

A NEW SPECIES OF ORTHOPODOMYIA, *O. ALBA* SP. N.
(DIPTERA, CULICIDAE).¹

By F. C. BAKER.

While making fortnightly observations on the fauna of thirty-three water-containing treeholes during the summer of 1934, the writer found strange culicine larvae breeding in two small rot-holes that had southern exposures in elm and maple trees. These larvae belong to the genus *Orthopodomyia*. However, they present certain aberrations as the larval description will show. During the summer and fall these larvae can be obtained in mixed culture along with our common *Orthopodomyia*, *O. signifera* Coq., and other treehole culicids. The two kinds of *Orthopodomyia* larvae can be separated with the unaided eye at a glance. No intergrading forms have been found.

For more than a year the morphology and biology of this new form of *Orthopodomyia* has been carefully studied both observationally and experimentally. Finally the writer was convinced that he was dealing with a new species.

FEMALE.

Body length 5 mm.; wing 4 mm. General color (of fresh unfaded specimens) black with whitish markings.

Head mostly black. A white line surrounds the eye. Two white lines border the dorsal groove of the proboscis. Torus, palpus, and the basal portion of the antenna each bear a dorsal white line. Palpus tipped with white. Occiput and nape clothed with numerous, long, narrow, cleft, erect black scales with a few, small, white curled scales on nape. A row of bristles overhang the eye.

Thorax black with delicate, graceful, longitudinal white lines. Pronotum wide; crossed by upper pleural white line; two or three bristles in posterior pronotal tuft; prothoracic lobe and proepisternum each with several bristles. Mesonotum with six distinct white striae between which lie tiny black scales anteriorly and bare black integument posteriorly; two submarginal lines reach the whole length of the mesonotum with only a slight break at the transverse ridge. The pair of subdorsal striae extend in an almost parallel course from the anterior border of the naked antescutellar disc to the anterior edge of the mesonotum. Two intermediate lines run from the places where the transverse ridges fade-out, posteriorly through the antescutellar space and out over the scutellum. The mesonotum is sparsely over-laid with erect, posteriorly curved

¹From the Department of Entomology; Cornell University.

black bristles. The scutellum bears two lateral tufts and two medio-lateral pairs of bristles. These scutellar bristles hang over the nude metanotum. The medio-lateral pairs mingle with the white scales on the posterior ends of the intermediate striae. Each pleurum possesses two or three irregular white lines. Each coxa has a short, vertical white line and a parallel row of erect setae. Bristles are found in the setal groups of the pleura. Wing gray with white mottlings; veins of the costal region covered with somewhat translucent black and white scales in equal proportions; those of the rest of the wing are almost completely dark scaled, except the pure white patches along the base of R (1st vein), the central third of R_{4+5} (3d vein), the area about the $m-cu$ (posterior) cross-vein, and the basal half of $2d A$ (6th vein). Haltere with minute whitish scales clustered around the pit in the knob. Legs whitish basally, mottled distally. Trochanters and the proximal ends of the femora are silvery scaled. The whitish scales become more and more interspersed with dark scales as the distal ends of the femora are approached. Front tibia black, outwardly marked by two vertical white lines; middle and hind tibiae black, flecked with white scales and bearing a distal white band. Tarsus of the fore leg black; first segments of the tarsi on the middle and hind legs black with white bands at both ends; rest of middle tarsus black; second segment of hind tarsus black with broad, white basal and apical bands; third segment with a broad, basal white band and an apical white spot; fourth segment spotted with white at both ends; fifth hind tarsal segment solid white dorsally, black ventrally.

Abdomen deep purplish black dorsally. The segments with white basal bands arranged as follows: first segment has only a triangular cape of white scales surrounded by many yellowish erect setae which originate from an otherwise bare light-yellow cuticula; second, almost completely white scaled with small, triangular, lateral black spots; remaining segments with distinct, narrow, basal white bands. The sternites of the venter are diffusely marked with wide basal bands.

MALE.

Body length 4 mm.; wing 3 mm. Palpus about as long as proboscis. Its dorsal white line extends out to the distal segment which is white spotted basally and white tipped. The plumose antenna has no white line on it.

(The male is similar to the female in other respects, with the exception of the genital segments.)

Genitalia. The side-piece is longer than wide, conical; clothed with long setae, crescentic waves of very tiny spines, a few scales outwardly, and two or three stout spines just distad to the basal lobe on the side-piece; basal lobe rudimentary, bearing a row of three or four large setae and a group of smaller ones; apical lobe absent; clasper inserted terminally, unevenly tapered, slightly incurved, sparsely setiferous, and beset distally with a frayed terminal claw. The tenth sternite is prominent, each half terminating in a heavily sclerotized lobe bearing three stout teeth. The mesosome is narrowly open along the venter, closed on the dorsum, and each side of its tip bears two or three lateral teeth. Parameres and basal plates are well developed.

(Extensive studies of this genitalia show it to be very similar to the hypopygium of *O. signifera*.)

PUPA.

Pupal case is only slightly pigmented.

Respiratory trumpet (viewed laterally) (Pl. I, fig. 4) has the general shape of an isosceles triangle with the long side of the tube forming the base of the triangle. The angles are rounded, especially the one at the apex where the dorsal open side joins the short side of the tube. At its ventral end the tube curves gracefully toward its long side.

FOURTH INSTAR LARVA.

(Pl. I, figs. 1-3, 6-10.)

The mature larva is about 8 mm. long by 1.5 mm. wide (across the thorax). The thorax is roughly $1\frac{1}{2}$ times as wide as the head and twice as wide as the anterior part of the abdomen. Pinkish hypodermal pigments are entirely wanting.

Head is light tan in color with reddish brown mouth brushes; capsule practically round, though dense anterior hair tufts give it a superficial ovate appearance. The double eye is medianly located on the lateral margin. The anterior clypeal border bears a pair of single, ventrally curved, stout clypeal spines surrounding the palatum which bears downward projecting bristles. Antennal hair tuft fairly long (6-9 hairs); postclypeal tuft relatively short (4-7 hairs); lower head tuft long (5-7 hairs); upper head tuft long (5-7 hairs); sutural hair long (single); trans-sutural tuft shorter (4-6 hairs); ocular hair long; sub-antennal tuft short (6-9 hairs). The ventral side of the head has a pair of tufts and three pairs of minute hairs. The sub-basal tuft is large and composed of 6-8 feathered hairs radiating in a single plane. Their tips are often curved inward so that the tuft resembles a bamboo lawn rake. The infra-ocular hair is often frayed, giving the appearance of a tiny tuft. The antenna is unevenly tapered; antennal tuft (3-4 hairs) attached on the dorsal surface before the middle in the region of the abrupt reduction in diameter, and about half as long as the shaft; tip beset with setae and papillae. The mandible has two chitinous teeth; one dagger-like, the other more triangular. The maxillary palp has five sensory cones on the apex. There are fifteen to nineteen teeth on the labial plate.

Thorax a little wider than long. Two pairs of primary tufts are on the lateral margin of each segment (7-8 hairs each). Three pairs of single hairs and four pairs of tufts arise along the anterior margin of the prothorax and more or less overhang the occipital region of the head (1-8 hairs each). Six pairs of medium length single hairs have their origins in a curved line extending across the dorsal surface of the mesothorax. Occasionally the innermost pair is modified into two-haired tufts. Three pairs of single hairs and a pair of tufts (2-3 hairs each) take origin along the dorso-posterior region of the metathorax. Ventrally the thorax is relatively nude, except a pair of very minute tufts that are near the center of the mesothorax (2-3 hairs each); a medium length tuft (3-6 hairs) on either side of the mid-line and about half way removed toward the sides of the metathorax.

Abdomen has long lateral hairs on the first six segments. The first two segments bear lateral tufts (3 hairs each); single lateral hairs on the following four.

The dorso-lateral groups are two-haired on the first abdominal segment and single on the remainder. The dorso-lateral hairs are especially long on the third, fourth, fifth, and sixth segments. Anti-siphonal dorsal plates are wanting completely.

On the ventral side the ventro-lateral tufts produce hairs about a segment in length on the third, fourth, and fifth segments (2-3 hairs each). Two rather conspicuous, short fan-like tufts (3-6 hairs each) are on the ventral side of the sixth segment. The segments of the abdomen have many minor setal groups. The comb (Fig. 10) of the eighth segment has two rows of teeth. The anterior row has ten to twelve teeth which alternate with and extend below the posterior row. The latter contains eight to nine longer teeth. One short tooth is located dorsally and in a position that is intermediate between the two rows. The siphon is a blocky dark-colored tube, slightly and evenly tapered toward its distal end. A pair of siphonal hair tufts (3-4 hairs each) are attached at about one-third of the distance from the base to the apex. The ninth segment is not ringed by the dorsal plate. Dorsal brush consists of a multiple tuft (9-12 hairs) and a long bristle on each side. A short lateral tuft is present (2 hairs); its position variable, sometimes on the posterior edge of the dorsal plate and sometimes on the hyaline integument behind it. There are five to seven pairs of tufts in the ventral brush (about 7 hairs in each tuft). The anal gills are bud-like, the dorsal pair somewhat the larger.

These data and drawings (Plate I) are based upon the studies of eight carefully mounted mature larvae, fourteen fourth stage skins and pupal cases from which adults have been reared.

In addition to the above listed morphological differences between the various forms of *O. signifera* and *O. alba* there also appears to be a physiological difference.

On the first of December, 1934, fourth stage larvae of *O. alba* were seen in Cayuga Heights Elm. Shortly thereafter the water in this habitat appeared to be frozen solid. It remained almost continually in this state until spring. On March 25, 1935, fourth stage larvae of this new species were found in an active condition. Although the writer has observed hundreds of *O. signifera* larvae in various stages go into the winter, he has found them all dead after the first freeze that completely congealed the water of their habitats.

In November, 1935, two hundred cubic centimeters of tree-hole water was secured from Coy Glenlet Maple. The liquid was of a clear straw color. It contained a few third and fourth stage *O. signifera* larvae and several second and third instar *O. alba* larvae. The water with its natural fauna was frozen solid and held for a week at -5 C in a refrigerator. Then it was allowed to thaw slowly. Examination showed all of the *O. signifera* to be dead and all of the *O. alba* to be still alive.

The adults of the two species appear to be remarkably similar.

The type locality is Ithaca, N. Y.

Reared specimens with their slide-mounted larval skins and pupal cases are distributed as follows:

Holotype and Allotype		U. S. National Museum, #51387
Paratypes	2 Males	U. S. National Museum
	1 Female	U. S. National Museum
	1 Pair	British Museum of Natural History
	3 Pairs	Cornell University Collection

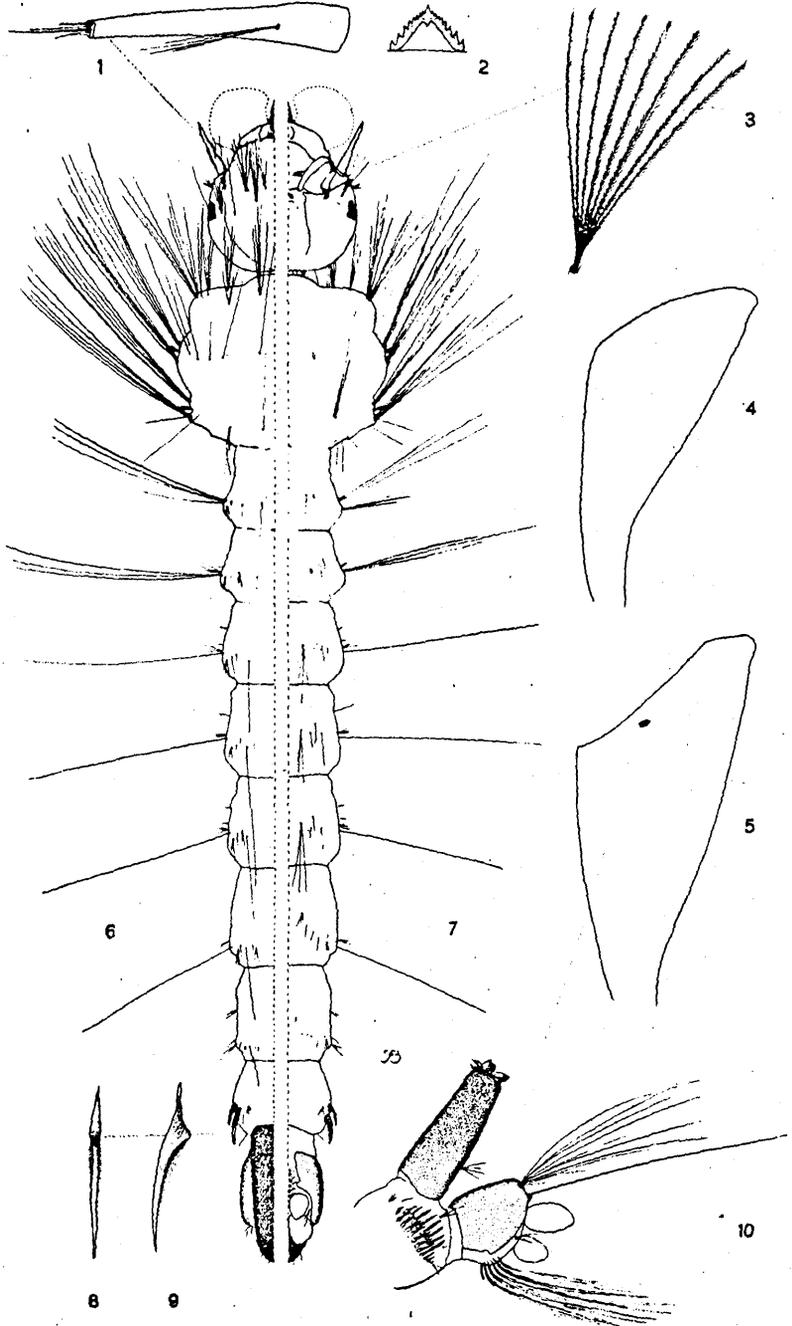
Additional dissected specimens and immature stages in the Cornell University collection.

Dyar (1928) mentions only one species of *Orthopodomyia* from North America, north of Mexico. It is *O. signifera*. The *Orthopodomyias* that are so common in a high percentage of our local treeholes, conform to his description of that species in all stages. However, the larvae of *O. alba* do not conform even to all of the characters listed for the genus by Edwards (1932). They have no pink or purplish pigmentation in any of the larval stages, and the anal segment is not ringed by its dorsal plate. The dorsal plates of the sixth, seventh, and eighth abdominal segments are always absent, and this agrees with two other aberrant species (*O. arboricollis* d'Emm. from Mauritius and *O. flavithorax* Barr. from S. India). The differentiation of all stages of *O. alba* from its nearest relative is summarized in the following table:

Table 1.

DIFFERENTIAL CHARACTERS SEPARATING *O. signifera* AND *O. alba*.

Character	<i>O. signifera</i>	<i>O. alba</i>
FOURTH STAGE LARVA.		
Head capsule	nearly black	light tan
Hypodermal pigments	pinkish	lacking
Dorsal plates	on segments 6-7-8	lacking
Anterior row of comb teeth	17 ± 2	11 ± 2
Siphon	gracefully tapered	blocky
Ventral fusion of anal plate	complete	incomplete
Anal gills	long and tapering	bud-like
General hairy appearance	inconspicuous	conspicuous
Transutural tuft	single	multiple
Sub-antennal tuft	inconspicuous	large and bushy
Sub-basal tuft	inconspicuous	large and modified
Lateral tufts on the first 2 abdominal segments	short and multiple	long and triple
Ventral tuft on 6th segment	6-12 hairs	3-6 hairs
Siphonal tuft	5-7 hairs	3-4 hairs
Sub-siphonal tuft	5-8 hairs	3-5 hairs



	PUPAL CASE.	
General pigmentation	dark	light
Resp. trumpet (lateral view)	angular outline	rounded outline
	ADULT	
Cuticula of 1st abdom. tergite	purplish brown	yellow
Apical black band of 2d abdom. tergite	continuous	broken

EXPLANATION OF PLATE.

1. Antenna. Dorsal view.
 2. Labial plate.
 3. Sub-basal tuft.
 4. Typical form of respiratory trumpets on the pupa of *O. alba*. Lateral view.
 5. Typical form of respiratory trumpets on the pupa of *O. signifera* (for contrast). Lateral view.
 6. Mature fourth stage larva. Dorsal half.
 7. Mature fourth stage larva. Ventral half.
 8. Comb tooth. Lateral view.
 9. Comb tooth. Dorsal view.
 10. Eighth and ninth abdominal segments of larva. Lateral view.
(All figures are of *O. alba* except figure 5.)
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