

## The identity of *Geranomyia bezzii* and a description of *G. fuscior* sp. nov. (Diptera: Limoniidae)

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**Abstract.** *Geranomyia bezzii* Alexander & Leonard, 1912 is revised and re-described based on the types, other available specimens, and new material. *Geranomyia fuscior* sp. nov. (Albania, Portugal, Libya) is described. All important characters of the male and female terminalia are illustrated for both species. Distribution of *G. bezzii* is confirmed for Algeria, Great Britain, Tunisia, and newly recorded from Portugal.

**Key words.** Diptera, Limoniidae, *Geranomyia*, redescription, new species, new records, distribution, Palearctic Region

### Introduction

*Geranomyia bezzii* was described by ALEXANDER & LEONARD (1912) from four males preserved in ethanol from Djerba Island, Tunisia, as having four brown longitudinal stripes on the mesothoracic dorsum, the so-called prescutal stripes. This character combined with three or four more or less distinct spots at the anterior margin of the wing has been the diagnosis for the species. LACKSCHEWITZ (1928) and EDWARDS (1938, 1939) dealt with taxonomy of *G. bezzii*, and LACKSCHEWITZ (1928, Figs. 2a-b; redrawn by LACKSCHEWITZ & PAGAST 1942, Pl. 10, Fig. 84) illustrated the male terminalia based on a specimen from Algeria in BMNH. Neither of them compared their material with the types. *Geranomyia bezzii* has been known to occur in coastal saline habitats of the Mediterranean, somewhat extraliminally in the British Isles, and even more so in the Canary Islands (OOSTERBROEK 2011).

Recently, I collected a species at Castro Marim, Portugal, with very distinct, dark brown prescutal stripes. Comparison of the male terminalia of these specimens and the British specimens from Chesil Bank, Portland, Dorset (EDWARDS 1939) revealed that the two are specifically different. Considering the not much pronounced prescutal stripes of the British specimens I automatically considered my Portuguese material to represent the true *G. bezzii*,

because it follows implicitly from the original description (ALEXANDER & LEONARD 1912) that the stripes are fairly distinct. Only examination of the male terminalia of the holotype of *G. bezzii* from MRSN showed that the opposite is true.

Hence, two species have been confused under *G. bezzii*, distinctively different in the structure of the male terminalia, but very similar in external characters, with the thoracic pattern sometimes varying to a certain degree within a species, or appearing slightly different in different specimens due to the state of preservation. The two species are sympatric in part, because, a year after my capture of one species in Portugal, I collected the second species at Alvor, Portugal. Here I redescribe *G. bezzii*, confirming its occurrence in Great Britain, and describe a new species, *G. fuscior* sp. nov. The records of *G. bezzii* from the Canary Islands were not examined in detail, but those corresponding to the figure by DE JONG (1987, Fig. 55) definitely represent another undescribed species.

## Material and methods

The following acronyms for museums and collections are used in the text:

BMNH	The Natural History Museum [formerly British Museum (Natural History)], London, United Kingdom;
JKLE	John Kramer collection, Leicester, England, United Kingdom;
JSOC	Jaroslav Starý collection, Olomouc, Czech Republic;
MRSN	Museo Regionale di Scienze Naturali, Torino, Italy;
NHMW	Naturhistorisches Museum, Wien, Austria;
NMPC	Národní muzeum, Praha, Czech Republic;
SMOC	Slezské zemské muzeum, Opava, Czech Republic.

## Taxonomy

### *Geranomyia bezzii* Alexander & Leonard, 1912

(Figs. 1–3)

*Geranomyia bezzii* Alexander & Leonard, 1912: 205 (description), Fig. 6 (wing).

*Geranomyia bezzii*: LACKSCHEWITZ (1928): 198 (redescription), Pl. 5, Figs. 2a–b (male terminalia).

*Limonia (Geranomyia) bezzii*?: EDWARDS (1938): 44 (diagnosis).

*Limonia (Geranomyia) bezzii*: EDWARDS (1939): 245 (diagnosis, note).

*Geranomyia Bezzii*?: LACKSCHEWITZ & PAGAST (1942): 48 (redescription), Pl. 10, Fig. 84 (male terminalia).

**Type material examined.** HOLOTYPE: ♂ (MRSN), ‘*Geranomyia bezzii* A. e L. / Is. Djerba (Tunisia) holotypus / dono Bezzi / Dipt – 3’ (handwritten in ink) on one side and ‘MUSEO ED INSTITUTO DI ZOOLOGIA / SISTEMATICA DELLA UNIVERSITÀ / TORINO (ITALIA)’ (printed) on another, ‘*Geranomyia bezzii* A.+L. / holotype / I. Djerba (Tunis)’ on one side and ‘Dono / Prof. Bezzi’ on another (all handwritten in ink), a blank red plastic square. **Note.** It should be noted that there are no labels handwritten by Alexander. The specimen is preserved in ethanol, without head and legs, with only right wing attached; some parts of wing and legs detached in ethanol; terminalia dissected by the present author and placed separately in a sealed plastic tube with glycerine, pinned and labelled ‘TUNISIA / Djerba Is.’ (printed), ‘HOLOTYPE / *Geranomyia / bezzii* Alex. & Leonard ♂ / J. Starý 2010’ (printed, red).

PARATYPE: ♂ (MRSN), with the same data and labelling as for holotype except that ‘paratypus / paratype’ is indicated. **Note.** The specimen is preserved in ethanol, without legs and with only bases of wings; terminalia intact. The other two paratypes were indicated as deposited in Cornell University, USA (ALEXANDER & LEONARD 1912: 206).

**Additional material examined** (29 ♂♂ 4 ♀♀). **GREAT BRITAIN: ENGLAND: DORSET:** Chesil Bank, Portland, 31.viii.1939, 2 ♂♂, F. W. Edwards leg. (BMNH) [listed by EDWARDS (1939)]. **PORTUGAL: ALGARVE:** Alvor, 1 km W, saltmarsh (11 m) (37°08'N, 8°36'W), 27.iv.2010, 13 ♂♂ 2 ♀♀, 1.v.2010, 14 ♂♂ 2 ♀♀, J. Starý leg. (JKLE, JSOC).

**Diagnosis.** Medium-sized species. Body colouration shiny yellow on thorax, richly patterned with pale brown to brown, mesothoracic dorsum with four stripes. Wing tinged greyish, with four indistinct spots or clouds at anterior margin. Legs with tips of femora and tibiae darker. Male terminalia with ventral gonostylus comparatively slender, with long, slender rostrum subacute at tip in dorsal aspect. Wing length 5.3–7.2 mm.

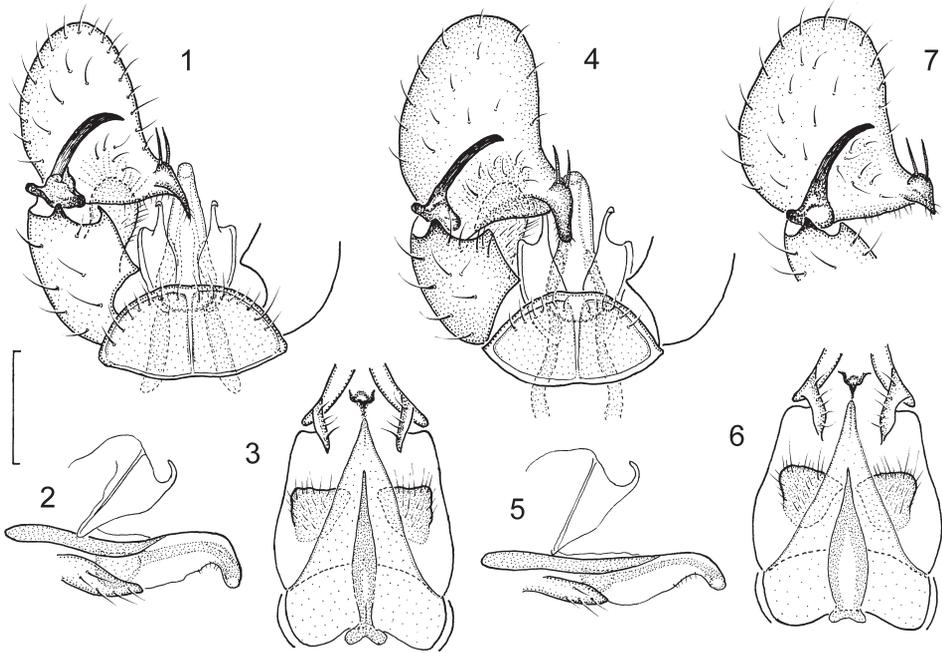
**Redescription. Male.** Head greyish brown on vertex. Mouthparts (proboscis) approximately as long as thorax, obscure yellow, with two diffuse darker rings, one at about one-quarter length, at position of palpi, second shortly before tip of labella. Antenna short, yellowish brown, with flagellomeres short-ovoid; longest verticils subequal in length to their respective segments.

Thorax with ground colour shining yellow. Mesothoracic dorsum with four shiny pale brown to brown stripes, inner ones only narrowly separated from each other, beginning at anterior margin of prescutum and reaching to transverse suture, outer ones extending from prescutal suture back over scutal lobes onto lateral parts of scutellum. Extreme lateral edge of scutum and paratergite darkened. Scutellum yellow, darkened laterally. Postscutellum yellow to obscure yellow, darkened anterolaterally. Pleuron concolorous with ground colour of prescutum, shiny yellow, with shining dark brown to black, roughly semicircular mark on pleural part of postpronotum and another, smaller one below wing base. Two pale brown longitudinal stripes on lower part of anepisternum and anepimeron and on lower part of katepimeron, leaving yellow space in between on upper part of katepisternum. Wing with membrane slightly tinged greyish and with four diffuse, indistinct, grey spots or clouds at anterior margin, viz. over humeral cross-vein (very indistinct), at middle of Sc, at tip of Sc<sub>1</sub> (combined with cloud at origin of Rs), and at tip of R<sub>1</sub> (stigma). Cross-veins slightly seamed greyish. Wing venation generally as in other *Geranomyyia* Haliday, 1833 and many *Dicranomyia* Stephens, 1829. Halter faintly darkened except for pale yellow base. Legs generally yellow, with tips of femora and tibiae darkened.

Abdomen darker than thorax, yellowish brown, dark brown on dorsal side, with posterior margins of tergites paler. Male terminalia (Figs. 1–2): Tergite 9 roughly semicircular. Gonocoxite only slightly shorter than ventral gonostylus; ratio about 9 : 11. Ventral gonostylus comparatively short and slender, rather conical, with rostral prolongation long and slender, subacute at tip in dorsal aspect, curved anteriorly. Rostral spines situated on tubercle, moderate in length, very slightly curved, parallel with each other. Dorsal gonostylus gradually tapered to pointed tip. Aedeagal complex as in Fig. 2, with aedeagus short, rather broad in lateral aspect, strongly downcurved at apex.

**Female** resembling male in general appearance. Female terminalia (Fig. 3): Cercus moderate in length, slightly upturned. Two parts of infra-anal (supravaginal) plate (subanale of TJEDER 1958) generally straight at posterior margin, or slightly wavy, and rectangular at outer edge. Genital fork (vaginal apodeme) greatly developed, triangular and membranous, tilted distally (as in all other Limoniini), reaching slightly beyond posterior margin of tergite 10, with its central, more pigmented part rather long and slender (Fig. 3).

**Differential diagnosis.** The differences of *G. bezzii* from *G. fuscior* sp. nov. are given in the differential diagnosis of the latter.



Figs. 1–7. 1–3 – *Geranomyia bezzii* Alexander & Leonard, 1912 (Portugal: Alvor): 1 – male terminalia, general view, dorsally; 2 – male terminalia, aedeagal complex, lateral view; 3 – female terminalia, internal structures, ventral view. 4–6 – *G. fuscior* sp. nov. (paratypes; Portugal: Castro Marim): 4 – male terminalia, general view, dorsally; 5 – male terminalia, aedeagal complex, lateral view; 6 – female terminalia, internal structures, ventral view. 7 – *G. unicolor* Haliday, 1833 (England: Devon: Beer, coll. JSOC), male terminalia, gonostyli, dorsal view. Scale bar 0.25 mm.

**Distribution.** According to OOSTERBROEK (2011) *G. bezzii* was recorded from the following countries: Albania, Great Britain, Ireland, Spain (Canary Islands); Algeria, Libya, Tunisia. The records from the Canary Islands (NIELSEN 1966, THEOWALD 1977, DE JONG 1987) are omitted here as belonging to at least one other species (see Introduction). The single male from Ireland (ASHE & O’CONNOR 1993) was not checked. The occurrence of *G. bezzii* in Algeria is confirmed, and the records from Albania and Libya pertain to *G. fuscior* sp. nov. (see below in Discussion). Thus, at present, *G. bezzii* is confirmed only from Algeria, Great Britain, Tunisia, and newly from Portugal, with an unchecked, but probably correct, record from Ireland. *Geranomyia bezzii* occurs sympatrically with *G. fuscior* sp. nov. in Portugal.

**Discussion.** The species was described from four males, all from the same locality. I have examined the holotype and paratype from MRSN. The types of *G. bezzii* are preserved in ethanol, thus considerably discoloured, cleared, without distinct patterning on the thorax, yet clearly conspecific with the above-listed additional material examined based on the structure of the male terminalia. The British specimens from Chesil Bank, Portland, Dorset (EDWARDS 1939), although dried, are rather pale, with barely evident prescutal stripes, possibly due to the teneral state of the specimens, thus differing from the Portuguese material. I do not

know whether other British specimens (FALK 1991, STUBBS 2003) have the same general appearance. LACKSCHEWITZ (1928) listed three specimens of what he considered *G. bezzii*, one male from Algeria (in BMNH) and two females, one from Albania and one from Libya (both in NHMW). Based on the figures of the terminalia (LACKSCHEWITZ 1928, Figs. 2a–b) the male belongs to *G. bezzii*. Examination of the female terminalia revealed, however, that both females represent *G. fuscior* sp. nov.

### *Geranomyia fuscior* sp. nov.

(Figs. 4–6)

**Material examined.** HOLOTYPE: ♂ (SMOC): **PORTUGAL: ALGARVE:** Castro Marim, 0.3 km S, saltmarsh (24 m), 2.iv.2009, J. Starý leg. / HOLOTYPE, *Geranomyia fuscior* sp. n. [♂], J. Starý 2011.

PARATYPES (20 ♂♂ 12 ♀♀): **ALBANIA:** Durazzo [= Durrës], 30.v.1917, 1 ♀, Karny leg. (NHMW) [listed by LACKSCHEWITZ (1928) as *bezzii*]. **PORTUGAL: ALGARVE:** Castro Marim, 0.3 km S, saltmarsh (24 m), 2.iv.2009, 10 ♂♂ 5 ♀♀, 4.iv.2009, 10 ♂♂ 5 ♀♀, J. Starý leg. (JKLE, JSOC, NMPC, SMOC). **LIBYA:** Tripolis [= Tarabulus], 17.vii.1906, 1 ♀, A. Klapotcz leg. (NHMW) [listed by LACKSCHEWITZ (1928) as *bezzii*].

**Diagnosis.** Extremely similar to *G. bezzii* in general appearance, but with thoracic patterning darker and more extensive. Stripes on mesothoracic dorsum shiny, very dark. Postscutellum mostly brown throughout. Tips of femora and tibiae with more pronounced darkenings. Male terminalia with ventral gonostylus distinctly longer and broader than in *G. bezzii*, with rostral prolongation more rounded at tip in dorsal aspect. Wing length 6.2–7.4 mm.

**Description. Male.** Terminalia (Figs. 4–5) darkly pigmented. Tergite 9 roughly semicircular. Gonocoxite distinctly shorter than ventral gonostylus; ratio about 2 : 3. Ventral gonostylus distinctly longer and broader than in *G. bezzii*, rather ovoid, with rostral prolongation shorter and stouter, more rounded at tip in dorsal aspect, and curved rather dorsoanteriorly. Dorsal gonostylus parallel-sided, tapered to point only shortly before apex. Aedeagal complex as in Fig. 5, with aedeagus not as strongly downcurved at apex as in *G. bezzii*.

**Female** resembling male in general appearance. Female terminalia (Fig. 6): Cercus moderate in length, slightly upturned, occasionally slightly longer than that of *G. bezzii*. Two parts of infra-anal plate generally convex at posterior margin and more rounded at outer edge than in *G. bezzii*. Genital fork with its central, more pigmented part not as long as in *G. bezzii* and, on average, somewhat broader.

**Differential diagnosis.** The two species, *G. bezzii* and *G. fuscior* sp. nov., may differ from each other in a few external characters, such as the patterning of the thorax (paler and less extensive in *G. bezzii*), the length of legs (slightly shorter in *G. bezzii*), and the length of the male tarsal claws (slightly longer in *G. bezzii*). None of these features, however, can be a reliable criterion for species separation. Especially the pattern on the thorax varies greatly in intensity and extent in both species (except for the two small marks on the upper part of the pleuron, which are always shining dark brown to blackish), even within specimens from the same locality (see Portuguese material), and it can be diagnostic only for very pale specimens of *G. bezzii* and very dark ones of *G. fuscior* sp. nov. A predominantly brown postscutellum may be indicative for *G. fuscior* sp. nov. The two species can be best differentiated from each other based on the male terminalia. The ventral gonostylus is the most indicative structure. It is rather large in *G. fuscior* sp. nov., distinctly exceeding the length of the gonocoxite (ratio

about 3 : 2), ovoid, with the rostral prolongation of moderate length, somewhat rounded at the tip in dorsal aspect and curved dorsocaudally. In *G. bezzii*, the ventral gonostylus is shorter compared to the gonocoxite (ratio about 11 : 9), more slender, rather conical, with the rostral prolongation longer, subacute at the tip in dorsal aspect and curved caudally (cf. Figs. 1 and 4). In *G. fuscior* sp. nov., the dorsal gonostylus is tapered to pointed tip only shortly before apex and the aedeagus is moderately downcurved at apex, whereas in *G. bezzii*, the dorsal gonostylus is gradually tapered to pointed tip and the aedeagus is strongly downcurved at apex. The female terminalia also provide some differences (cf. Figs. 3 and 6), but these should be thoroughly evaluated and combined with all available external characters. In the structure of the male terminalia, especially the outline of the ventral gonostylus, *G. fuscior* sp. nov. bears resemblance to *G. unicolor* Haliday, 1833, but in the latter species, the ventral gonostylus is still broader, with a very short rostral prolongation and with rostral spines situated distinctly more apart (Fig. 7), not to mention other characters, including external ones.

**Etymology.** The name of the new species (Latin *fuscior* = darker) refers to its body colouration, which is in general darker than that of *G. bezzii*. An adjective in nominative singular.

**Distribution.** Albania, Portugal, Libya. From my experience both species are rather common on saltmarshes in Portugal.

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