# ADDITIONAL SPECIES OF MOSQUITOES IN OKLAHOMA

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In 1942 Rozeboom (10) recorded forty species of mosquitoes in Oklahoma. In 1945 Roth (9) described *Psorophora longipalpis,* including records from this State. The present paper adds eleven species, bringing the State total to fifty-two recorded species. While this list is extensive, it is probably incomplete. Oklahoma exhibits considerable variety in physiography and climate, supporting highly diversified flora and fauna.

The collections were obtained from light traps operated by local cooperators throughout the State in the mosquito survey and control activities of 1945–1948. The new records came from thirty-seven of these traps (standard New Jersey type) in as many locations, each operated one season, usually April-October. Collection and identification of the specimens were made possible through the cooperation of the U. S. Public Health Service, the Oklahoma State Department of Health, and the University of Oklahoma.

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* This paper results from collections made largely while the writer was on duty with the Communicable Disease Center, Public Health Service, Federal Security Agency, and the Oklahoma State Department of Health. Studies of these collections were continued as personal research at the University of Oklahoma and were recently extended on further duty with the Communicable Disease Center in connection with the Arkansas-White-Red River Basins investigations. Since comprehensive distributional studies have been interrupted by an assignment to foreign duty, the writer offers this preliminary note on the new State records at this time.

## LOCALITIES

In the following list the light trap locations are grouped according to physiographic regions and approximately in geographic series from east to west across the State. The counties are shown in parentheses, followed by the year of trap operation. The list includes only the locations from which new State records were obtained, as noted, or about one-half of the light trap locations during 1945–1948.

OZARK PLATEAU (northeastern): — 1. Ketchum (Craig), 1947: *Aedes cinereus.* PRAIRIE PLAINS (northeastern): — 2. Nowata (Nowata), 1947: *Culex pipiens.* 3. Claremore (Rogers), 1947: *Culex pipiens.* 4. Eufaula (McIntosh), 1947: *Aedes dupreei, A. cinereus,* 5. Sallisaw (Sequoyah), 1946: *Aedes cinereus.* OUACHITA MOUNTAINS (southeastern): — 6. Broken Bow (McCurtain), 1946: *Aedes dupreei.* GULF COASTAL PLAINS (southeastern): — 7. Tishomingo (Johnston), 1946; *Urano-*

*taenia syntheta.* ARBUCKLE MOUNTAINS (south-central):—8. Platt National Park (Murray), 1948: *Aedes dupreei, A. tormentor, Uranotaenia syntheta.* SANDSTONE HILLS (east-central):—9. Coalgate (Coal), 1947: *Uranotaenia syntheta.* 10. Ada (Pontotoc), 1945: *Uranotaenia syntheta.* 11. Shawnee (Pottawatomie), 1946: *Culex pipiens, Uranotaenia syntheta.* 12. Pawhuska (Osage), 1946: *Culex pipiens.*

RED BEDS PLAINS (west-central and southwestern):—13. Tonkawa (Kay), 1946: *Culex pipiens.* 14. Great Salt Plains (Alfalfa), 1946: *Culex pipiens.* 15. Alva (Woods), 1946: *Culex pipiens, Uranotaenia syntheta.* 16. Enid (Garfield), 1946: *Culex pipiens, Uranotaenia syntheta.* 17. Guthrie (Logan), 1948: *Aedes thelcter, Uranotaenia syntheta.* 18. Fort Reno (Canadian), 1948: *Aedes thelcter, Culex stigmatosoma.* 19. Lake Overholser (Oklahoma), 1946: *Aedes dupreei, Culex stigmatosoma, Culex pipiens.* 20. Anadarko (Caddo), 1947: *Aedes thelcter.* 21. Walters (Cotton), 1947: *Aedes thelcter, Uranotaenia syntheta.* 22. Hobart (Kiowa), 1948: *Anopheles franciscanus.* 23. Altus (Jackson), 1946: *Aedes mitchellae, Uranotaenia syntheta.* 24. Mangum (Greer), 1948: *Anopheles franciscanus.* WICHITA MOUNTAINS (southwestern):—25. Medicine Park (Comanche), 1946: *Anopheles franciscanus, Culex thriambus, Uranotaenia syntheta.* 26. Quartz Mountain Park (Greer), 1948: *Anopheles franciscanus.* GYPSUM HILLS (western):—27. Hollis (Harmon), 1948: *Anopheles franciscanus, Aedes thelcter, Uranotaenia syntheta.* 28. Elk City (Beckham), 1948: *Anopheles franciscanus, Aedes dupreei, Culex stigmatosoma, Uranotaenia syntheta.* 29. Clinton (Custer), 1948: *Aedes thelcter.* 30. Watonga (Blaine), 1946: *Aedes dupreei, A. thelcter, Culex pipiens, Uranotaenia syntheta.* 31. Taloga (Dewey), 1948: *Anopheles franciscanus, Culex pipiens, Uranotaenia syntheta.* HIGH PLAINS (northwestern):—32. Cheyenne (Roger Mills), 1946: *Anopheles franciscanus.* 33. Shattuck (Ellis), 1948: *Anopheles franciscanus, Culex stigmatosoma, C. pipiens, Uranotaenia syntheta.* 34. Doby Springs (Harper), 1948: *Anopheles franciscanus, Culex stigmatosoma, Uranotaenia syntheta.* 35. Beaver City (Beaver), 1946: *Anopheles franciscanus, Culex pipiens.* 36. Goodwell (Texas), 1946: *Anopheles franciscanus, Culex pipiens.* 37. Boise City (Cimarron), 1946: *Culiseta incidens.*

## NEW OKLAHOMA RECORDS

*Anopheles (Anopheles) franciscanus* McCracken 1904. This species is distributed across the extreme western area of Oklahoma in the Red Beds Plains, Wichita Mountains, Gypsum Hills, and High Plains. It is sometimes associated in collections with *A. pseudopunctipennis* which occurs farther east in the State. *A. franciscanus* was collected occasionally in western light traps, usually with one or two specimens per collection, the highest being four. The accumulated records, too numerous to list, include ninety-four collections (20mm, 98ff) distributed seasonally as follows: May, 1 coll. (1m); June, 10 coll. (1m, 10ff); July, 27 coll. (8mm, 29ff); Aug., 25 coll. (3mm, 29ff); Sept., 27 coll. (6mm, 27ff); Oct., 4 coll. (1m, 4ff). These records are from Hobart, 25 coll. (8mm, 22ff); Mangum, 2 coll. (2ff); Medicine Park, 6 coll. (3mm, 3ff); Quartz Mountain Park, 3 coll. (3ff); Hollis, 3 coll. (1m, 2ff); Elk City, 11 coll. (1m, 17ff); Taloga, 12 coll. (2mm, 11ff); Cheyenne, 1 coll. (1f); Shattuck, 12 coll. (3mm, 14ff); Doby Springs, 8 coll. (1m, 14ff); Beaver City, 2 coll. (2ff); Goodwell, 9 coll. (1m, 8ff).

*A. franciscanus* has been reported from Colorado (5), New Mexico, Texas, and westward to the Pacific Coast (7). Vargas (13) distinguishes *A. pseudopunctipennis* var. *willardi* from *A. franciscanus* by egg and larval characters and considers the latter as probably being confined to California. Since the adults of these two forms seem indistinguishable, *A. franciscanus* is used here as generally accepted until further studies can be made of the immature stages of the Oklahoma species.

*Aedes (Ochlerotatus) mitchellae* (Dyar) 1905. The Oklahoma record of this species

is from Altus in the extreme southwestern Red Beds Plains. Only one male was taken in the combined collections of May 30–31, but the dissected terminalia of this specimen are clearly typical. This species has been reported from Texas (2, 11) to New Jersey in the Gulf and Atlantic Coastal States (2).

*Aedes (Ochlerotatus) dupreei* (Coquillet) 1904. Only six males (dissected) have been determined with surety in the Oklahoma collections. The species, although rarely taken, seems widely distributed across the State, with isolated records in the eastern Prairie Plains and Ouachita Mountains, the central Arbuckle Mountains and Red Beds Plains, and the western Gypsum Hills. Light trap collections were as follows: Eufaula, June 9 (1m); Broken Bow, May 30 (1m); Platt National Park, Aug. 15–17 (1m); Lake Overholser, June 9–10 (1m); Elk City, June 5 (1m); Watonga, Sept. 26 (1m). This species has been reported from Missouri, Arkansas (2), Texas (11), and throughout the southeastern States northward to New York and Iowa (2).

*Aedes (Ochlerotatus) thelcter* Dyar 1918. This species has been collected occasionally in Oklahoma in the central and southwestern Red Beds Plains and the western Gypsum Hills. The best series was obtained from Watonga: July 6 (5m), 7–8 (17mm, 16ff), 9 (1m, 3ff), 10 (1m, 13ff), 11 (12ff), 12 (1m), 13 (1f), 14–15 (1f), 18 (1f). Other Oklahoma records are from Guthrie, July 8–10 (1f); Fort Reno, July 9 (1f); Anadarko, June 5 (5ff), 8 (4ff); Walters, June 9 (1f), 12 (1f), 15 (1f), 18 (1f), 24 (1f); Hollis, June 6 (1f); Clinton, July 6 (1f). This species has been reported from Texas (7) and Florida (12).

*Aedes (Ochlerotatus) tormentor* Dyar and Knab 1906. Rozeboom (10) noted the difficulty of separating females of this species from those of *A. atlanticus*, but assigned his specimens to the latter species by association with larval determinations. He also suggested that both species might well occur in Oklahoma. The present record from the south-central Arbuckle Mountains is based on one male (dissected) taken Aug. 14 in Platt National Park. The terminalia are clearly determinative. This species has been reported from Arkansas, Texas, and the southeastern Gulf and Atlantic Coastal States (2).

*Aedes (Aedes) cinereus* Meigen 1818. The Oklahoma records of this curious species (the males having female-type palpi) are based on four males (dissected) taken at three locations in the eastern Prairie Plains and the border of the Ozark Plateau: Ketchum, May 15 (1m); Eufaula, May 6 (1m), 26 (1m); Sallisaw, May 17 (1m). This species has been reported from Arkansas (2), Colorado (5), and widely throughout the northern United States, Canada, Europe, and Siberia (7).

*Culex (Culex) thriambus* Dyar 1921. This species seems oddly isolated for one as commonly collected as it has been in the one location, Medicine Park, in the southwestern Wichita Mountains of Oklahoma. The records from this light trap are too numerous to list here, including fifty-nine collections (118mm, 36ff) of one to twelve specimens each: June, 1 coll. (1m); July, 8 coll. (8mm, 2ff); Aug., 20 coll. (46mm, 20ff); Sept., 15 coll. (43mm, 5ff); Oct., 13 coll. (18mm, 7ff); Nov., 2 coll. (2mm, 2ff). This species has been reported from Texas (3, 11).

*Culex (Culex) stigmatosoma* Dyar 1907. A most surprising find in the light trap collections is this west coast species which is abundant in one location in Oklahoma and apparently well distributed in the central Red Beds Plains and the western Gypsum Hills and High Plains. The best series was obtained at Elk City, where the species appeared in fifty-six collections (391mm, 596ff): June, 2 coll. (3mm); July, 10 coll. (9mm, 28ff); Aug., 30 coll. (181mm, 275ff); Sept., 13 coll. (170mm, 253ff); Oct., 1 coll. (28mm, 40ff). The largest collection was taken on Sept. 3 (65mm, 38ff). Other Oklahoma records are from Fort Reno, Aug. 18 (1f), Sept. 28 (1m); Lake Overholser, June 8 (1f);

Shattuck, Sept. 13 (1f), 14 (1f), 21 (1f), 24 (1f), 25 (1m, 1f), 26 (1m, 1f), 28 (1f), 29 (1f), Oct. 3–4 (1m), 6 (1f); Doby Springs, Sept. 14 (1f). This species has been reported from Texas (7), but this record may refer to *C. thriambus*. Dyar (4) placed the latter species in synonymy with *C. stigmatosoma*, and this was accepted by Matheson (7). The Oklahoma specimens of these two species are easily distinguished by coloration and the male terminalia. Other records are from California, Oregon, and Utah (7).

*Culex (Culex) pipiens*, Linnaeus 1758. Rozeboom (10) noted the difficulty of separating females of this species from those of *C. quinquefasciatus*, and pointed out the distinguishing characters of the male terminalia, but listed only the latter species from Oklahoma. The present records are based solely on dissected males, although many females are readily determinable by coloration. The numerous records include 128 collections (330 dissected males). These clearly indicate the distribution of *C. pipiens* completely across the northern length of the State, from the eastern Prairie Plains, through the central Sandstone Hills and Red Beds Plains, to the western Gypsum Hills and High Plains. This distribution parallels that of *C. quinquefasciatus* across the southern length of the State. Where the two species meet, there is some evidence of intergradation in the characteristic male terminalia and female coloration. The accumulated records are too numerous for publication here, but the seasonal trends may be shown as follows: May, 3 coll. (3mm); June, 12 coll. (23mm); July, 29 coll. (70mm); Aug., 32 coll. (51mm); Sept., 36 coll. (116mm); Oct., 15 coll. (66mm); Nov., 1 coll. (1m). The largest collection was from Shattuck, October 3–4 (26mm); 50 collections (162mm) were obtained from this locality. Other Oklahoma records are from Nowata, 2 coll. (2mm); Claremore, 5 coll. (6mm); Shawnee, 2 coll. (2mm); Pawhuska, 30 coll. (93mm); Tonkawa, 16 coll. (23mm); Great Salt Plains, 1 coll. (1m); Alva, 2 coll. (2mm); Enid, 13 coll. (31mm); Lake Overholser, 3 coll. (4mm); Watonga, 1 coll. (1m); Taloga, 1 coll. (1m); Beaver City, 1 coll. (1m); Goodwell, 1 coll. (1m). This species has been reported from Missouri, Kansas (2), and Colorado (5). Matheson (7) regards the species as the common house mosquito of eastern North America, Canada, the Pacific Coast, Europe, and southern South America.

*Culiseta (Culiseta) incidens* (Thomson) 1868. This western species was collected from the High Plains in the extreme western part of the Panhandle of Oklahoma. It has been taken only at Boise City, May 10–16 (1f); May 27–June 1 (1m); June 11–17 (2mm, 2ff). This species has been reported from Colorado (5), New Mexico, and the Rocky Mountain and Pacific Coast States to Alaska (3).

*Uranotaenia syntheta* Dyar and Shannon 1924. Numerous records of this species show it to be widely distributed across western Oklahoma, reaching toward the southeast, and sometimes in association with *Uranotaenia sapphirina*. It occurs in the southeastern Gulf Coastal Plains, the central Arbuckle Mountains and Sandstone Hills, the central and southwestern Red Beds Plains, the southwestern Wichita Mountains, and the western Gypsum Hills and High Plains. The species is usually no more than an occasional visitor to western traps, one to six specimens per collection. The accumulated records, including 112 collections (21mm, 157ff), are too numerous for more than a seasonal summary here: May, 7 coll. (1m, 6ff); June, 12 coll. (2mm, 16ff); July, 23 coll. (2mm, 33ff); Aug., 21 coll. (9mm, 20ff); Sept., 31 coll. (1m, 54ff); Oct., 14 coll. (5mm, 19ff); Nov., 4 coll. (1m, 9ff). Locality records are from Tishomingo, 1 coll. (1f); Platt National Park, 1 coll. (1f); Coalgate, 2 coll. (1m, 1f); Ada, 3 coll. (2mm, 2ff); Shawnee, 9 coll. (2mm, 11ff); Alva, 1 coll. (1f); Enid, 2 coll. (2ff); Guthrie, 1 coll. (1f); Walters, 1 coll. (4ff); Altus, 22 coll. (4mm, 34ff); Medicine Park, 34 coll. (10mm, 52ff); Hollis, 3 coll. (4ff); Elk

City, 6 coll. (6ff); Watonga, 7 coll. (2mm, 9ff); Taloga, 3 coll. (3ff); Shattuck, 2 coll. (3ff); Doby Springs, 14 coll. (22ff). This species has been reported from Texas (4, 11).


## SUMMARY

Eleven species of mosquitoes are added to the list of forty-one species previously collected in Oklahoma. The new records are from light traps (New Jersey type) distributed in thirty-seven locations throughout the State, 1945–1948. Each trap was operated by a local cooperator through one collecting season, usually April-October. The added species are *Anopheles franciscanus, Aedes mitchellae, A. dupreei, A. thelcter, A. tormentor, A. cinereus, Culex thriambus, C. stigmatosoma, C. pipiens, Culiseta incidens,* and *Uranotaenia syntheta.*


### *Literature Cited*


Reference may be made to the monographs by Dyar (1922 and 1928), King, Bradley, and McNeal (1942), Matheson (1944), and Carpenter, Middlekauff and Chamberlin (1946) for identification and general distribution of the species in this paper and extensive bibliographies. Substantial works have also appeared on the mosquitoes of Oklahoma (Rozeboom, 1942) and the adjoining states of Arkansas (Carpenter, 1941) and Texas (Randolph and O'Neil, 1944).

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