

AN ANNOTATED LIST OF OHIO MOSQUITOES

CARL E. VENARD AND FRANK W. MEAD¹

Department of Zoology and Entomology, The Ohio State University, Columbus 10

In 1906 Burgess published a list of 17 species of mosquitoes for the state of Ohio. This report was based on some collections he made during the summer of 1905 and on specimens supplied by Profs. H. Osborn and J. S. Hine. Dr. L. O. Howard furnished a record of *Wyeomyia smithii* and W. E. Evans, who did considerable collecting in the preparation of an undergraduate thesis for the B.Sc. at The Ohio State University, furnished some data.

The Reference Collection of Insects of this department today contains a number of specimens which were studied by Burgess. The undergraduate thesis by Evans (1906) contains the list compiled by Burgess and information which is useful in interpreting the list. The 17 names given by Burgess includes two, *Megarhinus portoricensis* Roeder and *Toxorhynchites rutilus* Coq., which refer to the species now known as *Toxorhynchites rutilus septentrionalis* (Dyar and Knab). Another name, *Anopheles maculipennis* Meigen, was used for specimens collected at Sandusky, all of which in the museum at the present time are *A. walkeri* Theobald.

Hoyt and Worden (1935), in studying a small epidemic of malaria at Aurora, Ohio, reported *Anopheles punctipennis* and *Anopheles quadrimaculatus*.

Articles by Jenkins and Carpenter (1946) and Sharkey (1946) contain some Ohio records on tree-hole-breeding species and anophelines, respectively, which the senior author furnished.

Starting in 1946, with the establishment of the Toledo Area Sanitary District mosquito control program, Crandell has included in his annual report the names of mosquitoes found and identified by that organization. The five reports for 1946-1950 contain a total of 43 names of species of mosquitoes collected in that locality. It should be emphasized that a number of the identifications were tentative. Species named in these reports and not found or seen by us are: *Anopheles occidentalis*, *Anopheles pseudopunctipennis*, *Aedes alleni*, *Aedes communis*, *Aedes impiger*, *Aedes infirmatus*, *Aedes intrudens*, *Aedes pionips*, *Aedes punctor*, *Aedes spencerii*, *Culex stigmatosoma*, *Culex tarsalis*, *Culiseta impatiens*, *Culiseta incidens*, and *Orthopodomyia alba*.

Masters (1949) made a study during 1946-1948 of the adult mosquito population in a Cuyahoga County woods where he found 21 species.

Mead (1949) presented, for the M.Sc. thesis requirements at The Ohio State University, a study of mosquitoes of Central Ohio which contains much data on the seasonal and ecological distribution of 34 species. He included data on *Aedes impiger* and *Aedes intrudens*, but has decided that these identifications based on larvae and females respectively, should not be accepted.

In 1940 the senior author made his first collection of mosquitoes in Ohio, and has collected some every year since then; and for the past five years the junior author has been active in this program. Although we have made collections in 83 of Ohio's 88 counties, there are still large areas to be studied. Also, the areas more distant from Columbus have been visited only occasionally. Our studies have been made incidentally to our regular duties; much material remains to be examined. Therefore, this report is a preliminary one.

The collections were made by dipping larvae and, in some instances, rearing them to the adult stage; capturing biting females; taking resting adults from

¹Present address: United States Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine.

buildings or natural resting places; and by sweeping vegetation for adults. Identifications, except where otherwise indicated, are based on fourth-instar larvae or males, or both, in addition to adult females. All comments for the various species are based on our observations in Ohio.

Dr. Edward S. Thomas of the Ohio State Museum, Dr. William C. Stehr of Ohio University, and Prof. Josef N. Knull of The Ohio State University have kindly furnished us with records from their collections. Dr. Herbert A. Crandell enabled us to study specimens collected by the Toledo Area Sanitary District and furnished laboratory facilities for examining the specimens. Doctors John M. Hutzel, John B. Gerberich, Howard W. Smith, Robert L. Blicke, Louis M. Roth, and Mr. Robert L. Goulding have all been helpful in making collections and identifications. We appreciate the assistance received from all of these people. Two grants to the senior author from the Research Fund of the Ohio Academy of Science partially met traveling expenses for two summers.

LIST OF SPECIES

1. *Anopheles barberi* Coquillett. Although this tree-hole-breeding species is probably generally distributed throughout Ohio, it has been collected in less than a dozen localities and may be regarded as fairly rare and unimportant.

2. *Anopheles crucians* Wiedemann. Ohio constitutes a section of the northern limits in the range of this pest species. In Ohio, *A. crucians* is rare, but in one locality, Indian Lake, it was present in sufficient numbers during autumn to be considered a nuisance. Larvae were usually found in cat-tail marshes, but on one occasion they were found along a drying stream.

3. *Anopheles punctipennis* (Say). This is our most abundant and widely distributed anopheline, but it is not usually a serious pest. It is found in a great variety of habitats, both inside and outside of cities, and often enters homes.

4. *Anopheles quadrimaculatus* Say. The famous vector of malaria is the second most abundant and generally distributed anopheline in Ohio. Small farm ponds, which are becoming very numerous, and reservoirs used for city water supplies or resort areas, are the usual breeding places.

5. *Anopheles walkeri* Theobald. This anopheline has been found in several widely separated portions of the state. Although it is sometimes quite abundant and annoying in local situations such as at Indian Lake and Lake Erie, it probably should have the ranking of a rare mosquito. The largest populations occur in cat-tail marshes.

6. *Aedes aurifer* (Coquillett). This mosquito seems to be in the southern part of its range in Ohio. It is usually rare, but when the females are encountered, they press a fierce attack. Captures have so far been restricted to woodland situations in Fairfield, Logan, and Hardin counties.

7. *Aedes canadensis* (Theobald). One of the most important earlybreeding pest mosquitoes in the state is *A. canadensis*. It is both widely distributed and very abundant. Its habitat is primarily in the forests, but the larvae are often found in other places such as roadside ditches and marshy areas.

8. *Aedes cinereus* Meigen. So far, *A. cinereus* has been collected only in the northern half of the state. The females can be energetic biters, but the species seems to be unimportant because of its rarity. The larvae have been found in small pools in and about forests and marshes.

9. *Aedes dorsalis* (Meigen). One larva was collected in Wayne Co., and adults have been collected in Lucas Co. by the Toledo Area Sanitary District, and in Lake Co. by the writers. Industrial wastes seem to be an important factor in providing a suitable habitat, and in Ohio this species must be considered rare.

10. *Aedes excrucians* (Walker). This is another one of the earlybreeding woodland mosquitoes whose range extends southward from Canada to the northern

half of Ohio. Since this species is rare, it does not matter much to Ohioans that the females are fierce biters.

11. *Aedes fitchii* (Felt and Young). *Aedes fitchii* is similar to *A. excrucians* in most respects, including its rareness. It has been taken in eight counties.

12. *Aedes grossbecki* Dyar and Knab. One of the most surprising discoveries to the writers was the many times this species was collected. However, the adults were seldom taken in the numbers expected in relation to the number of larvae observed. Practically all of the findings were in the northern two-thirds of the state, and the northwest quarter in particular.

13. *Aedes implacabilis* (Walker). The only record at hand is one larva collected by the writers in Portage County at a buttonbush swamp.

14. *Aedes sollicitans* (Walker). Although several salty water areas have been investigated, only one area has so far been discovered where *A. sollicitans* was present. This was in Lake County where, on occasions, the females were so abundant and fierce that life was miserable in the immediate vicinity.

15. *Aedes sticticus* (Meigen). Our experience is that this species attains its greatest abundance in northwestern Ohio. It is often the most important pest in this area during early summer. Elsewhere in the State it is not usually so abundant, indeed, it is absent or scarce in many areas even where it might be expected. *Sticticus* breeds in woodland pools, marshes, and floodwater situations.

16. *Aedes stimulans* (Walker). The Brown Woods Mosquito is an early breeding species that is widespread throughout most of the state, particularly in the more level areas. It is probably the most important early-season pest in the more northern forested areas.

17. *Aedes thibaulti* Dyar and Knab. Ohio may be a part of the northern or northeastern extreme in the range of this tree-hole-breeding species. Females were found in Cuyahoga County by Masters, and in Fairfield County by the writers. The females are fierce biters.

18. *Aedes tormentor* Dyar and Knab. Larvae have been collected in Franklin County, and biting females of what are probably this species have been taken in two other woodland localities in Fairfield and Perry counties. This is another southern species that is at the northern limits of its range in Ohio.

19. *Aedes triseriatus* (Say). This is the most widespread and common tree-hole-breeding species in Ohio. Although *A. triseriatus* is not usually present in large numbers like *Aedes stimulans*, for example, it is active for a long season and must be considered a major pest. Unlike *A. stimulans*, it is occasionally a pest around homes in cities.

20. *Aedes trivittatus* (Coquillett). Collections of this common and important species have been made in counties scattered all over Ohio. The larvae are found in temporary pools in a variety of habitats. The adults are found in both woods and lightly shaded rural areas, will bite in bright sunlight, and from mid-July until frost they are a serious pest, but fortunately do not migrate nearly as much as *A. vexans*.

21. *Aedes vexans* (Meigen). All things considered, this is probably the worst pest species in Ohio. It breeds in a wide variety of habitats both wild and domestic. Its distribution appears to extend throughout the State. It is the experience of the writers that most mosquito complaints during late summer and early autumn are attributable to *A. vexans*.

22. *Culex apicalis* Adams. Even though this species is common and widely distributed over the state, it is of no importance as a pest since the females are not known to feed on man. Our material reported under this name agrees with the description for *Culex territans* Walker and not with the description of *Culex apicalis* Adams as given by Bohart (1948).

23. *Culex erraticus* (Dyar and Knab). The writers have collected *C. erraticus* only a few times, and they consider it rare. The larvae appear in summer and

are usually found in quiet ponds with considerable vegetation. The females are not considered troublesome.

24. *Culex pipiens* Linnaeus. This is the common house mosquito, and it well deserves its title. However, the writers have not observed females of Ohio specimens taking blood meals. The distribution of *C. pipiens* is very wide not only as to geography, but also as to season and habitat. *C. quinquefasciatus* Say was reported for Cincinnati by Dyar (1922), but the writers have not made any attempt to recognize this species in Ohio.

25. *Culex restuans* Theobald. *C. restuans* is very common in woodland pools, bogs, and domestic situations. Its geographical and seasonal distribution is similar to that of *C. pipiens* except that the larvae are found earlier in the spring and later in the fall.

26. *Culex salinarius* Coquillett. On the basis of existing records in Ohio, this mosquito should be considered uncommon to rare even though the distribution could be fairly widespread. The larvae have been found primarily in domestic situations. The females apparently cause very little trouble as a pest.

27. *Culiseta inornata* (Williston). Collections are insufficient to allow much generalizing on the distribution of this species, but it can probably be found widely scattered throughout the State. Marshy areas constitute the principal habitat, but artificial conditions such as abandoned wells are sometimes utilized. The females seldom cause trouble even though they are said to use houses as resting places.

28. *Culiseta melanura* (Coquillett). This species seems to be quite rare since it was found at only two places, the cranberry-sphagnum bog at Buckeye Lake in Licking County and a bog in Ashland County.

29. *Culiseta moristans* (Theobald). *C. moristans* has been found only a very few times and these records were obtained in the northern part of the State. It is a bog-inhabiting species.

30. *Psorophora ciliata* (Fabricius). Collections of this large mosquito have been made in counties scattered all over the State. *P. ciliata* is versatile in its biting habits in that it will attack both in forested and cleared areas, and it will settle down on a moving person. The species is fairly common although it seldom attacks in swarms.

31. *Psorophora confinnis* (Lynch Arribláza). The famous rice-field mosquito of the South seems to be rare in Ohio, but the existing records are by no means restricted to the southern counties because most of the collections are from central and northwestern Ohio.

32. *Psorophora cyanescens* (Coquillett). Very little is known about this rare species in Ohio. A biting female has been collected in Licking County.

33. *Psorophora discolor* (Coquillett). Several specimens were found in Franklin County by John M. Hutzler in 1942 and a single female which remains appears to be the only record for the State thus far.

34. *Psorophora ferox* (Humboldt). This species is generally distributed over the State and perhaps it is the most common and obnoxious member of its genus in Ohio. It breeds in temporary pools, usually with *Aedes trivittatus*, and it stays close to woodland areas.

35. *Psorophora horrida* (Dyar and Knab). It may be that *P. horrida* is distributed over the major part of Ohio but due to its being uncommon, not enough records have been obtained to make an accurate statement of its distribution. When encountered, the females are fierce biters.

36. *Psorophora varipes* (Coquillett). Biting females have been obtained from three woodland areas in Fairfield, Franklin, and Logan counties. Dr. M. R. Newkirk has collected this species in Ashland County. Apparently *P. varipes* is one of the more rare species in the State.

37. *Mansonia perturbans* (Walker). *Mansonia*, widely distributed over the State, is a pest of major importance in the larger marshes such as those at Indian Lake and Lake Erie.

38. *Orthopodomyia signifera* (Coquillett). This tree-hole-breeding species can probably be found in most sections of Ohio, but it is of little economic importance because the females do not bite man. It is not nearly as abundant as the most common tree-hole-breeding species, *Aedes triseriatus*.

39. *Wyeomyia smithii* (Coquillett). Pitcher plants (*Sarracenia*) have been investigated in several localities, but usually with negative results. In addition to the record by Howard reported by Burgess, the only other positive records of this species are those of E. S. Thomas. He collected *Wyeomyia* in Ashland, Stark, and Wayne Counties.

40. *Uranotaenia sapphirina* (Osten Sacken). A moderately common, very small mosquito that apparently does not bite and that breeds over most of Ohio in clean water of permanent-type ponds.

41. *Toxorhynchites rutilus septentrionalis* (Dyar and Knab). This nonbiting, rare, tree-hole-breeding mosquito does not seem to be restricted to any one part of Ohio.

REFERENCES

- Abdel-Malek, A. 1948. The biology of *Aedes trivittatus*. Jour. Econ. Ent., 41: 951-954.
- Bohart, R. M. 1948. The subgenus *Neoculex* in America North of Mexico. Annals Ent. Soc. Amer., 41: 330-345.
- Burgess, A. F. 1906. A preliminary report of the mosquitoes of Ohio. Ohio Naturalist, 6: 438-440.
- Crandell, H. A. 1946-1951. Five mimeographed reports for 1946, 1947, 1948, 1949, 1950 of the mosquito control program of the Toledo Area Sanitary District, 5015 Stickney Avenue, Toledo 12, Ohio.
- Dyar, H. G. 1922. The mosquitoes of the United States. Proc. U. S. Nat. Mus., 62: 1-119.
- Evans, Jr., W. E. 1906. The mosquitoes of Ohio. B.S. Thesis, The Ohio State University, Columbus.
- Goulding, R. L. 1948. A study of some food organisms of several species of mosquito larvae and some of the larva-organism relationships involved. M.Sc. Thesis, The Ohio State University, Columbus.
- Hoyt, R. N., and R. D. Worden. 1935. Malaria epidemic in Aurora, Ohio. Public Health Reports, Wash., 50: 895-897.
- Jenkins, D. W., and S. J. Carpenter. 1946. Ecology of the tree-hole breeding mosquitoes of Nearctic North America. Ecolog. Monog., 16: 31-48.
- Masters, C. O. 1949. A study of the adult mosquito population of a Northern Ohio woods. Ohio Jour. Sci., 49: 12-14.
- Mead, F. W. 1949. Ecology of Central Ohio mosquitoes. M.Sc. Thesis, The Ohio State University, Columbus.
- Sharkey, T. P. 1946. The management of malaria. Ohio State Med. Jour., 42: 1025-1034.
-