

A little further from extinction risk: two new localities of *Turonychus fadriquei* Derkarabetian, Prieto & Giribet, 2021 (Opiliones: Laniatores: Buemarinoidae)

Carlos E. Prieto¹, Jesús Almela² & Hèctor Cardona³

¹ Departamento de Zoología, Universidad del País Vasco (EHU), Apdo.644, 48080 Bilbao / C/ Astarloa 5,5ºA 48001 Bilbao / carlos.prieto@ehu.eus

² Espeleo Club Castelló, Apdo.164, 12080 Castellón / masdexiva@hotmail.com

³ Espeleo Club La Vall d'Uixó, Castellón / idelalar@hotmail.com

Abstract. The family Buemarinoidae is a relictual family of Opiliones housing three epigeal genera from North America, Madagascar and Australia, and three troglobiont monotypic European taxa: *Buemarinoa patrizii* from Sardinia (Italy), *Arbasus caecus* from the French Pyrenees and *Turonychus fadriquei* from Teruel (Spain). These three are highly troglomorphic harvestmen: depigmented, with very long legs and lacking eyes. While *B. patrizii* and *A. caecus* are known from several cavities, including extensive karst systems stretching tens of km, and can therefore be considered relatively safe from extinction, *T. fadriquei* was known from a single isolated cave, Sima La Cija (Fortanete). The two new localities added, Cova Comelles (Puertomingalvo) and Cueva del Saúco (Mosqueruela), are located also in Teruel, on the eastern foothills of the Sierra de Gúdar. Although these are small cavities with small populations, the possibility of its occurrence in other intermediate cavities makes less probable its extinction.

Key words: New records, caves, Teruel, extinction risk

Un poco más lejos del riesgo de extinción: dos nuevas localidades de *Turonychus fadriquei* Derkarabetian, Prieto & Giribet, 2021 (Opiliones: Laniatores: Buemarinoidae).

Resumen. La familia Buemarinoidae es una familia relictual que alberga tres géneros epígeos de Norteamérica, Madagascar y Australia, y tres taxones europeos monotípicos troglobiontes: *Buemarinoa patrizii* de Cerdeña (Italia), *Arbasus caecus* de los Pirineos franceses y *Turonychus fadriquei* de Teruel (España). Los tres son opiliones altamente troglomórficos: despigmentados, con patas muy largas y sin ojos. Mientras que *B. patrizii* y *A. caecus* se conocen de varias cavidades, incluyendo grandes sistemas kársticos que se extienden decenas de kilómetros, y por lo tanto pueden considerarse relativamente a salvo de la extinción, *T. fadriquei* se conocía de una única cavidad aislada, Sima La Cija (Fortanete). Las dos nuevas localidades aportadas, Cova Comelles (Puertomingalvo) y Cueva del Saúco (Mosqueruela), se encuentran también en Teruel, en las estribaciones orientales de la Sierra de Gúdar. Aunque se trata de cavidades pequeñas con poblaciones reducidas, la posibilidad de su presencia en otras cavidades intermedias aleja la posibilidad de su extinción.

Palabras clave: Nuevos datos, cavidades, Teruel, riesgo de extinción

Troglobitic harvestmen constitute a highly significant element of subterranean biocenoses, given their position at the top of the trophic web. About 20 Iberian species belonging to nine genera of the suborders Laniatores and Dyspnoi, plus another ten species awaiting description, are troglobitic, representing more than 20% of the Iberian opilionid fauna. The most notable elements are those that have acquired a high degree of troglomorphy, primarily depigmentation and anophthalmy, and that lack close relatives in the epigeal world, qualifying them as relicts.

The family Buemarinoidae (Triaenonychoidea) (Figure 1) was erected by Karaman (2019), as the tribe Buemarinoini of the subfamily Triaenonychinae, for *Buemarinoa patrizii* Roewer, 1956 (Grotta del Bue Marino, Sardinia), *Fumontana deprehendor* Shear, 1977 (Appalachians, USA) and *Flavonuncia pupilla* Lawrence, 1959 (Madagascar). The tribe was characterized (Karaman 2019) by the male genital morphology, having a glans clearly separated from the stout truncus, elongated and terminally expanded by two lateral lobes which contains a pair of glans glands, a bifurcated sperm duct and a single distally oriented terminal projection, with an articulate ventral plate deeply divided into two flanking setiferous arms. The tarsal claws of legs III and IV also showed a peculiar morphology: a robust, bent claw with a pair of thinner but equal-length lateral branches to the central prong. But before that, Prieto (2015) already advanced in the "III Iberian Meeting of Subterranean Biology" the taxonomic novelty of a Teruel cave harvestman and its relationship with *Buemarinoa* and *Fumontana* in a group of its own within the Triaenonychidae family.

The geographic distribution of Buemarinoini was also rather peculiar, incorporating both Laurasian and Gondwanan elements, unlike the other subfamilies and tribes of Triaenonychidae, which are restricted to Gondwanan fragments (South America, South Africa, Madagascar, Australia, and New Zealand). The isolated systematic position was confirmed in a phylogenetic analysis by

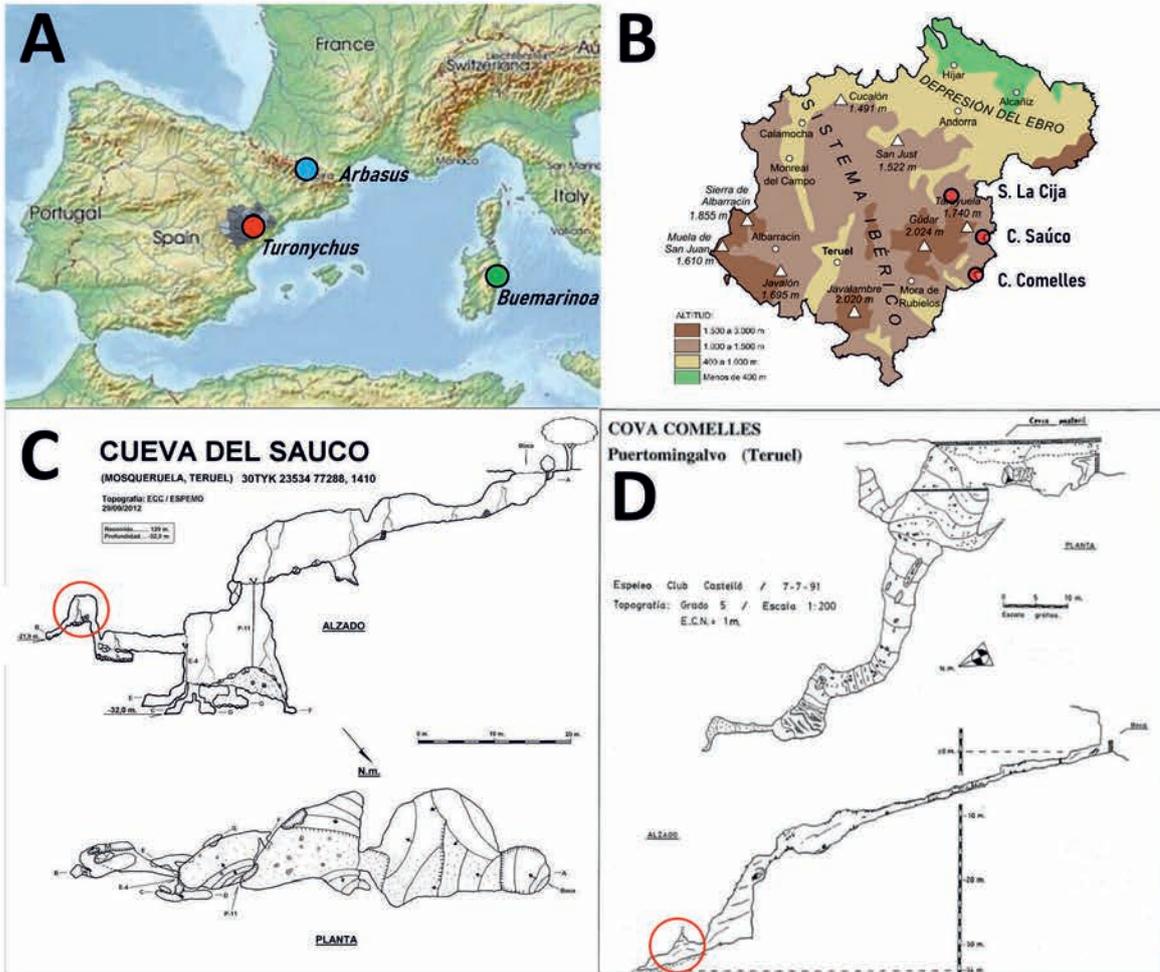
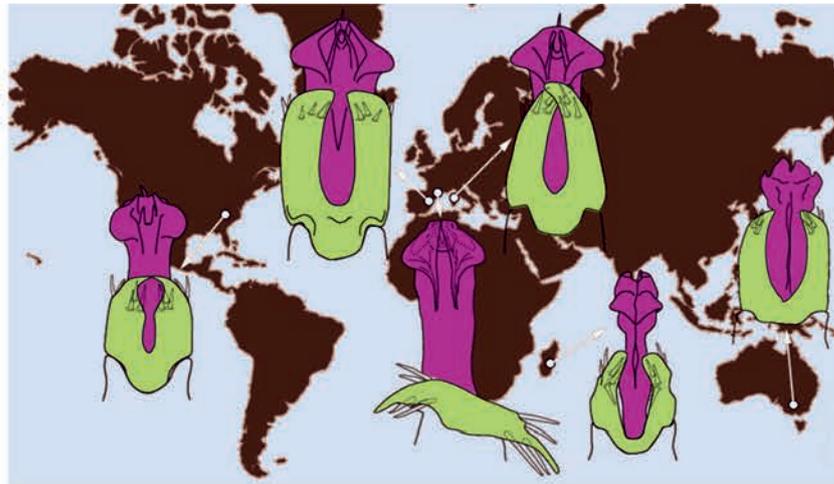
Derkarabetian *et al.* (2021), where Buemarinoini was elevated to family and Triaenonychidae to superfamily, which would also include the families Synthetonychiidae (New Zealand) and Lomanellidae (South Australia).

Subsequently, additional taxa were progressively included (Fig. 1): *Turonychus fadriquei* Derkarabetian, Prieto & Giribet, 2021 (Sima de La Cija, Teruel); *Arbasus caecus* (Simon, 1911) (Grotte de Peneblanque, French Pyrenees); *Phocyx australis* Porto, Monod & Pérez-González, 2024 (SE Australia); and very recently four new Malagasy species of the genus *Flavonuncia* (Derkarabetian *et al.* 2021; Karaman 2023; Porto *et al.* 2025; Porto & Pérez-González 2025). While non-European species are edaphic, inhabiting forested environments, the European ones are troglobites. While both, *B. patrizii* and *A. caecus* have narrow geographic distributions, they inhabit extensive karst systems and are known from multiple smaller cavities (Faille & Deharveng 2021, Karaman 2023, Prieto & Fadrique 2024). This is not the case for *T. fadriquei*.

Turonychus fadriquei was described from Sima La Cija (Fortanete, Teruel), a shaft located in the Sierra de Gúdar at 1575 m above sea level and reaching 113 m in depth, and it has been known only from this locality so far. In seven biological trips, 15 specimens were collected, 13 females and only one male. Being a tectonically originated cavity in a bedding plane of an anticline (Porcel & Gordillo, 1997) and very isolated, it was thought that the distribution of *T. fadriquei* might be restricted to that single cavity. Fortunately, this is not the case, as additional surveys carried out by the Iberian System Biospeleology Group have yielded two new localities (Figure 2):

Cova Comelles, Puertomingalvo, Teruel, Spain; 40.26019 -0.39775, 1447m; 30.xii.2024, Jesús Almela leg.: 1F (1.42mm). The only individual collected was found on a small gallery 13 m long, slightly inclined and with a clay-covered floor, located to the north of the room which is accessed after descending a 10 m shaft.

1



2



3



4



◀ **Fig. 1.** Geographic distribution of the family Buemarinoidea and morphology of the distal part of the penis (From Porto & Pérez-González 2025). Note that the ventral plate (in green, glans in fuchsia) of the penis of *Arbasus* (positioned on Africa) is distorted. **Fig. 2.** A, Distribution of the family Buemarinoidea in southwestern Europe. B, Type locality and new localities of *Turonychus fadriquei* in the province of Teruel. C, Topography of Cueva del Saúco (Espeleo Club Castelló 2013). D, Topography of Cova Comelles (Arenós 1993). Circle: collection site. **Fig. 3.** Female of *Turonychus fadriquei*. Cueva del Saúco, observed on 6 July 2025. Photo: Ricardo Giménez Mezquita. **Fig. 4.** Female specimen from Cova Comelles. A, body (dorsal view). B, open opisthosoma (ventral view) with 15 ovules at different stages of maturation// *Fig. 1. Distribución geográfica de la familia Buemarinoidea y morfología de la parte distal del pene (de Porto y Pérez-González, 2025). Obsérvese que la placa ventral (en verde, el glande en fucsia) del pene de Arbasus (posicionado en África) está deformada. Fig.2. A. Distribución de la familia Buemarinoidea en el suroeste de Europa. B. Localidad tipo y nuevas localidades de Turonychus fadriquei en la provincia de Teruel. C. Topografía de la Cueva del Saúco (Espeleo Club Castelló, 2013). D. Topografía de la Cova Comelles (Arenós, 1993). Círculo: lugar de recolección. Fig. 3. Hembra de Turonychus fadriquei. Cueva del Saúco, observada el 6 de julio de 2025. Foto: Ricardo Giménez Mezquita. Fig. 4. Ejemplar hembra de la Cova Comelles. A. Cuerpo (vista dorsal). B. opistosoma abierto (vista ventral) con 15 óvulos en diferentes etapas de maduración.*

Cueva del Saúco, Mosqueruela, Teruel, Spain; 40.41421 -0.36698, 1420m; 16.ii.2025, Hèctor Cardona leg.: 1 F (1.25mm). The only individual collected was found in the small terminal room accessed by a chimney from an underlying room reached after overcoming a 4 m overhang on the western side of the lower room of the cavity, reached after descending a 11 m shaft. Another female specimen (Fig. 3) was observed on a later visit to the same point in the cave.

The new specimens show different tarsal formulas (Comelles 5/4:15:4:5; Saúco 4:13:4:5), which are themselves different from those recorded in the type locality (4-5:13-14:4:4). The female from Cova Comelles (Figure 4) shows the opisthosoma somewhat dilated due to the presence of at least 15 oocytes at different stages of maturation, the smallest 0.05 mm and the largest reaching 0.2 mm in diameter, which could be mature due its different coloration.

The presence of *T. fadriquei* in two additional cavities, located 24 and 38 km to the south, has important implications for its conservation. It makes plausible its presence in other cavities within the geographic range, and since new cavities are not particularly deep (Saúco: 129 m length / 32 m deep; Comelles: 70 m length / 34 m deep), it is feasible that other shallow-developing cavities could harbour this species as long as troglobitic species are present. Moreover, the new localities and the expectation of additional ones move this emblematic species away from extinction risk. Notably, there is only one male among the 16 adults collected across the three cavities. Nothing is known about the reproductive biology of *Turonychus*, nor of the other genera in Buemarinoidea. The presence of oocytes at different stages of maturation could suggest that it does not lay a single mass but deposits eggs sequentially.

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