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SPIXIANA	Supplement 11	195–207	München, 30. Dezember 1985	ISSN 0177-7424

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

MURRAY, D. A. & E. J. FITTKAU (1985): *Hayesomyia* a new genus of Tanypodinae from the Holarctic (Diptera, Chironomidae). – Spixiana, Suppl. 11: 195–207.

A new genus of Tanypodinae, *Hayesomyia*, is erected for the species *Tanypus tripunctatus* Goetghebuer (GOETGHEBUER 1922) and *Tanypus senatus* Walley (WALLEY 1925) which occur in the Palaearctic 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 multibranched 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 *Thienemannimyia* group of genera within the tribe Pentaneurini.

Dr. Declan A. Murray, Department of Zoology, University College Dublin, Stillorgan 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 GOETGHEBUER (1922), was provisionally placed in the genus *Thienemannimyia* 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 *Thienemannimyia senata* (Walley) which show features similar to the Palaearctic *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*.

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A generic diagnosis, a description of the pupa and a redescription of the adult male of *H. tripunctata* (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 tripunctatus* Goetghebuer 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 ta_3 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 anteanepisternum 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 R_{4+5}, R_{2+3} well developed, R_3 ending midway between R_1 and R_{4+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

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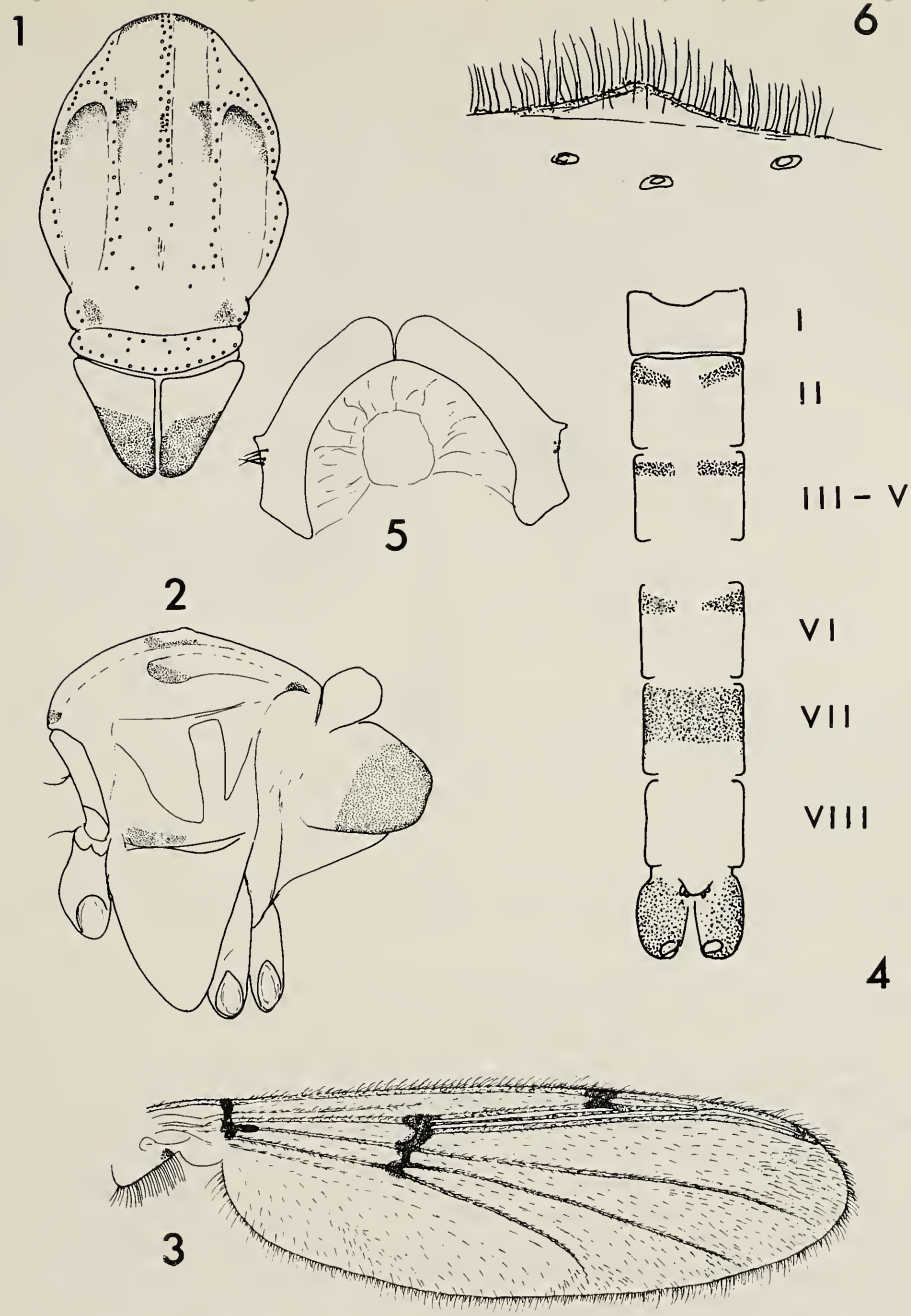

Figs 1–6. *Hayesomyia tripunctata* (Goetgh.), – 1 Thorax, dorsal. – 2 Thorax lateral. – 3 Wing. – 4 Abdomen, pigmentation pattern of tergites. – 5 Antepronotum. – 6 Scutal lamella.

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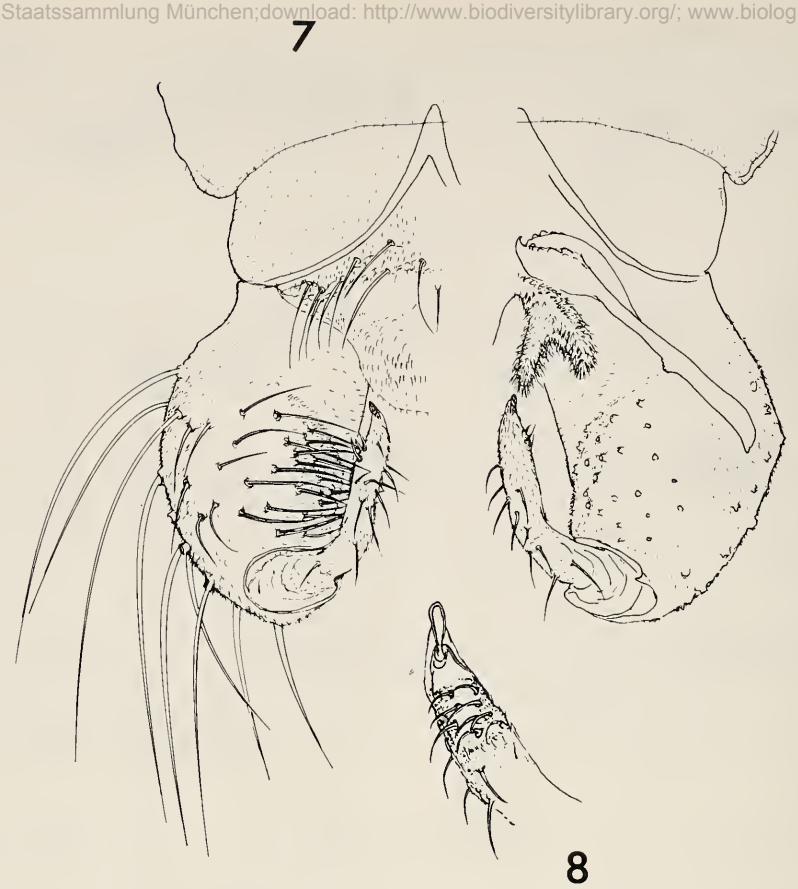

Figs 7–8. *Hayesomyia tripunctata* (Goetgh.), – 7 Hypopygium. – 8 Detail of apex of gonostylus.

sheath of male reaches $^2/_3$ 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 $^1/_2$ as long as head and almost 2× as long as mandible. Antennal ratio 4.0. Basal segment 8× as long as basal width, with ring organ at base of apical $^1/_3$; distal margin of basal segment not produced into point on outer side; segment 2 10× as long as wide; last segment about $^3/_5$ length of segment 3. Style clubbed apically, reaching to middle of last segment. Lauterborn organs very small. Blade scarcely longer than flagellum, 6,5× as long as hight of basal ring; basal ring 2× as high as wide. Accessory blade extending to level of last segment. Mandible uniformly curved, distal $^1/_2$ strongly narrowed, almost 2,5× as long as basal width; proximal $^1/_2$ strongly broadened. Apical tooth 2× as long as basal width, almost $^1/_4$ length of mandible; distal $^1/_2$ 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 $^1/_2$ 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

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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 bifid, $^1/_2$ as long as ligula, inner point $^1/_3$ 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 Goetghebuer, 1922: 59, Fig. 17
Ablabesmyia tripunctata Goetghebuer, 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 R_1 with the costa (Fig. 3). A slightly darkened area around the junction of R_{4+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 $^2/_3$, tergite 8 all pale, gonocoxite distinctly brown, gonostylus 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. Pedicel with 5 ventral and 1 lateral setae.

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, 33 μ long and 11 μ high (Fig. 6).

Wing: Costa slightly produced beyond R_{4+5} and ending just before M_{1+2} (Fig. 3). R_{2+3} well developed, R_3 ending on the costa midway between R_1 and R_{4+5}. Wing membrane with setae slightly more dense in the apex of cell r_{4+5}, around termination of M_{3+4} and Cu_1 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):

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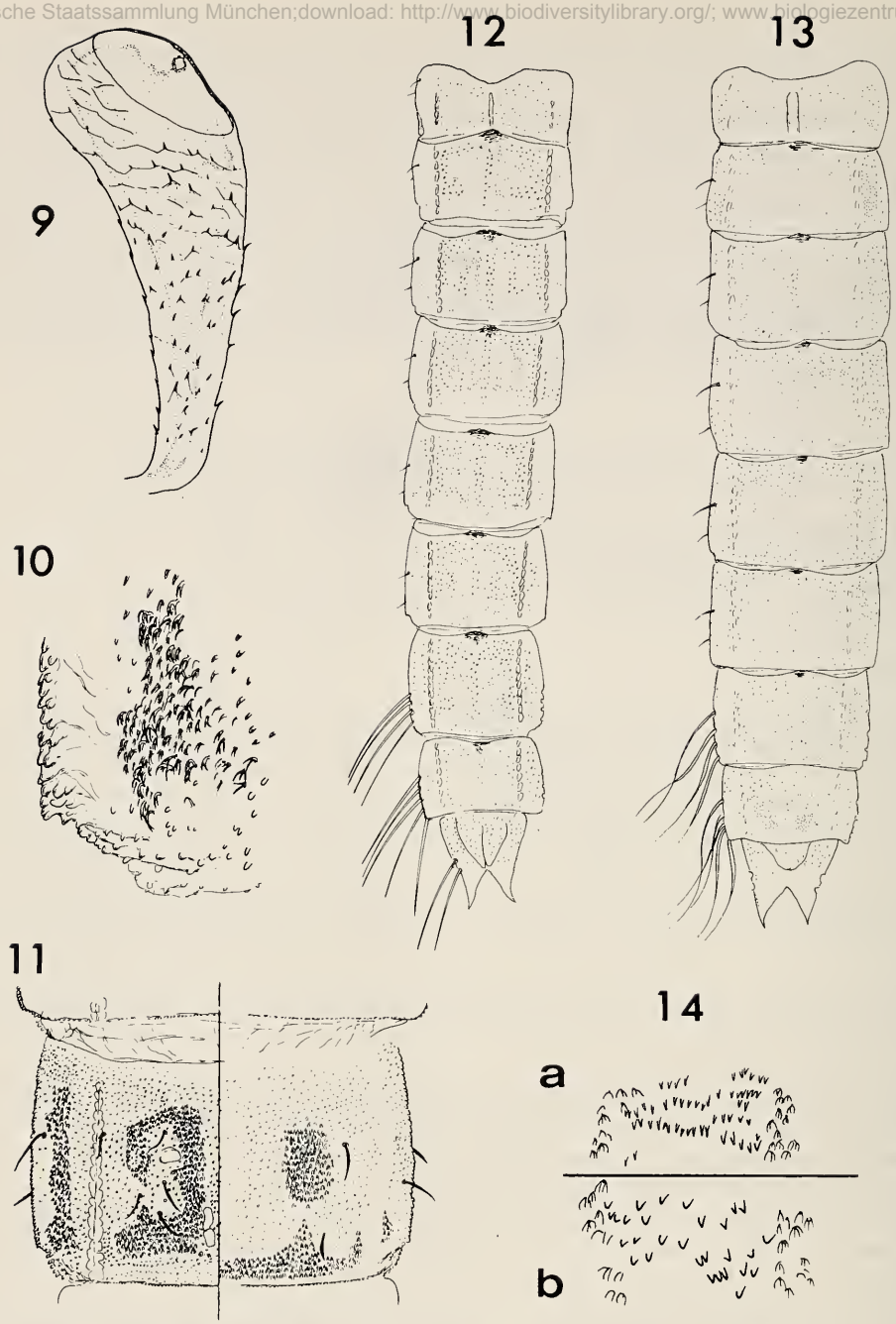

Figs 9–14; 9–12. *Hayesomyia tripunctata* (Goetgh.), pupa. – 9 Thoracic horn. – 10 Postero lateral corner of T IV. – 11 Setation and shagreen on T IV, dorsal/ventral. – 12 Abdomen. – 13 *H. senata* (Walley) Abdomen. – 14 Detail of shagreen on mid axis of T IV in a) *H. senata* and b) *H. tripunctata*.

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	Fe	Ti	Ta_1	Ta_2	Ta_3	Ta_4	Ta_5	LR	BV	SV
P_1	1000	1257	990	514	362	238	124	0.78	1.82	3.27
P_2	1066	1061	671	295	228	171	95	0.63	2.69	1.17
P_3	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 dorsomedian 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; precorneal seta 1; Mth setae (sensu Fittkau 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 spinules (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.

Material: Holotype missing. Neotype here designated, male imago, leg. D. Murray, 19/7/84, R. Slaney (IGR S 983450), Wexford, Ireland. Slide mounted in euparal in coll. Zool. Staatssammlung, Munich. Additional material: 1 pupa, numerous pupal exuviae leg. B. Hayes, R. Slaney (IGR S 977345); 3 pupae, leg. G. Morgan, R. Bandon 22/7/81. 27 ♂♂, 8 ♀♀, leg. W. Schacht, Siirt, 500 m. a. s. Botan-Cayi Valley, 23/6/1985 in coll. Zool. Staatssammlung, Munich. Voucher slide mounted pupal exuviae deposited in the Natural History Museum, Dublin; British Museum (Natural History) London and Zoologische Staatssammlung Munich.

Distribution

The adult male of this species was described by Goetghebuer (1922) on material collected in Belgium ("Pris a Falaen" 12 June 1921). It was also recorded from Austria (Goetghebuer 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 (Fittkau 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: *Thienemannimyia laeta* (Meig.), *T. pseudocarnea* Murray, *Conchapelopia viator* (Kieff.) and *Rheopelopia maculipennis* (Zett.).

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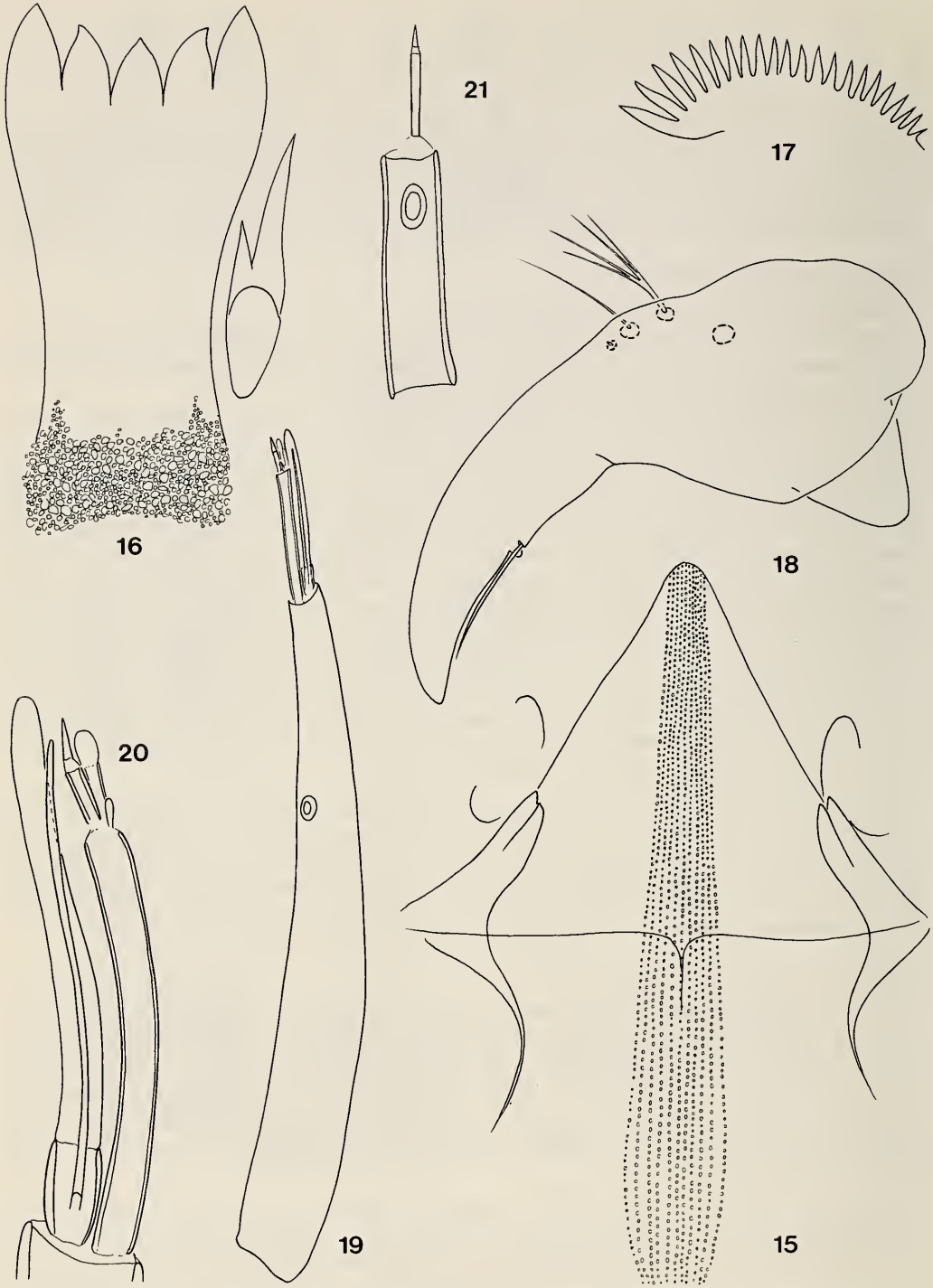

Figs 15–21. *H. senata* (Walley), larva. – 15 Mentum and M appendage. – 16 Ligula and paraligula. – 17 Pecten hypopharyngis. – 18 Mandible. – 19 Antenna. – 20 Apex of antenna. – 21 Maxillary palp, basal segment with b seta.

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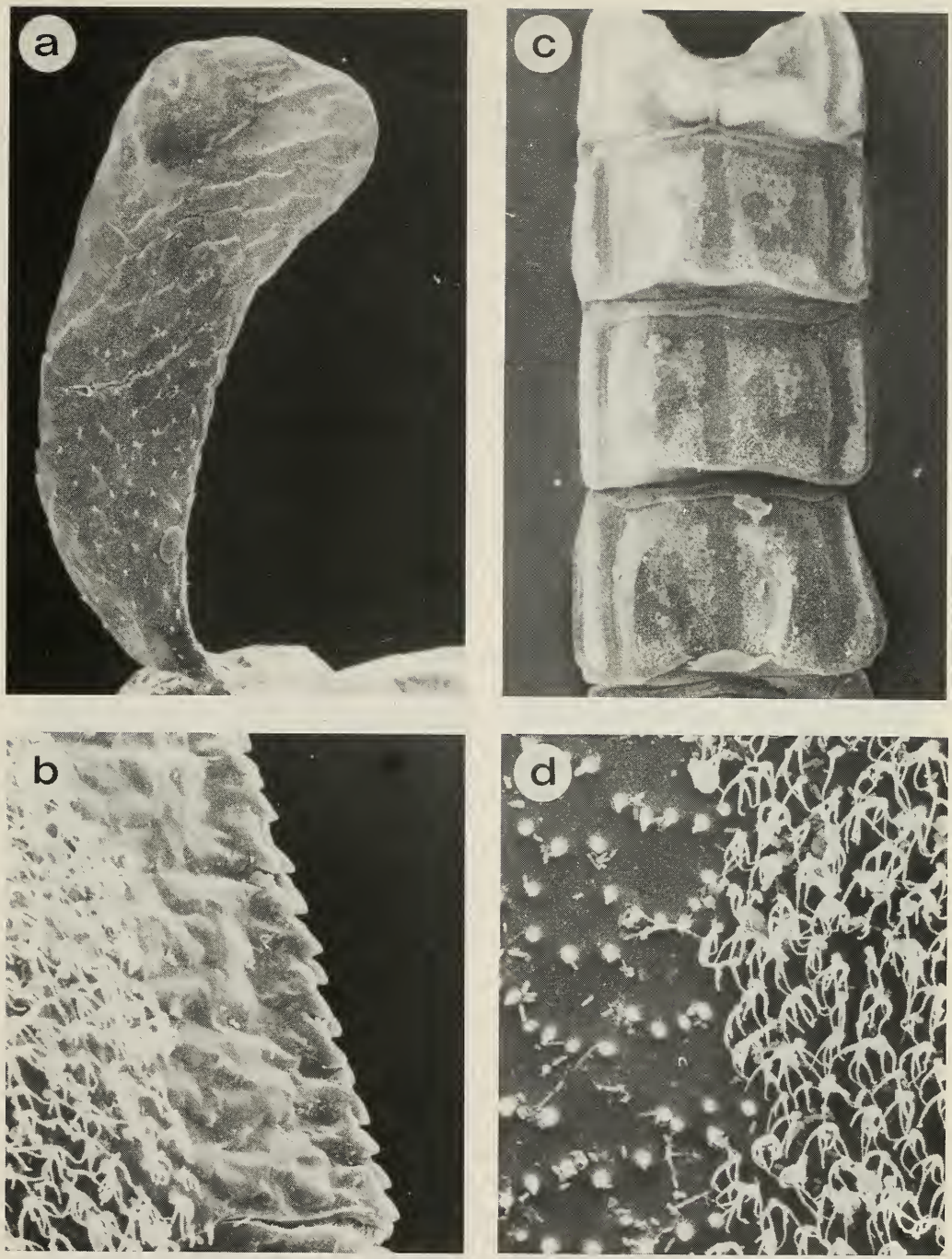

Plate 1 a–d. *H. tripunctata* (Goetgh.), pupa. – a Thoracic horn. – b Lateral border of segment IV. – c Abdominal tergites I–IV. – d Detail of part of tergite IV showing multibranched setae and spines on the mid dorsal region slightly right of center.

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H. senata (Walley) n. comb.

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.

Larva. See Roback (1981), generic description and Figs 15–21.

Material examined: 1 Pe, Chattooga River, Chattooga Co., Georgia, U.S.A., 14/6/75; 1 pupa Chattooga River, 25/9/74, both leg. B. Caldwell. 1 Pe, Walnut Creek, Atchinson Co., Kansas, U.S.A., 22/7/81, leg. L. Ferrington. 1 larva, Potomac River, 24/8/76, leg. Wolf and Cohen. 1 larva Potomac River, 23/8/72, leg. Richardson.

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 Palaearctic 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 Palaearctic *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 Saether (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-

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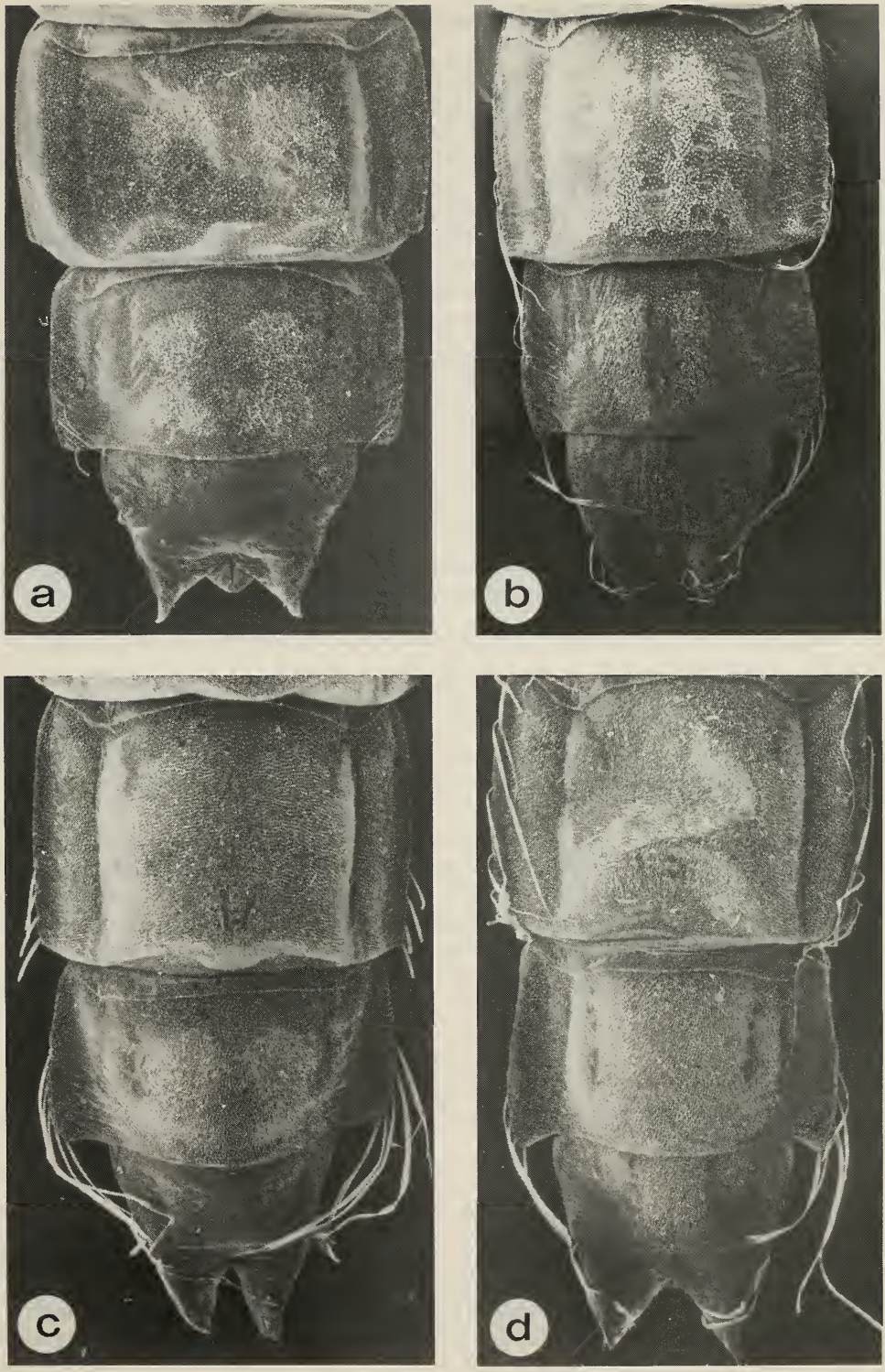

Plate 2 a–d. Posterior abdominal tergites of pupae. – a *Rheopelopia maculipennis* (Zett.). – b *Hayesomyia tripunctata* (Goetgh.). – c *Conchapelopia viator* (Kieff.). – d *Thienemannimyia pseudocarnea* Murray.

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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 l. 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 (l. 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 ½ 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.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: Spixiana, Zeitschrift für Zoologie, Supplement

Jahr/Year: 1984

Band/Volume: 011

Autor(en)/Author(s): Murray Declan A., Fittkau Ernst Josef

Artikel/Article: Hayesomyia a new genus of Tanypodinae from the Holarctic (Diptera, Chironomidae) 195-207