OESTOPHORA PRIETOI N. SP., *O. MARIAE* N. SP. AND *O. EBRIA* (CORBELLA, 2004), THREE *OESTOPHORA* HESSE SPECIES (STYLOMMATOPHORA, TRISSEXODONTIDAE) FROM THE IBERIAN PENINSULA

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Abstract Oestophora prietoi *n. sp. and* O. mariae *n. sp. are described from Andalusia in southern Iberia, and* Suboestophora ebria *Corbella, 2004 is assigned to the genus* Oestophora *Hesse. These three species are compared with all known* Oestophora *species from the Iberian Peninsula, along with other related species from north Africa that are cited in the older literature. Future anatomical (north African species), molecular (in general) and biogeographical studies are required to improve the knowledge about the phylogeny of this and other related genera.*

Key words *Taxonomy, new species, Andalusia,* Oestophora, prietoi, mariae, ebria.

INTRODUCTION

The genus *Oestophora* was erected by Hesse in 1907 but the heterogenous group of species included were later separated into three subgenera (*Oestophora* s. str., *Suboestophora* & *Gasullia*) by Ortiz de Zarate & Ortiz de Zarate (1961). These subgenera were given generic status by Prieto (1986). Puente (1994, 1996), Arrébola (1995, 1998) and Arrébola *et al*. (2006), have recently dealt with these and other important aspects of the history and systematic of *Oestophora* and related genera. In particular, Arrébola *et al*. (2006) gave a revised diagnosis of *Oestophora* that is adopted here (see below).

The genus *Oestophora* is distributed across North Africa, in the Iberian Peninsula and the Azores but the species are, in general, poorly defined. In the Iberian Peninsula the following species are present: *O. barbula* (Rossmässler 1838) (also known from the Azores), *O. lusitanica* (Pfeiffer 1841), *O. calpeana* (Morelet 1854), *O. tarnieri* (Morelet 1854), *O. dorotheae* Hesse 1930, *O. silvae* Ortiz de Zárate 1962, *O. ortizi* De Winter & Ripken 1991 and *O. granesae* Arrébola 1998. Some of these are also present in North Africa. The validity of *O. barbella* (Servain, 1880) has been questioned by several authors (Hesse, 1918; Ortiz de Zárate, 1962; Puente, 1994) and is now included in the synonymy of *O. barbula.*

The older literature on North Africa includes a number of nominal taxa whose status has never been fully resolved. *Helix pechaudi* Bourguignat in Ancey 1882, was assigned to *Oestophora* by Ortiz de Zárate & Ortiz de Zárate (1961). *Helix tlemcenensis* Bourguignat 1868, was included in the synonymy of *H. pechaudi* by Richardson (1980). Ortiz de Zárate & Ortiz de Zárate (1961) also noted that *H. marocana* Morelet, 1876 should be placed in *Oestophora*, citing the description of the genitalia by Schubert (1892). In 1996, Puente showed that *H. huloti* Pallary 1913 belonged to *Caracollina (Paroestophora)* Nordsieck 1993, contradicting Ortiz de Zárate & Ortiz de Zárate (1961) who placed it in *Oestophora*. Other species from North Africa that must be considered here are *H. gougeti* Terver 1839 (non *gougeti* Pfeiffer = *asturica* Pfeiffer), *H. (Gonostoma) columnae* Kobelt 1889 and *O. wenzi* Pfeffer 1929.

The "Terrestrial Snails Conservation and Sustainable Exploitation Programme" has been on going in Andalusia (southern Spain) since 1998. The objective was to complete the study carried out by Arrébola (1995) in Andalusia, as well as those previously made by Ortiz de Zárate & Ortiz de Zárate (1961), Gasull (1985), Alonso (1975), Muñoz (1992) and Puente (1994) in parts of the region. In this article two new species of the genus are described from southern Iberia: *O. prietoi* and *O. mariae*. Additionally, the erroneous assignment of *ebria* to the genus *Suboestophora* by Corbella (2004) is corrected by placing it in *Oestophora*.

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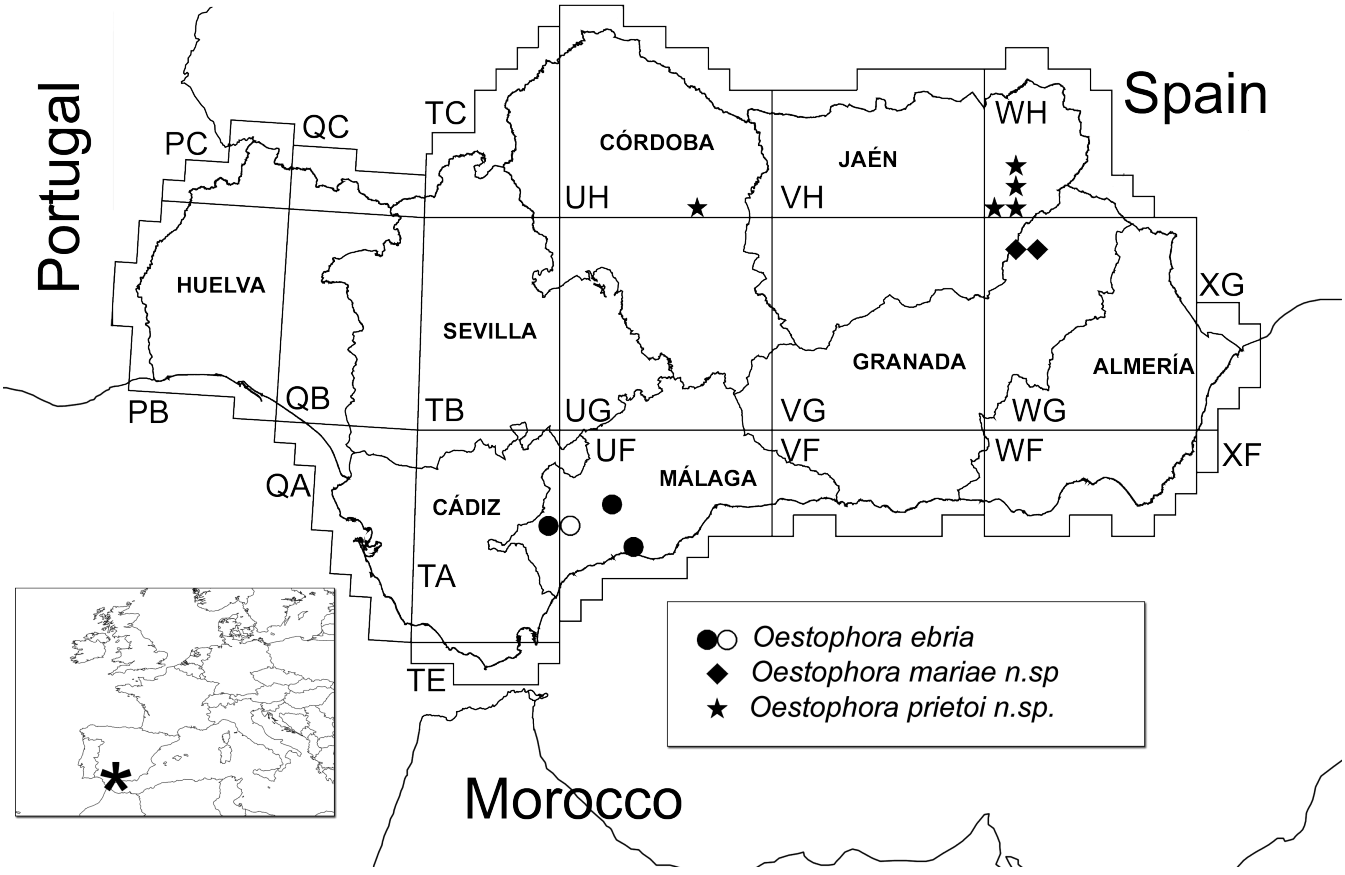

Map 1 Distribution of *Oestophora prietoi* n. sp., *Oestophora mariae* n. sp. and *Oestophora ebria* (Corbella 2004) on the map of Andalusia (southernmost part of the Iberian Peninsula) (open symbols: localities cited in literature, solid symbols: new localities).

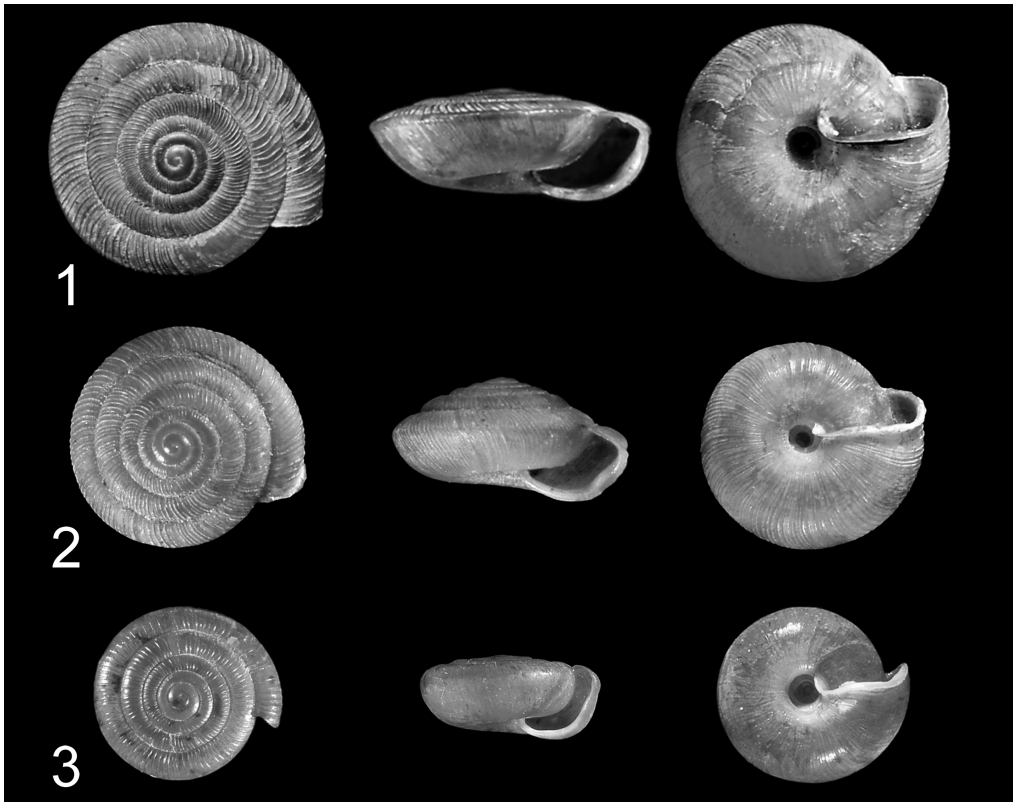

Figure 1 Shells: different views of a) *Oestophora prietoi* n. sp. b) *Oestophora mariae* n. sp. c) *Oestophora ebria* (Corbella 2004).

MATERIAL AND METHODS

The specimens for this paper came from six survey campaigns that were undertaken in the five provinces of Andalusia: Almería, Málaga, Granada, Córdoba and Jaén (Map 1). Environmental information was gathered during these surveys and the classification of habitats and climatic zones were based on those given in Consejería de Medio Ambiente (1999) (see Table I).

Following Outeiro (1998), several soil samples (0.5 x 0.5 x 0.1 m) were collected and sieved in the laboratory. Living specimens were drowned in tap-water and then preserved in 70% ethanol. Animals were dissected and studied using an optical stereomicroscope (Leica MZ6), and drawings of genital systems and other structures made using a camera lucida (Wild TYP 308700).

In the anatomical descriptions of the genitalia the gonad is considered proximal and the genital atrium distal following Gomez, 2001. The classification of Gastropoda by Bouchet & Rocroi (2005) is followed.

Holotypes are deposited in the Natural Sciences Museum of Madrid (MNCN) and two paratypes each in the Natural History Museum of Valencia (MVNH). The remainder of the specimens are lodged in the collections of Physiology and Zoology Department of Seville University (Seville) (DFZ-US) and the Zoology Laboratory of the Vasc Country University (Bilbao) (LZB-MOL).

"NP" is used as abbreviation of Natural Park, "sh" means shells and "sp" means specimens.

SYSTEMATICS

Superfamily HELICOIDEA Rafinesque 1815
Family TRISSEXODONTIDAE H. Nordsieck 1987
Genus *Oestophora* Hesse, 1907

Diagnosis: shell with rounded, angular or keeled whorls, reflected and thickened peristome and ribbed teleoconch. No flagellum nor penial papilla (Arrebola, 1998 erroneously indicated a papilla in *O. granesae*). Stimulatory apparatus composed of one small dart sac that is barely visible externally, one elongated accessory sac that is totally separated from the vaginal walls, and three long, simple mucous glands connected to the vagina.

Oestophora prietoi n. sp.
(Figs 1.1, 2)

Holotype (Fig. 2 a-c) Coto Ríos (NP Cazorla, Jaén), 30SWH11, 500 m, (1 sh) Prieto leg., 27.10.1982, MNCN 15.05/46749.

Paratypes (66sp and 26sh) Coto Ríos (NP Cazorla, Jaén), 30SWH11, 500 m, (50sp, 6sh), 27.10.1982, LZB-MOL and 1 sh in MVNH 1371. Fuente de la Gloria (NP Cazorla, Santiago de la Espada), 30SWH1916, 645 m, (2sh), 26.10.2002, A. Ruiz leg., DFZ-US. El Hoyazo, Km 26,5 El Tranco road (NP Cazorla, Santiago de la Espada), 30SWH1614, 645 m, (1sh), 26.10.2002, A. Ruiz leg., DFZ-US. El Tranco reservoir (1 km from El Tranco, direction to Cañada Morales), 30SWH1824, 663-685 m, (8sh), 11.11.2002, A. Ruiz leg., DFZ-US. Road CO 412 (Pedro Abad-Adamuz), 1,5 km W of Salto reservoir, 30SUH6804, 149-185 m, (7sp, 6sh), 19.03.2003, A. Ruiz leg., DFZ-US. Bridge over Borosa river, road from Torre del Vinagre to fish farm (NP Cazorla, Jaén), 30SWH1107, 702 m, (1sh), 26.10.2002, A. Ruiz leg., DFZ-US. Noguera de la Sierpe Hotel, El Tranco road (NP Cazorla, Santo Tomé), 30SWH0905, 715 m, (9sp, 2sh), 27.10.2002, A. Ruiz leg., DFZ-US.

Type locality Coto Ríos (NP Cazorla, Jaén)

Diagnosis Shell 9.5 to 13 mm in diameter; of 5½-6¼ convex whorls lenticular, keel blunt, no reflection or internal sinus. Upper part depressed and much less convex than the lower part. Aperture slightly wider than tall. Reproductive system with penial protuberances, sometimes externally visible, enclosing three internal penial cavities. Epiphallus thin, quite short, barely discernible from the vas deferens.

Shell (Fig. 1.1) moderately solid, lenticular, with a clear peripheral blunt keel separating a depressed upper part that is much less convex than the lower part. Colouration uniform pale brown, slightly translucent. Spire very low conical. Protoconch of approximately 1-1¼ whorls, surface smooth and not always clearly discernible from the teleoconch. Perisotracal surface of teleoconch sculptured by radial, regular and strong ribs, much weaker below. Whorls 5½-6¼ in number, convex with slow growth and somewhat deep sutures. Umbilicus

Bioclimatic Belts	**"Land Uses and Natural Vegetation"** (Synthesis)
	Anthropic
crio-Mediterranean	agricultural homogenous areas
oro-Mediterranean	agricultural heterogeneous areas
supra-Mediterranean	humid zones and water surfaces
meso-Mediterranean	woodland-forestry zones
thermo-Mediterranean	pastures
water-surfaces	scrubs
	open spaces with little or no vegetation

Table 1 "Bioclimatic belts" and "land uses and natural vegetation" existing in Andalusia (southern Spain).

deep, about 1/5-1/6 of the maximum width of the shell. Last whorl keeled, not descending at the end. Aperture narrow, semilunar, a little wider than tall; upper edge more advanced than the basal one; short, straight and not to only slightly reflected. Peristome somewhat thickened and reflected except above. The reflection of the columelar edge is practically negligible on the umbilicus.

Measurements The dimensions of the studied shells are: 9.5-13 mm wide (mean= 11.2 mm; n= 26) and 4-5.5 mm high (mean= 4.8 mm; n= 26).

Genitalia (Fig. 2) (14 dissected specimens): Right ommatophore muscle between penis and vagina. Atrium short and thick (0,8 x 0,8 mm in the holotype). Penis elongated (4,25 mm in the holotype), irregularly cylindrical and shorter than the mucous glands; proximal half enlarged with respect to the distal one (Fig. 2a), although in some juvenile or immature specimens the enlargement may be present in a central or even distal position (Fig. 2d). Penial sheath thin, continued by a short penial retractor muscle attached to the diaphragm. Internally, there is no papilla but three protuberances can generally be distinguished in the enlarged part (in longitudinal section) (Figs 2 b,e), each with one cavity and strong folds within (Fig. 2c). These cavities are not always clearly visible externally although they exist in the inner penis (Fig. 2f). Epiphallus thin, quite short, hardly discernible from the vas deferens. There is no flagellum. Vagina is initially thick and then thin and fairly lengthened. Stimulatory apparatus composed of one accessory sac, one dart sac and three mucous glands. Accessory sac muscular, elongated, (3,8 mm in the holotype) almost totally separated from the vaginal walls; apex linked to the spermoviduct by means of a muscular band. Dart sac much smaller than accessory sac, not usually externally visible, although sometimes it appears as a slight protrusion at the base of the accessory sac (Fig. 2a). Three simple and exceptionally long mucous glands are attached to the vagina (one of them is hardly visible in Fig. 2a, because it was broken during dissection). Bursa copulatrix large but variable in shape, duct slender in the middle, much thicker at both ends.

Derivation of name The species is dedicated to our colleague Dr. Carlos Prieto from the Basque Country University who discovered the first specimens of the species.

Habitat *Oestophora prietoi* lives mainly on meso-Mediterranean inland limestone mountains in northern Andalusia (Table I). Most localities were near to the high course of the Guadalquivir river (between 500 to 715 m altitude), except for that in the Cordoba province. This was the only locality placed in the thermo-Mediterranean bioclimatic belt at the lower altitudes between 149-185 metres. *Oestophora prietoi* was found associated with conifers, mainly in woodland-forestry zones but also in pastures with dispersed coniferous trees (Table I). It was found in a great variety of refuges such a trunks, moss, walls and crevices, and particularly among stones and fallen leaves. It is resistant to anthropic influence, being able to live under rubble.

Geographic range (Map 1). Endemic to Sierra de Cazorla (Betic Cordillera) and first slopes of Sierra Morena in the Andalusian provinces of Jaen and Cordoba.

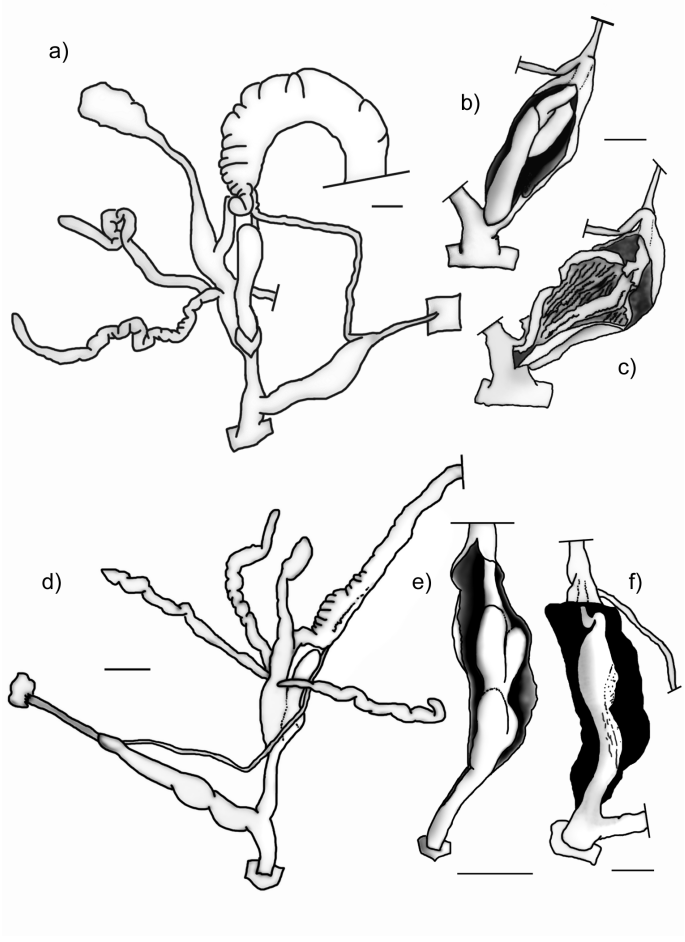

Figure 2 Genitalia of *Oestophora prietoi* n. sp. **A** Adult genitalia. **B** Detail of the penis with three external protuberances under the penial sheath open. **C** Internal structure of the penis showing three cavities. **D** Immature genitalia. **E** Details of the immature penis with the penial sheath open. **F** Details of the adult penis not showing external protuberances. **A-C** holotype from "Coto Ríos (NP Cazorla, Jaén)". **D-E** Road CO 412 (Pedro Abad-Adamuz), 1,5 km W of Salto reservoir. **F** paratype.

Oestophora mariae n. sp.
(Figs 1.2, 3)

Holotype (Fig. 3) Cortijo de las Tabernillas from Fátima (NP Sierra de Castril, Granada), 30SWG2088, 972 m, (1sh), 29.04.2003, A. Ruiz leg., MNCN 15.05/46750.

Paratypes 15sp, 9sh Cortijo de las Tabernillas from Fátima (NP Sierra de Castril, Granada), 30SWG2088, 972 m, 29.04.2003, A. Ruiz leg., DFZ-US and 1 shell in MVNH 1372.

Type locality Cortijo de las Tabernillas from Fátima (NP Sierra de Castril, Granada).

Diagnosis Shell with angulated periphery and one small tooth situated on the limit of the palatal edge of the aperture, and a slight enlargement on the basal one. Proximal part of penis long and thin, totally rolled inside the penial sheath. Inner penis with one small cavity not related to any externally visible protuberance.

Shell (Fig. 1.2) Circular, moderately solid, depressed with an angulated periphery. Colouration uniformly pale brown, slightly translucent. Spire conical, rather elevated, upper and lower sides similar in convexity. Protoconch of approximately 1-1¼ whorls, surface smooth. Periostracal surface of teleoconch sculptured by radial, regular and clearly visible ribs, much less conspicuous on the ventral side. 5¼ to 6¼ convex whorls that grow slowly and produce clear sutures. Angulated last whorl not descending at the end. Umbilicus deep, narrow, 1/8 of the maximum width of the shell. Aperture semi-lunar in shape, oblique, a little wider than tall; upper edge short and straight, more forward than the basal one. Peristome somewhat reflected and thickened, except on the upper part where it may be slightly reflected (or not reflected at all). Basal and palatal edges more thickened than columelar edge; palatal edge of adult shells with a poorly developed tooth that produces a small external depression of the shell. Some of the studied shells also showed a small enlargement in the basal edge that cannot be considered a tooth. Columelar edge barely reflected on the umbilicus.

Measurements The dimensions of the studied shells are: 7.9-10.0 mm in width (mean= 9.1 mm; n= 15) and 4-4.9 mm in height (mean= 4.4 mm; n= 15).

Genitalia (Fig. 3) (5 dissected specimens) Right ommatophore muscle lies between penis and vagina. Atrium short. Penis covered by a thin penial sheath that is continued by the penial retractor muscle (fig. 3a). Penial duct, inside the sheath, elongated and irregularly cylindrical; it shows a clearly thinner proximal part totally rolled (Fig. 3b), and no visible protuberances on the surface. Internally, there are strong longitudinal folds

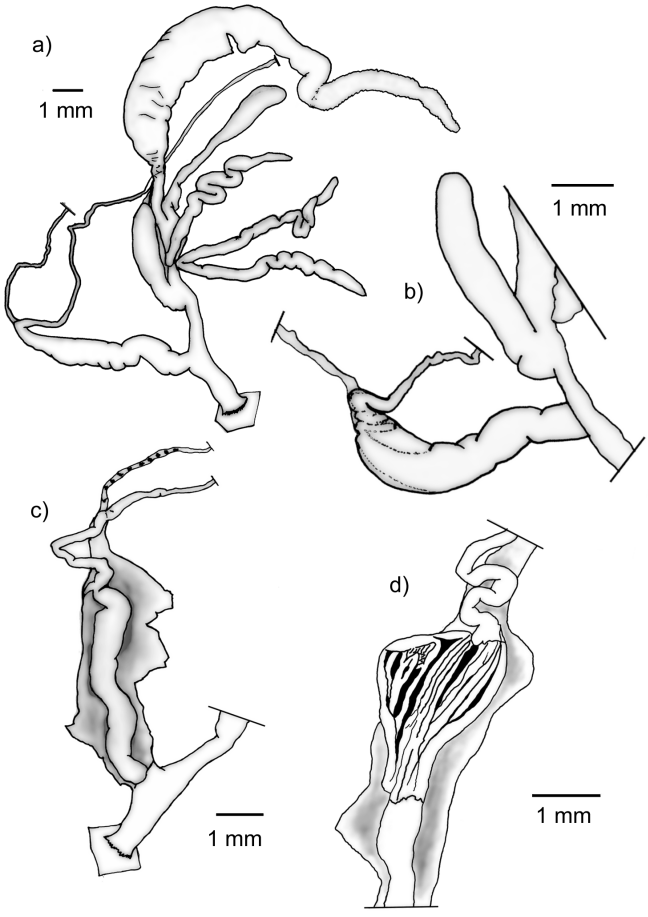

Figure 3 Genitalia of *Oestophora mariae* n. sp. a) Adult genitalia. b) Detail of the penis rolled inside the penial sheath. c) Penis unrolled with the penial sheath open. d) Internal structure of the penis showing two cavities. A-D: Holotype: Cortijo de las Tabernillas desde Fátima (NP Sierra de Castril, Granada).

and one small cavity more or less isolated from the general cavity of the penis (Fig. 3d). Penial papilla absent. The proximal penis is the physical prolongation of the narrow and thin epiphallus, both being separated by the penial retractor muscle. Flagellum absent. Vagina slender and moderately lengthened, especially between the end of penis and sacs. Stimulatory apparatus of one accessory sac, one dart sac and three mucous glands. Accessory sac muscular, elongated, almost completely separated from the vaginal walls; apex linked to the spermoviduct by means of a muscular band. Dart sac is much smaller than accesory sac, usually not visible externally and located at the base of the accessory sac. Mucous glands, 3 in number, simple, very long, attached to the vagina. Bursa copulatrix small, variable in shape, poorly differentiated where its duct start.

Derivation of name The species is dedicated to Maria Mateos who has collaborated with the authors and has had a valuable role in the discovery of this species.

Habitat "Sierra de Castril" is a group of calcareous mountains located inside the bowl of the Guadalquivir river. Climatically they belong to Mediterranean continental region with extreme temperatures and annual average rainfall of about 400 mm. The bioclimatic belt is meso-Mediterranean and the land use of the area is primarily dense coniferous woodland. Specimens were located under stones associated with decaying vegetable matter. Altitude: 972 m.

Geographic range (Map 1) Endemic to the Natural Park "Sierra de Castril" (Granada) in the Betic Cordillera. Known only from the type locality.

Oestophora ebria (Corbellá, 2004)

(Figs 1.3, 4)

Suboestophora kuiperi- Jaeckel, 1967: Marbella (UF34).

Suboestophora ebria.- Corbellá, 2004: "Puerto de Encinas Borrachas, municipio de Atajate, provincia de Málaga (España)" 30SUF05 and 30SUF06.

Type locality "Puerto de Encinas Borrachas, municipio de Atajate, provincia de Málaga (España)" (UTM: 30SUF05).

Material examined 2sp, 6 sh El Trapiche, south slope of Sierra Blanca (Marbella), 30SUF3044, 270 m; 1sh 28.02.03, DFZ-US. 1,5 km E Castillejo peak (NP Sierra de las Nieves, Tolox), 30SUF2661, 864 m; 1sp 01.03.03, DFZ-US. Casa de Curro (between Benadalid and Atajate), 30STF9955, 647-699; 1sp, 5sh 03.03.03, DFZ-US. A. Ruiz leg.

Shell (Fig. 1.3) moderately solid, circular, well depressed above, convex below. Colouration uniform, pale brown, slightly glossy and translucent, especially at base. Spire very low conical. Protoconch of 1½ whorls, surface smooth. Periostracal surface of teleoconch sculptured by regular and clearly visible ribs, rather separated from one another (in comparison with other

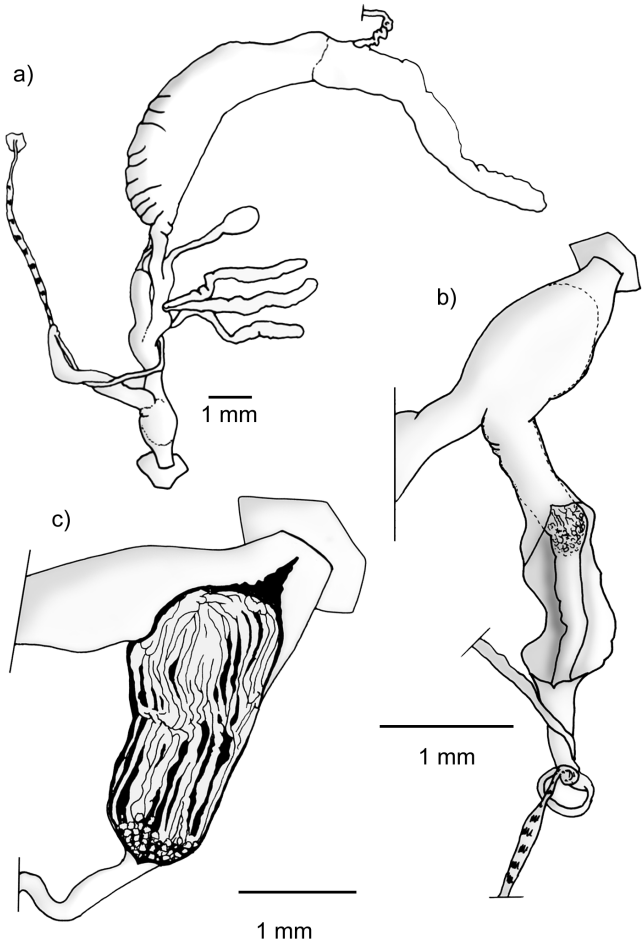

Figure 4 Genitalia of *Oestophora ebria* (Corbella 2004). a) Adult genitalia. b) Detail of the penis with the penial sheath open. c) Internal structure of the penis. A-C: 1,5 km E Castillejo peak (NP Sierra de las Nieves, Tolox).

Oestophora species), much less conspicuous on the ventral side. Whorls 5 to 5 3/4, convex with deep sutures and slow and general regular growth, although it is faster between 3rd and 4th, and slower between the penultimate (4th) and last (5th) whorls. Umbilicus approximately 1/6 of maximum width of shell. Periphery of last whorl rounded or subangulated. Slightly increasing at the end. Aperture narrow, semilunar, with a short upper edge and a small externally lateral depression. Peristome reflected and thickened in the basal, palatal and columelar edges; upper edge curved, basal edge waved.

Measurements The dimensions of the studied shells are within those in the range referred to by Corbella (2004): 7.3-8.9 mm in width and 3.6-4.3 mm in height.

Genitalia (Fig. 4) (2 dissected specimens). Right ommatophore muscle lies between penis and vagina. Atrium about two times longer than wide, proximal part very enlarged just where the penis ends. This is cylindrical, approximately as long as the mucous glands, covered by a penial sheath, and with two clearly differentiated parts: an enlarged distal half especially swollen when it communicates into the atrium, and a more slender proximal half (Fig. 4b). Internally, penial papilla absent, muscular walls of distal half with numerous strong folds and several hard, small, glossy vesicles at the beginning (Fig. 4c). Penial retractor muscle long, thin. Flagellum absent, epiphallus short, hardly discernible from vas deferens. Vagina long, thick, especially where the sacs are located. Stimulatory apparatus of three long mucous glands connected to the vagina; elongated accessory sac with glossy, thick and muscular walls, which is almost completely separated from the vaginal walls, and a small dart sac not clearly visible externally. Bursa copulatrix small, oval in shape and with a slender duct that is much shorter than the penis. Free oviduct is as long as the atrium.

Habitat This species mainly lives in thermomeso Mediterranean levels of the oceanic Mediterranean medium mountain region (rainfall: 500-800 mm/year). It is found in both silicicolous (with *Quercus suber* L.) and basophilous (with *Q. rotundifolia* Lam.) vegetation series, in localities with abundant scrub, with or without calcareous rocky outcrops. Although it seems generally to prefer crevices in calcareous rocks, it has also been found sheltered under esparto grass (*Stipa tenacissima* L.) and even in the vegetation growing near riverbanks in slate substrates and clayey soils. Altitude: from 270 to 1100 m.

Geographic range Andalusian endemic only known from a few localities in the mountain chains of Serrania de Ronda, Sierra de las Nieves and Sierra de Marbella, western Malaga province (Map 1).

DISCUSSION

With the description of these species Andalusia now becomes the area with the highest diversity of the genus *Oestophora*.

The most important conchological difference between *O. prietoi* and *O. mariae* is the presence of a keel in the first, that is absent in the second. In the Iberian Peninsula only two *Oestophora* species with keeled shells were known: *O. calpeana* (Morelet, 1845) and *O. dorotheae* Hesse, 1930 (Hidalgo, 1875; Ortiz de Zárate, 1962; Puente, 1996). While the first has been cited only in Gibraltar (30STF80), the second has been cited from Tarifa, in the south of Cadiz province (30STE69), and also from Gibraltar. However, Menez (2005) has thoroughly inspected Gibraltar and the authors have recently sampled Tarifa and surroundings, in both cases with no evidence of the species. So, the presence of *O. dorotheae* in the Iberian Peninsula could be due to an accidental and unsuccessful introduction. The shell differences between the three species are clear:

- The shell periphery has a pronounced, acute/sharp and upward-reflected keel with a sinus inside. The 6½ to 7 whorls are convex except the last two that are flatted. The diameter is 13 to 17 mm (data according to Ortiz de Zárate, 1962)..... *O. dorotheae*
- The shell periphery has a pronounced, acute/sharp (not reflected) keel and lacks an internal sinus. The 6 3/4 to 7 whorls are convex except the last two that are practically flatted. The aperture is clearly wider than tall. The diameter is 10.4 to 11.4 mm ….....*O. calpeana*
- The shell periphery has a clear and more or less blunt keel with neither reflection nor sinus inside. All the 5½-6¼ whorls are convex. The aperture is semilunar shaped and a little wider than tall. The diameter is 9.5 to 13 mm.....…..…….. *O. prietoi*

On the other hand, the peristome is clearly more reflected and thickened, the spire is lower and the basal side of the shell is much convex than the dorsal one in *O. prietoi* than in *O. calpeana*, where both sides of the shell show similar convexity.

According to the shell's original description by Morelet (1876, pag. 375) and the reproductive system data contributed by Schubert (1892), *O. maroccana* has a larger shell (17-18 mm of diameter), number of whorls (8) and general sizes of the reproductive structures (penis, dart sac, vagina, mucous glands…) than *O. prietoi* and *O. mariae*. The penis illustrated by Schubert (Taf. I - Fig. 11) is also quite different to those of the two new *Oestophora*.

As stated by Kobelt (1889), *Helix (Gonostoma) columnae* has a lenticular shell with a conical depressed spire, an acute and sharply indented keel, 8 slow growing whorls, is 18-20 mm wide and 10 mm of high. These, as well as other, less clear, shell features can consistently differentiate this species from *O. prietoi* and from the non-keeled *mariae*. Richardson (1980) included *columnae* in the genus *Caracollina*.

The main feature characterizing the shell of *O. mariae* is the relation between the umbilicus and the shell diameter (1/8), the smallest in the *Oestophora* Iberian group in common with *O. granesae* (Arrébola, 1998). Considering this, even the presence of the palatal tooth and the slight enlargement of the basal edge, are not comparable with the teeth of *O. barbula* (nor the tooth of *O. barbella*, see Introduction), the only Iberian *Oestopohora* species with this kind of modifications on the aperture. Firstly, because in *O. mariae* both are comparatively much less developed (not considered to be a tooth, rather an enlargement or a soft callosity, not always distinguishable, at the basal edge of the shell of *O. mariae*). Secondly, because they grow just on the limit of the aperture in *O. mariae*, while they are situated at some distance from the shell edges in *O. barbula*.

According to the original description of *O. wenzi* this species does not have a keeled shell, but an angulated one (Pfeffer, 1929). Although its diameter and number of whorls agree with those of *O. mariae*, at least the wider umbilicus of *O. wenzi* (1/3 of the shell base) and the absence of teeth or callosities on the aperture, and especially the palatal tooth, differentiates this species from *O. mariae*.

Other *Oestophora* species seem to be the north African species *Helix gougeti* Terver 1839, *H. tlemcenensis* Bourguignat 1868, *H. maroccana* Morelet 1876, *H. pechaudi* Bourguignat in Ancey 1882, *H. columnae* Kobelt 1889 and *O. wenzi* Pfeffer 1929 (see Introduction).

Ortiz de Zárate & Ortiz de Zárate (1961) pointed out the existence of *H. pechaudi* Bourguignat in Ancey 1882 as belonging to *Oestophora*. Richardson (1980) indicated that it was synonymous with *tlemcenensis* Bourguignat 1868 and Ancey (1882) related both with *H. gougeti* Terver 1839. According to original figures and descriptions (Terver, 1839; Bourguignat, 1868; Ancey, 1882) the three species have similar lenticular, depressed shells with low spires (almost

flat in *tlemcenensis* and *pechaudi*, taller in *gougeti*) and between 5 (*tlemcenensis*) to 6 (*pechaudi* and *gougeti*) whorls. They have the same diameter (8 mm), but different heights (3½ mm in *pechaudi*, 4 mm *tlemcenensis* and 5 mm in *gougeti*). Their peripheries are sharply angulated but not keeled despite the authors use of adjectives such as "subcarinata or carene obsolète" in *tlemcenensis*, and "carinatá" in *pechaudi* and *gougeti*. Finally the three have a clear external (palatal) single tooth in their apertures, together with "a large but no tall callosity" located on the basal border and present only in *pechaudi*, on which Ancey (1882) mainly based the specific identity of this species. The Algerian localities where they were found by these authors are: "environs de la ville d'Oran" for *pechaudi*, "Tremecen (=Tlemcen) près de la grande cascade du Sifsef aus Moulins" for *gougeti* and "près de Tlemcen, aux cascades du Sefsef" for *tlemcenensis*. There is no difficulty in separating *O. prietoi* (a "real keeled" species) from these three "species", but it is not so easy with *O. mariae*. In this case, some small differences can be emphasized, such as its general diameter (7.9 – 10 mm) bigger than in *pechaudi* (7.25 – 8 mm), the less developed palatal tooth in comparison with that of *tlemcenensis* or the callosity on the basal aperture's basal border not present in *gougeti* nor in *tlemcenensis.* The main distinction in *mariae,* with respect to the original descriptions of the other three, is again its smaller umbilicus in comparison with the diameter of the shell (1/8). Furthermore the umbilicus, that is described as medium size ("modicus" or "médiocre") in the texts of the other "species", can be clearly compared with the figures represented by Terver (1839), Rossmässler (1877) and Bourguignat (1868). Although shell differences between *O. mariae* and the three mentioned species are not considerable, in our opinion they are enough to describe a new *Oestophora* specie. In addition, some biogeographically reasons would support it: *O. mariae* has only been found in "Sierra de Castril" with no other known populations in Andalusia, "Sierra de Castril" is considerably far from Algeria being these two geographic areas separated from a long time by the Mediterranean sea, an historical barrier for allopatric speciation with numerous examples, the number of Andalusia *Oestopohora* endemics is high… It has not been possible to find type material of the three north Africa species. Nevertheless this is not quite important here because it must be constituted (if it exists) by shells, being the anatomical and molecular studies the required to clarify their validity, especially the north African ones.

Finally, the description of *ebria* by Corbella (2004) was exclusively based on shell features, which led this author to erroneously consider it to belong to the genus *Suboestophora* Ortiz de Zárate. The specimens investigated by us do not differ conchologically from those found by Corbella, but the anatomy of the reproductive system is undoubtedly consistent with genus *Oestophora* Hesse (see diagnosis in the introduction). There is no problem in differentiating *O. ebria* from any other *Oestophora* species (mostly because of the aperture), but the same is not true with *Suboestophora boscae* (Hidalgo, 1869) and *S. tarraconensis* (Aguilar-Amat, 1935), endemics of the eastern Iberian Peninsula (Puente, 1994). On this matter, Jaeckel (1967) would have found *O. ebria* from Marbella (Málaga province), but he cited it as *S. kuiperi*, actual synonym of *S. boscae* (Martinez-Ortí, 1999).

The general anatomy of the reproductive system of the three species agrees with that currently known for the genus (see introduction). However, they all show some new peculiarities that differentiate them from other *Oestophora*. The three protuberances that can be general and externally distinguished in the penis of *O. prietoi* (Figs 2e) are cited for the first time. These protuberances enclose internal cavities as in other *Oestophora* species (two in *silvae* and one in *tarnieri* and *mariae*), but only *O. calpeana* sometimes attains three (Puente, 1994; Puente *et al*., 1996), two according to Arrébola (1995). The long, thin proximal penial part completely rolled inside the penial sheath, which is externally visible (Fig. 3b), is characteristic of *O. mariae* (with one cavity in the internal penis). In *O. ebria* the following must be emphasized: the thickness and musculature of the distal vagina and penis ducts, the section of atrium where they join, and the many strong internal folds in both that in the penis grow from hard, glossy vesicles. These must be added to the species' diagnosis elaborated by Corbella (2004).

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