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## Research article

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# Revision of the genus *Dicranopalpus* from northern Spain and Corsica, with descriptions of two new species (Arachnida, Opiliones, Phalangioidea)

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**Abstract.** The Iberian Peninsula represents a diversity hotspot for the genus *Dicranopalpus*. However, most taxa are insufficiently defined. Our revision of the *Dicranopalpus pyrenaicus* species group reveals two hidden species: *D. catariensis* sp. nov. and *D. gallaecicus* sp. nov. Two species, *D. pyrenaicus* from the Spanish and French Pyrenees and *D. insignipalpis* from Corsica, are redescribed. *Dicranopalpus cantabricus* Dresco, 1953 is resurrected as a valid species. Three new synonyms of *D. martini* (Simon, 1878) are proposed: *Fagea bolivari* Dresco, 1949 (including *D. bolivari* sensu Rambla 1975), *Egaenasser extraordinarius* Roewer, 1953 and *Dicranopalpus dispar* Rambla, 1967. With these additions, the Iberian Peninsula harbours four species of the *Dicranopalpus pyrenaicus* species group. They largely have allopatric distributions, ranging from the Pyrenees and the Cantabrian mountain range to the west coast of Galicia.

**Keywords.** Galicia, Cantabria, Pyrenees, Corsica, genital morphology.

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## Introduction

The genus *Dicranopalpus* Doleschall, 1852 belongs to the superfamily Phalangioidea Latreille, 1802 (suborder Eupnoi Hansen & Sørensen, 1904) and currently contains 11 extant species that inhabit

mountainous areas in the Mediterranean, the Alpine and Carpathian regions; one species, *D. ramosus* (Simon, 1909), was described from Morocco, northwest Africa. A fossil species is known from Baltic amber (Staręga 2002; Mitov *et al.* 2021): *Dicranopalpus ramiger* (Koch & Berendt, 1854) (synonyms: *D. palmnickensis* Roewer, 1939 and *Opilio corniger* Menge, 1854). Most researchers include the genus in Phalangiidae Latreille, 1802, though formally it has no family assignment and is provisionally placed in the so-called *Dicranopalpus* group (Crawford 1992; Pinto-da-Rocha & Giribet 2007; see Discussion).

All species in the genus *Dicranopalpus* have sexually dimorphic pedipalps with a knob-shaped apophysis proximally on the femur and a long to extremely long apophysis on the patella medially, giving the pedipalp a forked (from the Greek ‘dicranos’, meaning ‘fork’) appearance (e.g., Martens 1978; Wijnhoven & Prieto 2015). Several species have an additional smaller apophysis medially on the tibia (e.g., *D. gasteinensis* Doleschall, 1852; Martens 1978). The patellar apophysis is smaller and more slender in males than in females. On their function, Wolff *et al.* (2016: 37) remarked: ‘Apophyses may increase the area covered by glandular setae and may form a capture basket together with the flexed tibia and tarsus. They are a barrier for a prey held between the pedipalps. This may help in restraining and holding down struggling prey.’ In females, the pedipalp femur, patella (including the apophysis) and tibia have a dense cover of plumose setae, while males have sensilla chaetica instead (Wijnhoven 2013; Wolff & Gorb 2016; Wolff *et al.* 2016). The areas with plumose setae are slightly inflated to contain glandular tissue.

The Iberian Peninsula (including the Spanish-French Pyrenees), with six valid species of *Dicranopalpus*, is particularly diverse, five of which may be considered endemic to the peninsula and adjacent regions: *D. bolivari* (Dresco, 1949), *D. caudatus* Dresco, 1948, *D. martini* (Simon, 1878), *D. pulchellus* Rambla, 1960 and *D. pyrenaeus* Dresco, 1948. In the last decennia, *D. ramosus* has colonised northern parts of Spain and expanded to western and northern Europe (Wijnhoven & Prieto 2015). *Dicranopalpus caudatus* and *D. pyrenaeus* have been recorded from French Pyrenean regions as well (e.g., D’Amico 1988; D’Amico & Besson 1995; Delfosse & Melotti 2016; Delfosse 2017).

Within the group of species, which we here refer to as the Iberian assemblage, two ‘species groups’ can be distinguished, mainly based on pedipalp and penis morphology. The first group consists of *D. ramosus* and *D. caudatus*, which have a globose glans and a short stylus with a brush of minute setae at its base (Martens 1978; Wijnhoven & Prieto 2015). The remaining four species have a different glans structure, a pair of horn-shaped projections on the dorsal side near the glans-stylus junction and a long, curved and sclerotized stylus. The second group comprises *D. bolivari* and *D. pulchellus*, displaying extreme sexual dimorphism, with rather ‘normal’ females, while males are distinctive for their pedipalps with large tubercles, long and slender patellar apophysis and robust chelicerae. A third group involves *D. martini* and *D. pyrenaeus*, referred to as the *Dicranopalpus pyrenaeus* species group or *Dicranopalpus pyrenaeus* group. The male pedipalps have a short patellar apophysis, approximately as long as the patella, and this feature also applies to *D. insignipalpis* (Simon, 1879), endemic to Corsica. Two Italian species, *D. larvatus* (Canestrini, 1874) and *D. brevipes* Marcellino, 1970, reviewed previously (Wijnhoven & Martens 2019; Wijnhoven *et al.* 2020), also show affiliation to this group. Taxonomy within the *Dicranopalpus pyrenaeus* group is complex, which can be illustrated by analysing the historical accounts on these species: *D. martini*, *D. insignipalpis* and *D. pyrenaeus*.

*Dicranopalpus martini* – the species was described by Simon (1878) as *Prosalpia martini*, from the Serra de Portalegre, northeast of Lisbon, Portugal. The holotype is deposited in the NMNH, Paris, but was not available for examination (see Material and methods). Simon did not provide any figures; the description is based on a single female. He described the dorsal pattern as follows: “On the abdomen, a large median blackish patch, extending from the second to the fourth segment, slightly narrowing anteriorly, widest on the third segment” (“sur l’abdomen une grande tache médiane noirâtre, s’étendant

du second au quatrième segment, un peu atténuée en avant, élargie transversalement sur le troisième segment”; Simon 1878). Next, Roewer (1923) included *D. martini* in his world catalogue, commenting that he had not seen the type specimen. Moreover, Mello-Leitão (1936), without providing any further information, quoted the species for the first time for Spain, in Vall d’Aran and Llivia (Cataluña). Dresco (1948) revised for the first time the then known species of *Dicranopalpus* by studying the types of Simon’s collection housed in the Paris MNHN, and new material and including an identification key, mainly based on the shape of the pedipalps. About the holotype of *D. martini* Dresco (ibid.) wrote: “The specimen in the Simon collection, tube 2493, has its venter opened and the ovipositor is lost. The animal is adult but its sex cannot be verified. The tube has no identification label, but Simon’s catalogue mentions for that number: *Prosalpia martini* Sim., Portalegre (Martin). An additional juvenile specimen is found in the tube” (“Le spécimen de la coll. Simon, tube 2493, a eu le ventre ouvert et l’ovopositor a disparu; l’animal est adulte mais le sexe ne peut être vérifié. Ce tube est sans étiquette de détermination, mais le catalogue Simon porte à ce numéro: *Prosalpia martini* Sim., Portalegre (Martin). Une bête non adulte se trouvait également dans ce tube”). In his key, he wrote: “Femoral apophysis one third as long as the diameter of the femur” (“apophyse basale infère du fémur de la p. m. atteignant le tiers du diamètre de l’article”; Dresco 1948), and he illustrated this character (Dresco 1948: 340, fig. 7), this being the only published illustration of the holotype.

The next published records are from Roewer (1953), referring to two non-adult females from ‘Monte de los Sagredales’ (Asturias). He did not know the Mello-Leitão (1936) publication and stated that it was the first record for Spain.

Later, Dresco (1953) described *D. cantabricus* based on two males collected in the ‘Picos de Europa’, Cantabria, presenting schematic drawings of the penis, pedipalp (also of a juvenile) and dorsal colour pattern. Kraus (1961) listed *D. cantabricus* as a valid species, although Rambla (1959) had synonymized *D. cantabricus* with *D. martini* based on a male from the ‘Sierra de Guadarrama’. Rambla (ibid.) gave illustrations of the dorsal colour pattern, male chelicera, pedipalp, legs and penis, and her description and figures clearly point to the *D. pyrenaicus* species assemblage. From that time on *D. martini* has been recorded solely from the northern regions of Spain (Aragón: Rambla & Perera 1989; Asturias: Merino Sainz & Anadón 2008, 2013; Gutiérrez-Moirón 2019; Galicia: Prieto *et al.* 2020).

*Dicranopalpus insignipalpis* – Simon’s (1879) description covers about one page and mainly concentrates on colouration, shape of pedipalps in both sexes and the arrangement of spines and (plumose) setae. References mentioning this species are scarce (Roewer 1923; Dresco 1947, 1948, 1953; Rambla 1967). Both Dresco (1948: figs 4–6) and Roewer (1923: fig. 891) provided sketchy illustrations. Recently, Pierre Oger (<https://arachno.piwigo.com/>) produced high-quality, detailed photos of the body, pedipalp, chelicera and penis of a male *D. insignipalpis*, representing the first images of the species’ morphology.

*Dicranopalpus pyrenaicus* – Dresco (1947) reported new finds of *D. gasteinensis* from the Pyrenees, but re-evaluated all these records the next year (Dresco 1948) when he had received new material from Lac d’Orédon (Aragnouet, Hautes-Pyrénées, France). He included relevant material from the Simon collection (nine series ranging from the Hautes-Pyrénées in the west to Canigou in the eastern range of the French Pyrenees) and established the new species *D. pyrenaicus*, with the holotype and female paratype originating from Lac d’Orédon. Kraus (1961) did not mention *D. pyrenaicus*, but Prieto (2003) reported it for the Iberian Peninsula. Until recently, specimens from the eastern French Pyrenees have erroneously been classified as *D. gasteinensis* (Ledoux & Emerit 2006), while Rambla & Perera (1989) identified all their samples from the Ordesa y Monte Perdido National Park and Cataluña (Rambla & Perera 1995) as *D. martini*. However, nowadays most authors refer to *D. pyrenaicus* (D’Amico 1988; D’Amico & Besson 1995; Delfosse 2004, 2014; Dubois 2018).

In summary, several nominal species are involved, of which none has been appropriately defined. In this paper, the results of a revision on *D. insignipalpis* and species of the *Dicranopalpus pyrenaicus* group are presented, based on older and newly collected unpublished material. Significant characters for species identification include the morphology of the penis and pedipalp. In total, two species are redescribed, two new species are identified and described, and one species is resurrected. A key to the males of the *Dicranopalpus pyrenaicus* group is provided.

## Material and methods

We collected the specimens by hand (mostly by turning stones and pieces of dead wood), stored them in 70% ethanol and preserved them in the collections mentioned below. Additional samples were provided from some other collections. Despite continuous efforts for years, we have not been given permission to investigate the material of *Dicranopalpus* from the Dresco and Simon collections of the Muséum national d'histoire naturelle in Paris.

For examination, the dissected penis was placed on a concave cavity slide and immersed in glycerine. It was covered with a cover glass that could be moved, facilitating the rotation of the penis while under the microscope. For each species a lateral, dorsal and ventral view of the glans is presented. For seminal receptacles, the ovipositor was cleared for some hours in a 5% KOH solution at room temperature. Original drawings were based on sketches directly drawn from an Olympus stereo light microscope and a Euromex dissecting microscope, with the aid of a calibrated drawing mirror.

Body length is measured from the anterior prosoma margin to the posterior margin of the opisthosoma. The BLI (body-leg index) is defined as length femur I/width prosoma at the level of leg coxae II and III (Starega 1972). For names and numbering of muscles, and proposed muscle functions Shultz (2000) is followed. Definitions of sensory structures are according to Wijnhoven (2013) and Willemart *et al.* (2009). Measurements are given in mm.

## Abbreviations

- CHW = Collection H. Wijnhoven, Netherlands  
CJM = Collection J. Martens, Institute for Zoology (now Institute of Organismic and Molecular Evolution), Mainz University, Germany; to be transferred to Senckenberg Research Institute, Arachnology, D-60325 Frankfurt am Main, Germany  
ZUPV = Arachnological Collection of the Departamento de Zoología y Biología Celular Animal, Universidad del País Vasco, Bilbao, Spain

## Results

### Morphology

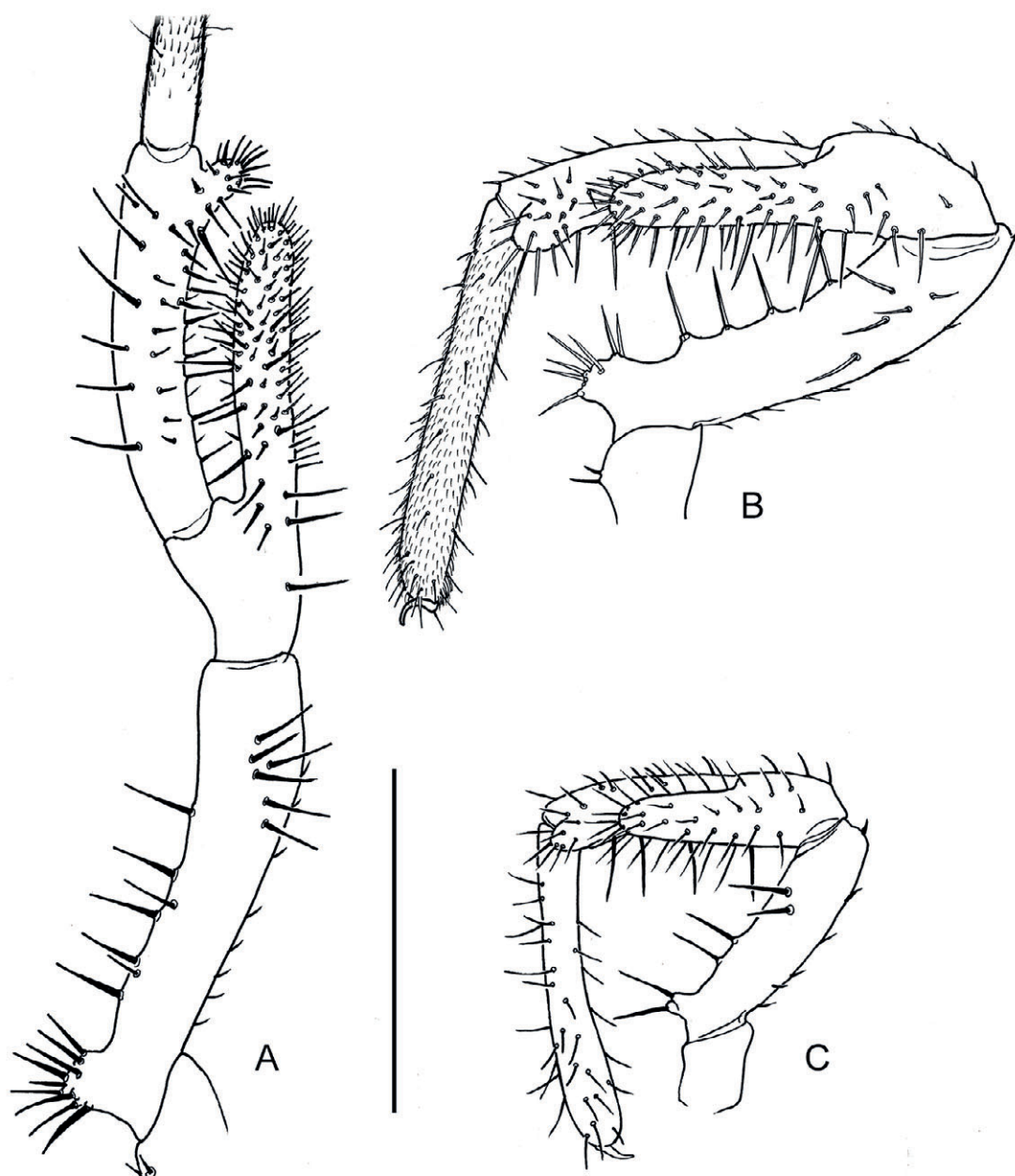
Chelicerae: segment I with ventral spur (Fig. 5). Suprachelical lamellae (integument between chelicerae and anterior margin of prosoma) indented medially, both sides of indentation with a row of 2–5 black setae.

Pedipalp morphology: in the species under study, the pedipalp is sexually dimorphic, with apophyses of femur, patella and tibia larger in females than in males. Pedipalps display interspecific variation, as illustrated in the species descriptions. Adult females have plumose setae on femur, patella and tibia. In juveniles, both sexes have a few plumose setae (Fig. 1), each seta is large and has a small plumose part. In Fig. 2 sensory and non-sensory setae are shown.

Legs: the numbers of pseudo-articulations in leg tibia (mostly only occurring in tibia II) and metatarsi I–IV are given.



Penial morphology: the penis consists of a truncus, glans and stylus. The truncus base is a dark brown, sclerotized, semi-circular structure, with a lateral extension, curving ventrally and apically on each side. At the extensions, extrinsic penial muscles attach (Fig. 3B), which act in protracting, guiding and retracting the penis. It is of notice that during preparation for taxonomic purposes, these lateral extensions often break off, or even the complete base of the truncus gets torn off (Fig. 8B). The truncus is sclerotized, long and tubular, its proximal portion being wider and containing the intrinsic penial muscle (Fig. 3A). A thin seminal duct enters the truncus from the base (Fig. 3B), continuing through the truncus dorsally of the intrinsic penial muscle, passing through the glans and exiting at the stylus



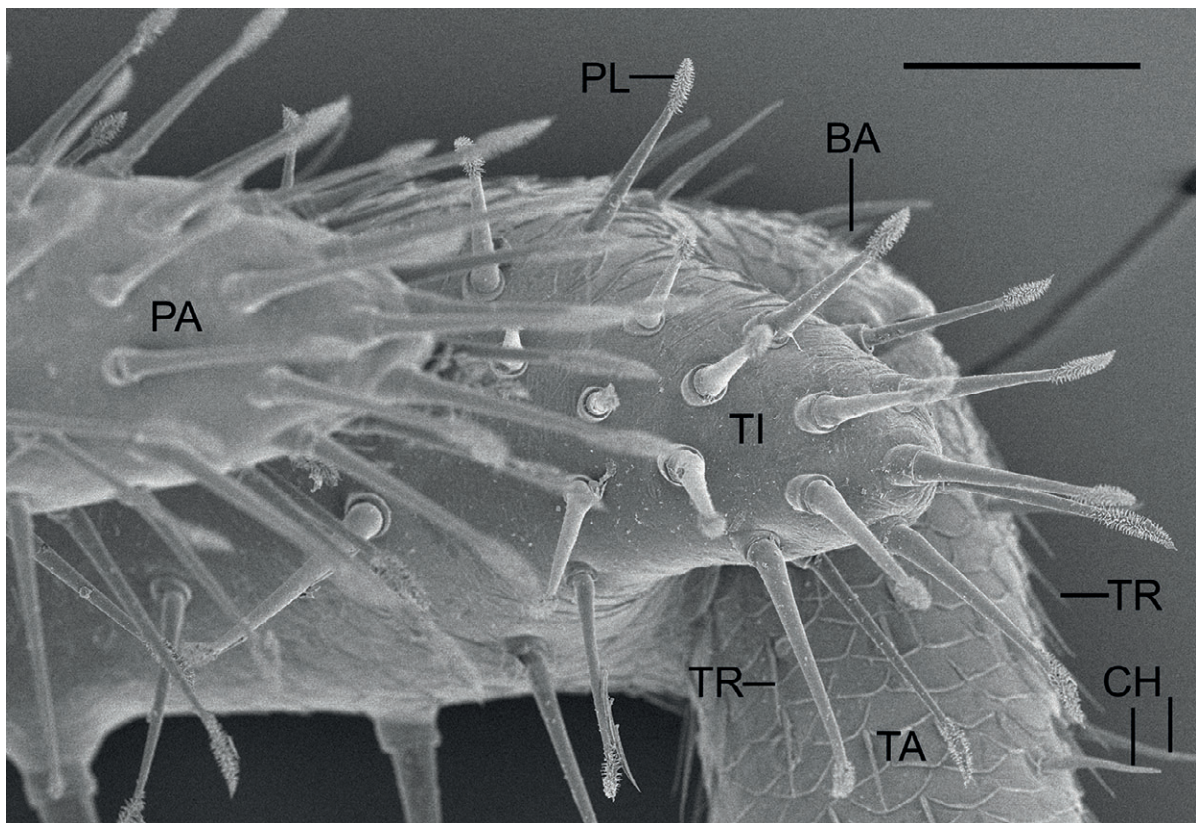
**Fig. 1.** Right pedipalps of juveniles of *Dicranopalpus* Doleschall, 1852. **A.** *D. catariensis* sp. nov., ventral view (CHW 466). **B.** *D. catariensis* sp. nov., median view (CJM 9005, paratype). **C.** *D. insignipalpis* (Simon, 1879), median view (CJM 7258). Scale bar = 0.5 mm.

tip (Fig. 3C–D). The large tendon of the intrinsic penial muscle is attached to the ventral glans base (Fig. 3D).

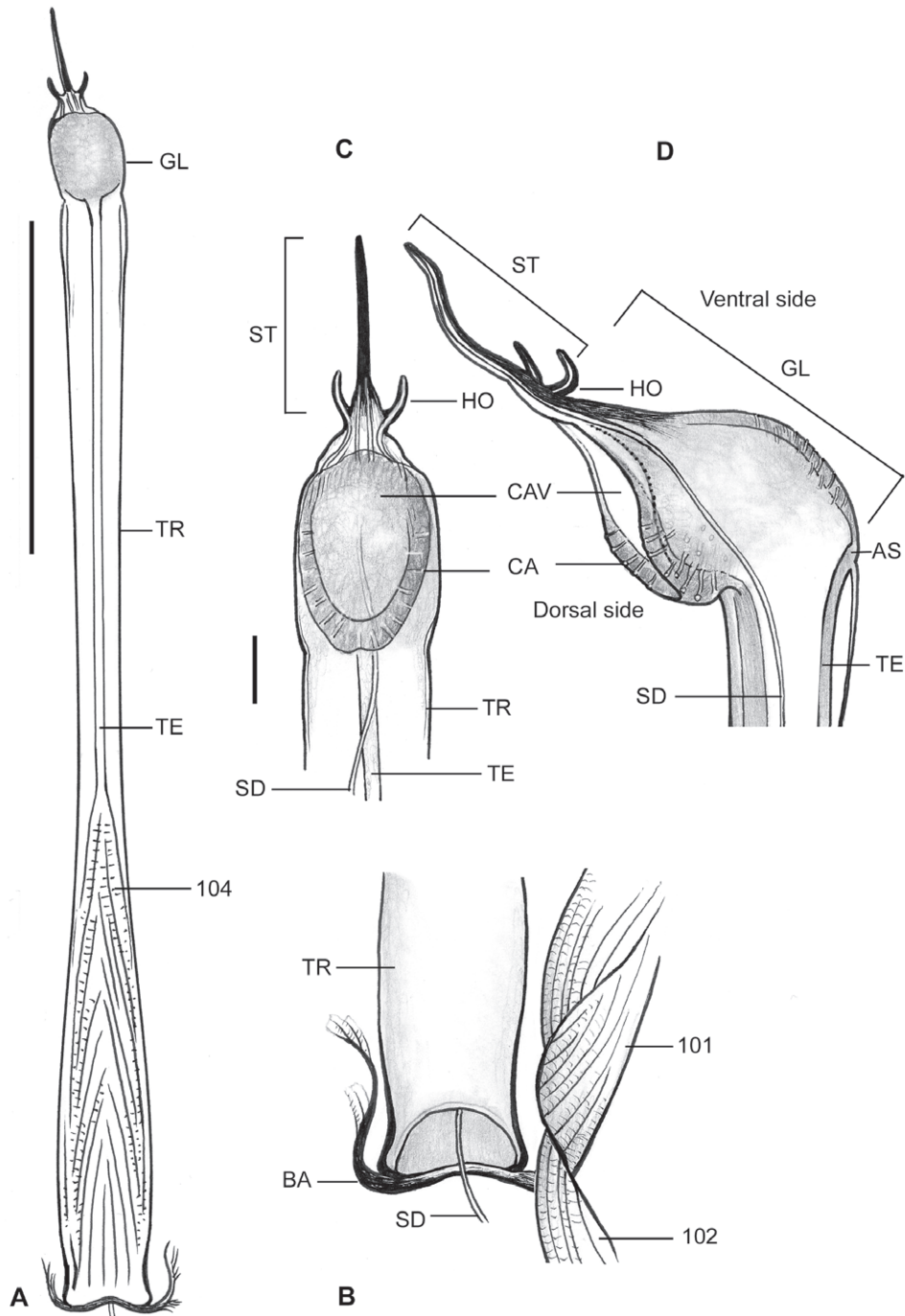
The glans is globular to elongated, movable to some extent, and flexed against the truncus. Glans dorsally with two sclerotized ridges widely spaced distally, forming a cavity with inflatable bladder (Fig. 3C–D). Thick-walled, sclerotized areas are recognisable by interspersed canaliculi. The S-curved stylus has a pair of horn-shaped, forward-directed projections near the base. In two species (*D. insignipalpis* and *D. pyrenaeus*) these horns are flattened and triangular (Figs 8C–I, 20E–K). Minute ducts of an unknown nature run from the glans to the horn tips. Laterally in the distal half of the glans there are two pairs of sensory setae. Presumably, these are present in all species under study, but because of their minute size they could not always be recognised (e.g., Figs 8F, H–I, 12F–G).

### Taxonomy

Suborder Palpatores Thorell, 1876  
Family Phalangiidae Latreille, 1802  
Subfamily Phalangiinae Latreille, 1802 (preliminary assignment)  
Genus *Dicranopalpus* Doleschall, 1852



**Fig. 2.** Left pedipalp *Dicranopalpus pyrenaeus* Dresco, 1948, juvenile (CHW 490), median view, showing dense cover of plumose setae on patellar apophysis (PA) and tibia including mediiodistal apophysis (TI). Abbreviations: BA = sensillum basiconicum; CH = sensillum chaeticum; PL = plumose seta; TA = tarsus; TR = trichome. Scale bar = 50  $\mu$ m. SEM photo Wolff J.O. & Gorb S.N.



**Fig. 3.** *Dicranopalpus gallaecicus* sp. nov., penis morphology, schematised (CHW 492). **A.** Ventral view. **B.** Dorsal view of proximal truncus, left side with basal extension, muscles torn off during preparation, right side with basal extension including attached extrinsic penial muscles. **C.** Dorsal view of glans. **D.** Dorsolateral view of glans. Abbreviations: AS = distal attachment site of intrinsic penial muscle; BA = basal extension; CA = canaliculus; CAV = glans cavity; GL = glans; HO = horns; SD = seminal duct; ST = stylus; TE = tendon of intrinsic penial muscle; TR = truncus; 101 = anterior extrinsic penial muscle; 102 = posterior extrinsic penial muscle; 104 = intrinsic penial muscle. Scale bars: A = 0.5 mm; B–D = 50  $\mu$ m.



***Dicranopalpus martini*** (Simon, 1878)

*Prosalpia martini* Simon, 1878: 218. Type locality: Portugal: Sierra de Portalegre.

*Fagea bolivari* Dresco, 1949: 41, figs 1–6. Type locality: Spain, Escorial **syn. nov.**

*Egaenasser extraordinarius* Roewer, 1953: 204, fig. 2. Type locality: Spain, Escorial **syn. nov.**

*Dicranopalpus dispar* Rambla, 1967: 133–139, figs 1–5. Type locality: Spain, Sierra de Guadarrama, El Ventorrillo **syn. nov.**

*Dicranopalpus bolivari* – Rambla 1975: 247–273, pls 16–17, figs 4a, 5a, 6d.

**Remarks**

We propose *Fagea bolivari* Dresco, 1949 as a junior synonym of *Prosalpia martini* Simon, 1878. Of the characters mentioned in the original description by Simon, the dorsal black patch on abdominal tergites 2–4 is distinctive, as it never occurs in any other species of *Dicranopalpus*. Also, the small femoral pedipalpal apophysis of the female holotype (Dresco 1949: 340, fig. 7) is consistent with that of female *Prosalpia martini*. Thus, the name *Dicranopalpus martini* (Simon, 1878) is valid for this taxon. A detailed redescription of *D. martini* and the related species *Dicranopalpus pulchellus* is in preparation.

***Dicranopalpus insignipalpis*** (Simon, 1879)

Figs 4A, 5A, 6A, F, 7–8, 9B, 10

*Prosalpia insignipalpis* Simon, 1879: 190–192. Type locality: Corsica ('In the high central mountains of the island').

**Diagnosis**

Medium-sized species, in both sexes pedipalp patella, tibia and tarsus with dense cover of trichomes. Coxae apically with dark spot.

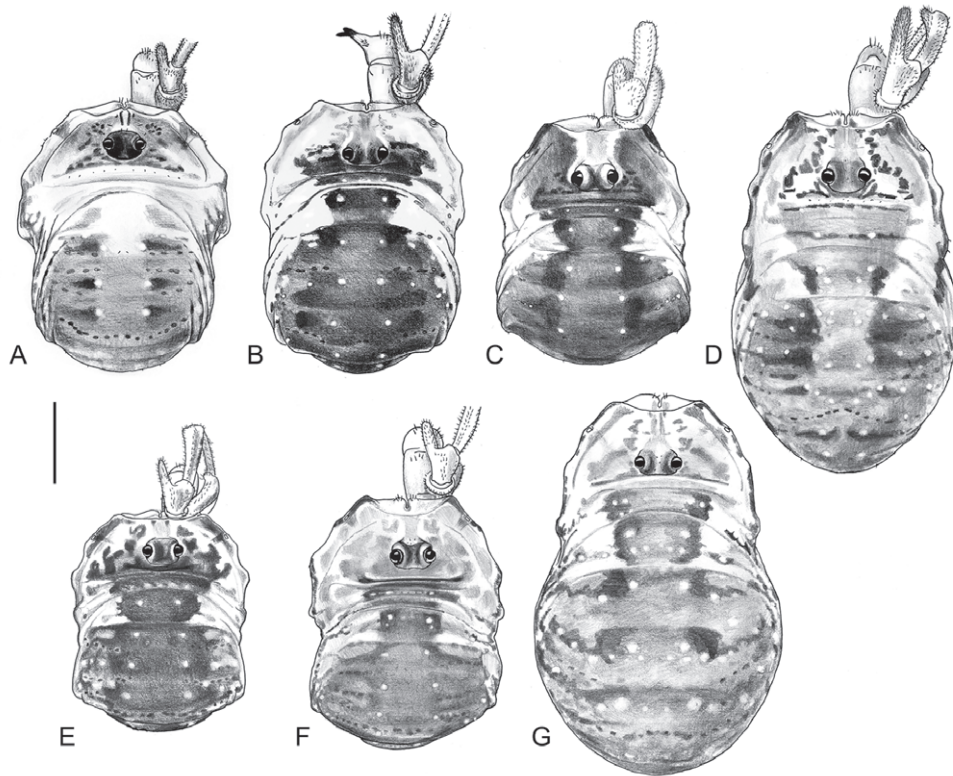
**Material examined**

FRANCE – **Corsica** • 3 ♂♂, 2 ♀♀; Corsica Natural Regional Parc, Col de Vizzavona, Vivario; 42.1125° N, 9.1136° E; 1185 m a.s.l.; 6 May 2015; E. Delfosse leg.; under pieces of moist wood; CHW 474 • 4 ♂♂, 2 ♀♀, 2 juv.; Col de Vizzavona; 1000–1200 m a.s.l.; 8 Sep. 2012; J. Martens leg.; CJM 7258 • 1 ♂, 1 ♀; Département Haute-Corse, Le Haut-Asco; 42.40° N, 8.92° E; 1500–1600 m a.s.l.; 29 Aug. 1980; W. Schawaller leg.; under stones; CJM 3061 • 2 ♂♂, 1 ♀; 14 km NE of Col de Vizzavona; 42.17° N, 9.20° E; 1100 m a.s.l.; 6 Jun. 1982; J. Martens leg.; beech forest; CJM 3062.

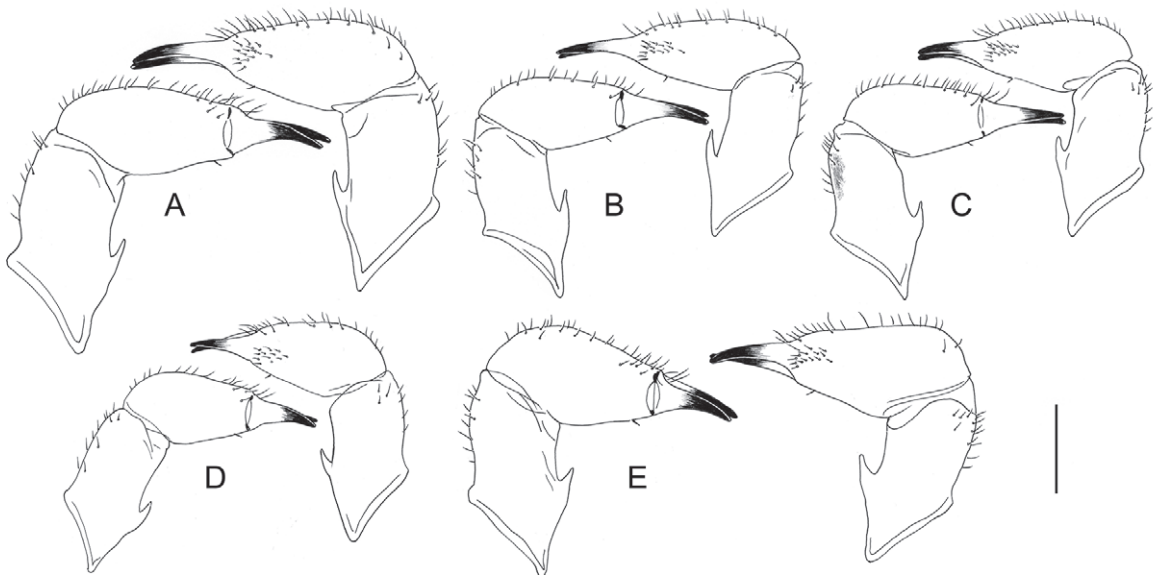
**Other material**

FRANCE – **Corsica** • 1 ♂, 2 juv.; Prunelli reservoir; 500 m a.s.l.; 31 Jul. 1980; W. Schawaller leg.; litter, chestnut; CJM 3067 • 2 ♂♂, 1 juv.; Département Corse-du-Sud, Ajaccio-Corte, Col de Vizzavona; 42.08° N, 9.10° E; 1100 m a.s.l.; 3 Oct. 1974; K. and E. Thaler leg.; beech forest, stream ditch with rubble; CJM 3323 • 1 juv.; Département Corse-du-Sud, Ajaccio-Corte, Col de Vizzavona; 42.08° N, 9.10° E; 1100 m a.s.l.; 3 Oct. 1974; K. and E. Thaler leg.; beech and pine forest, under stones, at tree trunks; CJM 3326 • 1 juv.; Département Haute-Corse; 42.35° N, 9.28° E; 800 m a.s.l.; 6 Aug. 1980; W. Schawaller leg.; litter, small beech forest near stream; CJM 3348 • 1 ♀; Département Corse-du-Sud; 41.67° N, 9.03° E; 300 m a.s.l.; 1 Aug. 1980; W. Schawaller leg.; holm oak, blackberry, holly, ivy; CJM 3361 • 4 juv.; Département Corse-du-Sud, Forêt d'Ospedale; 41.63° N, 9.22° E; 1000 m a.s.l.; Aug. 1982; B. Schroeter and K. Pfau leg.; CJM 3370 • 1 ♂, 1 ♀, 2 juv.; Haute-Corse, 10 km SW of Calacuccia; 42.28° N, 8.92° E; 1080 m a.s.l.; 3 Jun. 1982; B. Daams and J. Martens leg.; floodplain of small stream; CJM 4022 • 1 ♀; Département Corse-du-Sud, W of Col de Verghio; 42.28° N, 8.83° E; 1300 m a.s.l.; 4





**Fig. 4.** Dorsal colour pattern of species of *Dicranopalpus* Doleschall, 1852, ♂ (A–C, E–F) and ♀ (D, G). **A.** *D. insignipalpis* (Simon, 1879) (CJM 7258). **B.** *D. cantabricus* Dresco, 1953 (ZUPV 4542). **C–D.** *D. gallaecicus* sp. nov. (CHW 491). **E.** *D. pyrenaeus* Dresco, 1948 (CJM 2649). **F–G.** *D. catariensis* sp. nov. (F: CHW 469; G: paratype, CJM 9005). Scale bar = 1.0 mm.



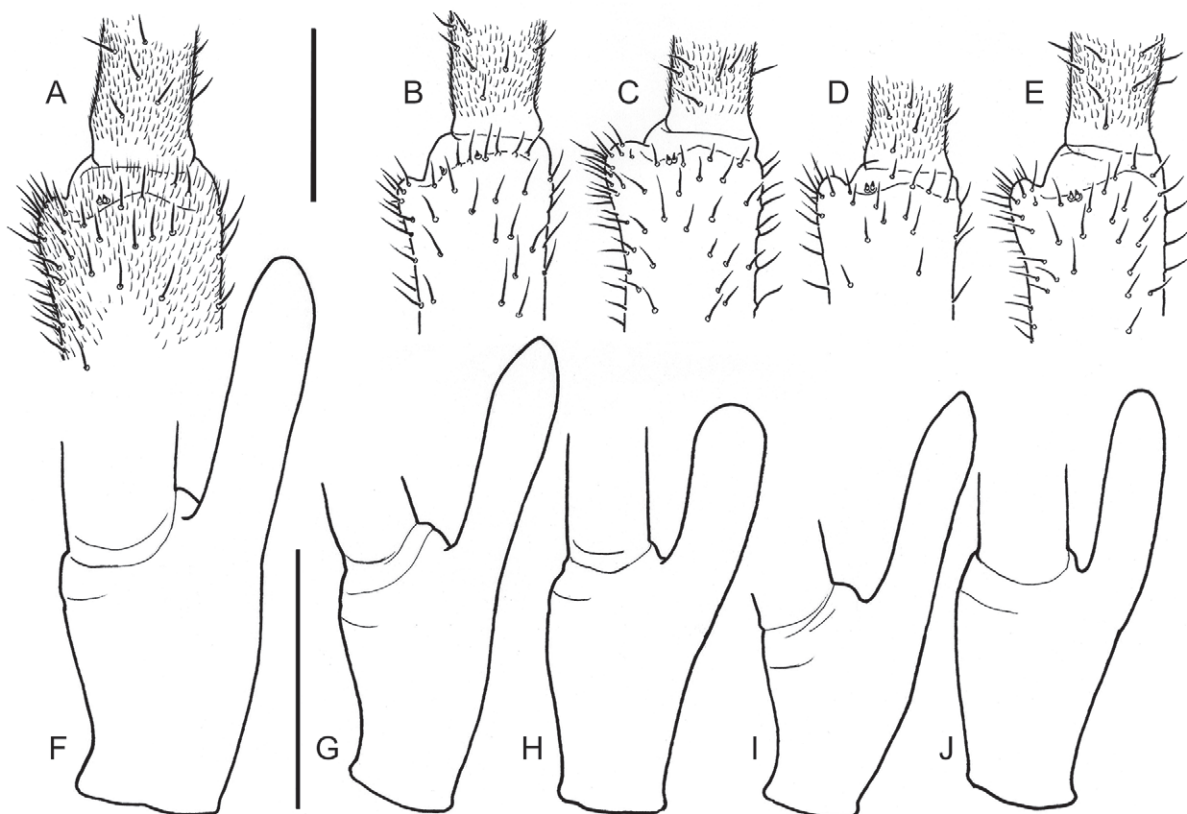
**Fig. 5.** Male right chelicera, left lateral view, right median view. **A.** *Dicranopalpus insignipalpis* (Simon, 1879) (CJM 7258). **B.** *D. cantabricus* Dresco, 1953 (ZUPV 4542). **C.** *D. gallaecicus* sp. nov. (CHW 491). **D.** *D. pyrenaeus* Dresco, 1948 (CJM 2647). **E.** *D. catariensis* sp. nov. (CHW 470). Scale bar = 0.5 mm.

Jun. 1982; B. Daams and J. Martens leg.; beech and pine forest; CJM 4025 • 2 ♂♂, 2 ♀♀; Département Corse-du-Sud, west of Col de Verghio; 42.28° N, 8.83° E; 1300 m a.s.l.; 4 Jun. 1982; B. Daams and J. Martens leg.; beech and pine forest; CJM 4026 • 1 ♂, 1 juv.; Département Corse-du-Sud, 14 km NE of Col de Vizzavona; 42.08° N, 9.10° E; 1100 m a.s.l.; 6 Jun. 1982; B. Daams and J. Martens leg.; beech forest; CJM 4027 • 3 ♂♂; Département Haute-Corse, 10 km S of Col de Verde; 41.98° N, 9.18° E; 1060 m a.s.l.; 10 Jun. 1982; B. Daams and J. Martens leg.; mixed forest; CJM 4030 • 7 ♀♀; Département Haute-Corse, 10 km S of Col de Verde; 41.98° N, 9.18° E; 1060 m a.s.l.; 10 Jun. 1982; B. Daams and J. Martens leg.; mixed forest; CJM 4031 • 1 ♂, 1 ♀; Département Haute-Corse, Forêt de Valdo-Niello; 42.28° N, 8.90° E; 1250 m a.s.l.; 28 Sep. 1994; J. Spelda leg.; CJM 5447 • 3 ♀♀, 5 juv.; Département Haute-Corse, Forêt de Valdo-Niello; 42.28° N, 8.88° E; 1250 m a.s.l.; 23 Sep. 1994; J. Spelda leg.; CJM 5572 • 1 ♀; Département Haute-Corse, 3 km SE of Monte d'Oro; 42.12° N, 9.13° E; 900 m a.s.l.; 28 Sep. 1994; J. Spelda leg.; CJM 5577 • 41 juv.; N of Col de Vizzavona; 1000–1050 m a.s.l.; 11 Sep. 2012; J. Martens leg.; CJM 7263 • 9 juv.; Col de Verde; 1200 m a.s.l.; 26 Aug. 2012; J. Martens leg.; CJM 7268.

### Redescription

**Male** (Col de Vizzavona, CJM 7258)

LENGTH. 3.4, width of prosoma 2.5, BLI 1.9.



**Fig. 6.** Details of male right pedipalps. **A–E.** Dorsal view of mediodistal apophysis on tibia. **F–J.** Ventral view of patella (setae omitted). **A, F.** *Dicranopalpus insignipalpis* (Simon, 1879) (CJM 7258). **B, G.** *D. cantabricus* Dresco, 1953 (ZUPV 4542). **C, H.** *D. gallaecicus* sp. nov. (CHW 491). **D, I.** *D. pyrenaicus* Dresco, 1948 (CJM 2649). **E, J.** *D. catariensis* sp. nov. (CHW 469). Note the two sensilla basiconica, mostly occurring paired, near the distal margin of the tibia (A–E; see also BA in Fig. 3). Scale bar: A–E = 0.25 mm; F–J = 0.5 mm.

**DORSUM** (Fig. 4A). Ground colour pale yellowish. Prosoma with groups of small, black spots latero-anteriorly and posteriorly of eye tubercle; dark spots near ozopores. Ozopores small, round. Prosomal tergites V–VI and opisthosomal tergites III–IV pale yellowish brown, darker laterally, following abdominal tergites brown, with paramedian pairs of dark brown triangular patches and light spots, and transverse rows of small dark spots.

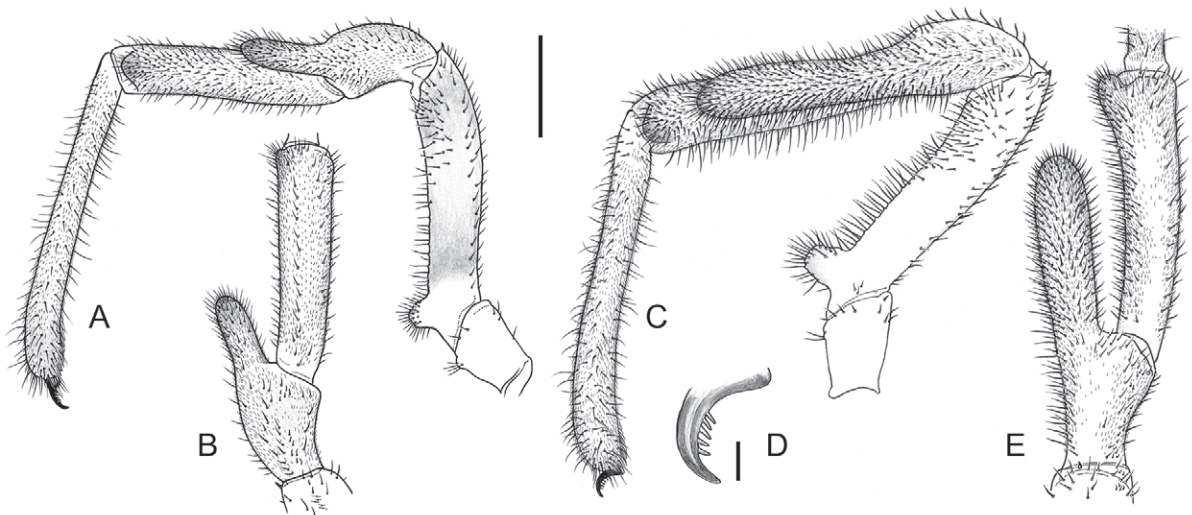
**EYE TUBERCLE**. Glossy black, wider than long, positioned at less than its length from anterior margin of carapace. Dorsally with small setae.

**VENTER AND COXAE**. Yellowish, distal coxal margins black, with indistinct central stripe; genital operculum with brown central band; genital operculum, coxae and coxapophyses with long black setae; sternites with small black setae, margins of sternites with dark brown, transverse rows of brown spots.

**CHELICERAE**. Pale yellowish, second segment dorsally smoked with brown; segment I with ventral spur; segment I dorsally, and segment II dorsally and medially near cheliceral claw with black setae (Fig. 5A).

**PEDIPALPS**. Robust compared to other species treated herein (Figs 6A, F, 7A–B); femoral apophysis conspicuous, slightly more than half as long as femur width at its base, pale yellowish, covered with black setae; femur dark, central region lighter, distal part darker. Patella and tibia brown, patella robust, covered with sensory setae as well as trichomes (Fig. 6A); solenidia typically occur grouped or in a row on dorsal side of pedipalp patella (Fig. 7B); patellar apophysis about as long as patella; also tibia with dense cover of trichomes, and with black sensory setae; mediolateral apophysis an indistinct hump (Figs 6A, 7B). Tarsus slightly bent ventrally in distal quarter section; claw with comb-like row of five minute denticles.

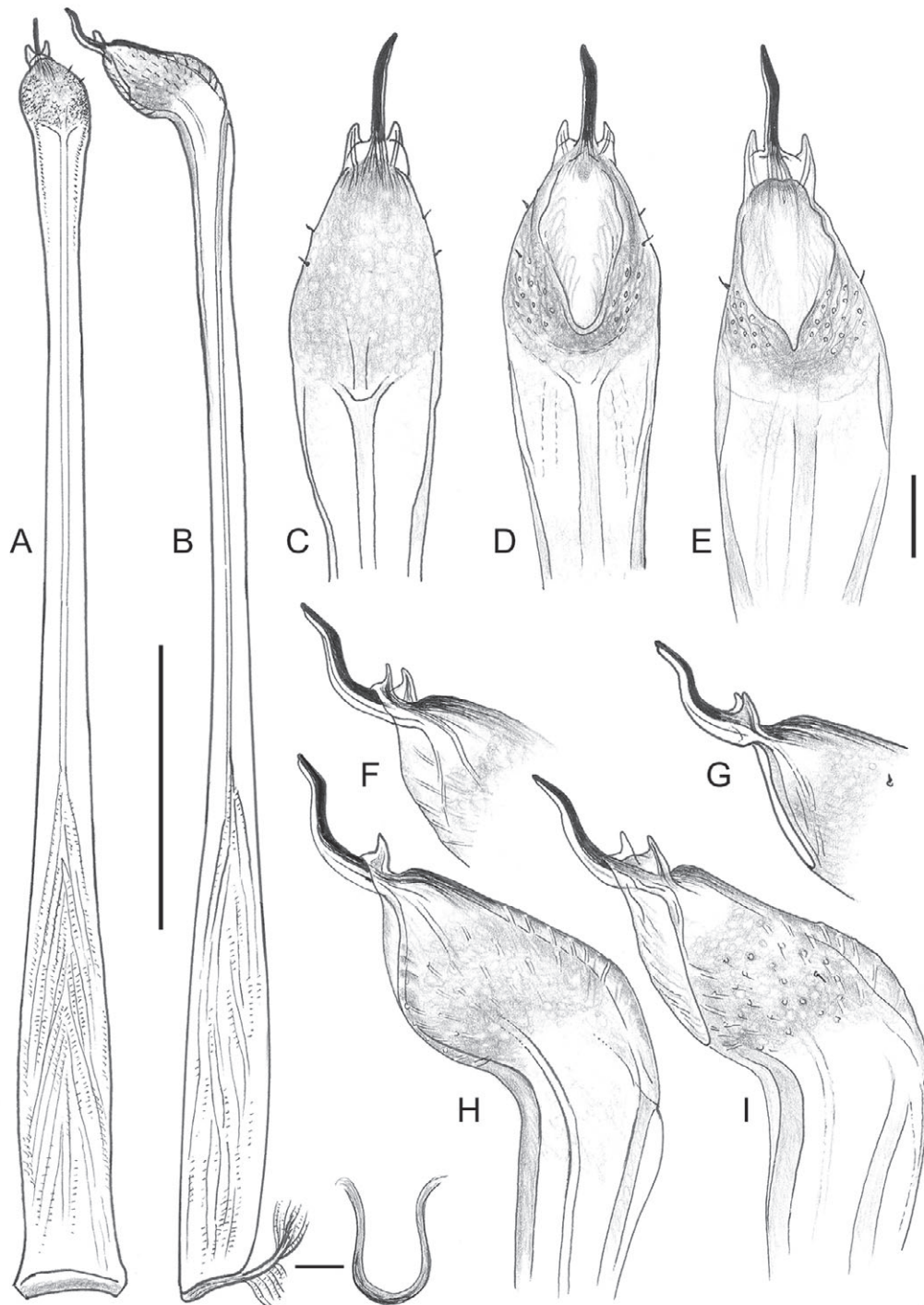
**LEGS**. Leg lengths I–IV (in parentheses femur lengths): 26 (4.3); 45 (7.3); 27 (4.7) 27 (5.8). Legs brown, near joints, segments annulated pale yellow. No trichomes on femora. Tibia II with five pseudo-



**Fig. 7.** *Dicranopalpus insignipalpis* (Simon, 1879). Right pedipalp (CHW 474). A–B = ♂. C–E = ♀. A, C. Median view. B, E. Dorsal view of patella and tibia. D. Claw. Scale bars: A–C, E = 0.5 mm; D = 50  $\mu$ m.



articulations; metatarsi I–IV with 3, 5, 3 and 4 pseudo-articulations, respectively. Numerous bipertate setae on prolateral side of metatarsus III, distally on metatarsus IV, and in decreasing numbers on proximal tarsomeres 1–13 of leg III and 1–13 of leg IV.



**Fig. 8.** *Dicranopalpus insignipalpis* (Simon, 1879). Penis. **A.** Ventral view. **B.** Lateral view, with frontal view of torn off basal portion of extrinsic penial muscle tendon. **C.** Ventral view of glans. **D–E.** Dorsal view of glans. **F.** Ventrolateral view of glans. **G, H.** Lateral view of glans. **I.** Dorsolateral view of glans. A–D, F, H. (CHW 474); E, G, I. (CJM 7258). Scale bars: A–B = 0.5 mm; C–I = 50  $\mu$ m.



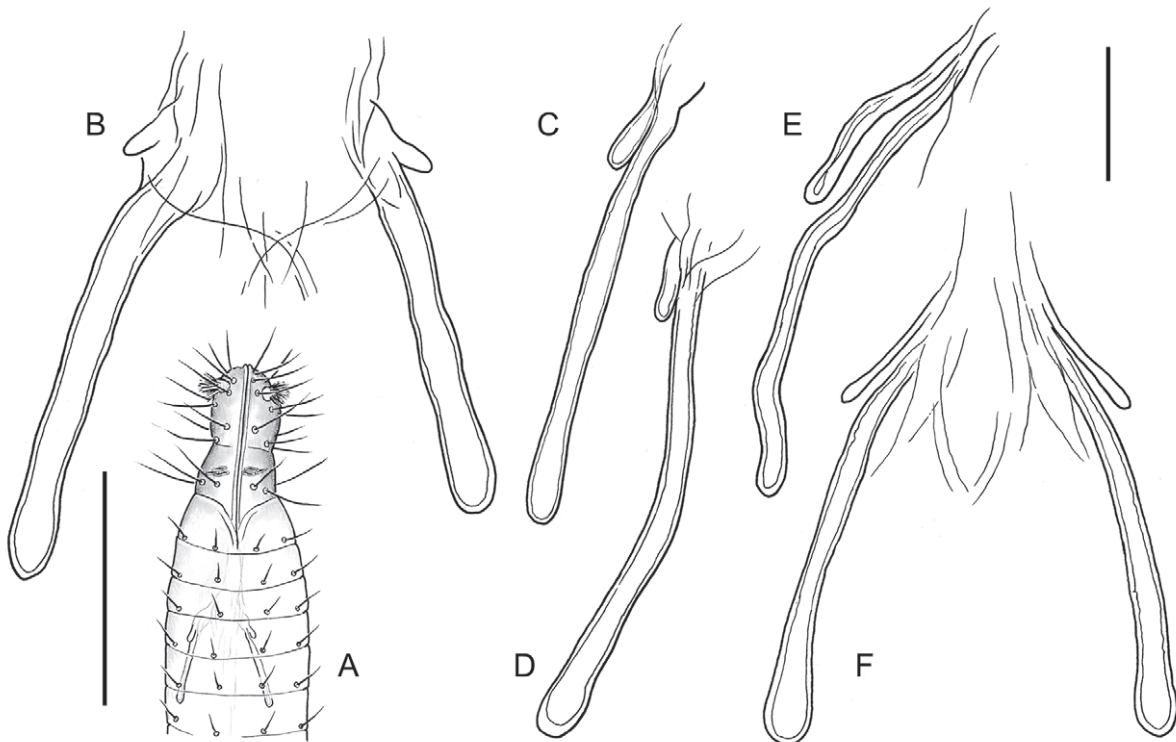
**PENIS** (Fig. 8). Long and slender, length 2.17 (CJM 7258). Base with sclerotized extensions (mostly broken off during preparation; Fig. 8B). Truncus widest in basal  $\frac{1}{5}$ , narrowest near distal  $\frac{4}{5}$ , slightly widening to glans. Intrinsic penial muscle in about basal  $\frac{2}{5}$  of truncus, tendon robust. Glans robust, heavily sclerotized and provided with canaliculi; ventral glans margin straight to slightly convex, with depression proximally of horns. Stylus short and robust, S-curved, shorter than half length of glans (Fig. 8F–I). Glans dorsally with two sclerotized ridges widely spaced near horns; cavity in the distal half of glans. Glans laterally with two pairs of minute sensory setae, poorly discernible in lateral view.

**Female** (CJM 7258)

LENGTH. 4.6, width of prosoma 2.7, BLI 1.3.

**DORSUM.** Eye tubercle, venter and coxae as in male. Dorsum with paramedian pairs of dark-brown patches.

**PEDIPALPS.** Robust, pale yellowish, femoral apophysis conspicuous, rounded, more than half as long as femur width (Fig. 7C–E); apophysis and femur ventrally with long black setae. Patella and its apophysis robust, covered with sensory setae as well as trichomes; patellar apophysis as wide as base of tibia, two-third its length; tibia with dense cover of trichomes, ventrally with black sensory setae that are longer than on other parts of tibia; mediiodistal apophysis stout (Fig. 7E). Pedipalp tarsus straight, slightly bent ventrally in distal quarter section; pedipalp claw with five minute denticles (Fig. 7E).



**Fig. 9.** Females. **A.** *Dicranopalpus gallaecicus* sp. nov., distal part of ovipositor with seminal receptacles. **B–F.** Seminal receptacles (C–E left side). **B.** *D. insignipalpis* (Simon, 1879) (CHW 474). **C.** *D. gallaecicus* sp. nov. (CHW 492). **D.** *D. cantabricus* Dresco, 1953 (ZUPV 4542). **E.** *D. pyrenaeus* Dresco, 1948 (CJM 2649). **F.** *D. catariensis* sp. nov. (CHW 467). Scale bars: A = 0.5 mm; B–F = 50  $\mu$ m.

LEGS. Leg lengths I–IV (in parentheses femur lengths): 20 (3.4); 36 (6.0); 24 (3.7); 25 (4.8) (CJM 7258); 23 (4.2); 37 (7.8); 26 (4.5); 33 (6.0) (CHW 474). Legs brown, pale yellow annulated. Tibia II with 5 pseudo-articulations; metatarsi I–IV have 2, 5, 2 and 3 pseudo-articulations, respectively.

SEMINAL RECEPTACLES. Ovipositor has 24 segments, seminal receptacles located in distal segments 6–7; two long tubes, each proximally with a small lateral pocket (Fig. 9B).

### Distribution and ecology

*Dicranopalpus insignipalpis* is endemic to Corsica, France (Fig. 10). It is a common mountainous species. According to recent data (JM), its elevational distribution ranges from 300 to 1500 m (13 records), with the majority between 800 m and 1300 m. The upper range may be higher so long running water and adjoining forest cover are present. Generally, *D. insignipalpis* is a forest-dwelling species, confined to forest types offering a minimum of the required air humidity. Consequently, highest population density is found in its upper areas with more abundant precipitation, locally occurring in considerable numbers



**Fig. 10.** Distribution of *Dicranopalpus insignipalpis* (Simon, 1879) on Corsica. The black spot indicates the provenance of the specimens used in the redescription here.

on the banks along mountain streams and rivers, under stones, pebbles and dead wood, often close to the waterline. *D. insignipalpis* lives at ground level; it was never found on rock faces or tree trunks.

Phenology: according to the known records from June to October, adults and juveniles were collected together. Thus, *D. insignipalpis* assumingly is eurychronous. The maturity period also cannot be defined by altitude. In June and July adults and juveniles were collected syntopically at altitudes of 500–1100 m, while in June and August, only adults were present in localities at altitudes of over 1300 m.

***Dicranopalpus cantabricus* Dresco, 1953 (revalidation)**

Figs 4B, 5B, 6B, G, 9D, 11–13

*Dicranopalpus cantabricus* Dresco, 1953: 147–149. Type locality: “Au-dessus du refuge des Puertos de Aliva, (...) au dela du Col Horcadina de Covarrobres (alt. 1900 m.) (43.16° N, 4.81° W) (province de Santander, presently Cantabria).”

*D. martini* – Roewer 1953: 206. — Luque 1992: 150.

*Dicranopalpus* sp. – Merino & Anadón 2008: 203.

**Diagnosis**

Medium-sized, male dark brown coloured, leg femora in both sexes with trichomes.

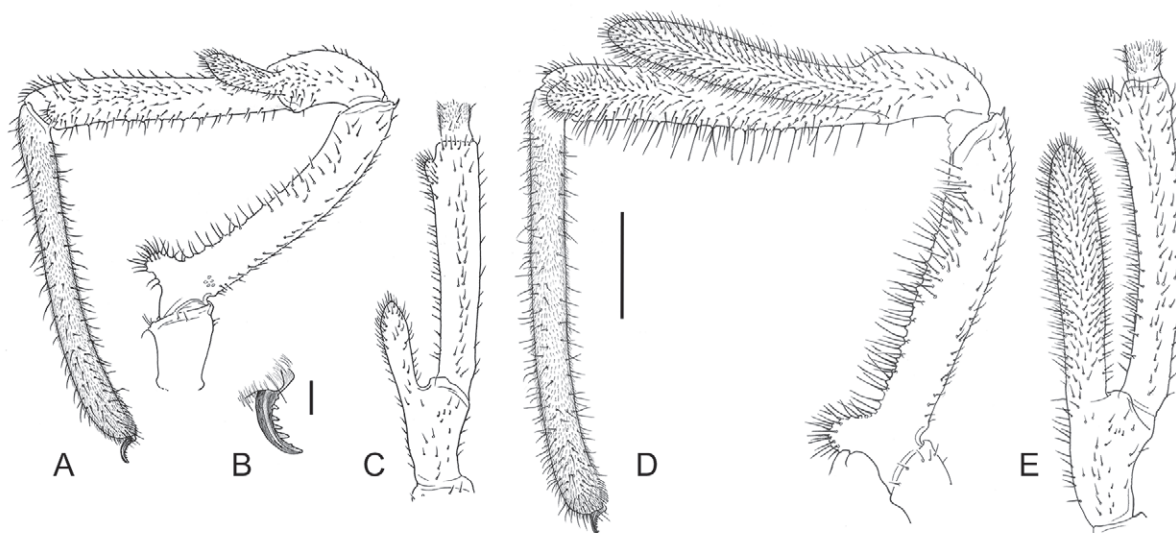
**Material examined**

SPAIN • 1 ♂, 1 ♀; Asturias, Río Cares, Camarmeña; 43.157° N, 4.503° W; 320 m a.s.l.; 24 Apr. 2006; L. Crespo leg.; both specimens are partly bleached; ZUPV 4542.

**Description**

**Male**

LENGTH. 3.4, width of prosoma 2.5, BLI 1.8.

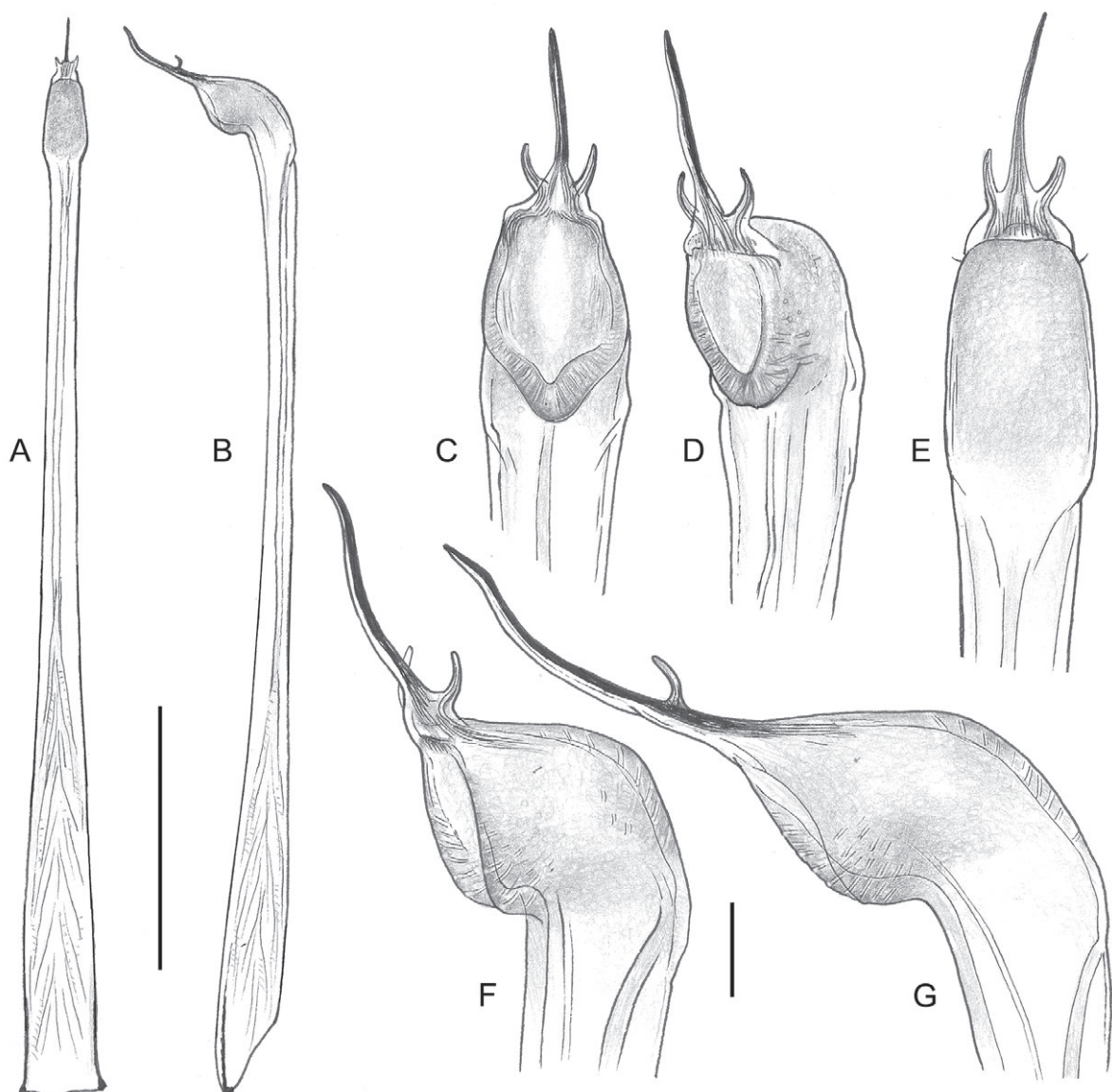


**Fig. 11.** *Dicranopalpus cantabricus* Dresco, 1953 (ZUPV 4542). Right pedipalp. A–C. Male. D–E. Female. A, D. Median view. B. Claw. C, E. Dorsal view of patella and tibia. Scale bars: A, C–E = 0.5 mm; B = 50 µm.

**DORSUM** (Fig. 4B). Ground colour pale yellowish. Prosoma with dark brown spots and patches laterally and posteriorly of eye tubercle. Anterior and lateral margins of prosoma pale yellowish. Ozopores small, round. Dark brown saddle narrowing on opisthosomal tergites III–IV, widening on following tergites. Opisthosomal tergites with paramedian pairs of white spots and transverse rows of small dark spots.

**EYE TUBERCLE.** Greyish brown with silvery sheen, shallow, canaliculated (with longitudinal groove), slightly wider than long, and slightly tilted backwards, at about its length from anterior margin of carapace, dorsally with few minute black setae. Eyes surrounded by narrow black ring.

**VENTER AND COXAE.** Uniformly pale yellowish with scattered black setae.



**Fig. 12.** *Dicranopalpus cantabricus* Dresco, 1953 (ZUPV 4542). Penis. **A.** Ventral view. **B.** Lateral view. **C–G.** Glans. **C.** Dorsal view. **D.** Slightly dorsolateral view. **E.** Ventral view. **F.** Dorsolateral view. **G.** Lateral view. Scale bars: A–B = 0.5 mm; C–G = 50  $\mu$ m.



CHELICERAE. Uniformly pale yellowish, segment I with distinct ventral spur; segment I dorsally, and segment II dorsally and medially near cheliceral claw with stout black setae (Fig. 5B).

PEDIPALPS (Fig. 11A–C). (Colouration of specimen faded, colour pattern probably as in *D. gallaecicus* sp. nov.) Compared to *D. gallaecicus* sp. nov., segments longer and more slender; femoral apophysis pale, more than half as long as femur width at its base, femur on ventral side with sensilla chaetica that are slightly longer than other setae on femur; patella slender, apophysis about as long as patella, slightly widening in distal half, in lateral view curved upwards (Figs 6G, 11A, C). Mediodistal apophysis of tibia a small knob (Fig. 6B). Tarsus straight, slightly bent ventrally in distal third section; claw pectinate (Fig. 11B).

LEGS. Leg lengths I–IV (in parentheses femur lengths): 25 (4.6); 46 (8.3); 28 (5.0); 37 (6.7). Colouration faded, colour pattern probably as in *D. gallaecicus* sp. nov. Leg segments cylindrical in cross section, dorsal and dorsolateral sides of femora with sensilla chaetica and a few small black spines. Femur I on dorsodistal half with trichomes, legs II to IV with trichomes, absent only on ventral side proximally. Patellae and tibiae densely covered with trichomes. Tibia II with 5 pseudo-articulations; metatarsi I–IV have 4, 9, 4 and 6 pseudo-articulations, respectively. Numerous bipterate setae on prolateral sides of metatarsus III and IV and in decreasing numbers on proximal tarsomeres 1–10 of leg III and 1–19 of leg IV.

PENIS (Fig. 12). Long and slender; length 1.94; truncus widest in basal  $\frac{1}{3}$ , tapering to glans (Fig. 12A). Intrinsic penial muscle in about basal  $\frac{2}{5}$ . Glans longer than wide, ventral margin continuing in a smooth line to horns (Fig. 12G); glans dorsally and ventrally sclerotized and provided with canaliculi; dorsal cavity large and ovoid (Figs 12C–D, F–G). Dorsal truncus–glans transition in a wide angle. A pair of sensory setae (Fig. 12E). Stylus about as long as glans, slightly curved ventrally; two slender horns positioned on stylus.

#### Female

LENGTH. 4.1, width of prosoma 2.4, BLI 1.9.



**Fig. 13.** Map of the northwestern part of the Iberian Peninsula with the known distribution of *Dicranopalpus gallaecicus* sp. nov. (red symbols) and *Dicranopalpus cantabricus* Dresco, 1953 (blue symbols). Dots: studied samples; squares: literature records; diamonds, photographic records. Type localities are indicated by a black spot.

DORSUM. Colours of specimen faded.

PEDIPALPS (Fig. 11D–E). Femoral apophysis robust, nearly as long as femur width at base; patellar apophysis large, reaching to base of tibial apophysis, as thick as tibia. Mediodistal apophysis of tibia stout, as long as wide (Fig. 11E). Femur ventrally with large plumose setae, tibia ventrally with a row of 14 robust plumose setae.

LEGS. As in male. Leg lengths I–IV (in parentheses femur lengths): 23 (4.6); 40 (8.8); 25 (5.1); 38 (7.1). Trichomes on femora as in male. Tibia II with 3 pseudo-articulations; metatarsi I–IV with 4, 7, 3 and 6 pseudo-articulations, respectively.

SEMINAL RECEPTACLES. Located in ovipositor segments 6–7; two long tubes, each with a small lateral pocket at base (Fig. 9D).

### Distribution and ecology

The locality of the redescribed specimens (Camarmeña, Asturias) is about 10 km from the type locality of *D. cantabricus* (Puertos de Áliva, Cantabria), in the Picos de Europa National Park (Fig. 13). Roewer (1953) erroneously located his *D. martini* records of Monte de los Sagredales (municipality of Caso, Asturias) in the Sierra de Guadarrama. Records given by Merino & Anadón (2008) from the Reserva Natural Integral de Muniellos (municipality of Cangas de Narcea) are in the mountainous Asturias, and these are likely *D. cantabricus*. We tentatively ascribe the record of Luque (1992) from a coastal Cantabrian site (Ría de Tina Menor, municipality of Val de San Vicente) to this taxon. In summary, *D. cantabricus* is a Spanish endemite, probably restricted to the Cantabrian Mountains. Phenology unknown.

### *Dicranopalpus gallaecicus* sp. nov.

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Figs 4C–D, 5C, 6C, H, 9A, C, 13–16, 17A

*Dicranopalpus martini* – Prieto *et al.* 2020: 50.

### Diagnosis

Medium-sized species, males with dark prosoma, with pale patch in front of eye tubercle. Legs dark brown, femora lack trichomes.

### Etymology

The name of the new species refers to the type locality in the north-westernmost Spanish autonomous community of Galicia, in Latin Gallaecia, here with masculine ending, and used as an adjective.

### Material examined

#### Holotype

SPAIN – Galicia • 1 ♂; Pontevedra, O Grove; 42.468° N, 08.898° W; 119 m a.s.l.; 23 Apr. 2019; H. Wijnhoven leg.; pine and eucalyptus forest, collected from loose strips of eucalyptus bark and from a rock face; deposited in collection of Naturalis Biodiversity Centre, Leiden, Netherlands; CHW 491.

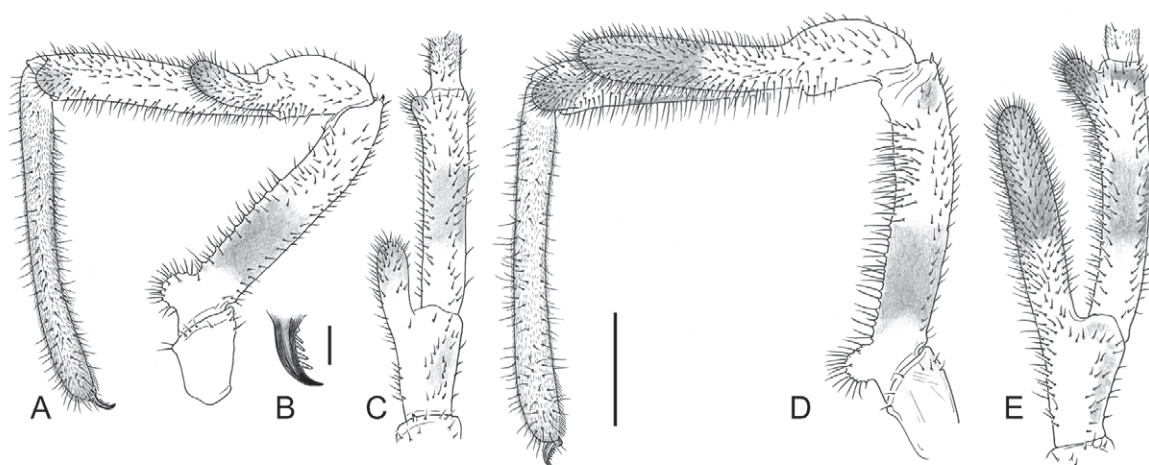
#### Paratypes

SPAIN – Galicia • 1 ♀; same collection data as for holotype; deposited in collection of Naturalis Biodiversity Center, Leiden, Netherlands; CHW 492 • 6 ♂♂, 1 ♀; same collection data as for holotype;

CHW 493 • 12 ♂♂; same collection data as for holotype; CHW 494 • 3 ♂♂; same collection data as for holotype; deposited in collection of C. Prieto, Spain; ZUPV 6164 • 8 ♂♂, 1 ♀; same collection data as for holotype; deposited in Senckenberg Research Institute, Arachnology, Frankfurt am Main, Germany; CJM 8152.

**Additional material**

SPAIN – A Coruña, Santiago, Monte Pedroso • 2 ♀♀; 42.900° N, 8.561° W; 363 m a.s.l.; 12 May 1977; J.C. Otero leg.; pitfall trapping; ZUPV 5932 • 1 ♀; 42.899° N, 8.572° W; 320 m a.s.l.; 28 Oct. 1977; J.C. Otero leg.; ZUPV 5940 • 1 ♀; 42.890° N, 8.557° W; 280 m a.s.l.; 23 Apr. 1977; J.C. Otero leg.; ZUPV 5949.



**Fig. 14.** *Dicranopalpus gallaecicus* sp. nov. Right pedipalp. A–C. Male (holotype, CHW 491). D–E. Female (paratype, CHW 492). A, D. Median view. B. Claw. C, E. Dorsal view of patella and tibia. Scale bars: A, C–E = 0.5 mm; B = 50  $\mu$ m.



**Fig. 15.** Dorsal view of *Dicranopalpus gallaecicus* sp. nov. in situ. A. Male from Villalba (Photo no. 783897, M. Sanmartín). B. Female from Cerdedo (Photo no. 985496, L. Álvarez).

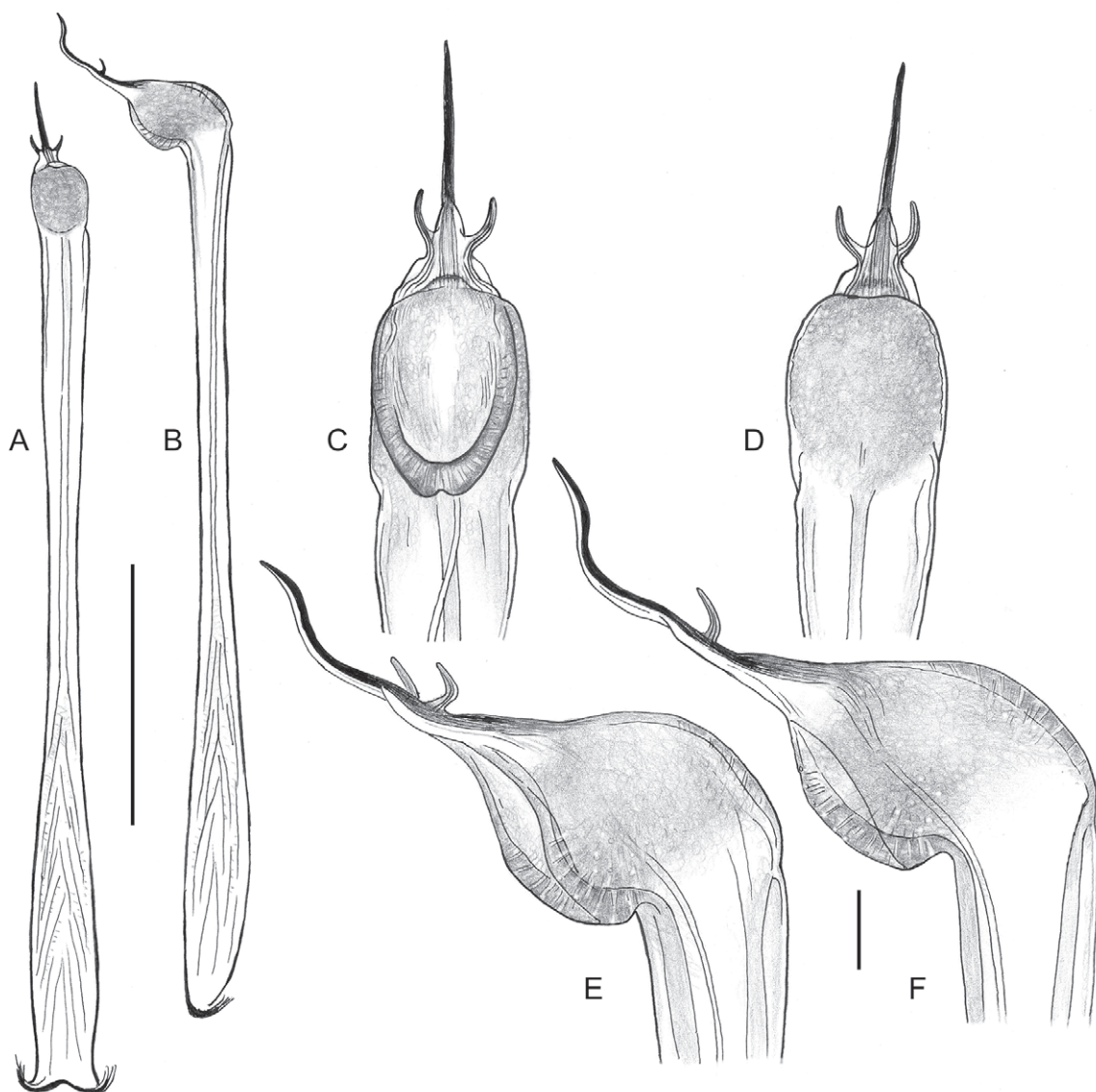


## Description

### Male (holotype)

LENGTH. 2.9, width of prosoma 1.9, BLI 1.9.

**DORSUM** (Figs 4C, 15). Ground colour pale yellowish. Prosoma dark brown to almost black, anterior margin of prosoma, and area proximally of eye tubercle pale yellowish. Ozopores oval-shaped, small. Black saddle wide on prosoma, narrowing on opisthosomal tergites I–IV, widening on following tergites. Opisthosomal tergites with paramedian rows of white spots. Tergite IX and lateral margins of opisthosomal tergites pale.



**Fig. 16.** *Dicranopalpus gallaecicus* sp. nov. (holotype, CHW 491). Penis. **A.** Ventral view. **B.** Lateral view. **C–F.** Glans. **C.** Dorsal view. **D.** Ventral view. **E.** Dorsolateral view. **F.** Lateral view. Scale bars: A–B = 0.5 mm; C–F = 50  $\mu$ m.



**EYE TUBERCLE.** Base pale yellowish, dorsally greyish, with silvery sheen most distinct around eyes, shallow, canaliculated, slightly wider than long, and somewhat tilted backwards, at less than its length from anterior margin of carapace, dorsally with a few minute black setae. Eyes with narrow black ring.

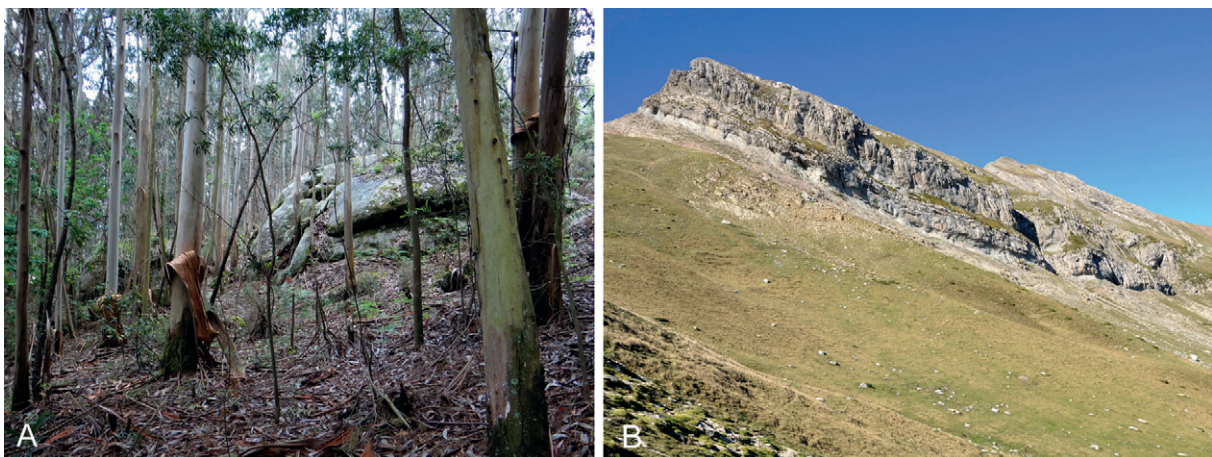
**VENTER AND COXAE.** Uniformly pale yellowish, with scattered black setae.

**CHELICERAE** (Fig. 5C). Pale yellowish, segment I with dorsolateral brown patch, segment II in dorsoproximal area dark; ventral spur distinct, segment I dorsally, and segment II dorsally and medially near cheliceral claw with stout black setae.

**PEDIPALPS** (Figs 6C, H, 14A–C). Pale yellowish, femur in proximal half, and patella and tibia dorsally with dark brown patches; femoral apophysis pale, robust, about half as long as femur width at its base, femur on ventral side with sensilla chaetica that are slightly longer than other setae on femur; patella slender, apophysis stout, shorter than patella, rod-shaped, widest in distal half (Fig. 6H), in lateral view distinctly curved upwards (Fig. 14A). Tibia mediodistally with a protrusion (Fig. 6C). Tarsus straight, slightly bent ventrally in distal third section; claw pectinate (Fig. 14B).

**LEGS.** Leg lengths I–IV (in parentheses femur lengths): 20 (3.6); 35 (6.2); 21 (3.6); 28 (5.1). Dark brown, trochanters, proximal femur portions, joints and pseudo-articulations paler, additional small pale spots on femora, particularly around the three isolated femoral dorsal slit sensilla (see Wijnhoven 2013, fig. 10B). Tibiae have lighter band in midsection. Leg segments cylindrical, dorsal and dorsolateral sides of femora with sensilla chaetica and a few small black spines. Patellae and tibiae densely covered with trichomes. Tibiae I–IV with 0, 4, 3 and 3 pseudo-articulations, respectively; metatarsi I–IV with 3, 6, 3 and 5 pseudo-articulations, respectively. Tarsi I–IV with 47, 66, 46 and 54 segments, respectively. Numerous bipterate setae on prolateral sides of metatarsus III and IV and in decreasing numbers on proximal tarsomeres 1–7 of leg III and 1–10 of leg IV.

**PENIS** (Fig. 16). Long, robust; length 1.78; truncus slightly widening from base, narrowing in midsection, narrowest in the middle; intrinsic penial muscle in about the basal  $\frac{2}{5}$ . Glans ovoid, robust, dorsally and ventrally sclerotized and provided with canaliculi, dorsal cavity large, ovoid. Dorsal truncus to glans transition forming a sharp angle (Fig. 16E–F). Sensory setae missing. Stylus about as long as glans, distinctly S-curved; horns slender.



**Fig. 17.** **A.** Habitat of *D. gallaecicus* sp. nov. at the type location, O Grove, Pontevedra (Galicia, Spain). Photo H. Wijnhoven. **B.** Habitat of *D. pyrenaicus* Dresco, 1948 on Pic d'Orhy in the French Pyrenees. Photo A. Schönhofer.

VARIABILITY. In some specimens, the dorsal saddle is dark brown, and the tergites VII–VIII are a contrasting reddish-brown.

### **Female**

LENGTH. 4.3, width of prosoma 2.5, BLI 1.1.

DORSUM (Figs 4D, 15). Prosoma with dark brown spots, lateral margins near ozopores dark brown; anterior margin of prosoma and area proximally of eye tubercle silvery. Opisthosoma with small dark brown paramedian patches on tergites III–IV, tergites V–VI with extended dark brown paramedian patches, central area light brown. Opisthosomal tergites with paramedian pairs of white spots and transverse rows of small dark spots.

VENTER AND COXAE. Pale yellowish, with scattered black setae. All coxae with subapical dark band. Margins of sternites dark.

PEDIPALPS (Fig. 14D–E). Pale yellowish, with dark brown bands on basal half of femur, distal portion of patellar apophysis and tibial apophysis; tibia dark in midsection, dorsolaterally with dark brown elongated patch. Femoral apophysis robust, half as long as femur width, patellar apophysis large, reaching base of tibial apophysis, as thick as tibia. Mediodistal apophysis on tibia as long as wide. Tarsus straight, claw pectinate.

LEGS. Leg lengths I–IV (in parentheses femur lengths): 16 (2.7); 29 (5.2); 17 (2.7); 24 (4.5). Colouration as in male. Patella, tibia and tarsus of all legs with trichomes. Tibia II with four pseudo-articulations; metatarsi I–IV with 3, 5, 3 and 4 pseudo-articulations, respectively.

SEMINAL RECEPTACLES (Fig. 9A, C). Ovipositor with 22 segments, seminal receptacles in segments 6–8; two long tubes, each proximally with an additional lateral pocket.

### **Distribution and ecology**

*Dicranopalpus gallaecicus* sp. nov. is a Spanish endemic species, its distribution probably being restricted to the Galician region (Fig. 13).

The type locality (Fig. 17A) is a wooded slope consisting of a *Pinus* L. and *Eucalyptus* L'Hér. tree plantation, undergrowth mainly with Common gorse (*Ulex europaeus* L.). Individuals were present in considerable numbers, and could easily be collected especially on and among shed strips of *Eucalyptus* bark, hanging from the trees or laying on the forest floor. In two cases, individuals were found in resting position on a shaded rock face.

Records based on photos (from <https://www.biodiversidadvirtual.org/insectarium/>; record number in parentheses) included (Fig. 13): 1 (sub)adult ♀, Pontevedra, Vigo, 21 Apr. 2017 (969655); 1 juv. ♀, Parque forestal do Vixiador, 8 Dec. 2018 (1194231); 1 juv., Parque forestal do Vixiador, 10 Feb. 2019 (1075602); 1 (sub)adult ♀, Pontevedra, Cercedo, 18 Mar. 2017 (985496); 1 ♀, Lugo, Villalba, 11 Jun. 2014 (593557); 1 juv. ♀, Lugo, Villalba, 19 Dec. 2014 (660313); 1 ♂, Lugo, Villalba, 1 Apr. 2015 (679111); 1 ♂, Lugo, Villalba, 17 Apr. 2016 (783897); 1 juv. ♀, Lugo, Villalba, 17 Feb. 2019 (1075059).

A species of lower altitudes, with recorded altitudes between 119 and 428 m a.s.l.

Phenology: juveniles have been found in December and February, subadults in March and April, adults from April to October, suggesting that eggs hatch in autumn, juveniles overwinter and adults appear in spring.

*Dicranopalpus pyrenaicus* Dresco, 1948

Figs 2, 4E, 5D, 6D, 9E, 17B, 18–21

*Dicranopalpus pyrenaicus* Dresco, 1948: 339–341, figs 17–18. Type locality: Lac d'Oredon, commune d'Aragouet (Hautes-Pyrénées, France).

*Dicranopalpus martini* – Mello-Leitão 1936: 14–15. — Rambla & Perera 1989: 30. — Rambla 1998: 6. *Dicranopalpus* sp. – D'Amico 1988: 149–150.

**Diagnosis**

Small-sized species, males with dark brown saddle. Penis glans rounded, with triangular horns.

**Material examined**

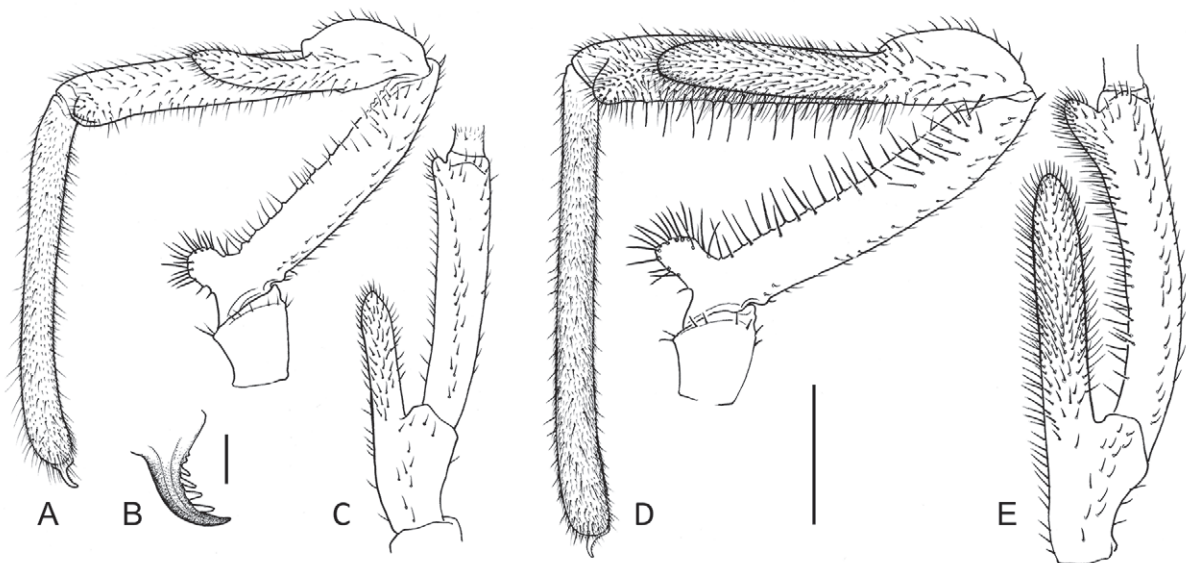
SPAIN – **Cataluña** • 1 ♂, 1 ♀; Lleida, Val d'Arán, ascent to Lac de Rius; 42.64° N, 0.82° E; 2000–2250 m a.s.l.; 31 Aug. 1984; J. and B. Martens leg.; CJM 2649 • 1 ♀, 1 juv.; Lleida, Val d'Arán, ascent to Lac de Rius; 42.64° N, 0.85° E; 1700–1800 m a.s.l.; 30 Aug. 1984; J. and B. Martens leg.; CJM 2651. – **Aragón** • 5 juv.; Huesca, Bujaruelo, Valle del Ara, Mesón San Nicolás; 42.693° N, 0.107° E; 1332 m a.s.l.; 30 Sep. 2014; H. Wijnhoven leg.; under stones and cardboard; CHW 490 • 3 ♂♂; Huesca, Bujaruelo; 42.673° N, 0.126° W; 1210 m a.s.l.; 26 Sep. 1987; C. Prieto, Benjamín Gómez and Ramón Martín leg.; beech forest; ZUPV 1112 • 1 juv.; Huesca, Selva de Oza; 42.857° N, 0.693° W; 1200 m a.s.l.; 15 Aug. 1984; C. Prieto, Kepa Altonaga and Ramón Martín leg.; ZUPV 1339 • 1 juv.; Huesca, Valle de Pineta, Parador; 42.680° N, 0.084° E; 1300 m a.s.l.; 1 Nov. 1995; C. Prieto leg.; ZUPV 1768.

FRANCE – **Hautes-Pyrénées** • 2 ♂♂; Bagnères-de-Bigorre, Baréilles; 42.887° N, 0.434° E; 1200 m a.s.l.; 23 Oct. 1987; C. Prieto, P. Benjamín Gómez and Ramón Martín leg.; mixed forest near river; ZUPV 861 • 1 juv.; Lac d'Oredon, Neouvielle; 42.827° N, 0.168° E; 1800 m a.s.l.; 30 Oct. 1988; Ramón Gorrotxategi leg.; ZUPV 1338 • 1 juv.; Tourmalet; 42.907° N, 0.140° E; 2175 m a.s.l.; 25 Oct. 1987; C. Prieto and Ramón Martín leg.; ZUPV 1575. – **Midi-Pyrénées** • 1 ♂; La Mongie; 42.908° N, 0.176° E;

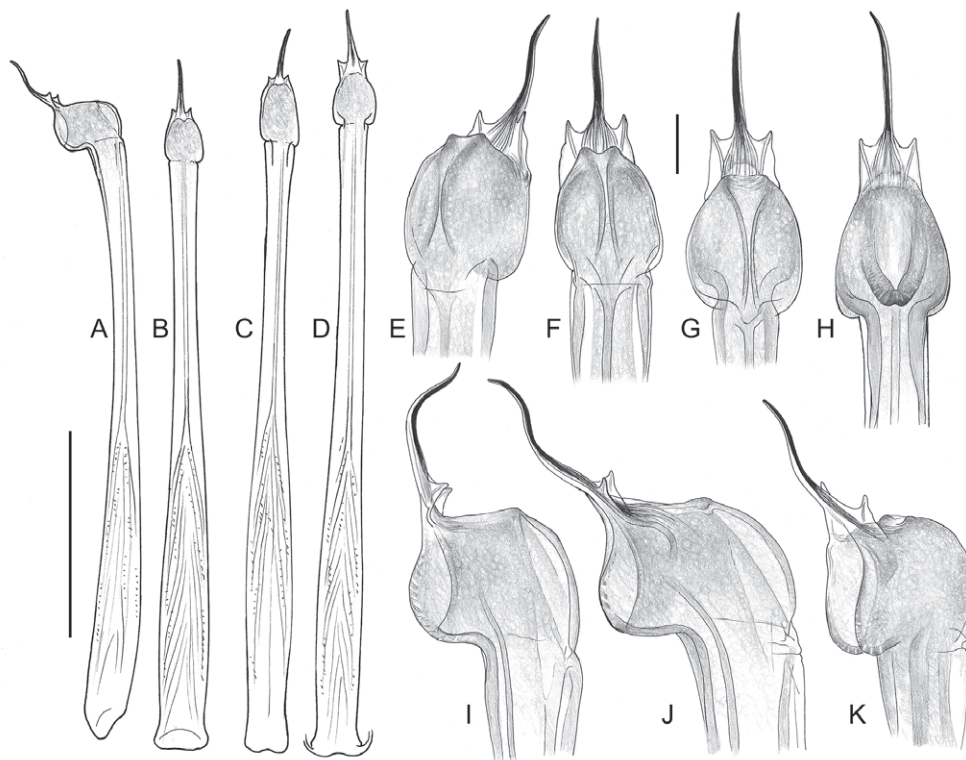


**Fig. 18.** *Dicranopalpus pyrenaicus* Dresco, 1948. Pic d'Orhy, Larrau, France, 15 Oct. 2019. **A.** Male. **B.** Female. Photos Axel Schönhofer.





**Fig. 19.** *Dicranopalpus pyrenaicus* Dresco, 1948. Right pedipalp. **A–C.** Male. **D–E.** Female. **A, D.** Median view. **B.** Claw. **C, E.** Dorsal view of patella and tibia. Scale bars: A, C–D = 0.5 mm; B = 50  $\mu$ m.



**Fig. 20.** *Dicranopalpus pyrenaicus* Dresco, 1948. Penis. **A.** Lateral view. **B.** Ventral view. **C–D.** Dorsal view. **E–K.** Glans. **E.** Ventrolateral view. **F–G.** Ventral view. **H.** Dorsal view. **I–J.** Lateral view. **K.** Dorsolateral view. A–B, E–F, J–K (CJM 2649). D, G–H (ZUPV 1112). C, I (ZUPV 941). Scale bar: A–D = 0.5 mm; E–K = 50  $\mu$ m.



1700 m a.s.l.; 24 Oct. 1987; C. Prieto, Ramón Martín leg.; mountain pasture; ZUPV 941. – **Pyrénées-Atlantiques** • 1 juv.; Urdos; 42.851° N, 0.517° W; 1755 m a.s.l.; 27 Sep. 2014; H. Wijnhoven leg.; under stones at edge of pasture and forest; CHW 471 • 1 juv.; Pic de Guilhers; 43.008° N, 0.733° W; 1250 m a.s.l.; 30 Oct. 1987; C. Prieto and R. Martín leg.; ZUPV 965.

## Description

### Male

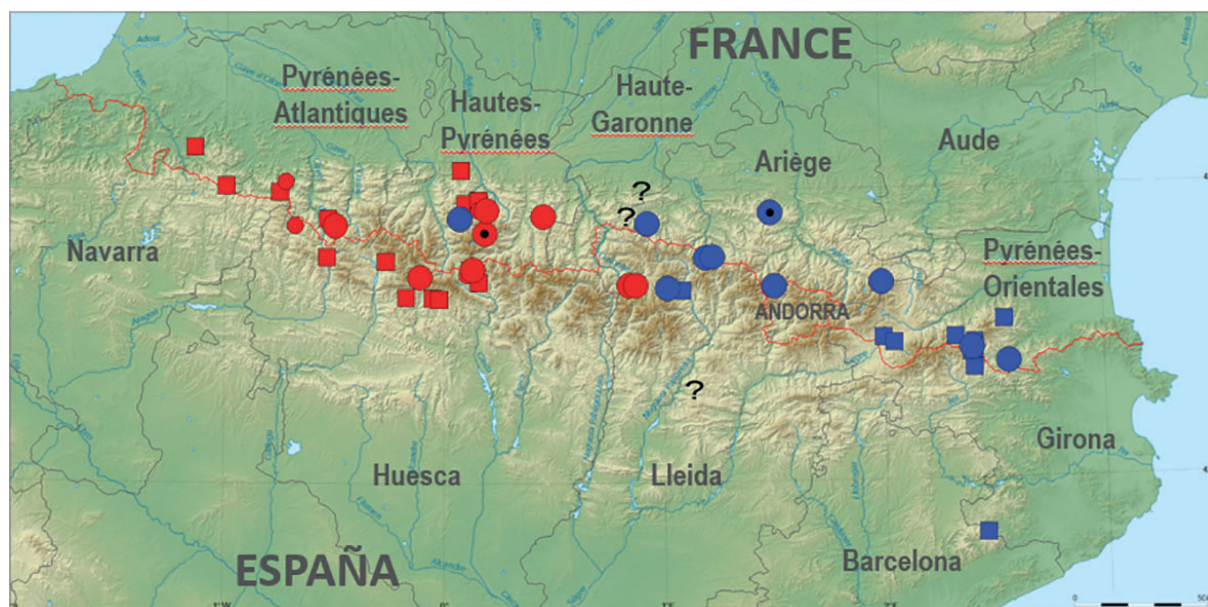
LENGTH. 2.7, width of prosoma 1.8, BLI 1.4 (CJM 2649).

**DORSUM** (Figs 4E, 18A). Ground colour pale yellowish brown. Prosoma with dark brown patches and spots, anterior margin pale, lateral margin near ozopores dark brown. Ozopores oval-shaped, small. Saddle dark brown, narrowing on opisthosomal tergites I–IV, widening on following tergites. Opisthosomal tergites with paramedian pairs of white spots. Lateral areas of tergites VI–IX mottled with light and dark spots.

**EYE TUBERCLE**. Dark brown with silvery ring around eyes, canaliculated, slightly wider than long, at about its length from anterior margin of carapace, dorsally with few minute black setae.

**VENTER AND COXAE**. Uniformly pale yellowish brown, with black sensory setae.

**CHELICERAE** (Fig. 5D). Small, smooth, pale yellowish, segment I with ventral spur, segment I dorsally, and segment II dorsally and medially near cheliceral claw with black setae.



**Fig. 21.** Map of the Pyrenean region with the distribution of *Dicranopalpus pyrenaicus* Dresco, 1948 (red symbols) and *Dicranopalpus catariegensis* sp. nov. (blue symbols). Dots, studied samples; squares, literature records. Type localities are indicated by a black spot. The two French sites indicated by “?” were recorded by Dresco (1948) as *D. pyrenaicus*; the Spanish “?” was recorded by Bellés (1978) as *Dicranopalpus* sp. (*martini*?).

**PEDIPALPS** (Fig. 19). Slender, pale yellowish, femur in proximal half, patella and tibia darker; femoral apophysis pale, robust, more than half as long as femur width at its base, femur ventrally and mediodistally with sensilla chaetica; patellar apophysis slender, tapering distally, as long as or longer than patella, in lateral view slightly curved upwards (Fig. 6I). Tibia mediodistally with a small protrusion (Fig. 6D). Tarsus slightly bent ventrally in distal third section; claw pectinate (Fig. 19B).

**LEGS.** Leg lengths I–IV (in parentheses femur lengths): 16 (28); 27 (5.2); 18 (3.2); 23 (3.9). All leg segments cylindrical. Femora brown with lighter median band and distal tips, rows of denticles and sensory setae, no trichomes; patellae brown, densely covered with small trichomes; tibiae brown with light brown tips, smooth, covered with trichomes and small sensilla chaetica; metatarsi and tarsi dark brown. Tibia II with 3 pseudo-articulations; metatarsi I–IV with 3, 4, 2 and 4 pseudo-articulations, respectively. Numerous bipterate setae on prolateral sides of metatarsus III and IV and in decreasing numbers on proximal tarsomeres 1–5 of leg III and 1–9 of leg IV.

**PENIS** (Fig. 20). Short and compact; length 1.56 (ZUPV 1112); truncus widest in proximal third (Fig. 20B–D), slightly widening to the glans; intrinsic penial muscle in basal half. Glans rounded, with two curved sclerotized ridges forming a pair of small humps on ventral side (Fig. 20E–G, K); glans dorsally sclerotized and provided with canaliculi; dorsal glans cavity large and ovoid, curving from halfway along glans to base of stylus. Dorsal truncus–glans transition approximately right-angled. Sensory setae not visible. Stylus about as long as glans, S-curved; horns triangular (Fig. 20D–H).

### **Female**

**LENGTH.** 3.1, width of prosoma 2.2, BLI 1.0.

**DORSUM** (Fig. 18B). Colours faded in available samples. Prosoma as in male, saddle dark brown, narrowing on opisthosomal tergites I–IV, continuing on following tergites as a broad median band. Opisthosomal tergites with paramedian pairs of white spots, lateral areas mottled with light and dark spots.

**PEDIPALPS** (Fig. 19D–E). Femoral apophysis robust, almost as long as femur width. Long and robust plumose setae on apophysis, and ventral and mediodistal side of femur; patellar apophysis large, with tapering tip, not reaching tibial apophysis, about  $\frac{4}{5}$  as thick as tibia. Mediodistal apophysis as long as wide. Tibia ventrally with twelve robust plumose setae.

**LEGS.** Leg lengths I–IV (in parentheses femur lengths): 13 (2.3); 25 (4.6); 14 (2.3); 19 (3.7) (CJM2649). All leg segments cylindrical. Femora lack trichomes. Metatarsi I–IV with 0, 3, 2 and 3 pseudo-articulations, respectively.

**SEMINAL RECEPTACLES** (Fig. 9E). Ovipositor with 24 segments (CJM2649), seminal receptacles in segments 5 and 6; two long tubes, each proximally with a long lateral pocket.

### **Distribution and ecology**

An endemic species, predominantly inhabiting the high mountain ranges of the central Pyrenees (Fig. 21). Easternmost occurrence in the Vall d’Aran (Lleida, Cataluña, Spain), and north along the French Ariège/ Haute-Garonne border; western distribution poorly known, the westernmost records are from Urdos (Pyrénées-Atlantiques), La Pierre-Saint Martin (Marcuzzi & Biondi 1980), Mendive and Pic d’Orhy (Delfosse & Dubois 2018; photos A. Schönhofer, Fig. 18). Recorded altitudes between 1200 and 2250 m a.s.l. For the Vallée d’Ossau (Pyrénées-Atlantiques) an altitudinal distribution of *D. pyrenaicus* is given by d’Amico & Besson (1995: fig. 2) ranging from about 1500 to 1800 m a.s.l. (Fig. 17B).

**Phenology:** adults probably from late summer to late autumn.

***Dicranopalpus catariensis* sp. nov.**

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Figs 1A–B, 4F, G, 5E, 6E, J, 9F, 21–23

*Dicranopalpus gasteinensis* – Ledoux *et al.* 2000: 7. — Ledoux & Emerit 2006: 12.

*Dicranopalpus martini* – Mello-Leitão 1936: 14–15. — Rambla & Perera 1995: 30.

*Dicranopalpus pyrenaicus* (s.l.) – Delfosse 2004: 39, 2014: 13.

**Diagnosis**

Medium-sized, with long brown legs. Male: prosoma pale with light brown patches, opisthosoma dark brown.

**Etymology**

The name of the new species refers to its east-Pyrenean distribution, combining names of the Spanish autonomous community of Cataluña and of the French department Ariège ('cat-ariég-ensis').

**Material examined**

**Holotype**

FRANCE – **Ariège** • ♂; Forêt de Sauzet, SE of Col de Port; 42.897° N, 01.460° E; 1200–1400 m a.s.l.; 26 Aug. 1978; J. Martens leg.; deposited in Senckenberg Research Institute, Arachnology, Frankfurt am Main, Germany; CJM 1725.

**Paratypes**

FRANCE • 3 ♂♂, 2 ♀♀, 5 juv.; same collection data as for holotype; deposited in Senckenberg Research Institute, Arachnology, Frankfurt am Main, Germany; CJM 9005.

SPAIN – **Cataluña** • 1 ♂; Lleida, Parque National Aigues Tortes, Estany de Gerber; 42.631° N, 0.996° E; 2170 m a.s.l.; 25 Jul. 2003; Ziortza Fernández leg.; ZUPV 1960.

**Additional material**

FRANCE – **Ariège** • 7 ♂♂, 2 ♀♀; Orlu, Jasse du Printemps; 42.6573° N, 1.9683° E; 1400 m a.s.l.; 19 Jul. 2014; S. Danflous and S. Cally leg.; CHW 468 • 4 juv.; Couflens, Salau, Cascade de Léziou; 42.740° N, 1.172° E; 1036 m a.s.l.; 8 Oct. 2014; H. Wijnhoven leg.; CHW 466 • 1 ♂; Cirque d'Anglade; 42.741° N, 1.198° E; 1200 m a.s.l.; 9 Aug. 1978; J. Martens leg.; CJM 1684 • 3 ♂♂; Vallée du Biros, river valley of the Isard near Fréchendeck; 42.857° N, 0.900° E; 1100–1150 m a.s.l.; 27 Aug. 1978; J. Martens leg.; CJM 1746. – **Hautes-Pyrénées** • 2 ♂♂, 4 ♀♀; Vallon de Bolou, Betpouey; 42.873° N, 0.049° E; 8 Jun. 2014; S. Danflous leg.; CHW 467. – **Pyrénées-Orientales** • 1 ♂; Vallespir, Serralongue; 42.383° N, 02.550° E; 1100 m a.s.l.; 15 Jul. 1994; J. Martens leg.; CJM 3432 • 1 ♂, 4 ♀♀; Prats de Mollo, Le Talaiador; 42.431° N, 2.382° E; 1850 m a.s.l.; 9 Jun. 2006; J. Cl. and P. Gauthier leg.; ZUPV 6055. **Andorra** • 2 juv.; Ordino, Estanys de Tristaina; 42.64° N, 1.48° E; 2300 m a.s.l.; 24 Jul. 1983; C. Prieto and A.G. Prieto leg.; ZUPV 1570.

SPAIN – **Cataluña** • 3 ♂♂, 1 juv.; Lleida, Espot, Embalse Ratera; 42.589° N, 0.990° E; 2141 m a.s.l.; 3 Aug. 2015; H. Wijnhoven leg.; under stones; CHW 470 • 7 ♂♂, 2 juv.; same collection data as for preceding; CHW 469.

**Description**

**Male**

LENGTH. 3.2, width of prosoma 2.1, BLI 1.7.

**DORSUM** (Fig. 4F). Ground colour pale yellowish. Prosoma pale yellowish, with light brown patches, margins near scent glands and area posteriorly of eye tubercle darkened. Ozopores oval-shaped, small. Dark brown saddle, narrow on opisthosomal tergites III–IV, widening on tergite IV. Opisthosomal tergites with paramedian pairs of white spots and transverse rows of small dark spots. Lateral areas of tergites VI–IX lighter.

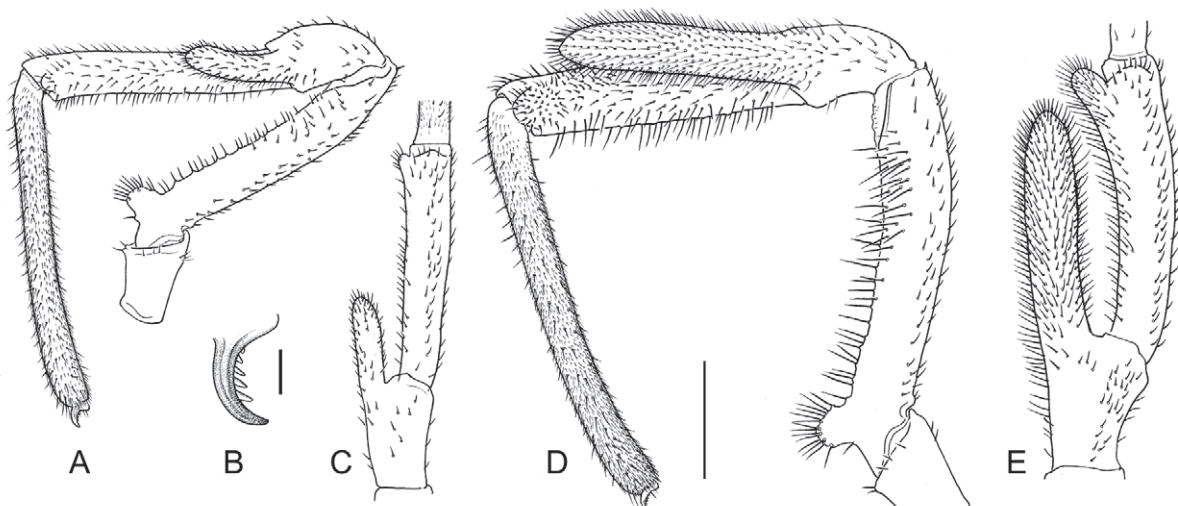
**EYE TUBERCLE**. Slightly wider than long, not tilted backwards, canaliculated, at about its length from anterior margin, greyish silvery, midsection dark brown, provided with about ten minute black setae; eyes with narrow black ring.

**VENTER AND COXAE**. Uniformly pale yellowish brown, with black sensory setae.

**CHELICERAE** (Fig. 5E). Pale yellowish, slightly darker dorsally; segment I with ventral spur, segment I dorsally, and segment II dorsally and medially near cheliceral claw with black setae.

**PEDIPALPS** (Fig. 22A, C). Pale yellowish, dorsal sides of femur, patella and distal part of tibia somewhat darker; claw pectinate (Fig. 22B). Femoral apophysis slightly shorter than wide at its base; patellar apophysis as long as or slightly shorter than patella, curved upwards in lateral view (Fig. 6J); tibia mediolaterally with small protrusion (Fig. 6E). Claw pectinate (Fig. 22B).

**LEGS**. Lengths of legs I to IV (in parentheses femur lengths): 28 (4.9); 41 (7.9); 27 (4.8); 35 (6.0). All leg segments cylindrical. Trochanters pale yellowish brown; femora brown with lighter distal tips, indistinct rows of small denticles and sensory setae; patellae dark brown, densely covered with small trichomes; tibiae dark brown with light tips, smooth, without spines or denticles, covered with trichomes and small sensilla chaetica; metatarsi and tarsi dark brown to black. Tibia II with 4 pseudo-articulations; metatarsi I–IV with 2, 5, 3 and 4 pseudo-articulations, respectively. Numerous bipterate setae on prolateral sides of metatarsi III and IV and in decreasing numbers on proximal tarsomeres 1–16 of leg III and 1–10 of leg IV.



**Fig. 22.** *Dicranopalpus catariensis* sp. nov. Right pedipalp. **A–C.** Male. **D–E.** Female. **A, D.** Median view. **B.** Claw. **C, E.** Dorsal view of patella and tibia. A–E (CJM 1746). D–E (CJM 9005). Scale bars: A, C–E = 0.5 mm; B = 50  $\mu$ m.



**PENIS** (Fig. 23). Long and slender; length 1.73 (CJM 1746). Base with sclerotized extensions (occasionally broken off during preparation). Truncus widest in basal  $\frac{1}{5}$ , narrowest near distal  $\frac{4}{5}$  (Fig. 23C–D), slightly widening to glans (Fig. 23A–B). Intrinsic penial muscle in about basal  $\frac{2}{5}$  of truncus, tendon robust. Glans longer than wide, sclerotized dorsally, with canaliculi (Fig. 23K–N); dorsal cavity in distal half of glans; glans laterally with one pair of minute sensory setae (Fig. 23H). Horns slender. Stylus shorter than glans.

**Female**

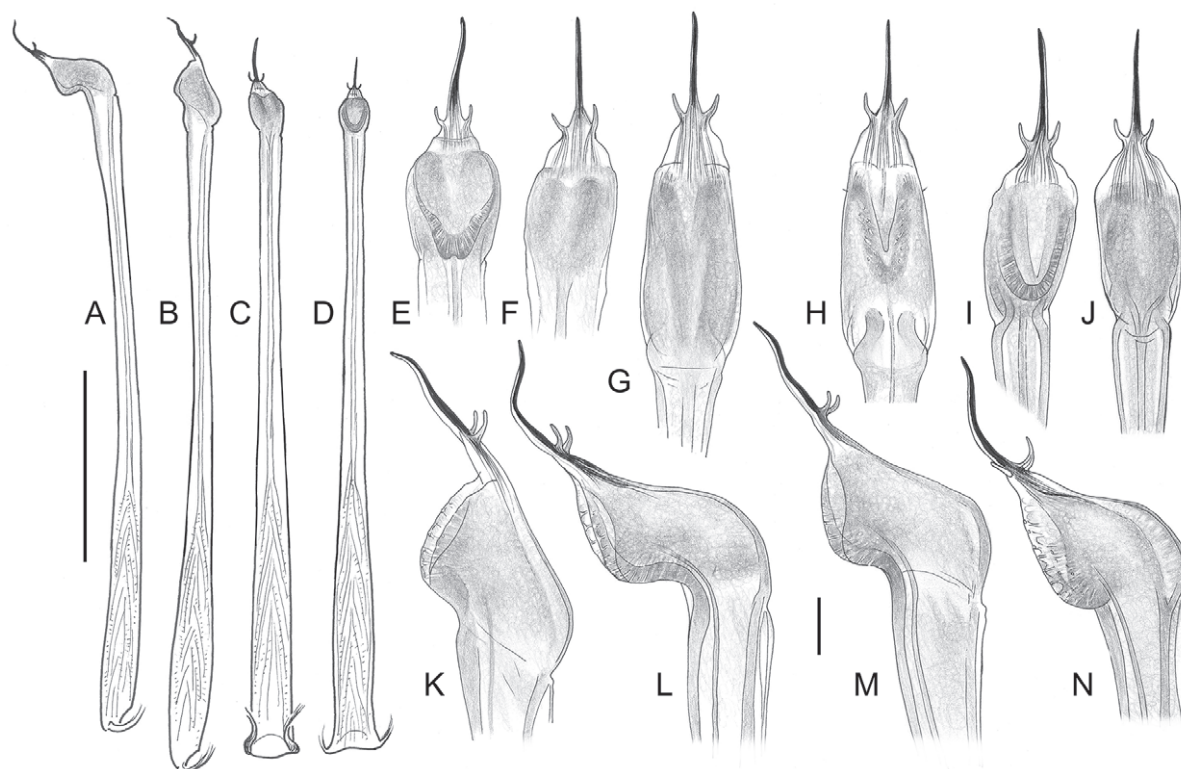
LENGTH. 4.9, width of prosoma 2.5, BLI 1.8.

**DORSUM** (Fig. 18B). Prosoma as in male, saddle consisting of dark brown paramedian patches, narrowing on opisthosomal tergites I–IV with median area light brown. Opisthosomal tergites with paramedian pairs of white spots, lateral areas mottled with light and dark spots and patches, and transverse rows of small dark spots.

**EYE TUBERCLE**. Brown with silvery sheen, lighter around eyes; canaliculated, with about ten minute black setae.

**VENTER AND COXAE**. Pale yellowish with scattered black setae.

**PEDIPALPS** (Fig. 22D–E). Pale yellowish, basal half of femur distally of apophysis, dorsal side of patella, distal patellar apophysis, and median and distal tibia region somewhat darker; femoral apophysis as long



**Fig. 23.** *Dicranopalpus catariensis* sp. nov. Penis. A–B, K–M. Lateral view. C, F–G, J. Ventral view. D–E, H–I. Dorsal view. N. Ventrolateral view. A (CHW 467). B, G–H, K (CHW 468). C, F, N (CHW 470). D–E, L (CJM 1746). I–J, M. (holotype, CMJ 1725). Scale bars: A–D = 0.5 mm; E–N = 50  $\mu$ m.

as wide; patellar apophysis robust, reaching tibial apophysis; tibia mediodistally with apophysis as long as wide. Claw pectinate.

LEGS. Leg lengths I–IV (in parentheses femur lengths): 24 (4.6); 41 (8.3); 26 (4.8); 36 (6.8) (CHW 467). Legs brown, joints light, patella dark brown, dark brown bands distally on femur and tibia. Femora lack trichomes. Tibia II with five pseudo-articulations; metatarsi of legs I–IV with 3, 5, 3 and 4 pseudo-articulations, respectively.

SEMINAL RECEPTACLES (Fig. 9F). Ovipositor with 22 segments (CHW 467), seminal receptacles located in segments 6 and 7; tube-shaped pocket, proximally with a slender lateral pocket.

### Distribution and ecology

A species endemic to the eastern Pyrenees (Fig. 21). The Montseny, a massiv between Barcelona and Girona provinces where Rambla & Perera (1995) recorded the species as *D. martini*, seems to be an isolated southern record. Distribution data suggest that *D. pyrenaicus* and *D. catariensis* ranges could meet in the northwestern part of Lleida province. A sample of *D. catariensis* sp. nov. from the Hautes-Pyrénées (CHW 467) is within the distribution range of *D. pyrenaicus*. Most records are from altitudes 1200–1400 m a.s.l.; a high locality is from Espot at 2141 m a.s.l. We found adult specimens mostly on tree trunks, under loose stones and on rock faces. The sex ratio in favour of males (21M, 6F) in our samples suggests that females mostly select daytime shelters at ground level, while males rest higher up, and are thus easier to find. Juveniles live at ground level.

Phenology: insufficiently known, adults from June to end of August; juveniles from July to October, suggesting that eggs hatch in summer and autumn, juveniles overwinter and adults appear in spring.

### Identification key for males of the *Dicranopalpus pyrenaicus* species group

1. All leg femora with trichomes ..... *D. cantabricus* Dresco, 1953  
– All leg femora without trichomes ..... 2
2. Glans penis about as long as wide, horns proximally of stylus triangular .....  
..... *D. pyrenaicus* Dresco, 1948  
– Glans penis longer than wide, horns proximally of stylus cylindrical ..... 3
3. Prosoma mottled with brown. Patellar apophysis slender, as long as patella, with tapering tip (Fig. 6J)..... *D. catariensis* sp. nov.  
– Prosoma dark brown with pale band in front of eye tubercle. Patellar apophysis robust, shorter than patella, with rounded tip (Fig. 6H) ..... *D. gallaecicus* sp. nov.

### Discussion

Our revision of the *Dicranopalpus pyrenaicus* species group from the Pyrenees and northern Spain, primarily based on penial and pedipalpal morphology, resulted in the redescription of *D. pyrenaicus*, the revalidation of *D. cantabricus* and descriptions of two hitherto hidden species, *D. gallaecicus* sp. nov. and *D. catariensis* sp. nov. Also, we propose *D. bolivari* as a new synonym of *D. martini*.

The genus *Dicranopalpus* (superfamily Phalangioidea) presently has no family assignment but is placed in the so-called “*Dicranopalpus* group”, containing seven genera (Crawford 1992; Pinto-da-Rocha & Giribet 2007). It has been provisionally placed in different subfamilies of Phalangiidae by various authors: Phalangiinae (Dresco 1949), Gyantinae (now Gyinae) (Rambla 1975) and Oligolophinae (Rambla 1960), or in Sclerosomatidae (Wijnhoven & Martens 2019). Martens (2021) suggested that the *Dicranopalpus* group probably has a long evolutionary history in Europe, and may precede the

Phalangiidae/Sclerosomatidae split. Morphological peculiarities such as the long apophysis on the pedipalpal patella also occur in other genera. For example, in *Megistobunus* Hansen, 1921 (Phalangiinae) and in some central Asian Gyinae (Sclerosomatidae, e.g., *Rongsharia* Roewer, 1957) (Martens 1982; Wijnhoven & Prieto 2015). In order to fully resolve this issue, genetic analyses considering both European and central Asian species will be required. In our opinion, the genus *Dicranopalpus* will probably deserve a separate subfamily or family assignment.

Currently, *Dicranopalpus* comprises 13 species, eight of which occur on the Iberian Peninsula: *D. cantabricus*, *D. catariensis* sp. nov., *D. caudatus*, *D. gallaecicus* sp. nov., *D. martini* (*D. bolivari* syn. nov.), *D. pulchellus*, *D. pyrenaeus* and *D. ramosus*; *D. insignipalpis* is endemic to Corsica, *D. larvatus* and *D. brevipes* are Italian species; finally, *D. gasteinensis* has an Alpine, and *D. fraternus* Szalay, 1950, an eastern European distribution. However, there are still knowledge gaps. For example, Martens (1978) highlighted clear geographically-linked differences in pedipalp armament in *D. gasteinensis*, suggesting within this taxon undescribed species probably hide. Also, the original descriptions of *D. fraternus*, *D. martini* and *D. pulchellus* are outdated and inaccurate, and their distributions are poorly known.

Additionally, the phylogenetic relationships within *Dicranopalpus* have not been satisfactorily resolved. As mentioned before, on the basis of morphological traits, two distinct species groups can be recognised. These are the sister groups of *D. ramosus/caudatus* (Wijnhoven & Prieto 2015) and *D. martini/pulchellus* (Rambla 1975). Relationships among the nine remaining species are unknown. Thus, the *D. pyrenaeus* species group as defined in this study (comprising *D. cantabricus*, *D. gallaecicus* sp. nov., *D. pyrenaeus* and *D. catariensis* sp. nov.) may not be monophyletic.

We recommend that further characterisation of species in this genus should focus on detailed descriptions of the pedipalps (shape, lengths and relative dimensions of apophyses; setation) and genital structures (in particular the three-dimensional structure of the penis glans).

In the four Iberian species *D. catariensis* sp. nov., *D. pyrenaeus*, *D. cantabricus* and *D. gallaecicus* sp. nov., cheliceral morphology is of minor importance; the dorsal colour pattern is rather similar, while, for unknown reasons, males are darker from east to west.

The mentioned four species occupy largely allopatric distribution areas (Figs 13, 21). The distribution of the Pyrenean *D. pyrenaeus* and *D. catariensis* sp. nov. shows distinct similarities with species of the genus *Centetostoma* Kratochvíl, 1958 (Martens 2011), with *C. scabriculum* (Simon, 1879) being the western and *C. juberthiei* Martens, 2011 being the eastern Pyrenean element, while *C. ventalloi* (Mello-Leitão, 1936) overlaps with both species of *Dicranopalpus*. According to Martens (2011), these three species of *Centetostoma* may have evolved from isolated populations as a result of Pleistocene climatic changes. *D. pyrenaeus* and *D. catariensis* sp. nov. may share a similar phylogenetic origin.

In the species under study, the dorsal truncus/glans junction is a heavily sclerotized zone, that distally divides into two ridges, surrounding a slit-shaped to oval-shaped cavity (Fig. 3C–D). Inside there is an inflatable and retractable integument. This structure is absent in the *D. ramosus/D. caudatus* species group, supporting its unique position within the genus. Other species of the genus do possess this glans cavity, with the exception of *D. brevipes*. Here, this cavity is lacking, possibly due to its ground dwelling habits, imposed by a xeric climate (Wijnhoven *et al.* 2020: fig. 5). Interestingly, *Mitopus morio* (Fabricius, 1799) (Phalangiidae, Oligolophinae) has a similar glans cavity, including a bladder-like structure (e.g., Martens 1978: fig. 658). Again, genetic analyses will be required to resolve whether this feature has a homologous or analogous origin.

Many questions regarding the biology of *Dicranopalpus* (including their seasonal phenology, horizontal and vertical distribution, and ecology) remain unanswered. Rambla (1975) mentioned that several

species are hard to find and may be common in some habitats, only to be absent in seemingly comparable habitats for unknown reasons. To some extent the present contribution also suffers from a limited set of available specimens, females in particular.

At present, eight species occur on the Iberian Peninsula: *D. cantabricus*, *D. catariensis* sp. nov., *D. caudatus*, *D. gallaecicus* sp. nov., *D. martini*, *D. pulchellus*, *D. pyrenaeus* and *D. ramosus*. France now harbours six species: *D. catariensis* sp. nov., *D. caudatus*, *D. gasteinensis* (south western Alps), *D. insignipalpis* (Corsica), *D. pyrenaeus* and *D. ramosus*. Clearly, the western Mediterranean region represents a diversity hotspot for this harvestman group.

## Acknowledgments

Over the years, K. and B. Pfau, H. Pieper, W. Schawaller, J. Spelda and K. Thaler have kindly put their opilionid collections at JM's disposal. JM sincerely thanks them. Numerous times JM was sponsored by Feldbausch-Stiftung and Wagner-Stiftung at Fachbereich Biologie of Mainz University for fieldwork in Europe and Asia. This was helpful for studying the harvestmen in the mountains of Corsica. JM thanks the mentioned institutions and their personnel. Beate Martens has contributed to JM's collection for many years. Emmanuel Delfosse provided additional fresh material. J.O. Wolff and S.N. Gorb gave permission to publish the SEM-photo (Fig. 2), and Manuel Sanmartín and Luis Álvarez approved the use of photos of *D. gallaecicus* sp. nov. Axel Schönhofer kindly provided photographs of *D. pyrenaeus*. Grant Brown checked the Discussion. We acknowledge the two reviewers who greatly improved the manuscript. Jan van Loon is thanked for his support and assistance.

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