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Additions in relation to Gerardiidae from the Macaronesian waters and the Mediterranean Sea (Anthozoa: Zoantharia)

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Ocaña, O., A. Brito, G. González & R. Herrera (2007). Nuevos datos sobre la familia Gerardiidae (Anthozoa: Zoantharia) en aguas macaronésicas y en el Mediterráneo. *VIERAEA* 35: 163-168.

RESUMEN: Estudios llevados a cabo con nuevo material de Canarias confirman la presencia de la especie *Gerardia* (= *Savalia*) *savaglia* (Anthozoa: Zoantharia) en aguas de la Macaronesia. En Canarias esta especie es capaz de formar poblaciones integradas por numerosas colonias que generan su propio esqueleto. La confirmación de la presencia de *Gerardia* (= *Savalia*) *savaglia* y *Gerardia* (= *Savalia*) *macaronesica* resuelve la confusión taxonómica que estas especies de zoantídeos parásitos había suscitado en el área. El reconocimiento de la presencia de la especie *Gerardia* (= *Savalia*) *savaglia* se basó en caracteres morfológicos y de cnidoma, demostrando la fiabilidad de estos descriptores a la hora de identificar zoantídeos.

Palabras claves: Nueva cita, Macaronesia, zoantídeo parásito, Gerardiidae, cnidoma.

ABSTRACT: Studies focused on new material collected in Canary Islands find out the presence of the species *Gerardia* (= *Savalia*) *savaglia* (Anthozoa: Zoantharia) in Macaronesian waters. This species is able to form populations

of numerous colonies growing from its own skeleton. The presence of both species *Gerardia* (*Savalia*) *savaglia* and *Gerardia* (= *Savalia*) *macaronesica* (see Ocaña & Brito, 2004) in Macaronesian waters putting an end to the confusion regarding the parasitic species able to generate their own horny skeleton. We recognize *Gerardia* (= *Savalia*) *savaglia* on the base of the morphology and the cnidome proving that these characters are useful tools to distinguish species of zoantharia.

Key words: New record, Macaronesian waters, parasitic zoanthids, Gerardiidae, cnidome.

INTRODUCTION

In 2004 we published a paper with the revision of the zoantharia species able to parasitize on gorgonians and antipatharians in Mediterranean and Macaronesian waters (Ocaña y Brito, 2004). Basically, we made this paper following to Roche & Tixier-Durivault (1951) and their approach on the importance of the axial skeleton character. We described the new species, *Gerardia macaronesica* Ocaña & Brito (2004), distributed along the Macaronesian Archipelagos, Cabo Verde Islands and the Gulf of Guinean (Principe). Ocaña & Brito (2004) described two ecological forms of *Gerardia macaronesica*, one growing parasitic on antipatharians and the other growing from its own horny skeleton. Because the scarce and not well fixed material of the second ecological form, we can not study deeply it.

The recent study of new material of the second ecological form that is able to grow from its own horny skeleton find out the presence of two different species of Gerardiidae in the Canaries. These are *Gerardia macaronesica* and *Gerardia savaglia* (Bertoloni, 1819), the last one is well known from the Mediterranean.

These results have allowed to clarify some disorder derived from recent molecular studies by Sinniger *et al.* (2005).

MATERIAL AND METHODS

We study the material following the same methods using in other papers (see Ocaña & Brito, 2004). The new materials of the species *Gerardia savaglia* collected and studied by us come from Gran Canaria (El Cabrón, Arinaga, Gran Canaria, 15-09-2007, 30 meters, small portion of a branch from a big colony, O. Ocaña y R. Herrera leg.), Lanzarote (Montaña Clara, Lanzarote, 23-07-2005, 40 meters, 1 colony, Gustavo González leg.) and Tenerife (Puerto de la Cruz, Tenerife, 10-08-2006, 35 meters, small portion of a branch from a big colony, O. Ocaña leg.).

RESULTS AND DISCUSSION

The characters studied on the polyps of the new material collected from Canary Islands fit very well with the description of *G. savaglia* from the Mediterranean. The

number of tentacles (25, 27, 28) and the characteristic cnidome with the special rounded spirulae and the conspicuous penicilli E distributed only in the body wall. Furthermore, this new material assigned to the species *Gerardia savaglia* present an extraordinary development as well as happen to this species in the Mediterranean (O. Ocaña obs. pers.).

In Ocaña & Brito (2004) we made a mistake recognizing two ecological forms instead of differentiating two different species of the genus *Gerardia* from the Macaronesian waters. These two species are *Gerardia macaronesica* and *Gerardia savaglia*. At the time we made the papers (see Ocaña & Brito, 2004; Brito & Ocaña, 2004) we overlooked the material of the big colonies growing with their own skeleton from Gran Canaria. These big colonies do not correspond with *G. macaronesica* but with *G. savaglia* and the material of this last species was very scarce at that time (exclusively the material from Punta de la Sal, El Cabrón, Gran Canaria). The analyzed colonies of *G. macaronesica* were growing mainly on *Antipathella wollastoni*, and some others occurred directly on the rocky bottoms or vertical walls, with scarce skeleton development. After checking new material (not included in Ocaña & Brito, 2004 and Brito & Ocaña, 2004), collected in the Canaries, corresponding to big colonies growing on its own skeleton, we conclude that all these new material belong to the species *G. savaglia*.

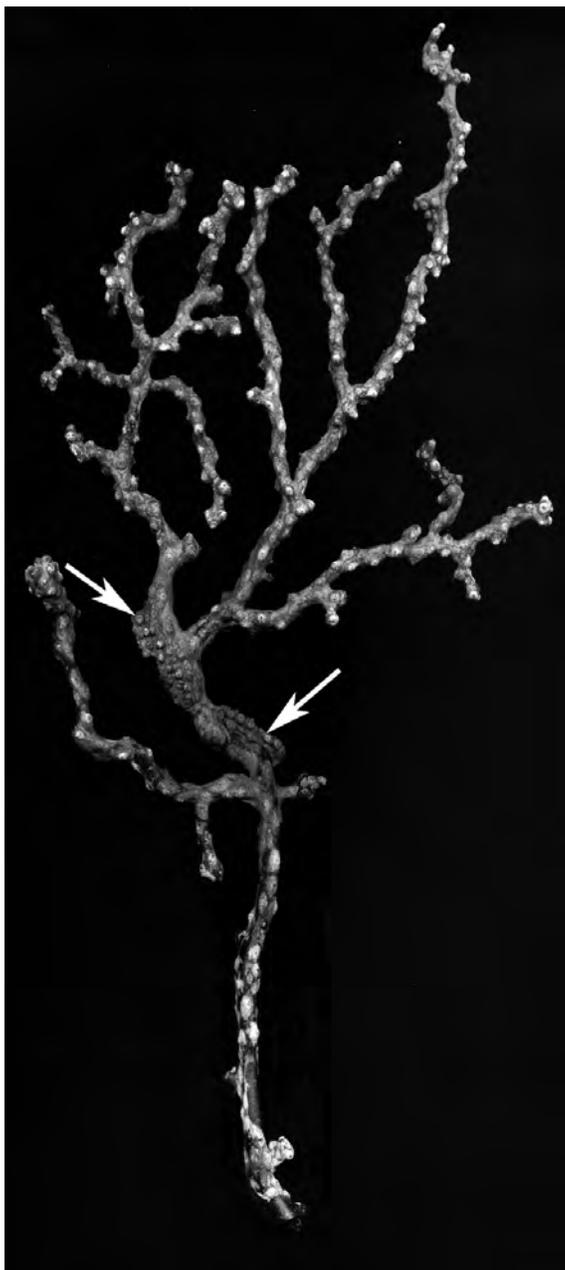


Figure 1. Colony of *G. savaglia* growing on its own skeleton from Montaña Clara Island showing the mark of the parasite *Laura gerardiae*.

All the material referred in the paper (see Ocaña & Brito, 2004) should be assigned to the species *G. macaronesica*, with the exception of the colony collected in Punta de la Sal, El Cabrón, Gran Canaria, which is *G. savaglia*. The colour images included in Ocaña & Brito (2004) should be considered all of them referred to *G. macaronesica*, with the exception of the next Figures: 5a and e; 8 and 10, which correspond to *G. savaglia*. The images included in Brito & Ocaña (2004) belong to the species *G. savaglia* (Figures: 152, 136, 121, 75, 54 and Lámina 67a,b, c).

In the three spots (mentioned in Material and Methods) the species *G. savaglia* occurs and is able to form important populations of big colonies. In fact, these kinds of ecological features (with numerous big colonies) are exclusively known from the Macaronesian waters (see Brito & Ocaña, 2004, Fig., 136). Meanwhile, in the Mediterranean Sea *G. savaglia* has been well known since the past although big populations have not recorded.

We recognize the species *G. savaglia* following the morphological classification focused on the cnidome characters as we have already stated (see Ocaña & Brito, 2004). However, we studied other additional characters, as the basal plate or the number of tentacles, typical from the *G. savaglia* way of growing. From the ecological point of view, we also notice the typical marks of the parasitic ascothoracic crustacean *Laura gerardiae* studied by Lacaze-Duthiers (1882) (see fig. 1).

The status of the material recorded from Madeira (see Johnson, 1899) is still uncertain. Nevertheless, Johnson's description fits very well the characters of the horny axis developed by *Gerardia savaglia*, «to be minutely wrinkled and finely punctured», and indeed without spines or similar features. Also, it is confirmed, along his paper, the presence of 24 tentacles in the polyps studied, a fine character known from *G. savaglia*. Possibly, the species is present in Madeira and also is extended to Azores and further north, so it would be desirable new collecting efforts. We also collected material of *G. savaglia* from Asilah (Morocco), confirming the presence of this species in the Atlantic coast of Morocco.

Our present work tries to help in the understanding of the particular taxonomical problem of parasitic zoanthids from the Macaronesian waters. It confirms the genetic data of Sinniger *et al.*, (2005) in the case of *Gerardia* (=Savalia) genus. The genetic contributions (see Sinniger *et al.*, 2005) assume the identical genetic sequences between the material of *Gerardia* (=Savalia) *savaglia* from the Mediterranean Sea and the material of *Gerardia* (=Savalia) *macaronesica* from Canary Islands. This genetic similarity is very much consistent with what we argued in our present paper on the base of morphological characters. Following our paper (see Ocaña & Brito, 2004), the material tested by Sinniger *et al.* (2005) (coming from a big colony collected in el Cabrón, Gran Canaria, Peter Wirtz, com. pers.) was referred under the name of *Savaglia* (=Gerardia) *macaronesica*, and it is now recognized as *Gerardia savaglia* from Macaronesian waters.

From the point of view of its distribution, Brito & Ocaña (2004) extended the distribution of *G. macaronesica* to the Principe Island, in the Guinea Gulf, referring also its capability of growing on hydrozoans. However, Sinniger *et al.*, (2005) make a genetic study on samples from Cape Verde and Principe including in the Bayesian tree as Cape Verde zoantharian and Principe zoantharian. Due to all this confusion about the parasitic zoantharia in the Macaronesian waters, this genetic study assume the material before referred (from Cape Verde and Principe) is a new genus and species but did not recognized them as *Gerardia* (=Savalia) *macaronesica*. Although the type specimens of *Gerardia*

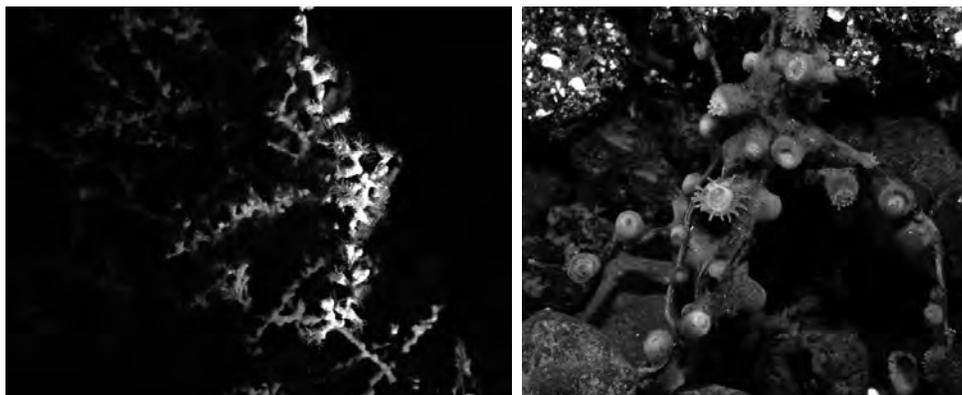


Figure 2. Colonies of *G. macaronesica* from Canary Islands developing a thin horny skeleton.

(=*Savalia*) *macaronesica* came from Cape Verde Archipelago. In fact, the material of Sinniger *et al.* (2005) from Cape Verde and Principe Island should be merged to *Gerardia* (= *Savalia*) *macaronesica*.

The confirmed existence of two Gerardiidae (parasitic zoanthids able to generate horny skeleton) in the Atlantic waters is consistent with the argument that both, *G. macaronesica* and *G. savaglia*, may be Guinean species that could have reached the Macaronesian archipelagos and the Mediterranean Sea respectively (see Ocaña & Brito, 2004).

From the point of view of the morphology, *G. macaronesica* is well defined by its quite different cnidome in Ocaña & Brito (2004). The cnidome and the others morphological features that we find out for *G. macaronesica* are also consistent with the genetic differences found by Sinniger *et al.* (2005) for the material from Guinea and Cape Verde. That proves that the morphology and the cnidome are useful tools to distinguish species of zoantharia *sensu lato*. On the other hand, Sinniger *et al.*, (2005) did not find secreted axis in their material from Cape Verde and Principe. As we pointed out (see Ocaña & Brito, 2004) *G. macaronesica* develop horny skeleton. Although the horny skeleton present a modest inconspicuous development when the species is growing on vertical walls or on rocky platforms, but it is conspicuous in the marginal zones where the antipatharians do not offer skeleton to the zoanthids (see fig., 2; see Ocaña *et al.*, 1995, fig. 4b).

Meanwhile, the proposal of a new genus based on genetic characters should be considered (see Sinniger *et al.*, 2005). The species *G. macaronesica* present a quite different cnidome in terms of categories and this fact supports the hypothesis of the new genus. The recent found of *Gerardia* (= *Savalia*) genus in the Indopacific (Ocaña *et al.*, in prep.) may eventually also support the existence of a different genera with horny axis among zoantharia. Following Carlgren's conception of the zoantharia systematic (see Carlgren, 1895), Sinniger *et al.* (2005) do not consider the Gerardiidae family for taxonomical purposes, being merged into the Parazoanthidae family. Their Bayesian tree of the molecular characters showed a complex Parazoanthidae family with different lineages. The relation between them and between the *Gerardia* (= *Savalia*) within the *Parazoanthus* genus have not been well established, and this fact does not allow to reject or accept the existence of the monophyletic groups.

For practical reasons, all the zoantharia with horny skeleton (more or less developed) should be merged into separate taxonomical units. For the time being, we think that the family Gerardiidae should be maintained, although perhaps in the future other taxonomical partition may be more appropriate.

Morphological point of view do not has to be coincident to genetic perspective and what we consider a single taxonomical species could be a different genetic species. Meanwhile, both perspectives should be considered in order to understand better the systematic and the evolution of any group of species.

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REFERENCES

- BRITO A. & O. OCAÑA (2004). *Corales de las islas Canarias*.- La Laguna: Francisco Lemus Editor, 477 pp.
- CARLGREN O. (1895). Ueber die Gattung Gerardia Lac.-Duth. Ofvers.- *K. Vetensk. Akad. Forhandl.* 5: 319-334.
- JOHNSON, J. Y. (1899). Notes on the Antipatharian corals of Madeira, with description of a new species and new variety with remarks on a specimen from the West Indies in the British Museum.- *Proc. Zool. Soc. London* 1899, part. 4:813-824.
- LACAZE-DUTHIERS, H. (1882). Histoire de la *Laura gerardiae*, type nouveau de crustacé parasite.- *Mém. Acad. Sci. Inst. France* 42: 1-160.
- OCAÑA O. & A. BRITO (2004). A review of Gerardiidae (Anthozoa: Zoantharia) from the Macaronesian Islands and the Mediterranean Sea with the description of a new species.- *Rev. Acad. Canar. Cienc.* 15 (3-4): 159-189.
- OCAÑA O., A. BRITO, J. NUÑEZ Y J. J. BACALLADO (1995). Redescipción de *Gerardia savaglia* (Bertoloni, 1819) (Anthozoa: Zoantharia: Gerardiidae).- *Vieraea* 24: 153-164.
- ROCHE, J. & A. TIXIER-DURIVault (1951). Rapports des Gerardiides avec les Zoanthides et les Antipathaires.- *Bull. Mus. Hist. nat., Paris* (Sér. 2) 23 (4):402-409.
- SINNIGER, F, J.I.MONTOYA-BURGOS, P. CHEVALDONNÉ & J. PAWLOSKI (2005). Phylogeny of the order zoantharia (Anthozoa, Hexacorallia) based on the mitochondrial ribosomal genes.- *Marine Biology* 147:1121-1128.