

## ***Pseudonapomyza benifassae* sp. n. (Diptera: Agromyzidae), a new species from Eastern Spain**

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Systematic and ecological aspects of a new species *Pseudonapomyza benifassae* Gil-Ortiz **sp. n.** (Diptera: Agromyzidae) from Spain, are given. A study of faunistic data of European *Pseudonapomyza* is made. *P. palliditarsis* Černý is recorded for the first time in Spain.

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### **1. Introduction**

Species of the genus *Pseudonapomyza* Hendel, 1920 (Diptera: Agromyzidae) are leafminers on monocotyledonous plants in Northern and Southern hemispheres (Spencer 1990). As a whole, the European species belong to the *atra*-group, mainly characterized by presence of the angulated first antennal flagellomere (Spencer 1973).

Of the species known in the Palaearctic region, only three, *Pseudonapomyza atra* (Meigen, 1830), *P. lacteipennis* (Malloch, 1913), and *P. spicata* (Malloch, 1913) were described before the 1970's. Because of largely uniform external morphology and small size (1–2 mm) in this genus, there were difficulties in the description of the species until recently.

Starting from the first study made by Spencer (1961), the male genital morphology was an essential element for descriptions. The 48 Palaearc-

tic species have until the present time been known, and nearly half of them are in Europe (Černý 1992, 2005a, 2005b, 2006, 2007, 2008, 2009, Zlobin 1993, 2005, Černý *et al.* 2001, Martínez 2004, Černý & Merz 2005, 2006, Černý & Vala 2006, Gil-Ortiz *et al.* 2010a,b,c) (Table 1).

In a previous study with the same material as included in this study, four new species of *Pseudonapomyza* were described (Gil-Ortiz 2010b,c). Later studies confirmed the presence of another new species in this genus. The species was also found (unpublished data) during the studies carried out by our research team in “Las Saladas” (Teruel), “Pina del Ebro” (Zaragoza) and “Tinença de Benifassà” (Castellón) during the years 1991–1994 (Echevarría 1996). The new species is described in this paper as *Pseudonapomyza benifassae* Gil-Ortiz **sp. n.** In addition, *Pseudonapomyza palliditarsis* Černý, 1992 is recorded for the first time from Spain. This species

Table 1. European species of *Pseudonapomyza*.

Species	Known European distribution
<i>P. andorrensis</i> Černý, 2007	Andorra
<i>P. atra</i> (Meigen, 1830)	Andorra, Austria, Azores, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Dalmatia, Denmark, Estonia, Finland, France (incl. Corsica), Germany, Great Britain, Greece, Hungary, Italy (incl. Sardinia), Latvia, Lithuania, Malta, Norway, Portugal (incl. Azores and Madeira), Poland, Romania, Slovakia, Spain (Incl. Balearic and Canary Is.), Sweden, Switzerland, The Netherlands, Turkey, Ukraine, Yugoslavia, Russia
<i>P. atratula</i> Zlobin, 2002	Spain
<i>P. benifassae</i> Gil-Ortiz <b>sp. n.</b>	Spain
<i>P. balkanensis</i> Spencer, 1973	Czech Republic, Dalmatia, France, Germany, Hungary, Macedonia, Poland, Switzerland, Ukraine, Yugoslavia
<i>P. curvata</i> Gil-Ortiz, 2010	Spain
<i>P. errata</i> Zlobin, 1993	Czech republic, France, Hungary, Poland, Sweden, Switzerland
<i>P. eurasiatica</i> Zlobin, 2002	Greece, Switzerland, Ukraine
<i>P. europaea</i> Spencer, 1973	Andorra, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Lithuania, Macedonia, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia
<i>P. hispanica</i> Spencer, 1973	Austria, Cyprus, France, Greece, Italy, Madeira, Spain, Turkey
<i>P. hobokensis</i> Scheirs, 1996	Belgium, Czech Republic
<i>P. hungarica</i> Spencer, 1973	Hungary, Poland
<i>P. insularis</i> Zlobin, 1993	Canary Is.
<i>P. lacteipennis</i> (Malloch, 1913)	Denmark, France, Germany, Great Britain, Greece, Italy, Malta, Spain, Sweden
<i>P. longitata</i> Gil-Ortiz, 2010	Spain
<i>P. mediterranea</i> Gil-Ortiz, 2010	Spain
<i>P. mohelnica</i> Černý, 1992	Czech Republic, Germany
<i>P. moraviae</i> Černý, 1992	Czech Republic, Hungary, Poland
<i>P. odessae</i> Černý, 1998	Hungary, France, Ukraine
<i>P. palavae</i> Černý, 1998	Czech Republic, Hungary
<i>P. palliditarsis</i> Černý, 1992	Bulgaria, Czech Republic, Hungary, Poland, Russia, Slovakia, Spain, Ukraine
<i>P. sicicornis</i> Gil-Ortiz, 2010	Spain
<i>P. siciformis</i> Zlobin, 2003	Czech Republic, France
<i>P. spenceri</i> Černý, 1992	Czech Republic
<i>P. spinosa</i> Spencer, 1973	Austria, Cyprus, Greece, Spain (incl. Canary Is.), Turkey
<i>P. spicata</i> (Malloch, 1914)	Spain (incl. Canary Is.)
<i>P. strobliana</i> Spencer, 1973	Andorra, Bulgaria, Czech Republic, Dalmatia, France, Germany, Hungary, Poland, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia
<i>P. sueciae</i> (Zlobin, 2005)	Sweden
<i>P. vota</i> Spencer, 1973	France, Greece, Hungary, Italy, Malta, Portugal, Spain, Switzerland, Yugoslavia

was cited by Černý (1992) in Zvěrkovice (Czechoslovakia), which suggests that it occurs in virtually all of Western Europe.

## 2. Material and methods

Materials in this paper were captured in Malaise traps during the years 2004–2006, in the Natural

Parks of “Tinença de Benifassà” (Castellón-Spain) and “Font Roja” (Alicante). The description of *Pseudonapomyza benifassae* **sp. n.** is based mainly on a study of the male genitalia, as well as other morphological characteristics. The general morphology of the new species resembles that of many other species, whereas its male genitalia are unique. Some of the characteristics used

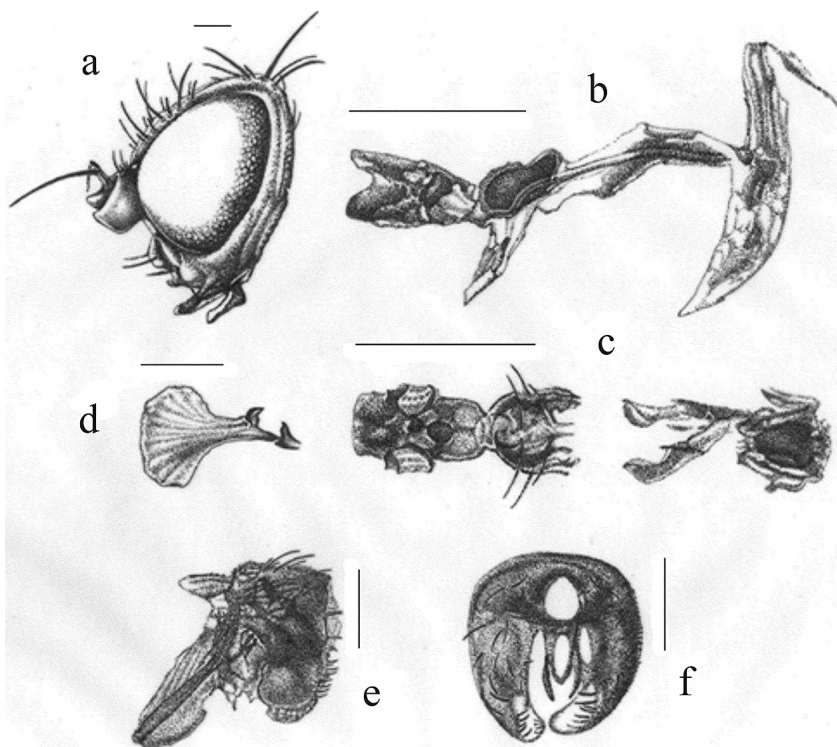


Fig. 1. *Pseudonapomyza benifassae* sp. n. (holotype ♂). – a. Head in lateral view; – b. Aedeagus in lateral view; – c. Aedeagus in ventral view; – d. Sperm pump in lateral view; – e. Epandrium in lateral view; – f. Epandrium in anterior view. Scale bar: 0.1 mm.

in this description, such as the coloration (e.g. squamal fringe, mesonotum, wings and legs), are difficult to observe when working with material preserved in alcohol due to loss of pigmentation.

Mainly the terminology system of Diptera proposed in the Manual of Nearctic Diptera by McAlpine (1981) is used in this study. The dorsocentral (*dc*) bristles are numbered from posterior to anterior on the thorax.

### 3. Description of *Pseudonapomyza benifassae* Gil-Ortiz sp. n. (Fig. 1)

*Type material.* Holotype male: Castellón, Spain. Tinença de Benifassà, 16–23.V.2005, GPS location: N40°30'22.6", E00°09'26.8".

Paratypes: Same data as holotype except for date: 1♂, 29.VII.2004–5.VIII.2004; 1♂, 18–28.VII.2005; 1♂, 29.V.2006–5.VI.2006; 1♂, 3–10.VII.2006; 3♂, 24.VII.2006–1.VIII.2006. Alicante, Spain. Font Roja, 1♂, 11–18.VII.2005, GPS location: N38°39'43.1", W00°31'04.0".

Holotype and paratypes are deposited in the Entomological Collection of Universidad de Valencia (ENV).

*Description.* Head (Fig. 1a). Frons slightly projecting beyond eye in profile (more projected at level of lunule). First antennal flagellomere (=third segment) strongly pointed anterodorsally, as long as wide, with short brown pilosity (clearly more distinct on other segments). Arista normal, with very fine and very short pilosity. Fronto-orbital plate (= parafrontalia) with 2 *ors* (upper fronto-orbital setae) and 3 inwardly curved *ori* (lower fronto-orbital setae). Normally, lower *ors* directed inwards, with an inclination of 45° to upper part of head and upper *ors* directed upwards slightly inclined to the exterior part of head. Orbital setulae short, erected along *ori* and reclined along *ors*, in a single row. Ocellar triangle slightly longer than wide (0.12 × 0.11 mm); ocellar bristles (*oc*) slightly divergent or parallel, slightly smaller and as strong as *ors*. Internal bristle (*vti*) (= inner vertical setae [*i vt s*]) long and strong, much longer than *ors* and *ori*. External vertical bristle (*vte*) (= outer vertical setae [*o vt s*]) strong but much shorter than *vti* (on average, *vti* 1.5 times as long as *ors*). Frons at level of *ors* 1.1 times as wide as eye. Cheeks form arc below eye. Gena including cheek (at highest measurement)

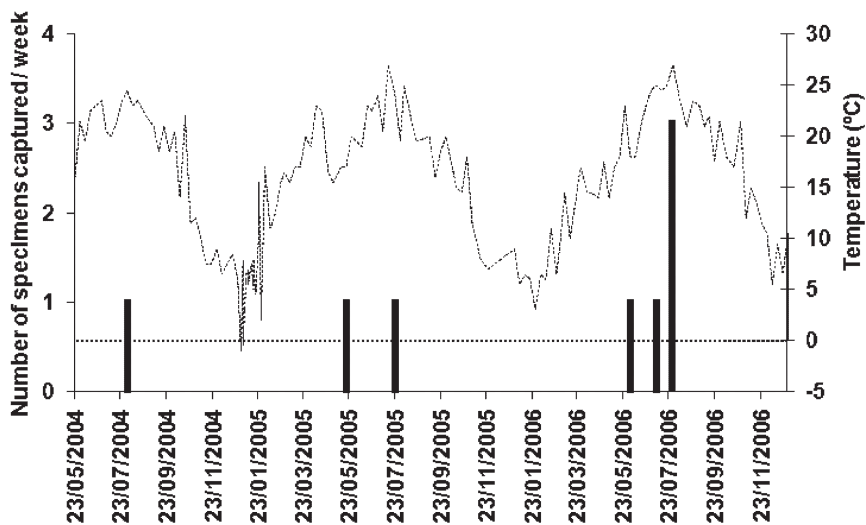


Fig. 2. Frequency distribution (black bars) of *Pseudonapomyza benifassae* sp. n. caught in “Tinença de Benifassà” Natural Park and daily average temperature during the study period.

0.32 times as high as eye (at highest measurement in profile). Eye without pilosity.

Thorax. Mesonotum with 3+0 long and strong distinct *dc*, increasing in length posteriorly; acrostical setae (*acr*) numerous (12), arranged in 6 or 7 sparse rows; intra-alar seta (*ia*) small, about same size as *acr*; supra-alar setae (*spal*) as long as first and second *dc*. Postpronotal lobe (=humeral callus) with 1 anterior bristle accompanied by 4–5 small setulae. Notopleuron with 2 normal bristles. Posterior part of anepisternum (mesopleuron) with 1 strong bristle, and generally 1 small seta at each side; katapisternum (sternopleuron) with 1 strong bristle at dorso-posterior angle. Scutellum with 2 setae on each side: 1 apical scutellar setae (*ap scl s*) generally parallel or very slightly convergent; 1 basal scutellar setae (*b scl s*) about same size as *ap scl s*, directed slightly inwards. Wing: length (on average)  $1.45 \times 0.68$  (long  $\times$  wide) mm. Costa (*C*) clearly reaching  $R_{4+5}$ , second and third costal sections short, first to fourth costal section in proportion of approximately 1:1:0.4:1. Legs: with normal pilosity and usual pre-apical bristle.

Abdomen. Setae of the tergites very distinct and relatively numerous arranged uniformly.

Coloration. Head entirely brownish, face, front and orbital brown stripes; *i vt s* (= *vti*) and *o vt s* (= *vte*) on brown ground. Lunule dark brown. Ocellar triangle dark brown like cheeks. Gena light brown. Thorax and scutellum uniformly brown. Wing pale brown; squama fringe light

brown. Halter white. Legs entirely brown. Abdomen brown on dorsal side and paler on ventral; tergites 1 to 5 each with clearly darker brown band between contiguous margins, with large brownish spots on sternites.

Genitalia. Aedeagus as in Figs. 1b,c; mesophallus bladder-shaped, hypophallus well developed, distiphallus with distinct distal opening in lateral view. Cercus short and thin. Sperm pump (=ejaculatory apodeme) longer (0.2 mm) than wide (0.11 mm) (wider part) expanded uniformly on the two sides (Fig. 1d). Gonostylus (=surstylus) with short uniform pilosity inside of each lower corner (Figs. 1e,f).

*Bionomy*. Echevarría (1996) found this species, referring to an undescribed “*Pseudonapomyza* n. sp. 2” (with a photo of the male genitalia), as resting on leaves of *Brachypodium* sp. (Poaceae) and *Tamarix canariensis* L. (Tamaricaceae). This is the only reference to host-plants of this species. It is certain that the species develops on Poaceae, possibly on *Brachypodium*, but *Tamarix* must be excluded as a host.

*Phenology* (Fig. 2). In “Tinença Benifassà”, this species is present from mid May to September (Echevarría 1996) under average temperatures of 17–27°C (32°C max and 10°C min). In “Font Roja”, it appears in mid July with average temperatures of 27°C (31.9 °C max and 21 °C min).

*Etymology*. The specific name refers to the type locality.



*Remarks.* The new species is similar to *Pseudonapomyza balkanensis* Spencer, 1973, in having the blunt angulate first antennal flagellomere and dark fringe on the calypter, but the two species are clearly different; in *P. benifassae* sp. n., the wing is slightly smaller, the second costal section is as long as the fourth, the hypophallus is elongated, and the distiphallus is provided with a pair of spinulose lobes on the ventral side; in *P. balkanensis*, the wings are 1.5–1.7 mm long, the second costal section is slightly longer than the fourth, and the phallus is shown in Figs. 403 and 404 by Spencer (1973).

#### 4. First record of *Pseudonapomyza palliditarsis* Černý, 1992 from Spain

*Material examined.* 1♂, Tinença de Benifassà, 12–19.IX.2005; 1♂, 1–10.VIII.2006, GPS location: N40°30'22.6", E00°09'26.8".

*Bionomy.* Host-plant unknown.

*Phenology.* Two males were captured when average temperature was 20°C (11°C min and 31°C max).

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