Hayesomyia a new genus of Tanypodinae from the Holarctic

(Diptera, Chironomidae)

By D. A. Murray and E. J. Fittkau
University College Dublin and Zoologische Staatssammlung Munich


A new genus of Tanypodinae, Hayesomyia, is erected for the species Tanypus tripunctatus Goetghueber (Goetghueber 1922) and Tanypus senatus Walley (Walley 1925) which occur in the Palearctic and Nearctic regions respectively. Generic descriptions of the adult male and pupa are given together with a redescription of the adult male and a description of the pupa of Hayesomyia tripunctata (Goetgh.) n. comb. The imago has a scutal lamella, lacks a tarsal brush on tarsomere 3 of the middle leg and the male has a bifid superior volsella. The pupal thoracic horn has an aeropyle and 10–12 ostia, LS setae are absent on abdominal segments I–VI, the lateral borders of all segments are tuberculate and the abdominal shagreen has distinctive multibranch spinules forming characteristic patterns. The larva of H. senata has an A. R. of approximately 4.0 and the distal margin of the basal antennal segment is smooth. The larva of H. tripunctata is unknown. The genus Hayesomyia gen. nov. belongs to the Thienemanniimyia group of genera within the tribe Pentaneurini.

Dr. Declan A. Murray, Department of Zoology, University College Dublin, St. Lorgan Road, Dublin 4, Ireland.
Prof. Dr. Ernst Josef Fittkau, Zoologische Staatssammlung, Münchhausenstr. 21, D-8000 München 60, Bundesrepublik Deutschland.

Introduction

In the revision of the Tanypodinae given by Fittkau (1962) the species Tanypus tripunctatus Goetgh., described by Goetghueber (1922), was provisionally placed in the genus Thienemanniimyia Fittkau. During the course of studies on Chironomidae from Irish rivers Mr. Brian Hayes obtained pupal exuviae, pupae and half emerged adults of a Tanypodine species which was not readily identifiable. The material was passed to one of us (D. M.) and was determined as „Tanypus“ tripunctatus Goetgh. a species rarely recorded in the literature. Features of the adult male and the previously unknown pupa suggest that this species does not belong to any of the currently recognised genera and thus the genus, Hayesomyia gen. nov. is now erected for the species Hayesomyia tripunctata (Goetgh.), n. comb., which is known to occur in Ireland, England, Belgium and Austria. Roback (1981) published descriptions of the pupa of the Nearctic species Thienemanniimyia senata (Walley) which show features similar to the Palearctic H. tripunctata. Examination of slide mounted material of the pupa of T. senata, generously provided by Dr. B. Caldwell, Department of Natural Resources, Atlanta, U.S.A. and Dr. L. Ferrington, Kansas Biological Survey, U.S.A. has confirmed the similarity and the species T. senata is here reassigned to the new genus Hayesomyia.
A generic diagnosis, a description of the pupa and a redescription of the adult male of *H. triplunctata* (Goetgh.) is given in this paper. Some additional comments on the morphology of the larva and pupa of *H. senata* (Walley) are also given. The terminology follows SAETHER (1980) with some reference to FITTKAU (1962) for features of the pupa. In addition the abbreviation “mbs” is used for the multibranched setae on the pupal abdominal segments.

**Hayesomyia gen. nov.**

Type species: *Tanypus triplunctatus* Goetghiebuer 1922, by present designation.

Systematic position: *Hayesomyia* belongs to the *Thienemannimyia* group of the tribe Pentaneurini within the subfamily Tanypodinae.

**Generic diagnosis**

Adult male; Scutal lamella present, tarsal beard absent on ta3 of P2, tibial spurs with main tooth and 5–8 side teeth, anal point triangular, gonocoxite with 20–30 dorsomedian setae, volsella bifid and setose.

Pupa; thoracic horn with corona and a distinct aeropyle. Well developed mesonotal spur and postnotal tubercle present. LS setae on segments VII–VIII only, multibranched setae forming distinct patterns on tergites.

Larva; (Based on *H. senata* only since the larva of the second species is so far unknown). Maxillary palp with b seta 2 segmented. Ring organ of palp in distal 1/3 of basal segment. Distal margin of basal antennal segment smooth. Pseudoradula uniformly broad, pecten hypopharyngis with 20–22 teeth. Posterior margin of head dark brown.

Etymology: Named after Mr. Brian Hayes who collected the material which instigated this study.

**Generic description**

Adult male: Medium sized species, wing length 2.5–3.0 mm. Overall colour whitish, with brown bands on the anterior of some tergites. Discrete brown pigment spots present or absent on the vittae and anteaneisternum II. Eyes projecting dorsally, A. R. 1.6–2.3. Thorax with scutal lamella, acrostichals for the most part uniserial. Dorsocentrals in one or two rows, humeral setae 12–14, scutellars 25 including a posterior uniserial row of about 14 setae. Wings with macrotrichia on membrane and veins, crossveins pigmented or not. Costa slightly produced beyond R4+5, R2+3 well developed, R3 ending midway between R1 and R4+5. Tibial spurs with main tooth and 5–8 side teeth, tarsal brush absent on tarsomere 3 of middle leg, comb on hind leg with 7 setae, claws slightly bent. Male hypopygium with broad conical anal point, tergite IX with an irregular concave row of 14–20 setae. Gonocoxite with 20–30 dorsomedian setae. Superior volsella (gonocoxite lobe) bifid and setose, inner branch of volsella slightly longer and narrower than outer branch. Gonostylus angular, phallapodeme forked.

Pupa: Medium size, approximately 5.0 mm long, colour pale. Thoracic horn slightly expanded apically and more than twice as long as broad at apex. External surface with weak sculpturing raised into spines. Plastron plate lacking, distinct aeropyle present surrounded by a spine free area (= “clear area”, ROBACK 1980; “hof”, FITTKAU 1962) on the horn surface. 10–12 ostia evident on the apical margin. Thorax rugose with well developed mesonotal spur. Mth setae (sensu FITTKAU, 1962) equidistant. Abdominal tergites and sternites with distinct patterns formed by differential arrangement of multibranched spinules, spines and tubercles. Lateral edge of abdominal segments tuberculate, posterior corners of segments indented. Scar on tergite I. Sharply delineated apophyse present on tergites and sternites II–VII. Anterior median margin of tergites II–VII or II–VIII with a distinct pigmented area. LS setae absent on I–VI; 4 LS on VII; 5 LS on VIII with LS1–3 lateral and LS4–5 ventral in origin. Gonopodial
sheath of male reaches \( \frac{2}{3} \) anal fin length ending level with the more distal of the two anal macrosetae. Distal end of anal fin curved ventrally and pointed.

Larva: Medium sized larvae, up to 10 mm long. Head brownish, posterior margin dark brown; body yellowish white. Head capsule longish-oval; cephalic index 0.05–0.70. Antenna almost \( \frac{1}{2} \) as long as head and almost \( 2 \times \) as long as mandible. Antennal ratio 4.0. Basal segment \( 8 \times \) as long as basal width, with ring organ at base of apical \( \frac{1}{3} \); distal margin of basal segment not produced into point on outer side; segment 2 \( 10 \times \) as long as wide; last segment about \( \frac{3}{4} \) length of segment 3. Style clubbed apically, reaching to middle of last segment. Lauterborn organs very small. Blade scarcely longer than flagellum, \( 6.5 \times \) as long as hight of basal ring; basal ring \( 2 \times \) as high as wide. Accessory blade extending to level of last segment. Mandible uniformly curved, distal \( \frac{1}{2} \) strongly narrowed, almost \( 2.5 \times \) as long as basal width; proximal \( \frac{1}{2} \) strongly broadened. Apical tooth \( 2 \times \) as long as basal width, almost \( \frac{1}{4} \) length of mandible; distal \( \frac{1}{2} \) blackish brown. Basal tooth inconspicuous, low and apically directed, with long seta subdentalis arising from dorsal side. A bluntly rounded, easily visible accessory tooth present on ventral inner margin of apical tooth, immediately distal to basal tooth, extending somewhat over seta subdentalis. Ventrolateral setae situated close together on outer margin of basal \( \frac{1}{2} \) of mandible; sensillum minusculum situated proximal thereto, on ventral side; ventrolateral seta 1 small, peg like, difficult to see, seta 2 simple, 3 divided; setae 1 and 2 situated close together, gap between setae 2 and 3 smaller.
than that between seta 3 and the sensillum minusculum. Basal segment of maxillary palp almost 3.5× as long as wide, with ring organ in the middle of the apical 1/3; b seta 2 segmented, basal segment 3× as long as distal segment. Dorsomentum without teeth, a selerotized complex on each side of base of M appendage; ending apically on each side in 2 overlying, blunt-ending points. Pseudoradula an uniformly broad band; granulation consisting of about 10 parallel rows. Ligula with 5 teeth, almost 2.5× as long as basal width, apical 1/3 blackish brown. Row of teeth deeply concave. Middle tooth about 1.5× as long as wide. Point of inner tooth strongly inclined towards outer tooth. Paraligula bilden, 1/2 as long as ligula, inner point 1/4 as long as outer. Pecten hypopharyngis with about 20 teeth of more or less equal length, only teeth of inner 1/4 becoming larger. Body without fringe of swim-setae. Anal tubules slender, spindle shaped, about 5× as long as wide. Subbasal seta of posterior parapod simple. Procercus almost 3.5× as long as wide with 7 anal setae. Claws, 10, of posterior parapod simple, some larger claws with small points on inner and/or outer margin; two of the smaller claws darker in colour than remainder.

**Hayesomyia tripunctata** (Goetgh.) n. comb.

*Tanypus tripunctatus* Goetghhebuer, 1922: 59, Fig. 17  
*Ablabesmyia tripunctata* Goetghhebuer, 1936: 25, 37  
*Thienemannimyia (?) tripunctata* (Goetgh.) in *Fittkau, 1962: 194*  
*Rheopelopia* sp.? Pe., Langton, 1984: 43

Adult male (Figs 1-8)

Length 3.5 mm, wing length 2.5 mm.

Colour: Head pale, antennal pedicel pale yellow/brown; setae on middle of penultimate flagellomere distinctly brownish; palps pale. Ground colour of thorax yellow, brown pigmentation confined to the basal anterior margin of anteanepisternum II, the anterior border and a wedge shaped area on the median vitta at the level of the beginning of the lateral vitta, the anterolateral margin of the lateral vitta, the postalar callus and the posterior two thirds of the postnotum (Figs 1,2). Legs pale with a narrow brown ring at the apex of all femora and bases of the tibiae. Wings with three distinct pigmented areas, one around the humeral crossvein, one around the crossveins RM and MCu and one at the junction of R₁ with the costa (Fig. 3). A slightly darkened area around the junction of R₄₊₅ and the costa. Abdominal tergite 1 all pale (Fig. 4), tergite 2 with a brown basal mark on both sides, tergites 3–5 with a narrow basal band occupying 1/4 the tergite length and separated in the middle, tergite 6 with a similar band but the distance between the bands is greater, tergite 7 brown on the basal 1/3, tergite 8 all pale, gonoxoxite distinctly brown, gonostyli pale.

Head: A. R. about 1.6, terminal flagellomere five times as long as broad, penultimate flagellomere 3.5 times longer than terminal flagellomere. Eyes projected dorsally, 15 temporal setae comprising 6 postorbitals, 5 outer verticals and 4 inner verticals. The post orbitals and outer verticals form a continuous row. Pedicle with 5 ventral and 1 lateral sete.

Thorax: Antepronotum with prominent lateral sense organs (“pronotal hocker” sensu *Fittkau* 1962) and with 4 antepronotal setae (Fig. 5). Dorsocentrals 18–20, acrostichals 22, prescutellars 2, supraalars 2, prealars 2, humerals 13–14, scutellars 25. Scutal lamella present, 33μ long and 11μ high (Fig. 6).

Wing: Costa slightly produced beyond R₄₊₅ and ending just before M₁₊₂ (Fig. 3). R₂₊₃ well developed, R₃ ending on the costa midway between R₁ and R₄₊₅. Wing membrane with setae slightly more dense in the apex of cell r₄₊₅, around termination of M₃₊₄ and Cu₁, and in the mid basal area of cell an. Anal lobe rounded. Squamal setae 23–26.

Legs: Tibial spurs with main tooth and 7–8 side teeth, comb on P₃ with 7 setae, claws weakly bent, pulvilli not apparent. Measurements and ratios (n = 1):

---

199
Fe  Ti  Ta₁  Ta₂  Ta₃  Ta₄  Ta₅  LR  BV  SV
P₁  1000 1257  990  514  362  238 124  0.78 1.82 3.27
P₂  1066 1061  671  295  228  171  95  0.63 2.69 1.17
P₃  1000 1399 1095  523  390  305 124  0.78 1.79 1.22

Hypopygium: (Fig. 7) Anal point broad and conical. Tergite IX with an irregular slightly concave row of 14–16 setae. Gonocoxite more or less cylindrical, slightly swollen apically with about 20 dorso-median setae. Gonostylus slightly bent and gradually tapering but abruptly narrowing before the apex and with 6–8 distinct ventrally situated setae (Fig. 8). Superior volsella bifid, inner branch slightly narrower and longer than the outer branch. Phallapodeme forked, anterior median surface rugose.

Pupa (Figs 9–12, 14b; Plate 1a–d, 2b)

Length 5.0–5.5 mm, colouration pale yellowish.

Cephalothorax: Median antepronotal seta 1; preconcial seta 1; Mth setae (sensu Fittkauf 1962) equidistant; thoracic horn 230 µ long, aeropyle 6.0 µ wide, corona 70 µ long (Fig. 9, Plate 1a). Thorax rugose with well developed mesonotal spur. Postnotal tubercle present.

Abdomen: (Figs 10–12) Tergite I with scar, anterior margin of tergites II–VIII with distinct median pigmented area. Dorsolateral muscle marks (MD3) very obvious. Lateral borders of all segments tuberculate (Fig. 10, Plate 1b). Abdominal shagreen (Figs 11, 12) forming a distinct pattern resulting from the differential distribution of multibranched spines (mbs) on a background of large and small spines. Median axis of tergites I–VIII with simple spines only (Plate 1c, 1d). Tergite I on each side with a median rectangular mbs field, pleuron I with a lateral longitudinal mbs band. On tergites II–VII the median fields are more or less rectangular but the outer and central areas are mbs free and here the background spines predominate. Laterally, outside the muscle scars, a continuous longitudinal mbs band is present on pleura II–V. On pleuron VI the lateral mbs band is restricted to an anterior and posterior patch while on pleuron VII the lateral mbs band is confined to the posterior corners only. Two median rectangular mbs fields on segment VIII, lateral bands absent. Tergite IX with spinose shagreen only. Sternites I–VIII with median rectangular mbs fields and a posterior continuous transverse mbs band which laterally project forwards (Fig. 12). 2 L setae on segments I–VI, 4 LS on segment VII, 5 LS on segment VIII, distribution of D and V setae as in Fig. 11.


Distribution

The adult male of this species was described by Goetgebuer (1922) on material collected in Belgium (“Pris a Falaen” 12 June 1921). It was also recorded from Austria (Goetgebuer 1936) but these appear to be the only records of this species and it is thus, until now, only known from zones 4 and 8 in Limnofauna Europaea (Fittkauf and Reiss, 1978). Langton (1984) records a pupal exuvium from the River Avon which very likely belongs to H. tripunctata. The records from Ireland are from two locations, the River Slaney, Co. Wexford, and the River Bandon, Co. Cork. The species has recently been found in Turkey, leg. W. Schacht.

Ecology

H. tripunctata occurs in rivers with a moderate flow but the larval habitat is as yet unknown. Other Tanypodinae which occur in the River Slaney in association with H. tripunctata are: Thienemanni- myia laeta (Meig.), T. pseudocarnea Murray, Conchapelopia viator (Kieff.) and Rheopelia maculipennis (Zett.).
Plate 1a–d. *H. tripunctata* (Goetgh.), pupa. – a Thoracic horn. – b Lateral border of segment IV. – c Abdominal tergites I–IV. – d Detail of part of tergite IV showing multibranched setae and spines on the mid dorsal region slightly right of center.
The adult male of this Nearctic species was described by Walley (1925). According to Roback (1971), who assigned this species to Thienemannimyia, and later described the larva and pupa (Roback 1981), H. senata has a wide distribution in the United States and lower Canada. The adult of H. senata has clear wings and thus is distinctly different compared with H. tripunctata. A description of the adult male of H. senata is given by Roback (1971).

Pupa (Figs. 13, 14a)

Roback (1981) gives a description of the pupa to which may be added: apophyse marked on tergites and sternites II–VIII. Anterior median margin of tergites II–VI with a distinct pigmented area. Shagreen on tergites as in Fig. 13. Lateral borders of all segments tuberculate. Median axis of tergites I–VIII with simple spines only. Tergites I–VII on each side with a median rectangular field and a lateral pleural longitudinal band of multibranched spinules (mbs). On tergites II–VII the central area of the rectangular mbs field is devoid of mbs and here spines occur. Tergite VIII with complete rectangular mbs fields only, lateral pleural mbs bands absent.


Remarks

The two species now recognised in the genus Hayesomyia are readily recognisable in both adult and pupal stages. The larva of H. tripunctata is not yet known. Adults of the sole Nearctic representative lack brown pigmentation on the thorax and the wings are unmarked. The sole Palaeartic representative of the new genus has a distinct brown pigmentation pattern on an otherwise pale yellow thorax and wing markings readily recognisable and distinctly different from the Palaeartic Thienemannimyia and Rheopelopia species. Pupae of the new genus may be separated on the basis of the distribution of the multibranched setae on the abdominal tergites. Additionally the number and size of the spines on the median axis between the multibranched setae is different in both species. In H. tripunctata the spines are more robust and less numerous than in H. senata (Fig. 14).

Systematic position of Hayesomyia

In the key to the Pentaneurini given by Fittkau (1962) the new genus Hayesomyia keys to the Thienemannimyia series in all life stages. Fittkau (1962) first recognised the Thienemannimyia Reihe as a coherent group of four genera, Arctopelopia, Conchapelopia, Rheopelopia and Thienemannimyia, within the tribe Pentaneurini. Roback (1971) regarded the genera Thienemannimyia and Rheopelopia as subgenera of Thienemannimyia Fittkau, recognised subgenera within Arctopelopia and Conchapelopia and included the genus Xenopelopia and a new genus Telopelopia in his concept of the Thienemannimyia group. Murray (1976) also included Telopelopia in the Thienemannimyia group sensu Fittkau but did not consider Xenopelopia a member of this series. The Thienemannimyia group of genera was briefly treated by Sæther (1977) who, on the basis of studies on the female genitalia, suggested that the group should be composed of the genera Thienemannimyia, Xenopelopia, Telopelopia and Guttipelopia. Later, Roback reverted to the general concept of the Thienemannimyia group sensu Fittkau but still retained subgenera in Conchapelopia and included the genus Telopelopia with suppor-
Plate 2a-d. Posterior abdominal tergites of pupae. – a Rheopelopia maculipennis (Zett.). – b Hayesomyia tripunctata (Goetgh.). – c Conchapelopia viator (Kieff.). – d Thienemannimyia pseudocarnea Murray.
tive evidence from the pupa described in an addendum to the same paper (Roback, 1981). In the recent works on larval Chironomidae Fittkau and Roback (1983) do not make any definitive statements on the composition of the Thienemannimyia group. However some of the subgenera previously recognised by Roback (1971, 1981) have been elevated to generic rank and based on comments given by these authors, with the inclusion of the new genus described here, the Thienemannimyia group may now be considered to be composed of the genera: Arctopelopia, Conchapelopia, Helopelopia, Hayesomyia, Meropelopia, Rheopelopia, Thienemannimyia, and Telopelopia.

Adults of the new genus exhibit characteristics suggesting a relationship with the genera Thienemannimyia and Rheopelopia. However, the adults of Hayesomyia may be distinguished from Thienemannimyia by the presence of a small scutal lamella, while the absence of a tarsal brush on tarsomere 3 of the middle legs further distinguishes Hayesomyia from Rheopelopia. The pupa of Hayesomyia is readily separable from all known Thienemannimyia and Rheopelopia species. Absence of LS setae on abdominal segments I–VI distinguishes Hayesomyia from all known Thienemannimyia while the presence of normal LS setae on segments VII–VIII and the structure and shape of the thoracic horn separates Hayesomyia from Rheopelopia. Multibranched spinules of the pupal abdominal shagreen are present in all genera of the Thienemannimyia group. The distribution pattern of these setae in Hayesomyia most closely resembles Rheopelopia (Plate 2). In the recent work on larval Chironomidae of the Holarctic region (Fittkau and Roback 1983) Hayesomyia keys to the genus Thienemannimyia. Larvae of Hayesomyia differ from Thienemannimyia in the shape of the distal margin of the basal antennal segment which in Thienemannimyia is produced to a point on the outer side (Fittkau and Roback I. c. Fig. 5.34). The larva of H. senata has a smooth distal margin on the basal antennal segment and an A. R. of 4.14–4.48 (Roback 1981). The larva of H. tripunctata is unknown.

The following key replaces couplet 35 in Fittkau and Roback (I. c.) to include Hayesomyia

35. Antenna not quite 2 × as long as mandible. Antennal ratio 6. Distal margin of basal segment produced into point on outer side. Segment 2 at least 5 × as long as wide. Basal ring of blade as long as wide .... Thienemannimyia
   Antenna at least 2 × as long as mandible. Antennal ratio less than 6. Distal margin of basal segment not produced into point on outer side. Segment 2 at least 8 × as long as wide. Basal ring of blade at least 2 × as long as wide ......... 35 a

35 a Antennal ratio about 5. Segment 2 of antenna 8 × as long as wide. Ratio of basal segment of antenna to mandible <1.8. Distance between ventrolateral setae 2 and 3 of mandible greater than that between seta 3 and sensillum minusculum. Posterior margin of head light brown ......... Meropelopia
   Antennal ratio less than 4.5. Segment 2 of antenna 10 × as long as wide. Ratio of basal segment of antenna to mandible >1.8. Distance between ventrolateral setae 2 and 3 of mandible ⅓ as great as that between seta 3 and sensillum minusculum. Posterior margin of head dark brown ......... Hayesomyia

Acknowledgements

We are indebted to Mr. R. French, Senior Technician, Dept. of Zoology, University College Dublin, for preparing the electron micrographs.

References


206
MURRAY, D. A. 1976. Four new species of Conchapelopia Fittkau from Nepal, with a discussion of the phylogeny of the nepalicola-group. (Diptera: Chironomidae). Ent. scand. 7: 293–301