

SOME NEW *PSYCHODIDAE* *PSYCHODINAE* FROM
THE UNITED STATES [*DIPTERA*]

BY

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Very few species of *Psychodidae* from North America have been described since L. W. QUATE revised the family in 1955. According to him, there are less than 60 nearctic species of *Psychodinae*, but I believe there are possibly many more.

Indeed all the taxonomical groups he named only as subspecies should be considered as real species. Sometimes two Psychodid flies of the same sex show only minute differences of their genital parts and the two populations to which they belong are nevertheless entirely separate, the males of one population being completely unable to breed with the females of the other population; important differences of the male or of the female genitalia always go with a genital segregation.

Besides, very few entomologists studied the *Psychodinae* in North America, and many more species will probably be discovered.

In the mountains of Western and Central Europe and in those of North Africa, larvae of *Psychodinae* are very numerous, especially during the spring, in the sand and mud of river banks, and among decaying leaves in very wet environments; in cushions of moss and liverworts on dripping rocks or in moss covering the stone in waterfalls, they can be so numerous that one handful of plant contains several hundred larvae; the standing crop of these insects is, in certain swift streams, as large as that of the Chironomid larvae. But conditions are different in the mountains of the United States and *Psychodinae* are never very abundant; for instance, I spent a whole week in August in Yosemite national park, looking for moth-flies and for their larvae; all I found was a few *Maruina* imagos; so it is not surprising that we have incomplete knowledge on the nearctic *Psychodinae*.

I recently undertook a revision of the *Psychodinae* of the Palearctic fauna and had to alter the classification, because only the characters of the imagos had been considered and because some of them, which were especially important, had been either under-estimated or overlooked. Our knowledge on the first stages is now better than it used to be and I have tried to find a classification that would fit both for the male imagos and for the larvae. It is nevertheless far from being satisfactory and other changes will have to be made later, when more information is available.

The subfamily *Psychodinae* can be divided into five tribes:

1 — The **Telmatoscopini**. — Containing the most primitive species. Male imago: When the eyes are separate, there is an « interocular suture » between them; it is just a local thickening of the cuticula; the suture is always curved (fig. 6 g) or V-shaped (fig. 6 a). The first ten flagellar segments of the antenna are always shaped like an onion, with a wide node and a slender internode (fig. 1 d and 3 i); the ascoid type is seldom simple and, when it is, there are usually several on each segment of the flagellum (fig. 1 a); the ascoids can have two branches (fig. 3 i and 3 j), three branches (fig. 5 c), or even more (fig. 1 c and 1 d), or can be leaf shaped. The labella of the labium are always thick, rounded, and bear only bristles and hairs. The wing-ratio (ratio between the length of the wing and its maximum width) is inferior to 3, except for a very few species; the radial fork $r_2 r_3$ is always at a distance from the origin of $r_2 + 3$ (fig. 2 b), so that the length of $r_2 + 3$ is not much shorter than that of r_2 ; there are no hairs on the wing membrane for most species, but there are for the *Trichopsychoda* and for a few species of *Threticus* and of *Philosepedon*. Except for some *Telmatoscopus* and some *Philosepedon*, most *Threticus* and all the *Nielsenella*, the aedeagus is symmetrical. Fourth stage larva: Hypostomium usually with only one row of pointed teeth; but, for a few genera, the teeth are blunt or nonexistent and, for some species of *Mormia*, there are several rows of very slender teeth. The body is never very wide and usually has a complete set of broad tergal plates. When the tergal plates are reduced in size and when some of them are nonexistent, there is always a preanal plate, and besides the siphonal plate is short, so that there is no real siphon; that means that the distal cylindrical or cylindroconical part of the plate is lacking or extremely short. There may be suckers on the ventral part of the body (*Neotelmatoscopus*).

2 — The **Brunettiini**. — Male imago: Eyes contiguous or with a straight or V-shaped interocular suture. The first ten flagellar segments of the antenna are usually onion-shaped, but their internode may be very short; never more than two ascoids on each flagellar segment, with one, two or several branches, never leaf-shaped. Labella rounded and with bristles and hairs. Wing ratio always less than 3; radial fork $r_2 r_3$ always close to the origin of $r_2 + 3$, so that $r_2 + 3$ is very short. There are, except for the *Arisemus* and *Neoarisemus* species, either hairs or scales on the wing membrane. Aedeagus either symmetrical or asymmetrical. The larvae of *Brunettia nitida* (BANKS), described by L. W. QUATE, have the same characters as those of certain *Telmatoscopini*.

3 — The **Pericomini**. — Male imago: Eyes seldom contiguous and with a V-shaped interocular suture. The first ten flagellar segments of the antenna are always barrel-shaped; each flagellar segment or most of them have two ascoids of the simple type. The labella are rounded, with bristles and hairs. Wing ratio always less than 3; radial fork always at a distance from the origin of $r_2 + 3$; neither scales nor hairs on the wing membrane. Except for a few genera (*Tonnoiriella*), aedeagus symmetrical. Fourth stage larva: Hypostomium with only one tooth (*Tonnoiriella*), with one row of teeth (*Clytocerus*, *Satchelliella*) or, in most genera, with several rows of strong o

slender teeth. The body is never very wide and always has a complete set of broad tergal plates. There is always a distinct siphon. There are no suckers.

4 — The **Maruinini**. — Male imago: Eyes separate and with a straight interocular suture. The flagellar segments are always barrel-shaped and have a pair of simple ascoids. Labella rounded and with bristles and hairs. Wing ratio always superior to 5; wing membrane without hairs and scales. The aedeagus is very different from those of the other *Psychodinae*, bearing at its end several groups of long spines; it is always symmetrical. Fourth stage larva: Hypostomium without teeth. Body wide and depressed, with a complete or an almost complete set of narrow tergal plates; there are always suckers on its ventral side. There is no distinct siphon.

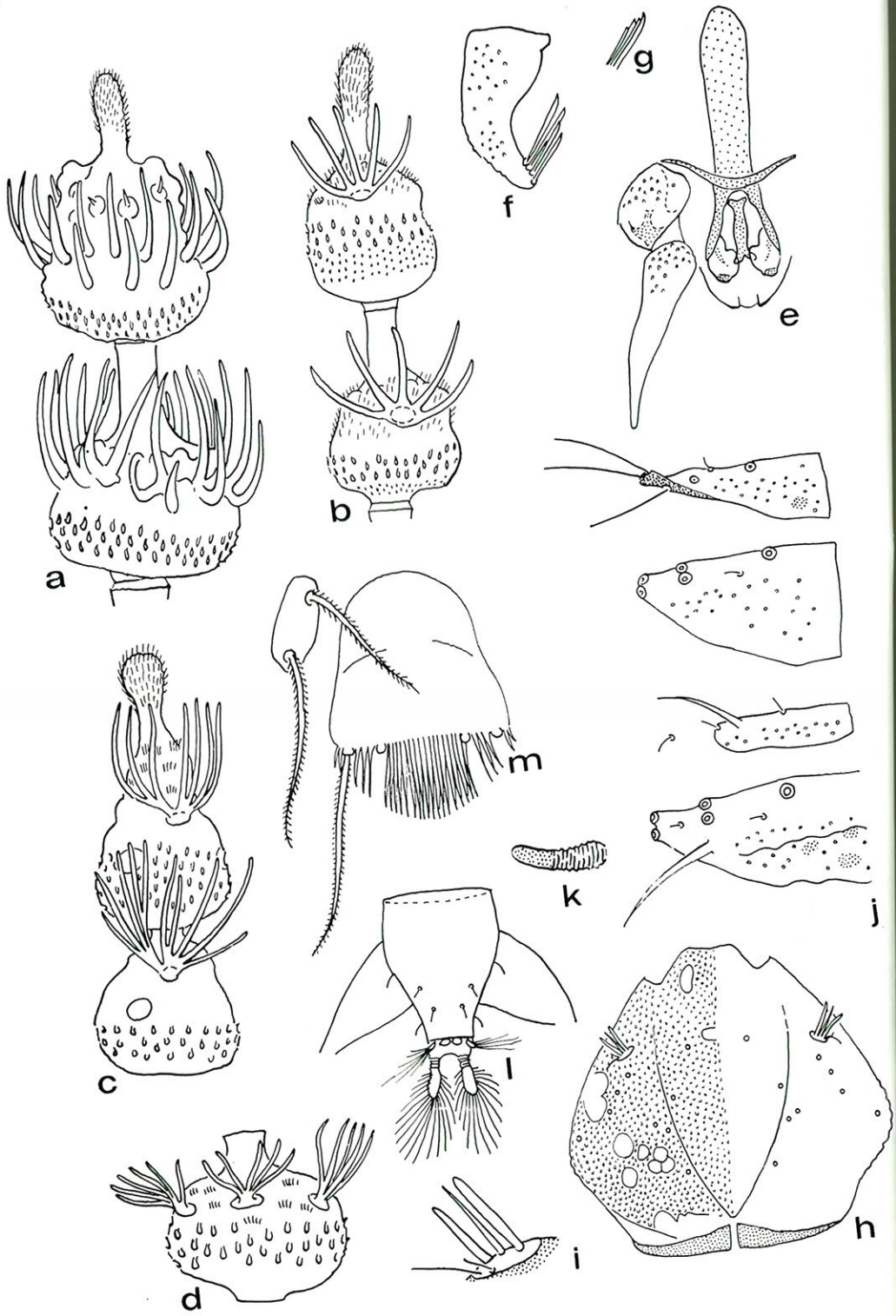
5 — The **Psychodini**. — Male imago: Eyes separate and without any suture between them (fig. 11 a) or with a straight one. The first ten flagellar segments are always onion-shaped, with a long internode; ascoids usually with three branches (fig. 10 a). Labella flattened, with a row of teeth and a few bristles (fig. 11 c). The wing ratio is usually inferior to 3, but can be superior to it for some species of the Southern Hemisphere; wing membrane without scales and hairs. Aedeagus usually very asymmetrical, but only slightly so for a few species. Fourth stage larva: Hypostomium without teeth. Body especially narrow (except for *Copropsychoda*); some or all of the tergal plates are reduced in width, or are even nonexistent. There is no preanal plate. The siphonal plate, always long and slender (fig. 12 e and 12 i), usually tapers progressively in the rear with a long siphon. There are no suckers.

In the present paper, I describe several new species of *Psychodinae*. The specimens were either collected at the imaginal stage, or found when they were larvae; some of these were reared to obtain imagos.

Telmatoscopus vestitus, n. sp.

Two fourth stage larvae were found, on September 7, 1962, in Boulder Canyon (Colorado) at about 2.5 miles from Boulder and at 1 580 m of elevation; they were on a dripping cliff covered with mud and blue algae, in a limimadiculous environment. One of the larvae was immediately killed and is described in this paper; the other one was reared, but the imago died before it was able to get out of its pupal skin; it was a male; unfortunately some characters of the antennae and all those of the wing cannot be given. Before other specimens are found and a more precise description is available, it is difficult to ascertain that *T. vestitus* really belongs to the genus *Telmatoscopus*.

Male imago (fig. 1 c-1 g): Eye bridge with four rows of facets; distance between the eyes equal to 2 facet diameters. Antenna with 16 joints; the scape is 1.4 times longer than wide and 1.5 times longer than the pedicel; flagellar segments with very short internodes and with branched ascoids; there are 6 on each of the first eleven segments, but only 2 on the last three. Last segment of the palpus as long as the third one, but much longer than the second. No scent organs on the back of the head and on the thorax. Geni-



talia: sternal bridge regularly curved and wider in its median part; basistyli short; dististyli tapering progressively towards their tip; cercopodia with 4 tenacula each; spatula of the aedeagus dorso-ventrally depressed.

Last stage larva (fig. 1 h-1 m and 3 a-3 c) — Head wider than long, with its maximum width at the posterior $\frac{2}{3}$ of its length; three of the sense organs of each antenna are remarkably long. Hypostomium with several rows of slender teeth. Back of the body with a heavy coat of clay held by the setae (*). Prothoracic spiracles 3,5 times longer than wide. Tergal plates rather large, with only small tubercles; they all have a complete set of principal setae, except the thoracic mesotergite I, which has 6 pairs of setae, instead of 7, and the thoracic mesotergites II and III, which have each lost a pair of setae inserted on either side of them; the thoracic mesotergites and metatergites II and III and all the abdominal protergites and mesotergites have a pair of accessory setae. The abdominal sternal plates bearing together setae 5 and 6, and those bearing setae 17 and 18, are large. Siphonal plate tapering progressively, with a short siphon; it has a complete set of principal setae, but no accessory ones. Preanal plate with a fringe of long accessory setae. Dorsal flabellar processes short; ventral ones slightly longer than $\frac{1}{4}$ the length of the siphonal plate.

The male imago of *Telmatoscopus vestitus* has all the characters of *Telmatoscopus*, except that there are more than 2 ascoids on several segments of the antennae. The larva of *T. vestitus* shares some characters with those of the palearctic species of *Telmatoscopus*, but has several special features, in particular the length of the antennal sensillae and the shape of the hypostomium. *T. vestitus* probably belongs to a distinct genus, having no representatives in the palearctic zone.

In 1955, L. W. QUATE redescribed two closely related species, *Telmatoscopus furcatus* (KINCAID) and *T. aldrichanus* (DYAR), which both belong to a genus erected in 1971, *Duckhousiella* VAILLANT.

Concerning the first species, L. W. QUATE quotes « sensory organs — of the head — almost always present; lobes small, oval, nearly as long as the scape ». I have examined many specimens of several species of *Panimerus*, *Jungiella* and *Peripsychoda* and am quite certain that the presence, or absence, of corniculi is a perfectly constant character for a species. It is likely that *Duckhousiella furcata* comprises at least two species, one with corniculi, the other without.

(*) The name given to the species is due to this character.

FIG. 1 a and 1 b, *Duckhousiella corniculata*, n. sp. — 1 a, male imago, tip of an antenna. — 1 b, female imago, tip of an antenna.
 FIG. 1 c-1 m, *Telmatoscopus vestitus*, n. sp. — 1 c-1 g, male imago. — 1 c, tip of the antenna. — 1 d, eighth antennal segment. — 1 e, genitalia, dorsal view; the ninth tergite and cercopodia have not been figured. — 1 f, cercopodium, side view. — 1 g, tip of a tenaculum, side view. — 1 h-1 m, fourth stage larva. — 1 h, head, dorsal view. — 1 i, left antenna, dorsal view. — 1 j, tergal plates of the first two thoracic segments. — 1 k, left prothoracic horn, dorsal view. — 1 l, last abdominal segment, dorsal view. — 1 m, preanal plate and right lateroanal plate, ventral view.

As for *Duckhousiella aldrichana*, according to L. W. QUATE's description, it has all the characters of *D. ustulata* (WALKER); this last species has a very wide range in North Africa, in Asia and in Europe up to Sweden, and is found in the Azores, in Madeira and in the Canary Islands; in America, *D. aldrichana* occurs as far north as Alaska. The two species could be synonyms and individuals might have passed from the Nearctic territory to the Palearctic one, or vice versa, in the northern part of the world.

The only other species of the *Duckhousiella ustulata* group, in the Palearctic zone, is *D. cornuta* (NIELSEN), endemic of Madeira Island.

In 1960, L. W. QUATE was convinced that *D. aldrichana* was synonym with *D. furcata*, but I do not agree.

In Knoxville, Tennessee, I found larvae closely resembling those of *T. ustulata* and raised them. The male imago obtained had corniculi and most of the characters given by L. W. QUATE for *D. furcata*. As I could not compare them to the type of this species, I shall consider that they belong to a new species and describe one of them:

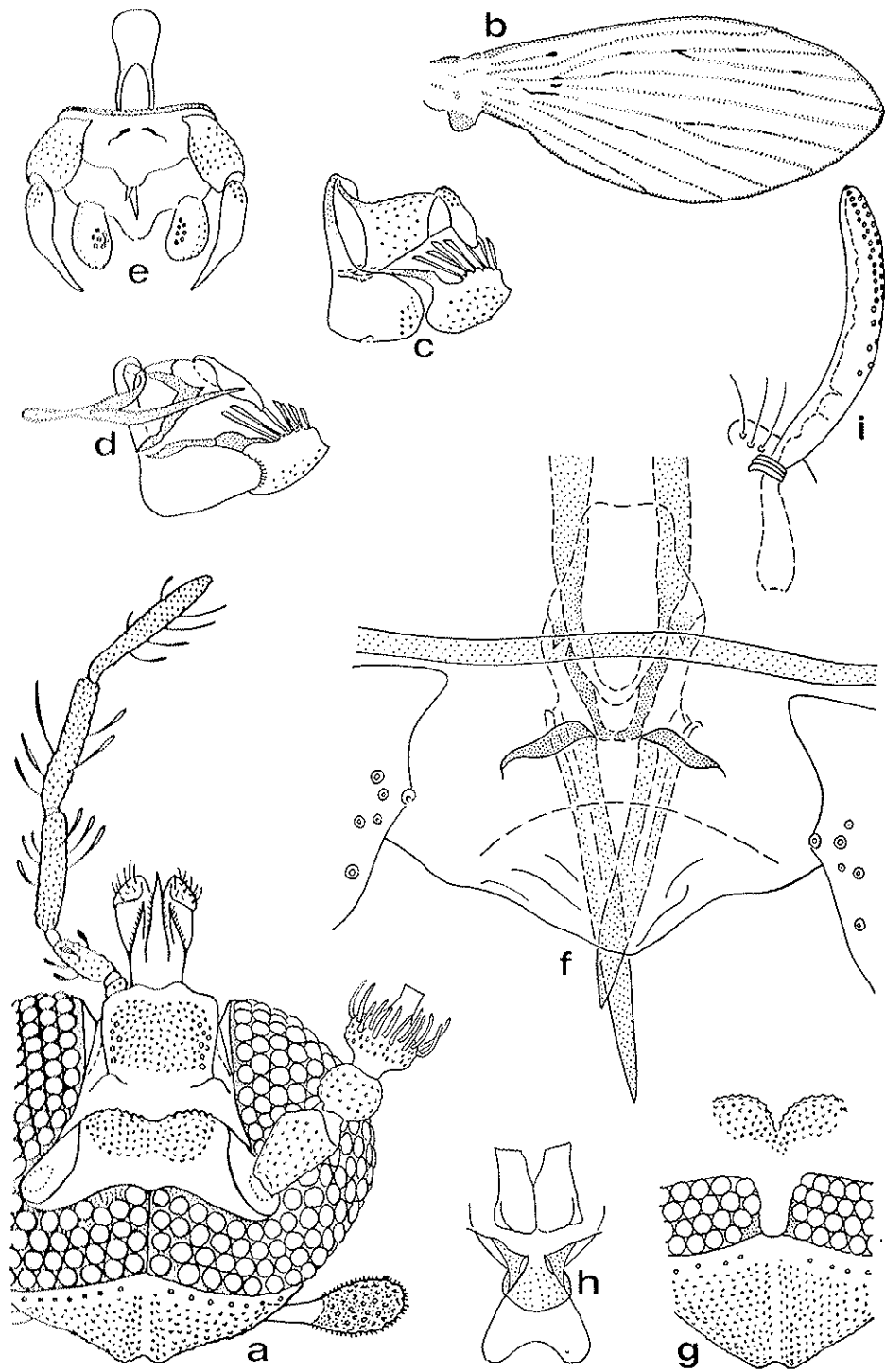
Duckhousiella corniculata, n. sp.

Male imago (fig. 1 a and 2 a-2 f): Eyes contiguous; eye bridge with four rows of facets. Corniculi longer than the scape and the pedicel put together. Flagellar segments of the antennae each with two rows of simple ascoids; length ratio of the segments of an antenna: 30 - 16 - 25 - 28 - 28 - 27 - 26 - 25 - 24 - 22 - 22 - 22 - 22 - 21 - 18 - 25. Length ratio of the segments of a palpus: 17 - 34 - 39 - 45. The wing has several dark places on the veins; wing ratio: 2,46; medial angle: 206°; vein r5 reaches the tip of the wing. Genitalia: sternal bridge slightly curved and not very thick; dististyli about 1,3 times longer than the basistyli and bent; cercopodia with 7 tenacula each; susgenital plate transparent and with two slanting strong thickenings of its cuticula; the spatula of the aedeagus is wide, dorso-ventrally depressed, and is prolonged by two lateral rods, pointed at their ends and of unequal length; the right one appears to be always shorter than the left one; between these rods and the thickenings of the susgenital plate, there is a strong V-shaped chitinous piece I shall call « suspensor of the aedeagus » and the homologous of which I have found in no other fly of the Psychodid family.

Length of the wing: 1,9 mm.

Female imago (fig. 1 b, 2 g and 2 h) : Eye bridge with four rows of facets; distance between the eyes equal to 1,5 facet diameters. No corniculi. Each flagellar segment of the antenna, except the first, has two ascoids

FIG. 2 a-2 i, *Duckhousiella corniculata*, n. sp. — 2 a-2 f, male imago. — 2 a, head, dorsal view; only the base of the first three segments of the right antenna and the left palpus have been figured. — 2 b, wing. — 2 c, genitalia, side view. — 2 d, right half of the genitalia, side view. — 2 e, genitalia, dorsal view. — 2 f, sternal bridge, internal part of each basistylus, susgenital plate and, back of it, the distal part of the aedeagus. — 2 g and 2 h, female imago. — 2 g, part of the head, dorsal view. — 2 h, subgenital plate, dorsal view. — 2 i, pupa, left respiratory horn, side view.



with 5-7 branches; length ratio of the segments of an antenna: 17 - 18 - 19 - 19 - 19 - 19 - 18 - 18 - 17 - 17 - 16 - 15 - 14 - 19. Length of the segments of a palpus: 20 - 37 - 40 - 50. Wing similar to that of the male. Genitalia: Cerci rather short. Subgenital plate with a margin deeper than it is for *D. furcata* and with distal lobes rounded in the male being acute. The genital bag — or case of the genital organs — is shorter than it is for *D. furcata*.

Length of the wing: 2,2 - 2,3 mm.

Pupa (fig. 2 i): It is almost similar to that of *D. ustulata*, the pits of the prothoracic horns are more widely apart than they are in other species.

All the larvae collected by the author were kept alive to obtain material so that no description of them can be given.

Several larvae were found, on July 15, 1969, on the shore of a pond in the northwestern part of Knoxville, Tennessee. Cattle had been grazing in the fields around the pond and the mud was littered with cow dung; the larvae were buried in the wet silt at a few inches from the margin of the pond, along with larvae of *Psychoda alternata* (SAY) (*) and of *Psylla* (BANKS) (*). Imagos emerged during the first days of August 1969.

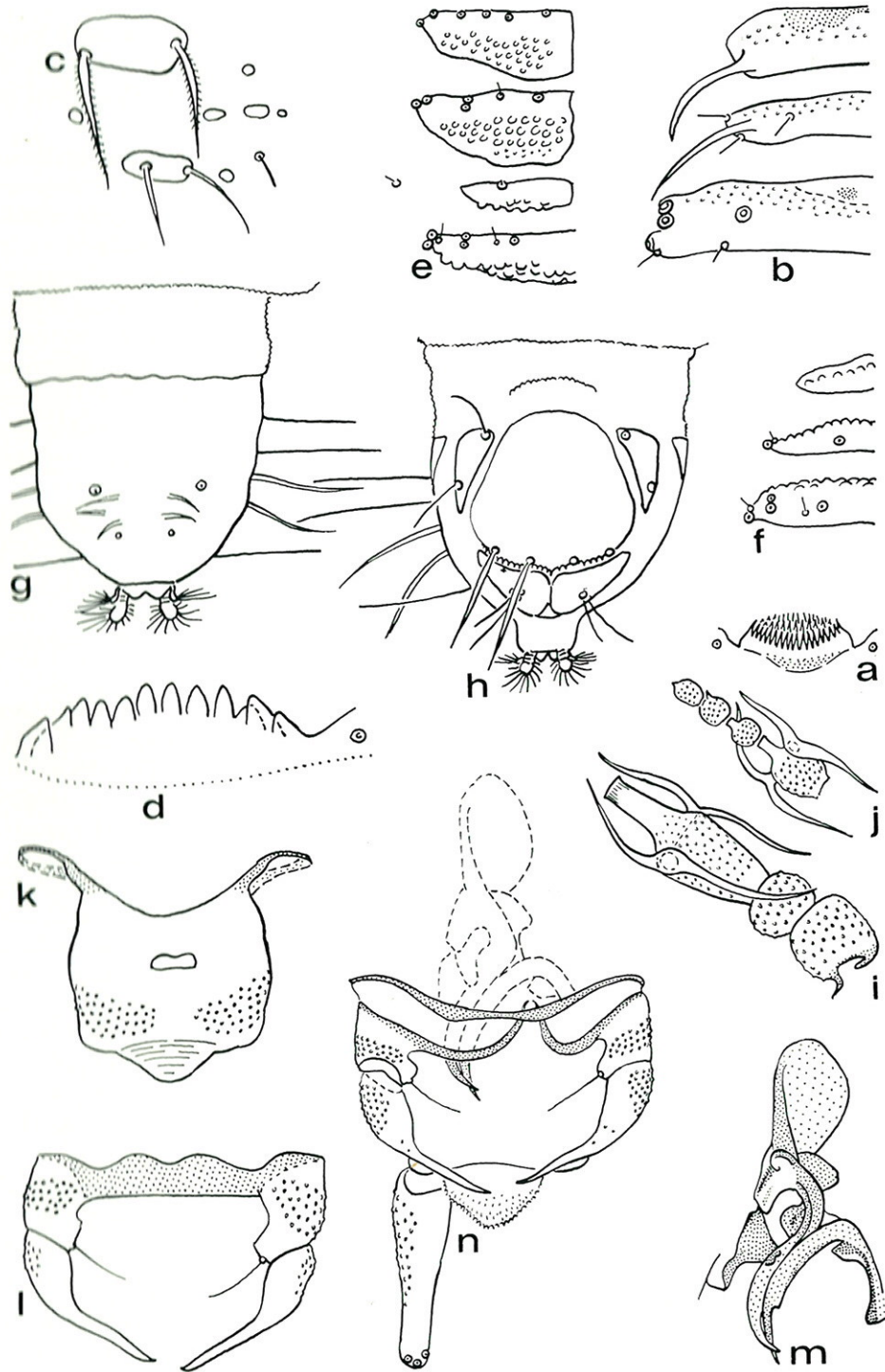
Panimerus lucens ** n. sp.

Last stage larva (fig. 3 d-3 h): Head capsule quite similar to that of *Panimerus* (*Krekiella*) *labeculosus* (EATON), from Europe. The hypostomium has a row of 12-13 strong teeth; the most exterior ones are broader than the others. Prothoracic spiracles 1,5 times more long than wide. The length of the body and the relative size of the different tergal plates is the same as for *P. labeculosus*. The tergal plates have a few big tubercles; those on the abdomen and the metatergites of the thorax have a complete set of principal setae, but the thoracic mesotergite I has six pairs of them, instead of three pairs; and thoracic mesotergites II and III have only one pair of them; on the other side of the thoracic mesotergites II and III, there is one principal seta. The tergal plates have no accessory setae. There are no sternal plates. The hypostomium is about as long as wide, with a very short siphon, a complete set of principal setae, 2-3 pairs of dorsal and 2 pairs of lateral accessory

(*) Male imagos were obtained by raising some of these larvae.

(**) The name is given due to the black shiny aspect of the larva.

- FIG. 3 a-3 c, *Telmatoscopus vestitus*, n. sp., fourth stage larva. — 3 a, hypostomium, ventral view. — 3 b, tergal plates of abdominal segment IV, on left side of the body. — 3 c, sternal plates of abdominal segment IV, on the left side.
- FIG. 3 d-3 h, *Panimerus lucens*, n. sp., fourth stage larva. — 3 d, hypostomium, ventral view. — 3 e, tergal plates of first two thoracic segments, on left side. — 3 f, tergal plates of abdominal segment IV, on left side. — 3 g, last abdominal segment, dorsal view. — 3 h, last abdominal segment, ventral view; the setae on left side have not been figured.
- FIG. 3 i-3 n, *Threticus appalachicus*, n. sp., male imago. — 3 i, base of the left antenna. — 3 j, distal part of the right antenna. — 3 k, abdominal segment IX, ventral view. — 3 l, cercopodia and internal chitinous bridge fused to both basistyli, ventral view. — 3 m, aedeagus, dorsal view. — 3 n, genitalia, dorsal view.



Preanal plate with only short spines on its posterior margin. Lateroan plates triangular in shape. Flabellar processes short.

Unfortunately, among the few larvae of *Panimerus lucens* that I kept alive, only one gave a female imago; it is quite different from the females of the other species of american *Panimerus*. This imago will be described in another paper.

In North America, there are at least 5 species of *Panimerus*. *P. patibulum* (QUATE), which is close to *P. advenus* (EATON), belongs to the subgenus *Krekiella* VAILLANT. The four other species, *P. basalis* (BANKS), *P. scalaris* (HASEMAN), *P. dysmica* (QUATE) and *P. sierra* (QUATE), have characters common with the *Panimerus* s. str. from Europe, such as the long curved gonapophyse of the male, but also have distinctive features, among others the absence of a protuberance and of spines on the pedicel of the antennae and the presence of two rows of similar simple ascoids on the flagellar segments of the antenna; they should be put together in a separate subgenus.

The larva of *Panimerus lucens* differs from those of all the Palearctic species by an incomplete set of principal setae on some of the tergal plates and by the lack of accessory setae on all the tergal plates.

Several larvae of *Panimerus lucens* were found, on April 20, 1971 and on April 28, 1972, at the foot of Dripping Rock Cliff beside Roaring Fork creek, in Smoky Mountains national park. They were among dead leaves soaked in water, and in earth between the leaves. With them, there were many larvae of *Plecoptera*, of *Trichoptera* and of *Diptera* of the families *Tipulidae*, *Limoniidae*, *Dixidae* and *Thaumaleidae*.

Threticus appalachicus, n. sp., *Philosepedon quatei*, n. sp., which are going to be described, and *Quatiella interdicta* (DYAR) belong to the *Telmatoscopini* of the *Threticus* group (F. VAILLANT, 1971-1972). The male flies of this group have the following characters: The eyes are usually separated, the back of the head has two occipital lobes. The antennae have 16 joints, the scape is less than twice as long as wide; the first eleven segments of the flagellum are always shaped like an amphora, the node having a sharp transverse distal ridge; there are usually one pair of ascoids on each, but there may be more; the ascoids can be simple, or can have 2, 3 or even 4 branches. There are neither corniculi, nor patagia, nor tegulae. The dististyles are always curved towards the sagittal plane. The spatula of the aedeagus is always very strong and obliquely or laterally depressed. At the end of the aedeagus, there are a flagellar rod, which is the penis sheath, and, on each side of it, two complex processes (komplexe Gebilde), which usually have two branches. The aedeagus is symmetrical for some species and asymmetrical for others.

The *Telmatoscopini* of the *Threticus* group comprise seven genera, all with representatives in North America, except one. Here is a key for the male imagos:

- 1 (2) All the flagellar segments of the antenna have two rows of simple ascoids..... *Neothreticus*, n. gen.
- 2 (1) All the flagellar segments of the antenna, or only the first eleven, or the first thirteen of them, can have one pair of ascoids.....

- 3 (4) Each cercopodium has more than 3 tenacula, which are individual.
The aedeagus is asymmetrical *Perithreticus*, n. gen.
- 4 (3) Each cercopodium has 1, 2 or 3 tenacula, or 2 groups of tenacula,
or 3 groups of them 5
- 5 (10) Each cercopodium has but one tenaculum 6
- 6 (7) All the segments of the antennal flagellum, except the last, have
a pair of simple ascoids *Neoquatiella*, n. gen.
- 7 (6) The first eleven segments of the flagellum have a pair of ascoids
with at least two branches 8
- 8 (9) Aedeagus symmetrical *Quatiella* BOTOSANEANU and VAILLANT
- 9 (8) Aedeagus asymmetrical *Nielsenella* VAILLANT
- 10 (5) Each cercopodium has more than one tenaculum 11
- 11 (12) Each cercopodium has 2 tenacula or 2 groups of tenacula
..... *Philosepedon* EATON
- 12 (11) Each cercopodium has 3 tenacula or 3 groups of tenacula.. *Threticus* EATON

Here are some characters, not given in the key, of the three new genera, and a list of the North American species of the *Threticus* group:

Neothreticus, n. gen.: Eyes contiguous. All the flagellar segments have internodes. Tip of the wing between end of r4 and that of r5. Several tenacula on each cercopodium. Aedeagus very asymmetrical. Type of the genus: *N. sobrinus* (QUATE).

Perithreticus, n. gen.: Eyes separate. The thirteenth flagellar segment does not have an internode. Nerve r5 ends at apex of wing. Type of the genus: *P. bishoppi* (DEL ROSARIO); other species: *P. jonesi* (QUATE).

Neoquatiella, n. gen.: Eyes separate. The medial angle of the wing is slightly superior to 180°. The tip of the wing is between the end of r4 and that of r5. Aedeagus asymmetrical. Type of the genus: *N. jeannae* (QUATE).

Quatiella B. and V.: Only one North American species, *Qu. interdicta* (DYAR), and a closely allied one from the West Indies.

Philosepedon EATON: *Ph. helici* (DYAR), *Ph. opposita* (BANKS) and *Ph. quatei*, n. sp.

Threticus EATON: *Thr. appalachicus*, n. sp., *Thr. bicolor* (BANKS), *Thr. tesca* (QUATE) and *Thr. tridactyla* (KINCAID).

Threticus appalachicus, n. sp.

Male imago (fig. 3 i - 3 n and 4 a): Eye bridge of 4 rows of facets. Interocular suture V-shaped. Distance between the eyes almost equal to 2 facet diameters. No postocular bristles on the top of the head, but some very strong ones on the sides of it. Scape not much longer than wide; pedicel wider than long; the eleven first flagellar segments have a pair of ascoids with a branch directed distally and a recurrent one; length ratio of the segments of an antenna: 23 - 15 - 51 - 48 - 47 - 47 - 46 - 45 - 45 - 44 - 42 - 39 - 23 - 9 - 9 - 13. Length ratio of the segments of a palpus: 26 - 47 - 64 - 62. Wing: A very short subcostal vein ending close to r1; wing ratio: 2,24; medial angle: 88°; r5 ends at the tip of the wing. Sternal bridge with two dorso-lateral thickenings. The basistyli are connected

with one another dorsally by the thickened edge of the susgenital plate and ventrally by the internal chitinous bridge; the latter is, for this particular species, a continuous band intimately fused at each end with a basistylus (fig. 3 l). The dististyli are slender in their distal part. Each cercopodium has three simple tenacula. The aedeagus is very asymmetrical; its spatula is oblique, with a strong dorsal thickened part prolonged by the flagellar rod, which is curved at its end, and by another short branch; the latter articulates with the left complex process, which is forked; the right complex process has two apparently separate branches; the inner one is very long, slender, curved, and lies against the flagellar rod.

Length of the wing: 2,7 - 2,8 mm.

Larvae were found, on April 20, 1971, with some of *Panimerus lucens*, at the foot of Dripping Rock cliff, in the Smoky Mountains national park; they were also among dead wet leaves. They were raised and two male imagos were obtained a month later.

Thr. appalachicus is very close to the Palearctic *Threticus* species of the *balkaneo-alpinus* group, but differs from them by the relations between the basistyli of the male and by the length of the flagellar rod.

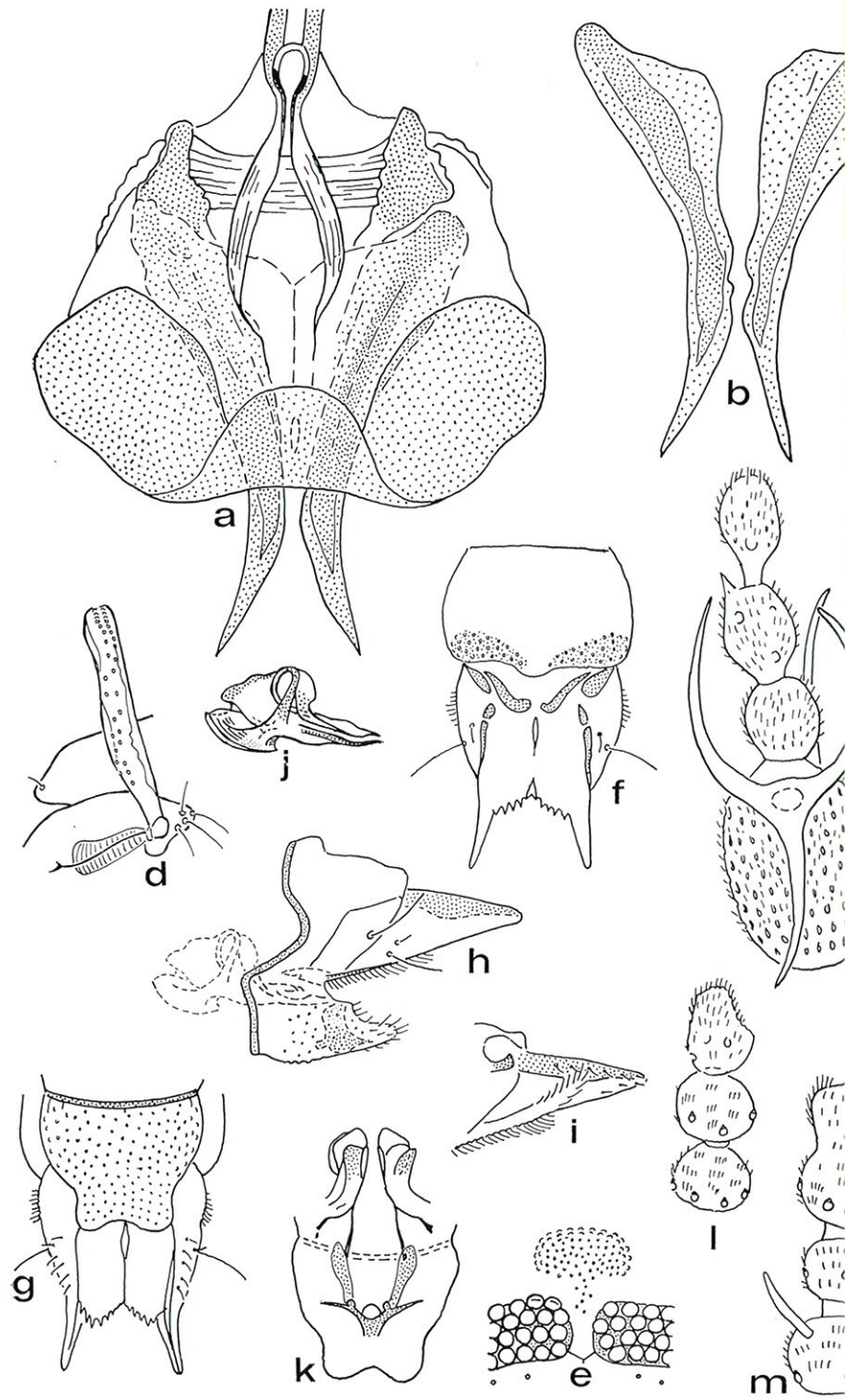
Here is a key for the males of the four North American species:

- | | |
|--|-----------------------------------|
| 1 (4) Ascoids with 3 branches | 2 |
| 2 (3) Aedeagus symmetrical | <i>Thr. tridactyla</i> (KINCAID) |
| 3 (2) Aedeagus asymmetrical | <i>Thr. tesca</i> (QUATE) |
| 4 (1) Ascoids with 2 branches | 5 |
| 5 (6) Dististyli tapering progressively. Eyes separated by distance equal to 2,5-3 facet diameters | <i>Thr. bicolor</i> (BANKS) |
| 6 (5) Dististyli with a slender part. Eyes separated by distance equal to 2 facet diameters | <i>Thr. appalachicus</i> , n. sp. |

Philosepedon quatei, n. sp.

Male imago (fig. 4 b - 4 e and 5 a - 5 c): Eye bridge of 4 rows of facets. Interocular suture V-shaped. Eyes separate; their distance is inferior to 1 facet diameter. Distinct postocular bristles all along the posterior margin of each eye. Antenna: scape 1,3 - 1,4 times longer than wide; pedicel wider than long; the eleven first flagellar segments have a pair of ascoids with two branches directed distally and a recurrent one; length ratio of the segments of an antenna: 21 - 15 - 26 - 24 - 25 - 26 - 26 - 25 - 24 - 24 - 24 - 13 - 13 - 7 - 7 - 7. Palpi without special sense organs; relative lengths of their segments: 14 - 25 - 30 - 42. Wing: subcostal vein thick and short; wing ratio: 2,53; medial angle: 78°; r5 ends at the apex of the wing. Genitalia: sternal bridge strong and without thickened parts; dististyli tapering

FIG. 4 a, *Threticus appalachicus*, n. sp., male imago, distal part of aedeagus, dorsal view.
 FIG. 4 b-4 j, *Philosepedon quatei*, n. sp. — 4 b-4 e, male imago. — 4 b, internal part of the eyes, dorsal view. — 4 c, wing. — 4 d, genitalia, dorsal view. — 4 e, abdominal segment IX, ventral view. — 4 f-4 j, female imago. — 4 f, right palpus, dorsal view. — 4 g, detail of sense organ on segment 2 of right palpus. — 4 h, genitalia, dorsal view. — 4 i, subgenital plate and genital car, dorsal view. — 4 j, genitalia, side view.



progressively; cercopodia with 2 long simple tenacula; susgenital plate with a median thickened part and two others overlapping the first. Aedeagus symmetrical; its spatula, laterally depressed, is prolonged backwards by two rods, which unite before meeting the median thickening of the susgenital plate; two strong chitinous pieces (fig. 5 b) are articulated directly on the internal chitinous bridge and they may be homologous to the complex processes of other *Telmatocepini*.

Length of the wing: 1,7 - 1,9 mm.

Female imago (fig. 4 f - 4 i) — Eye bridge with 4 rows of facets. Distance between the eyes slightly superior to 1 facet diameter. Interocular suture V-shaped. Antenna: ascoids similar to those of the male; length ratio of the segments: 21 - 14 - 25 - 25 - 25 - 25 - 24 - 23 - 23 - 21 - 20 - 18 - 5 - 5 - 8. Palpus very conspicuous; the first three segments each have a callous place entirely covered with short truncate setae set very close together; such callous places have never been observed for *Psychodidae* before, but female *Ceratopogonidae* of several species have some, and most *Simuliidae* and *Chironomidae* have « sensory pits » on their palpi. Length ratio of the segments of the palpus: 21 - 34 - 41 - 46. Wing similar to that of the male. Genitalia: cerci remarkably short, with 2 distal lobes; subgenital plate almost semicircular, with a thickened posterior edge; genital bag short.

Length of the wing: 1,7 - 2,2 mm.

Pupa (fig. 5 d): It is quite similar to that of the European species *Ph. humeralis* (MEIGEN), but the pits of each prothoracic horn are wide apart, and a double row of them starts on the externo-dorsal side, very close to the body.

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As far as we know, all *Philosepedon* develop in dead terrestrial gastropods and their females are viviparous.

The genus comprises many species from both hemispheres.

Here is a key for the male imagos of the North American species of *Philosepedon*.

-
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- 1 (2) Segments 13, 14 and 15 of the antenna fused. Dististyli more than 3 times longer than wide. A long aedeagal sheath... *Ph. opposita* (F.)
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The female was described in 1955 and in 1960 by L. W. QUATE, but I give other figures (fig. 5 e - 5 k) here, so they can be compared with those of *Philosepedon quatei*. The cerci are short, but not as much as in *Philosepedon*, and they taper progressively to their tip.

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While the *Telmatoscopus*, the *Duckhousiella*, the *Panimerus*, the *Threticoxena*, the *Philosepedon* and the *Quatiella* belong to the tribe *Telmatoscopini*, the *Pericoma*, the *Saraiella*, the *Thornburghiella* and the *Stupkaiella* are among the *Pericomini*.

Pericoma signata (BANKS)

A few specimens were captured, on September 12, 1962, near Dripping Rock cliff in the dale of Roaring Fork creek, Smoky Mountains park. They are almost identical to the type found in Washington DC and redescribed by L. W. QUATE; but the lateral lobes of the aedeagus seem to be longer than those of the lectotype and there are 4 tenacula on each cercopodium, instead of 5 (fig. 9 i - 9 l).

P. signata has already been recorded from Tennessee, for R. H. WHITTAKER found specimens in Gatlingburg.

Saraiella alexanderi, n. sp.

Male imago (fig. 9 f-9 h): Eye bridge with 4 rows of facets. Distance between the eyes equal to 1 facet diameter. Interocular suture V-shaped. Antenna: one pair of short simple ascoids on segments 4 to 14; the last segment, devoid of distal projection, is about twice as long as wide; length

ratio between the segments: 52 - 38 - 26 - 23 - 18 - 18 - 18 - 18 - 17 - 17 - 17 - 15 - 15 - 22. Two horn-shaped patagia, covered with long black androconia. Wing: membrane entirely clouded with brown; subcostal vein long and thickened at its distal part; wing ratio: 2,72; medial angle: 165°; the apex of r₄ and that of r₅ are about at the same distance from the tip of the wing, so that the apical angle is of 92°. Genitalia almost similar to those of the European *Saraiella parva* VAILLANT.

Length of the wing: 2,8 mm.

S. alexanderi differs from *S. parva* only by the shape of some of the genital parts; the sternal bridge has 3 thickened parts, instead of 2, and the susgenital plate is longer than that of the Palearctic species.

S. parva occurs only in the Alps at a high elevation.

Just one specimen of *S. alexanderi* was caught, on september 5, 1962, on the left bank of Middle Boulder creek (Colorado), at 2,5 miles from the city of Boulder and at an elevation of about 1 600 m.

The species is dedicated to the renowned dipterologist Professor Dr. C. P. ALEXANDER, from Amherst.

Thornburghiella, n. gen.

It seemingly comprises only North American and Asiatic species.

Male imago: Eye bridge with at least one oblique row of 5 facets. The antenna has from 13 to 16 segments; segment 3 bears several spines. There are always a pair of patagia, and sometimes one of tegulae. Wing: tip rounded, at about the same distance between the apex of r₄ and that of r₅; vein m₂ usually has a recurrent branch near its base; wing ratio between 2,40 and 2,70; medial angle of 180° or superior to it. The basistyli are contiguous or almost so; the dististyli are always simple, long, slender, and curved inwards; the cercopodia each have more than 10 tenacula. Aedeagus symmetrical; its spatula is narrow, when seen from above.

The characters of the larva will be given in another article.

This genus is close to *Saraiella*, owing to the presence of scent organs and to the shape of the genitalia, but has special characters, such as the long, slender dististyli and the large number of tenacula; besides, the number of segments of the antennae can be reduced, while all species of *Saraiella* have antennae with 16 segments.

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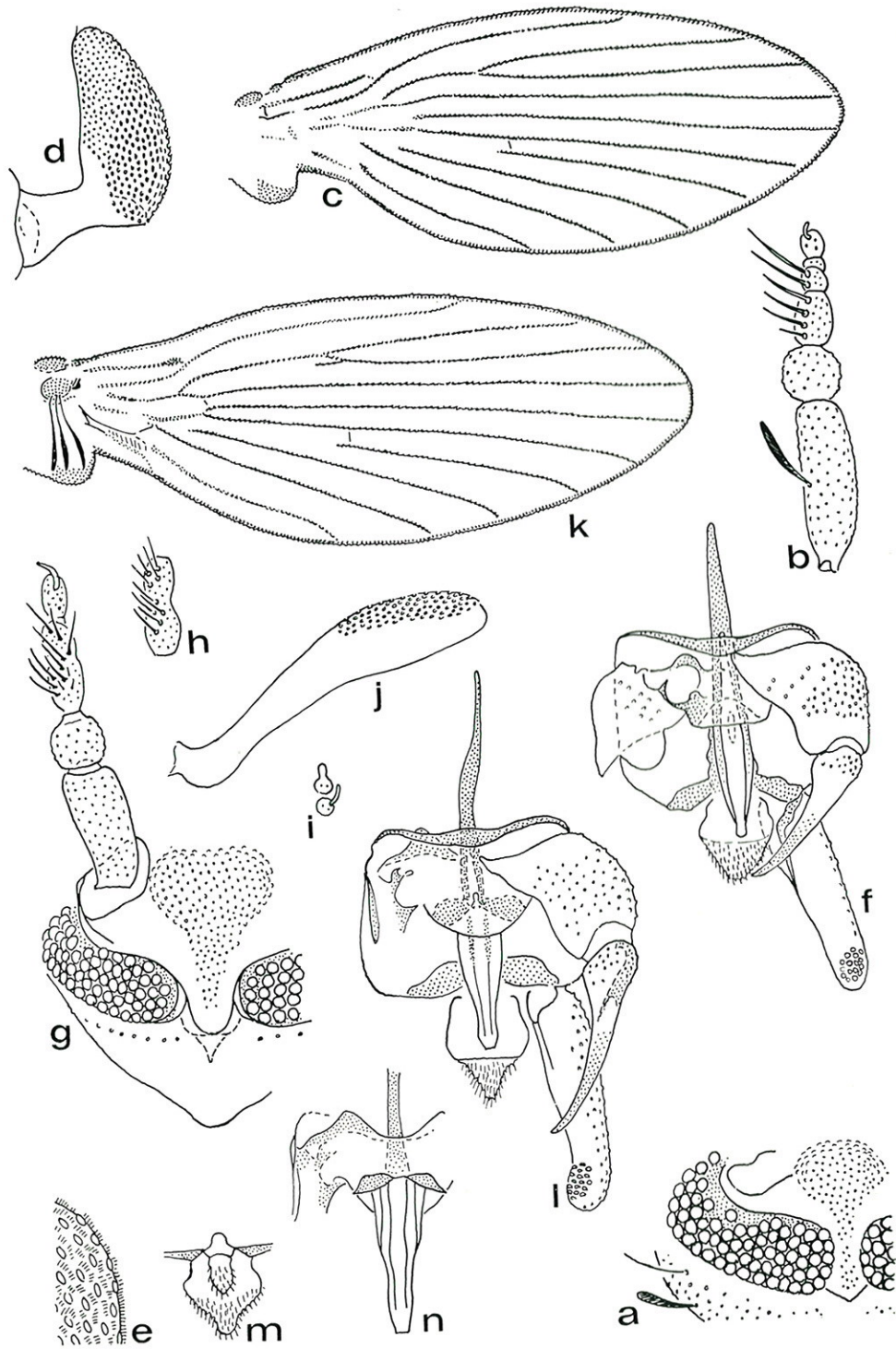
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quite different from that of the other species; length ratio between the segments of the antenna: 25 - 12 - 22 (13 + 9) - 10 - 9 - 9 - 9 - 9 - 9 - 8 - 7 - 7 - 6 - 6 - 9. Length ratio between the segments of the palpus: 18 - 29 - 32 - 48. Patagia club-shaped (*); tegulae kidney-shaped (*). Wing: a distinct thickening at the base (there is none for *Th. albitarsis*), covered with long androconia; there is usually a recurrent branch of r3 and one on m2; wing ratio: 2,66; medial angle: 203°. Genitalia: susgenital plate rounded (and not truncate) distally; dististyli much longer than the basistyli; cercopodia with 17 tenacula each. Aedeagus not very different from that of *Th. albitarsis*, but with a much longer spatula.

Length of the wing: 2,2 - 2,3 mm.

Many specimens were caught on leaves overhanging Dripping Rock cliff, near Roaring Fork creek, Smoky Mountains park, in april 1971 and in april 1972.

It is possible that the larvae, described (F. VAILLANT, 1959) and erroneously called *Pericoma marginalis* (BANKS), really belong to *Th. clavata*.

Thornburghiella marginalis (BANKS) = *Psychoda marginalis*
BANKS 1894 = *Pericoma marginalis*, BANKS 1931, QUATE 1955.

Male imago (fig. 7 c - 7 k): Eye bridge of 4 rows of facets, but the third oblique row, on each side of the median line, comprises 5 facets; the oblique rows 7, 8, 9 and 10, on each side of the median line, usually comprise only 3 facets; distance between the eyes equal to 1,5 facet diameters; interocular suture V-shaped and with only one thickening. Antenna of only 15 segments, but most likely the first flagellar segment is really made of two segments, which are intimately fused; scape 3 times longer than broad; pedicel a little longer than broad and usually with 3 interno-dorsal slender spines, never set in a row; first (composite) flagellar segment with an interno-dorsal row of 4, sometimes 5, strong spines (**); two simple ascoids on

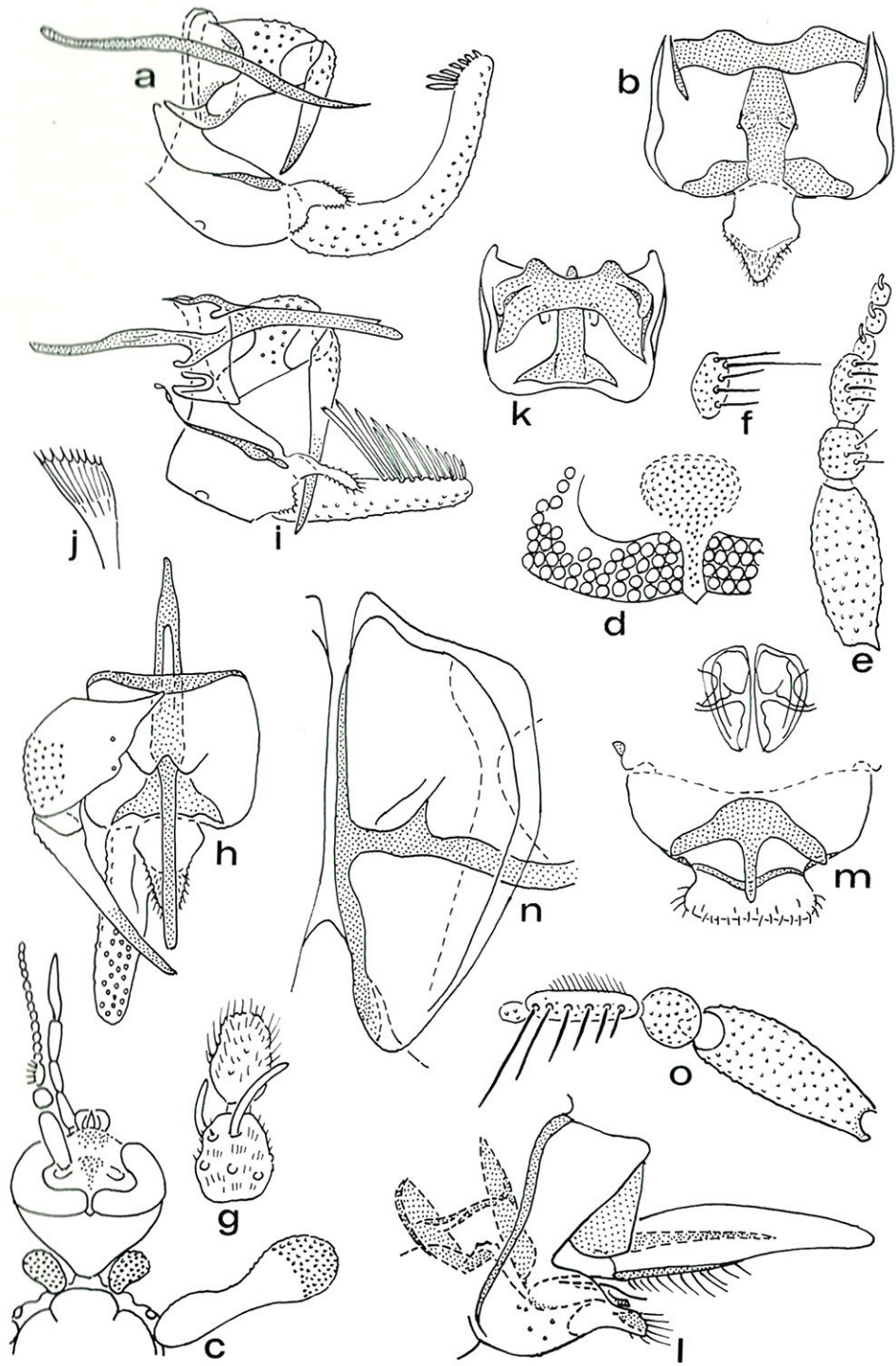
(*) The scent organs should not be taken into too much consideration, for they are turgescient and capable of distortion, so that, in mounted specimens of the same species, their shape is not always the same.

(**) When there are 5 strong spines on the first flagellar segment, instead of 4, the spines of the pedicel are nonexistent.

FIG. 7 a and 7 b, *Thornburghiella clavata*, n. sp., male imago. — 7 a, genitalia, side view; the left cercopodium, the left forceps and the left part of abdominal segment IX have been removed. — 7 b, abdominal segment IX and internal chitinous bridge, dorsal view.

FIG. 7 c-7 n, *Thornburghiella marginalis* (BANKS). — 7 c-7 k, male imago. — 7 c, head and right scent organs, dorsal view. — 7 d, eyes, dorsal view. — 7 e, base of right antenna, dorsal view. — 7 f, segment 3 of right antenna, side view. — 7 g, distal part of antenna. — 7 h, genitalia, dorsal view. — 7 i, genitalia, side view; the left cercopodium, the left forceps and the left part of abdominal segment IX have been removed. — 7 j, tip of tenaculum, side view. — 7 k, abdominal segment IX and internal chitinous bridge, dorsal view. — 7 l-7 n, female imago. — 7 l, genitalia, side view. — 7 m, subgenital plate and genital car, dorsal view. — 7 n, right part of genital car, enlarged.

FIG. 7 o, *Stupkaiella furcata*, n. sp., male imago, base of left antenna, dorsal view.



segments 4 to 14 of the antenna; last segment barrel-shaped, without any projection; length ratio between the segments of the antenna: 42 - 12 - 12 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 6 - 5 - 7 - 6. Length ratio between the segments of the palpus: 21 - 28 - 33 - 49. Patagia kidney shaped; tegulae club-shaped. Wing ratio: 2,60; medial angle: 180°. Genitalia: sternal bridge progressively thickened from the sides to the median line; susgenital plate with two distal lobes; dististyles very long and slender, much longer than the basistyles; cercopodia with 23 tenacula or even more. The lateral lobes of the aedeagus start close to the proximal end of it and unite distally again; the aedeagus has, near its end, a short dorsal branch.

Length of the wing: 2,2 - 2,3 mm.

Female imago (fig. 71 - 7 n): Distance between the eyes equal to 3,5 facet diameters. Antenna of 15 segments; their length ratio is: 29 - 13 - 15 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 6 - 6 - 6 - 6 - 7; no ascoids on segments 14 and 15. Ratio for the palpus: 22 - 30 - 34 - 47. No scent organs. Wing like that of the male.

The larva of *Th. marginalis* has already been described (F. VAILLANT, 1959) under the name of *Telmatoscopus (Telmatoscopus) sp. I.* The biotopes for *Th. marginalis*, during its immature stages, are moss either on stones in swift running streams or on dripping rocks; in Roaring Fork creek, larvae and pupae are abundant through all spring and summer.

Here is a key for the males of the 7 north american species of *Thornburghiella*:

- | | |
|--|---------------------------------|
| 1 (10) — Antenna with 16 segments | 2 |
| 2 (7) — Distance between the eyes equal to 2 facet diameters | 3 |
| 3 (4) — Dististyles curved outwards. Aedeagus with 3 distal branches | <i>Th. ancyla</i> (QUATE) |
| 4 (3) — Dististyles curved inwards. Aedeagus with only 1 distal branch | 5 |
| 5 (6) — Dististyles undulating and at least 6 times as long as broad. Distal part of aedeagus wide | <i>Th. melanderi</i> (QUATE) |
| 6 (5) — Dististyles regularly curved and less than 4 times as long as broad. Distal part of aedeagus narrow | <i>Th. albitarsis</i> (BANKS) |
| 7 (2) — Distance between the eyes superior to 3 facet diameters | 8 |
| 8 (9) — Basistyli with a deep notch; dististyli undulated; tenacula inserted on more than half the length of each cercopodium..... | <i>Th. complexa</i> (QUATE).. |
| 9 (8) — Basistyli with only a slight notch; dististyli regularly curved; tenacula assembled on the distal 1/6 of each cercopodium | <i>Th. clavata</i> , n. sp. |
| 10 (1) — Antenna with less than 16 segments | 11 |
| 11 (12) — Antenna with 13 or 14 segments. Tenacula assembled on the distal 1/6 of each cercopodium. The distal part of the aedeagus is rounded | <i>Th. lassenica</i> (QUATE) |
| 12 (11) — Antenna with 15 segments. Tenacula on almost half the length of each cercopodium. The distal part of the aedeagus is truncate | <i>Th. marginalis</i> (BANKS).. |

Stupkaiella, n. gen.

It is close to *Saraiella* and to *Thornburghiella*, but differs from both of them by the absence of patagia and tegulae. The antenna always has 16 segments; the third one is elongated; the last one has a long projection. The wing ratio is between 2,20 and 2,30; the vein m_2 always has a recurrent branch; the medial angle is inferior to 170° . The basistyli are wide apart, but they may have an internal projection joining them; the dististyli are always bifurcate, the two branches being of equal or unequal length; the cercopodia have more than ten tenacula each. The spatula of the aedeagus is usually narrow.

Stupkaiella has representatives both in North America and in Eastern Asia.

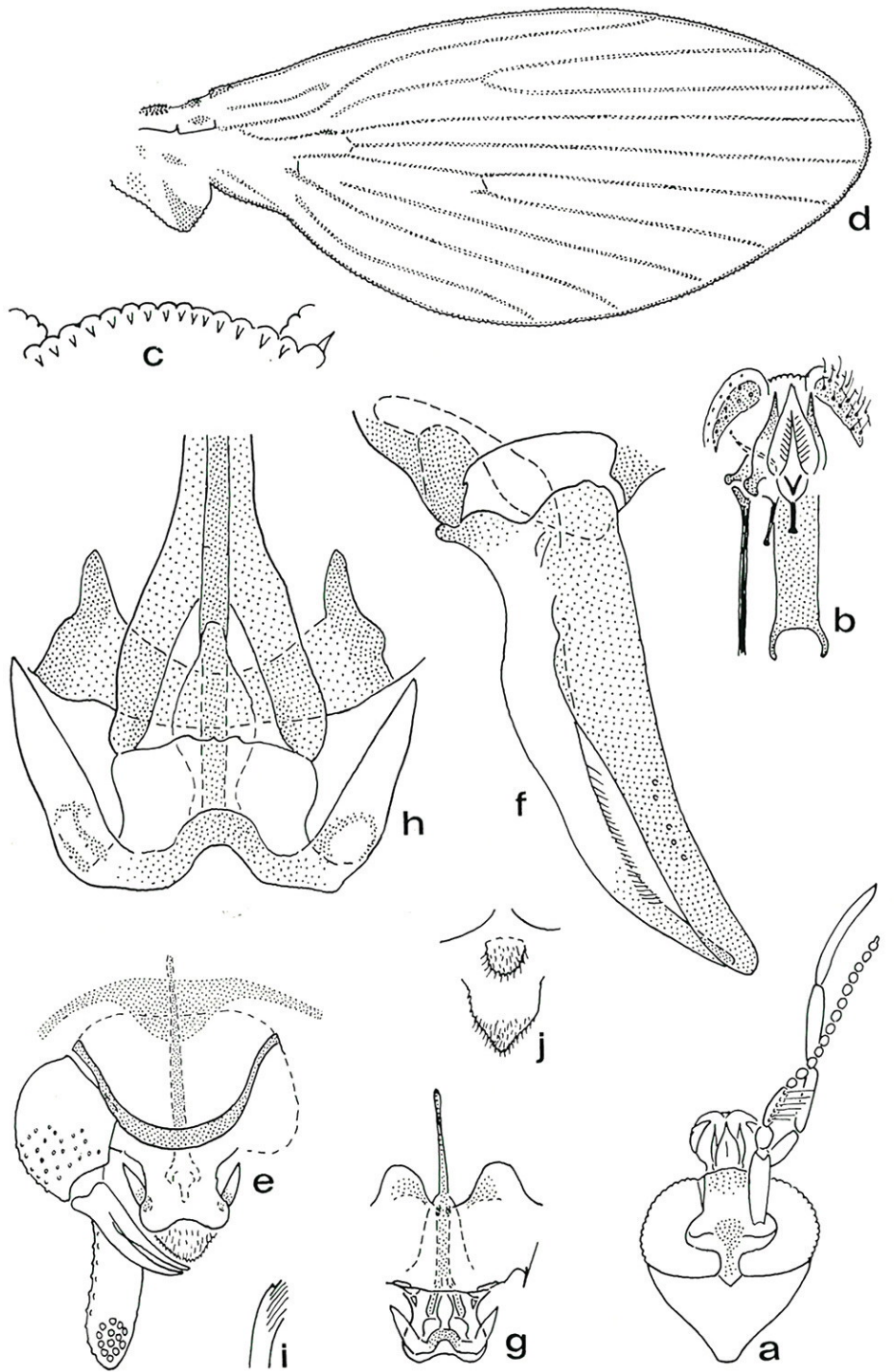
I take pleasure in naming this genus after Mr A. STUPKA, former head park naturalist of the Smoky Mountains national park.

Stupkaiella furcata, n. sp.

Male imago (fig. 7 o, 8 a - 8 j and 9 a): Eyes with oblique rows comprising inwards outwards 2 or 3 facets, 4 facets, 5 facets, 4 or 5 facets, 4 facets, 4 facets,...; distance between the eyes equal to 3,5 - 4 facet diameters; interocular suture U-shaped; occipital bristles undistinguishable. Antenna: scape 3 times longer than broad; pedicel slightly longer than broad; first flagellar segment almost 4 times longer than broad, with a row of 6 strong spines, the size of which increases from the base to the apex of the segment; ascoids on segments 7 - 13; length ratio between the segments : 56 - 15 - 29 - 11 - 11 - 10 - 10 - 10 - 10 - 10 - 10 - 9 - 8 - 7 - 7 - 11. Palpi longer than the antennae; length ratio of the segments: 24 - 50 - 51 - 79. Labium remarkably broad, almost as half the width of the head; the median part of it, shovel-shaped, has a row of minute teeth (fig. 8 c). Wing: subcostal vein long, ending independently, almost as far as the first basal cell; wing ratio: 2,29; medial angle: 164° . Genitalia: the tergite of abdominal segment VIII has a heavily sclerotized posterior margin, which projects posteriorly in front of the sternal bridge; this character is most conspicuous and makes the males of this species very easy to recognize. Sternal bridge regularly curved and wide, especially in its median part; susgenital plate with two short lobes; basistyli wide apart and without an inner apodeme. Dististyli forked; both branches are about of equal length; the external one has a row of hairs; the internal one, slightly stouter than the former, has only a few small and scattered bristles. Cercopodia stout, with 13 tenacula, which are pectinate at their tip. Aedeagus with a long narrow spatula and, at its proximal end, with two strong spines running through the susgenital plate and curved dorsally.

Wing length: 2,3 - 2,4 mm.

Several males were caught, in August 1969, on bushes and trees around Dripping Rock cliff and in the dale of Roaring Fork creek, Smoky Mountains. In April 1972, larvae were collected, from dead leaves soaked with water, at the foot of the cliff; some were reared and imagos were obtained in the following May. In another paper, the larva of *St. furcata* will be described.



Stupkaiella recurrens, n. sp.

Male imago (fig. 9 b - 9 e): Eye bridge with only 4 rows of facets in its widest part; distance between the eyes equal to 3,5 facet diameters: interocular suture V-shaped. Antenna: scape 2,5 times longer than broad; pedicel as long as broad; first flagellar segment less than 3 times longer than broad, with 3 to 5 dorso-external bristles stronger than the others, but which cannot be considered as spines; ascoids only on segments 7 - 11; ratio between the segments of the antenna: 27 - 12 - 16 - 10 - 9 - 8 - 8 - 8 - 8 - 8 - 7 - 6 - 6 - 5 - 9. Palpi distinctly shorter than the antennae; length ratio between the segments: 22 - 30 - 32 - 49. Labium not larger than that of most other flies belonging to the *Pericomini* tribe. Wing: subcostal vein long, a distinct transverse vein going from its apex to r1; wing ratio: 2,27; medial angle: 151°. Genitalia: no heavily sclerotized band on tergite of abdominal segment VIII; sternal bridge regularly curved and rather narrow; the distal part of the susgenital plate is truncate and fused with the aedeagus; the two basistyli are articulated with one another, under the susgenital plate, by the tip of a long inner apodeme. Dististyli forked, but the external branch is much shorter than the internal one; both have but a few scattered hairs. Cercopodia stout, with 13 pectinate tenacula. The spatula of the aedeagus is slightly broader and much shorter than for *St. furcata*; its end projects far beyond the apex of the susgenital plate and has two recurrent and fusiform branches.

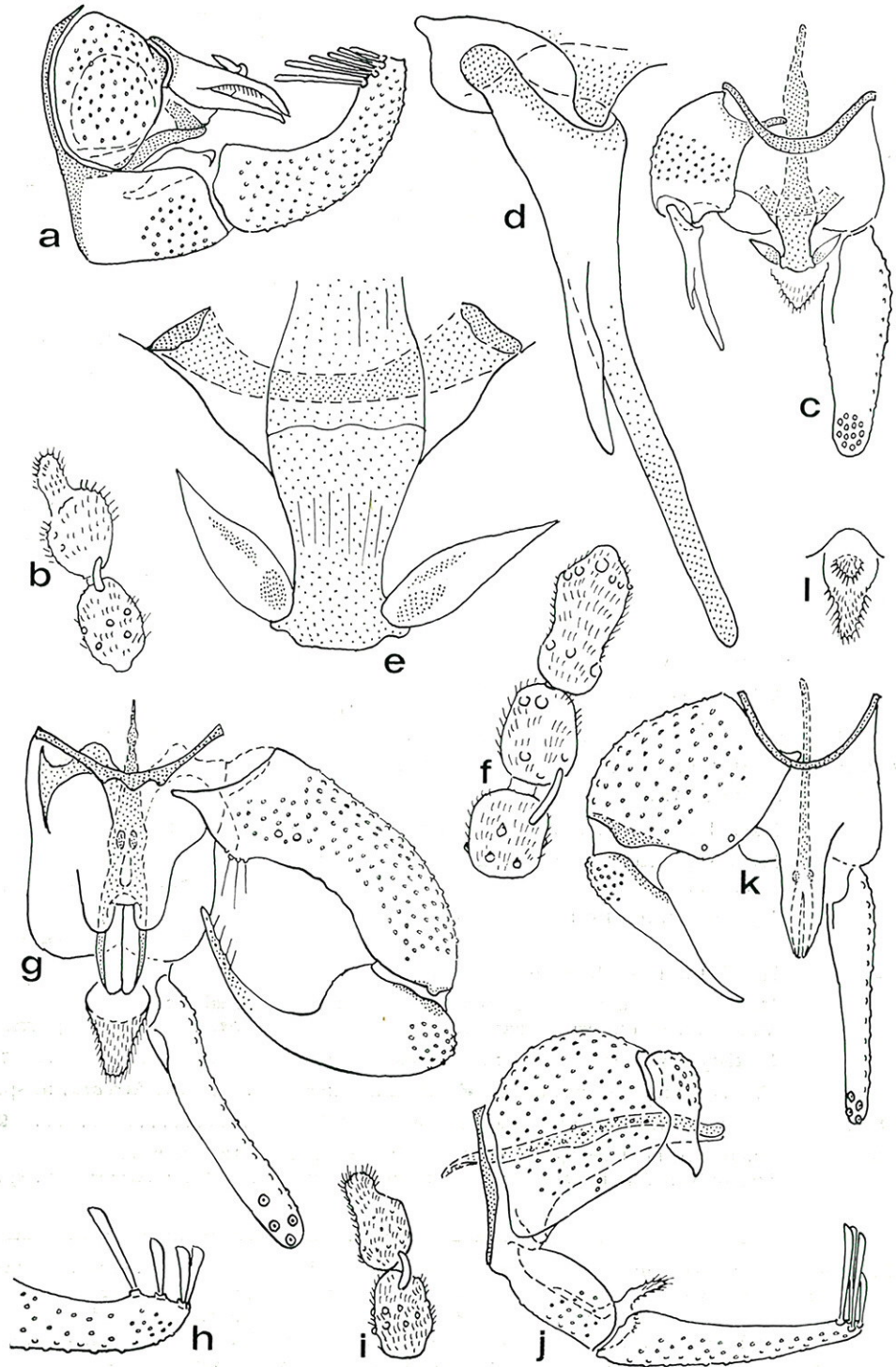
Length of the wing: 2,2 - 2,3 mm.

Several males were caught, in August 1969, with those of *St. furcata*. So far, no larva has been found.

Stupkaiella, n. gen. is what L. W. QUATE called the *Pericoma* of the *bipunctata* complex. Here is a key for the males of the different species from the United States :

- | | | |
|--------|--|-------------------------------|
| 1 (4) | — Each basistylus has a distal internally directed projection | 2 |
| 2 (3) | — Eyes separated by a distance equal to 4,5 facet diameters
..... | <i>St. kincaidi</i> (QUATE) |
| 3 (2) | — Eyes separated by a distance equal to 2 facet diameters..... | <i>St. carolina</i> (BANKS) |
| 4 (1) | — No distal projections on the basistyli..... | 5 |
| 5 (6) | — Dististyli-crescent shaped, with a very short external branch
and a longer one wide apart | <i>St. bessophila</i> (QUATE) |
| 6 (5) | — Dististyli with their two branches close together | 7 |
| 7 (8) | — The two branches are about of the same length | <i>St. furcata</i> , n. sp. |
| 8 (7) | — The two branches are of a very different length..... | 9 |
| 9 (10) | — There are no true spines on the third segment of the antenna,
but only a few bristles stronger than the others... | <i>St. recurrens</i> , n. sp. |

FIG. 8 a-8 j, *Stupkaiella furcata*, n. sp., male imago. — 8 a, head, dorsal view. — 8 b, mouthparts, dorsal view. — 8 c, median part of labium and hypopharynx, enlarged. — 8 d, wing. — 8 e, genitalia, dorsal view. — 8 f, left dististyle, enlarged. — 8 g, aedeagus and internal chitinous bridge, ventral view. — 8 h, distal part of aedeagus, dorsal view. — 8 i, tip of tenaculum. — 8 j, subgenital valve and anal valve, ventral view.



- 10 (9) — There are spines on the third segment of the antenna 11
- 11 (12) — The external branch of each dististylus is stouter than the other and conical. The spatula of the aedeagus is long and rather narrow *St. bipunctata* (KINCAID) (*)
- 12 (11) — The external branch of each dististylus is slender, like the other. The spatula of the aedeagus is short and broad *St. birama* (QUATE)

I choose *St. furcata* as type for the new genus, because the larva of this species has been found.

Here are now two species of the *Psychodini* tribe:

Psychoda symmetrica, n. sp.

Male imago (fig. 10 a - 10 f): Eye bridge with 4 rows of facets; distance between the eyes a little more than 1 facet diameter; no interocular suture. Antenna with 16 segments; scape 1.3 times longer than wide; pedicel subspherical; each flagellar segment, except the last three, has a distinct internode and 2 three-branched ascoids; length ratio between the segments: 19 - 13 - 21 - 21 - 22 - 22 - 22 - 22 - 21 - 20 - 17 - 8 - 5 - 3 - 5. Length ratio between segments of palpus: 17 - 18 - 19 - 24. Labium with 5 pairs of distal teeth. Wing: subcostal vein short and stout; r₅ ends at the tip of the wing, which is rather rounded; radial fork and medial fork complete; wing ratio: 2.64; medial angle: 66°. Genitalia: sternal bridge with almost square angles and extending as far backwards as the basistyli; these are short; each dististylus has a long tapering part. The aedeagus is almost symmetrical, though it is bent to the right at its apex. The internal chitinous bridge is very peculiar; it is a wide band extending from the long ventral apodem of one basistylus to that of the other; it has two transverse slender sclerites ending on the aedeagus and extending backwards under it, building a sheath with two pointed lobes.

Length of the wing: 2.0 mm.

Female imago (fig. 10 g - 10 i): No important difference with the male. The cerci are rather short. The subgenital plate has two angular distal lobes, with a deep notch between them; on its dorsal side, there is a slender projection with a distal bristle, and, on either side of it, a flap covered with hairs.

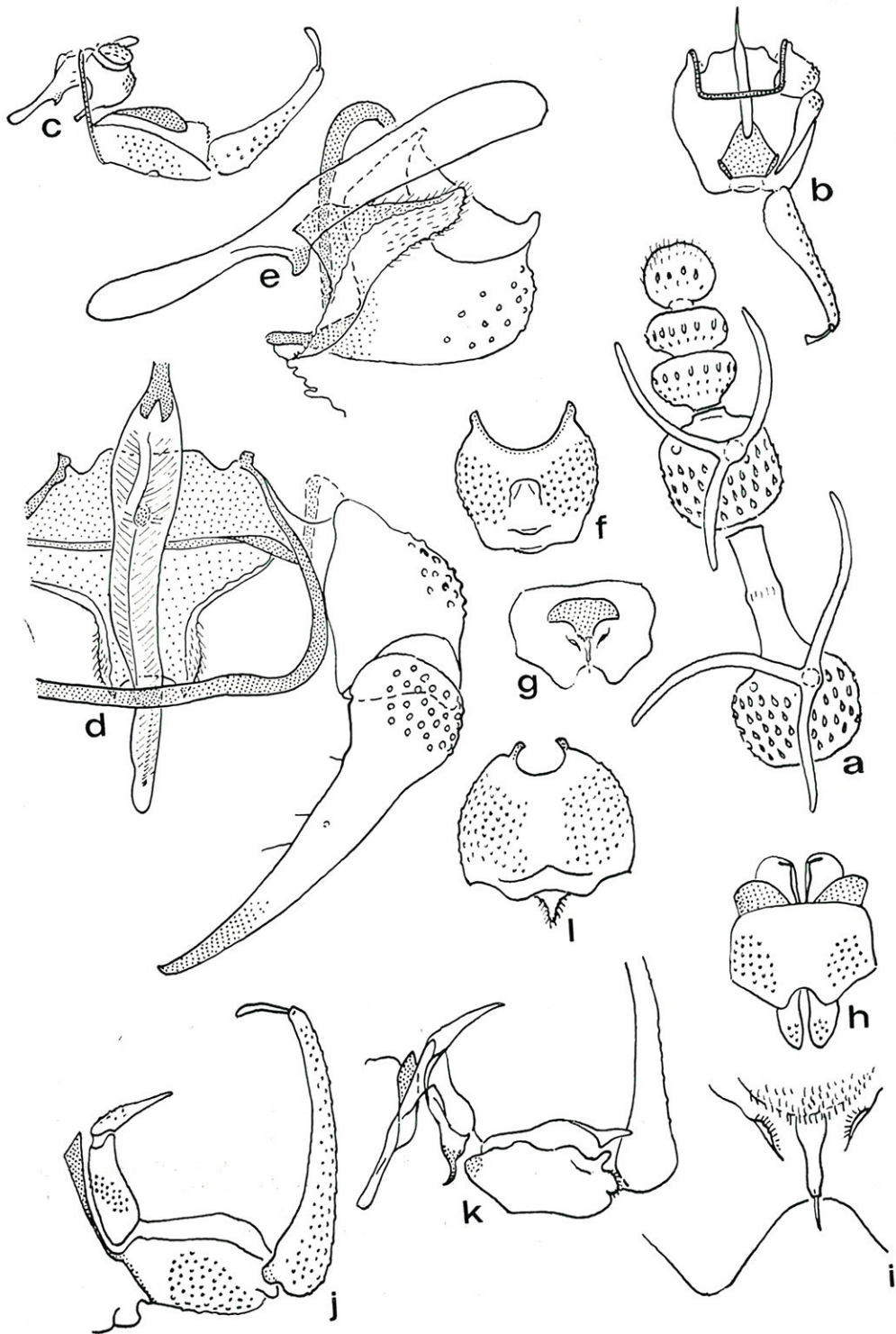
(*) The specimen from Santa Cruz Mountains, in California, figured by L. W. QUATE in 1955, belongs, of course, to a distinct species; but the description is very short and this species is not included in the key.

FIG. 9 a, *Stupkaiella furcata*, n. sp., male imago, genitalia, side view.

FIG. 9 b-9 c, *Stupkaiella recurrens*, n. sp., male imago. — 9 b, tip of right antenna, dorsal view. — 9 c, genitalia, dorsal view. — 9 d, left dististylus, dorsal view. — 9 e, distal part of aedeagus and of internal chitinous bridge, dorsal view.

FIG. 9 f-9 h, *Saraiella alexanderi*, n. sp., male imago. — 9 f, tip of left antenna, dorsal view. — 9 g, genitalia, dorsal view. — 9 h, distal part of left cercopod, side view.

FIG. 9 i-9 l, *Pericoma signata* (BLANKS), male imago. — 9 i, tip of right antenna, dorsal view. — 9 j, genitalia, side view. — 9 k, genitalia, dorsal view. — 9 l, subgenital valve and anal valve, ventral view.



Several males and females were found, in April 1971, in the dale of Roaring Fork creek, Smoky Mountains, close to dripping rocks.

Ps. symmetrica is very close to *Ps. umbracola* QUATE, but differs from the type by several characters of the genital parts, for both sexes:

The male of *Ps. umbracola* has a regularly curved sternal bridge, and the dististyli are shorter than they are for the other species.

The female of *Ps. umbracola* has a subgenital plate with two rounded distal lobes and the notch between them is not deep; on the dorsal side of the plate, there is a big stout projection, without any bristle at its end.

L. W. QUATE records *Ps. umbracola* from the Smoky Mountains, but the specimen described and figured by him comes from California. There may be several closely related species of the *umbracola* group of *Psychoda* in America, and *Ps. symmetrica* is one of them.

The flies of this « Artenkreis » and the *Ps. phalaenoides* (LINNAEUS), with their almost symmetrical aedeagus, are at the limit between the *Telmatoscopini* of the *Threticus* group and the *Psychodini* with an asymmetrical aedeagus. They nevertheless are true *Psychodini*, because the last segments of their antennae are reduced in size, the ascoids are trifurcate, the labium is flattened and has teeth, the basistyli are wide apart and the sternal bridge projects far backwards between them.

In 1952, S. BERDÉN described a new species of *Psychoda* from Sweden, *Ps. lativentris*; later, specimens were found in different parts of Europe and Asia, but all belonged to the female sex, the species being parthenogenetic. In France, I found some larvae of *Ps. lativentris*, reared them, and many generations followed from these; I examined several thousand imagos obtained in this way, but did not find a single male.

But one individual of the latter sex was caught in Sweden and described in 1955 by L. W. QUATE; this author registered, under the same name, many males and females found in different parts of Canada, of the United States and of Mexico.

In April 1971, I collected, on the bank of Ten Mile creek, on the western limits of Knoxville, Tennessee, several hundred larvae of *Psychoda*; they were found in short stemmed moss, full of red clay, partly emerged but completely wet; some of these larvae were raised and turned out to be flies almost similar to the *Ps. lativentris* described previously; the sex-ratio was not very far from 1/2.

I compared with great care the female imagos and the mature larvae of the American *Psychoda* respectively to those of *Ps. lativentris* from Europe and found that several characters were different. Thus, the species from

FIG. 10 a-10 h, *Psychoda symmetrica*, n. sp. — 10 a-10 f, male imago. — 10 a, distal part of antenna, dorsal view. — 10 b, genitalia, dorsal view. — 10 c, genitalia, side view. — 10 d, part of genitalia, enlarged, dorsal view; the subgenital plate is supposed to be transparent. — 10 e, aedeagus, right basistylus and subgenital valve, side view. — 10 f, abdominal segment IX, ventral view. — 10 g-10 i, female imago. — 10 g, subgenital plate, dorsal view. — 10 h, subgenital plate and base of cerci, ventral view. — 10 i, detail of subgenital plate, dorsal view.

FIG. 10 j and 10 k, *Psychoda limicola*, n. sp., male imago. — 10 j, genitalia, side view. — 10 k, genitalia, side view; the left cercopodium, the left forceps and the left part of abdominal segment IX have been removed.

the United States is a new one, though very closely related to *Ps. lativentris*, and there is no geographical parthenogenesis for this last species, but a compulsory one.

It would be useless to compare the male of *Ps. limicola*, n. sp. to the unique male of *Ps. lativentris*, for the figure given by L. W. QUATE is not precise enough to permit it.

Psychoda limicola, n. sp.

Male imago (fig. 10 j, 10 k and 11 a - 11 e): Eye bridge with four rows of facets; distance between the eyes equal to 1,3 - 1,5 facet diameters; no interocular suture; postocular bristles distinct and numerous. Antenna with 15 segments, 13 and 14 being fused and having together 4 forked ascoids; the last segment, the fifteenth one, has none; the first ten segments of the flagellum each have a pair of three branched ascoids; relative lengths of the segments: 19 - 15 - 19 - 19 - 19 - 18 - 17 - 16 - 15 - 14 - 10 - 12 (8 + 4) - 4. Relative lengths of the segments of the palpus: 19 - 19 - 20 - 25. Labella of the labium each with 5 long distal teeth and 2 external bristles. Wing: radial and medial forks complete; wing ratio: 2,34; medial angle: 116°. Genitalia: sternal bridge very thick, except on its sides, regularly curved and reaching beyond the distal part of each basistylus; dististyli tapering progressively and moderately long; cercopods curved like an S, when seen from above. The spatula of the aedeagus is cut abruptly at its base; it is rather narrow both seen from above or from the side; it divides distally into two lateral rods; the right one of these is short, but articulates, at its distal end, with a curved and strongly sclerotized process, which lies under the sheath of the flagellum; the left rod is longer than the other and builds part of the sheath, which is finger-like. The internal chitinous bridge is long and wide; it unites, at its proximal end, ventrally with the median part of abdominal tergite IX and it runs into the sheath of the flagellum at its distal end.

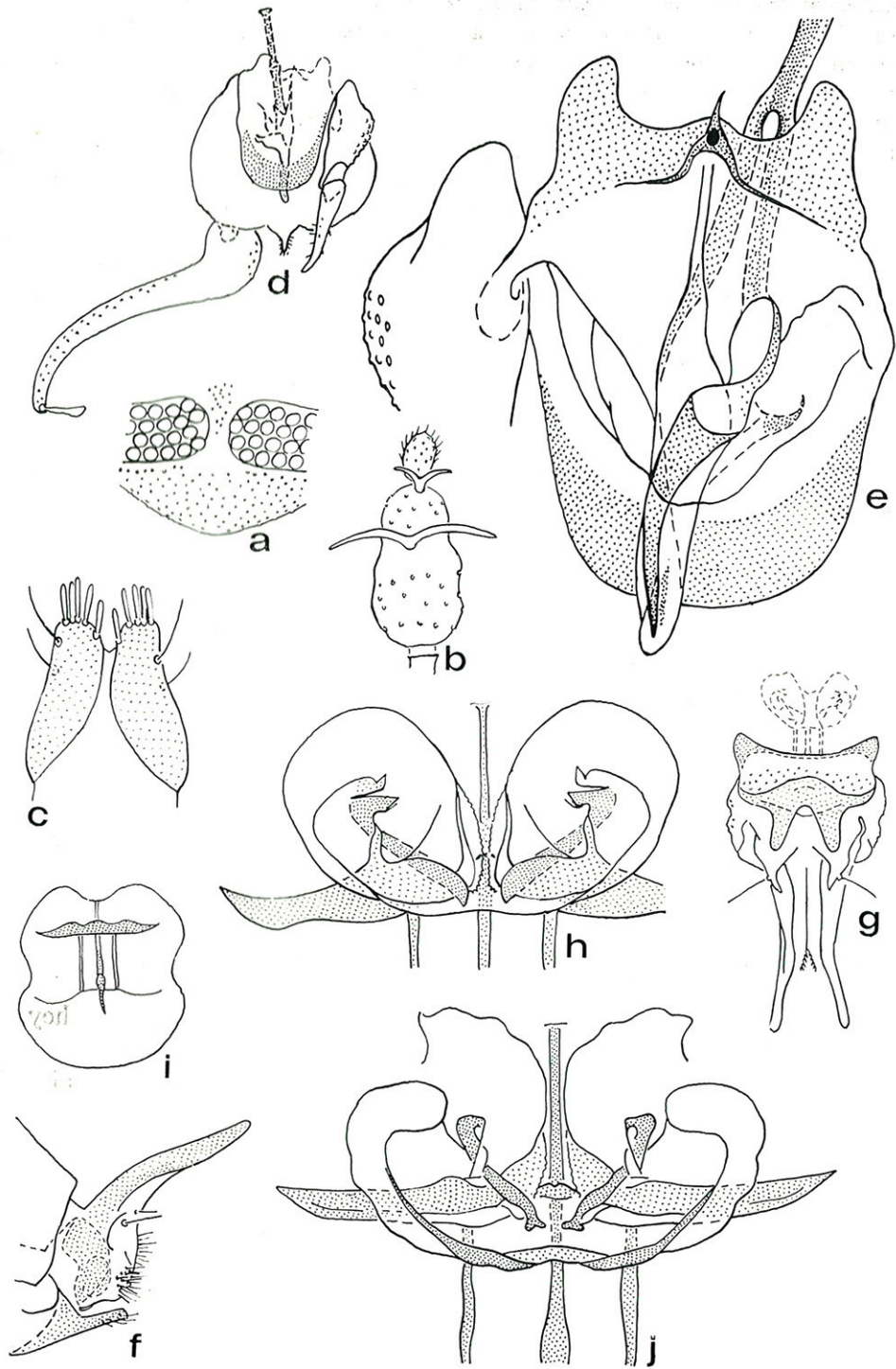
Length of the wing: 2,0 mm.

Female imago (fig. 11 f - 11 j): Distance between the eyes equal to 3 facet diameters. Length ratio of the segments of an antenna: 20 - 13 - 17 - 17 - 17 - 17 - 17 - 17 - 16 - 15 - 14 - 12 - 12 (8 + 4) - 3. Length ratio of the segments of a palpus: 22 - 24 - 21 - 28. Wing ratio: 2,44; medial angle: 103°. The cerci are rather long; the subgenital plate ends with two narrow lobes separated by a notch.

Length of the wing: 1,9 - 2,0 mm.

FIG. 11 a-11 i, *Psychoda limicola*, n. sp. — 11 a-11 e, male imago. — 11 a, internal part of the eyes, dorsal view. — 11 b, tip of antenna. — 11 c, labium, ventral view. — 11 d, genitalia, dorsal view. — 11 e, distal part of aedeagus, internal chitinous bridge and sternal bridge, ventral view. — 11 f-11 j, female imago. — 11 f, genitalia, side view. — 11 g, genitalia, ventral view. — 11 h, genital car enlarged, ventral view. — 11 i, ninth abdominal tergite and genital car, ventral view.

FIG. 11 j, *Psychoda lativentris* BERDÉN, genital car enlarged, ventral view.



Fourth stage larva (fig. 12 b - 12 e): Head capsule and mouth parts not different from those of *Psychoda alternata* (SAY). There are no tergal plates on the body, except on abdominal segments VI and VII. The thoracic segments and the abdominal segments I to VII have a reduced number of principal setae on their dorsal side; there are 3 pairs of setae, instead of 7, on the first annulus of thoracic segment I, 2 pairs, instead of 3, on the first annulus of each of the following segments: thoracic segment II, thoracic s. III, abdominal s. I, 2 pairs, instead of 3, on the second annulus of each of the abdominal segments II to V, 5 pairs, instead of 7, on the second annulus of thoracic segment II and on that of thoracic s. III, 5 pairs, instead of 6, on the posterior annulus of each of the following segments: thoracic s. I, abdominal segments I to V. The abdominal mesotergite VI has only 2 setae and there is one on either side. The abdominal mesotergite VII has 4 setae; those of the third pair seem to be nonexistent. On the dorsal side of the third annulus of abdominal segment VI, there are only 10 setae, 6 of them being on the tergal plate. The abdominal metatergite VII has a complete set of bristles. The siphonal plate, much longer than that of *Ps. alternata*, tapers progressively backwards; it has a complete set of 12 setae. There are no preanal and no lateroanal plates, but 2 small lateroanal setae are present. The two adanal plates are fused on the medioventral line and have 2 setae each.

Psychoda lativentris BERDÉN

Female imago (fig. 11 j and 12 a): It differs from that of *Ps. limicola* by the shape of the genital bag. Besides this, the wing ratio is 2,90 (*) and the medial angle is 103°.

Length of the wing: 2,0 mm.

Fourth stage larva (fig. 12 f - 12 i): It was never described before. It differs from that of *Ps. limicola* especially by the size of the tergal plates and by the shape of the siphonal plate. Usually there is no abdominal mesotergite VI. The abdominal mesotergite VII has only 2 setae and there is one on either side. The metatergite VI usually has only 4 setae and there are 3 on either side. The metatergite VII has only 6 or 8 setae and the others are outside of it. The siphonal plate is narrower than it is for *Ps. limicola*, the ratio between its length and its maximum width on dorsal view being 2,4 (instead of 1,9 for *Ps. limicola*). The flabellar rods are longer than they are for the American species.

Psychoda lativentris and *Ps. limicola* not only show morphological differences, but the ecological niches they occupy, during their immature stages, are not at all the same.

The larvae of the first species develop on the margin of small ponds; they are found in wet silt with a large amount of decaying plant fragments, but very little ammonium salts; they have most special ecological requirements, but, when these are fulfilled, they develop in large numbers, in spite of competitors and predators, and there is considerable crowding; one handful

(*) This character should not be considered as too important, for the proportions of the wing vary in several species of *Psychoda*.

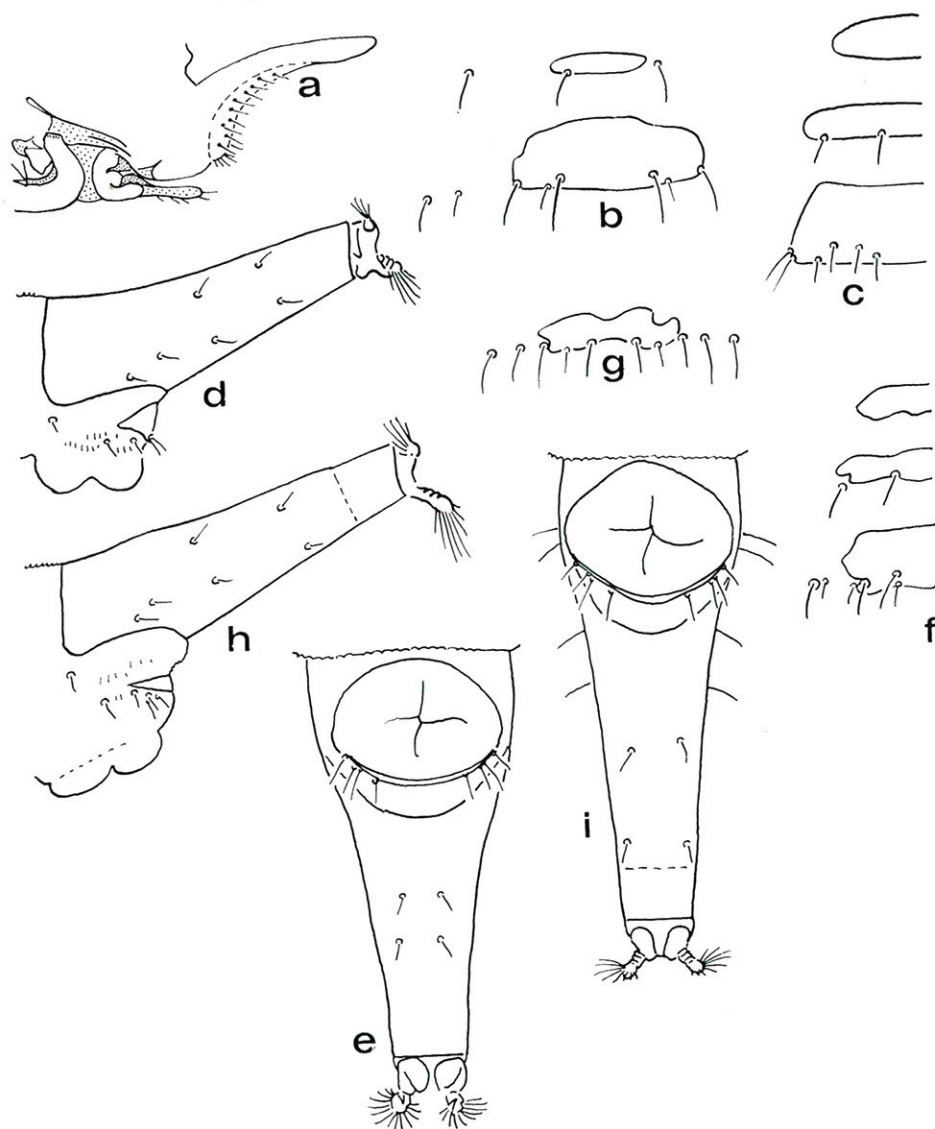


FIG. 12 a, *Psychoda lativentris* BERDÉN, right part of genitalia, side view.
 FIG. 12 b-12 e, *Psychoda limicola*, n. sp., fourth stage larva. — 12 b, dorsal plates and setae of abdominal segment VI. — 12 c, dorsal plates and setae of abdominal segment VII. — 12 d, siphonal segment, side view. — 12 e, siphonal segment, ventral view.
 FIG. 12 f-12 i, *Psychoda lativentris* BERDÉN, fourth stage larva. — 12 f, dorsal plates and setae of abdominal segment VII. — 12 g, dorsal plates and setae of abdominal segment VI. — 12 h, siphonal segment, side view. — 12 i, siphonal segment, ventral view.

of silt can contain several hundred larvae of *Ps. lativentris*. But a population of this species does not at all stay on a same level and can reduce suddenly or even disappear for several years. This is why very few imagos were collected in Europe, in spite of the large distribution of the species.

The larvae of *Ps. limicola*, which I found, were on the bank of a brook and in moss with mud, but apparently a small amount of organic particles.

ACKNOWLEDGEMENTS

I wish to express my thanks to Dr C.L. RICHARDSON, from the Academy of Sciences of Philadelphia, who kindly identified for me *Mesodon chilhoweensis*; as it has been pointed out in the present article, snails of this species, in the Smoky Mountains, may have their soft parts eaten by larvae of at least two species of *Psychodidae*.

RÉSUMÉ

F. VAILLANT : Quelques *Psychodidae Psychodinae* nouveaux des États-Unis [*Diptera*].

Le nombre des espèces néarctiques de *Psychodidae Psychodinae* décrites jusqu'ici est bien inférieur à celui des espèces paléarctiques de la même sous-famille. Plusieurs de celles, représentées en Amérique du Nord, qui se développent, au cours de leurs premiers stades, dans des matières fécales de Vertébrés terrestres ou dans la vase en bordure d'eaux stagnantes, sont cosmopolites. Les autres, liées aux sources ou aux eaux courantes, ont un territoire plus ou moins étendu à l'intérieur de l'Amérique du Nord seulement.

Les imagos mâles de neuf espèces nouvelles sont décrits ici, ainsi que les larves au quatrième stade de deux d'entre elles et d'une autre espèce, dont les imagos mâles ne sont pas encore connues.

Ces dix espèces se répartissent entre huit genres, dont deux sont nouveaux.

L'étude des larves de *Psychoda lativentris* BERDÉN montre que cette espèce en comprend en réalité deux, l'une paléarctique et parthénogénétique, l'autre néarctique et bisexuée.

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