston, Oakland, Oceana, Ontonagon.

*Weyomyia smithii* (Coquillett): Published records of this species from Michigan are few, although it has been recorded from Cheboygan

County by Irwin (1941) and others. I have been able to obtain larvae in Oakland County from the pitcher-like leaves of *Sarracenia purpurea*. This plant is common in wet meadows and bog areas over most of the state, and it is quite likely that *W. smithii* follows its distribution. COUNTY RECORD: Oakland.

*Uranotaenia sapphirina* (Osten Sacken): Adults were taken by means of a light trap, and one collection of larvae was obtained from a small pond covered with a *Lemna* sp., in Genesee County. I have identified a single adult male from Allegan County. COUNTY RECORD: Allegan.

*Mansonia perturbans* (Walker): Often becoming a serious nuisance, particularly around marshy areas throughout its range, *M. perturbans* appears in the early part of June. It may persist through the first week of September. Specimens were taken indoors as well as outside, in daytime and in the evening, most frequently with *A. vexans*, but often with anophelines and *A. canadensis*, *A. cinereus*, *A. fitchii*, and *A. sticticus*. This species has been found in nearly one-half of the counties sampled. COUNTY RECORDS: Calhoun, Emmet, Gogebic, Huron, Isabella, Jackson, Keweenaw (Isle Royale), Oakland, Oceana, Roscommon.

*Psorophora ciliata* (Fabricius): Considering present records, it would seem that this large mosquito is confined to the southern half of the lower peninsula. Adults are vicious and determined biters, appearing from the middle of July through late September, invading not only urban areas but homes as well. Upon occasions, they may cause considerable distress. On September 23, 1961, specimens were brought to me for identification by a resident of Fenton, Michigan. It seemed that *P. ciliata* had become so numerous in at least one part of the village that the residents had become quite disturbed. It was reported that a child had developed a short-lived fever resulting from the bites. This species is attracted to light, and in several instances was collected around yard lights late in the evening. COUNTY RECORD: Wayne.

*Culex pipiens* Linnaeus: Larvae were taken on two occasions from metal containers holding only a few gallons of water, during the months of August and September. One of these included numerous larvae of *C. restuans*. No biting collections were obtained. Resting adults were found in buildings, along with anophelines, as late as November 25. The adult specimens have been checked by Dr. Stone. COUNTY RECORDS: Cass, Macomb, Oakland, Shiawassee.

*Culex restuans* Theobald: Appearing over the entire state, larvae were commonly found in metal containers with other species of *Culex*, as well as anophelines. Others were taken from small ponds and bog holes, either alone, or with other culicines and anophelines. COUNTY RECORDS: Cass, Crawford, Oakland.

*Culex territans* Walker: Previously reported as *Culex apicalis* (Obrecht, 1949), this species is widely distributed over the entire state. Larvae have been found as early as May 31, and as late as October 17, mostly in small marsh and bog holes well covered with *Lemna* spp. A 20-gallon garbage can partly filled with water and decaying

leaves produced large numbers of larvae during late May 1961. Adults were discovered resting with *Anopheles quadrimaculatus* and *Aedes* spp. in dense vegetation. Apparently the males are attracted to light, as specimens were collected around yard lights, as well as in a light trap. COUNTY RECORDS: Allegan, Calhoun, Gogebic, Oakland, Oceana.

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Help provided by students and other friends who have been kind enough to send me their collections is greatly appreciated. Mr. Fred Ohlmacher, of Holly, Michigan, has been particularly helpful in this respect. The burden of checking the more difficult material has, as usual, fallen upon Dr. Allan Stone, of the Entomology Research Division (ARS) of the U.S. Department of Agriculture, to whom I am extremely grateful.

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#### COVER PHOTO

A plate from Isaac P. Trimble's *A Treatise on the Insect Enemies of Fruit and Fruit Trees* (New York, 1865). The farmer is jarring the branches of his trees to dislodge plum curculios, *Conotrachelus nenuphar* (Herbst) (Coleoptera: Curculionidae). He uses a padded mop handle to avoid bruising the bark, and his son crushes the beetles as they fall to the sheet. More sophisticated methods are now in vogue!