

# PAPERS AND PROCEEDINGS OF THE 15th ANNUAL MEETING

of the

## AMERICAN MOSQUITO CONTROL ASSOCIATION

HELD JOINTLY WITH THE UTAH MOSQUITO  
ABATEMENT ASSOCIATION

Salt Lake City, Utah, April 12-15, 1959

### PART I

## THE MOSQUITOES OF UTAH—A Revised List<sup>1</sup>

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The first detailed report on the mosquito fauna of Utah was published by Rees (1943). In this bulletin Rees reported the occurrence in the state of 31 species, representing 4 genera, and discussed their biology, distribution, life history and importance.

Subsequent publications by Rees (1944), Rees and Nielsen (1951, 1955) and Richards *et al.* (1956) have added to the knowledge of the mosquito fauna of this state.

A total of 42 species has been reported in the literature as occurring in Utah. Of this number five are records which the authors consider invalid or of uncertain status.

Three species included in the present paper are new distributional records for Utah. Specific locality records, with dates and ecological notes are included for these species. Collections were made by the authors unless otherwise indicated.

At the present time the Utah mosquito fauna consists of 40 species representing 6 genera and is as follows:

*Aedes: atropalpus* (Coquillett), *campestris* Dyar and Knab, *cataphylla* Dyar, *cinereus* Meigen, *communis* (De Geer), *dorsalis* (Meigen), *excrucians* (Walker),

*fitchii* (Felt and Young), *flavescens* (Müller), *hexadontus* Dyar, *implicatus* Vockeroth, *impiger* (Walker), *increpitus* Dyar, *intrudens* Dyar, *melanimon* Dyar, *nigromaculis* (Ludlow), *niphadopsis* Dyar and Knab, *pullatus* (Coquillett), *schizopinax* Dyar, *spencerii* (Theobald), *sticticus* (Meigen), *varipalpus* (Coquillett), *vexans* (Meigen).

*Anopheles: earlei* Vargas, *franciscanus* McCracken, *freeborni* Aitken.

*Culex: apicalis* Adams, *erythrothorax* Dyar, *pipiens* Linnaeus, *quinquefasciatus* Say, *restuans* (Theobald), *salinarius* Coquillett, *tarsalis* Coquillett, *territans* (Walker).

*Culiseta: impatiens* (Walker), *incidens* (Thomson), *inornata* (Williston), *minnesotae* Barr.

*Mansonia perturbans* (Walker) and *Psorophora signipennis* (Coquillett).

### NEW UTAH RECORDS

*Anopheles earlei* Vargas. This species is apparently restricted to high mountain valleys in the extreme northeastern part of the state. Larvae were found in two localities; one at 7200 ft. elevation in a small, shallow, open, semi-permanent pond overgrown with grass and *Carex* plants. Larval associates were *Culex tarsalis* and *Culiseta inornata*. The other collection was at 6600 ft. elevation in a small, per-

<sup>1</sup>The studies on which this report is based were supported in part by grants from the University of Utah Research Fund.

manent, partially shaded woodland pool containing heavy growths of pondweed, *Potamogeton* species and rather densely covered with the duckweed, *Lemna minor* L. *Anopheles freeborni* larvae also occurred in this pond. Adults were found resting in culverts near both localities.—SUMMIT COUNTY: Chalk Creek, 7200 ft., V-15-56. RICH COUNTY: Woodruff Creek, 6200 ft., VI-11-53.

*Aedes varipalpus* (Coquillett). Larvae of this species were collected in tree holes of the cottonwood, *Populus fremonti* S. Wats, along the Virgin River in Zion National Park in southwestern Utah. Biting females also were collected in the vicinity. Identification of specimens as the true *varipalpus* was verified by J. N. Belkin of the University of California at Los Angeles.—WASHINGTON COUNTY: Zion National Park, 3900 ft., V-20-56, IV-25-58, III-23-59.

*Culiseta minnesotae* Barr. Specimens of this species were taken in two localities in mountain valleys of northern Utah. Larvae were collected in a small permanent overflow pool from a flowing well. The pool contained considerable algal growth. *Culiseta inornata* larvae also were present.—WEBER COUNTY: Weber River, 4500 ft., V-15-56; Huntsville, 4920 ft., VIII-24-56 (R. McHugh).

#### PUBLISHED RECORDS OF INVALID OR QUESTIONABLE STATUS

*Anopheles quadrimaculatus* Say. This species was reported from Utah by Howard, Dyar & Knab (1917). An examination of the Dyar collection of mosquitoes by Alan Stone in the National Museum has failed to reveal any *A. quadrimaculatus* material from Utah. No additional specimens of this species have been collected in Utah. The authors are of the opinion that Dyar's records are based on specimens of *Anopheles freeborni*, a very common species in Utah and one easily confused with *Anopheles quadrimaculatus*.

*Aedes idahoensis* (Theobald). Both *Aedes spencerii* (Theobald) and *Aedes*

*idahoensis* (Theobald) were reported for Utah by Rees (1943). Since that time an examination of material referable to these species from the western United States has led the authors to conclude that only a single species complex exists. Therefore the prior name *A. spencerii* is used to refer to this species. This is in agreement with Pratt (1956) who also considered *A. idahoensis* to be a synonym of *A. spencerii*.

Specimens from Utah are generally similar to the form named *idahoensis*; however, material in the authors' possession from localities in northern Utah, Wyoming and Montana show a definite overlapping of characters of both forms in the adult female. In these areas some females show the typical *idahoensis* type of abdominal scaling with narrow to broad basal white bands on each tergite, and with few if any apical white scales. Other females, as is typical of *spencerii*, show a conspicuous dorsal median longitudinal stripe of pale scales or have the dorsum of the abdomen almost entirely covered with pale scales. Appreciable numbers of females, however, show almost every degree of variation between these two extremes. It should be noted that similar variations have been reported for *A. spencerii*, both in Minnesota, by Owen (1937) and in Wisconsin by Dickinson (1944). Dyar (1917) also reported an intergrading of *idahoensis* toward *spencerii* in the Missouri Valley of Montana.

Another difference reported in the literature to distinguish *idahoensis* and *spencerii* is the scaling on the posterior pronotum. In *spencerii* the scaling on the dorsal half of this sclerite is supposedly brown; in *idahoensis* white or whitish-brown. In the western United States the scaling on the posterior pronotum is so variable, not only in the areas of overlap, but throughout the entire Western States that it is worthless as a means of identification. Some specimens with typical *idahoensis* abdominal markings have typical *spencerii* posterior pronotal scaling. The reverse also occurs.

Unfortunately, insufficient larval mate-

rial is available from these intergrading areas to attempt an adequate correlation. Some larval specimens from northern Utah cannot be assigned with certainty, on the basis of the number of comb scales and comb scale structure, to either form.

The male genitalia appear to be indistinguishable not only in the intergrading areas, but throughout the entire ranges of both forms.

On the basis of collections in the possession of the authors and records available in the literature it appears that the *spencerii* type has a northern range in North America occurring in southern Canada and the northern United States while the *idahoensis* type is the form occurring throughout most of Montana, Idaho, Wyoming, Colorado and Utah. Intergrading areas appear to occur in parts of Utah, Wyoming and Montana. If the foregoing comments represent an accurate view of the geographical variation and distribution of the two forms it will be necessary to assign *A. idahoensis* as a subspecies of *A. spencerii*. It is interesting to note that Theobald (1903) described *idahoensis* as a variety of *spencerii*. Additional material, particularly from areas where intergrades occur, is needed before this problem can be adequately resolved.

*Aedes punctor* (Kirby). This species apparently does not occur in Utah. Specimens reported as *A. punctor* by Rees (1943) have now been assigned to *Aedes hexodontus* Dyar.

*Aedes stimulans* (Walker). This species apparently does not occur in Utah. Speci-

mens reported as *A. stimulans* by Rees (1943) are actually *Aedes increpitus* Dyar.

*Culex stigmatosoma* Dyar. Dyar (1928) reported this species as occurring in Utah although no localities are given. Despite intensive collections throughout the state this species has not been collected again. The authors consider the presence of *Culex stigmatosoma* in Utah to be doubtful.

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