

A new site for *Vertigo angustior* Jeffreys, 1830 in Spain, the first record in Andalucía and the most southerly in Europe, and notes on the status of *Euconulus alderi* (Gray, 1840) in the Iberian Peninsula

PETER TATTERSFIELD¹, JUAN SEBASTIÁN TORRES ALBA² & MICHAL HORSÁK³

¹ Honorary Research Fellow, Department of Natural Sciences, Amgueddfa Cymru–National Museum Wales, Cardiff, CF10 3NP, UK

² C/ Doctor Gálvez Moll, 32. 29011 Málaga, España

³ Department of Botany and Zoology, Masaryk University, Kotlářská 2, Brno, CZ-61137, Czech Republic

Corresponding author: P. Tattersfield (peter@tattersfield.uk)

Abstract. New records for *Vertigo angustior* and four additional species are reported from a site at Sierras de Cazorla, Segura y las Villas in Jaén, Andalucía, Spain. This is the most southerly record for *V. angustior* in Spain and probably Europe. The wider distribution and habitat associations of *V. angustior* in Spain and elsewhere in Europe is discussed. The presence of *Euconulus alderi* in the Iberian Peninsula is confirmed, with records in León, Asturias, and Andalucía; its identification, status and distribution are discussed.

Se dan a conocer nuevos registros de *Vertigo angustior*, junto con otras cuatro especies de una localidad en las Sierras de Cazorla, Segura y Las Villas en Jaén, Andalucía, España. Siendo éste el registro más meridional de *V. angustior* para España y probablemente para Europa. Se discute la amplitud de su distribución así como las asociaciones de hábitat de *V. angustior* en España y otras partes de Europa. Se confirma la presencia de *Euconulus alderi* en la Península Ibérica, con registros en León, Asturias y Andalucía; se discute su identificación, estatus y distribución.

Key words. Jaén; Vertiginidae; Euconulidae; Parque Natural; Annex II; Sierras de Cazorla, Segura y las Villas

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INTRODUCTION

This note reports on a new site for *Vertigo angustior* Jeffreys, 1830 at Sierras de Cazorla, Segura and las Villas in Jaén, Andalucía, Spain. It is the first record in the region of Andalucía and is about 230 km to the south-west of the closest previously known locality. As well as being the most southerly (and westerly) record to date in Spain, it is also probably the most southerly in Europe as a whole. We also report new records, from the same site, for three additional species for the province of Jaén, Andalucía, including *Euconulus alderi* (Gray, 1840).

Vertigo angustior is the fourth *Vertigo* species to be recorded in Andalucía. The others are *V. pygmaea* (Draparnaud, 1801), which is apparently widespread in Andalucía having been reported from the provinces of Málaga, Granada, Jaén, and Cádiz, and *V. substriata* (Jeffreys, 1833) and *V. antivertigo*

(Draparnaud, 1801), which have previously only been reported from Granada.

LOCATION AND HABITAT DETAILS

Eighteen shells of *Vertigo angustior* (Fig. 1A), including living specimens and four juveniles, were found by sieving about 2 L of leaf litter taken from the floor of riparian woodland on the right bank of the rio Aguamula, Parque Natural de las Sierras de Cazorla, Segura y las Villas, Santiago-Pontones, Jaén, Andalucía, Spain (38.0531°N 002.8192°W, 9.v.2022.I. P. & C. Tattersfield leg.

The following species were also present in the same litter sample: *Acanthinula aculeata* (O.F. Müller, 1774) (Fig. 1E), *Vertigo antivertigo* (Draparnaud, 1801) (Fig. 1C), *Carychium minimum* O.F. Müller, 1774 (Fig. 1B), *Euconulus alderi* (Gray, 1840) (Fig. 1D), and *Punctum pygmaeum* (Drapar-

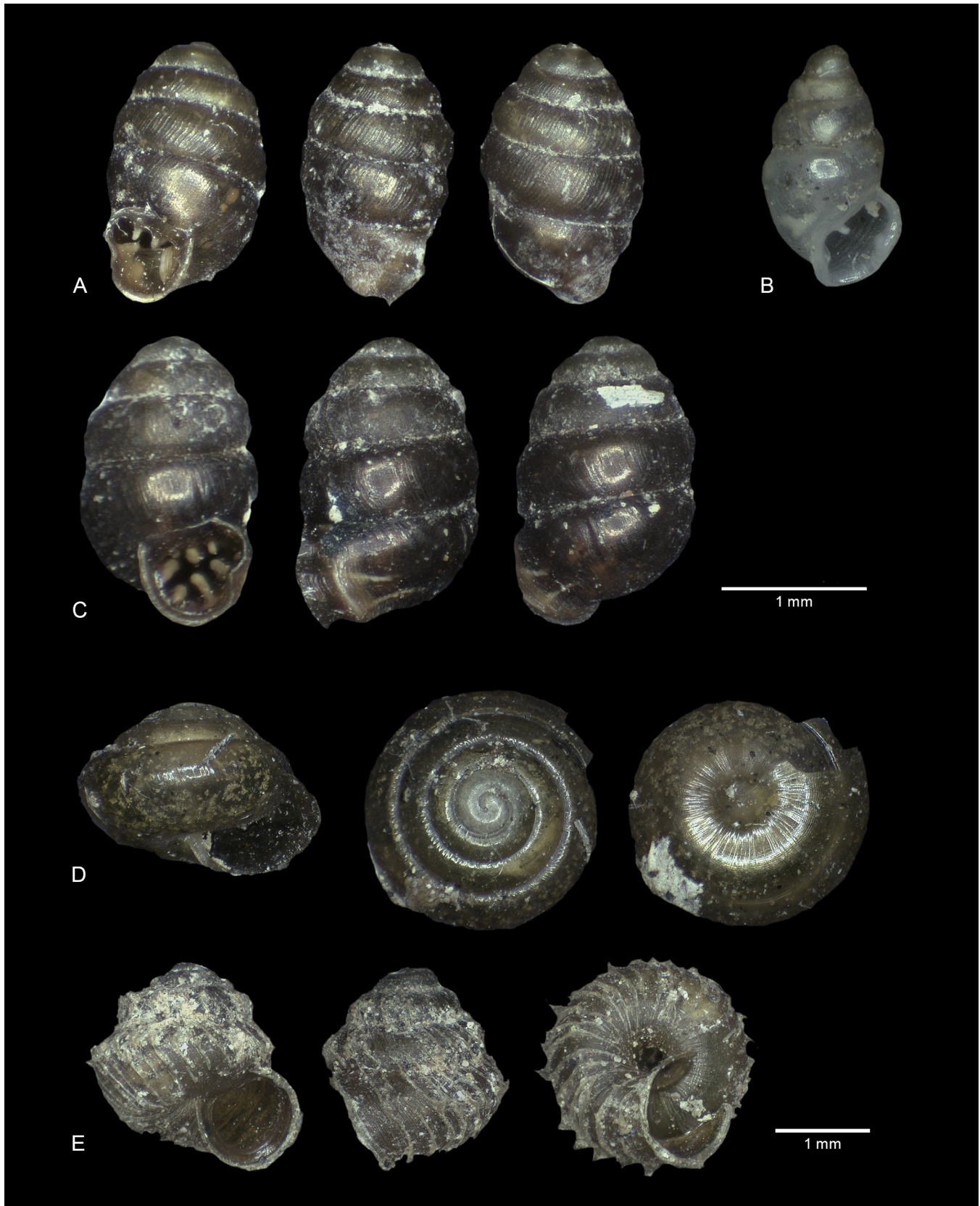


Figure 1. Specimens from the site at Rio Aguamula, Parque Natural de las Sierras de Cazorla, Segura y las Villas, Jaen, Andalucía. **A,** *Vertigo angustior*. **B,** *Carychium minimum*. **C,** *Vertigo antivertigo*. **D,** *Euconulus alderi*. **E,** *Acanthinula aculeata*.

naud, 1801). The first three of these are new records for the province of Jaén. *Euconulus alderi* is discussed further below.

DISCUSSION

Vertigo angustior

The new record is noteworthy because *V. angustior* is a rare, declining, and protected species across Europe (Welter-Schultes 2012), and there have been few recently confirmed records in Spain. Its southerly location and the population's association with riparian woodland habitat are also of interest.

Vertigo angustior is listed in the IUCN Red List as Near Threatened at the global level (IUCN 2024; Moorkens *et al.* 2012), and as Vulnerable in Europe (Cuttlelod *et al.* 2011); it is included in Annex II of the EU Habitats and Species Directive. Nine Special Areas of Conservation (known as zonas especiales de conservación (ZEC) in Spain), all in Cataluña or Valencia, have been selected in Spain for its protection (EUNIS 2024). *Vertigo angustior* is listed as Critically Endangered in the Red Book of Invertebrates of Spain (Gómez-Moliner *et al.* 2009) and is included in the country's List of Wild Species under Special Protection Regime.

The species' range extends throughout northern (Proschwitz 2003) and western Europe and the Mediterranean (Greece, Italy, Spain) to northern Iran (Caspian Sea), and further east to south-central Siberia to the east of Novosibirsk (Speight *et al.* 2003; Nekola *et al.* 2018). According to Gómez-Moliner *et al.* (2009), in the Iberian Peninsula, *V. angustior* has been found at a dozen localities in the regions of Cataluña and Valencia during the last 120 years, and it has also been reported living near Cuenca in the autonomous community of Castilla-La Mancha (Martínez-Ortí *et al.* 2010) (Fig. 2). However, surveys carried out in Cataluña during the 1990s only re-found the species at one site (Gómez-Moliner *et al.* 2001). A few populations are known in the Valencia region, although one of them has recently been lost, and the other is in clear decline (Robles 1991; Martínez-Ortí 1999; Martínez-Ortí and Robles 2003; Martínez-Ortí *et al.* 2010). However, a new site has recently been reported in the Valencia region (Prades *et al.* 2015).

Vertigo angustior is primarily found in wetland habitats, but it can also live in sand dunes, on limestone pavement, in various types of grasslands, and less frequently in forest habitats (Speight *et al.* 2003). The wooded and shaded character of the locality reported here is therefore somewhat unusual, although the species has been reported in *Alnus* swamp forests in central Europe and in mixed deciduous forests in

Scandinavia (Proschwitz 2003). Pokryszko (2003) pointed out that the species' habitat occupancy is subject to much regional variation.

At the microhabitat level, *V. angustior* is usually found among decaying vegetation, in the leaf-litter and moss layer in unshaded areas where the soil is permanently moist (Cameron *et al.* 2003). Martínez-Ortí and Robles (2003) commented that in Spain, the species lives in hygrophilous environments on the edge of permanent springs and lakes, where they occur under stones and wet wood, and in bryophytes, as well as climbing through spring and riverside vegetation.

Vertigo angustior appears to have had a wider geographical range during the Holocene because fossil records have been reported from the central Spanish mainland (Preece 1991), as well as from central Morocco (Limondin-Lozouet *et al.* 2013; Wackenheim *et al.* 2020; Segauoi *et al.* 2023) (Fig. 2).

This record resulted from an incidental survey. It would be helpful to obtain more detailed information on vegetation, soils, and other environmental features at the current site to enable the habitat of *V. angustior* in the area to be defined more precisely. It seems likely that additional, more focussed surveys concentrating on other riparian woodlands and wetland habitats in Las Sierras de Cazorla, Segura y las Villas, would likely identify additional localities for *V. angustior*.

Euconulus alderi

The determination of the single *Euconulus* specimen collected in this study as *E. alderi* is based on the characters identified by Horsáková *et al.* (2020), with these being:

- the relatively strong and widely spaced sillons on the base of the shell (finer and denser sillons are characteristic of *E. fulvus*),
- a brownish-red shell (*E. fulvus* is typically yellowish),
- the rapidly expanding whorls (for shells with the same number of whorls, *E. alderi* is wider than *E. fulvus*),
- the typically glossy surface of the shell (*E. fulvus* has a dull lustre), and,
- the near absence of microsculpture on the upper surface of the teleoconch (fine radial microsculpture is characteristic of *E. fulvus*).

In live individuals or shells with dry tissue, a uniformly dark mantle is distinctive for *E. alderi* (it is pale in *E. fulvus*), with some high-elevation populations having dark spots on the mantle (see images of all described characters in Horsáková *et al.* 2020). The riparian habitat is also consistent with the known ecological associations of *E. alderi*. This species is strictly limited to alkaline wetlands, mostly open, where it can co-occur with *E. fulvus*. Contrary to the latter,

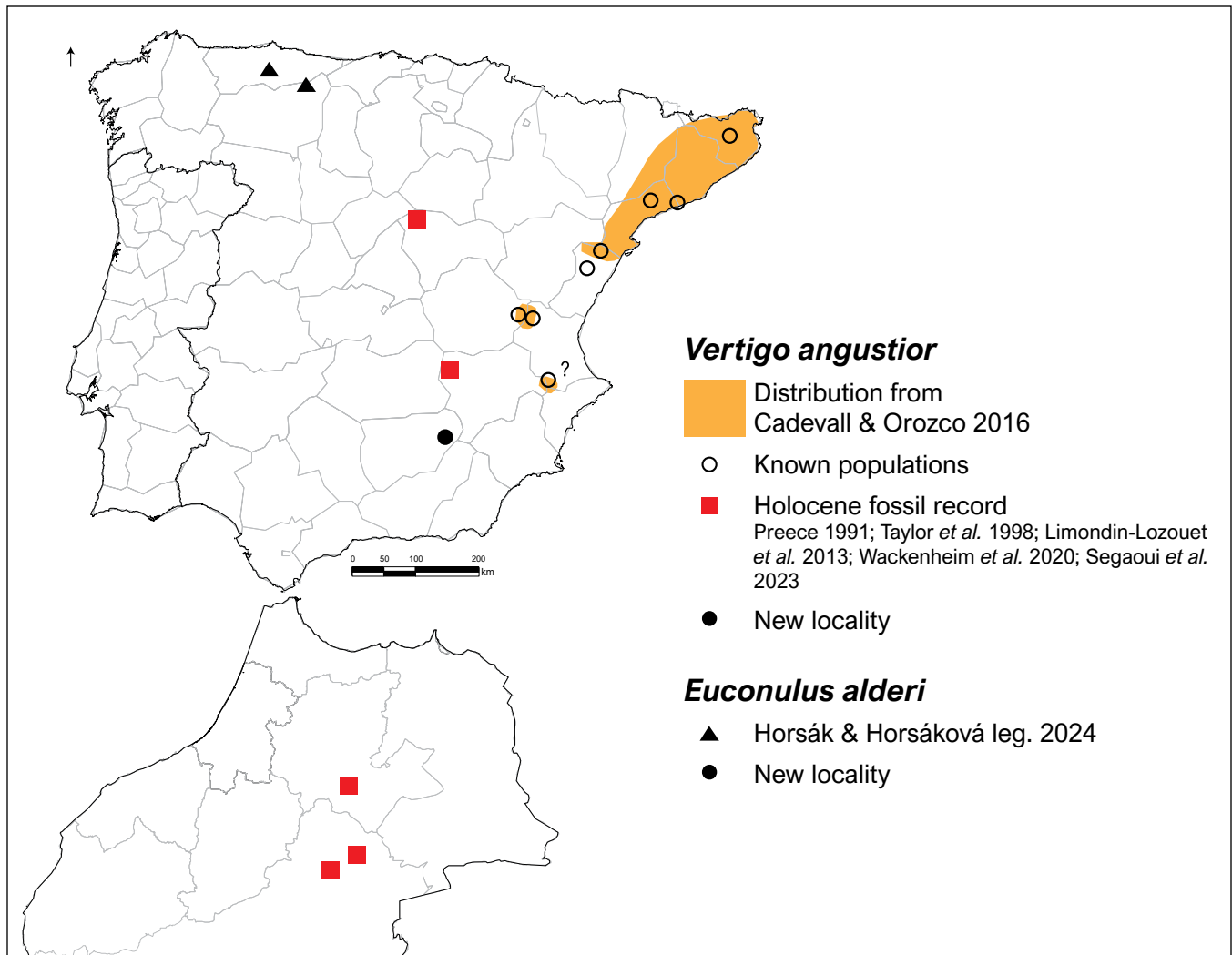


Figure 2. Distribution of *Vertigo angustior* in mainland Spain and Morocco, extant populations and Holocene fossils (modified from Wackenheim 2023), and confirmed records of *Euconulus alderi*.

E. alderi avoids dry to mesic habitats, acidic wetlands, and high-mountain elevations.

Euconulus alderi does not appear to have been reported from Andalucía before, and its occurrence and distribution in the Iberian Peninsula appears to be somewhat confused at present. Cadevall & Orozco (2016) considered *E. alderi* to be a junior synonym of *E. trochiformis* (Montagu, 1803) and reported records in the Iberian Peninsula from Andorra, several Cataluñan provinces and Navarra in Spain, and the Atlantic coast of Portugal (Beira Litoral). However, they also commented that the species' distribution is not well known due to confusion with *E. fulvus*. Cadevall & Orozco (2016) included another taxon, *E. praticola* (Reinhardt, 1883), which has previously been reported from north-western Spain and Andorra (Falkner *et al.* 2002), to be a species whose presence in the Iberian Peninsula still

requires confirmation.

However, Horsáková *et al.* (2020) have recently published a revision of Holarctic *Euconulus* taxa using molecular, morphometric and other qualitative traits, and have shown that *E. alderi* is a well-supported species, but that *E. trochiformis* and *E. praticola* are not and represent junior synonyms. The record reported here may thus be the first published verified record of *E. alderi* in Spain, although it is very likely that at least some of the Iberian material previously referred to *E. trochiformis* and/or *E. praticola* by other authors should correctly be assigned to *E. alderi*. This is further confirmed by new records of *E. alderi* in four alkaline spring fens in two provinces, Asturias and León (Table 1, Fig. 2). Additional survey and critical examination of existing material will be needed to gain an understanding of the distribution of *E. alderi* in the Iberian Peninsula.

Table 1. Location details to four new sites of *Euconulus alderi*, for the first time reported from León and Asturias provinces. Collectors: M. Horsák and V. Horsáková. Numbers of recorded live individuals and empty shells extracted from 12 L samples of upper soil vegetation processed by wet sieving (Horsák 2003).

Province	Lat. (°N)	Long. (°W)	Habitat	Elev. (m)	Date	No. of live/shell
León	43.0803	005.1561	Calcareous spring fen	1259	03.viii.2024	7/7
León	43.0864	005.1645	Calcareous spring fen	1278	03.viii.2024	12/1
León	43.0874	005.1664	Calcareous spring fen	1278	03.viii.2024	10/3
Asturias	43.0668	005.9664	Alkaline spring fen	1376	02.viii.2024	12/0

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