



## BRIEF COMMUNICATION

### First record of the paedomorphic goby *Schindleria praematura*, Easter Island, South Pacific

M. F. LANDAETA, R. VEAS AND L. R. CASTRO\*

Laboratorio de Oceanografía Pesquera y Ecología Larval, Departamento de Oceanografía, Universidad de Concepción, Casilla 160-C, Concepción, Chile

(Received 23 October 2001, Accepted 10 May 2002)

Thirty-five larvae and adults of the paedomorphic goby *Schindleria praematura* were collected around Easter Island, during November 1999. Mean abundance from the five stations where they were caught ( $n=26$ ) was  $10.2 \pm 6.1$  individuals  $1000 \text{ m}^{-3}$ . They occurred only in shallow areas. Oocyte counts ranged from 70 to 110. Otolith examination suggests that adults appear to live no longer than 3 months.

© 2002 The Fisheries Society of the British Isles. Published by Elsevier Science Ltd. All rights reserved.

Key words: *Schindleria praematura*; Easter Island; paedomorphism; fish larvae; otoliths.

The Schindleriidae is a monogeneric gobioid family of small fishes ( $\leq 20$  mm) that show extreme paedomorphism. Some of the larval characteristics observed in sexually mature individuals include functional pronephros, a transparent body and a largely unossified skeleton (Johnson & Brothers, 1993). Miller (1997) has hypothesized that the primary incentive for such developmental truncation could be the rich trophic resources of coastal waters in conjunction with reduction of risk in the pre-adult life-history.

*Schindleria* is confined to the Indo-Pacific coral reefs (Watson *et al.*, 1984; Watson, 2000), and it has also been found off southern Japan, in the South China Sea (Ozawa & Matsui, 1979), off southern Africa (Harris & Cyrus, 1996) and at the Salas y Gómez submarine ridge (Belyanina, 1989; Parin *et al.*, 1997).

During an oceanographic expedition (CIMAR-5) to Easter Island ( $27^{\circ}10' \text{ S}$ ;  $109^{\circ}20' \text{ W}$ ) in November 1999, 10 oblique Bongo net tows (60 cm diameter, 300 micrometer mesh, with flowmeter) down to 100 m or less depending on depth of water, were carried out at stations located within 1 nautical mile (nm) from shore around the island during the day, and repeated at night. Also, four transects perpendicular to the island at each of four stations, were sampled at 3, 7, 12 and 20 nm from shore. Samples were preserved in 10% formalin and 96% ethanol (four stations).

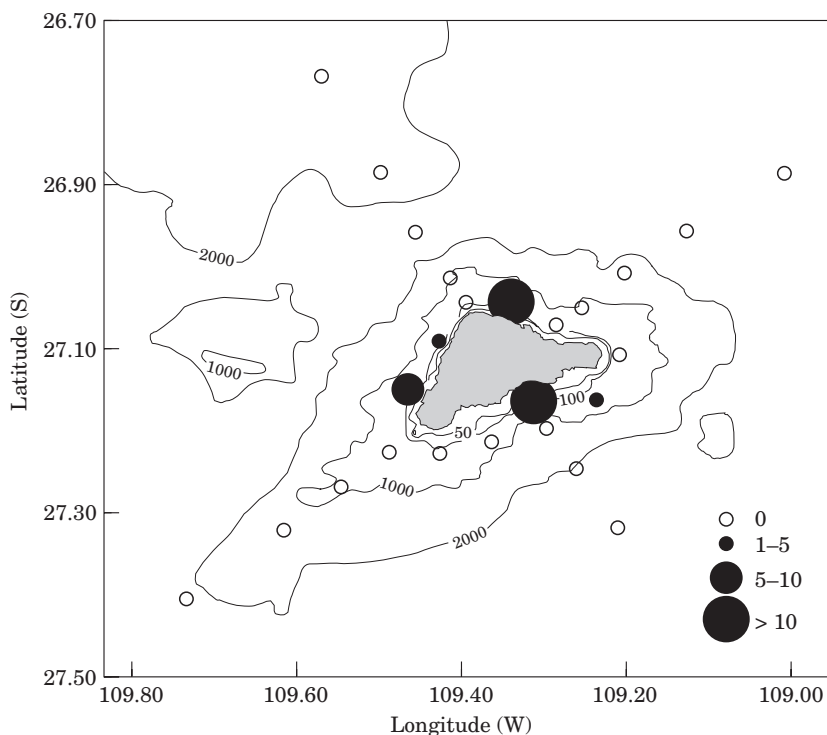
Identification of the species as *Schindleria praematura* (Schindler) was based on two diagnostic features: (1) 13 segmented caudal rays and (2) the gut extending to about two-thirds of the standard length ( $L_S$ ) (Watson, 2000). Species identification as *S. praematura* was confirmed (G. Herrera, pers. comm.).

Standard length (mm) and other morphometric measurements (nearest 0.1 mm, Table I) were measured using a dissecting microscope fitted with an eyepiece micrometer. Otoliths from individuals preserved in ethanol were extracted and mounted on a microscope slide with epoxic resin. Otolith rings were counted with the aid of a light microscope attached to a video camera and monitor. The average radius of the otolith was measured using OPTIMAS® (version 6.1; Optimas Corporation, 1996).

\*Author to whom correspondence should be addressed. Tel.: +56 41 203532; fax: +56 41 256571; email: lecastro@udec.cl

TABLE I. Morphometrics as proportions of standard length of *Schindleria praematura* from Easter Island

	Larvae	Juveniles and adults
Preanal length	60.6–66.0	63.8–72.5
Head length	13.0–16.0	11.7–15.2
Eye diameter	3.7–6.5	2.2–3.5
Snout length	2.8–4.3	2.2–4.2
Body depth	6.6–8.7	2.2–3.5

FIG. 1. Oceanographic stations around Easter Island sampled in November 1999. Larval abundance as individuals  $1000\text{ m}^{-3}$ . The bathymetric contours are also shown.

A total of 35 specimens (both larvae and adults) of *S. praematura* were identified in the samples from the nearshore (<1 nm) stations around Easter Island (Fig. 1). This is the first record of this species at Easter Island and constitutes its southern-most location in the south-eastern Pacific Ocean.

Abundance at stations where the fish were caught ranged from 3.5 to 23.3 individuals  $1000\text{ m}^{-3}$  with a mean density ( $\pm$  S.D.) of  $10.2 (\pm 6.1)$  individuals  $1000\text{ m}^{-3}$ . There was no significant differences in abundance between day and night catches (Mann–Whitney *U* test,  $P > 0.05$ ). No larvae were collected at the offshore stations located along the transects. The shallow areas where they were collected contrast with previous findings from the nearest locality where they had been reported earlier (Salas y Gomez deep submarine ridge; Belyanina, 1989).

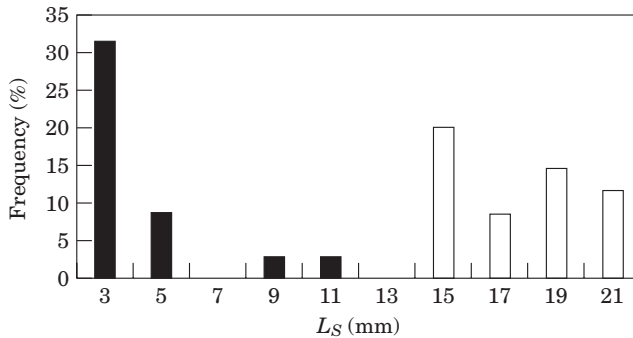


FIG. 2. Size frequency distribution of larval (■) and adult (□) *Schindleria praematura* collected around Easter Island in November 1999.

TABLE II. Otolith reading (number of rings and radius) of *Schindleria praematura* from Easter Island

$L_S$ (mm)	Rings	Sagitta average radius ( $\mu\text{m}$ )
3.10	?	8.77
13.40	31	22.56
15.00	26	20.37
15.75	29	23.17
17.13	Broken	24.15
18.75	42	

Individual  $L_S$  ranged between 1.8–20.9 mm, including pre- and postflexion larvae (<11 mm  $L_S$ ), juveniles and adults (>11 mm  $L_S$ ) (Fig. 2). The largest individuals collected (20.9 mm  $L_S$ ) were close to the maximum size reported for this species (Harris & Cyrus, 1996; Watson, 2000). Seventy to 110 oocytes were counted in ripe females.

The number of otolith rings in the sagitta ranged from 26 to 42 (Table II). It was not possible to clearly read the otoliths of the smallest individuals, because of the narrow thickness of the increments (<1  $\mu\text{m}$  width; Johnson & Brothers, 1993). The small size of the otoliths (Table II) in relation to  $L_S$  could indicate that *S. praematura* is a fast-growing fish (Campana, 1990). The small number of otolith rings in the larger individuals suggests a short lifespan (probably no more than 2 or 3 months), possibly associated with the extreme pedomorphism of the species. Because of the thickness of the increments, their number could have been underestimated especially around the core.

This study was supported by CONA (Chilean National Oceanographic Committee), Grant 'Distribution and larval accumulation patterns around oceanic islands: Easter island and Salas y Gómez island' to L. R. Castro. We thank G. Herrera for his help with the species identification.

#### References

- Belyanina, T. P. (1989). Ichthyoplankton in the regions of the Nazca and Salas y Gomez submarine ridges. *Journal of Ichthyology* **29**, 84–90.
- Campana, S. E. (1990). How reliable are growth back-calculations based on otoliths? *Canadian Journal of Fisheries and Aquatic Sciences* **47**, 2219–2227.
- Harris, S. A. & Cyrus, D. P. (1996). Occurrence of Schindler's fishes, genus *Schindleria* (Teleostei: Gobioidae), at a small reef in the mouth of the Kosi Estuary, Kwazulu-Natal: A first record for southern Africa. *Bulletin of Marine Science* **59**, 228–234.

- Johnson, G. D. & Brothers, E. B. (1993). *Schindleria*: a paedomorphic goby (Teleostei: Gobioidae). *Bulletin of Marine Science* **52**, 441–471.
- Miller, P. J. (1997). Persistent postlarvae: the case of progenetic gobies. In *Ichthyoplankton Ecology, Fisheries Society of the British Isles, Annual Symposium* (Geffen, A. J., Fives, J. M. & Thorpe, J. E., eds). *Journal of Fish Biology* **51** (Suppl. A), 412.
- Optimas Corporation (1996). *Optimas, Version 6.1*. Bothell, Washington: Optimas Corporation.
- Ozawa, T. & Matsui, S. (1979). First record of the schindlerid fish, *Schindleria praematura*, from southern Japan and the South China Sea. *Japanese Journal of Ichthyology* **25**, 283–285.
- Parin, N. V., Mironov, A. N. & Nesis, K. N. (1997). Biology of the Nazca and Sala y Gómez submarine ridges, an outpost of the Indo-West Pacific fauna in the Eastern Pacific Ocean: composition and distribution of the fauna, its communities and history. *Advances in Marine Biology* **32**, 147–242.
- Watson, W. (2000). Schindleriidae (Schindler's fishes). In *The Larvae of Indo-Pacific Coastal Fishes* (Leis, J. M. & Carson-Ewart, B. M., eds), pp. 633–636. Leiden: Brill.
- Watson, W., Stevens, E. G. & Matarese, A. C. (1984). Schindlerioidei: development and relationships. In *Ontogeny and Systematics of Fishes* (Moser, H. G., Richards, W. J., Cohen, D. M., Fahay, M. P., Kendall, A. W. & Richardson, S. L., eds). *American Society of Ichthyologists and Herpetologists Special Publication* **1**, 552–554.