Two new Clausiliidae (Gastropoda Pulmonata) of Sicily (Italy)

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ABSTRACT
In the present paper the Authors describe two new Clausiliidae (Gastropoda Pulmonata) of Sicily (Italy): Muticaria cyclopica n. sp. from SE-Sicily and Siciliaria calcarae orlandoi n. ssp. from W-Sicily. The two new species are described by virtue of their distinctive conchological and anatomical features. Additional biological and taxonomic notes are provided.

KEY WORDS
Door snails; Clausiliidae; Muticaria; Siciliaria; new taxa; taxonomy; Sicily.

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INTRODUCTION

Muticaria Lindholm, 1925 and Siciliaria Vest, 1867 s. str. are xeroresistant and calcicolous mollusks, widespread, the first, in CE and SE-Sicily and Maltese Islands, the second in W-Sicily and Egadi Islands (Alzona, 1971; Beckmann, 1990, 1992; Cossignani & Cossignani, 1995; Giusti et al., 1995; Manganelli et al., 1995; Nordsieck, 2007, 2013; Liberto et al., 2010, 2015; Bank, 2011; Colomba et al., 2012. The strict connection between the geological nature (calcaceous) of the soil they live in and the extremely scarce vagility of specimens results in island-like distributional patterns and contributes to high levels of endemism. Nordsieck (2007) listed 6 taxa of specific and subspecific ranks for Muticaria and 16 taxa for Siciliaria s. str. Recently, Colomba et al. (2012) described a new species of Muticaria.

The researches carried out in the last years on the Sicilian freshwater and land mollusks allow us to describe two new Clausiliidae (Gastropoda Pulmonata), Muticaria cyclopica n. sp. from SE-Sicily and Siciliaria (Siciliaria) calcarae orlandoi n. ssp. from W-Sicily.

ABBREVIATIONS AND ACRONYMS. AUPP = anterior upper palatal plica; BC = bursa copulatrix; BCD = diverticulum of bursa copulatrix; CD = copulatory duct; CL = columellar lamella; D = shell width; DBC = duct of the bursa copulatrix; DE = distal epiphallus; FO = free oviduct; G = penial papilla; GA = genital atrium; H = shell height; L = lunella; LPP = lower palatal plica (basal plica); P = penis; PD = diverticulum of penis; PE = proximal epiphallus; PL = parietal lamella; PLL = parallel lamella; PP = principal plica; PR = penial retractor muscle; PUPP = posterior upper palatal plica; SCL = subcolumellar lamella; SL = spiral lamella; SUL = sulcalis plica; SP = sutural plica; V = vagina; VD = vas deferens; ex/x = specimen/s, s.l. = sensu lato; s. str. = sensu stricto.

The materials used for this study are deposited in the following Museums and private collections:
Molecular Biology, University of Urbino, Italy (LCMBU); F. Liberto collection, Cefalù, Italy (CL); Museo Naturalistico F. Minà Palumbo, Castelbuono, Italy (MNMP); Museo Civico di Storia Naturale di Comiso (MSC); Museo Civico di Storia Naturale di Genova “G. Doria”, Italy (MSC); Museo Regionale di Terrasini (MRT); A. Reitano collection, Tremestieri Etneo, Italy (CR); I. Sparacio collection, Palermo, Italy (CS); R. Viviano collection, Palermo, Italy (CV).

MATERIAL AND METHODS

All specimens were collected by sight on the soil and under the rocks. Observations on ecology of these organisms were made directly in the field. Dry shells have been studied as regard size, colour, morphology, sculpture, aperture, plicae and lamellae, lunella and clausilium. In order to study and illustrate genital organs, the specimens were drowned in water and fixed in 75% ethanol. Reproductive apparatus was extracted by means of scalpel, scissors and needles. Photographs were taken with a digital camera. Height and maximum diameter of the shell along with some parts of genitalia were measured (in millimeters) by a digital gauge. Voucher specimens were stored in collections listed above. Toponyms (place-names) are reported following the Portale Cartografico Nazionale (PCN, http://www.pcn.minambiente.it/PCN/), Map IG M 1:25000. Each locality and/or collection site is in the original language (Italian).

All the specimens were studied by a Leica MZ 7.5 stereomicroscope. The taxonomic order and nomenclatural arrangement follow Nordsieck (2007, 2013) and Bank (2011).

RESULTS

SYSTEMATICS

Phylum MOLLUSCA Cuvier, 1795
Classis GASTROPODA Cuvier, 1795
Ordo PULMONATA Cuvier in Blainville, 1814
Subordo STYLOMATOPHORAA. Schmidt, 1855

Familia CLAUSILIIDAE J.E. Gray, 1855
Subfamilia ALOPIINAE A.J. Wagner, 1913
Tribus MEDORINII H. Nordsieck, 1997

Genus Maticaria Lindholm, 1925
Type species: Clausilia scalaris L. Pfeiffer, 1850

Maticaria cyclopica n. sp. (Figs. 1–13)
Figure 1. Shell of *Muticaria cyclopica* n. sp., Italy, Sicily, Siracusa, Epipoli, H: 11.35 mm - D: 3.90 mm (MSNC n. 4537).

Figure 2. Idem, H: 13.95 mm - D: 4.40 mm (CL n. 16527).
Figures 9–13. Genitalia of *Mucicaria cyclopica* n. sp., Siracusa, Epipoli. Figure 9. Genitalia of holotype (MSNC n. 4537). Figure 10. Internal structure of penis, with penial papilla (same specimen of figure 9). Figure 11. Genitalia (CL n. 16772). Figure 12. Genitalia (CL n. 16798). Figure 13. Internal structure of penis, with penial papilla (same specimen of figure 12).
taxa, most of which having a strictly limited distribution in C-E and S-E Sicily (Fig. 14) and Maltese Islands. *M. syracusana* (Philippi, 1836) is confined to a few coastal locality of Syracuse province (locus typicus Syracuse: Philippi, 1836), *M. neuteboomii* Beckmann, 1990 (locus typicus Cava d’Ispica, Modica, Raguse province: Beckmann, 1990) occurs throughout the greater part of the S-E Sicily, *M. brancteoi* Colomba, Gregorini, Liberto, Reitano, Giglio et Sparacio, 2012 has a restricted distribution to South of Syracuse, and *M. cyclopica* n. sp., at moment, is known only for the description locality: Epipoli, a hill about 150 m high, very close to the modern city of Syracuse (20–60 m). *Masticaria macrostoma* (Cantraine, 1835) is endemic to the Maltese Islands where it occurs with four subspecies: *M. macrostoma macrostoma*, *M. macrostoma scalaris* (L. Pfeiffer, 1850), *M. macrostoma oscitans* (Charpentier, 1852) and *M. macrostoma mamotica* (Gulia, 1861).

**Comparative Notes.** *Masticaria cyclopica* n. sp. is morphologically closer to *M. brancteoi* n. sp. than other *Masticaria* species (see Colomba et al., 2012); for the morphology of other *Masticaria* species see Giusti et al. (1995) and Colomba et al. (2010).

However, *M. cyclopica* n. sp. has a rudimental posterior upper palatal plica (absent in *M. brancteoi*), a more raised anterior portion of principal plica (fused to anterior upper palatal plica), a longer and often emerging parallel lamella; the genitalia have a smaller penial diverticulum and the internal walls of penis without pleats (present in *M. brancteoi*).

*Masticaria cyclopica* n. sp. is similar to *M. syracusana* in morphology of shell but it is distinct for the longer and often emerging parallel lamella, the thinner anterior portion of principal plica (fused to anterior upper palatal plica), the rudimental posterior upper palatal plica (more developed in *M. syracusana*); genitalia have a smaller penial diverticulum and shorter copulatory duct.

*Masticaria cyclopica* n. sp. is well distinct also from *M. neuteboomii* and *M. macrostoma macrostoma* for the anterior portion of principal plica fused to anterior upper palatal plica (indipendent in *M. neuteboomii* and *M. macrostoma* spp.) and for longer parallel lamella which adheres to spiral lamella (indipendent in *M. neuteboomii*, *M. macrostoma macrostoma*, *M. macrostoma oscitans* and *M. macrostoma scalaris*).

Genitalia (Figs. 9, 10) are characterized by: short vagina (1.47 mm), very short free oviduct (0.4 mm), well developed ovispermiduct and a short copulatory duct (0.9 mm) ending in a branched bursa copulatrix complex: one branch consisting of a short and wide diverticulum of the bursa copulatrix (0.78 mm) and the other branch with very short bursa copulatrix duct and oval and elongated (1.52 mm) bursa copulatrix. Penial complex consisting of flagellum, epiphallus, penial diverticulum and penis; epiphallus (2 mm) divided, by point insertion of robust penial retractor muscle, into proximal and distal portions, the latter very short; very short and pointed penial diverticulum (0.55 mm) arising on border between distal epiphallus and penis; penis short (1.22 mm). Internal walls of penis without pleat.

**Variability.** Shell (10 specimens examined) (Figs. 1, 2, 4–8): dimensions in decollate specimens (4–5 whorls): height: 15.19–12.55 mm (on average: 13.59 mm); maximum diameter: 4.43–3.90 mm (on average: 4.21 mm). The number of ribs on 2 mm of the penultimate whorl ranges from 9 to 7 (on average, 7.7); parallel lamella from emerging to scarcely visible in frontal view of the aperture; spiral lamella adherent or fused to parallel lamella. Genitalia (5 specimens examined) (Figs. 11, 13); short to moderately long vagina (1.20–1.65 mm) and copulatory duct (0.9–1.65 mm); pointed to round penial diverticulum.

**Etymology.** The specific epithet is derived from the English word cyclopic referring to the characteristic ancient Greek cyclopic walls of the type locality.

**Biology and Distribution.** Like the other *Masticaria* species, *M. cyclopica* n. sp. is xeroresistant and calcicolous and lives on limestone blocks of the ancient Greek walls of the type locality and under stones in stony soils.

The genus *Masticaria* is represented by about 7 taxa, most of which having a strictly limited distribution.
Genitalia with very short penial diverticulum, longer in *M. neuteboomii* and *M. macrostoma macrostoma*. Only *M. macrostoma mamotica* has a penial diverticulum similar to that of *M. cyclopica* n. sp.; however, *M. macrostoma mamotica* has genitalia with a pleat on the internal wall of the penis (not present in *M. cyclopica* n. sp.) and a ventricose shell (fusiform in *M. cyclopica* n. sp.) with shorter parallel lamellae and anterior portion of principal plica distinct from anterior palatal plica (fused in *M. cyclopica* n. sp.).

Preliminary molecular studies (Gregorini et al., 2008; Colomba et al., 2010; 2012) showed the existence of significant genetic differences between populations attributed either to *M. syracusana*, *M. neuteboomii* or *M. brancatoi*, including the topotypic ones. Moreover, further and more complete molecular data (personal unpublished data) confirmed these preliminary results; furthermore, by comparing cytochrome oxidase I (COI) partial sequences, specimens of *M. cyclopica* n. sp. turn out to be genetically distant from all other Sicilian and Maltese *Maticaria* populations.

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![Figure 14. Geographic distribution of genus *Maticaria* in CE and SE Sicily (in yellow) with *M. cyclopica* n. sp. (triangle), *M. brancatoi* (star), *M. syracusana* (square) and *M. neuteboomii* (dots).](image)

**Examinèd Material.** Holotype: Italy, Sicily, Corleone, Rocca Busambra, Ficuzza, 27.IX.1981, legit V.E. Orlando (MRT, n. 31040 Orlando collection, written in the box and in the register: *Siciliaria calcarae* n. subsp., det. H. Nordsieck); Paratypes: same data of holotype, 4 exx (MRT, n. 31041/4 Orlando collection); Corleone, Bosco Ficuzza, 25.IV.1971, legit V.E. Orlando, 2 exx (MRT, n. 4903/4 Orlando collection); Monreale, Ficuzza, Val di Conti, 23.III.1981, 2 exx (CS); idem, legit I. Sparacio, 8 exx (CL n. 17276–17283); Monreale, Diga Scanziano, 31.XII.1989, 5 exx (CS); Monreale, Bosco del Cappelliere, 2.I.1991, 21 exx (CS); idem, 28.XI.1993, 8 exx (CS); Godrano, Rocca Busambra, Alpe Cucco, 21.II.2010, 5 exx (CS); Monreale, Bosco Ficuzza, Ponte Arcera, 37°55′42″ N; 13°23′01″ E; 27.IX.2009; 9 exx, (CL n. 5508–5516); Monreale, Bosco del Cappelliere, Cozzo San Leopoldo, 37°54′53″N, 13°22′57″E, 616 m, 2.IV.2016, 4 shells (CV); idem, 3 exx, legit R. Viviano (CL n. 16446–16448).

**Other Examined Material.** *Siciliaria calcarae calcarae* (Philippi, 1844). Italy, Sicily, Palermo, San Ciro, 31.X.1986, 7 exx (CS); idem, 38°05′11″N, 13°23′07″E, 190 m, legit Sparacio I., 28.XI.2015, 2 exx (CL n. 16807–16829); Bagheria, Monte Catalfano, 30.VI.2006, 28 exx (CS); Palermo, base Monte Grifone, Cimitero Santa Maria di Gesù, 24.VIII.2014, 11 ex (CS); Favignana Island, Grotta delle Uccerie, 37°57′04″N, 12°18′18″E; 30 m, 11.IX.2010, 17 exx, 14 shells, (CL n. 8414–8444); Calatafimi, Le Rocche, 37°54′14″N, 12°48′14″E, 493 m, 20.XI.2011, 6 exx, 15 shells (CL n. 10763–10783); Scopello, Torre Bennistra, 07.XII.2016, 3 exx (CR); Erice, Monte Castellazzo, 20.VI.2002, 26 exx (CR); Castellammare del Golfo, Monte Inici, VI.1996, 5 exx (CR).

*Siciliaria* (S.) *calcarae belliemi* (Brandt, 1961). Italy, Sicily, Partinico, Monte Belliemi, 1.III.2015, 28 exx (CS); idem, 8.V.2016, 34 exx (CS); idem 9 shells (CL n. 17284–17292).

*Siciliaria* (S.) *ferrox* (Brandt, 1961). Italy, Sicily, Trabia, Torre Sant’Onofrio, 143 m, 25.VIII.2007, 30 shell (CL n. 2331–2360); Altavilla Milicia, Grotta Mazzamuto, 15.X.2015, 25 exx (CS).
DESCRIPTION OF HOLOTYPE. Dimensions: height 19 mm; maximum diameter 4.8 mm. Shell elongated, fusiform, sinistral, not decollate, obtuse apex, robust, brown in color (Figs. 15, 16); external surface with very minute and just raised ribs equally arranged in all whorls of teleoconch; 92 ribs on penultimate whorl. Spire slowly and regularly growing, with 11 whorls little convex; basal and cervical keels little distinct; umbilicus closed; suture shallow with papillae scattered and slightly evident (more numerous from third to seventh whorl); aperture about ¼ of shell height, subovoidal, with 4 lamellae on parietum and columellar side, lunella, and 4 plicae on palatum. On palatum there is an evident lateral lunella, starting from suture there are a long and raised principal plica not fused to lunella apex and slightly wider in its posterior portion, a short posterior portion of upper palatal plica fused to lunella apex and an obsolete upper palatal plica represented only by a short, large callosity little in relief, a medium long basal plica, the internal first part of which is joined to the base of lunella; a short sulcalis. On parietum and columellar side there are: non emergent and well raised spiral lamella in centre of parietum; tooth-like (upper) parietal lamella, moderately high (inferior) columellar lamella, non emergent subcolumellar lamella. Peristome continuous, slightly thickened, reflected, superiorly attached to the wall of last whorl.

VARIABILITY. Dimensions of paratypes (not decollate) (Fig. 17): height: 18–22 mm; maximum diameter: 4.2–4.8 mm; ribs on the penultimate whorl of the shell ranges from 88 to 95 mm, but some ribs are incomplete or obsolete; sometimes a very little sutural plica is present; the upper palatal plica can be very small or absent (Figs. 18, 19). Parietum as in figure 20. Clausilium (Figs. 21–22) with elongate plough-like basal plate, sutural angle slightly bent up, palatal and columellar edges of plate nearly parallel; outer corner more or less pointed.

Genitalia (5 specimens examined) (Figs. 23–28) are characterized by: slender and thin free oviduct, well-developed ovisperm duct; bursa copulatrix complex consist of slender copulatory (3.45–2.8 mm) duct ending in two branches: one branch consisting of a long diverticulum of the bursa copulatrix (5.2 mm), second branch consisting of very short bursa copulatrix duct with cylindrical bursa copulatrix; vagina short (1.8–2.5 mm) and uniform in diameter; vas deferent long and slender, entering the epiphallus; epiphallus (2.6–3.2 mm) divided by point insertion of robust penial retractor muscle into cylindrical-conic proximal portion and shorter distal portion slightly enlarged before entering in the penis. Penis short (1.6–2.2 mm), wider than epiphallus; internal walls of penis show two weak longitudinal furrows; conic penial papilla, with slightly pointed apex and a restriction to the base.

Body. Animal long, narrow, posteriorly pointed, blackish with a dorsal, narrow and whitish band; skin tubercle ovale-elongated; upper tentacles rather short, cylindro-conical, whitish, apically widened with small black eyes; pneumostome and genital opening on left side; foot long, narrow, with sole paler than body.

BIOLOGY AND DISTRIBUTION. Siciliaria calcarae orlandoi n. ssp. lives under the bark of dead trees and in the leaf litter of woods vegetating both in sandstone (Bosco del Cappelliere, Diga Scanzano) and calcareous (Alpe Cucco, Rocca Busambra) soils (Figs. 29, 30); in these two last localities S. calcarae orlandoi n. ssp. is found also on calcareous rocks into the woods. This new subspecies is known for the “Nature Reserve Bosco della Ficuzza, Rocca della Busambra, Bosco del Cappelliere e Gorgo del Drago” an area which is included in the Sicani Mountains Regional Natural Park since 2013.

Siciliaria calcarae s.l. lives on calcareous rocks, in cavities and under stones on calcareous soils. It is described from Palermo and is widespread in Western Sicily and the Egadi Islands (see Beckmann, 2004) (Figs. 31, 32, 56).

ETYMOLOGY. The new subspecies is dedicated to Vittorio Emanuele Orlando (1928–2014, Terrasini, Italy), who identified this taxon, to his passion for molluscan studies and his museum activity in Sicily.

COMPARATIVE NOTES. Siciliaria calcarae orlandoi n. ssp. is distinct from S. calcarae calcarae (Figs. 31, 35, 37–41, 45–55) for the reduced anterior upper palatal plica (longer and raised in S. calcarae calcarae who as, rarely, also a small second upper palatal plica), reduced or absent sutural plica (present in S. calcarae calcarae), moderately high columellar lamella (low in S. calcarae calcarae), the clausilium with sutural angle slightly bent up, thus palatal and columellar edges of plate are nearly parallel (sutural angle much bent up in S. calcarae calcarae).
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Figure 15. Holotype of Siciliaria (S.) calcarae orlandoi n. ssp., Italy, Sicily, Corleone, Bosco Ficuzza, h: 19 mm, D: 4.8 mm (V.E. Orlando coll., MRT). Figure 16. Label of holotype of S. calcarae orlandoi n. ssp. (V.E. Orlando coll., MRT). Figure 17. Shell of S. calcarae orlandoi n. ssp., Monreale, Bosco Ficuzza, Ponte Arciera, H: 18.65 mm, D: 4.5 mm (CL n. 5512).
Figure 23–28. Genitalia of *Siciliaria (S.) calcarea orlandoi* n. ssp. Figure 23. Monreale, Bosco Ficuzza, Ponte Arciera (CL n. 5511). Figure 24. Idem, internal structure of penis, with penial papilla. Figure 25. Monreale, Bosco Ficuzza, Ponte Arciera (CL n. 5508). Figure 26. Idem, internal structure of penis, with penial papilla. Figure 27. Monreale, Bosco del Cappelliere, Cozzo San Leopoldo (CL n. 16448). Figure 28. Idem, internal structure of penis, with penial papilla.
Figure 29. *Siciliaria* (S.) calcarea orlandoi n. ssp. in natural habitat. Figure 30. Landscape of Bosco Ficuzza, Monreale. Figure 31. *Siciliaria* (S.) calcarea calcarea in natural habitat. Figure 32. Landscape of San Ciro, Monte Grifone, Palermo. Figure 33. *Siciliaria* (S.) calcarea belliemi in natural habitat. Figure 34. Landscape of Monte Belliemi, Partinico.
Figure 35. *Siciliaria* (*S.*) *calcarae calcarae*, San Ciro, Monte Grifone, Palermo, H: 19.9 mm, D: 4.7 mm (CL n. 16816).
Figure 36. *Siciliaria* (*S.*) *calcarae belliemi*, Monte Belliemi, Partinico, H: 17.35 mm, D: 4.15 mm (CL n. 17284).
Figure 37. *Siciliaria* (*S.* calcarae calcarae*, Le Rocche, Calatafimi H: 20.5 mm, D: 4.65 mm (CL n. 10769).

Figure 38. *Siciliaria* (*S.* calcarae calcarae*, Grotta dell’Uccerie, Favignana, H: 18.5 mm, D: 4.1 mm (CL n. 8431).
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Figure 39. *Siciliaria* (S.) *calcarae calcarae*, San Ciro, Monte Grifone, Palermo: palatum (CL n. 16819). Figure 40. Idem, parietum (CL n. 16820). Figure 41. Idem, clausilium (CL). Figure 42. *Siciliaria* (S.) *calcarae belliemi*, Monte Belliemi, Partinico: palatum (CS). Figure 43. Idem, parietum (CL n. 17286). Figure 44. Idem, clausilium (CL).
Figure 45. *Siciliaria* (S.) *calcareae calcareae*, Le Rocche, Calatafimi, palatum (CL n. 10770). Figure 46. Idem, parietum (CL n. 10771). Figure 47. Idem, clausilium (CL). Figure 48. *Siciliaria* (S.) *calcareae calcareae*, Grotta dell’Uccerie, Favignana, palatum (CL n. 8432). Figure 49. Idem, parietum (CL n. 8433). Figure 50. Idem, clausilium (CL).
Figures 51–55. Genitalia of *Siciliaria* (*S.*) *calcarae calcarae*. Figure 51. San Ciro, Monte Grifone, Palermo (CL n. 16807). Figure 52. Idem, internal structure of penis, with penial papilla. Figure 53. Le Rocche, Calatafimi (CL n. 10764). Figure 54. Idem, internal structure of penis, with penial papilla. Figure 55. Grotta dell’Uccerie, Favignana (CL n. 8424).
Siciliaria calcarae belliemi Brandt, 1961 (Figs. 36, 42–44), from Monte Belliemi, near Partinico, is characterized for ribbed whorls (rib-striated in S. calcarae calcarae and S. calcarae orlandoi n. ssp.); the anterior upper palatal plica is longer and raised same as in S. calcarae calcarae. Nordsieck (2002) considers S. calcarae belliemi a “transitional form between neighboring species which may have originated by hybridation (c. calcarae/tiberii)” (see also Beckman, 2004).

Remarks. Siciliaria calcarae s.l. is the more widespread species of the genus Siciliaria st. It lives from Bagheria in the East to Favignana Island and Levanzo Island in the West, up to Castelvetrano in the South.

It is reported in Quaternary deposits of Palermo (De Gregorio, 1927 sub Clausilia adelina, Palermo, Pietrazzi) and in in Quaternary deposit Wied tal-Bahrja in the Island of Malta (Giusti et al., 1995 sub Siciliaria cfr. septemplicata).

Siciliaria calcarae calcarae is morphologically little variable, nevertheless some taxa were described in the past for this mollusk, and nowadays they are considered synonyms.

Küster (1847–1862) described Clausilia adelina on specimens received by the Sicilian naturalist Luigi Benoit, with type locality “Inseln Sicilien”. The accurate Küster’s description and illustration (Küster, 1847: Pl. 34, figs. 4–6) show that S. adelina is a S. calcarae with a well developed anterior upper palatal plica and a low columellar lamella. These characters are typical of S. calcarae calcarae and exclude any reference to S. calcarae orlandoi n. ssp. Benoit (1875, 1882) specifies as distribution localities for C. adelina: “Favignana e Bonagia presso Calatafimi”.

Pini (1884) described Clausilia (Siciliaria) brugnonea for Palermo. Also Pini’s description and illustrations of C. brugnonea allow to refer this name to the typical S. calcarae calcarae for the presence of a developed upper palatal plica (Pini, 1884: Pl. 2, fig. 16a) and low sinuous columellar lamella (Pini, 1884: Pl. 2 fig. 16b).

Monterosato (1892) described Clausilia (Siciliaria) adelina var. subsolida for the Aegadian islands by these few words “più solida e più fortemente striata” [more solid and more strongly striated]. This description and the examen of topotypic specimens (Figs. 38, 48–50, 55) allowed us to consider the taxon subsolida clearly distinguished from S. calcarae orlandoi n. ssp.

Westerlund (1892) described Clausilia (Siciliaria) calcarae var. nodosa from Palermo, with these words: “Testa non decollata, tenue regulariter costulato-striata, plica palatalis infera perbrevis, peristoma expansum, incrassatum, margine externo sub simulum nodoso, plica palatalis supera secunda tenuis, brevis. Hab. Sicilien, bei Palermo (A. de Monterosato comm.)”. Monterosato (1892) specifies that the type series of nodosa came from Bagheria (East of Palermo). The diagnostic characters of S. nodosa Westerlund, 1892 are the presence of a small secon upper palatal plica and a small callus on the upper outer edge of the peristome. A similar species is S. (S.) ferrox Brandt, 1961 which is widespread along the coast from Termini Imerese in the East to Altavilla Mlicia in the West, very close to Bagheria (Reitano et al., 2007). In fact, S. ferrox has the shell similar to S. calcarae s.l. but with a second upper palatal plica, therefore as in S. nodosa. Nevertheless, S. calcarae calcarae occasionally have a second upper palatal plica; anyway this is absent in S. calcarae orlandoi n. sp.; nowadays C. (S.) nodosa Westerlund, 1892 is considered a synonym of a nominotypical subspecies of S. calcarae (Bank, 2011; Nordsieck, 2013).

Finally, De Gregorio (1894) described Clausilia proxima levanzensis from Levanzo Island (Aegadian Island, Western Sicily) but, however, for this little island, only S. calcarae is known (Fiorentino et al., 2004).
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We dedicate this work to the memory of our dear friend Giuseppe Pocaterra (San Pietro in Casale, Bologna, Italy).

REFERENCES


Nordsieck N., 2013. Revisory remarks on the species of Siciliaria Vest from N. W. Sicily. Available at: www.hnords.de/printable/5356429d0b11adc0b/535642a1dc1365e05/index.html - last access: July 27th 2016.


