# *Pseudogramma axelrodi*, A New Species of Serranid Fish from the Tropical Eastern Pacific Ocean

**Abstract**

*Pseudogramma axelrodi* is described from 16 specimens, 12.5-61.4 mm SL, collected with rotenone at Clipperton Island in 1994. The new species is closely allied to *P. thaumasium* (Gilbert) of the tropical eastern Pacific, but differs in having a shorter skin flap above the eye, 17 or 18 rather than 16 (rarely 17) pectoral-fin rays, and lacks dark horizontal lines on the side of the body.

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## Introduction

The genus *Pseudogramma* (Bleeker) contains small, cryptic inhabitants of coral reef crevices. It was formerly included in the family Grammistidae (Schultz, 1966), but the allied genera in this group are now considered to form a monophyletic tribe (Grammistini) within the family Serranidae (Johnson, 1983, and Baldwin and Johnson, 1993). Only five species of *Pseudogramma* have been described previously: *P. polyacantha* (Bleeker), which ranges widely in the Indo-west and central Pacific; *P. thaumasium* (Gilbert), from the eastern Pacific; and *P. bermudensis* (Kanazawa), *P. brederi* (Hildebrand), and *P. gregoryi* (Breder) from the western Atlantic. The present paper describes a sixth species that was collected by the authors during a recent visit to remote Clipperton Island in the tropical eastern Pacific.

Methods of counting and measuring specimens are as follows: *Standard length* (SL) is the straight-line distance from the front of the upper lip to the base of the caudal fin (posterior end of the hypural plate). *Body depth* is the maximum depth from the base of the dorsal spines. *Body width* is measured just posterior to the gill opening. *Head length* is taken from the front of the upper lip to the most posterior point of the opercular flap. *Snout length* is measured from the same anterior point to the fleshy edge of the orbit. *Orbit diameter* is the greatest fleshy diameter of the orbit. *Interorbital width* is the least bony width between orbits. *Caudal peduncle depth* is the least depth of the peduncle; *caudal peduncle length* is the horizontal distance from the rear base of the anal fin to the base of the caudal fin. *Pectoral and pelvic fin lengths* are the lengths of their longest rays. *Lateral-line scale counts* are given in two parts, one for the anterior section, which extends from the upper corner of the gill cover (operculum) to just below the last dorsal rays, and one for the posterior section, which runs along the middle of the sides on the posterior part of the body to the base of the caudal fin. *Gill raker counts* include all rudiments and are given in two parts, the upper limb plus the lower limb; the raker at the angle between the two limbs is included in the lower limb count. Counts and morphometric proportions in parentheses refer to the range for the paratypes.

Type specimens of the new species are deposited at the U.S.

National Museum of Natural History, Washington, D.C. (USNM); and the Western Australian Museum, Perth (WAM).

***Pseudogramma axelrodi*, new species**

Fig. 1, Table 1

*Holotype:* WAM P.30995-001, 61.4 mm SL, collected with rotenone in 15-30 m at Clipperton Island (approximately 10°18'N, 109° 13'W) by G. R. Allen and D. R. Robertson, 16-26 April 1994.

*Paratypes (collected with holotype):* USNM 337446, 10 specimens, 12.5-61.0 mm SL; WAM P.30995-002, 5 specimens, 13.3-53.6 mm SL.

**Diagnosis**

Dorsal rays VII,21-22 (rarely with VI spines); anal rays III,17-18; pectoral rays 17-18; principal caudal rays 17; scales in lateral series 52-55; anterior lateral-line scales 35-36; posterior lateral-line scales 18-23; gill rakers including rudiments 6 + 9 = 15; a short, broad-based dermal flap on upper edge of eye; maximum body depth 2.8-3.2 in SL; color brown, including fins, with numerous large tan blotches on side of body; a dark brown eye-sized spot on upper operculum.

**Description**

Dorsal rays VII,21 (VII,21-22, one paratype with VI spines); anal rays III,17 (17-18); pectoral rays 17 (17-18); pelvic rays I,5; principal caudal rays 17, the upper and lower unbranched; upper and lower procurrent caudal rays 3; lateral-line in two sections, 35 (35-36) in anterior section and 23 (21-23) in mid-peduncular section. Longitudinal scale rows 49-51; horizontal scale rows at level of anal fin origin 3 + 1 + 18; circumpeduncular scales 38 (37-40); gill rakers (including rudiments) 6 + 9 = 15, most low rudiments except for 5-6 developed rakers on lower limb; branch-iostegal rays 7.

**Figure 1.** *Pseudogramma axelrodi*, underwater photograph of holotype, 61.4 mm SL, Clipperton Island.

Body ovate, the depth 2.8 (2.9-3.2) in SL, and compressed, the width 1.8 (1.7-2.1) in depth; head length 2.5 (2.5-2.7) in SL; eye diameter 4.4 (4.0-4.6) in head; snout 5.0 (5.1-7.8) in head; interorbital space slightly convex, the least bony width 10.2 (8.0-11.4) in head; caudal peduncle depth 2.5 (2.5-3.0), caudal peduncle length 4.1 (4.3-5.2), both in head length.

Mouth large, slightly oblique, the maxilla reaching well past level of posterior margin of eye, the upper jaw length 2.0 (1.9-2.0) in head; dense bands of backward-slanting, depressible, villiform teeth in each jaw; similar bands of villiform teeth on vomer and palatines, those on vomer slanting posteriorly, arranged in v-shaped patch. Tongue broad-based, tapering anteriorly, the tip spatulate and rounded. Longest gill raker on first gill arch at angle, its length about one-fourth eye diameter. Nostrils in front of lower anterior corner of eye, anterior nostril tubular, situated just above upper lip.

Upper edge of orbit with a short, broad-based fleshy flap. Rear margin of operculum forming a triangular fleshy flap, extending beyond level of pectoral fin base; margins of preorbital, suborbital, preopercle, and operculum smooth, without visible serrae; margin of preopercle with small, fleshy lobate scales. Circumorbital pores 12, including an enlarged interorbital pore; a single posterior interorbital pore (obscure in some specimens); about 6 pores along lower edge of preorbital and suborbital; dentary with 4 enlarged pores; preopercle with 6 enlarged, slit-like pores along rear margin; scattered pores also present on nape and uppermost part of operculum and preopercle.

Lateral line in two parts, the anterior section arched below origin of dorsal fin and ending just below base of last soft-dorsal rays, posterior section following straight path on middle of posterior one-third of body, ending at base of caudal fin; posterior lateral-line variable, usually consist-

**Figure 2.** *Pseudogramma thaumasium*, 35 mm SL, Panama.

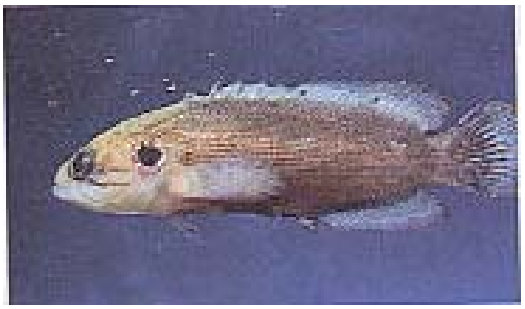

**Table 1.** Proportional measurements of selected type specimens of *Pseudogramma axelrodi* expressed as percentage of the standard length: (A) holotype, WAM P.30995-001; (B-D) paratypes, USNM 337446; (E-F) paratypes, WAM P.30995-002.

| Character | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Standard length (mm) | 61.4 | 61.0 | 58.6 | 54.5 | 53.6 | 51.1 |
| Body depth | 35.7 | 34.6 | 31.1 | 32.3 | 32.5 | 31.5 |
| Body width | 19.5 | 16.4 | 18.6 | 18.2 | 15.9 | 16.6 |
| Head length | 39.9 | 37.4 | 40.6 | 39.3 | 37.7 | 39.1 |
| Snout length | 8.0 | 6.9 | 8.0 | 5.7 | 4.9 | 6.3 |
| Jaw length | 19.9 | 19.7 | 21.0 | 19.3 | 19.6 | 20.0 |
| Orbit diameter | 9.1 | 8.2 | 8.9 | 9.4 | 9.5 | 9.8 |
| Interorbital width | 3.9 | 3.3 | 4.3 | 4.4 | 3.9 | 4.9 |
| Caudal peduncle depth | 16.3 | 12.3 | 13.5 | 15.4 | 12.5 | 14.1 |
| Caudal peduncle length | 9.8 | 8.5 | 7.8 | 7.7 | 8.8 | 7.6 |
| Predorsal length | 40.6 | 39.3 | 44.2 | 37.8 | 40.5 | 36.6 |
| Preanal length | 68.4 | 57.4 | 54.6 | 58.2 | 65.3 | 64.6 |
| Prepelvic length | 33.4 | 35.2 | 34.8 | 33.8 | 35.8 | 35.0 |
| Length dorsal fin base | 61.9 | 65.6 | 60.9 | 61.7 | 60.6 | 60.5 |
| Length anal fin base | 31.1 | 34.6 | 34.1 | 32.3 | 33.6 | 31.7 |
| Pectoral fin length | 24.4 | 23.3 | 23.7 | 23.3 | 23.7 | 22.5 |
| Pelvic fin length | 14.8 | 13.9 | 15.2 | 12.8 | 12.3 | 13.1 |
| Length pelvic spine | 5.5 | 4.9 | 6.0 | 5.7 | 6.0 | 4.1 |
| Length 1st dorsal spine | 3.4 | 3.9 | 4.3 | 3.5 | 2.4 | 2.0 |
| Length 4th dorsal spine | 7.7 | 7.5 | 8.9 | 7.5 | 7.1 | 6.7 |
| Length last dorsal spine | 8.3 | 7.5 | 8.0 | 7.3 | 6.7 | 5.3 |
| Longest soft dorsal ray | 16.6 | 15.4 | 17.1 | 21.3 | 16.0 | 15.5 |
| Length 1st anal spine | 2.6 | 3.0 | 3.4 | 2.8 | 3.4 | 2.9 |
| Length 2nd anal spine | 6.5 | 6.6 | 8.2 | 6.4 | 10.1 | 9.0 |
| Length 3rd anal spine | 6.0 | 4.9 | 5.1 | 4.6 | 7.1 | 5.9 |
| Longest anal soft ray | 15.5 | 16.4 | 14.5 | 16.0 | 14.0 | 13.3 |
| Caudal fin length | 22.3 | 22.0 | 21.3 | 21.3 | 19.4 | 20.0 |

ing of 18-22 tubed, pored, or notched scales, but is scarcely evident in a few of the paratypes, or only a few tubed scales are conspicuous. Scales cycloid on head and anteriormost portion of body, becoming progressively more ctenoid posteriorly; no auxiliary scales on body; no scales on maxilla; basal half of median fins and pectoral fins covered with small scales, forming a sheath at base of dorsal and anal; predorsal scales about 40 (36-40), extending forward to front of interorbital region; pectoral fins with small scales at base.

Origin of dorsal fin even with posteriormost extension of opercular flap; dorsal spines low, mostly covered with scaly basal sheath; spines 1-4 gradually increasing in length, remaining spines more or less subequal, the longest 5.2 (4.6-4.8) in head; all dorsal and anal rays branched, the last to base; tips of posterior dorsal and anal soft rays reaching just beyond a vertical through caudal-fin base; soft dorsal rays becoming gradually longer posteriorly, the longest 2.4 (1.8-2.5) in head length; origin of anal fin below base of about first dorsal soft ray; anal spines mainly covered with scaly basal sheath, the middle spine strongest and longest, 6.1 (3.7-6.1) in head length; soft anal rays becoming gradually longer posteriorly, the longest 2.6 (2.3-2.9) in head length. Caudal fin rounded, its length 1.8 (1.7-2.0) in head. Pectoral fins extending to about level of anal fin origin, the rays branched except uppermost and lowermost; middle pectoral rays longest, 1.6 (1.6-1.7) in head. Origin of pelvic fins below lower pectoral-fin base; pelvic fins short, extending only about half distance between base of fins and anus, their length 1.4 (1.1-1.3) in head; pelvic spine less than half length of longest pelvic ray.

*Color of holotype in life:* Brown overall, including fins; side of body covered with numerous, large tan blotches; lower portion of head tan; a prominent eye-sized ocellated dark brown spot on upper part of operculum; a pair of dark brown lines radiating backward from lower half of eye across cheek. Juveniles under 20 mm SL are uniformly brown on the sides and have a tan head with a diagonal white band across the cheek and a vertical white bar below the eye.

*Color in alcohol:* Very similar to live coloration, except colors are more vivid.

**Remarks**

Schultz (1966) provided a key to the five previously described species of *Pseudogramma*, which at the time were divided into two genera, *Pseudogramma* and *Rhegma*. *P. axelrodi* belongs to the complex of species that includes *P. thaumasium* from the eastern Pacific and *P. bermudensis* and *P. gregoryi* from the western Atlantic. These four species are characterized by the

presence of a dermal flap on the upper edge of the eye (Fig. 3), and were formerly placed in the genus *Rhegma* Gilbert, now recognized as a junior synonym of *Pseudogramma*. The new species is most similar to *P. thaumasium* with regard to fin-ray counts and general appearance. These two eastern Pacific species generally have higher soft-ray counts for the dorsal, anal, and pectoral fins (21-22, 16-18, and 16-18 respectively) than the western Atlantic members of this complex (15-18, 12-16, and 14-15 respectively).

*P. axelrodi* differs from *P. thaumasium* (Fig. 2) in having a shorter, broader-based skin flap on the upper edge of the eye (Fig. 3) and 17 or 18 pectoral fin rays (versus 16, rarely 17). The two species also differ in color. *P. thaumasium* has thin, horizontal dark lines, one per scale row, on the side of the body, although this pattern is sometimes overlain with pale blotches, similar to those of *P. axelrodi*. Furthermore, the white band across the cheek tends to be more clearly defined in adults of *P. thaumasium*, although it is distinct in the juveniles of both species. The two species have apparent allopatric distributions. *P. thaumasium* ranges from the Gulf of California to Panama (Allen and Robertson, 1994), whereas *P. axelrodi* is known only from Clipperton Island.

The habitat consists of crevices and caves on the outer reef slope at depths between about 15-30 meters. It is difficult to judge the abundance of *P. axelrodi* due to its cryptic habits. It was never seen while diving except when collected with rotenone. Usually a few specimens were captured at each rotenone station.

**Etymology**

The species is named *axelrodi* in honor of Dr. Herbert R. Axelrod, Founder and Chairman of T.F.H. Publications and Publisher of *Tropical Fish Hobbyist*, in recognition of his many ichthyological contributions and generous patronage of this branch of science.

**Acknowledgments**

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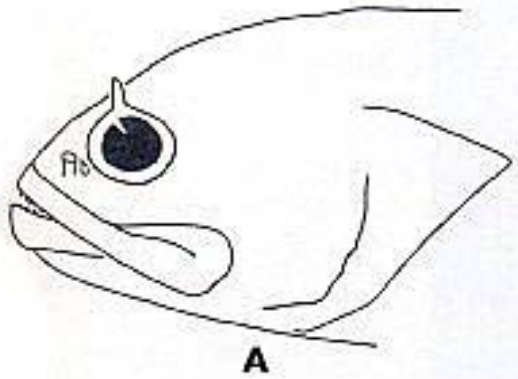

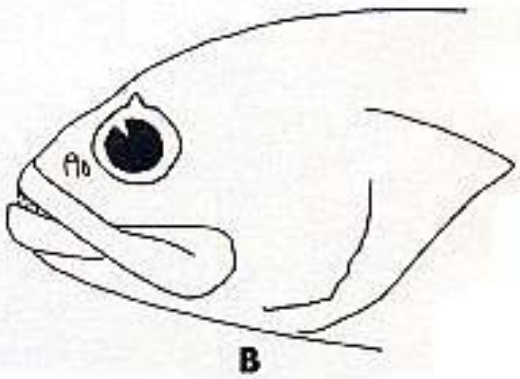
Figure 3. Diagram of heads of *Pseudogramma axelrodi* (B) and *P. thaumasium* (A), showing structure of orbital flap.