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*THE FLOWER-LOVING MICROBOMBYLIID
GENUS EMPIDIDEICUS BECKER, 1907
(DIPTERA: MYTHICOMYIIDAE) IN PORTUGAL*

NEAL L. EVENHUIS, JORGE ALMEIDA & RUI ANDRADE



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Cover photo: *Empidideicus carrapateira*, sp. nov., visiting flowers of Asteraceae in Carrapateira, Portugal. Photo: Jorge Almeida.

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The State Museum of Natural and Cultural History
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Honolulu, Hawai'i 96817-2704, USA

The flower-loving microbombyliid genus *Empidideicus* Becker, 1907 (Diptera: Mythicomyiidae) in Portugal

NEAL L. EVENHUIS 

J. Linsley Gressitt Center for Research in Entomology, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817-2704, USA; email: NealE@bishopmuseum.org

JORGE ALMEIDA 

Rua da Noruega, 14 – lote 393, 8125-459 Vilamoura, Portugal; email: jorgemotalmeida@gmail.com

RUI ANDRADE 

Rua Calouste Gulbenkian 237 4H3, 4050-145 Porto, Portugal; email: ruiamandrade@yahoo.com

Abstract. The genus *Empidideicus* Becker, 1907 is comprised of more than 50 species found primarily in Africa, Europe and Asia. Four new species from Portugal are here described and illustrated: *Empidideicus carrapateira*, **n. sp.**, *E. blascoi*, **n. sp.**, *E. inesae*, **n. sp.**, and *E. pallidifacies*, **n. sp.** In addition, the species *Empidideicus freyi* Greathead, 1986 is recorded from Portugal for the first time. With these new species and new records, there are seven species of *Empidideicus* now known from Portugal. Additional new records of Portuguese species found elsewhere are also given. A key is provided to the species of *Empidideicus* from the Iberian Peninsula.

INTRODUCTION

Little work has been done on the taxonomy of Mythicomyiidae in Portugal. The world catalog by Evenhuis (2002) listed no known species from Portugal. The checklist of the Iberian fauna by Carles-Tolrá (2002) listed 16 species (all from Spain, including the Canary Islands). Subsequent collecting by two of us (JA, RA) has revealed a fairly diverse fauna of the family for the country. The first Portuguese record of the family, *Empidideicus hackmani* François, 1969, was published in 2009 (Evenhuis *et al.* 2009). Next, Gharali *et al.* (2013) recorded *Platypygus ridibundus* Costa, 1863; Almeida (2014) recorded *Cephalodromia nitens* (Loew, 1846) from Serra da Estrela; Dils & Gharali (2018) described a second Portuguese *Platypygus* species (*P. ibericus* Dils & Gharali, 2018); and most recently, Evenhuis (2023) described a second Portuguese *Empidideicus* species, *Empidideicus evenhuisi* Evenhuis, 2023 from southern Portugal. With further collecting and specimens from numerous localities from many parts of Portugal, further new species of *Empidideicus* have been identified. We here summarize the fauna of *Empidideicus* in Portugal based on these collections, describing and illustrating four new species, *Empidideicus carrapateira*, **n. sp.**, *E. blascoi*, **n. sp.**, *E. inesae*, **n. sp.**, and *E. pallidifacies*, **n. sp.** and recording additional described species of the genus from Portugal for the first time. When comparing Portuguese species with specimens from adjacent countries, some new records were found and are listed here. A key to species of *Empidideicus* of the Iberian fauna is provided.

MATERIAL AND METHODS

Material has been examined from or is/will be deposited in the following collections:

BPBM	Bishop Museum, Honolulu, Hawai‘i, USA
CAS	California Academy of Sciences, San Francisco, California, USA
CNC	Canadian National Collection of Insects, Ottawa, Ontario, Canada
MCT	Miguel Carles-Tolrà, Barcelona, Spain
MNHNR	Muséum National d’Histoire Naturelle Rabat, Morocco
NHMM	Natuurhistorisch Museum, Maastricht, Netherlands
RA	Rui Andrade, Portugal
RBINS	Royal Belgian Institute of Natural Sciences, Brussels, Belgium
ZMHB	Museum für Naturkunde, Berlin, Germany
ZMUC	Natural History Museum of Denmark, Copenhagen, Denmark

Genitalic preparations were made by macerating parts in either hot lactic acid (a few minutes) or overnight in an enzymatic solution used for cleaning contact lenses (see Yau & Marshall 2015), washing in distilled water, and dissecting and examining in concave slides in a medium of Purell® Hand sanitizer mixed with a drop of 95% ethanol. Male genitalia are preserved in a microvial pinned below the specimen; female genitalia are mounted on slides.

Images of various morphological structures were accomplished by using a Leica M165C stereo dissecting scope via the Leica Microsystems LASX Multifocus software (v. 5.0.1) and using Zerene Stacker® software (v. 1.04) (Zerene Systems, LLC, Richmond, Washington, USA) to align and stack-focus each final image. Geographical coordinates use WGS84 datum. Morphological terminology follows Cumming & Wood (2017).

TAXONOMY

Genus *Empidideicus* Becker

Empidideicus Becker, 1907: 97. Type species: *Empidideicus carthaginiensis* Becker, 1907, by monotypy.

This genus of 53 previously described species worldwide (Evenhuis & Pape 2023) is predominantly Old World with high diversity in southern Africa and the Middle East. Many undescribed forms are known from these areas as well as China, Madagascar, India, Pakistan, Sri Lanka, Thailand, Flores Island (Indonesia), and western and northern Australia. The European distribution of *Empidideicus* is mostly Mediterranean and southern Europe. As members of the genus are found mostly in arid and semi-arid areas, the diversity of the genus is thus disproportionately higher in the drier parts of the Iberian Peninsula than other areas of Europe.

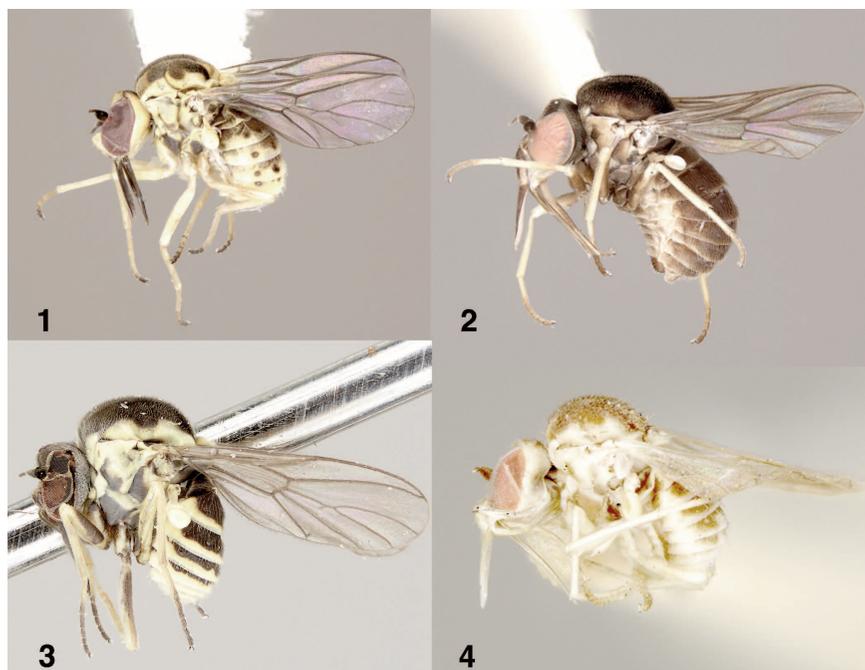
Many of the species in this study were collected from or photographed at flowers. Species of Mythicomyiidae, especially *Empidideicus*, are frequently found on flowers and/or inflorescences, and sweeping them with aerial nets or setting traps near flowers will often result in good catches. Those species of *Empidideicus* in Portugal seem to prefer flowers with large petals that can serve as “landing zones”—such as many Asteraceae—which may aid in resource lekking behavior. This resource lekking behavior is seen in other mythicomyiids [e.g. species of *Cyrtosia* in Kazakhstan in Evenhuis (2018)] where flowers can host more than one species (see Fig. 44 herein of *Empidideicus freyi* and *E. hackmani* sharing floral resources of the aster *Chamaemelum mixtum*). The courting and

mating of these flower-loving mythicomyiids apparently does not always occur on the flowers (but see Fig. 45 of *Empidideicus freyi*) and may sometimes take place near to floral resources [see description of the “Sammelplatz” (= meeting place) and courting and mating for *Cephalodromia* in Greece] described in Mühlenberg (1973). Table 1 gives a list of flowers that have been identified in this study as those visited by species of *Empidideicus* in Portugal. Selected photos of species on those flowers are provided in Figs. 43–48. Nothing is known of the biology of the immatures.

With the four new species described here and new records recorded, there are now seven species known from Portugal, with a few of these co-occurring in Spain, France, Tunisia and Morocco; and the total number of *Empidideicus* species worldwide is now 57.

KEY TO SPECIES OF *EMPIDIDEICUS* BECKER OF THE IBERIAN PENINSULA

1. Occiput all black 2
- Occiput black with some yellow color laterally 5
2. Scutellum all dark brown or black ... (Portugal) **carrapateira, n. sp.**
- Scutellum predominantly yellowish to yellowish brown, some darker brown color may be present 3
3. Scutellum yellow, without brown border 4
- Scutellum yellow with brown border; mesonotum without admedian lines; frons white with brown medial spot ... (Spain) **hispanus** François
4. Face black; scutellum yellow, some brown may be present as small spot basolaterally (Fig. 18); wing cell r4+5 much wider than cell m1 at wing margin (Fig. 25); R₄₊₅ bowed (Portugal, Morocco, Spain) **evenhuisi** Evenhuis
- Face white, scutellum yellow with thin brown mark basomedially; wing cell r4+5 equal in width to m1 at wing margin (Fig. 29); R₄₊₅ straight ... (Portugal) **pallidifacies n. sp.**
5. Prescutellar area brown to black, no yellow color present ... (Spain, Portugal, Morocco, Tunisia) **hackmani** François
- Prescutellar area with yellow color, color may be faint 6
6. Scutellum all yellow; prescutellar area broadly yellow; mesonotum with black and yellow pattern, without gray tomentum (Figs. 15, 16) ... (Morocco, Portugal, Spain) **blascoi n. sp.**
- Scutellum yellow with some black color; prescutellar area dark colored, with only small marks of light color; mesonotum gray tomentose with black and whitish pattern (e.g., Fig. 21) 7
7. Scutellum brown with yellow median stripe (Fig. 21); prescutellar area with narrow yellow mark medially as extension of yellow mark on scutellum; anal cell widely open at wing margin (Fig. 28); spermatheca globular, apical invagination deep with small basal dome (Fig. 41) ... (Portugal) **inesae n. sp.**
- Scutellum yellow with medial brown band (Fig. 19); prescutellar area with yellow marks as extensions of admedian vittae; anal cell narrowly open at wing margin (Fig. 26); spermatheca long subcylindrical, longer than wide; apical invagination shallow, without basal dome (Fig. 39) ... (Cape Verde Is, Portugal, Morocco, Spain) **freyi** Greathead



Figures 1–4. *Empidideicus* habitus, lateral view. 1, *E. blascoi*, n. sp., male; 2, *E. carrapateira*, n. sp., male; 3, *E. evenhuisi* Evenhuis, male; 4, *E. freyi* Greathead, male.

***Empidideicus blascoi* Evenhuis, Almeida & Andrade, n. sp.**

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(Figs. 1, 8, 15, 16, 23, 30, 36)

Material examined. Types. *Holotype* ♂ (BPBMENT 0000081262) and 1♂, 2♀ *paratypes* from **POR-TUGAL**: Beja, Mértola, Mértola, 37°38'13.0"N, 07°39'47.1"W, 4 Aug 2022, R. Andrade. *Other Paratypes*: **PORTUGAL**: 2♀, topotypic, 2 Aug 2022, R. Andrade; 1♀, Faro, Silves, São Bartolomeu de Messines, 37°16'28.7"N, 08°18'37.3"W, 12 Jul 2014, R. Andrade (BPBM); 1♂, Viseu, Moimenta da Beira, Leomil, 41°00'16.1"N, 07°40'13.4"W, 7 Aug 2013, R. Andrade (BPBM). **MOROCCO**: 1♀, Tiznit plague, Sidi Moussa d'Aglou, 29.49°N, 09.50°W, 9 May 1999, V. Vrabeč, V. Vrabcová (BPBM); 1♀, Ifane environs, Forêt de Cedres, 33°31'N, 05°06'W, 1500 m, yellow pan, V. Vrabeč, V. Vrabcová (BPBM). **SPAIN**: Zaragoza Prov: 12♂♀, Monegros, Pina de Ebro, Retuerta de Pina, 360 m, 7 Jun 1991, pan traps between *Juniperus thurifera* and *Rosmarinus* sp., J. Blasco-Zumeta (BPBM); Segovia: 1♂, Chañe, 16 Aug–14 Sep 2000, J.F. Gomez (MCT); Salamanca: 1♀, Villa de Ciervo, La Navizuela, 31 May–9 Jun 2003, H.-P. Tschorsnig (MCT); 19♂♀, Sierra del Gata, Rio Azueda, N of El Payo, 15 Aug 2000, on *Erigeron*, J.F. Gomez (MCT); 163♂♀, Aldea del Obispo, Prado Caño, 28 Jun 1995, J.F. Gomez (MCT); 179♂♀, Villa de la Yegua, 24 Apr 1995, swept from Umbelliferae, H.-P. Tschorsnig (MCT). *Holotype* in BPBM. *Paratypes* in BPBM, ZMUC and MCT.

Diagnosis. Easily separated from the congeners in Portugal by the presence of a large yellow prescutellar area (other species have this area all or predominantly brown to black).



Figures 5–7. *Empidideicus* habitus, lateral view. 5, *E. hackmani* François, male; 6, *E. inesae*, n. sp., female; 7, *E. pallidifacies*, n. sp., female.

Description

Male (Fig. 1). Length: 1.10–1.50 mm. *Head*: as long as high in lateral view; eyes separated at vertex by $1.5\times$ distance between lateral ocelli; occiput black medially, yellow laterally and on postgena; frons (Fig. 8) white with brown medially; face and tip of oral margin white; antennae black; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere lanceolate, length $2.5\times$ greatest width; second flagellomere subequal to length of first flagellomere, with minute transparent apical style; mentum white; clypeus yellowish white, slightly shorter than oral margin; proboscis brown, length $1.5\times$ head length; labrum dark brown, sclerotized, stiff, pointed apically, slightly longer than clypeus; palpus not evident.

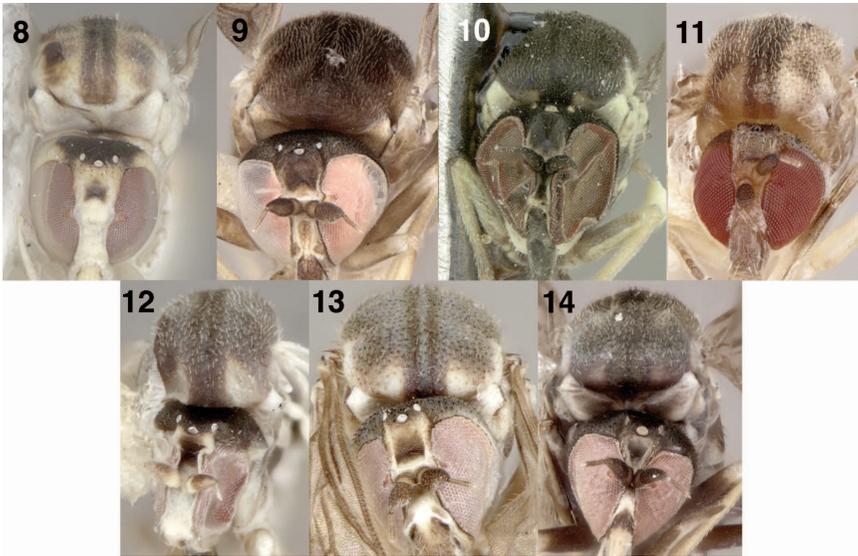
Thorax (Figs. 15, 16). Mesonotum matte black; white broadly laterally from postpronotal lobe to postalar callus; scutum with white interhumeral marks as beginning of admedian yellowish white vittae extending to broad, square yellowish prescutellar mark; interhumeral marks coalesced with white postpronotal lobes; scutellum yellow; mesonotal disc and dorsum of scutellum with admixed short fine yellow and white hairs; pleura (Fig. 1) bare, predominantly whitish yellow with black on following: lower half of katepisternum and meron; halter stem yellowish white, knob white.

Legs. Yellowish white except tarsal segments 3–5 brown.

Wing (Fig. 23). Elongate, length $3\times$ width; hyaline; veins brown; thickened portion of costa ends beyond end of R_{4+5} one-third way to M_1 ; R_s faded basally at connection with R_1 ; R_{4+5} straight to wing margin, ending in wing margin at level before end of M_2 ; vein M_1 slightly curved toward wing margin; M_2 slightly curved downward at wing margin; cell dm open; A_1 thin, straight to wing margin; anal cell broadly open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

Abdomen. Dorsum with tergites I–IV black medially, broadly yellow posteriorly and laterally; lateral margins yellowish white (some specimens with brown spots on extreme lateral margin); sternites white; tergites with admixed scattered minute yellow, white, and brown hairs.

Genitalia (Fig. 30). Hypopygium in ventral view gonocoxites subovate, cleft medially, with thin dark sclerotization basally (hyandrium); gonostylus thin, sickle-shaped; lateral arms of parameral sheath extending well below gonocoxa, rounded and slightly flared apically; aedeagal bulb fairly large, rounded; aedeagal apodeme thin, axe-



Figures 8–14. *Empidideicus* heads, frontal view. **8**, *E. blascoi*, n. sp.; **9**, *E. carrapateira*, n. sp. **10**, *E. evenhuisi* Evenhuis; **11**, *E. freyi* Greathead; **12**, *E. hackmani* François; **13**, *E. inesae*, n. sp.; **14**, *E. pallidifacies*, n. sp.

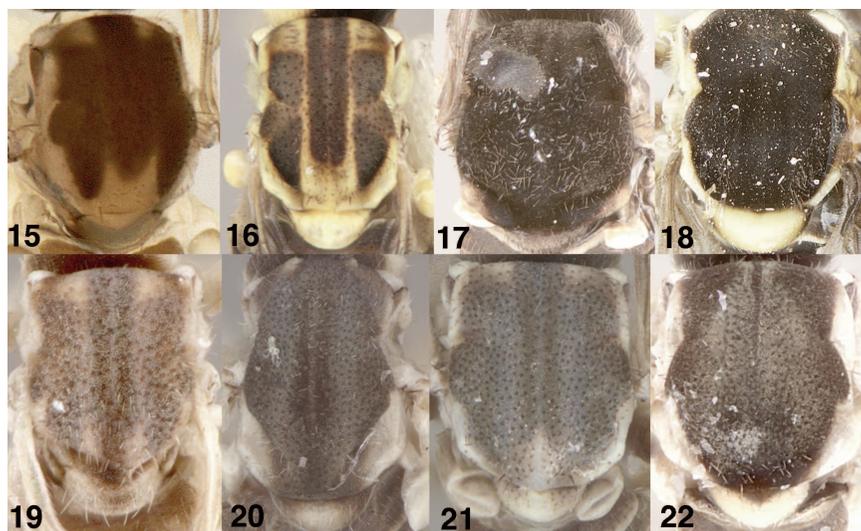
shaped, length subequal to aedeagal bulb, with short lanceolate lateral rami; upper portion of parameral sheath one-half length of gonocoxa, very thin, bifid on upper half; aedeagus not extending beyond parameral sheath; epandrium subrectangular with large rounded apicoventral process; cerci not evident.

Female: As in male. Genitalia (Fig. 36): genital fork thin, U-shaped; spermatheca spheroid, flat apically sclerotized brown, without striations, invagination apically with depth slightly more than one-third of reservoir; apical spermathecal duct ca. $3\times$ length of spermatheca, thin, transparent; sperm pump $3\text{--}4\times$ length of apical duct, swollen, corrugated in appearance, slightly sclerotized, without evident valves apically or basally; basal duct short, transparent; common duct absent.

Etymology. The specific epithet is named for Javier Blasco-Zumeta, who collected the specimens from Monegros, Zaragoza, Spain, and who has been very supportive of the first author's work on Mythicomyiidae in Spain for many years.

Remarks. There is some variation in the amount of black color on the mesonotum, from separate bands with distinct admedian yellowish white vittae (Fig. 16) to the black mesonotal color coalesced medially obscuring the vittae (Fig. 15).

Distribution. Morocco, Portugal, Spain.



Figures 15–22. *Empidideicus* thoraxes, dorsal view. 15, *E. blascoi*, n. sp. (dark form); 16, *E. blascoi*, n. sp. (typical form); 17, *E. carrapateira*, n. sp.; 18, *E. evenhuisi* Evenhuis; 19, *E. freyi* Greathead; 20, *E. hackmani* François; 21, *E. inesa*, n. sp.; 22, *E. pallidifacies*, n. sp.

***Empidideicus carrapateira* Evenhuis, Almeida & Andrade, n. sp.**

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(Figs. 2, 9, 17, 24, 31, 37, 43)

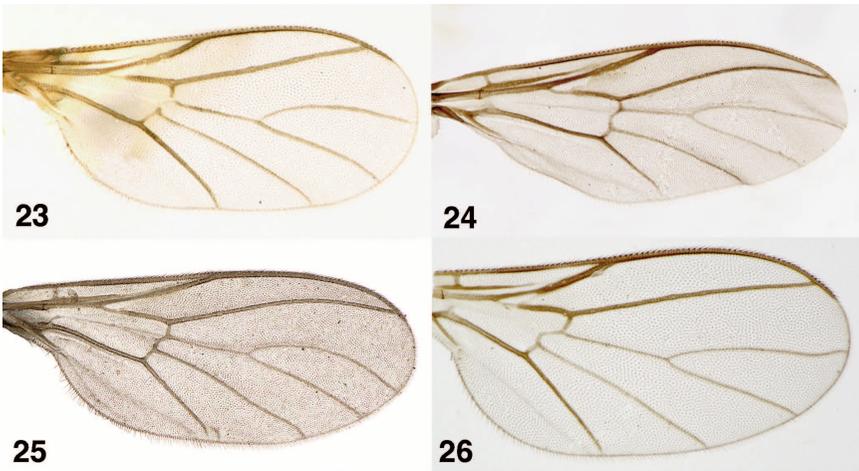
Material examined. Types. Holotype ♂ (BPBMENT 0000081263) and 3♂, 15♀ paratypes from: PORTUGAL: Faro, Aljezur, Carrapateira, Bordeira beach, 37°11'44.68"N, 08°54'16.81"W, 16 Apr 2011, J. Almeida, R. Andrade. Holotype in BPBM. Paratypes in BPBM and ZMUC.

Diagnosis. Easily separated from the congeners in Portugal by the all black occiput and all black to brown scutellum (other species with some amount of yellow in those areas).

Description

Male (Fig. 2). Length: 0.80–1.05 mm. **Head:** slightly longer than high in lateral view; eyes separated at vertex by 1× distance between lateral ocelli; occiput and postgena black; frons (Fig. 9) dark brown, depressed medially; face white with brown medially; tip of oral margin shiny brown; antennae black; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere lanceolate, length 3× width; second flagellomere slightly less length of first flagellomere, with minute transparent apical style; mentum black; clypeus shiny brown, as long as oral margin; proboscis dark brown to black, length 1.5× head length; labrum sclerotized, stiff, pointed apically, 1.25× head height; palpus not evident.

Thorax (Fig. 17). Mesonotum matte black with scattered minute pale brown hairs; scutellum dark brown tomentose with black along posterior margin; mesonotal disc and dorsum of scutellum with short fine pale brown hairs; pleura (Fig. 2) bare, dark brown except propleuron and upper margins of katepisternum and meron gray; halter stem and knob grayish yellow.



Figures 23–26. *Empidideicus* wings. **23**, *E. blascoi*, n. sp.; **24**, *E. carrapateira*, n. sp.; **25**, *E. evenhuisi* Evenhuis; **26**, *E. freyi* Greathead.

Legs. Coxae, basal three-fourths of femora and tarsal segments 2–5 brown, yellow elsewhere.

Wing (Fig. 24). Elongate, length $3\times$ greatest width; subhyaline; veins brown; costa ends beyond end of R_{4+5} , one-fifth way to end of M_1 ; Rs thin basally at connection with R_1 ; R_{4+5} bowed at subapical one-third; vein M_1 curved toward wing margin; M_2 straight, with a gentle bend before reaching wing margin; A_1 thin, straight to wing margin (wing wrinkled in photo making it not look straight); anal cell open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

Abdomen. Dorsum black, concolorous with mesonotum; tergite I black with white membrane basally; tergites II–VII black with thin grayish white band along posterior margin; sternites pale brown; tergites with sparsely scattered minute pale brown hairs, concolorous with those on scutellum.

Genitalia (Fig. 31). Hypopygium shiny brown. In ventral view gonocoxites subtrapezoidal, not cleft medially, with thin dark sclerotization basally (hypandrium); gonostyli subconical-ovular, tapering to apex; lateral arms of parameral sheath extending well below gonocoxa, thin, slightly L-shaped apically in dorsal view (Fig. 31C); aedeagal bulb large, rounded; aedeagal apodeme short, axe-shaped, one-third length of lateral arms of parameral sheath, with short lanceolate lateral rami; upper portion of parameral sheath very short; aedeagus not extending beyond parameral sheath; epandrium subrectangular with large somewhat pointed apicoventral process, darkly sclerotized apically; apex with numerous minute hairs; cerci hemispherical, exerted.

Female: As in male except thin white band not evident on posterior margins of tergites. Genitalia (Fig. 37): genital fork thin, U-shaped; spermatheca spheroid, sclerotized brown, darker on basal half, slightly wider than long, with invagination apically extending to one-



Figures 27–29. *Empidideicus* wings. 27, *E. hackmani* François; 28, *E. inesae*, n. sp.; 29, *E. pallidifacies*, n. sp.

half depth of reservoir; apical spermathecal duct ca. $3\times$ length of spermatheca, thin, transparent; sperm pump subequal to length of apical duct, slightly sclerotized, without evident valves apically or basally, shorter section separated from and apical to main sperm pump; basal duct extremely short, transparent, confluent with sperm pump; no common duct evident.

Etymology. The specific epithet is named for the type locality. It is treated as a noun in apposition.

Distribution. Known only from Portugal.

***Empidideicus evenhuisi* Evenhuis**

(Figs. 3, 10, 18, 25, 32, 38)

Empidideicus evenhuisi Evenhuis, 2023: 20.

Material examined. Types. Holotype ♂ (NHMM 2022-017) and 1♂, 4♀ (NHMM 2022-018–2022-022) *paratypes* from **PORTUGAL**: Faro, Vila Real de Santo António, Monte Gordo, 11 Mar 1994, H.H. Evenhuis, ‘op gele Composiet in de Zeeduinen’ [on yellow composites in the sea dunes]. *Other paratypes*: same data except 1♂, 3♀ (NMHH 2022-023, 2022-024) (BPBM). *Other material examined*: **PORTUGAL**: 2♂, 7♀, Beja, Mértola, Mértola, 37°38'13.0"N, 07°39'47.1"W, 4 Aug 2022, R. Andrade (BPBM), 1♂, same data except 2 Aug 2022, R. Andrade (BPBM); **MOROCCO**: 1♂, Tiznit plage, Sidi Moussa d'Aglou, 29.49°N, 09.50°W, 9 May 1999, V. Vrabec, V. Vrabcová (BPBM). **SPAIN**: Segovia: 1♂, Chañe, 16 Aug–4 Sep 2000, J.F. Gómez (MCT); Salamanca: 2♀, Aldea del Obispo, Prado Caño, 30 Jun 1995, H.-P. Tschorsnig (MCT). Holotype in NHMM.

Diagnosis. This species is closest to *Empidideicus pallidifacies*, n. sp. but can be separated from it by the black face (white in *E. pallidifacies*, n. sp.) and wing cell r4+5 much wider than cell m1 at the wing margin (cell r4+5 subequal in width to cell m1 in *E. pallidifacies*, n. sp.).

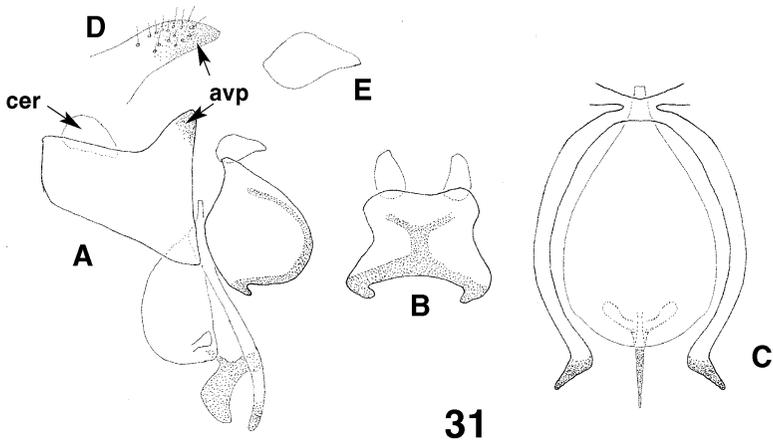
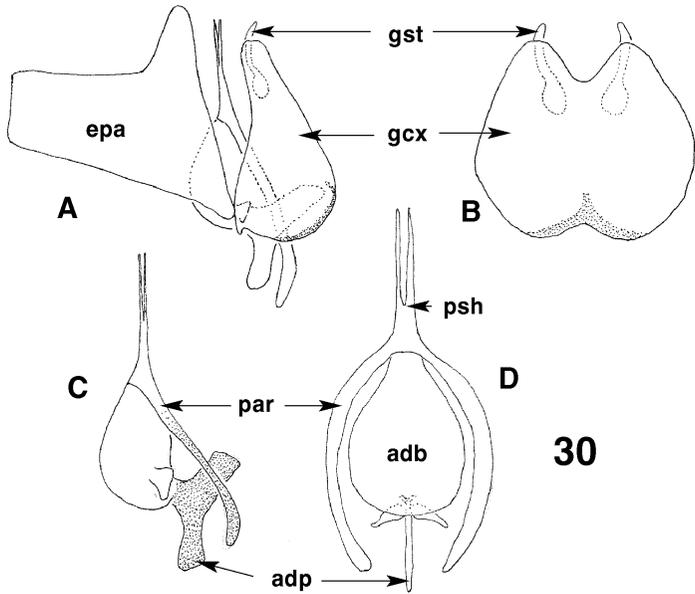
Description

Male (Fig. 3): Length: 0.95–1.00 mm. *Head* (eyes slightly collapsed from air drying). slightly higher than long; eyes separated at vertex by 1.5 times distance between lateral ocelli; occiput and postgena black; frons (Fig. 10) slightly depressed medially, black with whitish area immediately above antennal sockets; face black (some white may be present at base of antennae), tip of oral margin brown; clypeus black, 2/3 head height, forcing proboscis downward; antennae black; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere linear-lanceolate, length 2.5× width; second flagellomere subequal in length to first flagellomere, with minute transparent style apically; proboscis black, subequal to head height; labrum sclerotized, stiff, pointed apically, length slightly shorter than proboscis; labellae short; palpi not evident.

Thorax. Mesonotum (Fig. 18) matte black, white yellow on postpronotal lobes, small whitish interhumeral marks (Fig. 10), broad yellow notopleural line to post alar area; scutellum yellow with large brown spot basolaterally, yellow on hind margin; mesonotal disc and dorsum of scutellum with short fine white hairs; pleura yellow with black on anteroventral portions of anepisternum, katepisternum, anepimeron and meron; halter stem grayish brown, knob white.

Legs. Coxae black; femora yellow, brown dorsally; tibia yellow; basitarsus yellow with brown at extreme apex, remainder of tarsi brown.

Wing (Fig. 25). Pale smoky grayish brown, small streak of brown at base of cell r1 [reminiscent of similar patterning in *Empidideicus zuluensis* Hesse]; veins brown; costa ends just beyond end of R₄₊₅; R₄₊₅ slightly bowed to wing margin; vein M₁ strongly down-curved and M₂ straight to wing margin; cell dm open apically; A₁ almost straight to wing margin, curved only at extreme apex; anal cell narrowly open at wing margin; fringe of hair on posterior margin of wing shortest at wing tip becoming longer and more sparse toward alular area.



Figures 30–31. *Empidideicus* male genitalia. **30.** *E. blascoi*, n. sp.; **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, lateral view; **D**, phallic complex, ventral view. **31.** *E. carrapateira*, n. sp. **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, dorsal view; **D**, detail of apicoventral process of epandrium; **E**, detail of gonostylus. Abbreviations: adb = aedeagal bulb; adp = aedeagal apodeme; avp = apicoventral process of epandrium; cer = cercus; epa = epandrium; gcx = gonocoxite; gst = gonostylus; par = lateral arm of parameral sheath; psh = parameral sheath.

Abdomen with tergites black with thin yellow band along posterior margin (cf. Fig. 3); tergites with sparsely scattered minute white hairs.

Genitalia (Fig. 32). In lateral view with epandrium subrectangular and gonocoxa sickle-shaped; in dorsal view with epandrium with long pointed apicoventral processes (pseudo-surstyli) that overlap, cerci small, rounded, not exerted; gonostylus blade-like, curved apically, broad basally; phallic complex with relatively small parameral sheath and long, thin lateral arms of parameral sheath; aedeagal bulb large; aedeagal apodeme small, thin, peanut-shaped in lateral view; aedeagus thin, extending slightly beyond parameral sheath.

Female. As in male except interhumeral marks lacking, but yellow band present anteriorly directly behind head (sometimes obscured by head); fore and mid coxae brownish basally, yellowish apically. *Genitalia* (Fig. 38) with genital fork consisting of paired thin lateral sclerites, medial sclerite pale, not well sclerotized; spermathecal reservoir spherical with apical invagination, depth almost one-fourth of reservoir; reservoir with short, thin, sclerotized base leading to transparent long, thin apical spermathecal duct; sperm pump short (about equal in length to spermathecal reservoir), sclerotized, without apical or basal valves; basal duct longer than apical duct; common duct absent.

Remarks. There is some variation in the amount of yellow in the interhumeral area; in males it can be reduced to a small spot; in females it can be completely absent. In addition, the whitish area surrounding the antennal sockets (on frons and face) may be solid white, smoky, or absent altogether. The black and yellow tergal pattern in *E. evenhuisi*, n. sp. is sometimes difficult to see as often the last few abdominal segments are retracted.

Distribution. Morocco (**new record**), Portugal, Spain (**new record**).

***Empidideicus freyi* Greathead**
(Figs. 4, 11, 19, 26, 33, 39, 4, 45, 46)

Empidideicus freyi Greathead, 1986: 86. Evenhuis 2002: 33.

Empidideicus hackmani. Evenhuis *et al.* 2009: 492 [in part]; Almeida 2014: 16, misidentification.

Types. *Holotype* ♂ and 1♂, 5♀ *paratypes* from **CAPE VERDE ISLANDS**: São Tiago, São Jorge, May 1983, water traps, A. van Harten (BMNH). Other *paratypes*: **CAPE VERDE ISLANDS**: 6♀, topotypic, 1–10 Mar 1984, 10♂, 32♀, topotypic, Mar–Apr 1984, suction trap, A. van Harten (BMNH, ZMHB) [specimens stated to be in personal collection of D. Greathead are now in BMNH].

Material Examined. **CAPE VERDE ISLANDS**: 1♂, 3♀, São Tiago, São Jorge dos Órgãos, Mar 1990, A. van Harten (BPBM). **PORTUGAL**: 1♂, 10♀, Porto, Vila Nova de Gaia, Canidelo, 41°08'20.7"N, 08°39'55.2"W, 30 Sep 2010, R. Andrade; 1♀, same data except 29 Jun 2011; 2♂, same data except 4 May 2011; 1♀, Porto, Vila Nova de Gaia, Arcozelo, 41°03'12.3"N, 08°39'18.0"W, 26 May 2011, R. Andrade (BPBM, ZMUC); 1♀, Porto, Vila Nova de Gaia, Gulpilhares, 41°04'27.8"N, 08°39'23.6"W, 22 Jun 2009, on *Eryngium maritimum*, R. Andrade; 1♀, Braga, Esposende, Apúlia, 41°28'16.4"N, 08°46'27.2"W, 6 May 2009, R. Andrade; 1♀, same data except 4 Jun 2009; 2♀, Faro, Loulé, Al Mancil, 37°01'31.8"N, 08°00'20.4"W, 30 Sep 2016, R. Andrade (all BPBM). **MOROCCO**: 1♀, Tiznit plage, Sidi Moussa d'Agrou, 0–50 m, 29.49°N, 09.50°W, 20 Apr 2003, P. Skála (BPBM); 1♀, Oued El Hamma, 6–21 Jun 2016, Malaise, K. Kettani (MNHNR); 1♀, Oued Mhajat, 20–13 Oct 2015, Malaise, K. Kettani (MNHNR). **SPAIN**: Salamanca: 24♂♀ Sierra de Gata, Rio Agueda, n. of El Payo, 6 Aug 2000, on *Eryngium*, J.F. Gómez (MCT); 1♀, Villa de Cierro, La Naviguela, 1 May–9 Jun 2003, H.-P. Tschorsnig (MCT); 177♂♀, Villa de Yegun, Vado de la Viña, 24 Apr 1995, swept off Umbelliferae, H.-P. Tschorsnig (MCT); 107♂♀, Aldea del Obispo, Prado Caño, 28 Jun 1995, H.-P. Tschorsnig (MCT).

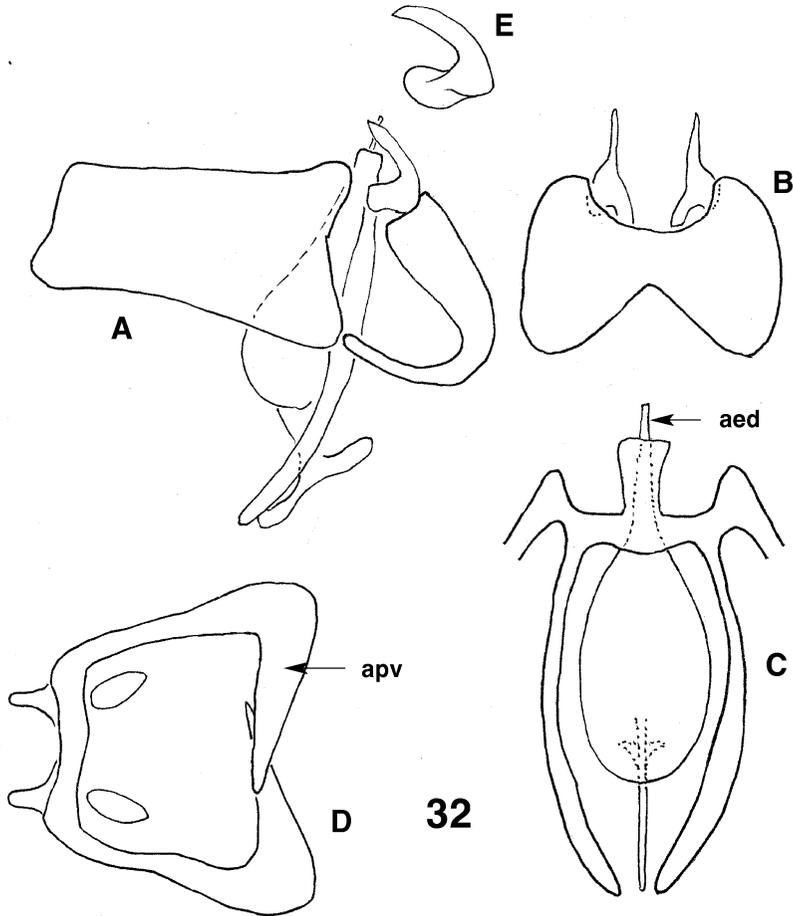


Figure 32. *Empidideicus evenhuisi* Evenhuis, male genitalia; **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, ventral view; **D**, epandrium caudal view; **E**, detail of gonostylus. Abbreviations: aed = aedeagus; apv = apicoventral process of epandrium.

Diagnosis. Easily separated from the congeners in Portugal by the yellow scutellum with a median brown stripe (the scutellum in other species without such a median brown stripe) and the generally grayish brown pollinose mesonotum with thin yellowish admedian vittae (other species either grayish, black, or yellow and black but not grayish brown pollinose and with or without admedian vittae).

Description

Male (Fig. 4). Length: 0.98–1.15 mm. *Head*: About 1.3× longer than high; eyes separated at vertex by 1× distance between lateral ocelli; occiput black dorsally, yellow laterally,

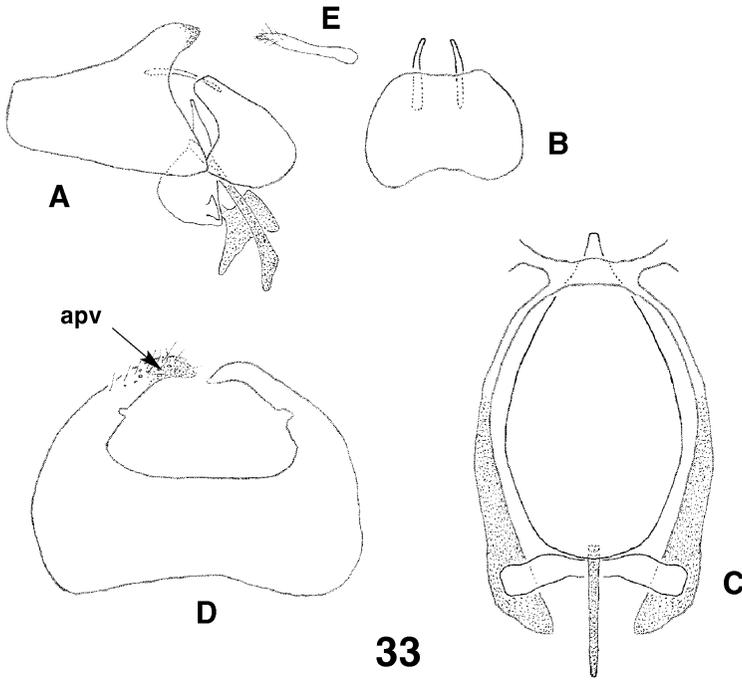


Figure 33. *Empidideicus freyi* Greathead, male genitalia; **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, ventral view; **D**, epandrium caudal view. Abbreviations: apv = apicovertebral process of epandrium.

postgena yellow; frons (Fig. 11) depressed medially, yellow along inner eye margin, brown medially; face white, tip of oral margin tan; antennae brown; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere ovate, length $3\times$ width; second flagellomere subequal in length to first flagellomere, with minute transparent apical style; mentum white; clypeus tan, as long as oral margin; proboscis dark brown to black, length $2\times$ head length; labrum sclerotized, stiff, pointed apically, length subequal to proboscis; palpus not evident.

Thorax (Fig. 19). Mesonotum matte grayish brown pollinose with yellow pollinose interhumeral marks; thin grayish yellowish admedian vittae from interhumeral marks to scutellum; admedian vittae in prescutellar area concolorous with interhumeral marks; white to yellow dorsolaterally from postpronotal lobe to transverse suture; interhumeral marks not coalesced with white postpronotal lobes; scutellum grayish yellow with brown band medially; disc and dorsum of scutellum with numerous short fine white hairs; pleura (Fig. 4) predominantly yellowish white except brown spot on ventral anepisternum, and brown on ventral half of katepisternum and meron; halter stem and knob yellow.

Legs. Basal half of coxae and tarsal segments 3–5 brown, yellow elsewhere.

Wing (Fig. 26). Shorter than other species from Portugal, length $2\times$ width; subhyaline; veins brown; costa ends beyond end of R_{4+5} one-third way to end of M_1 ; Rs faded basally at connection with R_1 ; R_{4+5} straight to wing margin; vein M_1 slightly curved toward wing margin; M_2 straight; cell dm open; A_1 thin, straight to wing margin; anal cell open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

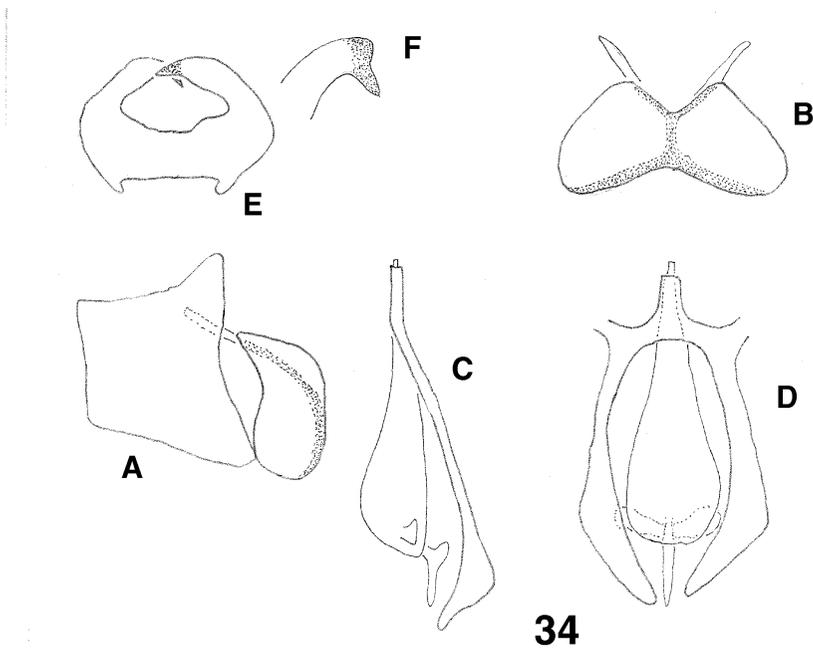
Abdomen. Dorsum brown; tergites II–VII predominantly brown with white band along posterior margin; lateral margins broader white than posterior bands, extreme lateral margin brown; sternites white; tergites with sparsely scattered minute white hairs.

Genitalia (Fig. 33). Hypopygium shiny yellowish brown. In ventral view gonocoxites subquadrate, without cleft medially; gonostylus thin, linear, with minute hairs at apex; lateral arms of parameral sheath extending well below gonocoxa, flared apically; aedeagal bulb very large, rounded; aedeagal apodeme short, one-fourth length of lateral arms of parameral sheath, with short lanceolate lateral rami; upper portion of parameral sheath short; aedeagus not extending beyond parameral sheath; epandrium subquadrate with large rounded apicoventral process, process rounded at apex with minute hairs, and with small depression in inner margin.

Female: As in male. Genitalia (Fig. 39): spermatheca cylindrical, sclerotized brown, length $2.5\times$ width, with thin band of striations near base, invagination apically very small, narrow; apical spermathecal duct ca. $3\times$ length of spermatheca, thin, transparent; sperm pump $3\text{--}4\times$ length of apical duct, slightly sclerotized, without evident valves apically or basally; basal duct extremely short, transparent, confluent with sperm pump; common duct not evident.

Remarks. The Portuguese and Moroccan specimens differ in some characters from those from the type locality in the Cape Verde Islands including legs with brown on basal half of the coxae (all yellow in the Cape Verde specimens) and the presence of what appears to be an apical valve in female genitalia, which is lacking in the Portuguese specimens. However, dissection of females of Cape Verde specimens on hand showed this valve not to be present. The difference in coxal coloration is here considered to be variable since other external characters of the head, mesonotum and scutellum fit well with *E. freyi*. The sperm pump of the female genitalia drawn by Greathead is not the same as dissections from other specimens from Cape Verde made during this study seems to be an error in illustrating. The disjunct distribution of this species may be evidence of it as a relict species. It is hypothesized that further collecting will show it to be present in other countries in between Cape Verde and Portugal. Some of the specimens of this species recorded in Evenhuis *et al.* (2009) and those in Almeida (2014) were misidentified as *E. hackmani*.

Distribution: Cape Verde Islands, Morocco (**new record**), Portugal (**new record**), Spain (**new record**).



Figures 34. *Empidideicus hackmani* François, male genitalia. **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, lateral view; **D**, phallic complex, ventral view; **E**, epandrium caudal view; **F**, detail of apex of apicoventral process of epandrium.

***Empidideicus hackmani* François**

(Figs. 5, 12, 20, 27, 24, 40, 44, 47)

Empidideicus hackmani François, 1969: 113. Cooper & Cumming 1993: 10; Evenhuis 2002: 33; Zaitzev 2008: 87; Evenhuis *et al.* 2009: 492; Koçak & Kemal 2008: 21, 2015: 14.

Material examined. Types. *Holotype* ♀ from **SPAIN**: Granada, Sierra Nevada, N. slope Veleta, 2,200 m, [37.162°N, 03.5252°W], 30 Jul 1960, J.R. Vockeroth [photographs of type on slide examined] (CNC). *Paratype* ♀ from **SPAIN**: Sierra Nevada, Granada, 2,400 m, [37.162°N, 03.5262°W], 30 Jul 1960, J.R. Vockeroth [on slide] (RBINS). *Other material examined:* **FRANCE**: 48♂♀, 4 km S Agde, 43°18'49"N, 3°31'55"E, 10–11 Jul 2009, salty meadows, pan traps and sweeping, M. Barták (BPBM). **MOROCCO**: 1♀, Rif, Larache, Tagzhout Adrou, 556 m, 35.523333°N, 05.62861°W, 14 Jun–15 Jul 2013, Malaise in *Quercus suber* forest, K. Kettani (MNHNR). **PORTUGAL**: 1♂, 6♀, Viana do Castelo, Viana do Castelo, Vila Nova de Anha, 41°40'08.9"N, 08°49'25.7"W, 12 Jun 2011, R. Andrade (BPBM); 2♀, Viana do Castelo, Ponte da Barca, Entre Ambos-os-Rios, 41°49'12.6"N, 08°19'18.4"W, 8 Aug 2013, R. Andrade; 2♀, Porto, Vila Nova de Gaia, Avintes, 41°06'00.0"N, 08°33'35.3"W, 20 Jun 2011, R. Andrade (BPBM); 1♂, 1♀, same data except 23 May 2011 (BPBM); 2♀, Porto, Vila Nova de Gaia, Canidelo, 41°08'20.7"N, 08°39'55.2"W, 29 Jun 2011, R. Andrade (BPBM); 1♂, 10♀, Braga, Esposende, Apúlia, 41°28'16.4"N, 08°46'27.2"W, 3 Aug 2009, R. Andrade (BPBM, ZMUC); 1♀, Braga, Vila Nova da Famalicão, Novais, 41°23'26.34"N, 08°26'06.06"W, 16 Aug 2013, R. Andrade; 1♂, 1♀, same data except 16 Jun 2017; 6♀, same data except 23 Aug 2010 (BPBM), 2♀, Braga, Barcelos, Gilmonde, 41°30'43.0"N, 8°38'57.0"W, 19 Aug 2010, R. Andrade

(BPBM); 1♀, same data except 2 Jun 2019; 2♀, same data except 1 Sep 2020; 1♀, Bragança, Miranda do Douro, Vila Chã de Braciosa, 41°25'29.8"N, 06°18'29.4"W, 9 Jun 2021, R. Andrade (BPBM); 2♂,6♀, Leiria, Óbidos, Vau, 39°23'30.9"N, 09°12'03.6"W, 15 Aug 2022, R. Andrade (BPBM); 11♂,24♀, Porto, Valongo, Campo, 41°10'31.9"N, 08°28'48.5"W, 28 Jul 2010 (BPBM, ZMUC); 3♂,5♀, Bragança, Bragança, França, 41°56'33.1"N, 06°45'51.0"W, 19 Jul 2020, R. Andrade (BPBM). **TUNISIA:** 1♂,2♀, Mahdia, dunes N of Chebba [36.2569°N, 11.0965°E], 28 Apr 2009, D. Gibbs (BPBM).

Unverified records in the literature. **FRANCE:** Taulignan, 22 Jul 1956, P. du Merle (MNHN) (Zaitzev 2008: 87). The record of Italy in Evenhuis (2002: 33) was an error and is here removed from the distribution of this species.

Diagnosis. Easily separated from the congeners in Portugal by the scutellum brown dorsally and along posterior margin with a yellow band medially (*E. inesae*, n. sp. is similar but has yellow along the posterior margin).

Description

Male (Fig. 5). Length: 0.98–1.15 mm. *Head:* clearly longer than high in lateral view; eyes separated at vertex by $1\times$ distance between lateral ocelli; occiput black dorsally, yellow laterally and postgena yellow; frons (Fig. 12) white, slightly depressed, brown medially; face white; antennae with scape short, yellowish white, subtrapezoidal; pedicel yellow, subconical, wider than long; first flagellomere brown, lanceolate, length $2\times$ greatest width; second flagellomere brown, slightly less length of first flagellomere, with minute transparent apical style; mentum black; clypeus pale brown, as long as oral margin; proboscis dark brown to black, length $1.5\times$ head length; labrum sclerotized, stiff, pointed apically, length subequal to proboscis; palpus not evident.

Thorax (Fig. 20). Mesonotum brown pollinose, darker medially, with gray pollinose admedian stripes from interhumeral mark to scutellum; grayish white dorsolaterally from postpronotal lobe to post alar callus; grayish white interhumeral marks narrowly coalesced with white postpronotal lobes; scutellum brown with yellow median stripe; mesonotal disc and dorsum of scutellum with short fine white hairs; pleura bare, yellowish white, with black on following: anteroventral half of anepisternum, ventral three-fourths of katepisternum and meron; halter stem and knob white.

Legs. Coxae and femora brown basally, yellow elsewhere except tarsomeres 3–5 brown.

Wing (Fig. 27). Elongate, length $3\times$ width; hyaline; veins brown; thickened portion of costa ends slightly beyond end of R_{4+5} ; Rs thin at connection with R_1 ; R_{4+5} fairly straight to wing margin; vein M_1 slightly curved toward wing margin; M_2 straight; cell dm open; A_1 thin, straight to wing margin; anal cell open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

Abdomen. Dorsum black, concolorous with mediotergite color; tergites I–VII black with thin white band along posterior margin, band becoming successively broader on successive segments; lateral margins broader white than posterior bands; sternites pale brown; tergites with sparsely admixed minute white and black hairs.

Genitalia (Fig. 34). Hypopygium brown. In ventral view gonocoxites subtrapezoidal, deeply cleft medially, with thin dark sclerotization basally and medially (hypandrium), extending to origins of gonostyli; gonostylus long, thin, linear; lateral arms of parameral

sheath extending well below gonocoxa, flared apically; aedeagal bulb large, narrow-elongate, rounded; aedeagal apodeme small, one-fifth length of lateral arms of parameral sheath, with short lanceolate lateral rami; upper portion of parameral sheath subequal in length to gonostylus; aedeagus extending slightly beyond parameral sheath; epandrium subquadrate in lateral view with large rounded apicoventral process, which is beaklike and darkly sclerotize apically.

Female: As in male. Genitalia (Fig. 40): spermatheca spheroid, sclerotized brown, slightly longer than wide, without striations, apical invagination one-third depth of reservoir; apical spermathecal duct ca. $2\times$ length of spermatheca, sclerotized at base of reservoir, otherwise thin, transparent; sperm pump $2\times$ length of apical duct, appearing corrugated, not sclerotized, without evident valves apically or basally; basal duct short, transparent, confluent with sperm pump; common duct absent.

Remarks. *Empidideicus hackmani* was described from southern Spain by François (1969) based on two female specimens. Evenhuis *et al.* (2009) recorded it for the first time from Portugal and Zaitzev (2008) recorded it from southern France [although unverified, its location is near enough to the verified French record near Agde, so it is very probable that the identification by Zaitzev is correct.] From the material examined in this study, we can add Morocco and Tunisia to the distributional range. Further collecting may extend its distribution further into adjacent countries as it seems to be a fairly widespread species.

Distribution: France, Morocco (**new record**), Portugal, Spain, Tunisia (**new record**).

***Empidideicus inesae* Evenhuis, Almeida & Andrade, n. sp.**

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(Figs. 6, 13, 21, 28, 41)

Types. *Holotype* ♀ (BPBMENT 0000081264) and 11 ♀ *paratypes* from **PORTUGAL:** Faro, Aljezur, Carrapateira, Bordeira beach, 37°11'44.68"N, 08°54'16.81"W, 16 Apr 2011, J. Almeida, R. Andrade. Holotype in BPBM. Paratypes in BPBM and ZMUC.

Diagnosis. Easily separated from the congeners in Portugal by the small medial whitish mark in the otherwise brown prescutellar area (other species either have no mark, a large yellow prescutellar area, or paired whitish marks as extension of admedian mesonotal vittae).

Description

Female (Fig. 6). Length: 0.75–1.10 mm. *Head:* longer than high; eyes separated at vertex by $1\times$ distance between lateral ocelli; occiput black, white laterally, postgena black; frons (Fig. 13) yellowish white, slightly depressed and brown medially; face white; antennae dark brown; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere ovate, length $2\times$ greatest width; second flagellomere subequal in length to first flagellomere, with minute transparent apical style; mentum black; clypeus dark brown, as long as oral margin, with white hairs; proboscis dark brown to black, length equal to head length; labrum sclerotized, stiff, pointed apically, length subequal to proboscis; palpus not evident.

Thorax (Fig. 21). Mesonotum matte brown, gray pollinose with darker brown admedian vittae and brown above postpronotal lobe, supraalar and postalar areas; white dorso-laterally from postpronotal lobe to postalar callus; yellow interhumeral marks not coa-

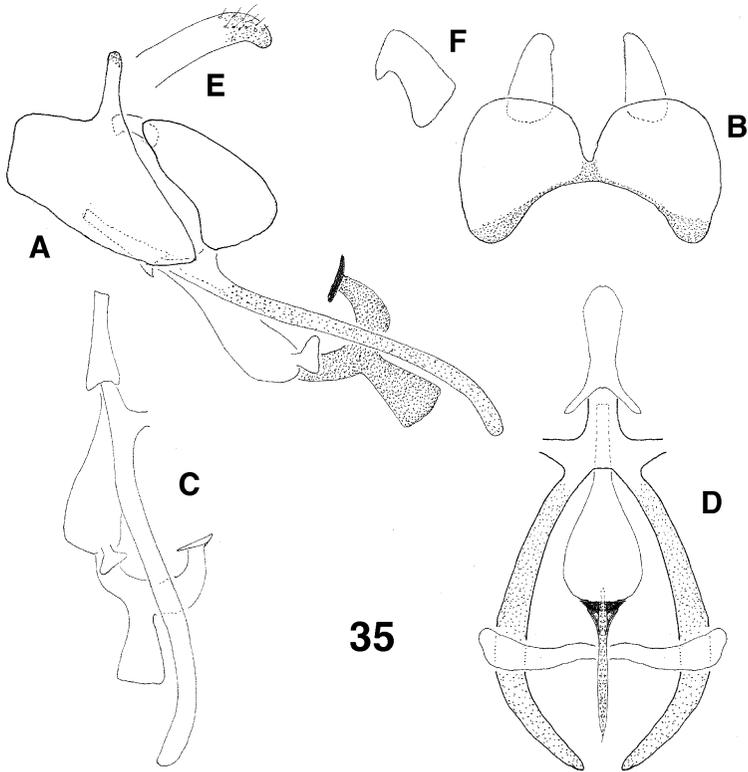


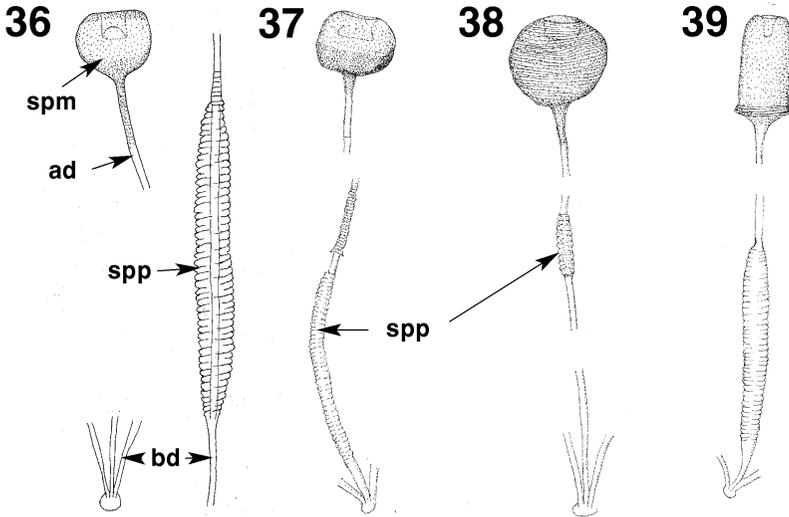
Figure 35. *Empidideicus pallidifacies*, n. sp., male genitalia; **A**, lateral view; **B**, gonocoxites, dorsal view; **C**, phallic complex, lateral view; **D**, phallic complex, ventral view **E**, detail of apex of apico-ventral process of epandrium; **F**, detail of gonostylus.

lesced with white postpronotal lobes; prescutellar area brown with thin white median mark extending to scutellum; scutellum whitish yellow with brown basolaterally; mesonotal disc and dorsum of scutellum with short fine black hairs; pleura (Fig. 6) bare, yellowish white with brown on following: anteroventral portion of anepisternum and katepisternum and all of meron; halter stem yellow, knob yellow with brown spot dorsally.

Legs. Coxae and femora pale brown basally, yellow elsewhere except tibia brown.

Wing (Fig. 28). Elongate, length 3× width; subhyaline; veins brown; costa ends one-fourth way beyond end of R_{4+5} ; R_s faded basally at connection with R_1 ; R_{4+5} short, straight, ending at level well before end of M_2 ; vein M_1 slightly curved toward wing margin; M_2 slightly downcurved at wing margin; cell dm open; A_1 thin, straight to wing margin; anal cell widely open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

Abdomen. Dorsum chocolate brown; tergites I–IV with white band along posterior margin; sternites brown; tergites with sparsely scattered minute black hairs.



Figures 36–39. *Empidideicus* female genitalia. **36,** *E. blascoi*, n. sp.; **37,** *E. carrapateira*, n. sp.; **38,** *E. evenhuisi* Evenhuis; **39,** *E. freyi* Greathead. Abbreviations: ad = apical duct; bd = basal duct; spm = spermathecal reservoir; spp = sperm pump.

Genitalia (Fig. 41): spermatheca spheroid, sclerotized brown, slightly longer than wide, without striations, apical invagination deep, four-fifths depth of reservoir, with small dome at base; apical spermathecal duct ca. $2\times$ length of spermatheca, sclerotized at base of reservoir, otherwise thin, transparent; sperm pump short, $0.75\times$ length of apical duct, appearing corrugated, slightly swollen medially, not sclerotized, without evident valves apically or basally; basal duct short, transparent, confluent with sperm pump; common duct absent.

Male: Unknown.

Etymology. The specific epithet is named for Inês Almeida, the daughter of one of the authors (JA).

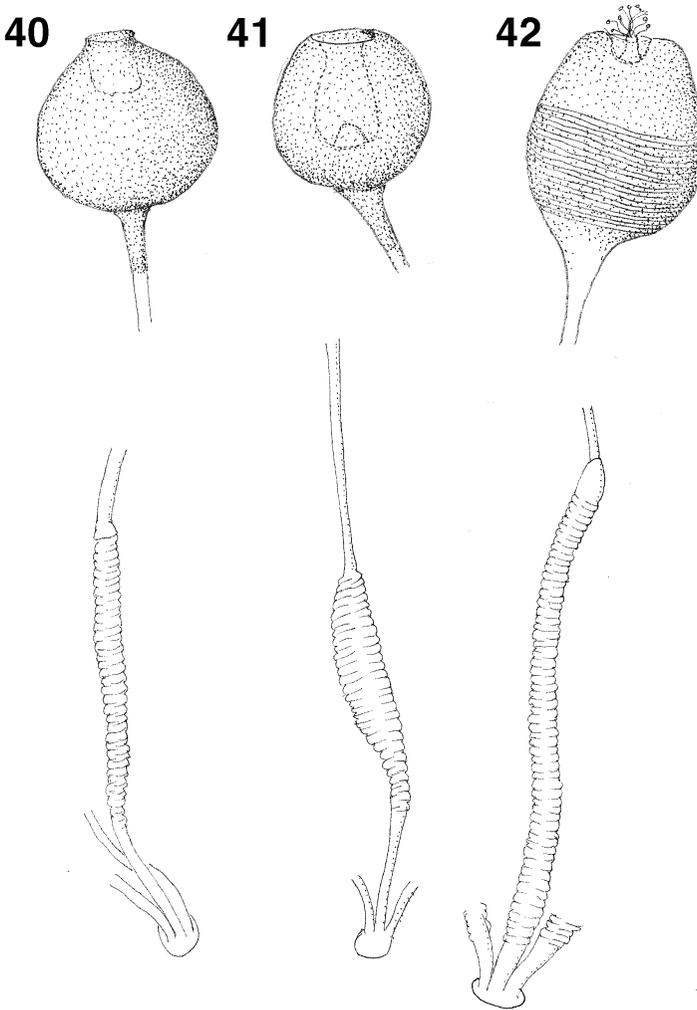
Distribution. Known only from Portugal.

***Empidideicus pallidifacies* Evenhuis, Almeida & Andrade, n. sp.**

Isid:zoobank.org:act:EBCD54EE-37F9-480F-9262-B7412F3A634B

(Figs. 7, 14, 22, 29, 35, 42, 48)

Types. *Holotype* ♂ (BPBM 0000081265) and 7♂, 20♀ *paratypes* from **PORTUGAL:** Porto, Vila Nova de Gaia, Arcozelo, $41^{\circ}03'12.3''\text{N}$, $08^{\circ}39'18.0''\text{W}$, 26 May 2011, R. Andrade. *Other paratypes* from **PORTUGAL:** same data except 20–22 Jun 2009; 1♂, 4♀, Porto, Vila Nova de Gaia, Gulpilhares, $41^{\circ}04'27.8''\text{N}$, $08^{\circ}39'23.6''\text{W}$, 22 Jun 2009 on Euphorbiaceae, R. Andrade; 1♂, 8♀, Braga, Esposende, Apúlia, $41^{\circ}28'16.4''\text{N}$, $08^{\circ}46'27.2''\text{W}$, 4 Jun 2009, R. Andrade. *Holotype* in BPBM. *Paratypes* in BPBM and ZMUC.



Figures 40–42. *Empidideicus* female genitalia. 40, *E. hackmani* François; 41, *E. inesae*, n. sp.; 42, *E. pallidifacies*, n. sp.

Diagnosis. This species is closest to *Empidideicus evenhuisi* but can be separated from it by the white face (black in *E. evenhuisi*) and wing cell r4+5 equal in width to cell m1 at the wing margin (cell r4+5 much wider than cell m1 in *E. evenhuisi*).

Description

Male (Fig. 7). Length: 0.98–1.15 mm. *Head*: slightly longer than high; eyes separated at vertex by $1\times$ distance between lateral ocelli; occiput and postgena black, gray pollinose; frons (cf. Fig. 14) grayish black; face white; antennae black; scape short, subtrapezoidal; pedicel subconical, wider than long; first flagellomere linear-ovate, length $3\times$ width; second flagellomere four-fifths length of first flagellomere, with minute transparent apical style; mentum black; clypeus black, as long as oral margin; proboscis dark brown to black, length $1.5\times$ head length; labrum sclerotized, stiff, pointed apically, length slightly shorter than head height; palpus not evident.

Thorax (Fig. 22). Mesonotum matte black, gray pollinose medially; grayish white dorso-laterally from postpronotal lobe to post alar callus, deeply cleft in supraalar area; without interhumeral marks; postpronotal lobes white; scutellum creamy yellowish white with thin brown spot basomedially and spot of brown basolaterally; mesonotal disc and dorsum of scutellum with short fine admixed black and yellowish white hairs; pleura (Fig. 7) bare, mixed grayish white and brown, with dark brown on following: almost all of katepisternum and meron, laterally on propleuron, posterior half of meron; halter stem grayish yellow, knob brilliant white.

Legs. Coxae and femora except tips dark brown, otherwise yellow except tarsal segments 2–5 brown.

Wing (Fig. 29). Elongate, length $3.5\times$ width; subhyaline; veins brown; costa ends one-fourth way beyond end of R_{4+5} ; R_s faded basally at connection with R_1 ; R_{4+5} fairly straight to wing margin; vein M_1 slightly curved toward wing margin; M_2 slightly curved downward at wing margin; cell dm open; A_1 thin, straight to wing margin; anal cell narrowly open at wing margin; fringe of hair on posterior margin of wing well shortest at wing tip becoming longer and more sparse toward base.

Abdomen. Dorsum black, concolorous with mediotergite color, with white band along posterior margin, band becoming successively broader on successive segments; sternites dark brown; tergites with sparsely scattered minute golden hairs.

Genitalia (Fig. 35). Hypopygium brown. In ventral view with gonocoxites deeply cleft medially, thus appearing as two lobes, with thin dark sclerotization basally (hypandrium); gonostylus fairly short, length ca. $2\times$ width, hooked apically; lateral arms of parameral sheath extremely long, extending well below gonocoxa, rounded, slightly curved at apex; aedeagal bulb, rounded, less than one-half length of lateral parameral arms; aedeagal apodeme fairly large, Y-shaped with flattened apex at one end of the “Y”, one-half length of lateral arms of parameral sheath, with long foliate lateral rami; upper portion of parameral sheath slightly shorter than gonocoxa, with long cap-like covering apically; aedeagus not extending beyond parameral sheath; epandrium subrectangular with long thin rounded api-ventral process, with dark sclerotization and microscopic hairs apically.

Female: As in male except faint interhumeral marks present (Fig. 14); notopleural stripe and not cleft in supraalar area; tergal white bands broader than in male. Genitalia (Fig. 42) with spermatheca spheroid-cylindrical, sclerotized brown, slightly longer than wide, with striations on basal half, apical invagination shallow, one-sixth depth of reservoir, with papillate process medially bearing glandular trichomes apically; apical spermathecal duct subequal in length to spermatheca, thin, transparent; sperm pump long, $2\times$ length of apical duct, appearing corrugated, not sclerotized, without evident valves apically or basally; basal duct extremely short, transparent, confluent with sperm pump; common duct absent.

Etymology. The specific epithet is named for the pale face that distinguishes it from *E. evenhuisi*.

Distribution. Known only from Portugal.

Table 1. Records of floral visitation by Portuguese species of *Empidideicus*.

Species*	Locality	Flower family	Flower species
<i>blascoi</i>	Mértola	Lamiaceae	<i>Mentha suaveolens</i>
<i>carrapateira</i>	Carrapateira	Asteraceae	Undet. gen. sp.
<i>evenhuisi</i>	Mértola	Lamiaceae	<i>Mentha suaveolens</i>
<i>evenhuisi</i>	Monte Gordo	Asteraceae	Undet. gen. sp.
<i>freyi</i>	Arcozelo	Brassicaceae	<i>Malcolmia littorea</i>
<i>freyi</i>	Gulphilhares	Apiaceae	<i>Eryngium maritimum</i>
<i>freyi</i>	Gulphilhares	Asteraceae	Undet. gen. sp.
<i>freyi</i>	Apúlia	Asteraceae	<i>Helichrysum italicum</i>
<i>freyi</i>	Vila Nova de Anha	Asteraceae	<i>Chamaemelum mixtum</i>
<i>hackmani</i>	Apúlia	Asteraceae	<i>Helichrysum italicum</i>
<i>hackmani</i>	Apúlia	Asteraceae	Undet. gen. sp.
<i>hackmani</i>	Apúlia	Crassulaceae	<i>Sedum acre</i>
<i>hackmani</i>	Campo	Asteraceae	<i>Topis barbata</i>
<i>hackmani</i>	Campo	Asteraceae	<i>Andryala integrifolia</i>
<i>hackmani</i>	Canidelo	Asteraceae	Undet. gen. sp.
<i>hackmani</i>	Gilmonde	Asteraceae	Undet. gen. sp.
<i>hackmani</i>	Vau	Asteraceae	<i>Cichorium intybus</i>
<i>hackmani</i>	Vila Nova de Anha	Asteraceae	<i>Chamaemelum mixtum</i>
<i>pallidifacies</i>	Apúlia	Geraniaceae	<i>Erodium cicutarium</i>
<i>pallidifacies</i>	Apúlia	Crassulaceae	<i>Sedum acre</i>
<i>pallidifacies</i>	Apúlia	Asteraceae	Undet. gen. sp.
<i>pallidifacies</i>	Arcozelo	Apiaceae	<i>Eryngium maritimum</i>
<i>pallidifacies</i>	Arcozelo	Euphorbiaceae	<i>Euphorbia paralias</i>
<i>pallidifacies</i>	Torreira	Euphorbiaceae	<i>Euphorbia</i> sp.

* Some records in this table are from photographs only, thus material is not listed in the Material examined section for those species.

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Figures 43–44. *Empidideicus* on flowers in Portugal. 43, *Empidideicus carrapateira*, n. sp. on an undetermined aster at Carrapateira, Bordeira beach. Photo: Jorge Almeida; 44, *E. freyi* Greathead and *E. hackmani* François on *Chamaemelum mixtum* at Vila Nova de Anha. Photo: Rui Andrade.



Figures 45–46. *Empidideicus* on flowers in Portugal. **45,** *E. freyi* Greathead, in copula on *Chamaemelum mixtum* at Vila Nova de Anha. Photo Rui Andrade; **46,** *E. freyi* Greathead on *Helichrysum italicum* at Apúlia. Photo: Jorge Almeida.



Figures 47–48. *Empidideicus* on flowers in Portugal. **47,** *E. hackmani* on an undetermined aster at Apúlia. Photo: Rui Andrade; **48,** *E. pallidifacies*, n. sp. on *Erodium cicutarium* at Apúlia. Photo: Rui Andrade.

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