

**Taxonomical clarification of the Iberian endemic
Helicella (Xerotracha) mariae Gasull, 1972
(Gastropoda, Pulmonata Hygromiidae)**

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The type series of the Iberian endemic hygromiid *Helicella mariae* was studied conchologically, with the purpose of clarifying its taxonomic status. This study compares protoconch and teleoconch microsculpture and hairs of *Helicella mariae* and the most similar hygromiid species *Microxeromagna lowei* and *Xerotracha conspurcata*. The study of dried specimens of *Helicella mariae* found inside some shells was inconclusive because of the specimens' immaturity. Based on the conchological characters examined and on distributional data, *Helicella mariae* must be considered a junior synonym of *Xerotracha conspurcata*. The distribution map in the Iberian Peninsula for this species is shown.

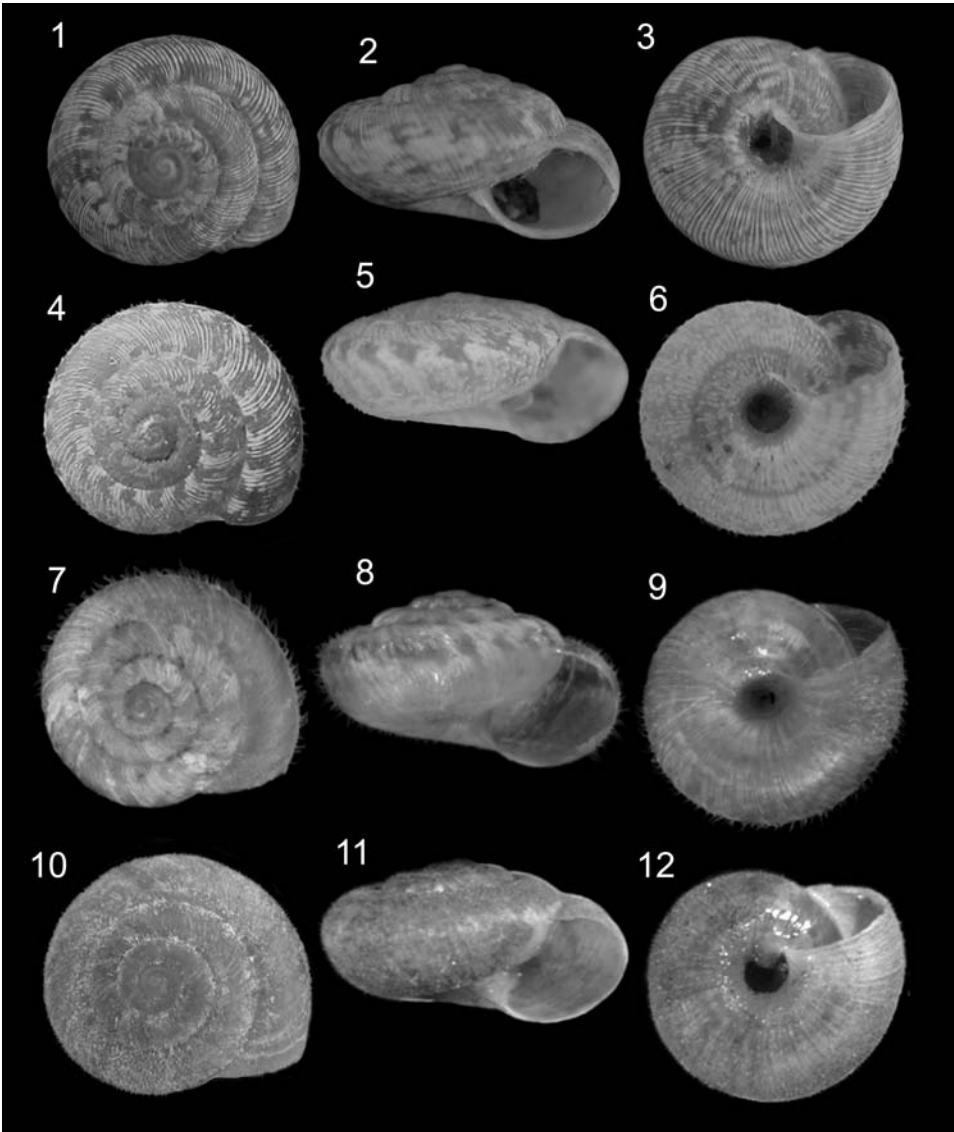
Key words: Gastropoda, Pulmonata, Hygromiidae, *Helicella*, *Xerotracha*, taxonomy, endemism, Spain, Portugal.

INTRODUCTION

Since its description by Gasull in 1972, the taxonomic status of the hygromiid *Helicella (Xerotracha) mariae* has been considered uncertain. It was collected from a single locality in the southeast of the Iberian Peninsula in the province of Almería ["Sierra de Gata, Sabinal ravine, Mediodía summits (19-1-1973)"; UTM: 30SWF76].

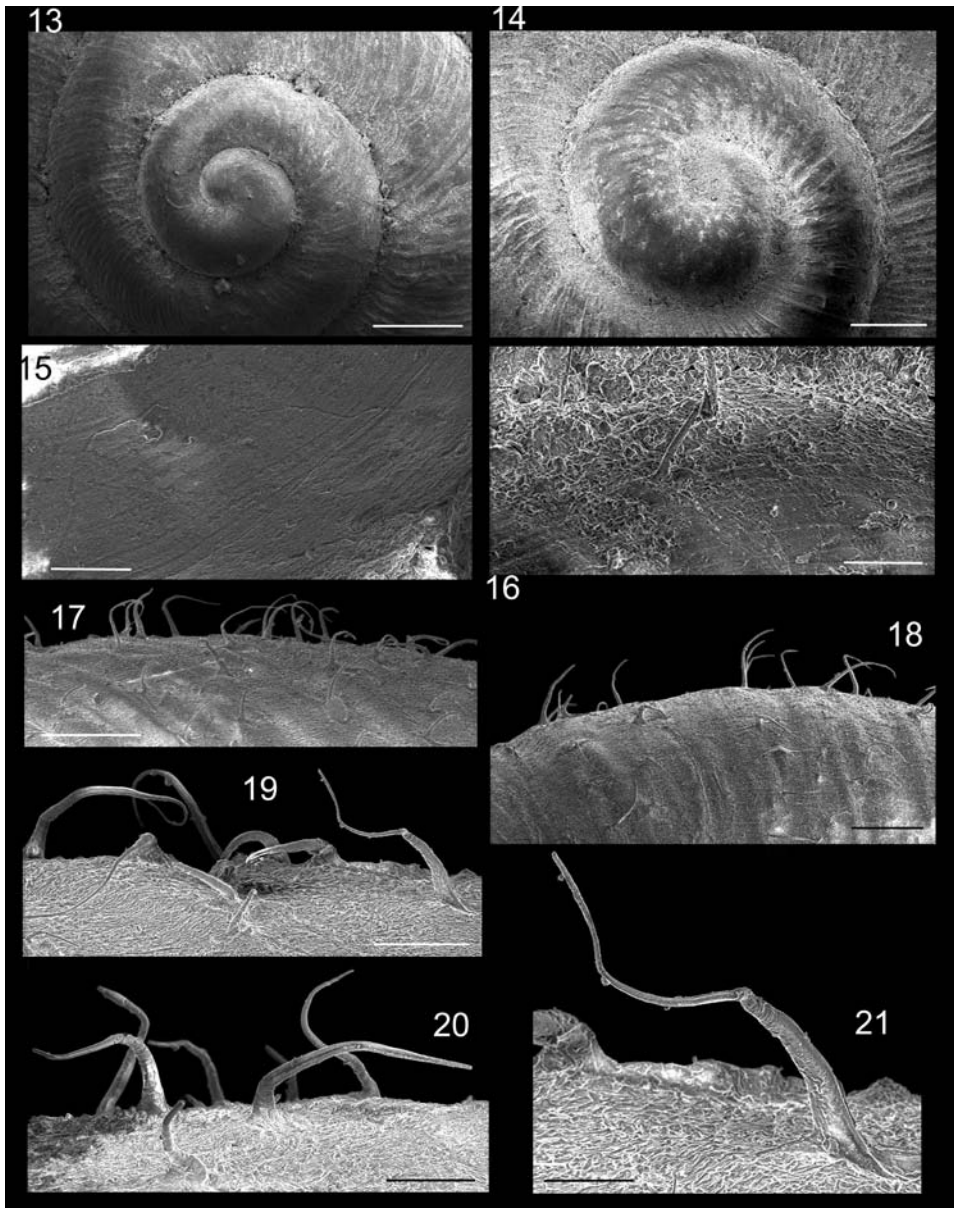
The description and generic assignment of *Helicella (Xerotracha) mariae* were based on conchological characteristics only. The reproductive system of three syntypes was studied by Dr. Edmund Gittenberger (in Gasull, 1972), but these were found to be sexually immature. The subgenus was named with some doubts as shown by Gasull (1972: 72) when he wrote *Helicella (Xerotracha?) mariae*, in the lower part of the figure, with a question mark. This suggests that he assigned it uncertainly to *Helicella (Xerotracha)* for its conchological similarity, mainly its hairiness, which it shared with *Helicella (Xerotracha) conspurcata*. Currently, *Xerotracha* Monterosato, 1892 is a valid genus, different from *Helicella* within Hygromiidae according to Giusti & Manganeli (1989), who elevated it to genus. Puente (1994: 473) named it *Helicella (?) mariae* and Arrébola (1995: 471) *Xerotracha (?) mariae*. Both authors indicate the necessity to know the genital anatomy of this taxon in order to confirm its generic placement. *Xerotracha* can be distinguished from *Helicella* by its dart-sac complex. The dart-sac complex of *Helicella* has two reduced and externally invisible accessory sacs, which are somewhat visible in *Xerotracha*, and two dart-sacs are more developed in *Helicella* than in *Xerotracha*. In addition, *Helicella* has an interior elliptic wall in the dart-sac complex, which is absent in *Xerotracha*, and there are two connected tongue-like structures in *Helicella*, with independent apical in *Xerotracha*.

Moreover, Arrébola indicates that the available conchological data on this taxon do not allow for a clear differentiation from other similar taxa, such as *Xerotracha conspurcata* (Draparnaud, 1801) (Arrébola, 1995) or *Microxeromagna lowei* (Potiez & Michaud, 1835) (pers. comm.). *Microxeromagna* Ortiz de Zárate, 1950 is characterized by having one dart-

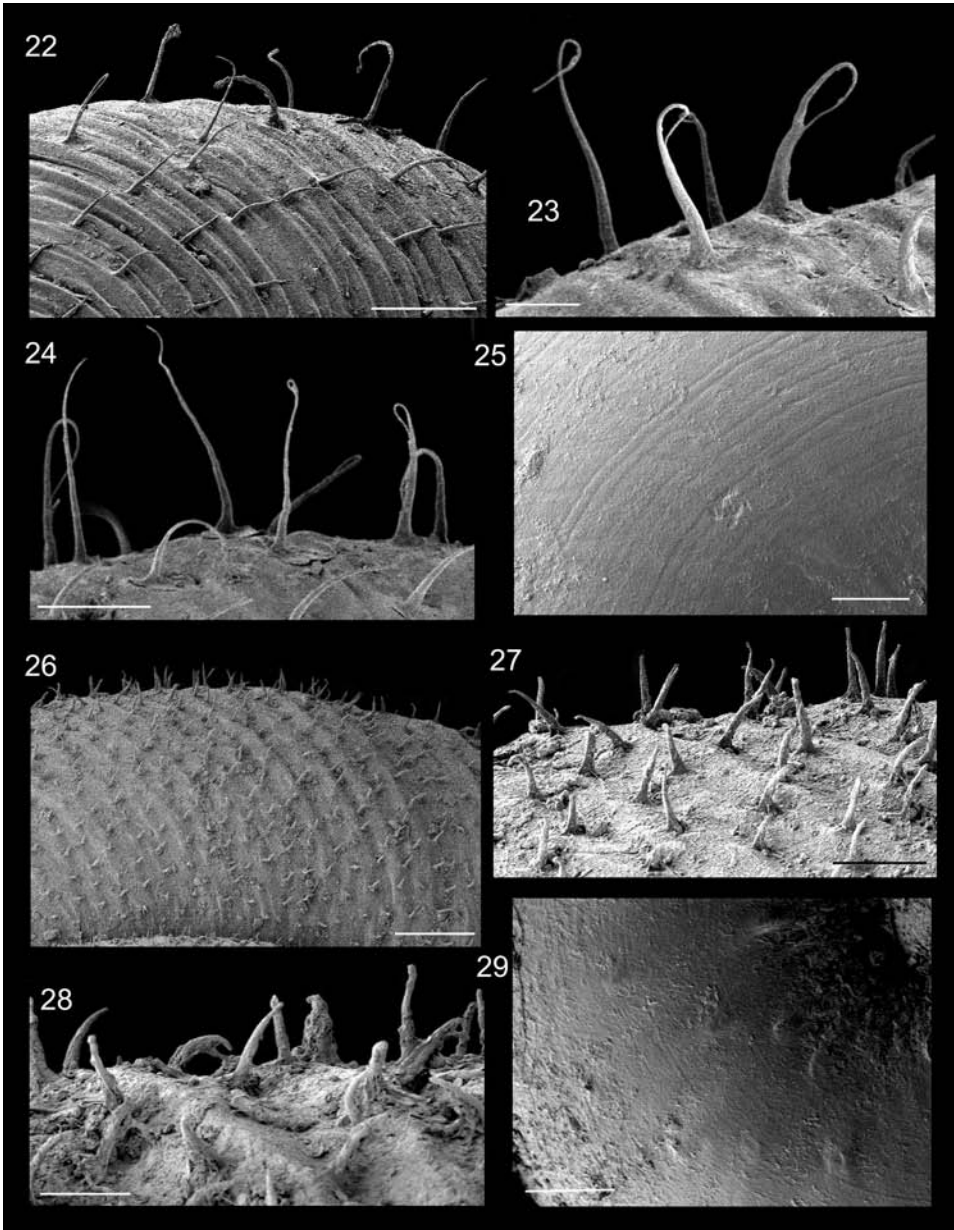


Figs 1-12. Some Spanish hygromiids. 1-3. Lectotype of *Helicella mariae* Gasull, 1972 (diameter (\varnothing)=5.8 mm). 4-6. Paralectotype of *H. mariae* (\varnothing =5.25 mm). 7-9. *Xerotricha conspurcata* (Muro d'Alcoi, river Serpis, Alicante province, Spain) (\varnothing =6.51 mm). 10-12. *Microxeromagna lowei* (Ayora, Meca, Valencia province, Spain) (\varnothing =5.16 mm).

sac, with one dart, and an accessory sac partially joined on one side of the vagina. Both *Xerotricha conspurcata* and *Microxeromagna lowei* are also present in the province of Almería. Arrébola (1995) also indicates that, according to Gasull (1972), *H. mariae* differs from *X. conspurcata*, because it has more depressed shells with an incipient keel and more



Figs 13-21, Shell details of *Helicella mariae*. 13-16. Protoconch. 13. Lectotype (bar (b)=400 μ m). 14. Paralectotype (b=200 μ m). 15. Sculpture (b=30 μ m). 16. Hairs (b=30 μ m). 17-21. Teleoconch hairs (17-18. b=200 μ m; 19. b=70 μ m; 20. b=70 μ m; 21. b=30 μ m).



Figs 22-29, shell sculpture of some Spanish hygromiids. 22-25. *Xerotricha conspurcata*. 22. Protoconch sculpture (bar (b)=300 μm). 22-24. Hairs and sculpture of teleoconch (21. b=100 μm ; 22. b=200 μm). 25. Protoconch sculpture (b=50 μm). 26-29. *Microxeromagna lowei*. 26-28. Hairs and sculpture of teleoconch. (26. b=300 μm ; 27. b=100 μm ; 28. b=80 μm). 29. Detail of the protoconch (b=80 μm).

regular ribs.

Recently, Ruiz, Cárcaba, Porras & Arrébola (2006) named it *Xerotricha mariae* and indicate that it has never again been found in its type locality nor in the rest of the Sierra de Gata, in spite of detailed sampling. Thus both its presence and its taxonomical validity must be confirmed.

Finally, Martínez-Ortí & Uribe (2008) listed the type series of *Helicella (Xerotricha) mariae*, as well as the number of syntypes. Besides the lectotype, which corresponds to the specimen figured by Gasull (1972: 72), there are 10 paralectotypes (shells), in the Museu de Zoologia of Barcelona, and three paralectotypes (shells) in the Nationaal Natuurhistorisch Museum-Naturalis in Leiden (The Netherlands). Martínez-Ortí & Uribe (2008) also indicate that both their taxonomical validity and their generic placement in the Family Hygromiidae, are yet to be confirmed.

In this work, conchological characteristics of *Helicella mariae*, such as protoconch and teleoconch hairs and microsculpture, are compared with those in *X. conspurcata* and *M. lowei*, to verify if it can be assigned to either genus and/or species. Furthermore, I have tried to obtain information about the genitalia of the dried specimens, extracted from two of the shells of the type series, which could support the generic assignment of *H. mariae* in the Family Hygromiidae.

MATERIAL AND METHODS

The type series deposited in the Museu de Zoologia of Barcelona has been revised. [lectotype n°84-8396A (shell) and paralectotypes n°84-8396B (10 shells)] (Martínez-Ortí & Uribe, 2008). This sample contains two labels. One of them indicates that the collected date is 14-II-1962, which is considered correct, and the other label 19-I-1973, can be considered a mistake, for the paper's publication date is 1972.

In the type material microphotographies of *H. mariae*, realized in the HITACHI S-4100 Scanning Electron Microscope, the habitual coat with gold-palladium was not used in order not to alter the characteristics of the shell, whilst it was used on the specimens of *M. lowei* and *X. conspurcata*. The extracted dried specimens from inside the shell of the lectotype and of one paralectotype were softened with sodiumphosphate and permanent slides were made, in the case of the lectotype, whereas the paralectotype was preserved in ethanol 70%.

The localities of the photographed specimens of *X. conspurcata* in this manuscript correspond to Muro d'Alcoi, river Serpis (Alicante) (Figs. 7-9), Benissa, Cala Baladrar (Alicante) (Fig. 25), l'Alcudia, Magro river (Valencia) (Figs. 23-24) and the vineyards of the Pobla del Duc (Valencia) (Fig. 22), and the ones of *M. lowei* correspond to Ayora, la Meca (Valencia) (Figs. 10-12) and the vineyards of the Puebla del Duc (Valencia) (Figs. 26-29).

RESULTS AND DISCUSSION

Shell morphological data. -- The shell of *H. mariae* shows periostracal hairiness on the protoconch (figs. 13, 14 and 16) as well as on the teleoconch (figs. 17-21). This hairiness can be partially lost when shells become older. However, *Helicella* lacks hairs and hair-pits on the protoconch and the teleoconch, both in its young and older stage (Arrébola, 1995; Martínez-Ortí, 1999). The protoconch sculpture of *H. mariae* (fresh or older shells) consists of thin parallel spiral lines (fig. 15), that disappear on the teleoconch, which has an irregular reticulated surface (figs. 19-21), as in *X. conspurcata* and *M. lowei* (Giusti & Manganeli, 1989; Giusti, Manganeli & Schembri, 1995).

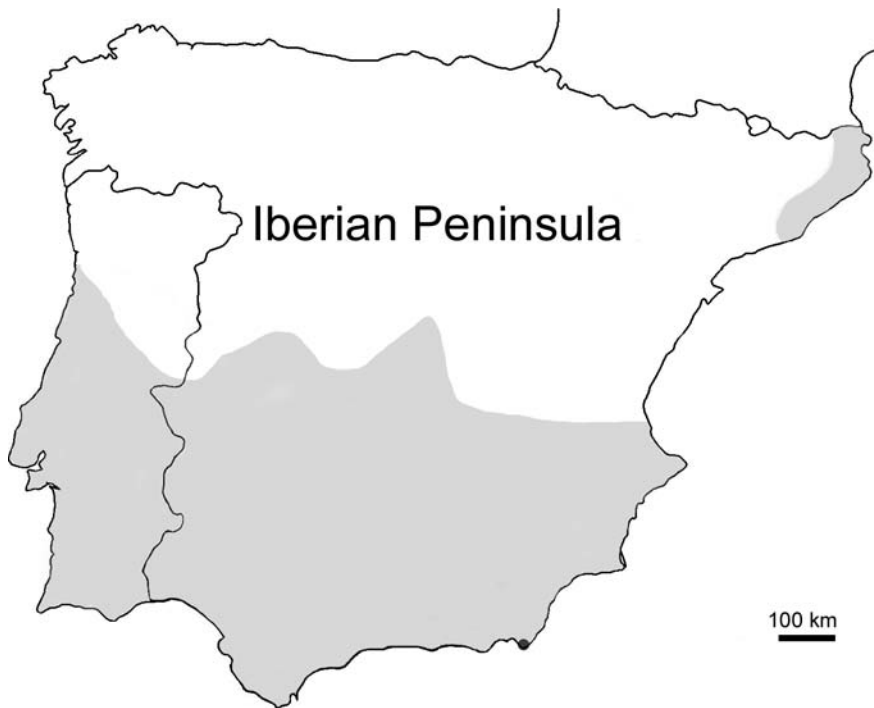


Fig. 30. Distribution map of *Xerotricha conspurcata* in the Iberian Peninsula based on Puente 1994, Martínez-Ortí, 1999; Ruiz *et al.*, 2006 and new data (dot: *Locus typicus* of *Helicella mariae* Gasull, 1972).

In the description of *H. mariae*, Gasull (1972) only points out that the hairs are thin, without giving further information about them. However, in my detailed study I show that the hairs are long and curved in their distal half portion (figs. 17-21), where they are much thinner, even creating a loop (fig. 19), as Gasull (1977) already indicated for *X. conspurcata*.

The hairs of the *X. conspurcata* and *M. lowei* to which *H. mariae* has been compared, show a different morphology. According to different authors such as Gasull (1977), Giusti & Manganelli (1989), Puente (1994), Arrébola (1995), Puente & Altonaga (1995), Martínez-Ortí (1999, 2000), Ruiz *et al.* (2006), amongst others, the hairs of *X. conspurcata* and *M. lowei* differ in length and density. In *M. lowei* they are shorter and more abundant whilst in *X. conspurcata* they are longer and less abundant (figs. 22-14; 26-28). This is most evident in both species' younger specimens.

With respect to the density, distribution, abundance and morphology of the protoconch hairs, *Helicella mariae* (fig. 17-21) is similar to *Xerotricha conspurcata* (figs. 22-24) and different from *Microxeromagna lowei* (fig. 26-28).

Besides, the colour pattern in *H. mariae* (figs. 1-6) is much more similar to *X. conspurcata* than *M. lowei*, for the presence of many white flecks (figs. 7-9).

The protoconch and teleoconch sculpture (figs. 15, 16, 25, 29) (figs. 21, 23, 27) in the three taxa is very similar, with the presence of numerous parallel thin spiral lines. This protoconch morphology is common in many other hygromiids, such as in *Helicella* Férussac, 1821 (Martínez-Ortí, 1999, 2006), *Microxeromagna* Ortiz de Zárate, 1950 (Giusti &

Manganelli, 1989), *Trochulus* Chemnitz, 1786 (Martínez-Ortí, 2006), *Xerocrassa* Monterosato, 1892 (Martínez-Ortí, 1999, 2000, 2006) or *Xerotricha* Monterosato, 1892 (Giusti & Manganelli, 1989; Giusti *et al.*, 1995). Hence, it is not a valid character to assign to one of these genera.

Other morphological characters pointed out by Gasull (1972) for *H. mariae*, such as size, thin and regular ribbing in the dorsal area, small umbilicus, a discontinuous cutting and non-reflected peristome, the nearly imperceptible presence of incipient keel and almost round and somewhat oblique aperture, can be also valid for *X. conspurcata* and/or *M. lowei* (figs. 1-12). Later Gasull himself (1977) and Puente & Altonaga (1995) indicate the conchological similarity between the last two taxa, and consequently with *H. mariae*.

Data about the reproductive system morphology. – The two dried bodies studied of *H. mariae*, from the lectotype and from one paralectotype, showed neither dart-sacs nor darts, due to the fact that the examined specimens had not reached sexual maturity, as was also the case with the other three paralectotypes examined by Gittenberger (in Gasull, 1972). Therefore the genital-anatomical study does not allow me to assign *H. mariae* to either the genus *Xerotricha* or the genus *Microxeromagna*.

Distribution. – *Helicella mariae* is known from only one locality of the Natural Parc of Cabo de Gata in Almería (fig. 30), where it has never been found again (Ruiz *et al.*, 2006; Arrébola, pers. comm.), despite intense prospecting realized in this area in the last years.

On the other hand, both *M. lowei* and *X. conspurcata* are well known species in the Iberian Peninsula; and both are widely distributed in Andalusia as well. *X. conspurcata* is scarcer in the province of Almería (fig. 30) (Puente, 1994; Puente & Altonaga, 1995; Arrébola, 1995; Martínez-Ortí, 1999; Ruiz *et al.*, 2006; own data).

CONCLUSIONS

The conchological results obtained confirm that *Helicella mariae* does not belong to genus *Helicella*, as this genus lacks hairs and hair-pits, on the protoconch and the teleoconch. Therefore, *H. mariae* must be reassigned to another genus in the Family Hygromiidae. The morphological characteristics of the shell in general, and especially the morphology and density of the hairs observed in *H. mariae* coincide with those present in *Xerotricha conspurcata*. Finally the *locus typicus* of *H. mariae* is situated within the distribution area of *Xerotricha conspurcata* in Andalusia and in the Iberian Peninsula (Fig. 30). Therefore, I conclude that *Helicella (Xerotricha) mariae* Gasull, 1972 must be considered a junior synonym of *Xerotricha conspurcata* (Draparnaud, 1801).

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