

DESCRIPTIONS OF SOME MOSQUITO LARVÆ, WITH NOTES
ON THEIR HABITS.

BY JOHN B. SMITH AND JOHN A. GROSSBECK.

The larvæ here described are figured with structural details in a forthcoming report of the New Jersey Experiment Station, on the "Mosquito Investigations"; but as that report will appear later than was expected, it is deemed best to give a few notes with descriptions of heretofore undescribed larvæ in advance. The descriptions were drawn up by Mr. Grossbeck from office material; the notes and comments are by the senior author.

Culex squamiger Coq.

Larvæ of this species were first taken in April, 1903, by Mr. Grossbeck near Paterson, N. J., in woodland pools associated with *Culex canadensis*. They were recognized as distinct from any other that we had met with, but were not bred. May 2nd., of the following year Mr. Van Deursen, another assistant, brought in a lot of what were accepted as full grown *C. canadensis* larvæ, collected in the woods near New Brunswick, N. J. Pupation began May 3rd, and adults commenced to issue May 7. May 9, a male *squamiger* was found with the *canadensis*, and an examination of the breeding jar resulted in the discovery of one *squamiger* larva and its identification with the Paterson form. No other adults hatched from the pupæ. Another collection was made May 16, mostly pupæ of *canadensis*, but amongst them were some very large ones. From this lot 3 ♂ and 2 ♀ *squamiger* emerged May 17; 5 ♂ and 4 ♀ May 18, and 2 ♂, the last of the lot, on May 19. Other collections in the same locality were made at intervals throughout the season; but no more larvæ were found. This indicates a single brood; furthermore, adults were taken up to the middle of July, the late ones being so worn as to be almost unrecognizable.

The larva in general appearance resembles *Culex canadensis*; but is much larger, measuring 12-14 mm., in length, exclusive of the anal siphon. It is dirty gray in color, excepting the head and siphon. The head is almost as broad as long, widest immediately below the eyes, tapering without curve to beyond the base of the antenna, flattened in front, light brown in color, and with four small black spots near the base of the vertex. On the anterior part of the vertex are four apparently single hairs, each arising from separate pits; the pits so placed as to form a square, slightly narrower in front; directly opposite the posterior pair,

at the base of each antenna, is a small tuft of 4 to 5 hairs. The antenna is rather short, curved, uniformly brown in color, the surface sparsely set with short, stout spines and with numerous small spinules scattered on the basal half. The tuft of 4 or 5 hairs is situated at the middle of the shaft and does not reach the tip of the antenna, which has the apex terminated with one long and one short spine, two short bristles and a short articulated peg. The eyes are of moderate size, semi-circular in outline with a small detached portion at the posterior edge. The rotary mouth brushes are thick, with the hairs in the more central part distinctly pectinated. The mentum is triangular in form, about as long as broad and with slightly curved series of from 12 to 14 small teeth on each side of the apex. The mandible is normal, set with small spines at its base. The maxillary palpus is short and very broad, with hairs and spines arranged in patches on the surface and with a comparatively small apical tuft; the basal joint rather large, with small stout spines at its apex.

The thorax is rounded, with rather short hair tufts issuing from slight angles at the sides. The anterior margin also with two short hair tufts.

The abdomen is long, the anterior two segments transversely oblong and with lateral tufts of 4 or 5 hairs; the central and posterior joints lengthened and narrower, with only two hairs to the lateral tuft up to segment 7. The eighth segment has lateral patches of from 28 to 34 scales, without any regular arrangement; the single scale has spines at the apex and along the sides, the apical one largest and longest, the others diminishing in size toward the base. The anal siphon is about four times as long as its width at the base, and has two series of toothed spines, each ranging from 17 to 22 in number. The spines are black, white tipped, with the teeth not quite reaching the middle; a common arrangement is for four teeth to form two pairs. The ninth segment is longer than wide, with a double dorsal tuft and ventral brush, the latter confined to the barred area. The dorsal chitinized saddle does not ring the segment. The tracheal gills are only a little longer than the ninth segment.

Culex niveitarsis Coq.

This species was first met with May 9th, on the Garret Mts., near Paterson. Only a single fully matured larva was taken; it occurred in a rocky pool with larvæ and pupæ of *Culex canadensis* and *sylvestris*, from which it was at once separated by its conspicuous rusty brown color and robust form. May 12, a new species—*niveitarsis* ♂—hatched from one of the pupæ; and it was recognized as theretofore undescribed, and the larva was put in alcohol. May 14, another collection was made, resulting in five specimens of the new species being found,

together with larvæ and pupæ of *canadensis*, *sylvestris* and *Aedes fuscus*. Two of the larvæ were preserved in alcohol and the other three fell prey to some small Dytiscids which had been overlooked in bottom material. From the pupæ one ♀ *C. niveitarsis* emerged May 17. Later collecting in the same pool where they occurred failed to turn out any additional material of this species, and from this it appears that it also is a single brooded, early spring form.

The larva is a very stout, robust wriggler and measures 7–7.5 mm., in length to the end of the ninth segment. In color, it is grayish white, profusely mottled and shaded with brown. The head is about one and one half times as broad as long, and of a yellowish brown color. The posterior part of the vertex is maculated with a dark brown crescent shaped spot and a smaller one each side of it. Six hair tufts of 6 or 8 hairs each arise from the anterior part of the vertex, four in the central part and one at the base of each antenna. The antenna is of moderate length, pale yellowish, becoming brown at the apical third, the surface covered with rather large spines and many smaller ones intermingled; the apex with one long and three shorter spines besides a little joint. The tuft is situated on the shaft considerably below the middle and consists of 8 or 10 hairs. The rotary mouth brushes are deep orange in color, with the hairs of the central part pectinated at their tips. The mentum is triangular in form, twice as broad as high, with nine blunt teeth on each side of the apex. The maxillary palpus is normal, with a large apical tuft, a stout basal joint, and hairs over the surface arranged in rows and patches. The mandible is normal in form, peculiar by its very blunt teeth.

The thorax is rounded with slight lateral angles giving rise to moderate hair tufts; two very small tufts are also on the anterior margin. The dorsal surface is a little depressed and symmetrically blotched with brown. These markings differ as to shape, but always resemble two transverse bands, the anterior one broken in the middle.

The abdominal segments are thick and robust, each with lateral tufts of two hairs each, except the anterior two, which usually have 4 or 5 hairs. The eighth segment has a large patch of small scales on each side, about 45 in each patch, arranged in three or four irregular rows. The individual scale is rather long, broadest in the middle, with a small apical spine, and lateral ones becoming very small basally. The anal siphon is yellowish brown, about three and one half times as long as broad, with the lateral rows of spines extending half the length of the siphon from the base; the single spines broad at the base with one large tooth, or with one or two smaller ones beside the large tooth. The ninth segment is almost square, largely covered by the chitinized saddle; the double dorsal tuft and ventral brush moderate, the latter with two small tufts below the

barred area. The anal gills are one and one half times as long as the ninth segment.

Culex siphonalis Grossbeck.

Four specimens of the larvæ were taken in a swampy woodland area, near New Brunswick, N. J., April 25, with *Culex canadensis* and *Corethra cinctipes*. They were recognized as new to us by the unusually long and tapering anal siphon, and were put in a separate jar to breed; they did not do well in confinement and May 7, two died, so the other two were put in alcohol. April 27, twenty specimens, all rather well grown were brought in, and on May 2, as many more. They were comparatively rare, and difficult to secure, seldom rising to the surface and inhabiting only the deep pools.

The larva measures 9-11 mm., in length excluding the anal siphon and is not robust in appearance. The body is light gray or yellowish brown in color, with the thorax somewhat darker. The head is about one and one half times as broad as long, yellowish to light brown, though the vertex is often clouded so as to give the appearance of a dark brown head. The posterior part of the vertex is marked by four spots and a semi-circular blotch, which are often obscured by the clouds. Four tufts of two hairs each are situated on the top of the head in the anterior part and a larger tuft is at the base of each antenna. The antenna is moderately long, somewhat sharply curved, the surface sparingly set with spines, rather thickly at the base, and with three or four regular rows of minute spines from the base toward the apex on the inner side. The tuft is well below the middle and consists of but two or three hairs. In color the antenna is brown, very dark toward the tip, the apex with three spines of different lengths, a very short spine and a small joint. The eyes are large and black and the rotary mouth brushes are pectinated in the central hairs. The mentum has slightly curved edges of 11 or 12 teeth on each side of the apical one and becomes very broad at the base. The mandible is normal, with a group of small spines at the base. The maxillary palpus is set with spines and patches of hairs over the surface and has a chunky little joint at its base.

The thorax is as long as broad, only slightly angulated at the sides, the lateral tufts moderately long and, in addition, there are two very small tufts on the anterior margin.

The abdominal segments from 1 to 7 are oblong or sub-quadrate in form, with three or more hairs to the lateral tuft in the first and second segments, two hairs to the tuft in the following segments. The eighth segment has from 24 to 30 scales to each of the lateral patches; the single scales long, with three spines at the apex, the central one very long and very fine ones along the sides.

The anal siphon is pale yellow in color, slightly darker near the tip, very long, being about five times as long as its width at the base and evenly tapered toward the apex. The spines, from 15 to 22 in each row, extend almost to the middle: they vary in size and in the number and length of the teeth; the short ones always toward the base; the apical two separated from the rest and from each other. The siphonal tufts at the end of the rows have but three or four long hairs. The ninth segment is slightly longer than broad with the usual dorsal and ventral tufts, the latter with several small tufts below the barred area. The anal gills are stout and moderate in length without visible tracheæ. The larva differs obviously from that of *cantans* in the antennal structure, in the form and arrangement of the scales on the eighth segment and in the form and armature of the anal siphon.

Culex pretans Grossbeck.

The connection between the larva here described and the adult is not positively made, but there seems little doubt as to the correctness of the association. A mixture of full grown larvæ and pupæ was collected from woodland pools in the Great Piece Meadows, May 10, 1904. The larvæ were put in alcohol and the pupæ left to develop. On May 12, 1 ♂ and 1 ♀ *Culex pretans*, together with specimens of *canadensis* and *sylvestris* emerged from the pupæ. The alcoholic larvæ were examined at once and were found to be *canadensis*, *sylvestris*, *Aedes fuscus* and four larvæ which were new to us, and as we had the larvæ of all other New Jersey species thus far known, excepting *perturbans*, we thought it quite safe to associate them with *pretans*.

The larvæ are from 5.5-6mm. in length to the end of the ninth segment and are pale to dark gray in color. The head is one and one half times as broad as long, yellowish, with a large brown blotch in the anterior part of the vertex, similar to *C. sylvestris*. There are four hair tufts of 4 or 5 hairs each in the center of the vertex and a larger one at the base of each antenna. The antenna is rather short, slightly curved, pale yellow in color, faintly infuscated apically, thickest a short distance from the base and has the surface sparsely set with stout spines and numerous small ones arranged in longitudinal rows. The tuft is situated well below the middle and consists of 8 or 10 hairs which do not reach the apex; the apex with one long spine, several smaller ones and a small joint. The rotary mouth brushes are dense, with the hairs of the central part pectinated. The mentum is triangular in form, with 15 to 17 small teeth on each side of the apex. The mandible and maxillary palpus are normal, the latter with a moderate apical tuft and stout basal joint.

The thorax is very much broader than long, with angulated sides, each angle

set with acute infuscated tubercles from which issue moderate sized hair tufts and there are two very small tufts near the anterior margin.

The abdominal segments are subequal, each bearing lateral hair tufts of from 2 to 5 hairs each, the larger number on the anterior segments. The lateral patches of scales on the eighth segment are large, having from 25 to 30 scales in each patch. The individual scale is elongated, with a rather small apical spine and smaller ones fringing the sides. The anal siphon is two and one half times, or slightly over, as long as broad, yellowish brown in color, thickest near the base and tapering a little apically. There are from 16 to 20 spines in each of the rows, the single spine with one or two teeth near the base. The ninth segment is almost square, nearly ringed by the chitinized saddle, and with the double dorsal tuft and ventral brush normal and moderate in size, the latter with several small tufts below the barred area. The tracheal gills are slender, about two and one half times the length of the ninth segment and taper to a point.

Culex inconspicuus Grossbeck.

Larvæ of this species were taken with *C. sylvestris* on the Garret Mts., near Paterson, N. J., Sept. 29, 1903. They began to die off in the breeding jar before it was known that we had a new larva to deal with. Then, only *sylvestris* were left alive but remnants in the bottom of the jar were placed in alcohol. In these remnants only the more strongly chitinized parts of the larvæ remained, the anal siphon and the head case. The antennal attachments seem to offer but little resistance to decomposition: only one had retained them and these were in such condition as not to allow a description to be drawn.

From the pupæ in the jar, adult *C. inconspicuus*, emerged as follows: 1 ♂, Oct. 4; 1 ♂ and 1 ♀, Oct. 5; and 1 ♂, Oct. 6.

The larva presents a general resemblance to *C. sylvestris*, but is much smaller. The mandibles and maxillary palpi are also similar to that species, but the sides of the mentum are more rounded and have fewer teeth,—10 or 12 on each side of the apex. The hairs of the rotary mouth brushes are pectinated. The antennæ as well as could be seen were very much like those of *C. sylvestris*. The anal siphon is about three times as long as broad with 16 to 22 spines in each of the lateral rows; the individual spines are rather slender, and with one or two teeth near the middle, but in one larva the spines were stouter and had as many as four teeth on one spine. The lateral patches are large, each with about 40 to 45 scales, the single scale with long slender apical spines and shorter lateral ones. The ninth segment is as broad as long, not quite ringed by the saddle and with the dorsal tuft and ventral brush moderate in size, the latter with small tufts below the barred area. None of the specimens retained the tracheal gills.



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