Zootaxa 1576: 1–13 (2007)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Zealantha thorpei gen. et sp. nov. (Diptera: Anthomyzidae), first family representative from New Zealand

JINDŘICH ROHÁČEK
Silesian Museum, Tyršova 1, Opava, CZ-746 01 Opava, Czech Republic. E-mail: rohacek@szmo.cz

Abstract

The first representative of the family Anthomyzidae discovered in New Zealand, viz. *Zealantha thorpei* sp. nov., is described and illustrated. *Zealantha* gen. nov. is diagnosed and its relationship to other known genera of Anthomyzidae is discussed on the basis of morphological features including characters of the male and female internal genitalia. Notes on the habitat association and distribution of the new species are given.

Key words: Anthomyzidae, *Zealantha* gen. nov., *thorpei* sp. nov., taxonomy, relationships, biology, distribution, New Zealand

Introduction

The Anthomyzidae is a small group of acalyptrate Diptera (20 genera and 94 species described to date including 2 fossil genera and species) with most species associated with larger graminoids (Poaceae, Cyperaceae, Typhaceae, Juncaceae) in damp habitats; only a few species are known to develop in dicotyledonous plants or in sporocarps of fungi (Roháček 2006). Larvae of Anthomyzidae have been found to feed in partly rotting plant tissues and the formation of their cephalopharyngeal skeleton suggests they are probably microsaprophagous.

No species of the acalyptrate family Anthomyzidae has been described from the Australasian Region up to the present (see Vockeroth 1989; Roháček 1998); only Colless & McAlpine (1970, 1991) refer to the occurrence of unidentified species of *Amygdalops* Lamb, 1914 in northern Australia but there has been no evidence of the family in New Zealand. The nearest records of Anthomyzidae (3 species of the genus *Amygdalops*) are from Indonesia (Java – de Meijere 1916; Vockeroth 1977; Sueyoshi & Roháček 2003) and my current revision (Roháček, in prep.) has revealed *Amygdalops* species also in Australia (Queensland), Papua New Guinea, Mariana Is., Palau Is., Ponape Is. and the Philippines apart from more distant areas of the Oriental and Oceanian Regions.

During the years 2006–2007 Stephen E. Thorpe collected a good series of an unknown species of Anthomyzidae in several localities in the Auckland metropolitan area (New Zealand). This species, considered by him probably to be introduced, surprisingly was found not to belong to *Amygdalops* or any other genus of the family known from the adjacent biogeographical regions. Externally the species is reminiscent of an unusually coloured *Anthomyza* species but closer examination revealed it is not closely related to this group (which also is represented in the Oriental Region), nor to any other genus hitherto recognized in the world fauna.

The discovery of a member of the family Anthomyzidae in New Zealand is considered highly important from a biogeographical point of view. Not only does it substantially extend the world distribution of the family but also represents the first endemic anthomyzid genus in the Australasian Region. For all these reasons the new New Zealand genus and species are described below along with discussion of relationships and notes on biology and distribution.

Accepted by D. Bickel: 30 May 2007; published: 5 Sept. 2007

Material and methods

The material examined is deposited in the following collections: NZAC—New Zealand Arthropod Collection, Auckland, New Zealand, SMOC—Silesian Museum, Opava, Czech Republic. The presentation of label data is strictly verbatim for the holotype but standardized for other material examined. The area codes in New Zealand follow those of Crosby et al. (1998). Abdomens of several specimens were detached and genitalia dissected. After examination, all dissected parts were put into plastic tubes containing glycerine and pinned below the respective specimens; this is indicated by the abbreviation "genit. prep." in the text.

The new genus is diagnosed following a sequence of characters of Roháček (2006). Morphological terminology follows that used in Roháček (1998, 2006) including terms of the male hypopygium. The "hinge" hypothesis of the origin of the eremoneuran hypopygium, re-discovered and documented by Zatwarnicki (1996), has been accepted and, therefore, the following alterations of terms of the male genitalia need to be listed (new term first): ejacapodeme = ejaculatory apodeme, epandrium = periandrium, medandrium = intraperiandrial sclerite, phallapodeme = aedeagal apodeme, transandrium = posterior hypandrial bridge. Morphological terms of the male genitalia are displayed in Figs 6–14, of the female postabdomen and genitalia in Figs 17–18, 21–22.

Abbreviations of morphological terms used in text and/or figures:

A_1	anal vein	oc	ocellar (seta)
ac	acrostichal (seta)	ors	orbital (seta)
afa	aedeagal part of folding apparatus	pa	postalar (seta)
ag	accessory gland	pg	postgonite
ar	arista	pha	phallapodeme
bm	basal membrane	poc	postocular (setulae)
C	costa	pp	phallophore
ce	cercus	ppl	propleural (= proepisternal) (seta)
cs	connecting sclerite	prg	pregonite
Cs_3, Cs_4	3rd, 4th costal section	prs	presutural (seta)
ct	ctenidial spine	pvt	postvertical (seta)
CuA_1	cubitus	R_1, R_{2+3}, R_{4+5}	1st, 2nd, 3rd branches of radius
dc	dorsocentral (seta)	r-m	radial-medial (= anterior, t_a) cross-vein
dm	discal medial cell	s	saccus of distiphallus
dm-cu	discal medial-cubital (= posterior, t_p) cross-vein	S1-S10	abdominal sterna
ea	ejacapodeme	sa	supraalar (seta)
ep	epandrium	sc	scutellar (seta)
f	filum of distiphallus	Sc	subcosta
f_1, f_2, f_3	fore, mid, hind femur	stpl	sternopleural (= katepisternal) (seta)
fc	fulcrum of phallapodeme	svi	subvibrissa
gs	gonostylus	T1-T10	abdominal terga
hu	humeral (= postpronotal) (seta)	t_1, t_2, t_3	fore, mid, hind tibia
hy	hypandrium	ta	transandrium
is	internal sclerite(s)	vi	vibrissa
M	media	vr	ventral receptacle
ma	medandrium	vte	outer vertical (seta)
npl	notopleural (seta)	vti	inner vertical (seta)

***Zealantha*, gen. nov.**

Type species: *Zealantha thorpei* sp. nov. (hereby designated)

Etymology: The name is an abbreviated conjunction of "*Zeal*[and] + *anth*[omyz]*a*" and is derived from the name of the country (New Zealand) where the type species was found. Gender feminine.

Diagnosis: (1) **Head** (Figs 1, 4) as long as high. (2) Eye large, convex, broadly subovoid, with longest diameter oblique, densely white pilose. (3) Occiput strongly concave. (4) Head velvety grey microtomentose; occiput with a pair of medial silvery grey microtomentose stripes. (5) Frons relatively narrow; frontal triangle narrow and poorly delimited and like ocellar triangle velvety microtomentose; (6) Ocellar triangle flat and ocelli relatively large. (7) Frontal lunule small but distinct. (8) Antenna geniculate between pedicel and 1st flagellomere; pedicel short, simple. (9) Arista short-ciliate. (10) Palpus slender, with 1 distinct subapical seta. Cephalic chaetotaxy: (11) pvt unusually long and crossed; (12) vti longest of cephalic setae (but vte, oc, and posterior ors of almost the same length); (13) vte as long as or slightly shorter than vti; (14) oc inserted outside the ocellar triangle; (15) 3 ors, 2 posterior strong, 1 anterior short, plus 1 microsetula just in front of anterior ors; (16) a single row of minute postocular setulae; (17) 1 long vi and 1 long subvibrissa; (18) peristomal setulae few in number, about twice as long as postoculars.

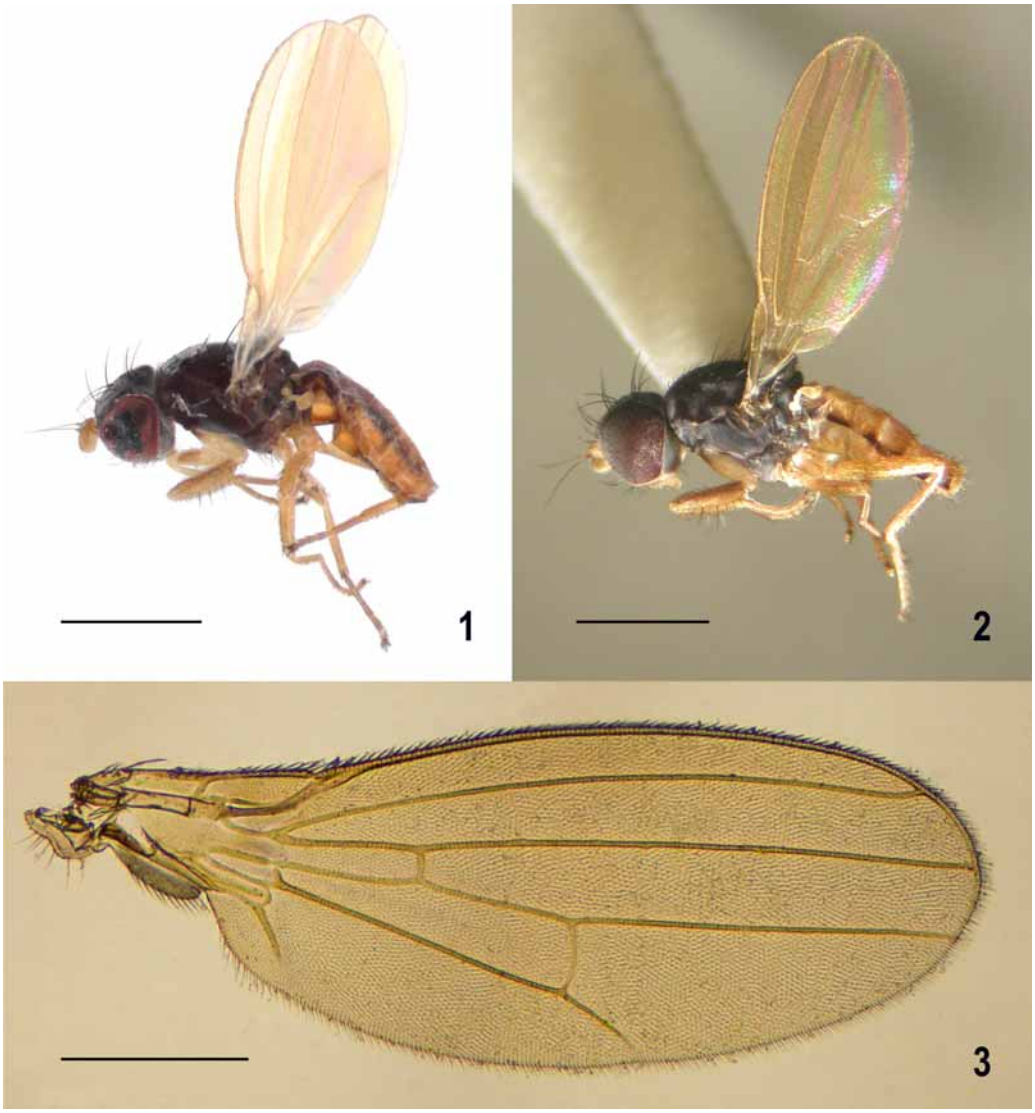
(19) **Thorax** slightly narrower than head. (20) Thorax unicolourous, dark, with dense bluish grey velvety microtomentum. Thoracic chaetotaxy: (21) 1 hu, 2 npl (anterior longer); (22) 1 small sa, 1 longer pa; (23) 1 small weak prs; (24) 2 postsutural dc, the anterior relatively strong; (25) ac microsetae in 4 rows in front of suture, in 2 rows behind anterior dc; (26) 2 sc, the apical long, the laterobasal small; (27) 1 well developed ppl; (28) 2 stpl, the anterior only slightly shorter. Legs (29) unicolourous or f_1 and t_1 somewhat darkened; (30) f_1 with short ctenidial spine (Fig. 19); (31) t_2 with distinct ventroapical seta; (32) male f_3 with posteroventral row of setae, with those in distal part shortened and thickened (Fig. 16). (33) Wing (Fig. 3) moderatelly long and wide; (34) wing membrane unicolourous; (35) C with small and sparse spinulae; (36) R_{2+3} long, sinuate, parallel to C with apex upcurved to it; (37) R_{4+5} very slightly recurved; (38) R_{4+5} and M almost parallel; (39) M straight or very slightly bent; (40) discal (dm) cell moderate, widened distally, with r-m situated near its middle; (41) CuA_1 moderately short, not reaching wing margin; (42) A_1 short, ending before wing margin; (43) alula small and narrow.

(44) **Male abdomen** ochreous to yellow with brown spots in posterolateral corners of T1-T5. (45) T1 separate from T2, at least dorsally; (46) T2-T5 large and broad, wrapping onto ventral side of abdomen; (47) S1-S5 much narrower and paler than terga. Male postabdomen: (48) T6 reduced to membranous bare unpigmented strip; (49) S6-S8 fused dorsolaterally; (50) S6 strongly asymmetrical, very short and transverse; (51) S7 asymmetrical, placed laterally, twice length of S6; (52) S8 relatively long, less asymmetrical and situated dorsally.

Male genitalia (Figs 5–14). (53) Epandrium medium broad; setosity sparse, with dorsolateral seta longest. (54) Medandrium subtriangular, dorsally acute-angled (Fig. 6). (55) Cercus small, short, pale. (56) Gonostylus simply formed, setose on inner side, micropubescent on outer side. (57) Hypandrium relatively long, simple, with internal lobes reduced; (58) transandrium (Fig. 10) simply arched, without caudal process. (59) Pregonite fused to hypandrium, anteriorly flat and incurved, posteriorly somewhat projecting ventrally, with 2 groups of setae. (60) Postgonite robust, widened and flattened (Fig. 9). (61) Aedeagal part of folding apparatus (Fig. 14) covered by numerous flat spines arranged in dense curved rows. (62) Connecting sclerite (Figs 8–10) elongately plate-shaped, situated ventrally to basal membrane. (63) Basal membrane medially with flattened spine-like excrescences. (64) Phallapodeme very robust, with widened and posteriorly forked base. (65) Aedeagus with simple frame-like phallophore and (66) distiphallus composed of larger saccus and slender sclerotized filum. (67) Saccus unusually short, largely sclerotized (Fig. 14), with membranous part reduced

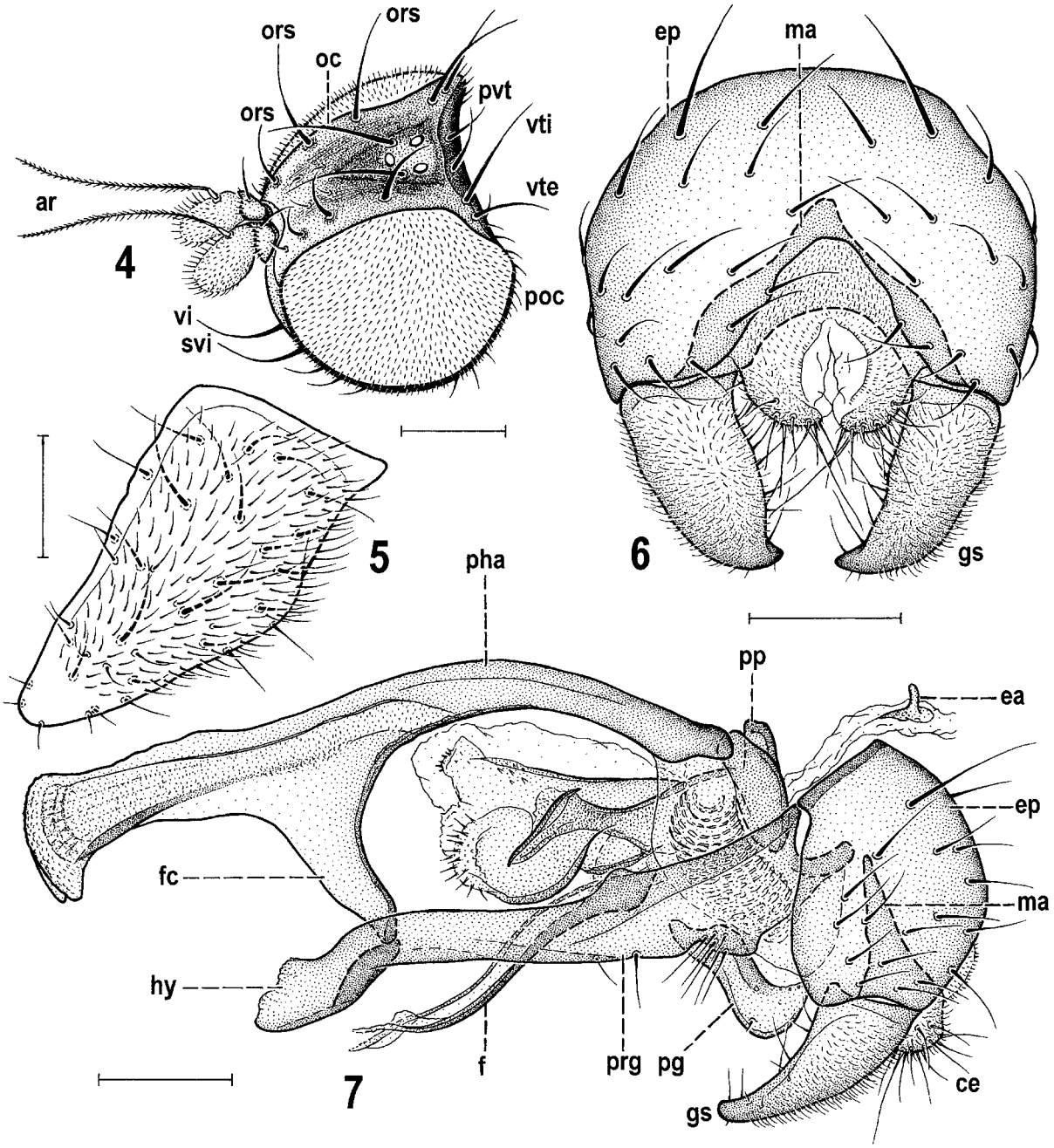
and distally armed by small spinulae only; (68) filum relatively short, formed by 2 elongate sclerites, the ventral being basally robust and heavily sclerotized. (69) Ejacapodeme small, with digitiform projection.

(70) **Female abdomen** similarly coloured (Fig. 15) but with broader terga (T2–T6) than in male. (71) Postabdomen (Figs 17-18) short and broad; (72) T6 and S6 large, both transverse. (73) T7 and S7 fused to form unicolourous ring-shaped tergosternum where the boundary of S7 is indicated by a depressed line; 7th spiracles embedded in tergosternum; (74) T8 plate-shaped, transverse, with rounded posterior corners; (75) S8 short, semicircular, slightly protruding posteroventrally, with a narrow, posteromedial fissure. (76) Internal sclerotization of female genital chamber (Figs 21–22) formed by 1 pair of posterior flat crooked sclerites and (77) 1 large anterior ovoid annular sclerite. (78) Anterior part of uterus with weakly sclerotized short-cylindrical ventral receptacle (Fig. 23) having a terminal curved digitiform projection. (79) Accessory gland small, with stalked microglobulae on surface, connected with terminally dilated duct by thin stem. (80) Spermathecae (1+1) very short pyriform (Fig. 20), with long cervix, body surface plain with some stalked microglobulae, spermathecal duct relatively short and finely ringed. (81) T10 small, transverse, with 1 pair of long medial dorsal setae and some micropubescence around them; (82) S10 (Fig. 22) wider than T10, simple, almost bare except for posterior marginal setose area. (83) Cercus short and broad, with rich setae.



FIGURES 1–3. *Zealantha thorpei* **gen. et sp. nov.** (paratypes). 1–2. Habitus of female, laterally. 3. Wing of male. Scales: Figs 1–2 = 1.0 mm, Fig. 3 = 0.5 mm. Photo by Birgit Rhode (1) and J. Roháček (2–3).

Discussion: The new genus is best characterized by the combination of the characters No. 2–4, 6, 9, 11, 14–15, 17, 20, 23, 27, 30, 32–35, 44, 54–55, 58–62, 67–68, 71, 73, 75–78, 80, 82 and 83. However, only some of these features can be considered apomorphic and a few of them are obviously unique (U) within the family. These include: (2) eye densely long-pilose (U), (4, 20) head and thorax with peculiar velvety dark bluish grey microtomentum (U), (11) pvt unusually long, (14) oc arising outside the ocellar triangle (this condition is otherwise only known in some species of the genera *Stiphrosoma* Czerny, 1928, and *Mumetopia* Melander, 1913), (27) ppl setula longer than usual, (44) abdomen largely ochreous-yellow, (54) medandrium dorsally pointed (U), (60) postgonite robust, widened, (62) connecting sclerites situated ventrally, (67) saccus with reduced membranous part and well sclerotized, (73) T7 and S7 fused to form tergosternal ring, (78) ventral receptacle subcylindrical with terminal curved digitiform projection, (80) spermathecae with simple surface and long cervix, (82) S10 almost bare (micropubescence reduced).



FIGURES 4–7. *Zealantha thorpei* **gen. et sp. nov.** (male, paratype). 4. Head, dorsolaterally. 5. Gonostylus, lateroventrocaudally (widest extension). 6. External genitalia, caudally. 7. Genitalia, laterally. Scales: Fig. 4 = 0.2 mm, Fig. 5 = 0.05 mm, others = 0.1 mm. For abbreviations see text.

As noted in the introduction the sole member of the new genus resembles an aberrantly coloured *Anthomyza* species (shared features: similar frontal chaetotaxy, shortly ciliate arista, mesonotal chaetotaxy, f_1 with ctenidial spine, male f_3 with short thickened posteroventral setae, similar wing venation, well developed female tergosternum T7+S7) but the male and female genitalia differ substantially from those of *Anthomyza* congeners (e.g. by the form of medandrium, postgonite, filum and saccus of distiphallus, construction of female postabdomen, S8, S10, internal sclerites of genital chamber, ventral receptacle, cerci, etc.).

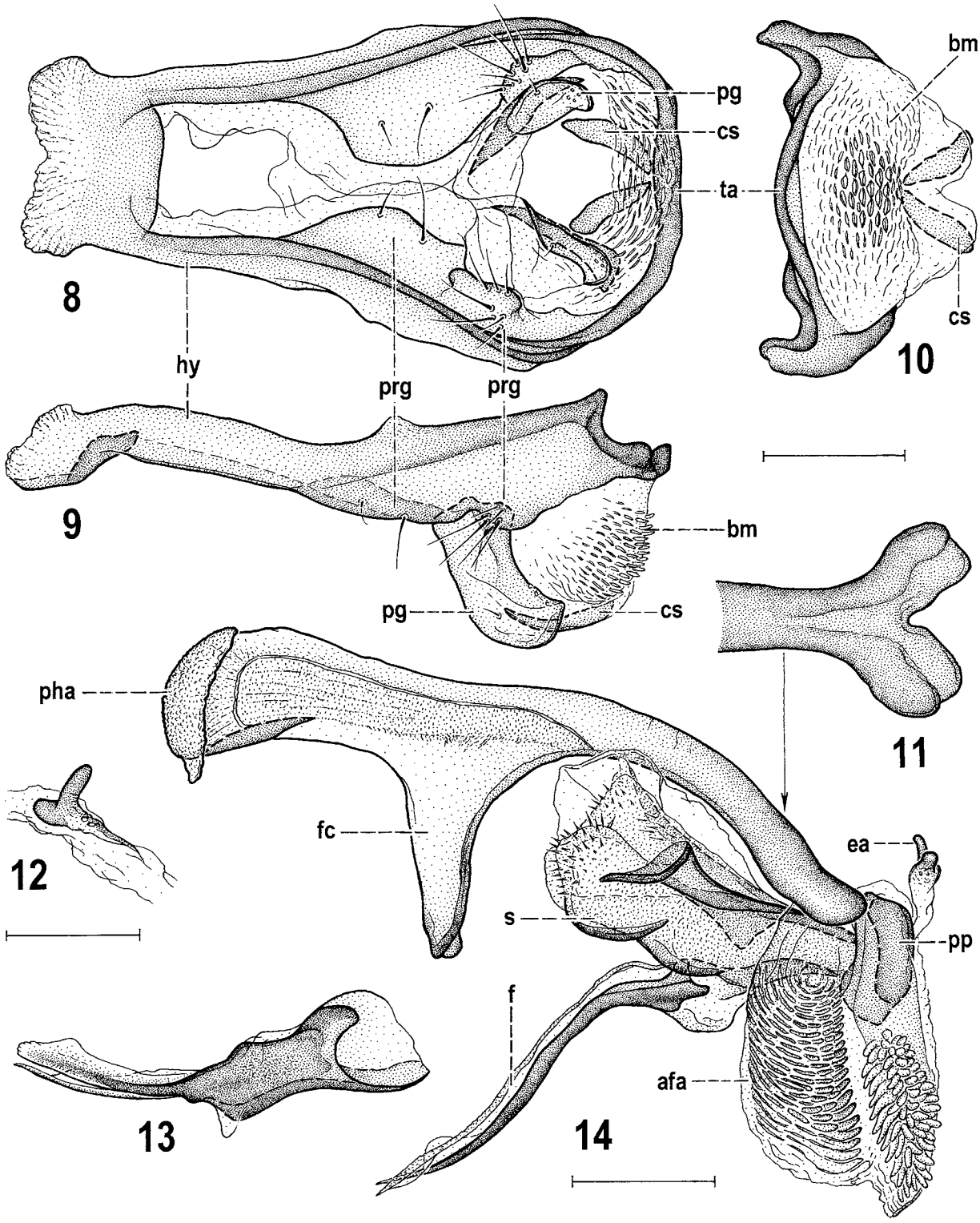
Interestingly, some genitalic features of *Zealantha* are reminiscent of those of various (and apparently unrelated) genera. For example, the ventrally positioned connecting sclerite and the widened postgonite most resemble those of the Malagasy genus *Amnonthomyza* Roháček, 1993 which also has dorsally narrowed (but not acute-angled) medandrium and short cercus (see Roháček 1993: 182–189). The short saccus with reduced membranous apical part can also be found in the E. Palaearctic genus *Epischnomyia* Roháček, 2006 but detailed construction of the saccus is entirely different (composed of extremely large spine-like processes in *Epischnomyia*) not to mention other quite dissimilar parts of male genitalia. The form of the female S8 (short, convex, with posteromedial fissure or incision) probably represents the plesiomorphic condition and can be found in various unrelated genera including *Amygdalops* Lamb, 1914, *Margdalops* Roháček & Barraclough, 2003, *Cercagnota* Roháček & Freidberg, 1993, *Stiphrosoma* Czerny, 1928, *Paranthomyza* Czerny, 1902 and *Epischnomyia* Roháček, 2006. Similarly, the tergosternal ring probably evolved by the fusion of female T7 and S7 several times within Anthomyzidae because this structure occurs not only in *Zealantha* but also in most species of *Anthomyza* Fallén, 1810, in *Cercagnota* Roháček & Freidberg, 1993, *Epischnomyia* Roháček, 2006, *Receptrixa* Roháček, 2006, *Stiphrosoma* Czerny, 1928 (where it is dorsally divided), and in the Afrotropical wingless genus *Apterosepsis* Richards, 1962 (see Roháček 1998). On the other hand, the internal sclerotization of the female genital chamber with large ovoid annular sclerite (character 77) is rather unusual in the known genera of Anthomyzidae. It is most similar to the condition found in *Receptrixa* Roháček, 2006 which also has small pyriform spermathecae on short broad ducts but differs by the voluminous strongly sclerotized ventral receptacle and many other features (including elongate, apically fused female cerci). However, the form of the ventral receptacle of *Zealantha* also is distinctive and its simple female spermathecae are distinguished by the long sclerotized cervix.

In summary, the new genus combines various characters known (or similar to those) in a number of genera of Anthomyzidae but it also possesses several unique features which delimit this taxon from them unambiguously. For the time being, none of the decribed genera was recognized to be distinctly allied to *Zealantha*. It is therefore expected that the related taxa will be found in the future among the hitherto largely unknown anthomyzid fauna of the Australasian, Oceanian and/or Oriental Regions.

***Zealantha thorpei,* sp. nov.**
(Figs 1–23)

Type material: Holotype ♂ labeled: “NEW ZEALAND AK, Henderson Valley Scenic Reserve, 29 Dec 2006, S. E. Thorpe”, “Candia Road entrance. Sedges on stream bank”, “HOLOTYPUS ♂ *Zealantha thorpei* sp.n., J. Roháček det. 2007“ (red label) (NZAC, intact). Paratypes: NEW ZEALAND, North Island: same data as for holotype, 1♂; same but 17.xii.2006, 2♂ 6♀; same but 26.xii.2006, 3♂ 1♀; same but 14.i.2007 1♂ 2♀; AK: Auckland Domain, on plants by stream, 12.xi.2006, 1♀; same locality, sedges by stream, 28.xii.2006 3♂ 2♀, S. E. Thorpe leg.; Henderson, Opanuku Walkway at Chardon Place, stream bank sedges, 18.xii.2006 1♀, 23.xii.2006 1♂, S. E. Thorpe leg.; Tahuna Torea Res, grasses on spit, 30.xii.2006 1♂, S. E. Thorpe leg.; Parnell, Hobson Bay, Thomas Bloodworth Park, under board walk to tennis court, coastal swards, 13.i.2007 4♂ 1♀, S. E. Thorpe leg.; Lynfield, Wattle Bay, sweeping *Scirpus*, 24.xi.1983 1♀, A. K. Walker leg.; TO: Tongariro River S. E. National Park, net, 1.i.1971 1♀, H. A. Oliver leg. (11♂ 14♀ NZAC, 5♂ 2♀ SMOC, 4♂ 3♀ with genit. prep.).

Other material examined (excluded from the type series): NEW ZEALAND, South Island: SD: Ship Cove, 27.xi.–1.xii.1972, 1 specimen (sex unknown because abdomen and hind legs are missing), J. S. Dugdale leg. (NZAC).



FIGURES 8–14. *Zealantha thorpei* **gen. et sp. nov.** (male, paratypes). 8. Hypandrial complex, ventrally. 9. Ditto, laterally. 10. Ditto, caudally. 11. Base of phallapodeme, dorsally. 12. Ejacapodeme, widest extension. 13. Filum of distiphallus, ventrally. 14. Aedeagal complex, laterally. Scales: Fig. 12 = 0.05 mm, others = 0.1 mm. For abbreviations see text.

Etymology: The species is named for Mr Stephen E. Thorpe who collected most of the type series and recognized it as the first representative of the family Anthomyzidae in New Zealand.

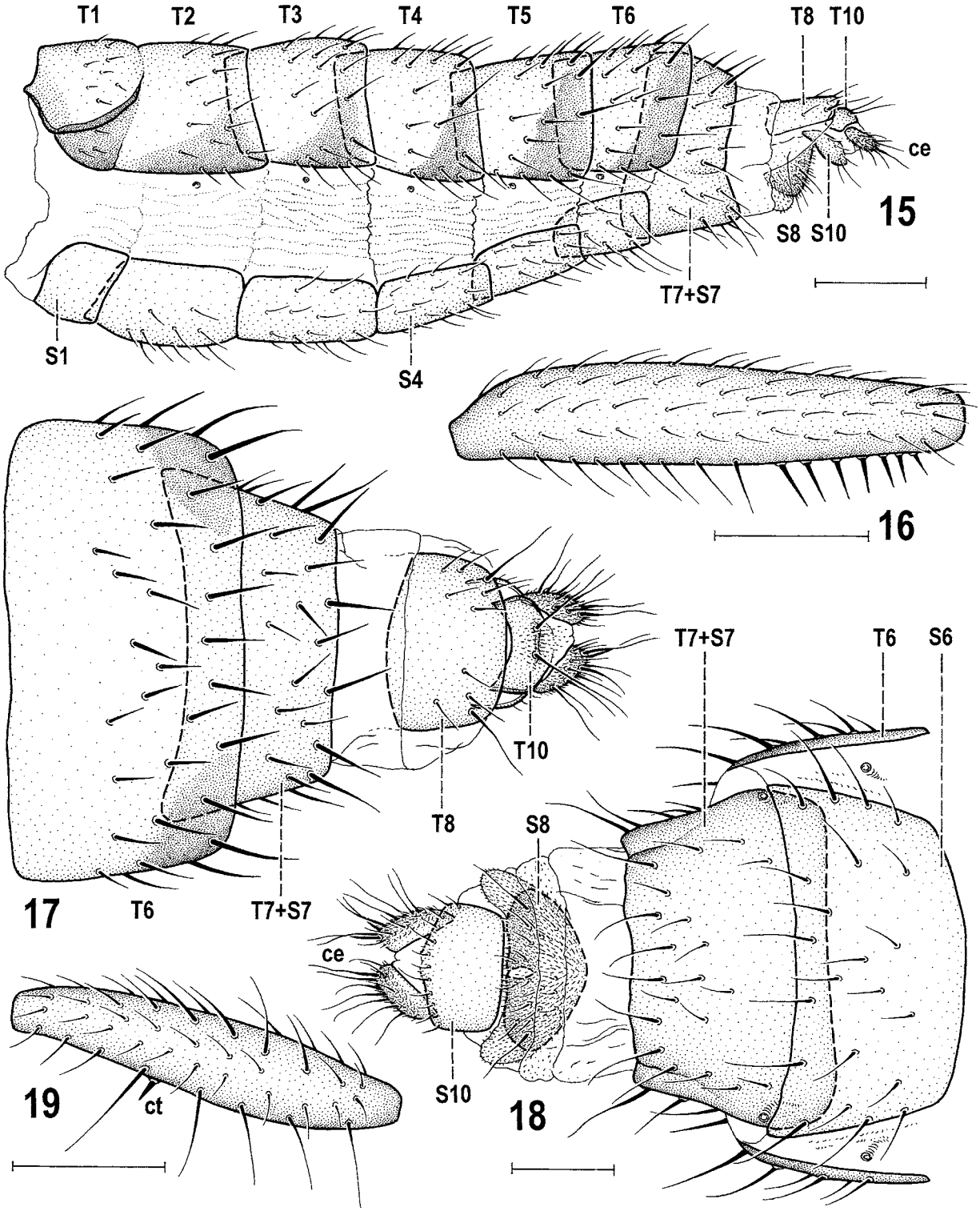
Description: M a l e. Total body length 2.02–2.35 mm. Body distinctly bicolourous (Figs 1–2), head and thorax greyish black with dense velvety dark grey microtomentum with bluish tinge, while abdomen and extremities largely ochreous-yellow. Head (Fig. 4) about as long as high, with face only slightly receding in profile, dark greyish brown and yellow. Occiput dorsomedially strongly concave, greyish black, with dense grey microtomentum, medially (above foramen) with a pair of short ventrally convergent silvery grey stripes. Frons relatively narrow, yellowish only in anterior fourth to third; rest of frons dark greyish brown and velvety grey microtomentose, dull. Orbits anteriorly (up to anterior long ors) yellow and silvery white microtomentose, posteriorly brownish, with grey microtomentum. Base of each ors seta surrounded by a small darker brown spot. Frontal triangle narrow, poorly delimited, reaching to middle of frons; areas between orbits and frontal triangle very finely brown- and grey-striated and often reaching almost to anterior margin of frons. Ocellar triangle flat but ocelli relatively large. Frontal lunule small, depressed but visible, yellow. Face relatively narrow, medially weakly sclerotized, dull dirty white; parafacialia and gena yellowish white and silvery white microtomentose; gena ventrally with distinctive brown marginal band being posteriorly widened but anteriorly narrowed and extended as a marginal stripe also on parafacialia; postgena dark grey and densely pale grey microtomentose; mouthparts yellow to yellowish white. Cephalic chaetotaxy (Fig. 4): pvt markedly longer than usual in Anthomyzidae, crossed; vti longest of cephalic setae; vte, oc and posterior ors slightly shorter than vti (vte sometimes as long as vti); oc arising outside of ocellar triangle; 3 ors - 2 long (the middle slightly to distinctly shorter than posterior) and 1 (anterior) short; 1 microsetula (sometimes absent) in front of the foremost (short) ors; 2 pairs of medial microsetulae in anterior third of frons; 1 inclinate setula behind vte; postocular setulae (10–11) short, in single row; postgena with several setulae and 2 relatively short posteroventral setae; 1 long vi (normally shorter than the middle ors); also subvibrissa long, about as long as vi; 4–5 fine peristomal setulae, almost half length of vi. Palpus slender, yellow, with 1 ventral preapical seta and 2–3 shorter ventral setulae in proximal half. Eye convex, large, anteroventrally somewhat widened, with longest diameter oblique and about 1.5–1.6 times as long as the shortest. Eye with dense white pilosity (Fig. 4) being as long as that of arista. Smallest genal height about 0.16 times as long as shortest eye diameter. Antenna geniculate, entirely whitish yellow; scape minute; pedicel short, simple, not capiform expanded; 1st flagellomere flattened laterally, with white pilosity on anteroventral margin slightly longer than cilia on arista. Arista brown including basal segment, about 2.0 times as long as antenna, shortly ciliate.

Thorax slightly narrower than head, almost entirely blackish brown and very densely pale to dark bluish grey microtomentose, of peculiar velvety appearance; only small stripe separating scutellum and postscutellum and suture between pteropleuron and hypopleuron yellowish. Thoracic chaetotaxy: 1 hu; 2 npl (anterior longer); 1 prs and 1 sa (both very weak); 1 pa (moderately long); 2 strong postsutural dc (anterior shorter, about half length of posterior) and 5 dc microsetae in front of them; 4 rows of ac microsetae on suture but only 2 rows between anterior dc, the latter posteriorly reaching to level of posterior dc; 2 sc, laterobasal weak and shorter than anterior dc, apical as long as posterior dc (these are the longest thoracic setae), both sc situated rather dorsally on scutellum; 1 ppl, markedly longer than in other Anthomyzidae (sometimes almost as long as prs but weaker); 2 relatively long stpl (anterior only slightly shorter) and 2–3 setulae in dorsal half of sternopleuron; its ventral part with 4–5 longer setae. Scutellum rounded triangular, convex dorsally; postscutellum well developed, distinctly bulging. Legs dirty ochreous-yellow, femora and tibiae somewhat darker and last tarsal segment of all tarsi blackish brown in distal half. f_1 (Fig. 19) with ctenidial spine small, distinctly shorter than maximum width of t_1 and with long thin setae in posteroventral (longer setae) and posterodorsal row; f_2 uniformly setulose; f_3 (Fig. 16) with a long row of posteroventral setae, 6–7 of them in apical two-fifths shortened and thickened; t_2 with short ventroapical seta; t_1, t_3 and all tarsi simply setulose; tarsal claws and empodium relatively long. Wing (Fig. 3) moderately long and narrow, with ochreous veins and conspicuously ochreous-yellow membrane. C with very small and sparse spinulae between apices of R_1 and R_{2+3}. Sc well

developed basally and fused with R_1 apically to form a distinct preapical kink on the level of subcostal break. R_{2+3} slightly sinuous, parallel to C with apex slightly upcurving to it; R_{4+5} very slightly bent (recurved) along its entire length, subparallel to M apically; the latter straight or very slightly bent. Discal (dm) cell moderate, narrow proximally, widened distally, with r-m situated about the middle; dm-cu slightly convex. Apical portion of CuA_1 about as long as dm-cu and not reaching wing margin. A_1 short, not reaching wing margin. Alula small, narrow. Wing measurements: length 2.08–2.50 mm, width 0.69–0.88 mm, Cs_3 : Cs_4 = 1.24–1.52, rm\dm-cu : dm-cu = 2.04–2.45. Haltere with stem yellowish, knob almost white.

Abdomen slender, elongate, largely ochreous to yellow (only terga posterolaterally spotted) and sharply contrasting with very dark thorax. Preabdominal terga (T1-T5) ochreous or light ochreous, all with brown to dark brown subtriangular spot in posterolateral corner being larger than in female (cf. Fig. 15). T1 and T2 dorsally separate, the former with very short and sparse setulae. T2-T5 subequal in length, broad, reaching far onto ventral side of abdomen, all with sparse, short but relatively robust setae (longest at posterior margin). Preabdominal sterna paler than terga, yellowish, relatively narrow, and, except for S1, finely setose. S1 shortest, shorter than wide, bare. S2-S3 about as long as wide, S4-S5 becoming wider than long, S5 widest. Spiracles situated near ventral margin of terga. T6 reduced to a very short, bare, unpigmented, membranous transverse strip between T5 and S8. S6 and S7 strongly asymmetrical, situated on left side of postabdomen, ochreous like S8; S6 very short and transverse; S7 twice longer than S6, both with more sclerotized and brownish anterior margin and each usually with 3 (rarely with 2 or 4) setae; S8 yet longer than S7, situated dorsally and bearing a number (7–12) of setae.

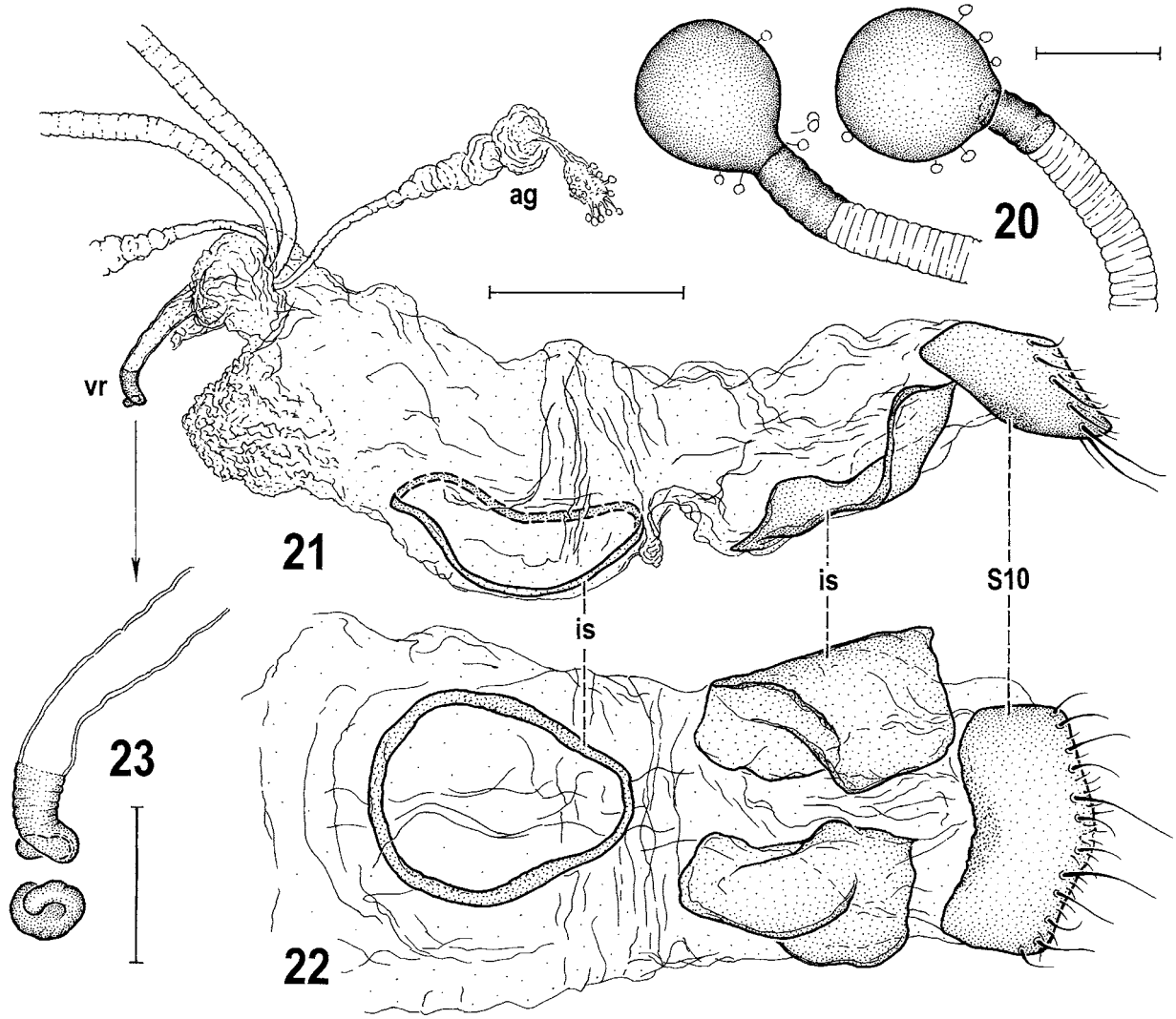
Genitalia (Fig. 7) with hypandrial and aedeagal complexes large compared to size of epandrium. Epandrium (Figs 6–7) dark brown, contrasting with pale-pigmented postabdominal sclerites S6-S8, semiglobular, moderately broad, with rather sparse setosity including 1 pair long dorsolateral setae; anal fissure small, subtriangular. Cercus small, short, pale-pigmented, with numerous fine setae, apical longest. Medandrium (Fig. 6) of unusual subtriangular shape, dorsally pointed. Gonostylus (Figs 5–7) relatively large (almost as long as epandrium), of simple shape, apically tapered and bent anteromedially, with non-acute apex, densely micropubescent on outer side and finely setose on inner side. Hypandrium (Figs 8–9) frame-like, moderate, relatively long and narrow (see Fig. 9), slighty sinuous in profile (Fig. 8), with anterior internal lobes reduced and membranous; posterior arms of hypandrium fused with transandrium. Transandrium (Fig. 10) strongly sclerotized, forming slender transverse arch with lateral bulges, but posteromedially simple, without caudal process. Pregonite (Figs 8–9) fused to hypandrium, anteriorly flat, leaf-like and bent medially, posteriorly somewhat bulging ventrally; anterior part with 2 setae, posterior projection with 6–7 setae. Postgonite (Figs 8–9) conspicuously widened, flat, slightly bent posteriorly, with 1 anterior setula in distal third in addition to a few granular sensillae. Basal membrane covered with flattened spine-like excrescences being largest posteromedially. Ventral to basal membrane there is a peculiar paired ventral sclerite (see Figs 8–10), possibly homologous with connecting sclerite. Aedeagal part of folding apparatus also distinctive (Fig. 14), with rich armature on its wall formed by flat spines densely arranged in curved rows; posterior to it there is an additional set of pale spines forming a bunch-like group attached to lateroventral part of phallophore. Phallapodeme very robust, particularly in distal pale-pigmented part; its basal part laterally expanded and posteriorly forked (Fig. 11) but its fulcrum relatively slender (Fig. 14). Aedeagus with short, simple, frame-like phallophore (Fig. 14) and large distiphallus bifid from its basal third. Saccus (Fig. 14) relatively short, largely sclerotized (distal membranous portion reduced), reinforced with several sclerites (dorsal, lateral, ventral) and its laterodistal parts distinctly spinulose. Filum (Figs 13–14) also rather short, formed by a pair of sclerites, the robust ventral sclerite basally widened (Fig. 13), the dorsal one slender, ribbon-shaped and weakly sclerotized; apex of filum formed by membranous expansions of both these sclerites. Ejacapodeme small, with usual digitiform projection (Fig. 12), rather dark-pigmented.



FIGURES 15–19. *Zealantha thorpei* **gen. et sp. nov.** (paratypes). 15. Female abdomen, laterally. 16. Male hind femur, anteriorly. 17. Female postabdomen, dorsally. 18. Ditto, ventrally. 19. Male fore femur, posteriorly.
Scales: Figs 17–18 = 0.1 mm, others = 0.2 mm. For abbreviations see text.

Female. Similar to male unless mentioned otherwise. Total body length 2.08–2.94 mm. Postocular and peristomal setulae more numerous (in largest specimens up to 15 postoculars and 7 peristomals) and ac microsetae forming 4 rows also behind anterior dc setae. Fore leg with f_1 and t_1 more darkened; particularly f_1

dorsally distinctly greyish brown tinged. Wing measurements: length 2.10–3.08 mm, width 0.75–1.13 mm, Cs_3 : Cs_4 = 1.15–1.28, rm\dm-cu : dm-cu = 2.07–2.55. Abdomen (Fig. 15) with terga pale ochreous to yellow, having brownish spots in posterolateral corners shorter, smaller. Preabdominal terga wider and more transverse than in male. T1 smaller than T2; T2–T5 subequal in length, all shortly setose. Preabdominal sterna as in male, but S4 and S5 slightly wider and more transverse.



FIGURES 20–23. *Zealantha thorpei* **gen. et sp. nov.** (female, paratype). 20. Spermathecae. 21. Genital chamber (uterus) and S10 laterally. 22. Ditto, ventrally. 23. Ventral receptacle, laterally and ventrally. Scales: Figs 21–22 = 0.1 mm, others = 0.03 mm. For abbreviations see text.

Postabdomen (Figs 17–18) short, strongly tapered posteriorly. T6 large, broad, tranversely suboblong, pale yellow, with brown spot in posterolateral corners. S6 transverse, subtrapezoidal, wider than S5, whitish yellow and sparsely finely setose. T7 and S7 fused to form ring-shaped pale ochreous tergosternum where boundary of original S7 is (at least posteriorly) indicated by depressed line; dorsal part (original T7) of tergosternum with thicker setae, ventral part (S7) comparatively large and broad, finely setose. 7th spiracle embedded in ventrolateral part of tergosternum. T8 plate-shaped, transversely suboblong with rounded corners, with fine setae including 1 long in posterior corner; S8 shorter than T8, transverse, semicircular, posteromedially with narrow fissure (best visible in caudal view), densely micropubecent and finely setose. Genital chamber (uterus) with internal sclerotization (Figs 21–22), formed by 1 pair of posterior, flat, crooked,

ventrolaterally situated sclerites and 1 anterior, large, annular sclerite of ovoid to pear-shaped outline (Fig. 22). Ventral receptacle (Fig. 23) small, weakly sclerotized, shortly subcylindrical with terminal curved digitiform projection, set on tube-like proximal duct; accessory gland (Fig. 21) hyaline, bearing stalked globulae on surface and connected to distally dilated duct by a thin stem. Spermathecae (1+1) very shortly pyriform (Fig. 20) with plain surface, long sclerotized cervix (almost as long as spermathecal body), several minute stalked globulae attached to surface and relatively short, broad, densely ringed duct. T10 (Fig. 17) small, transverse, with somewhat projecting anterior corners and rounded posteriorly, pale, with 1 pair of long setae arising on small transverse medial tubercle surrounded by reduced micropubescence. S10 (Figs 18, 21–22) larger than T10, transversely pentagonal, bare except for fine marginal setae and some micropubescence at posterior margin. Cercus (Figs 17–18) short, broad, with rich setosity, including apical thicker (but not longer) setae.

Discussion: *Zealantha thorpei* sp. nov. can easily be recognized from all hitherto described species of Anthomyzidae by the distinctive colouring of the body (dark velvety microtomentose head and thorax contrasting with largely ochreous abdomen), pilose eyes, and additionally supported by the shortly ciliate arista, long subvibrissa, short ctenidial spine on f_1 and unusually long pvt and ppl setulae. Only some species of *Anagnota* Becker, 1902 have a similar bicolourous appearance but these differ in having arista pectinate, thorax without velvety micropubescence with pleural part ventrally yellow, and f_1 lacking ctenidial spine not to mention quite different cephalic and thoracic chaetotaxies (cf. Roháček 2006).

Biology: The majority of the type series was collected in sedges (unidentified Cyperaceae) on stream banks and there is also one female taken by sweeping *Scirpus* sp. Some of the remaining specimens were caught in coastal swards, grasses on spit or on plants by stream. These data indicate the species is most preferably associated with Cyperaceae-dominated vegetation on damp littoral habitats. Adults were recorded in September (one female) and from late November to January.

Distribution: Hitherto, the species has been recorded from the North Island of the New Zealand mainland (AK and TO areas) and from the northernmost area of the South Island (SD area). Although the frequent appearance of the species in December 2006 and January 2007 in the Auckland metropolitan area suggests that the species could be recently introduced to New Zealand, the discovery of several older specimens (collected in 1971, 1972 and 1983 in TO, SD and AK areas) in the NZAC collection demonstrates that *Zealantha thorpei* sp. nov. is likely an indigenous species simply overlooked in the past.

Acknowledgements

For the arrangement of the loan of the material listed above I should like to thank curator Dr Trevor K. Crosby (NZAC). The acknowledgements are further extended to Dr Birgit Rhode (Landcare Research, Auckland) for taking the photograph of the new species and to Mr Kevin N. Barber (Sault Ste. Marie, Ontario, Canada) for his valuable comments and improvement of an early draft of the manuscript. I am particularly indebted to Mr Stephen E. Thorpe (Auckland) who collected most of the type specimens, presented information about preferred habitat of the species and critically reviewed the text of the paper. The study was financially supported by grant No. 206/06/0287 of the Grant Agency of the Czech Republic.

References

Colless, D.H. & McAlpine, D.K. (1970) 34. Diptera (flies). Pp. 656–740. In Waterhouse, D.F. (ed.), *The insects of Australia. A textbook for students and research workers.* 1029 pp. Melbourne University Press, Carlton, Victoria.

Colless, D.H. & McAlpine, D.K. (1991) 39 Diptera (flies). Pp. 717–786. In CSIRO, Division of Entomology (eds): *The insects of Australia. A textbook for students and research workers.* 2nd edition. 1135 pp. Cornell University Press, Ithaca, New York.

Crosby, T.K., Dugdale, J.S. & Watt, J.C. (1998) Area codes for recording specimen localities in the New Zealand subregion. *New Zealand Journal of Zoology*, 25, 175–183.
Meijere, J.C.H. de (1916) Studien über südostasiatische Dipteren. XI. Zur Biologie einiger javanischen Dipteren nebst Beschreibung einiger neuen javanischen Arten. *Tijdschrift voor Entomologie*, 59, 184–213.
Roháček, J. (1993) Two new Afrotropical genera of Anthomyzidae (Diptera), with descriptions of seven new species. *Annals of the Natal Museum, Pietermaritzburg*, 34(1), 157–190.
Roháček, J. (1998) Taxonomic limits, phylogeny and higher classification of Anthomyzidae (Diptera), with special regard to fossil record. *European Journal of Entomology*, 95, 141–177.
Roháček, J. (2004) Revision of the genus *Amygdalops* Lamb, 1914 (Diptera, Anthomyzidae) of the Afrotropical Region. *African Invertebrates*, 45, 157–221.
Roháček, J. (2006) A monograph of Palaearctic Anthomyzidae (Diptera) Part 1. *Časopis Slezského zemského Muzea, Opava* (A), 55, supplement 1, 1–328.
Roháček, J. (in prep.) Revision of the genus *Amygdalops* Lamb, 1914 (Diptera: Anthomyzidae) of the Oriental, Australasian and Oceanian Regions.
Roháček, J. & Barraclough, D. (2003) *Margdalops*, a new African genus of Anthomyzidae (Diptera), comprising six new species. *African Invertebrates*, 44(2), 157–190.
Sueyoshi, M. & Roháček, J. (2003) Anthomyzidae (Diptera: Acalyptrata) from Japan and adjacent areas. *Entomological Science*, 6, 17–36.
Vockeroth, J.R. (1977) Family Anthomyzidae. p. 241. In: Delfinado, M.D. & Hardy, D.E. (eds), *A catalog of the Diptera of the Oriental Region*. Vol. 3, 854 pp. The University Press of Hawaii, Honolulu.
Vockeroth, J.R. (1989) 72. Family Anthomyzidae. P. 548. In Evenhuis, N. L. (ed.), *Catalog of Diptera of the Australasian and Oceanian Regions.* 1155 pp. Bishop Museum Press and E.J. Brill, Honolulu.
Zatwarnicki, T. (1996) A new reconstruction of the origin of eremoneuran hypopygium and its implications for classification (Insecta: Diptera). *Genus*, 7(1), 103–175.