

MOSQUITO STUDIES (Diptera, Culicidae)

XVI. A NEW SPECIES OF TREEHOLE BREEDING AEDES (OCHLEROTATUS) FROM SOUTHERN CALIFORNIA¹

By

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In April 1964 a large number of *Aedes* larvae were taken from a rot hole in a sycamore tree growing near the junction of Santiago and Little Rock creeks, on the north (desert) slope of the San Gabriel Mountains, Los Angeles County, California. Very few of these larvae were reared to adulthood; the majority, most of them younger instars, were killed and preserved. This material was not examined until January 1969, at which time it was discovered that 2 different species were present. One of these was the common Pacific Coast treehole mosquito, *Aedes sierrensis* (Ludlow, 1905), the second appeared to be an undescribed species belonging, as does *sierrensis*, to the *varipalpus* complex of the subgenus *Ochlerotatus*. Additional material collected during February and March 1969 indicated that this second species was distinct from the 2 remaining species of the *varipalpus* complex, *monticola* Belkin & McDonald, 1957 and *varipalpus* (Coquillett, 1902), and that it was widespread in the desert drainages of southern California. This new species, *deserticola*, is described and illustrated in the present paper.

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Aedes (*Ochlerotatus*) *deserticola* Zavortink, n.sp.

Figs. 1,2

TYPES: *Holotype* ♂ with associated larval and pupal skins (UCLA 516-32), junction of Santiago and Little Rock creeks, about 5 air mi southwest of Littlerock, San Gabriel Mountains, Los Angeles County, California, larva from a rot hole in a living cottonwood tree, 4 Feb 1969, T.J. Zavortink [USNM]. *Allotype* ♀ with associated larval and pupal skins (UCLA 516-33), same data

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as holotype [USNM]. *Paratypes*: 2 lp♂ (516-10,34), 17 lp♀ (516-35-51), 1 lp (516-31), 17 ♂, 40 P, 78 L, same data as holotype (UCLA 516); 5 lp♂ (517-30-34), 18 lp♀ (517-35-39,41-53), 1 lp (517-40), 19 ♂, 17 ♀, 39 P, 125 L, same data as holotype except collected in a sycamore treehole (UCLA 517); 4 lp♂ (522-10-13), 4 lp♀ (522-15-17,19), 11 ♂, 4 ♀, 13 P, 8 L, same data as holotype except collected in a sycamore treehole (UCLA 522); 3 ♂, 5 ♀, 146 L, same data as holotype except collected in a sycamore treehole on 4 Apr 1964 (UCLA 503) [UCLA].

FEMALE. Wing: 3.70 mm. Proboscis: 2.14 mm. Forefemur: 1.82 mm. Abdomen: about 2.9 mm. Very similar to *sierrensis* and other members of group, differing primarily in the following. *Head*: Proboscis entirely dark scaled or with a small patch of light scales at base on ventral surface. *Thorax*: Mesonotum with broad median stripe of pale golden scales; at least some of the light scales immediately laterad of posterior dorsocentral and lateral prescutellar bristles yellowish. Pleural scale patches relatively small and pleural bristles relatively few; *ssp* and lower *mep* bristles absent; postcoxal area and metameron without scales. *Legs*: Hindtarsal segment 4 entirely dark scaled or with a few white scales at ends.

MALE. Similar to female except for usual sexual differences. *Labium*: Basal half light scaled on at least ventral surface. *Palpus*: Without a patch of light scales over the joint between segments 2 and 3.

MALE GENITALIA (fig. 1). As figured; very similar to *monticola* and *varipalpus*. *Segment IX*: Tergite lobe usually with 4-6 (2-7) strong bristles. *Sidepiece*: Basal tergomal lobe with 1 strongly differentiated seta and 1-3 long slender bristles; tergomal margin without hairs. *Claspette*: Connection between claspettes declivous mesally. *Clasper*: Strongly curved apically. *Spiniform*: Relatively long.

PUPA (fig. 1). Abdomen: 3.12 mm. Trumpet: 0.62 mm. Paddle: 0.79 mm. Position, length, degree of development and modal number of branches of all hairs as figured. Very similar to other members of group, distinguished on the basis of the following characters. *Cephalothorax*: Integument more or less uniformly light yellowish in color. *Trumpet*: Bright yellowish brown in color. *Abdomen*: Integument more or less uniformly light yellowish in color; hair I-II-VII subequal in development, usually double (1-4b) on segment II, usually single (single, double) on segments III-VII; 5-IV-VI usually relatively long and exceeding 9-VII in length. *Paddle*: Integument uniformly light yellowish except for darker midrib; basal portion of external buttress often straight or slightly concave.

FOURTH INSTAR LARVA (fig. 2). Head: 0.81 mm. Siphon: 0.69 mm. Anal Saddle: 0.20 mm. Position, length, degree of development and modal number of branches of all hairs as figured. Similar to other species in the complex, especially *monticola* and *varipalpus*, but distinguished as follows. *Head*: Integument light yellowish brown in color with ocular area lighter and posterior portion darker; sculpturing indistinct. *Antenna*: Uniformly light yellowish brown. *Thorax*: Epidermis and fat body without pigment, living larva white; integument without spicules. *Abdomen*: Pigmentation and spiculation as for thorax; hair 7-I,II usually weakly developed, similar to hair 10 of corresponding segment; 1,13-III-V usually double, with outer branch much longer and stronger than inner and usually longer than siphon. *Segment VIII*: Comb scales usually brown and 7-12 (5-15) in number, arranged in a single regular or irregular row; hairs 1,3 frequently single. *Siphon*: Index usually 2.2-2.4 (2.1-2.6); pigmentation uniformly brown; sculpturing indistinct; slightly inflated, usually broadest near level of hair 1-S; pecten teeth usually 7-11 (4-13); hair 1-S usually located 0.25-0.33 (0.23-0.36) distance from base of siphon. *Anal Segment*: Saddle small, brown, with sculpturing indistinct except apically; hair 1-X usually single (single, double); gills sausage-shaped, dorsal and ventral subequal in development and usually 4.0-5.0 (3.8-5.5) length of saddle.

SYSTEMATICS. As now interpreted, the *varipalpus* complex of *Aedes* (*Ochlerotatus*) contains 4 species. Three of these, *deserticola*, *monticola* and *varipalpus*, are relict species with relatively limited allopatric distributions in the interior portions of the southwestern United States and in Baja California. The remaining species, *sierrensis*, is very widely distributed in Pacific Coast drainage systems from British Columbia to southern California and, in addition, is found along the desert margins in western Nevada, northern Utah and southern California. While its distribution is basically complementary to the other 3 species, it does occur with *deserticola* along the desert edges in southern California.

All species in the *varipalpus* complex are very similar morphologically and are separated by relatively few characters in each stage. These diagnostic features are to be found in the provisional keys to the complex given below.

BIONOMICS. Nothing is known of the habits of the adults of *Ae. deserticola*. The larvae, like those of the other 3 species of the *varipalpus* complex, occur in treeholes. On the northern side of the San Gabriel Mountains *deserticola* has been collected in large rot holes in sycamores (*Platanus racemosa*) and a cottonwood (*Populus fremontii*) growing in riverine situations. *Ae. sierrensis* occurred in the same holes and *Orthopodomyia signifera* (Coquillett, 1896) was present at one of the localities. In Banner Canyon *deserticola* has been recovered from large rot cavities in Engelmann oaks (*Quercus engelmannii*). *Ae. sierrensis* was taken from the same holes and *O. signifera* was present at the site. On the eastern side of the San Bernardino Mountains and in the Little San Bernardino Mountains *deserticola* has been collected from small rot holes in scrub oaks (*Quercus turbinella*) growing in pinyon-juniper woodland. *Ae. sierrensis* and *O. signifera* were not found at these localities. The rot holes in the limbs of these scrub oaks were remarkably small, most of them having an opening less than 1 cm in diameter and holding less than 20 ml of water. In 2 instances larvae of *deserticola* were removed from rot holes which had formed in a living limb beneath the base of a still-attached but dead and dried branch. In both cases the only access to the cavity containing water was through the oval gallery of a wood-boring beetle larva which had exited near the base of the dead branch.

When larvae of *sierrensis* and *deserticola* are reared in the same container, the development of *deserticola* is much slower than that of *sierrensis*. It is not known if this is due to *deserticola* having an intrinsically slower rate of growth or due to its being competitively inferior to *sierrensis*.

DISTRIBUTION. *Ae. deserticola* has been collected in the western portions of both the Mojave and Colorado deserts, on the interior slopes of the Transverse and Peninsular ranges and in the Little San Bernardino Mountains. During this study the material cited below, all of which is in the UCLA collection, has been seen. Material examined: 1321 specimens; 154 ♂, 128 ♀, 311 pupae, 728 larvae; 148 individual rearings (138 larval, 10 incomplete).

CALIFORNIA. *Los Angeles Co.*: Littlerock (5 mi SW), type series, see above. Pearblossom (6.5 mi SE), 12 Mar 1969, T.J. Zavortink and D.W. Heinemann (UCLA 530), 1 lp♂ (530-12), 4 lp♀ (530-10,11,14,15), 1 ♂, 1 ♀, 2 P, 1 L. Pearblossom (8 mi SE), 4 Feb 1969, T.J. Zavortink (UCLA 518), 2 lp♂ (518-21,25), 3 lp♀ (518-28-30), 8 L. *Riverside Co.*: Joshua Tree (11-12 mi SSE), 17 Mar 1969, T.J. Zavortink and D.W. Heinemann (UCLA 539), 18 lp♂ (539-10-27), 5 lp♀ (539-28-32), 17 ♂, 12 ♀, 33 P, 138 L; same data (UCLA 545), 4 lp♂ (545-10,11,16,17), 3 lp♀ (545-14,18,19), 3 lp (545-12,13,15), 2 ♂, 4 ♀, 6 P, 4 L; same data (UCLA 546), 2 lp♂ (546-10,12), 1 lp♀ (546-14), 3 lp (546-11,13,15). *San Bernardino Co.*: Yucca Valley (6.5 mi NW), 18 Mar 1969, T.J. Zavortink and D.W. Heinemann (UCLA 544), 3 lp♂ (544-10,11,13), 2 lp♀ (544-14,15), 1 lp (544-12); same data (UCLA 548), 1 lp♂ (548-13), 4 lp♀ (548-10-12,14). Yucca Valley (9 mi NW), 18 Mar 1969, T.J. Zavortink and D.W. Heinemann (UCLA 547), 1 L. *San Diego Co.*: Julian (3-4 mi

E), 12 Feb 1969, T.J. Zavortink and J.A. Bergland (UCLA 527), 13 lp♂ (527-23-25,27-32,34,37-39), 15 lp♀ (527-22,26,33,35,36,40-49), 26 ♂, 5 ♀, 30 P, 71 L; same data (UCLA 528), 2 lp♂ (528-20,21), 3 lp♀ (528-22,24,25), 1 lp (528-23).

KEYS TO THE VARIPALPUS COMPLEX

ADULTS

1. Subspiracular area with several light bristles **varipalpus**
Subspiracular area without bristles 2
- 2(1). Postcoxal area with scales **monticola**
Postcoxal area without scales 3
- 3(2). Base of hindtarsal segment 4 usually with a distinct white ring; metameron usually with a small patch of scales; male proboscis with light scales restricted to patch or ring near middle **sierrensis**
Base of hindtarsal segment 4 usually dark or with only a few white scales dorsally; metameron without scales; male proboscis with light scales in long streak on at least ventral surface in basal half **deserticola**

MALE GENITALIA

1. Basal tergomesal lobe of sidepiece with a dense patch of strongly developed, apically curved setae; tergomesal margin of sidepiece with numerous short, strong hairs; clasper not strongly curved apically, its spiniform relatively short; connection between claspettes nearly horizontal but with a deep median emargination **sierrensis**
Basal tergomesal lobe of sidepiece with a single strongly differentiated seta; tergomesal margin of sidepiece without hairs; clasper strongly curved apically, its spiniform relatively long; connection between claspettes declivous mesally 2
- 2(1). Basal tergomesal lobe of sidepiece with numerous long slender bristles in addition to 1 strongly differentiated seta **varipalpus**
Basal tergomesal lobe of sidepiece with 1-3 long slender bristles in addition to 1 strongly differentiated seta 3
- 3(2). Tergite IX usually with 4-6 (2-7) bristles on each lobe **deserticola**
Tergite IX usually with 6-8 (5-10) bristles on each lobe **monticola**

PUPAE

1. Hair 1-IV relatively well developed, larger than 1-III or 1-V **varipalpus**
Hair 1-IV more weakly developed, usually not longer than 1-III or 1-V 2
- 2(1). Integument of dorsal portion of cephalothorax, metanotum and abdominal segments 1-III,IV or V of all but depauperate specimens well pigmented, tan to brown **sierrensis**

- Integument uniformly lightly pigmented, yellow 3
- 3(2). Hair 5-VI usually subequal in length to hair 9-VII **monticola**
 Hair 5-VI usually distinctly longer than hair 9-VII **deserticola**

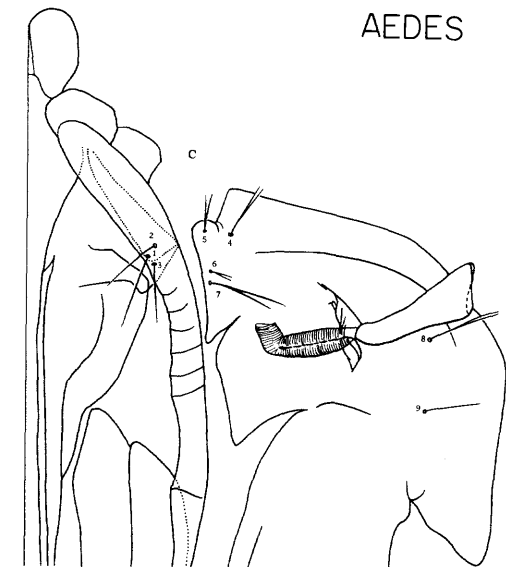
LARVAE

1. Body, especially dorsally and/or caudally, almost always pigmented, grey in color; hair 1-IV,V usually shorter and frequently with more numerous branches than hair 13 of the corresponding segment and usually shorter than or subequal to hair 1-S; comb scales relatively numerous, usually 16-24 (13-36), and arranged in 2 or 3 irregular rows or a small patch; pecten teeth relatively numerous, usually 10-15 (7-17); siphon usually relatively long, not noticeably inflated and not sharply reduced in diameter apically **sierrensis**
 Body usually unpigmented, white in color; hair 1-IV,V as above or subequal in length to and with the same number of branches as hair 13 of the corresponding segment and longer than hair 1-S; comb scales few to numerous (5-23) and arranged in 1-3 rows or a small patch; pecten teeth few to numerous (4-18); siphon often relatively short, frequently noticeable inflated and/or sharply reduced in diameter apically 2
- 2(1). Hairs 1,13-IV,V frequently subequal in length, usually double with 1 branch much longer than the other and as long as the siphon; pecten teeth relatively few, usually 7-11 (4-13); hair 1-X usually single, comb scales relatively few, usually 7-12 (5-15), and usually arranged in a single regular or irregular row; hairs 1,3-VIII frequently single **deserticola**
 Hair 1-IV,V shorter and with more numerous branches than hair 13 of the corresponding segment, or if subequal in length to hair 13 and double, then both hairs 1 and 13 shorter than siphon and usually without 1 branch much elongate; pecten teeth relatively numerous, usually 10-17 (8-18); hair 1-X usually double; comb scales few to numerous, usually 9-19 (7-23), and arranged in 1 to 3 rows or a small patch; hairs 1,3-VIII branched 3
- 3(2). Hair 1-IV,V usually with the same number of branches as and frequently subequal in length to hair 13 of the corresponding segment and longer than hair 1-S; comb scales relatively numerous, usually 12-19 (7-23), and usually arranged in 2 or 3 irregular rows or a small patch. **monticola**
 Hair 1-IV,V usually much shorter than and with more numerous branches than hair 13 of the corresponding segment and usually shorter than hair 1-S; comb scales relatively few, usually 9-14 (7-20), and usually arranged in 1 or 2 irregular rows **varipalpus**

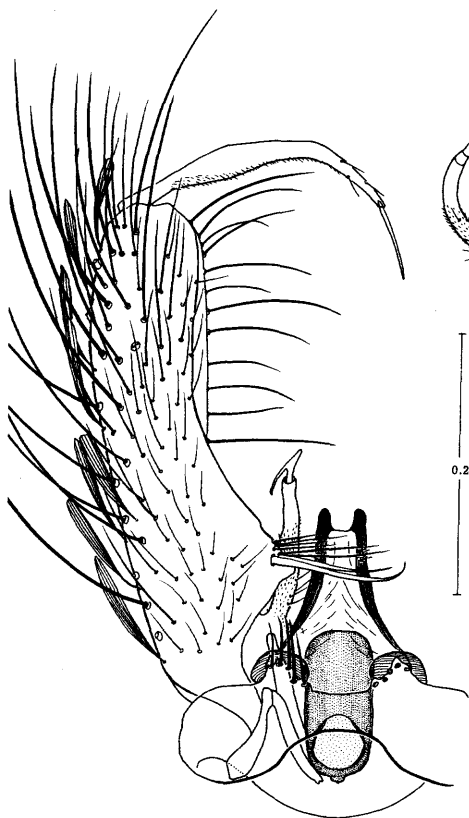
FIGURES

1. *Aedes (Ochlerotatus) deserticola*; male genitalia and pupa.
 2. *Aedes (Ochlerotatus) deserticola*; larva.

AEDES



1.0

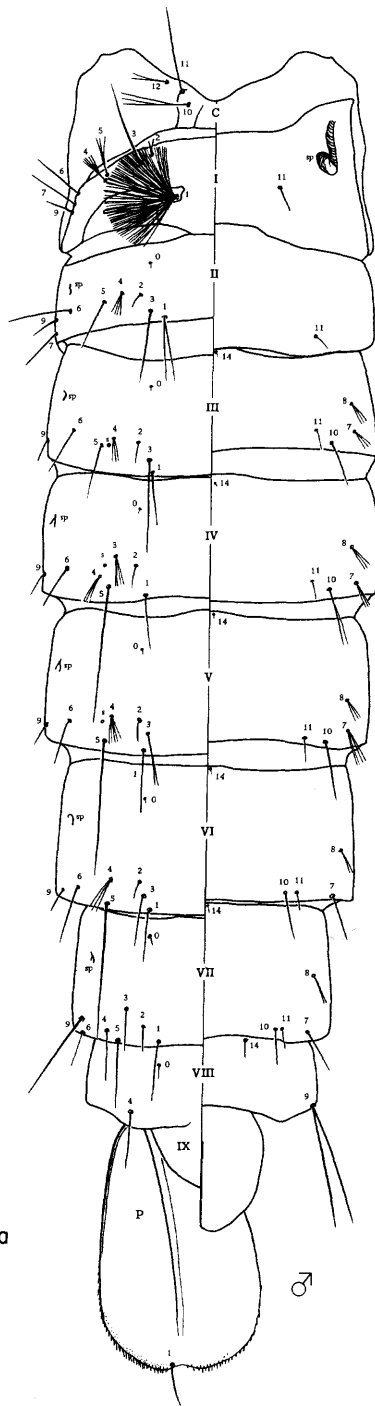


0.2

Fig. I

deserticola

UCLA 516
California
United States



♂

AEDES

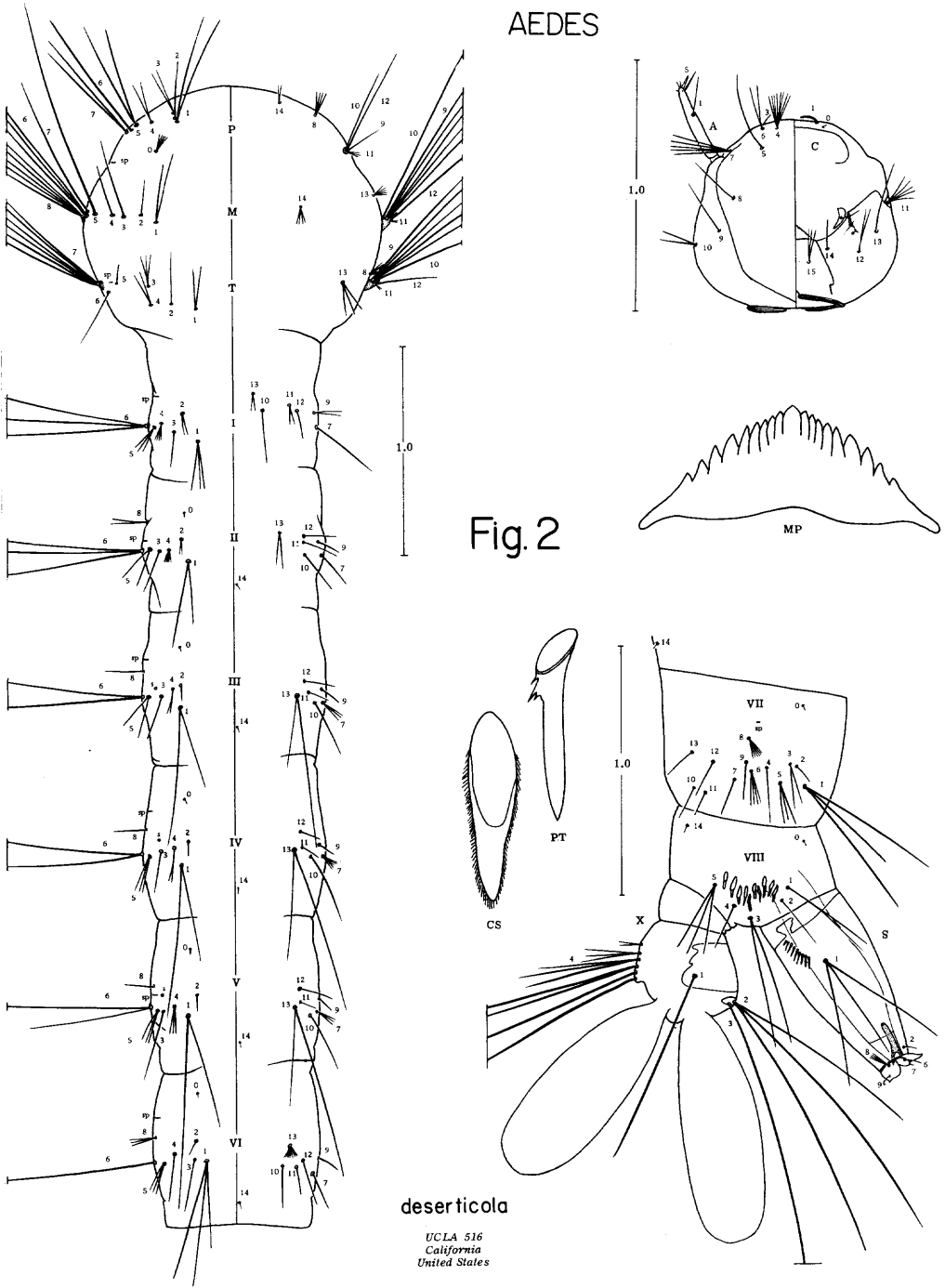


Fig. 2

deserticola

UCLA 516
California
United States