A new species and genus of aeolid nudibranch (Mollusca, Gastropoda) from the Iberian coasts

by José Carlos García-Gómez and Juan Lucas Cervera

Abstract. — Two specimens of a new species of aeolid nudibranch from Southern Portugal, Algarvia alba n. sp., are described. This species is placed in the new genus Algarvia, within the Facelinidae. Algarvia n. gen. differs from members of the closely allied genera according to a set of morphological features, of which the more remarkable are the following: head with an enlargement on each side, rhinophores with some lamellae (they can be interrupted in front and/or behind the rhinophoral axis), nephroproct and gonopores interhepatic, masticatory border of jaws smooth, penis simple and unarmed. We add a comparative table among the new genus and other closely allied genera.

Résumé. — Nous décrivons une espèce nouvelle de nudibranche éolidien du sud du Portugal, Algarvia alba n. sp., à partir de deux exemplaires. La nouvelle espèce est placée dans le nouveau genre Algarvia, inclus dans les Facelinidae. Algarvia n. gen. est distinct des autres genres de la famille par plusieurs caractéristiques morphologiques dont les plus remarquables sont : tête élargie de chaque côté, rhinophores ayant quelques lamelles (qui peuvent être interrompues devant et/ou derrière l’axe du rhinophore), néphroprocte et gonopores interhépatiques, bord masticatoire des mâchoires lisse, pénis simple et inerme. Un tableau comparatif du nouveau genre avec d’autres genres étroitement liés est donné.

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INTRODUCTION

In an earlier paper (García-Gómez et al., in press, a), a check-list of the opistobranch molluscs collected and identified during the international Marine Biological Expedition “Algarve-88” (May-June, 1988) (organized by the MNHN of Paris, Dr. P. Bouquet, and the INIP of Portugal, Dr. L. Saldanha) was furnished. New data on the results of this expedition were given in another recent paper (García-Gómez et al., in press, b) that was partially done with material of the mentioned expedition.

In this paper, two specimens of an unknown species of aeolid nudibranch collected during the “Algarve-88” expedition are described and their systematic placement within the Aeolidacea is discussed.

Abbreviations

a, anus; am, ampulla; ce, cephalic enlargements; dd, deferent duct; fgl, female gland; gp, genital pore; hd, hermaphroditic duct; hw, hyaline white; m, mouth; ne, nephroproct; or, orange red; ow, opaque white; p, penis; pr, prostate.
Order NUDIBRANCHIA Cuvier, 1817

Family FACELINIDAE Bergh, 1889

ALGARVIA n. gen.

**Diagnosis:** Body elongate, with a cephalic enlargement on each side, limaciform. Foot corners tentacular. Rhinophores with some lamellae; they can be interrupted in front and/or behind the rhinophoral axis. Cerata arranged in single oblique rows. Anus cleioproctic. Nephroproct and gonopore interhepatic. Masticatory border of jaws smooth. Radula uniseriate with cuspitate rachidian teeth. Central cusp of rachidian wide, with triangular adjacent denticles. Penis simple and unarmed.

**Type species:** *Algarvia alba* n. sp.

**Etymology:** The name *Algarvia* is dedicated to the region of Algarve (Southern Portugal), along whose coasts the "Algarve-88" expedition occurred.

*Algarvia alba* n. sp.

**Material:** Sagres (Southern Portugal) Baia da Baleeira, entrance to the harbour, bottom with rocks and ooze, 13 m (37°00'N; 08°55'W): one specimen of 5 mm in length (21 May 1988); one specimen of 2'5 mm (24 May 1988).

**External Anatomy** (figs 1-6)

The body is elongate and has a very conspicuous enlargement on each side of the head, in front of the rhinophores. These enlargements form a small recess that corresponds to the space between the bases of the oral tentacles. The foot is slightly wider than the body, has a small notch anteriorly and tapers posteriorly to a pointed tail. The rhinophores have 5 oblique lamellae arched posteriorly. The two upper lamellae are interrupted behind and the three remaining ones are interrupted in front and behind, being different in size. The rhinophores have a swelling over the upper lamella (figs. 1, 2, 4, 6). The oral tentacles are elongate, starting from the cephalic enlargements. The foot corners are tentacular, about 2/3 of the length of the oral tentacles. The cerata are arranged in single oblique rows (fig. 6). The ceratal formula in the specimen of 5 mm was I-5, II-4 (anterior ceratal cluster), III-3-4, IV-3, V-3, VI-3, VII-2, VIII-1-2. The longest cerata are more dorsal and longer than the rhinophores and the oral tentacles. The anus is cleioproctic (fig. 6), located behind the lower ceras of the first post-pericardial row. The nephroproct is situated between the second and third ceratal rows, within the interhepatic space. The gonopore is also located within the interhepatic space on the right side of the body, at the pericardial level.

**Coloration** (figs 1-5)

The ground color is hyaline white with opaque white pigment that covers the whole of the animal except the foot, the tips of cerata, rhinophores and oral tentacles. Orange red
**Figures 1-4.** *Algarvia alba* n. gen., n. sp.: 1, dorsal view; 2, lateral view of the anterior part; 3, ventral view of the anterior part; 4, anterior (a), inner left (b) and posterior (c) views of a rhinophore.
pigmentation covers most of the dorsal surface of the oral tentacles and a large portion of the surface of the cephalic enlargements. This pigment is also present on the apical part of the rhinophores, except at their tips, as well as on part of the two upper rhinophoral lamellae and part of the anterior rhinophoral face.

**INTERNAL ANATOMY (figs 7-9)**

The jaws are gold in color and concave, with a short and smooth masticatory border. Their shape is depicted in figure 7. The radular formula of the specimen of 5 mm is $23 \times 0.1.0$. The radular teeth (fig. 8) are thin and elongate. On the either side of the prominent triangular central cusp are 4 triangular denticles, but from 15th tooth up to the last, the central cusp becomes shorter. The reproductive system (fig. 9) has a hermaphroditic duct that widens in an elongate ampulla, which bends at the proximal end. The relatively long vas deferens forms an almost spherical prostate joining the penis, which is simple and unarmed. The location of the seminal receptacle was not observed, probably due to its internal position within the female gland and also to the small size of the specimen.

**ETYMOLOGY**: The specific name *alba* refers to the opaque white pigmentation covering almost the whole of the animals of this species.

**HOLOTYPE**: The specimen of 2.5 mm in length was designated as holotype, being deposited in the collections of the Muséum national d'Histoire naturelle, Paris.

**DISCUSSION**

Facelinid taxonomy fell into two schools of thought twenty years ago. One recognized the genera on the basis of the mode of branching of the liver and the arrangement of cerata that results from it. Thus, the two major groups should be composed by the species in which the anterior liver gives off cerata in rows (subfamily Facelininae or family Facelinidae) and the species in which the anterior liver gives off cerata in arches (subfamily Favorininae or family Favorinidae) (*Marcus*, 1958; *Miller*, 1974; *Rudman*, 1980). The other trend was that of the *Edmunds* (1970), who stated that reproductive characters, particularly the development of the seminal receptacle and the gametolytic gland (quoted by this author as bursa copulatrix), should take taxonomic precedence over ceratal arrangement, and that ceratal arrangement should be considered polyphyletic. *Edmunds* argued that the Favorinidae and Facelinidae are polyphyletic and that separation of the two families on the basis branching of the digestive system does not accurately reflect evolution within the groups. According to *Gosliner* (1980), *Miller’s* (1974) placement of the families Favorininae, Cratenidae, Facelinidae and Herviellidae as subfamilies within Glaucidae does not solve the problem, because these are still polyphyletic units established on the basis of convergence in ceratal arrangement. According to *Gosliner* (1980), establishment of phyletic units on the basis of reproductive system seems more accurate and decreases the number of polyphyletic taxa. Thus, this author discarded the subfamilies proposed by *Miller* (1974) and retained the species in a single large family, the Facelinidae, and maintained the genera *Glaucus* Foster, 1777, and *Pteraeolidia* Bergh, 1875, in Glaucidae and Pteraeolididae, respectively. This opinion was followed by *Schmekel* and...
Figs 5-9. — *Algarvia alba* n. gen., n. sp.: 5, detail of a ceras; 6, schematic arrangement of cerata; 7, jaw; 8, sixth and twenty-third radular teeth; 9, reproductives system.

Edmunds and Just (1983) recognized that the numerous genera of facelinids are not all defined in the best way to reflect phyletic relationships, but they nevertheless prefer, as we do, to follow Gosliner (1980) rather than Miller (1974) or Rudman (1980) and retain all genera that Miller placed Phidiana Gray, 1850, sensu lato, so that these genera should be considered as distinct genera until more accurate relationships can be assessed. Willan (1987a) first followed Gosliner (1980), discarding the subfamilies proposed by Miller (1974), but later (Willan, 1987b) used the genus Phidiana sensu lato to describe P. pegasus, following Miller's proposal.

Our specimens are clearly placed in the Facelinidae sensu Gosliner (1980), as the anus is cleioproctic, the nephroproct is interhepatic and the uniseriate radula bears cuspidate teeth. However, we have not found any genus in such family in which our animals could be included. Thus, we think that the proposal of the new genus Algarvia needs to be justified and compared with the criteria followed for other species of aeolidaceans in earlier papers (Garcia-Gomez, 1984; Cervera and Garcia, 1986; Cervera et al., 1988; Garcia-Gomez and Cervera, 1989; Garcia-Gomez and Thompson, in press). Thus, in the description of the flabellinid Flabellina baetica García-Gómez, 1984, the possible placement of this species within a new genus was discussed making reference to the presence of papillate rhinophores. However, since the other external and internal characters were those of the genus Flabellina Voigt, 1834, and according to the criteria of Gosliner and Griffiths (1981), the proposal of a new genus was considered unnecessary (Garcia-Gomez, 1984). Likewise, following Rudman (1982), we have considered the aeolidid genus Berghia Trinchese, 1876-77 as synonymous with Spurilla Bergh, 1864, since the only difference between both genera is the shape of the rhinophores (Cervera and Garcia, 1986; Cervera et al., 1988; Garcia-Gomez and Thompson, in press). Another problem was raised by the accurate generic placement of Flabellina insolita García-Gómez & Cervera, 1989, as this species had internal characters (jaws, radula, reproductive system) typical of the genus Flabellina, while it showed external features clearly unusual among the aeolidaceans: rhinophores and oral tentacles enlarged at the base and small papillae flanking the pericardial area. Faced with the possibility of proposing a new genus, we decided to give more taxonomical value to the internal characters, the location of the anus and nephroproct, and the ceratal arrangement, so that we retained the species F. insolita within Flabellina (Garcia-Gomez and Cervera, 1989).

In our view, the case of Algarvia is also different. Although the internal characters of this genus do not differ clearly from those of other genera of the family, we have not been able to place our specimens in any known genus of Facelinidae taking into consideration jointly internal and external (especially the location of the anus and nephroproct, ceratal arrangement and cephalic enlargements) characters. Therefore, we think the whole of external characters together with the presence of a smooth mandibular masticatory border are sufficient to propose this new genus, which is compared in Table I with all facelinid genera that have only a seminal receptacle and the anterior ceratal cluster arranged in rows (genera of the subfamily
<table>
<thead>
<tr>
<th>Genera</th>
<th>Cephalic enlargements</th>
<th>Rhinophores</th>
<th>Anterior ceratal cluster</th>
<th>Posterior ceratal cluster</th>
<th>Foot corners</th>
<th>Masticatory border</th>
<th>Genital pore</th>
<th>Nephtoproct</th>
<th>Penis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phidiana Gray, 1850</td>
<td>-</td>
<td>Smooth, exceptionally with some rings</td>
<td>Rows</td>
<td>Rows</td>
<td>Rounded</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>With a terminal hollow spine</td>
</tr>
<tr>
<td>Facelina Alder and Hancock, 1855</td>
<td>-</td>
<td>Lamellate, exceptionally tuberculate or smooth</td>
<td>Rows or arched</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>With spines (rarely absent) often with penial gland Papillate</td>
<td></td>
</tr>
<tr>
<td>Hermissenda Bergh, 1879</td>
<td>-</td>
<td>Perfoliate</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>Simple, unarmed</td>
<td></td>
</tr>
<tr>
<td>Caloria Trinchese, 1888</td>
<td>-</td>
<td>Papillate or smooth</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>Simple, unarmed</td>
<td></td>
</tr>
<tr>
<td>Moridilla Bergh, 1888</td>
<td>-</td>
<td>Smooth, papillate or lamellate</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>Simple, unarmed</td>
<td></td>
</tr>
<tr>
<td>Facelinella Baba, 1949</td>
<td>-</td>
<td>Lamellate or smooth</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>Postpericardial With spines</td>
<td></td>
</tr>
<tr>
<td>Rolandia, Pruvo-Fol, 1951</td>
<td>-</td>
<td>Lamellate or annulate</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>? Unarmed, with accessory penial leaf</td>
<td></td>
</tr>
<tr>
<td>Facelinopsis Pruvo-Fol, 1954</td>
<td>-</td>
<td>Some lamellae</td>
<td>Rows, exceptionally some arch</td>
<td>Tentacular</td>
<td>Slightly denticulate</td>
<td>Interhepatic</td>
<td>? Unarmed, with accessory penial leaf</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palisa Edmunds, 1964</td>
<td>-</td>
<td>Papillate</td>
<td>Arches and rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Interhepatic</td>
<td>Interhepatic</td>
<td>Simple, unarmed</td>
<td></td>
</tr>
<tr>
<td>Pruvo-Folia Tardy, 1969</td>
<td>-</td>
<td>Perfoliate</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Interhepatic</td>
<td>Interhepatic</td>
<td>With spines</td>
<td></td>
</tr>
<tr>
<td>Emarcusia Ruller, 1972</td>
<td>-</td>
<td>Smooth</td>
<td>Rows</td>
<td>Rounded</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>? With a tubular stylet</td>
<td></td>
</tr>
<tr>
<td>Learchis Bergh, 1896</td>
<td>-</td>
<td>Smooth or annulate</td>
<td>Rows or arches</td>
<td>Tentacular</td>
<td>Denticulate</td>
<td>Prepericardial</td>
<td>Interhepatic</td>
<td>Unarmed</td>
<td></td>
</tr>
<tr>
<td>Algarvia n. gen.</td>
<td>-</td>
<td>Some lamellae (they can be interrupted in front and/or behind)</td>
<td>Rows</td>
<td>Tentacular</td>
<td>Smooth</td>
<td>Interhepatic</td>
<td>Interhepatic</td>
<td>Simple, unarmed</td>
<td></td>
</tr>
</tbody>
</table>

**Table I.** - Comparison of *Algarvia* with those facelinid genera that has only a seminal receptacle and the anterior ceratal cluster arranged in rows.
Facelininae, according to Miller, 1974), except Antonietta Schmekel, 1966, which also has gametolytic gland. From this Table, we can infer that Algarvia is the only one of the compared genera that possesses smooth mandibular masticatory border. Other facelinid genera with smooth mandibular masticatory border are Antonietta Schmekel, 1966, Dicata Schmekel, 1967, Hermosita Gosliner & Behrens, 1986, Phylloodesmopsis Risso-Domínguez, 1964, and Jason Miller, 1974, but the three former possess gametolytic gland, and, except Antonietta, the remaining genera have the anterior ceratal cluster arranged in arches. On the other hand, Jason has a vestigial radula. Moreover, the cephalic enlargement on each side of the head is a character unknown in any other aeolidacean.

Acknowledgements

We deeply thank Dr. P. Bouche for his kind invitation to participate in the International Marine Biological Expedition “Algarve-88” and S. F. García-Martín for his help in collection of the data for this work.

This paper has been partially supported by the project PN87-0397 of the “Comisión Interministerial de Ciencia y Tecnología” of Spain (CICYT).

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