

## *Protemblemaria perla*, a new species of tube blenny (Perciformes: Chaenopsidae) from the tropical eastern Pacific

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**Abstract:** *Protemblemaria perla*, from Isla del Rey, Islas Perlas, Panama, is distinctive in having a long unbranched cirrus on the posterior nostril, a U-shaped fleshy ridge bearing fleshy flaps and a pair of papillae on the nape, a relatively high number (18) of segmented dorsal-fin rays, and small rust-colored spots on the dorsal fin. *Protemblemaria perla* and *P. punctata*, from the southern Caribbean, share several morphological features and form a transisthmian species pair. Although the degree of color variation is unknown in *P. perla*, color varies greatly in *P. bicirris* and *P. punctata*, both of which have an orange morph.

**Key words:** Blennioidei; Chaenopsidae; tropical eastern Pacific; transisthmian species; color variation

*Protemblemaria* was erected by Stephens (1963) for *Emblemaria bicirris* Hildebrand (1946), and a new species, *Protemblemaria lucasana* Stephens (1963), from the Pacific coast of Mexico. Subsequently, Böhlke and Cervigon (1967) elaborated the unintended but valid description of *Protemblemaria punctata* Cervigon (1966) from the southern Caribbean. Hastings (1997) recently erected a new genus, *Cirriemlemaria*, for *P. lucasana*, because this species does not appear to form a monophyletic group with the other members of *Protemblemaria*, but instead shares some features with the exclusively Caribbean genus *Emblemaropsis*.

Collections of reef fishes in the tropical eastern Pacific continue to reveal new species. Among these is a new chaenopsid from Panama collected by Gerald R. Allen

and D. Ross Robertson during their recent survey of tropical eastern Pacific fishes (Allen & Robertson 1994). This new species is clearly referable to *Protemblemaria* as defined by Hastings (1997) in having fleshy interorbital ridges, a medial fleshy ridge on the snout, and two pairs of branched supraorbital cirri. This new species is herein described and compared with other members of *Protemblemaria*.

### MATERIAL AND METHODS

Measurements were taken with dial calipers to the nearest 0.1 mm except for snout length, bony orbital diameter, iris diameter, and bony interorbital width, which were measured with an ocular micrometer on a dissecting scope. Cirrus lengths are from the

base to the end of the longest branch; nasal cirrus lengths include the basal tube if present. Definitions of pore series follow Smith-Vaniz and Palacio (1974) and Hastings (1990) and are abbreviated as follows: MD = mandibular; CP = common; POP = preopercular; PT = posttemporal; T = temporal; LST = lateral supratemporal; MST = median supratemporal; AIO = anterior infraorbital; PIO = posterior infraorbital; SO = supraorbital; F = frontal; CM = commissural; AFO = anterofrontal; N = nasal. Counts for bilateral pore series are reported separately for both sides. Institutional abbreviations follow Leviton, et al. (1985).

**Comparative Material Examined.** *Protemblemaria bicirris* – Mexico: SIO 62-61 and SIO 62-105, Bahía Magdalena, BCS; SIO 62-121, Bahía Almejas, BCS; SIO 00-14, Isla Coronado, Gulf of California; SIO 00-15, Isla Leon, Bahía Algodones, Son; SIO 00-16, Acapulco, Guer.; UAZ 73-94-2, Cabo San Lucas, BCS; UAZ 71-60-1 and UAZ 71-69-2, Pto. Vallarta, Jal.; USNM 31640, Isla San Ignacio de Farallon, Gulf of California. Panama: SIO 71-247, Bahía Panama; SIO 71-260 and USNM 317698, Isla Tabogilla; USNM 317683, Isla del Rey, Islas Perlas; USNM 317705, Playa Veneau, Azuro Peninsula. Ecuador: ANSP 102490, ANSP 102632, ANSP 123480, and ANSP 102644, Isla La Plata. Peru: USNM 128223 (holotype), Lagunilla, Bahía Independencia. *Protemblemaria punctata* – Venezuela: ANSP 103565, Peninsula de Araya, Estado Sucre. *Cirriblemarmaria lucasana* – Mexico: SIO 65-343 and SIO 65-354, Isla Sta. Cruz, Gulf of California; SIO 65-347, Isla San Francisco, Gulf of California; UAZ 72-87-3 and UAZ 73-94-3, Cabo San Lucas, BCS; UAZ 70-23-9, Pto. Escondido, Oaxaca.

***Protemblemaria perla*, new species**

Figure 1A, Figure 2

Pearl blenny

**Synonymy:** *Protemblemaria bicirris* (in part): Allen and Robertson, 1994. *Protemblemaria* new species: Hastings, 2000.

**Holotype:** USNM 353939, Panama (Pacific), Islas Perlas, Isla del Rey, 40.8 mm SL male, collected 4 May 1990 by D. R. Robertson and G. R. Allen.

**Paratypes:** USNM 353940, collected with the holotype (29.8 mm female); SIO 00-64, collected with the holotype (22.7 mm male).

**Diagnosis:** Unique within *Protemblemaria* in having a long unbranched cirrus on the posterior nostril, a U-shaped fleshy ridge bearing fleshy flaps and a pair of papillae on

the nape, a relatively high number (18) of dorsal-fin rays, and rust-colored spots on the dorsal fin of the male.

**Description:** Frequencies of fin-ray counts are given in Table 1: dorsal fin XX, 18 (38 total elements), anal fin II, 25 or 26, pectoral fin 14, pelvic fin I, 3. Cephalic sensory pores: MD = 4, CP = 1, POP = 4, PT = 4, T = 0, LST = 2, MST = 1, AIO = 3, PIO = 3, SO = 2, F = 1 or 2, CM = 1 or 2, AFO = 2, N = 1.

Measurements in mm: standard length: 40.8 (holotype), 29.8 (female paratype), 22.7 (male paratype); predorsal length: 6.3, 4.9, 4.2; preanal length: 17.5, 12.8, 9.3; head length (to dorsal insertion of gill membrane): 9.5, 7.1, 5.9; head length (to posteriormost extent of gill membrane): 9.7, 7.3, 5.9; snout length: 1.2, 1.0, 0.9; bony orbital diameter 2.1, 1.8, 1.5; iris diameter: 1.8, 1.6, 1.3; bony interorbital width: 0.8, 0.6, 0.5; jaw length: 5.0, 3.6, 3.0; anterior supraorbital cirrus length: 1.9, 1.5, 1.5; posterior supraorbital cirrus length: 2.2, 1.7, 1.5; anterior nasal cirrus length: 1.4, 0.8, 0.7; posterior nasal cirrus length: 1.8, 1.1, 1.3; maximum body depth: 5.9, 4.5, 3.5; body depth at anal-fin origin: 5.7, 4.2, 3.3; caudal peduncle depth: 3.0, 2.1, 1.6.

Head bluntly rounded. Jaws horizontal, mouth terminal. Maxilla extends posteriorly well past posterior orbital margin to level of vertical from fourth MD pore. Two pairs of deeply branched supraorbital cirri. Anterior cirrus palmate with stout base and four main branches near base; each main branch, especially central two, with several other branches. Posterior cirrus pinnate to palmate, with stout base and both basal and more distal branches along its length. Anterior nostril with well-developed tube; anterior margin of tube fluted or turned downward; posteromedial margin of tube with cirrus with two to five branches; cirrus palmate in holotype, with four to five branches of similar length. Posterior nostril with low rim; anterior margin with simple, unbranched cirrus, length slightly more than half orbital diameter (larger paratype) to just less than orbital diameter

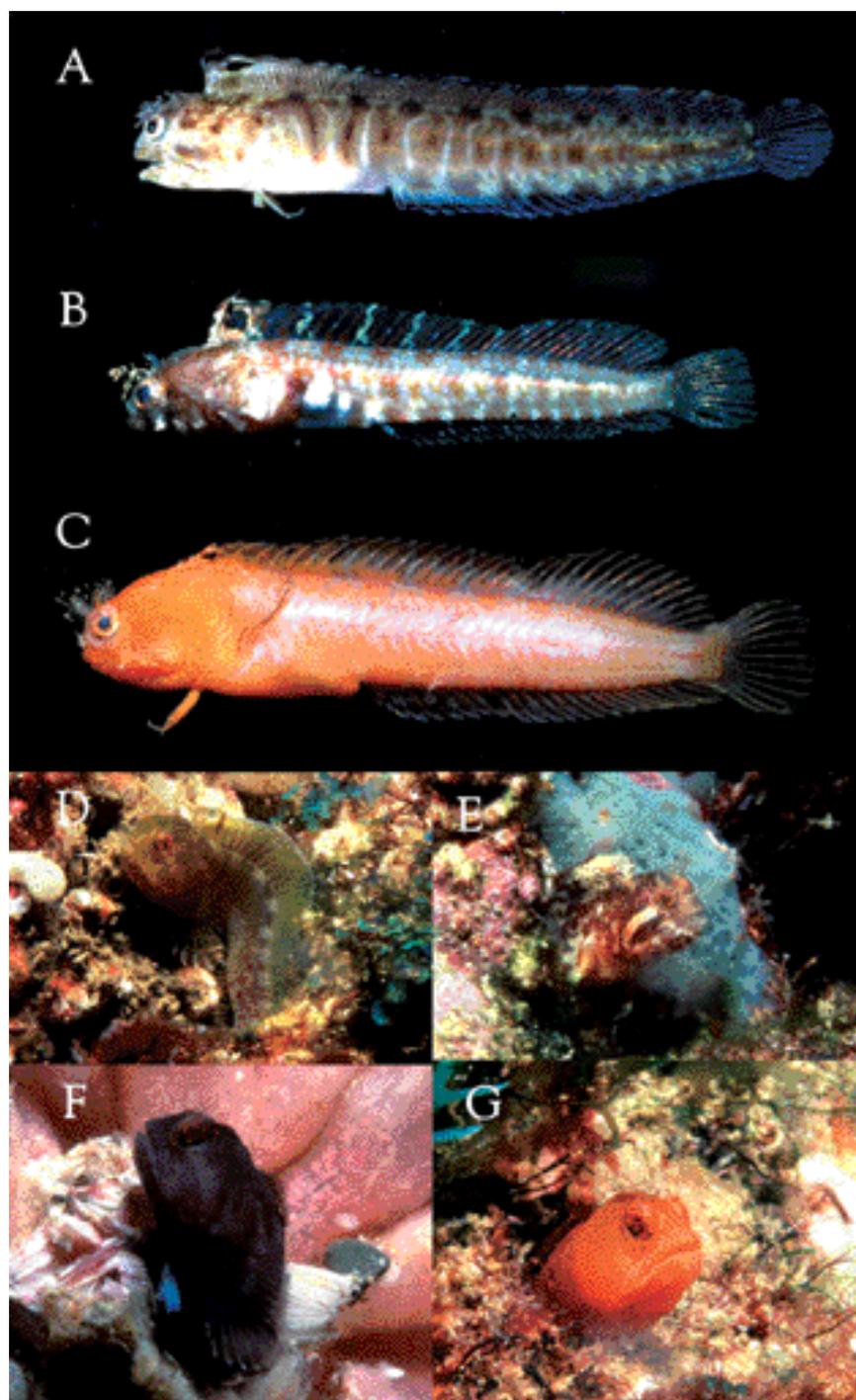


Fig. 1. A. *Protemblemaria perla* holotype, USNM 353939, 40.8 mm SL male (photograph by G. R. Allen); B. *Protemblemaria bicirris* brown morph, 26 mm SL, Los Islotes, Gulf of California, Mexico (photograph by G. R. Allen); C. *Protemblemaria bicirris* orange morph, USNM 317640, 31.1 mm SL, Isla San Ignacio de Farallon, Mexico (photograph by G. R. Allen, originally published in Allen and Robertson, 1995, p. 249). Photograph reversed herein (right side of fish is shown); D-G. *Protemblemaria punctata*. Isla Margarita, Venezuela (photographs by Paul Humann).

TABLE 1.

Frequency distribution of fin-ray elements and selected cephalic sensory pore series for species of *Protemblemaria* and *Cirriblemaria lucasana*. MST = median supratemporal; LST = lateral supratemporal. Data for *P. bicirris* and *C. lucasana* include those of Stephens (1963). Counts for bilateral elements are reported for each side and both sides were counted for most specimens.

|                    | Dorsal-Fin Spines         |    |    | Segmented Dorsal-Fin Rays |    |    | MST          |    |    |     |    |
|--------------------|---------------------------|----|----|---------------------------|----|----|--------------|----|----|-----|----|
|                    | 19                        | 20 | 21 | 22                        | 23 | 24 |              | 25 |    |     |    |
| <i>P. bicirris</i> | 6                         | 19 | 4  | 1                         | 3  | 28 | 10           | 2  | 3  | 17  | 18 |
| <i>P. punctata</i> | 3                         |    |    | 9                         |    | 4  | 6            |    |    |     |    |
| <i>P. perla</i>    |                           |    |    |                           |    |    |              |    |    |     |    |
| <i>C. lucasana</i> |                           |    |    |                           |    |    |              |    |    |     |    |
|                    | Total Dorsal-Fin Elements |    |    | Anal-Fin Rays             |    |    | MST          |    |    |     |    |
|                    | 34                        | 35 | 36 | 37                        | 38 | 39 |              | 40 |    |     |    |
| <i>P. bicirris</i> | 4                         | 13 | 9  | 1                         | 3  | 9  | 16           | 2  | 2  | 24  | 25 |
| <i>P. punctata</i> |                           |    |    | 18                        | 4  | 22 | 23           | 2  | 2  | 24  | 26 |
| <i>P. perla</i>    |                           |    |    | 1                         | 3  | 9  | 16           |    | 1  | 30  | 21 |
| <i>C. lucasana</i> |                           |    |    | 1                         | 6  |    |              |    | 3  | 2   | 6  |
|                    | Anterofrontal             |    |    | Commissural               |    |    | Frontal      |    |    | MST |    |
|                    | 1                         | 2  | 3  | 4                         | 5  | 6  | 7            | 8  | 9  |     |    |
| <i>P. bicirris</i> | 86                        | 2  | 2  | 41                        | 2  | 21 | 65           | 2  | 0  | 1   | 1  |
| <i>P. punctata</i> | 36                        | 6  | 6  | 2                         | 15 | 1  | 5            | 31 | 21 | 44  | 18 |
| <i>P. perla</i>    | 6                         | 29 | 29 | 2                         | 2  | 1  | 4            | 2  | 2  | 3   | 3  |
| <i>C. lucasana</i> | 1                         |    |    | 3                         | 12 | 2  | 8            | 20 | 2  | 8   | 7  |
|                    | LST                       |    |    | Temporal                  |    |    | Preopercular |    |    |     |    |
|                    | 0                         | 1  | 2  | 3                         | 4  | 5  | 6            | 7  | 8  | 9   | 10 |
| <i>P. bicirris</i> | 0                         | 1  | 2  | 3                         | 0  | 1  | 2            | 2  | 2  | 4   | 5  |
| <i>P. punctata</i> | 2                         | 65 | 12 | 4                         | 12 | 13 | 35           | 3  | 3  | 5   | 81 |
| <i>P. perla</i>    |                           |    |    | 4                         | 36 | 36 | 1            | 1  | 1  | 34  | 1  |
| <i>C. lucasana</i> |                           |    |    | 6                         | 6  | 6  | 6            | 6  | 6  | 6   | 6  |
|                    |                           | 13 | 13 | 4                         | 1  | 29 | 1            | 1  | 1  | 1   | 29 |

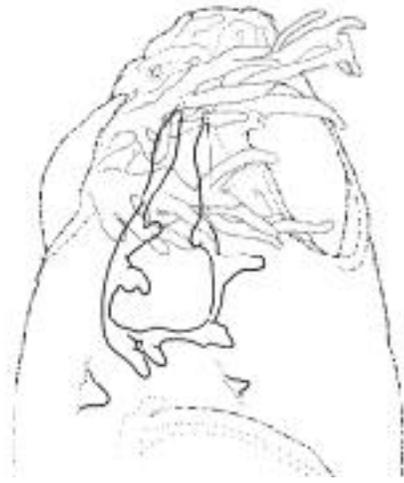


Fig. 2. Dorsal view of the head of *Protottemblemaria perla* paratype (SIO 00-64, 22.7 mm male). Extent of the fleshy ridges and the pair of papillae on the nape are indicated by solid lines

(holotype). Snout with low medial fleshy ridge extending from just above upper lip posteriorly to level of first AFO pore. Interorbit and nape with U-shaped fleshy ridge (Fig. 2) extending from slightly posterior to first AFO pore, along interorbital margins, parallel across nape, and joining medially just anterior to MST pore. Ridge interrupted on nape (holotype) or continuous (paratypes; Fig. 2). Ridge along interorbit with short lobes, parallel parts of ridge on nape with irregular fingerlike projections or short lobes, and medial portion of ridge connecting left and right sides with large, fleshy flaps. Nape with a pair of small papillae posterior to ridge and just anterior to LST pores.

First dorsal-fin spine with thin fleshy flap along anterior margin. Anterior dorsal fin low, all spines approximately equal in length in male holotype and female paratype; first two spines slightly longer than third in male paratype. Second dorsal-fin spine closer to first than third; other spines more or less equally spaced. Posterior dorsal-fin spines slightly shorter than more anterior and posterior elements, resulting in shallow notch between spinous and soft dorsal fins. Pectoral fin rounded. Caudal fin rounded. Pelvic

fin with thin spine and three rays; second ray longest, third well-developed and equal in length to first ray.

**Coloration in preservative:** Color pattern of holotype resulting from variation in both the concentration and expansion of melanophores with relatively few areas lacking melanophores. Snout, interorbit, cheek, nape, supraorbital cirri, nasal cirri, and U-shaped fleshy ridge with scattered melanophores. Nape irregularly spotted; supraorbital margin with two concentrations of melanophores, one anterior and one posterior to anterior SO pore. Cheek with central pale area, with large ill-defined dark blotch above and ill-defined dark swath below. Margin of fleshy flap just above maxilla with narrow dark line. Lower side of head with four dark bands; first just posterior to anteriormost MD pore, and fourth just posterior to posterior tip of jaw. Anterior pectoral-fin base covered evenly with melanophores. Body with twelve dorsal saddles, posteriormost three small and faint; first saddle just posterior to pectoral-fin insertion, last on caudal peduncle. Body midline with series of irregular dark markings; anteriormost thin, barlike, grading posteriorly to broader blotches that become progressively more faint. Body along anal-fin base with series of blotches; blotches indistinct anteriorly but well-defined posteriorly. Belly with scattered melanophores. Dorsal-fin flap with uniform dense melanophores. Anterior dorsal fin with dark distal margin and tear-drop shaped black spot between spines II and III; spot ocellated above and below. Spinous dorsal fin with background of uniform dense melanophores; spinous dorsal fin posterior to spine III with dense, small dark spots. Soft dorsal fin with fine melanophores which decrease in density posteriorly. Anterior anal fin with background of dense melanophores which decrease in density posteriorly, dark submarginal band, and unpigmented distal margin. Pectoral fin with few melanophores along rays and fewer on membranes. Caudal fin with melanophores along rays but none on

membrane. Pelvic fin with dense melanophores on both rays and membranes.

Coloration of both paratypes similar to that of holotype but generally paler and with more areas lacking melanophores. Smaller male with dorsal saddles extending from body onto dorsal fin, and dark marks distally above each saddle. Dark ocellus present on anterior dorsal fin, but no small dark spots posterior to spine III. Anal fin with prominent spots along base. Female paratype with indistinct saddles and bars on body, no spots on dorsal fin posterior to spine III, and prominent spots along anal-fin base.

**Coloration in life** (based on color photograph of holotype, Fig. 1A, taken shortly after collection and fixation in formalin). Dark portions of head brown; cheek with yellowish spots. Infraorbital region and jaws with a series of pale-blue dots; iris pale with rust-colored or yellow lines radiating from pupil. Lower jaw, branchiostegal membrane and pelvic fin with a faint yellow wash. Body with a series of narrow, pearly white bars mostly below dark dorsal saddles. Black spot on anterior dorsal fin with a distinct, narrow white dorsal border and a diffuse yellow ventral border. Spinous dorsal fin posterior to spine III covered with fine rust-colored spots that continue posteriorly onto soft dorsal fin; distal margin of spinous dorsal fin with alternating white and rust or black marks. Anterior anal fin with a pale-blue wash both proximal and distal to black submarginal band.

Allen and Robertson (1994:249) provide a color photograph of the male paratype (SIO 00-64) labeled as "*Protemblemaria bicirris* Juv." taken after fixation in formalin. Its coloration is similar to that of the holotype except as follows. Narrow white bars on body not evident. Dorsal fin without rust-colored spots but with proximal and distal rust-colored bands and an intervening dark band, interrupted by narrow white bars. Dorsal-fin ocellus between spines II and III similar to that of holotype. Apparent spot between spines I and II is an artifact.

**Sexual dimorphism:** As in other

species of chaenopsids, males and females are readily distinguishable by the shape of the genital region (Böhlke 1957, fig. 2). Males have a long, pointed papilla and relatively smooth anal margin, whereas females have a shorter, broader papilla with a fimbriate anal margin. There are no obvious differences that can be confidently attributed to sex between the two males and single female. A possible difference involves the rust-colored dorsal-fin spots present in the larger male and absent from the female, but also absent from the smaller male.

**Etymology:** *perla*, an arbitrary combination of letters, refers both to the Islas Perlas where the only known specimens were collected and to the pearly bars on the body (Fig. 1A), and is used as a noun in apposition.

**Distribution:** *Protemblemaria perla* is known only from Isla del Rey, Islas Perlas, Bay of Panama, eastern Pacific Ocean. The three specimens were collected along with 14 specimens of *P. bicirris* (USNM 317683). Interestingly, this same collection produced the only known specimen of another chaenopsid, *Tanyemblemaria alleni* (Hastings 1992). Clearly, the systematics of small shore fishes of this archipelago warrant further study.

**Comparisons and relationships:** *Protemblemaria perla* shares with the other two species of *Protemblemaria* the following unique features: fleshy ridges along the interorbital margin, a medial fleshy ridge on the snout, and two pairs of branched supraorbital cirri. All three species also have dark radiating lines on the iris, but the distribution of this character state in other chaenopsids is unknown. Although the osteology of *P. perla* has not been studied, it is predicted to lack a cleithral stay on the dorsal arm of the scapula, and to have a complex suture between the anterior and posterior ceratohyals, features shared by the other two species of *Protemblemaria* (Hastings 1997).

*Protemblemaria perla* is unique in having a long cirrus on the posterior nostril,

fleshy flaps along the nape ridges, a pair of papillae on the nape, 18 segmented dorsal-fin rays (Table 1), and rust-colored spots on the spinous dorsal fin (Fig. 1A). *Protemblemaria punctata* is unique in having rust-colored spots on the posterior portion of the body and caudal fin (Fig. 1D), and the anterior portion of the dorsal fin slightly elevated in females (Böhlke & Cervigon 1967). *Protemblemaria bicirris* is unique in having numerous wart-like bumps on the head (especially the nape) and a long tube on the posterior nostril. It is also distinguishable from its congeners in having the dorsal-fin ocellus at midheight on the fin instead of on the distal half of the fin, and reduced numbers of cephalic sensory pores in some series (Table 1). These include one instead of two pairs of AFO pores, no CM pore, no or only one pair of F pores instead of typically two, no MST pore, and one instead of two pairs of LST pores.

Although the extent of color variation in *P. perla* is unknown, coloration is highly variable in both *P. bicirris* and *P. punctata*. Most specimens of *P. bicirris* are brown to olive and variously banded or mottled (Fig. 1B). Occasionally individuals are yellowish or in some cases bright orange (Fig. 1C). Coloration appears to be even more variable in *P. punctata*. Recent underwater photographs of chaenopsids taken at Isla Margarita off the northern coast of Venezuela (Fig. 1D-G) appear to represent this species, previously known only from nearby mainland Venezuela (Böhlke & Cervigon 1967). These photographs include an olive morph (Fig. 1D) in which the diagnostic spots on the posterior portion of the body are evident, a brown morph (Fig. 1E) with a distinct pale bar behind the eye, a black morph (Fig. 1F) with a faint bar behind the eye and blue pelvic fins, and an orange morph (Fig. 1G) closely resembling the orange morph of *P. bicirris* (Fig. 1C).

*Protemblemaria perla* appears to be most closely related to *P. punctata* from the southern Caribbean. These two species are unique in having prominent parallel fleshy

ridges on the nape; these ridges are simple in *P. punctata*, bear flaps in *P. perla* (Fig. 2), but are absent or small in *P. bicirris*. These two species also are unique in having a flap on the anterior margin of the posterior nostril; this flap is short in *P. punctata*, long and thin in *P. perla*, but is absent in *P. bicirris*. *Protemblemaria perla* and *P. punctata* are similar in a number of other respects, including presence of a dark spot on the distal half of the anterior dorsal fin, and numerous small rust-colored spots. Interestingly similar spots are present on the dorsal fin of *P. perla* (Fig. 1A) and on the body of *P. punctata* (Fig. 1D).

*Protemblemaria perla* is known only from the Bay of Panama, while its hypothesized sister species, *P. punctata*, is known only from the southern Caribbean, from mainland Venezuela (Böhlke & Cervigon 1967) and apparently nearby Isla Margarita (Fig. 1D-G). These closely related and morphologically similar chaenopsids thus provide another example of transisthmian geminate species whose distributions are restricted to the presumed distribution of their common ancestor prior to the closure of the isthmus (Hastings 2000).

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#### RESUMEN

*Protemblemaria perla*, de Isla del Rey, Islas Perlas, Panamá, se distingue con base en características morfológicas, morfométricas y de coloración. *Protemblemaria perla* y *P. punctata*, son especies de origen común separadas por el istmo panameño.

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