

New records of *Grammicolepis brachiusculus* Poey, 1873 (Zeiformes: Grammicolepididae) in Brazilian waters, with a key to Western Atlantic species of Grammicolepididae

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ABSTRACT: *Grammicolepis brachiusculus*, commonly known as Thorny tinselfish, was previously cited from Brazilian waters, but not thoroughly documented. Here we report about a new record of this species, based on three voucher specimens, 169.2–196.3 mm SL, collected off Bahia, Brazil. This report extends the range of the species southwards for a distance of about 3,500 kilometers along the South American coastline. Given its rarity, an updated diagnosis of the species, and an identification key to the Western Atlantic species of Grammicolepididae, are provided.

Grammicolepididae contains only three monotypic genera with meso-benthopelagic species (Tyler *et al.* 2003; Nelson 2006). The inclusion of this family in the Zeioidei (Zeiformes) and the inclusion of the Pacific *Macrurocyttus acanthopodus* Fowler, 1933 in Grammicolepididae are discussed by Tyler *et al.* (2003). Morphological/morphometric differences among the species of Zeioidei are also provided by Heemstra (2002). Only one species of Grammicolepididae is reported from Brazilian waters: *Xenolepidichthys dalgleishi* Gilchrist, 1922 (Figueiredo and Menezes 1980; Figueiredo *et al.* 2002; Menezes 2003; Bernardes *et al.* 2005). *Grammicolepis brachiusculus* Poey, 1873 is the other Western Atlantic species of the family previously known to occur between Georges Bank off Canada to the Gulf of Mexico and northern South America, off Venezuela and Suriname (Poey 1883; Jordan and Evermann 1896; Shimizu 1983; Karrer and Heemstra 1986; Quéro 1986; Cervigón 1996; McEachran and Fechhelm 1998; Heemstra 2002; Moore and DeWitt 2002; Tyler *et al.* 2003; Ditty 2006). Despite previously cited by Costa *et al.* (2007), the occurrence of *G. brachiusculus* in Brazilian waters is herein first documented. In addition, a brief re-description of *G. brachiusculus* based on the three specimens from Brazil and on information from the literature is provided.

Measurements of the specimens were taken with a caliper to tenths of millimeters (mm). Institutional abbreviations follow Sabaj Pérez (2010). The key to Western Atlantic species of Grammicolepididae is based on information from the literature and on the following specimen examined: *Grammicolepis brachiusculus*: TAMAR 036 (3 pre-juveniles, 169.2–196.3 mm SL), 12°39'91" S, 37°54'30" W, at about 500 m depth, off Praia do Forte, Mata de São João, Bahia, Brazil (from stomach contents of a large *Ruvettus pretiosus* Cocco, 1833), collected by G. Marcovaldi on 26 October 2007; *Xenolepidichthys dalgleishi*: MZUSP 80422 (4 juveniles, 34.2–52.4 mm SL), 27°14'04" S, 46°

46'53" W, at 250 m depth, off Santa Catarina, Brazil, RV *Atlântico Sul*, REVIZEE SCORE Sul, station PE06, collected on 16 October 1999; AZUSC 2990 (4, 130.0–190.4 mm SL), 26°04'57" S, 45°37'49" W, at 501 m depth, off Paraná, Brazil, RV *Solency Moura*, collected on 1st August 2003.

Grammicolepis brachiusculus Poey, 1873

Thorny tinselfish, Palombeta-de-fundo
(Figures 1-2, Tables 1-2)

Synonyms: *Vesposus egregius* Jordan, 1921; *Xenolepidichthys americanus* Nichols and Firth, 1939; *Daramattus americanus* (Nichols and Firth, 1939); *Daramattus armatus* Smith, 1960; *Daramattus barnardi* Smith, 1968.

Diagnostic characters: Based on the specimens examined and on the literature (Poey 1883; Myers 1937; Shimizu 1983; Karrer and Heemstra 1986; Quéro 1986; Cervigón 1996; McEachran and Fechhelm 1998; González *et al.* 1999; Heemstra 2002; Moore and DeWitt 2002; Tyler *et al.* 2003; Pequeño and Matallanas 2004; Ditty 2006). Morphological data are presented in Tables 1 and 2. The species has three morphologically distinct phases, in addition to the larval stage: pre-juvenile, juvenile and adult. The depth of body, relative position of dorsal and anal fins origin, presence of scutes/spines on body and on the bases of dorsal and anal fins, and the length of the anterior spines of these fins, vary strongly with age. The body is strongly compressed, rather high in pre-juveniles to oblong in adults, the greatest depth varying from at least 74.5% (taken from a 94-mm SL specimen, Cervigón 1996), to about 43% of standard length; mouth small, terminal, and almost vertical; snout short; eye large; dorsal and anal fin-bases long, with spiny scutes in pre-juveniles (29–34 at base of dorsal fin and 27–35 at base of anal fin), absent in adults; dorsal and anal fin with anterior

elements prolonged in pre-juveniles, much short in adults; in pre-juveniles and juveniles the first anal fin spine may surpass the caudal fin base, but often is broken and short in specimens deposited in fish collections; anal fin origin almost opposite to dorsal fin origin in pre-juveniles, but it is rather posterior to dorsal fin origin in adults; first spine of dorsal fin reduced, often not visible externally; scales small, vertically elongate; sides of body and caudal peduncle with 10–13 flat spiny scutes, absent in adults; caudal fin usually emarginated in pre-juveniles, central rays very elongate in juveniles but emarginated in large adults. Principal caudal-fin rays 15, with one procurent ray in dorsal and one in the ventral portion of the caudal-fin; pelvic fin with one spine and 6–7 rays; branchiostegal rays 7; vertebrae 43–46. Metamorphosis from pre-juvenile to juvenile occurs between 25 to 30 cm SL. Pre-juveniles and juveniles are blue-silvery to brassy with irregular dark blotches or bars on body, anal, and caudal fins; the spiny scutes may be very dark in color, suggesting black spots from distance. Adults are dull silvery to partial (head and/or belly) violet-blue, eventually with faint darker or lighter marks on body and caudal fin; iris golden to silvery and often reddish due to blood perfusion. Live specimens recorded from deep waters might display an overall blue color due to the blue light produced by submersibles (Kenneth Sulak, pers. comm.). Maximum SL reported 470 mm, from Poey's original description.



FIGURE 1. *Grammicolepis brachiusculus*, TAMAR 036, 196.3 mm SL, off Praia do Forte, Mata de São João, Bahia, Brazil. Pedro Cordeiro.

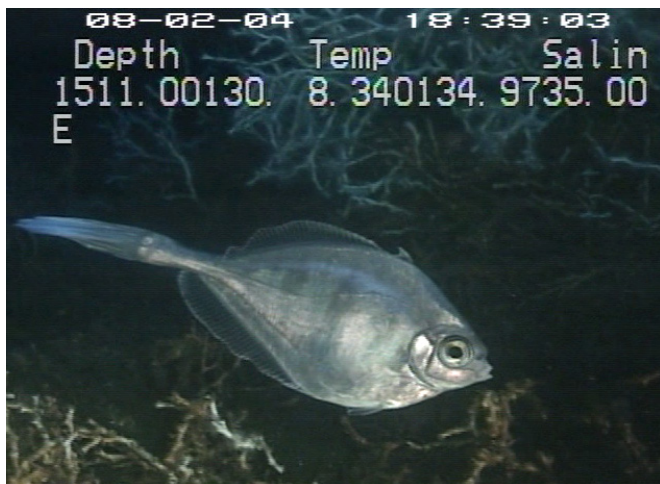


FIGURE 2. *Grammicolepis brachiusculus*, alive in deep water at Vioska Knoll shipwreck, south of Mobile, Alabama, Northern Gulf of Mexico, Station JSL 4751, 1510 ft deep. Kenneth Sulak.

Distribution: Eastern Atlantic: off Ireland and Scotland south to Spain, Canary Islands, Ascension Island, and northern Africa southwards to Durban, South Africa. Indian Ocean: off Madagascar and Mozambique. Indo-Pacific: from Western Australia northwards to Japan, Hawaii and off Chile (Pequeño and Matallanas 2004). Western Atlantic: from Georges Bank through the Caribbean to Bahia, northeastern Brazil (Figure 5). The previously known southernmost record of the species in the Western Atlantic was Suriname (Shimizu 1983). In this study, the range of the species is extended southwards for a distance of about 3,500 kilometers.

Previous records from Brazilian waters: Costa *et al.* (2007) reported on the collection of one specimen of *G. brachiusculus* in the Brazilian central east coast (Bahia, Espírito Santo and north of Rio de Janeiro (11–22°S), collected by RV *Thalassa* (IFREMER) between May and July, 2000. The specimen was listed by Costa *et al.* (2007) among fishes collected in the region during the REVIZEE Program; morphological and distributional data on the



FIGURE 3. *Xenolepidichthys dalgleishi*, MZUSP 80422, juvenile, 48.3 mm SL.



FIGURE 4. *Xenolepidichthys dalgleishi*, AZUSC 2990, female, 139.0 mm SL.



FIGURE 5. Distribution of *Grammicolepis brachiusculus*. Modified from OBIS (http://www.obis.org.au/cgi-bin/cs_map.pl).

TABLE 1. Meristic data of *Grammicolepis brachiusculus*. Abbreviation: NA, not available.

COUNTS	Poey (1883)	Myers (1937)	Shimizu (1983)	Karrer and Heemstra (1986)*	Cervigón (1996)	González et al. (1999)	Pequeño and Matallanas (2004)	PRESENT STUDY
N. of Specimens	1	5	1	NA	3	2	1	3
SL (mm)	470	73-230	218	NA	94-230	418-424	270	169-196
Dorsal fin spines	VI	VI-VII	VII	VI-VII	V**	V**	VI	VI
Dorsal fin rays	34	28-35	32	32-34	28-33	33-34	34	33
Anal fin spines	II	II	II	II	II	II	II	II
Anal fin rays	33	28-36	34	33-35	28-35	34	37	33
Pectoral fin rays	15	14-16	15	14-15	14-15	15	NA	14
Gill rakers	NA	NA	NA	1-2+12	1-2+14-15	14-15	NA	1-2+13-15
Lateral line scales	NA	NA	NA	NA	NA	120-122	NA	115-119

* data from several previous papers included.

** first spine of dorsal fin minute, often not visible externally.

TABLE 2. Selected measurements (in % of SL) of *Grammicolepis brachiusculus*. Abbreviations: NA, not available; P, Pre-juvenile; J, Juvenile; A, adult.

REFERENCES	Myers (1937)	Cervigón (1996)	González et al. (1999)	Pequeño and Matallanas (2004)	PRESENT STUDY	RANGE
Number of specimens	5	3	2	1	3	
Age	3 P, 2 A	2 P, 1 J	2 A	1 J	3 P	
SL (mm)	73-230	94-230	418-424	270	169-196	73-424
Head length	26.9-35.4	26.9-32.9	23.9-24.0	24.8	33.1-32.3	23.9-35.4
Snout length	7.1-9.8	6.9-8.5	6.2-6.6	7.4	8.3-8.7	6.2-9.8
Eye diameter	11.7-17.0	11.7-16.4	10.4-10.7	9.3	15.6-16.0	9.3-17.0
Postorbital length	NA	NA	NA	7.4	9.3-10.2	7.4-10.2
Interorbital space	NA	NA	8.1-8.5	NA	11.0-12.4	8.1-12.4
Pectoral fin length	NA	NA	NA	10.0	14.2-14.5	10.0-14.5
Body depth	58.7-79.5	57.4-74.5	47.4-48.4	56.7	62.1-65.8	47.4-79.5
Predorsal length	36.8-47.6	NA	31.6-31.8	31.5	44.4-52.0	31.5-52.0
Preanal length	NA	NA	41.5-41.9	NA	62.1-62.5	41.5-62.5
Dorsal fin base	51.2-63.0	NA	50.2-51.7	61.1	58.9-62.1	50.2-63.0
Anal fin base	54.8-60.8	NA	47.9	58.2	60.2-64.7	47.9-64.7

specimen collected were not provided. As far as we know, this specimen was not deposited in fish collection.

Biological data: Stomach contents of the three specimens were analyzed and we found just a mass of digested animal remains, impossible to identify. According to Kenneth Sulak (pers. comm., after watching the fish behavior displayed by video feeding), “the fish hovers very slowly maneuvering among the coral branches [... of *Lophelia*]. I believe it feeds on the small snow white alpheid shrimps that live on *Lophelia*.”

Key to the Western Atlantic species of Grammicolepididae

[Modified from Myers (1937), Cervigón (1996), Heemstra (2002), and Tyler *et al.* (2003)]

1a. Dorsal fin elements VI–VII, 28–35 (usually 32–34); anal fin elements II, 28–37 (usually 33–35); pectoral fin rays 14–15 (sometimes 16); edge of elongate vertical scales serrated; pre-juveniles and juveniles with about 10 horizontal scale crests on body and caudal peduncle, absent in adults; 34–36 spiny protuberances along dorsal-fin base..... *Grammicolepis brachiusculus* (Figures 1–2)

1b. Dorsal fin elements V–VI, 27–30; anal fin elements II, 27–29; pectoral fin rays 14–15; edge of elongate vertical scales relatively smooth; no scale crests on body at any age; about 29 spiny protuberances along dorsal-fin base..... *Xenolepidichthys dalgleishi* (Figures 3–4)

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