Revision of the cosmopolitan deep-sea genus Sciadonus (Teleostei, Bythitidae) with two new species

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Revision of the cosmopolitan deep-sea genus *Sciadonus* (Teleostei, Bythitidae) with two new species

by

Jørgen G. NIELSEN (1)

**Abstract.** – The genus *Sciadonus* Garman, 1899 belongs to the aphyonid clade within the Bythitidae. The present revision is based on 304 specimens all trawled at great depths (1169-5610 m), 19 of which have not been examined earlier. As a consequence, the generic diagnosis from Nielsen et al. (1999) is here modified. The enlarged material resulted in synonymizing of *S. galatheae* (Nielsen, 1969) and *S. pedicellaris* Garman, 1899 and in the description of two new species, *S. robindsi* and *S. longiventralis*. The new species differ from the other *Sciadonus* species by lack of pigmentation, fewer dorsal fin rays and position of origin of anal fin. *S. longiventralis* differs from *S. robindsi* by shorter predorsal length (28.5 vs 42.5% SL) and length of pelvic fin rays (3.5% SL vs no pelvic rays).

**Résumé.** – Révision du genre cosmopolite d’eaux profondes *Sciadonus* (Teleostei, Bythitidae) et description de deux nouvelles espèces.

Le genre *Scianodus* Garman, 1899 appartient au clade des aphyonides à l’intérieur de la famille des Bythitidae. La révision proposée est basée sur 304 spécimens, tous chalutés à grande profondeur (1169-5610 m) dont 19 n’ont jamais été examinés antérieurement. En conséquence, la diagnose générique de Nielsen et al. (1999) est modifiée. Le matériel complémentaire conduit à la mise en synonymie de *S. galatheae* (Nielsen, 1969) et de *S. pedicellaris* Garman, 1899 et à la description de deux nouvelles espèces, *S. robindsi* et *S. longiventralis*. Les nouvelles espèces diffèrent des autres *Sciadonus* par l’absence de pigmentation, par un plus faible nombre de rayons à la nageoire dorsale et par la position de l’origine de la nageoire anale. *S. longiventralis* diffère de *S. robindsi* par une plus courte longueur prédorsale (28.5 vs 42.5% LS) et par la longueur des rayons de la nageoire pelvienne (3.5% LS vs pas de rayons).

**Key words**

Teleostei

Bythitidae

Sciadonus

Revision

New species

The former ophidiiform family Aphyonidae, consisting of seven genera (Nielsen, 2015), was transferred to the Bythitidae by Möller et al. (2016), in which it now forms a monophyletic aphyonid clade. Five of the genera have recently been revised (Nielsen, 2015, 2016b, 2017). The present paper is a revision of the genus *Sciadonus* Garman, 1899, based on 304 specimens, 19 of which have not been examined earlier. In the revision of the Aphyonidae (Nielsen, 1969), three species were recognized in the genus *Leucochlamys* Zugmayer, 1911 (*S. cryptophthalmus* (Zugmayer, 1911), *S. galatheae* (Nielsen, 1969), *S. jonassoni* (Nybelin, 1957)) and one species in the genus *Sciadonus* (S. pedicellaris Garman, 1899). *Leucochlamys* was later considered a junior synonym of *Sciadonus* now consisting of four species (Cohen and Nielsen 1978: 62). Examination of the present enlarged material has resulted in establishing two new species and synonymizing of *S. galatheae* and *S. pedicellaris*. All specimens have been trawled at great depths (1169-5610 m), so the loose, thin skin and fragile head bones are often damaged making it difficult to observe nostrils and head pores and obtain accurate measurements. Pelvic fin rays thin and often absent; when present, difficult to observe. Pectoral and pelvic fin rays often broken. None of the gear used were provided with a closing device. Ichthyological terminology follows Nielsen et al. (1999) and institutional abbreviations follow Eschmeyer et al. (2017).

**MATERIAL AND METHODS**

The material derives from 10 scientific collections (BMNH, IOAN, MNHN, MOM, NHMG, NMNZ, NMV, OSUO, UF, ZMUC). All specimens have been trawled at great depths (1169-5610 m), so the loose, thin skin and fragile head bones are often damaged making it difficult to observe nostrils and head pores and obtain accurate measurements. Pelvic fin rays thin and often absent; when present, difficult to observe. Pectoral and pelvic fin rays often broken. None of the gear used were provided with a closing device. Ichthyological terminology follows Nielsen et al. (1999) and institutional abbreviations follow Eschmeyer et al. (2017).

**SYSTEMATIC**

**BYTHITIDAE: Sciadonus Garman, 1899**

**Synonymy**

*Sciadonus* Garman, 1899: 172, type species by monotypy *Sciadonus pedicellaris* Garman, 1899.

*Leucochlamys* Zugmayer, 1911a: 11, type species by monotypy *Leucochlamys cryptophthalmus* Zugmayer, 1911.


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Diagnosis
The number of known specimens of the genus Sciadonus has increased considerably (from 11 to 304) since the diagnosis by Nielsen et al. (1999: 142), which involves that the generic diagnosis has been modified. Body long, slender and compressed. Loose, transparent, scaleless skin. Lower jaw protruding. Upper jaw ends below or slightly behind small, deepset eyes. Mouth almost horizontal. Palatines edentate. Vomer with or without small fangs. Basibranchial tooth patches not developed. Pectoral peduncle about three times as long as high. Dorsal fin rays 68-107; caudal fin rays 5-7; anal fin rays 38-60; pectoral fin rays 9-16; pelvic fin rays 0-1. Anterior gill arch without long and with 12-15 very small rakers. Vertebral centra in adults almost rectangular in lateral view. Males with well-developed urogenital hood ventrally covering penis. Females with a pair of claspers at urogenital opening.

Comparisons
Sciadonus differs from the six other genera in the aphyonid clade of the Bythitidae by the pectoral peduncle being about three times as long as high (vs length and height equal). It is most similar to Parasciadonus Nielsen, 1984 by the horizontal mouth and lack of long gill rakers. Rannou et al. (1975: 1255) suggested synonymizing Leucochlamys Zugmayer, 1911 and Sciadonus Garman, 1899, which was effectuated by Cohen and Nielsen (1978: 63).

Species
Sciadonus holds five species of which two are here described. Furthermore, S. galatheae (Nielsen, 1969) is considered a junior synonym of S. pedicellaris Garman, 1899. In the revision of the Aphyonidae (Nielsen, 1969) only two specimens of each of the two species were known while the present revision is based on 19 specimens whereby the main differences (number of precaudal vertebrae and presence or absence of pelvic fins and fangs on vomer) between the two species became obliterated.

Key to the species of Sciadonus
1 – Distinct, black spots below dorsal edge or spots below dorsal edge and along mid-body and above anal fin ........ 3
2 – No distinct black spots; faint black pigmentation may occur dorsally and ventrally ......................... 5
3 – Black spots dorsally from above gill cover to caudal fin; 13-16 pectoral fin rays; head 18.0-18.5% SL; no soft tissue flaps anteriorly on lower jaw ......................... cryptophthalmus (Zugmayer, 1911)
4 – Black spots below dorsal edge, above anal fin and in midline; pectoral fin rays 9-10; head 14.5-17.0% SL; a pair of soft tissue flaps anteriorly on lower jaw ............................................................... jonassoni (Nybelin, 1957)
5 – Dorsal fin rays 90-107; precaudal vertebrae 43-49; origin of anal fin below dorsal fin rays nos. 44-56; origin of anal fin below vertebrae nos. 44-49 .... pedicellaris Garman, 1899
6 – Dorsal fin rays 81-87; precaudal vertebrae 37-39; origin of anal fin below dorsal fin rays nos. 30-36 and below vertebrae nos. 38-41 ............................... longiventralis n. sp.
7 – Predorsal length 28.5% SL; length of pelvic fins 3.5% SL; a pair of distinct soft tissue flaps anteriorly on lower jaw ................................................................. bonyoni n. sp.
8 – Predorsal length 42.5% SL; pelvic fins absent; no flaps on tips of lower jaw ........................................... robbi n. sp.

Sciadonus cryptophthalmus (Zugmayer, 1911)

Material examined (2 specimens, SL 82-100 mm)
Holotype. MOM (no cat. no.), SL 82 mm, male, off northwestern Spain, 44°08'N, 10°44'W, R/V Princesse-Alice, st. 2994, bottom trawl, 5000 m, 19 Aug. 1910.
Non-type. ZMH 120293, SL 100 mm, female, off Portugal, 41°49'N, 13°55'W, R/V Walther Herwig, st. 16, Agassiz trawl, 5320 m, 6 Jun. 1981.

Diagnosis
Sciadonus cryptophthalmus is long, rather slender and compressed. Many 1-2 mm black pigment spots seen through transparent skin near dorsal edge of body from above gill cover to caudal fin. Dorsal fin with 80-83 rays, anal fin with 40-46 rays, pectoral fin with 13-16 rays and pelvic fins absent. Precaudal vertebrae 41-42 and total vertebrae 76-78. Origin of anal fin below dorsal fin rays no. 37-39. Anterior gill arch with 14-15 minute rakers on lower branch. No tissue flaps anteriorly on lower jaw.

Description
The principal meristic and morphometric characters are shown in table I. For a thorough description of the holotype see Nielsen (1969: 70). The figure showing the holo-
type (Fig. 2) is here included to show the coloration, but old photos of the holotype demonstrate that the body proportions are incorrect. Actually it is slender and compressed like the non-type (Fig. 3). Skin loose, transparent and scaleless. Mouth almost horizontal with protruding lower jaw. Tiny, black eyes deep-set. Origin of dorsal fin slightly behind tip of pectoral fins and origin of anal fin well behind midpoint of fish. Pectoral peduncle about three times as long as high. Anterior gill arch with minute rakers each provided with 1-2 small denticles, upper branch with two and lower branch with 14-15 rakers. Gill filaments on anterior arch equal in length to rakers. Holotype with a well-developed urogenital hood partly covering a 1 mm long penis placed close to the tip of the hood. A pair of vestigial claspers placed near base of hood on each side rather similar to those in *S. pedicellaris* (Fig. 13). Histological examination of the testes showed the presence of spermatophores (Nielsen et al., 1968: 247). The non-type specimen with ovaries 24 mm long and numerous apparently ripe eggs about 1 mm in diameter. Urogenital hood ends in a pair of 1-2 mm long, fleshy claspers like those in *S. pedicellaris* (Fig. 12).

**Axial skeleton (from radiographs)**

Number of precaudal vertebrae 41-42. All neural and haemal spines thin and pointed. Tip of the posterior half of the neural and all haemal spines bent. Anterior neural spine equal in length to the next but lengths decreasing posterior ad. The posterior 9-10 precaudal vertebrae with a vertical-
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Nielsen

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Table I. – Meristic and morphometric characters of Sciadonus species. Numbers in brackets show average values. * indicates number of specimens examined.

<table>
<thead>
<tr>
<th>Sciadonus cryptophthalmus</th>
<th>Sciadonus jonassoni</th>
<th>Sciadonus longiventralis</th>
<th>Sciadonus pedicellaris</th>
<th>Sciadonus robinisi</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of specimens</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Standard length in mm</td>
<td>82-100</td>
<td>35-51</td>
<td>70</td>
<td>70-126</td>
</tr>
</tbody>
</table>

Meristic characters

| Dorsal fin rays           | 80-83               | 68(74.4)80 5*            | 87                     | 90(96.4)107 18*   | 81 |
| Caudal fin rays           | 7                   | 5(5.8)6 5*              | 6                      | 6(6.2)7 6*        | 6 |
| Anal fin rays             | 40-46               | 38(44.6)49 7*           | 52                     | 42(49.3)60 18*    | 53 |
| Pectoral fin rays         | 13-16               | 9(9.7)10 7*             | 14                     | 10(12.3)14 18*    | 14 |
| Pelvic fin rays           | 0                   | 0                       | 1                      | 0(0.6)1 18*       | 0 |
| Precaudal vertebrae       | 41-42               | 35(38.6)42 7*           | 39                     | 43(46.0)49 18*    | 37 |
| Total vertebrae           | 76-78               | 65(68.6)75 7*           | 80                     | 79(83.9)88 18*    | 77 |
| Origin of dorsal fin above vertebrae Nos. | 18-21 | 16(18.8)24 6*           | 16                     | 13(16.3)20 18*    | 20 |
| Origin of anal fin below dorsal fin ray Nos. | 37-39 | 27(32.7)38 6*           | 36                     | 44(49.8)56 18*    | 30 |
| Origin of anal fin below vertebrae Nos. | 43-45 | 35(38.6)43 7*           | 41                     | 44(47.4)49 18*    | 38 |
| Long rakers on anterior gill arch | 0 | 0 | 0 | 18* | 0 |
| Total rakers on anterior gill arch | 14-15 | 13(14.6)15 5* | 15 | 12(13.7)15 17* | 12 |

Morphometric characters in % of SL

| Head length            | 18.0-18.5           | 14.5(15.8)17.0 7*       | 14.0                   | 12.0(14.4)16.5 18* | 15.0 |
| Depth at anterior anal fin | 8.7              | 5.1(6.2)7.4 5*        | 6.1                    | 4.6(6.0)8.3 15*    | 5.5 |
| Upper jaw length       | 9.9-10.5           | 7.4(8.5)10.0 6*        | 7.9                    | 5.7(7.7)9.7 17*    | 6.0 |
| Pigmented eye dia.     | 0.5                | 0.3(0.4)0.5 7*         | 0.3                    | 0.2(0.4)0.5 18*    | 0.4 |
| Interorbital length    | 4.3-5.4            | 2.9(3.3)3.8 7*         | 2.6                    | 2.5(3.4)4.5 9*     | 3.4 |
| Postorbital length     | 12.0               | 8.9(10.1)11.5 6*       | 10.0                   | 7.6(9.4)13.0 15*   | 7.7 |
| Preventral length      | 14.0               | 12.0(13.7)16.5 10*     |                       |                    |     |
| Prenal length           | 63-64              | 56(62.8)66 6*          | 59                     | 58(64.1)69 16*     | 66 |
| Predorsal length       | 35.5-36.5          | 31.0(36.1)39.5 6*      | 28.5                   | 26.0(29.2)31.5 18* | 42.5 |
| Base of pelvic fin to anal fin | 48.5 | 46.5(50.5)54 9*       |                       |                    |     |
| Pectoral length        | 5.9-8.3            | 7.0(8.9)11.5 7*        | 9.7                    | 6.2(8.1)10.5 14*   | 6.6 |
| Pelvic length           | 3.5                | 1.0(1.4)2.2 5*         |                       |                    |     |

Dentition

Premaxillaries with 1-2 rows of conical and pointed teeth anteriorly and one row posteriorly. Vomer with many close-set blunt teeth in 1-2 rows. Holotype with a fang in each side. Non-type without fangs or they may be broken. Dentaries with 2-3 rows of pointed teeth anteriorly and one row posteriorly.

Coloration

Figure 2 shows an illustration of the holotype drawn less than a year after capture. Numerous black-brown spots are found near the dorsal edge of the body and above the operculum. The deep-set small, black eyes appear through the transparent skin. Otherwise the fish is light brown. After 36 years of preservation the colour of the non-type is brownish and only the larger spots near the dorsal edge remain.

Distribution (Fig. 1)

Sciadonus cryptophthalmus is known from two specimens trawled northwest of the Iberian Peninsula at abyssal depth (5000-5320 m).

Comparison

Sciadonus cryptophthalmus differs from S. jonassoni, the only other Sciadonus species provided with distinct, black pigment, by having the pigmentation concentrated along the dorsal edge of body while S. jonassoni has pigment along the body midline and at basis of anal fin as well. Further-
more, *S. cryptophthalmus* has more pectoral fin rays (13-16 vs 9-10).

**Sciadonus jonassoni** (Nybelin, 1957)

(Tab. I, Figs 1, 4-5)

*Leucochlamys jonassoni* Nybelin, 1957: 311 (type locality south of Cape Verde Islands).


**Material examined** (7 specimens, SL 35-51 mm)

**Holotype.** NHMG Pi. ex. 1745, SL 38 mm, female, south of Cape Verde Islands, 9°38’N, 26°20’W-9°50’N, 26°30’W, Swedish Deep-Sea Expedition, st. 329, bottom trawl, 5600-5610 m, 3 Jul. 1948.

**Non-type**: UF 226945, SL 37-51 mm, 2 males, off Trinidad and Tobago, 11°30’N, 60°15’W, R/V *Pillsbury*, st. PIL844, bottom trawl, 1464-1848 m, 1 Jul. 1969. ZMUC P77707 (former VIMS 05712), 35 mm, female, Bahamas, 26°04.0’-10.6’N, 74°03.2’-02.1’W, R/V *Columbus Iselin*, cr. CI-8007, st. CO27, bottom trawl, 5114-5049 m, 11 Sep. 1980. BMNH 2017.3.17.1-2, SL 37-38 mm, 2 females, 31°06’N, 25°03’42”W, R/V *Discovery*, st. 11261#58, semi-balloon otter trawl, 5440 m, 4 Jul. 1985. BMNH 2017.3.17.3, SL 37 mm, male, sw of Madeira, 31°13’18”N, 25°14’24”W, R/V *Discovery*, st. 11262 #17, bottom trawl, 5432 m, 17 Jul. 1985.

**Diagnosis**

*Sciadonus jonassoni* is slender and compressed. It is a small species with fully ripe females 37 mm in SL and known up to 51 mm SL. Many, small, black pigment spots seen along body midline, along dorsal edge of body and at base of anal fin. Dorsal fin with 68-80 rays, anal fin with 38-49 rays, pectoral fin with 9-10 rays, precaudal vertebrae 35-43, total vertebrae 65-75. Origin of anal fin below dorsal fin rays 27-38. Head length 14.5-20.5% SL. Tissue flaps anteriorly on lower jaw in present or absent.

**Description**

The principal meristic and morphometric characters are shown in table I; for a more detailed description of the holotype see Nielsen (1969: 73). Body slender and compressed with loose, transparent, scale less skin. Mouth almost horizontal with protruding lower jaw. Deep-set, tiny, black eyes placed above middle of upper jaw. Origin of dorsal fin somewhat behind tip of pectoral fins and origin of anal fin well behind midpoint of fish. Pectoral peduncle 2-3 times as long as high. Anterior gill arch with 13-15 very small rakers, two on upper branch and 11-13 on lower branch. Gill filaments extremely small on anterior arch, somewhat longer on the second and third arches. Males with a small penis covered by a ventrally placed urogenital hood. Females with a pair of almost 1 mm long, slender claspers. All three females apparently ripe with 5-10 eggs 0.5 mm in diameter. Sagittal otolith 0.3 mm in diameter (measured on radiographs).

**Axial skeleton**

Number of precaudal vertebrae 35-42, but due to poor ossification some of the counts are estimated. All neural and haemal spines are thin and pointed and almost equal in

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**Figure 4.** – *Sciadonus jonassoni*: NHMG PL ex. 1745, holotype, female, SL 38 mm (from Nybelin, 1957 – figure reversed).

**Figure 5.** – *Sciadonus jonassoni*: ZMUC P77707, female, SL 35 mm. A: Drawing; B: Photo after 37 years of preservation.
Length. The posterior 1-3 precaudal vertebrae with a vertically-directed, thin, bony process (parapophyse?). Ribs not observed. Vertebral centra almost rectangular in lateral view, anteriorly about 1.5 times higher than long.

**Dentition**

All teeth small and pointed. Premaxillaries and dentaries with two irregular tooth rows anteriorly and one row posteriorly in the five small specimens (35-38 mm SL) and in the largest specimen (51 mm SL) three rows anteriorly and two rows posteriorly; vomer with about 10 pointed teeth (except for edentate in one specimen) and palatines edentate.

**Coloration** (Figs 4, 5)

One specimen (ZMUC 77707) has, like the holotype, distinct black pigmentation arranged in three lines: along the dorsal edge of body, in the body midline and along the basis of anal fin. In three specimens there is a variety of pigmentation left and in two specimens all body pigmentation has disappeared. Eyes black.

**Distribution** (Fig. 1)

*Sciadonus jonassoni* is caught in the North Atlantic in bottom fishing gear at depths between 1464 and 5610 m.

**Comparisons**

*Sciadonus jonassoni* has 9-10 pectoral fin rays vs 10-16 rays in all other *Sciadonus* species. It differs from the most similar species, *S. cryptopthalmus*, by having pigment along body midline and at dorsal and anal fin bases vs only pigment near dorsal edge. None of the three other species are provided with pigment on body.

**Sciadonus longiventralis** n. sp.

*(Tab. I, Figs 1, 6-7)*

**Material examined** (1 specimen, SL 70 mm)

*Holotype*. NMV A5672, SL 70 mm, male, off New South Wales, 35°0.00’S-34°54.42’S, 151°16.30’E-151°13.36’E, R/V *Franklin*, st. CSIROFR5/86, 5 m otter trawl, 1100 m, 15 Jul. 1986.

**Diagnosis**

*Sciadonus longiventralis* is long, slender and compressed. Mouth horizontal with protruding lower jaw. A pair of distinct tissue flaps anteriorly on lower jaw. No black pigmentation spots seen through transparent skin. Dorsal fin rays 87, anal fin rays 52, pectoral fin rays 14, precaudal vertebrae 39 and total vertebrae 80. Pelvic fin rays long (3.5% SL) and predorsal length 28.5% SL.

**Description**

The principal meristic and morphometric characters are shown in table I. Body slender and compressed with loose, scaleless, transparent skin showing the inner organs (Fig. 6). Anterior nostril with skin-flap, posterior a mere hole. Mouth horizontal with protruding lower jaw. A distinct pair of tissue flaps on tip of lower jaw (Fig. 7). Small, black, deep-set eyes
placed above middle of upper jaw.Opercular spine absent. Otolith dissolved. Origin of dorsal fin above tip of pectoral fin. Origin of anal fin well behind midpoint of fish. Vertical fins joined. Pectoral peduncle three times as long as high. Pelvic fin rays thin and the longest (3.5% SL) among the 34 Sciadonus specimens examined for this revision. Anterior gill arch with 15 small rakers and short filaments. Second and third arches with small rakers and 2-3 times as long filaments and fourth arch without filaments. Pseudobranchial filaments not observed. A well-developed, rather flat urogenital hood with a wing-like extension distally on each side of the hood that ends in a penis-like prolongation. Length of distinct testes 11 mm.

Axial skeleton (from radiographs)
Number of precaudal vertebrae 39. All neural and haemal spines very thin and pointed becoming gradually shorter posteriorad. Anterior neural spine equal in length to the following spines. Vertebral centra rectangular in lateral view, anteriorly with height 1.5 times length. Skeleton generally poorly ossified.

Dentition
All teeth small and pointed. Premaxillaries with 3-4 irregular rows anteriorly and 1-2 rows posteriorly, inner row with somewhat larger and retrose teeth. Dentaries with a dentition like the premaxillaries, but all teeth small. Vomer with six tiny teeth. Palatines edentate.

Coloration (Fig. 6)
The small, black eyes, the brownish musculature and lighter brown inner organs are seen through the transparent skin. The dark area above origin of anal fin is not pigment but due to removal of tissue.

Distribution (Fig. 1)
Sciadonus longiventralis known from one specimen trawled off New South Wales at a depth of 1100 m.

Comparisons
Sciadonus longiventralis differs from S. cryptophthalinus and S. jonassoni by lacking black pigmentation, from S. pedicellaris it differs by the having less dorsal fin rays (87 vs 90-107), less precaudal vertebrae (39 vs 43-49) and origin of anal fin below dorsal fin ray no. 36 (vs nos. 44-56) and from S. robinsi by the shorter predorsal (28.5 vs 42.5% SL), distinct tissue flaps on tip of lower jaw (vs flaps absent) and long pelvic fin rays (3.5% SL vs absent).

Etymology
The specific name, longiventralis, refers to the long ventral (= pelvic) fins.

Sciadonus pedicellaris Garman, 1899
(Tab. I, Figs 1,8-13)
Sciadonus pedicellaris Garman, 1899: 172 (type locality Gulf of Panama).
Sciadonus kullenbergi Nybelin, 1957: 310 (type locality off the Azores).
Leucochlamys galatheae Nielsen, 1969: 75 (Kermadec Trench, South West Pacific).
Leucochlamys galatheae: Rannou et al., 1975: 1253.
Sciadonus kullenbergi: Munk, 1966: 27.
Sciadonus sp.: Nielsen and Eagle, 1974: 1071.
Holotype of Leucochlamys galatheae Nielsen, 1969.

Material examined (19 specimens, SL 44-126 mm)
MCZ 28628 (holotype of Sciadonus pedicellaris), SL 70 mm, female, Gulf of Panama, 5°31’N, 86°31’W, R/V

Figure 8. – Sciadonus pedicellaris: MCZ 28628, holotype, female, SL 70 mm (from Garman, 1899).

Figure 9. – Sciadonus pedicellaris: ZMUC P77456, female, SL 84 mm (from Nielsen, 1969).
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Diagnosis

*Sciadonus pedicellaris* is long, slender and compressed with protruding lower jaw and differs from all other *Sciadonus* species by the following combination of characters: no black pigmentation on body, dorsal fin rays 90-107, precaudal vertebrae 43-49, origin of anal fin below dorsal fin rays nos. 44-56 and below vertebrae nos. 44-49. Tissue flaps anteriorly on lower jaw well developed on most specimens.

Description

The principal meristic and morphometric characters are shown in table I. Body slender and compressed with scaleless, loose skin. Skin and peritoneum transparent showing the inner organs. Mouth horizontal with protruding lower jaw. Most specimens with a pair of distinct tissue flaps anteriorly on lower jaw (cf. Fig.  7). Small deep-set black eyes placed above posterior third of upper jaw. Opercular spine absent. Sagittal otolith (Fig. 10) small, half as thick as long; sulcus undivided reaching to about middle of inner face and with wide opening at anterior rim. Origin of dorsal fin at about tip of pectoral fin; anal fin origin well behind midpoint of fish. Vertical fins joined. Pectoral peduncle about three times as long as high. Pelvic fin rays very thin and short, when present; lacking in about half of the specimens. Anterior gill arch (Fig. 11) with 12-15 small, knob-formed rakers each provided with 2-6 short spines and with gill filaments equal in size to rakers. Filaments on second and third gill arch twice the length of those on anterior arch. Pseudobranchial filaments not observed. Females with a pair of well-developed claspers (Fig. 12). Penis partly covered ven-
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trally by the urogenital hood that ends in two small wing-like prolongations on each side of penis and a pair of probably vestigial claspers placed at each side at base of hood (Fig. 13). A thorough description of the holotype and para-type of the now synonymized Leucochlamys galatheae is given in Nielsen (1969: 75-78).

Axial skeleton (from radiographs)

Number of precaudal vertebrae 43-49. Anterior neural spine equal in length to the following spines. Weak parapophyses developed on the posterior 1-7 precaudal vertebrae. Pleural and epipleural ribs not developed. Vertebral centra rectangular formed, three times as high as long in a specimen 44 mm SL and 1.5 in a specimen 85 mm SL.

Dentition

Number of teeth seems to increase with growth. Both granular and pointed teeth occur and some of the latter ones could be called small fangs. Premaxillaries and dentaries with up to 3-4 irregular rows anteriorly decreasing to one row posterior ad; longest teeth in outer row. Boomerang-shaped vomer with varying number of teeth from about 3-4 up to 15 on each wing in 1-3 rows. Palatines edentate. Basibranchial tooth plates absent.

Coloration

Small, black eyes, light brown musculature and inner organs seen through transparent skin. In a ripe specimen brown eyes of several embryos are visible.

Distribution (Fig. 1) and biology

Sciadonus pedicellaris is known from the northern part of the Atlantic Ocean and from the northeastern and southwestern parts of the Pacific Ocean. The 19 specimens examined were caught at 18 localities in bottom fishing gear at depths between 1169 and 5440 m. A ripe female (BMNH 2017.3.17.7) holds numerous 8 mm long embryos with large yolk-sack and distinct, brown eyes.

Comparisons

Sciadonus pedicellaris differs from S. cryptophthalmus and S. jonassoni by lacking black pigmentation on body and from S. longiventralis and S. robinsi by having more dorsal fin rays (90-107 vs 81-87), more precaudal vertebrae (43-49 vs 37-39), origin of anal fin below dorsal fin rays nos. 44-56 (vs 30-36) and below vertebrae nos. 44-49 (vs 38-41).

Sciadonus robinsi n. sp.

(Tab. I, Figs 1, 14)

Material examined (1 specimen, SL 47 mm)

Holotype. UF 187413, SL 47 mm, male, off northeastern Brazil, 1°58’N, 40°54’W, R/V Gillis, st. 77, 41’semi-balloon otter trawl, 4416-4422 m, 10 Aug. 1973.

Diagnosis

Sciadonus robinsi is long, slender and compressed. Mouth horizontal. No tissue flaps anteriorly on protruding lower jaw. No black pigment spots seen through transparent skin. Dorsal fin with 81 rays, anal fin with 53 rays, pectoral fin with 14 rays and pelvic fins absent. Precaudal vertebrae 37 and total vertebrae 77. Predorsal length 42.5% SL.

Description

The principal meristic and morphometric characters are shown in table I. Body slender and compressed with loose, scaleless skin. Inner organs seen through transparent skin (Fig. 14). Mouth horizontal with protruding lower jaw. Tiny deep-set, black eyes placed above a point just posterior to end of upper jaw. Opercular spine absent. Otolith dissolved. Origin of dorsal fin shortly behind tip of pectoral fin and origin of anal fin well behind midpoint of fish. Vertical fins joined. Pectoral peduncle three times as long as high. Pelvic fins absent. Anterior gill arch with 12 tiny rakers and small filaments. Second and third arches with rakers and filaments somewhat larger. Pseudobranchial filaments not observed.

Figure 12. – Sciadonus pedicellaris: Female claspers of ZMUC P77456. a: anus (from Nielsen, 1969).

Figure 13. – Sciadonus pedicellaris: Urogenital hood and penis of ZMUC P77457. a: anus, b: vestigial clasper, c: wing-like prolongations (from Nielsen, 1969).
A well-developed urogenital hood covering a small penis. Proximal half of hood with a wing-like extension on each side. Length of distinct testes 11 mm.

Axial skeleton (from radiographs)
Number of precaudal vertebrae 37. All neural and haematoid spines very thin and pointed becoming gradually shorter posterior ad. Anterior neural spine equal in length to the following spines. Parapophyses and ribs not observed. Vertebral centra rectangular in lateral view, anteriorly with height three times length. Skeleton generally poorly ossified.

Dentition
All teeth are pointed and very small. Premaxillaries and dentaries with few teeth in a single row. Vomer with about 10 teeth. Palatines edentate.

Coloration
The small, black eyes and brownish musculature are seen through the transparent skin.

Distribution (Fig. 1)
*Sciadonus robinsi* is known from one specimen trawled off northeastern Brazil at a depth of 4416-4422 m.

Comparisons
*Sciadonus robinsi* differs from *S. cryptophthalmus* and *S. jonassoni* by lacking black pigmentation, from *S. pedicellaris* by having fewer dorsal fin rays (81 vs 90-107) and precaudal vertebrae (37 vs 43-49) and from *S. longiventris* by the longer predorsal (42.5% SL vs 28.5%), absence of tissue flaps on tip of lower jaw (vs distinct flaps) and absence of pelvis fins (vs fin length 3.5% SL).

Etymology
The specific name *robinsi* refers to C. Richard Robins (formerly UMML) and Rob Robins (UF) who together through the last 50 years generously have sent me numerous ophidiiform specimens.

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REFERENCES
Revision of the cosmopolitan deep-sea genus Sciadonus


