A new eyeless *Hahnia* from the French Pyrenees with remarks on *Iberina mazarredoi* (Araneae: Hahniidae)

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doi: 10.30963/aramit7105

Abstract. A new troglobiotic species, *Hahnia troglopyrenaea* **sp. nov.** is described from caves in the French western Pyrénées. It has been wrongly reported from France as *Iberina mazarredoi* Simon, 1881. Diagnostic differences from this species from north-eastern Spain are pointed out and a distribution map of both species is presented. *Iberina mazarredoi* is deleted from the French checklist.

Keywords: cave, distribution, *Iberina*, new species, spider, troglobiont

Zusammenfassung. Eine neue augenlose *Hahnia* aus den französischen Pyrenäen (Araneae: Hahniidae) mit Anmerkungen über *Iberina mazarredoi*. Eine neue troglobiontische Art, *Hahnia troglopyrenaea* **sp. nov.**, wird aus Höhlen in den französischen Westpyrenäen beschrieben. Es wurde fälschlichichererweise aus Frankreich als *Iberina mazarredoi* Simon, 1881 gemeldet. Diagnostische Unterschiede zu dieser Art aus Nordostspanien werden aufgezeigt und eine Verbreitungskarte beider Arten präsentiert.
Iberina mazarredoi wird von der französischen Checkliste gestrichen.

Résumé. Une nouvelle *Hahnia* aveugle des Pyrénées françaises (Araneae: Hahniidae) avec des remarques concernant *Iberina mazarredoi*. Une nouvelle espèce troglobie, *Hahnia troglopyrenaea* **sp. nov.**, est décrite des Pyrénées occidentales françaises. Dans le passé, l'espèce a été citée par erreur de France sous *Iberina mazarredoi* Simon, 1881. Les différences diagnostiques avec cette espèce sont proposées et une carte de répartition est présentée. *Iberina mazarredoi* est supprimée de la liste française.

The genus *Iberina* Simon, 1881 was created for an eyeless Hahniidae species (*Iberina mazarredoi* Simon, 1881) from a cave in Cantabria (Spain). No figures were included, leaving its taxonomic position unclear for a long time. Furthermore, the description of the single included species, *Iberina mazarredoi*, was in Latin, complicating the matter. The species was later reported from three localities in the French Pyrenees by Simon (1907, 1937) and Fage (1931) and in a cluster of localities in the north-west of Spain. Questions about the seemingly disjunct distribution area of this blind species have never been raised, without noting that one population is on the Iberian plate and the other on the Eurasian plate, probably assuming further localities would later be discovered connecting these populations. A century later, this gap remains and these two populations are here shown to be two distinct species.

For a long time, all cave-dwelling Hahniidae were considered to belong to the genus *Iberina*, to which this genus was restricted. An enlarged redefinition of the *Iberina* genus was initially suggested by Lehtinen (1967), then Wunderlich (2004), based on species groups identified by Harm (1966). Ledoux (2014) confirmed the validity of the enlarged definition of *Iberina*, insisting on differences in the structure of the vulva. Finally, Růžička (2022) revised the genus and redescribed five of its six currently valid species. However, the latter insisted on differences between the male palps. Results of CO1 barcoding by Astrin et al. (2016) also seem to confirm genetic distinction between *Iberina* and *Hahnia*.

Material and methods

All recent specimens were collected by active search in caves using headlamps. All material available in French collections was studied. All literature records of both species were compiled in order to provide a comprehensive map of the known worldwide distribution of both studied taxa.

All specimens are preserved in 75% ethanol.

The nomenclature of the sexual organs follows Ledoux (2014).

Species were examined using stereo microscopes (WILD M5 and Nikon SMZ645). Details of male palps and female epigynes were studied with an Olympus CH-2 microscope with a drawing tube, as well as the photographs.

Measurements are in mm. Leg measurements are presented in the same form as in Růžička (2022).

Abbreviations. MNHN: Muséum national d'Histoire naturelle de Paris; MHNT: Muséum d'Histoire naturelle de Toulouse.

Taxonomy

Family Hahniidae Bertkau, 1878
Genus *Hahnia* C. L. Koch, 1841
Type species: *Hahnia pusilla* C. L. Koch, 1841
***Hahnia troglopyrenaea* sp. nov.**
Figs 1a-b, 2, 3, 5

ZooBank. urn:lsid:zoobank.org:act:32623611-284E-4F49-A73D-52386FA99638

Type material. Holotype ♂ from FRANCE, Pyrénées-Atlantiques: Rébénacq, grotte d'Arréglade (43.15483°N, 0.40944°W, 300 m a.s.l.), 22. Mar. 2016, S. Déjean, H. Brustel & V. Duprat leg., (MHNT.CUT.20251.1). Paratypes: 1 ♀, same data as holotype (MHNT.CUT.2025.1.2); 1 ♀, same data as holotype coll. S. Déjean; Rébénacq, grotte d'Arréglade [grotte de Réglade], 3. Aug. 1945, 2 ♀♀, J. Nègre & H. Henrot leg., MNHN coll. Dresco, jar "A.110; *Iberina* (Fam. Agelenidae)"; Rébénacq, grotte de l'Oueil de Néez (43.14949°N, 0.40443°W, 320 m a.s.l.), 1. Mar. 2015, 1 ♀, H. Brustel leg., coll. S. Déjean. Hautes-Pyrénées: Saint-Pé-de-Bigorre, gouffre des Castagnets (43.09171°N, 0.15747°W, 410 m a.s.l.), 2. Nov. 2016, 1 ♂, 3 ♀♀, S. Danflous, H. Brustel, F. Barbe, D. Lapierre & G. Susong leg., coll S. Danflous.

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Academic editors: Tobias Bauer & Petr Dolejš

submitted 28.11.2024, accepted 14.5.2026, online 30.6.2026

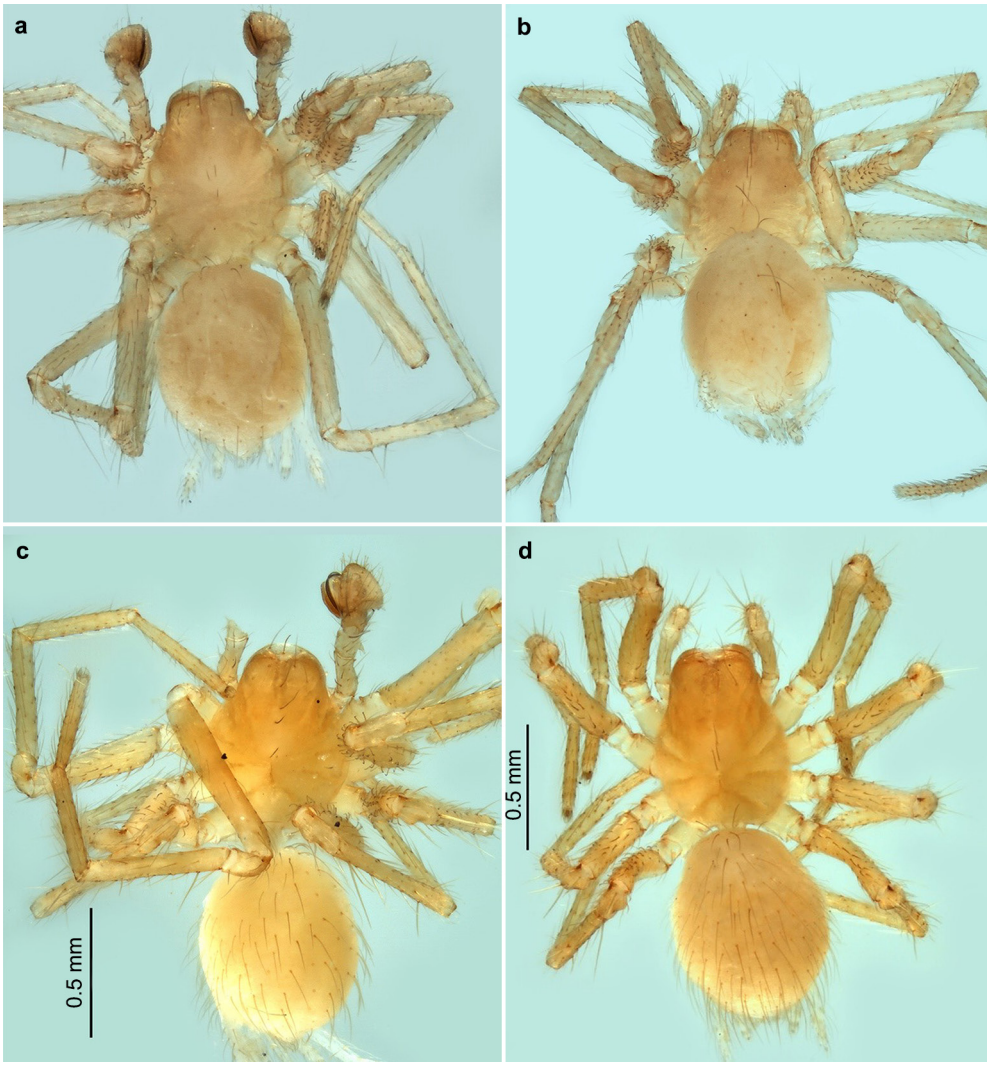

Fig. 1: *Hahnia troglopyrenaea* **sp. nov.** from gouffre des Castagnets (**a-b**) and *Iberina mazarredoi* Simon, 1881 (**c-d**). **a.** male, dorsal view; **b.** female, dorsal view; **c.** male, dorsal view; **d.** female, dorsal view (scale line: 0.5 mm)

Comment. Formerly, this species has been misidentified as *Iberina mazarredoi* probably because it was also collected in caves and had the same, pale, eyeless appearance (Fig. 1a-d), and was never diagnosed by its sexual characters. Because of their small size both species are indeed difficult to study. The sexual organs are, however, quite different.

Diagnosis. Superficially, *Hahnia troglopyrenaea* **sp. nov.** most resembles another eyeless hahniid, *Iberina mazarredoi*. Males of *Hahnia troglopyrenaea* **sp. nov.** differ by the patellar apophysis with tubercles, the ellipsoid bulbus (circular in *I. mazarredoi*) and an embolus long but much shorter than in *I. mazarredoi*. Associated with the embolus, the vulva has the copulatory ducts long, but having less loops than the latter and the primary spermathecae larger.

These characters of the genitalia clearly place this species in the genus *Hahnia*. Within this genus, in addition to being eyeless, male palps lack a tegular comb, like *H. helveola* and *H. nava* from which it is easily distinguished by its much shorter, less curved tibial apophysis. The male of the eyeless *Hahnia anophthalma* Barrientos & Mederos, 2024 (Morocco: Middle Atlas) can be distinguished by the slender hook-shaped patellar apophysis and the tibial apophysis strongly bent, almost "closed" (female unknown).

Etymology. The name is an adjective referring to its occurrence in caves in the Pyrenees.

Other material examined. FRANCE: Pyrénées-Atlantiques: Rébénacq, grotte de l'Oueil de Néez: 1 ♂, 1 ♀ (MNHN 23623), coll. Simon, jar 1984 [specimens bleached by time]; Rébénacq, grotte de l'Oueil de Néez, 21. Oct. 1946, 1 ♀ [opisthosoma lost], H. Fourès leg. MNHN coll. Dresco, jar "A 110; *Iberina* (Fam. Agelenidae)"; all labelled *Iberina mazarredoi*.

Description. Characters considered distinctive between *Hahnia* and *Iberina* genera are in **bold**.

Measurements: Male holotype: Total length 1.06; prosoma 0.56 long, 0.48 wide. Female paratype: Total length 1.46; prosoma 0.66 long, 0.52 wide.

Male from gouffre des Castagnets: Total length 1.26; prosoma 0.59 long, 0.49 wide. Female from gouffre des Castagnets: Total length 1.44; prosoma 0.63 long, 0.52 wide.

Leg measurements: Male holotype: I: 2.2 (0.54, 0.16, 0.6, 0.5, 0.4); II: 2.1 (0.58, 0.16, 0.52, 0.44, 0.4); III: 2.2 (0.6, 0.16, 0.5, 0.52, 0.42); IV: 2.58 (0.68, 0.2, 0.6, 0.62, 0.48). Female paratype: I: 2.36 (0.64, 0.18, 0.58, 0.5, 0.46); II: 2.22 (0.66, 0.16, 0.5, 0.46, 0.44); III: 2.16 (0.62, 0.12, 0.46, 0.5, 0.46); IV: 2.66 (0.7, 0.18, 0.64, 0.66, 0.48).

Colour: Colour of recent specimens is whitish creamy almost translucent (Fig. 1a-b).

Prosoma: Completely eyeless, a series of at least six long hairs present, seeming to replace the eyes. A longitudinal median row of long hairs along the prosoma. Clypeus rounded, dis-

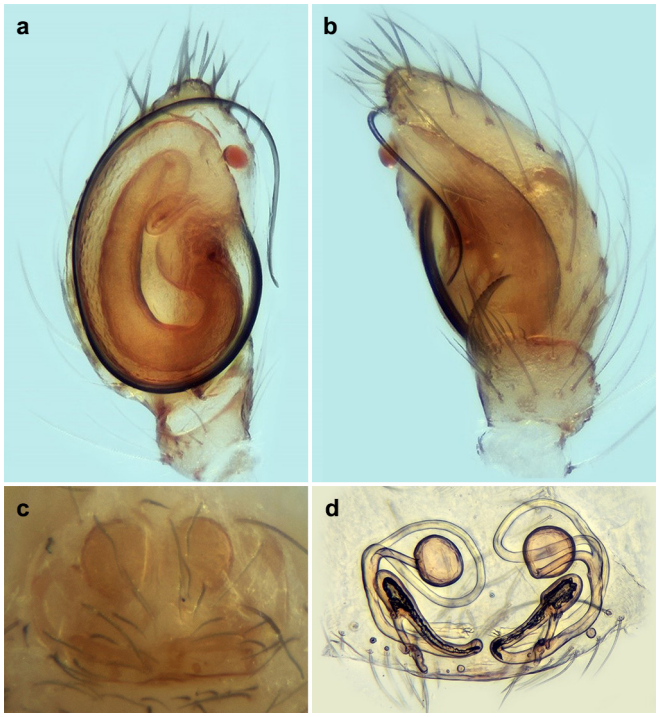

Fig. 2: *Hahnia troglopyrenaea* **sp. nov.** from gouffre des Castagnets. **a.** male palp, ventral view; **b.** idem, retrolateral view; **c.** epigyne, ventral view; **d.** vulva, dorsal view

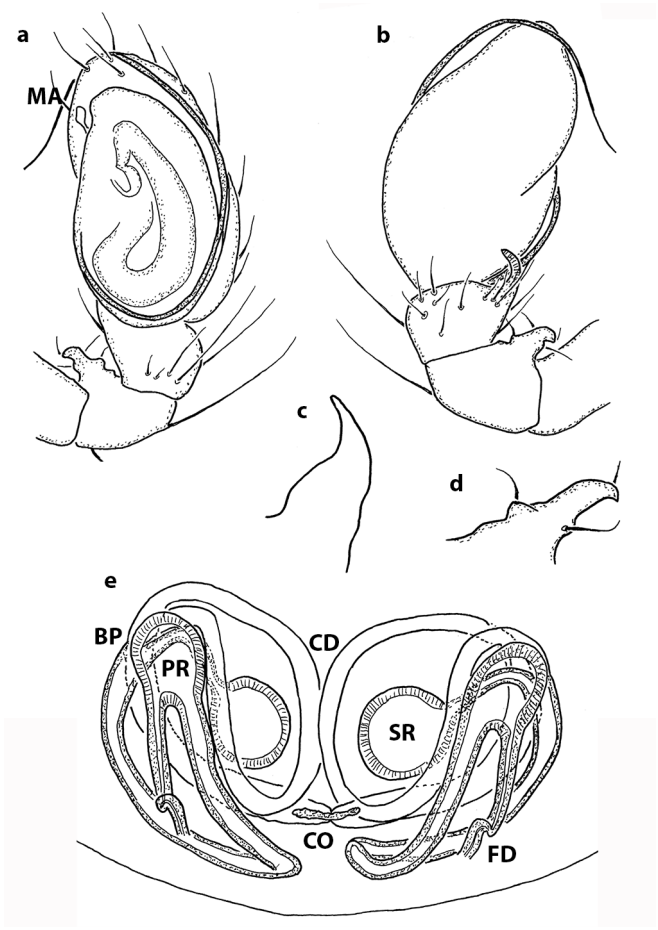

Fig. 3: *Hahnia troglopyrenaea* **sp. nov.** from grotte de l'Oeil de Néez (MNHN). **a.** male palp, ventral view; **b.** idem, dorsal view; **c.** Male tibial apophysis, dorsal view; **d.** male patellar apophysis, dorsal view; **e.** vulva, dorsal view. BP: Bifurcation point of copulatory duct; CD: Copulatory duct; CO: Copulatory opening; FD: Fertilisation duct; MA: Median apophysis; PR: Primary receptaculum; SR: Secondary receptaculum

tinctly protruding (Fig. 1a-b), much more than in *I. mazarredoi* (Fig. 1c-d).

Legs: Femora without dorsal spines. Patellae and tibiae I–IV with dorsal spines, metatarsi without spines (Fig. 1) (possibly broken off).

Male palp (Figs 2a-b, 3a-d)**:** Tibia with curved, gradually narrowing, relatively short apophysis, tip of the tibial apophysis serrated on its outer margin (Fig. 3c); patella with a stout warty apophysis, each tubercle carrying a hair, terminally bluntly pointed (Fig. 3d); **bulbus ellipsoid**, with a threadlike embolus, completely encircling the bulbus (Fig. 3). **Median apophysis (MA) present**; tegular comb absent.

Vulva (Fig. 1e)**:** Copulatory openings (CO) situated in postero-median part of epigyne, touching in the middle; basal, thin-walled part of copulatory ducts (CD) describing a complete circle, thick-walled part of copulation ducts bifurcating to the receptacula; primary (PR) and secondary receptacula (SR) rounded, of about the same size; fertilisation duct (FD) elongated.

Previous incorrect records of the species. This species was first cited as *Iberina mazarredoi* from France by Simon (1907), repeated by Fage (1931), Simon (1937), Denis (1957) and Ledoux (2014). Identification was only based on the absence of eyes and the pale colour which appears to be the same for both species. Ledoux (2014), in his revision of French Hahniidae, cited *I. mazarredoi* from France but only studied specimens from Spain. The description and figures therefore correspond to the true *I. mazarredoi*, not *H. troglopyrenaea*.

FRANCE: Pyrénées Atlantiques: Rébénacq, grotte d'Arréglade [= grotte de Rébénacq] (43.15483°N, 0.40944°W) (Simon 1907, Fage 1931, Denis 1959); Rébénacq, grotte de l'Oueil de Nez (43.14949°N, 0.40443°W) (Simon 1907, 1937); Camou-Cihigue (43.11611°N, 0.90611°W), Kintacharette Ko Karbia (Denis 1959).

Distribution. *Hahnia troglopyrenaea* **sp. nov.** is a troglobiont spider endemic to caves in the French western Pyrenees (Hautes-Pyrénées and Pyrénées-Atlantiques). It seems even more localised and rarer than *I. mazarredoi*. Known from over a century in France under the latter name, the species was only cited from three caves in the Pyrénées-Atlantiques. A fourth cave in Saint-Pé-de-Bigorre in Hautes-Pyrénées can now be added, slightly extending its distribution eastwards. Less than 20 adults of this species seem to have been collected over that period. It should be noted that many other caves have been surveyed in recent years, sometimes on numerous occasions. Despite its minute size rendering it difficult to spot, it is undoubtably localised and rare, even within it known distribution range.

Genus ***Iberina*** Simon, 1881
Type species: *Iberina mazarredoi* Simon, 1881
Iberina mazarredoi Simon, 1881
Figs 1c-d, 4, 5

Iberina mazarredoi Simon, 1881: 127 (descr. ♂♀); Simon 1898: 277, fig. 274; Simon 1911: 198 (cit.); Simon 1913: 382 (cit.); Fage 1931: 215, 248 (cit.); Machado 1942 (cit.); Simon 1937: 1033, 1047, fig. 1614 (♂); (Dresco 1957: 6 (cit.); Ribera 1983: 31 (cit.); Dresco & Hubert 1971: 203 (cit.); Ledoux 2014: 32, figs 6A-D (♂♀); Fernández-Pérez et al. 2014: 80, figs 7-9 (♂

♀); Fernández-Pérez & Prieto 2023: 140, fig. 2 (cit.); Růžička 2022: 560, figs 3A, 4A, 5A (♂♀).

Type material. Syntypes: 1 ♂, 1 ♀ of *Iberina mazarredoi* from SPAIN, Viscaya, Galdames, Cueva de la Magdalena; MNHNP 3714, jar 1984; examined (Fig. 4).

Other material examined. SPAIN: Cantabria: Arredondo, Cueva Coventosa, 4. Aug. 1962, 1 ♀, Loriol leg. (Dresco & Hubert 1971); Arredondo, Cueva de la Cañuela, 3. Aug. 1954, 1 ♂, 1 ♀, 3 jj. (Dresco 1957), 8. Aug. 1959, 4 ♂♂, 3 ♀♀, Loriol leg.; Arredondo, Cueva Horco B, 5. Aug. 1954, 1 ♀ (Dresco 1957); Sámano, Cueva de Sámano, 7. Aug. 1952, 1 ♂, 2 ♀♀, 1 juv, (Dresco 1957); Soba, Sima del Mortero, 20. Jul. 1961, 1 ♀, Loriol leg., 8. Aug. 1962, 1 ♂, 2 ♂♂ subad., 2 ♀♀, Plançon leg. (Dresco & Hubert 1971), all MNHN, coll. Dresco, jar A.110; Ramales de la Cantabria, Cueva Cullavera, 30. Dec. 1997, 1 ♂, 1 ♀, J. Lips leg., MNHN, coll. Ledoux, tube 11284; San Roque, Torcal de la Canal, 29. Oct. 1998, 1 ♀, J. Lips leg., MNHN coll. Ledoux, tube 11286; Astrana, unnamed cave, 28. Dec. 1997, 4 ♀♀, J. Lips leg., MNHN coll. Ledoux, tube 11287. Viscaya: Trucíos, Torca Peña Loredo, 4. Dec. 2016, 1 ♂, leg. C. Prieto; Viscaya, unknown cave, 1. Apr. 2013, 1 ♀, leg. C. Prieto.

Diagnosis. See preceding species.

Dscription. For details, see Růžička (2022) and Ledoux (2014), here only the sexual organs are described.

Male palp (Fig. 4a-d): Tibial apophysis (TA) gently curved, describing one quarter of a circle, with serrated tip; patellar apophysis (PA) compact, with slightly curved tip directed posteriorly; bulbus circular, with threadlike embolus encircling bulbus more than two times.

Vulva (Fig. 4e): Copulatory openings (CO) fused, situated in median part of the epigyne; thin-walled part of copulation ducts (CD) strongly elongated, consisting of several loops; thick-walled part of copulatory ducts bifurcating to the two pairs of receptacula by short loops; primary (PR) somewhat wider than long, secondary receptacula (SR) rounded; fertilisation ducts (FD) relatively short, as long as the diameter of a receptaculum.

Previous correct citations of the species. SPAIN: Cantabria: Arredondo (43.27333°N, 3.60028°W), Cueva Coventosa (Dresco & Hubert 1971); Arredondo, Cueva de la Cañuela (Dresco 1957); Arredondo, Horco B (Dresco 1957); Arredondo, Cueva Molino (Fernández-Pérez & Prieto 2023); Arredondo, Cueva San Juan de Socueva (Fernández-Pérez & Prieto 2023); Castro Urdiales (43.38278°N, 3.22056°W), Cueva de Casa Nueva (Machado 1942); Guriezo (43.32833°, 3.29055°W), Cueva Llaguno (Fernández-Pérez et al. 2014); La Cueva de la Castañeda (43.31667°N, 3.90000°W) (Simon 1913, Fage 1931); Puente Viesgo (43.29805°N, 3.96805°W), Cueva del Castillo (Simon 1911, 1913, Fage 1931); Ramales de la Victoria (43.25722°N, 3.46528°W), Cueva de Cullalvera (Simon 1911, Fage 1931, Fernández-Pérez & Prieto 2023); Ramales de la Victoria, Cueva Baranda (Fernández-Pérez & Prieto 2023); San Roque de Riomiera (43.23472°N, 3.70167°W), Sima PO-153 (Růžička 2022, Fernández-Pérez & Prieto 2023); Ruesga, Torca El Porrón (Fernández-Pérez & Prieto 2023); Sámano (43.35778°N, 3.24083°W), Cueva de Sámano (Dresco 1957); Soba (43.20000°N, 3.58333°W), Cueva Becceral (Fernández-Pérez et al. 2014); Soba, Sima del Mortero (Dresco & Hubert 1971); Soba, Sima Calaca (Fernández-Pérez & Prieto 2023); Soba, Cueva Las Montosas (Fernández-Pérez & Prieto 2023). Vizcaya: Abanto-Zierbena (43.30822°N, 3.08764°W), Cueva Picón-2 (Fernández-Pérez & Prieto 2023); Barakaldo (43.29228°N, 2.98480°W), Cueva Peña Roche (Fernández-Pérez & Prieto 2023); Galdames (43.26861°N, 3.10639°W), Cueva de la Magdalena; type locality (Simon 1881, Fage 1931, Fernández-Pérez et al. 2014); Galdames, Sima Escachabel-2 (Fernández-Pérez et al. 2014, Růžička 2022, Fernández-Pérez & Prieto 2023); Galdames, Cueva Comandanta (Fernández-Pérez et al. 2014); Galdames, Solpado La Hiedra (Fernández-Pérez et al. 2014); Gallarta (43.31594°N, 3.07358°W), Cueva-sima La Barga (Fernández-Pérez & Prieto 2023); Güeñes (43.21250°N, 3.09500°W), Torca Avellano (Fernández-Pérez et al. 2014); Güeñes, Cueva Grazal (Fernández-Pérez & Prieto 2023); Sopuerta (43.26320°N, 3.17389°W), Cueva Santa Lucía (Fernández-Pérez & Prieto 2023); Trucíos (43.27480°N, 3.27876°W), Torca Peña Loredo (Fernández-Pérez & Prieto 2023); Valle de Carranza (43.16667°N, 3.33333°W), Sima de Mazo (Fernández-Perez et al. 2014).

Remarks. Fage (1931) calls it "une curieuse espèce", probably by its supposedly large distribution for a blind cave species. And he was right, because they appear to be two different species.

Distribution. *Iberina mazarredoi* is a troglobiont spider, endemic to caves in the Cantabria and Vizcaya provinces in the north-east of Spain (Fig. 5). It is currently known from published records from 30 caves, the examined material in the Ledoux collection (MNHN) enables two new caves to be added for this species.

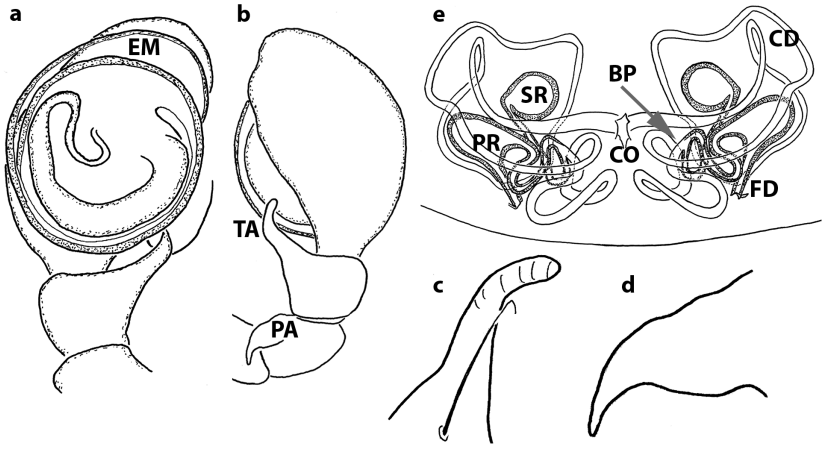

Fig. 4: *Iberina mazarredoi* Simon, 1881. **a.** male palp, ventral view; **b.** idem, retrolateral view; **c.** male tibial apophysis, retrolateral view; **d.** male patellar apophysis, retrolateral view; **e.** vulva, ventral view. BP: Bifurcation point of copulatory duct; CD: Copulatory duct; CO: Copulatory opening; EM: Embolus; FD: Fertilisation duct; PA: Patellar apophysis; PR: Primary receptaculum; SR: Secondary receptaculum; TA: Tibial apophysis

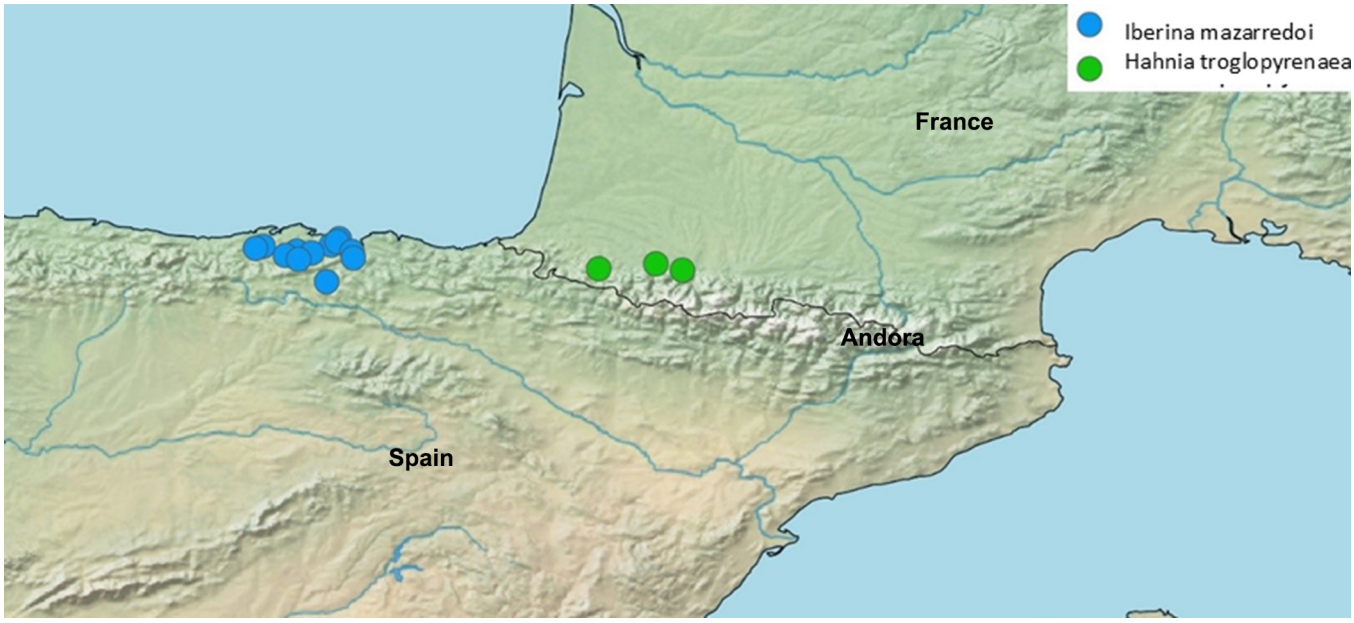

Fig. 5: Distribution map of *Hahnia troglopyrenaea* **sp. nov.** (green dots) and *Iberina mazarredoi* (blue dots) in Spain and France

Discussion

The sexual organs clearly place *H. troglopyrenaea* **sp. nov.** in the genus *Hahnia*: the ellipsoid shape of the bulbus, and the presence of a median apophysis. It should be noted that some morphological characters considered typical of *Iberina* by Růžička (2022) are also present in this new species: tibial apophysis not sickle shaped, but relatively short, and tip serrated on its outer margin, patellar apophysis not slender with hook-like tip, but stout and warty, with a bluntly pointed tip, legs: femora without dorsal spines and patellae and tibiae with dorsal spines, clypeus rounded and distinctly protruding. These criteria do not seem to be as genus-specific as the author thought.

Despite these species being close geographically, separated by only 150–200 km, and having been mistaken for over a century, *H. troglopyrenaea* **sp. nov.** and *I. mazarredoi* belong to two distinct genera. They have therefore been submitted to independent speciation events to become cave-dwelling eyeless and depigmented species. This is all the more astonishing given that few troglobiont Hahniidae are currently known. They are the only two troglobiont hahniid taxa currently known in Western Europe. However, Ledesma et al. (2019) reported a "*Hahnia* sp. nov." from the Mesovoid Shallow Substratum in the Sierra Guadarrama National Park (Spain); most likely another troglobiont species, according to the habitat it lives in.

The Hahniidae family is represented by a small number of species in France and in Europe. Only three cave-dwelling species were known from Europe, according to Mammola et al. (2018, supplementary material S1): *Iberina mazarredoi* Simon, 1881; *Hahnia molossidis* Brignoli, 1979 (from Greece), both troglobionts, and *Iberina microphthalma* (Snazell & Duffey, 1980) which is, by contrast, troglophile. Two taxa omitted by these authors must be added: *Iberina caeca* Georgescu & Sarbu, 1992 from Romania and *Iberina* (?) *ljovuschkini* Pichka, 1965 from the western Caucasus (Russia). These two cave-dwelling species are eyeless (Georgescu & Sarbu 1992, Weiss & Sarbu 1996, Pichka 1965), therefore clearly troglobionts. Růžička (2022) synonymised *I. caeca* (described from a cave near the Black See in Romania) with the troglophile and widespread *Iberina microphthalma*. As types of the former are lost, it would be wise to study topotypical material to confirm this synonymy. The male of *Iberina* (?) *ljovuschkini* remains unknown; Růžička (2022) considered the latter as a *species inquirenda* and *nomen dubium*. Again, here the study of topotypical material would be required to describe the male and clarify the taxonomic position of this undoubtably valid species. Finally, a further eyeless cave-dweller, *Hahnia anophthalma* Barrientos & Mederos, 2024 was recently described from a cave in the Middle Atlas (Morocco) and an undescribed species from Spain was reported by Ledesma et al. (2019). This recapitulation illustrates how rare troglobiont Hahniidae are among the Western Palaearctic spider fauna. It is also remarkable that with only one troglophile species, so many independent extreme events of speciation have occurred resulting in complete eye loss in geographically distant regions and different genera.

Acknowledgments

This study was made possible thanks to the contribution of the following colleagues: Christine Rollard & Elise-Anne Leguin enabled access and loan to the MNHN collections. Pierre Oger provided once again his photographs of great quality. Lynda Beladjal prepared the maps.

Conflicts of Interest. The authors have no conflicts of interest to declare that are relevant to the content of this article.

Use of AI-based technologies. No generative AI and AI-assisted technologies were used in the writing process.

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