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# New Records of a Paedomorphic Fish, *Schindleria praematura* (Pisces: Schindleriidae), from Waters of Taiwan

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## ABSTRACT

This is the first record of the paedomorphic fish, *Schindleria praematura* (Schindleriidae) from Taiwan. Nine specimens from eight samples colleted from eight cruises were studied. Four females, 11.42 to 18.95 mm SL, were sexually mature with many eggs. Three males, 10.28 to 14.20 mm SL, were also sexually mature with genital papilla extending over the anus. The remaining two specimens were in a young stage at 3.14-7.90 mm SL.

**Key words:** Pisces, Schindleriidae, Paedomorphic

## INTRODUCTION

Paedomorphosis results as a fish retains its larval form and becomes reproductively mature. It is a deviation from biogenetic law and a recapitulation of development; adults are paedomorphic by which they resemble juveniles of their ancestors. The most developed paedomorphosis in fish is known from the Schindleriidae (Miller, 1997). The Schindleriidae includes one genus, *Schindleria,* with two species; *S. pietschmenni* and *S. praematura*. Both species have been found in planktonic sampling by Leu *et al*. (pers. commun.) near Taiwan. They are small neoteinic fishes without adult characters (Schindler, 1932; Nelson, 1984). Both species inhabit neritic surface waters of the subtropical and tropical Indian and Pacific Oceans (Johns and Kumaran, 1964; Ozawa and Matsui, 1979; Watson *et al.,* 1984). These small fishes are planktonic, and found only occasionally in zooplankton samples. Before a comprehensive study on ichthyoplankton was undertaken in the waters around Taiwan, the family was missing from the Taiwanese ichthyological records (Chen and Yu, 1986; Shen, 1993). In recent years, specimens of this family were found in our ichthyoplankton collections. In this study, we report a new record of *Schindleria praematura* from the waters around Taiwan.

These small fishes were placed in the suborder of Perciformes and are related to the ammodytoids formerly (Gosline, 1971; Nelson, 1984). After comparative studies with gobioid fishes, Johnson and Brothers (1993) suggested that *Schindleria* should be a member of the Gobioidei.

## MATERIALS AND METHODS

The specimens used in this study are deposited in the larval collection of the Economic Fish Laboratory, Department of Zoology, National Taiwan University. The distribution of collection points

covered nearly all the waters around Taiwan (Chiu, 1999). Eight samples with *Schindleria praematura* are numbered 109863, 010578, 012421, 013084, 022711, 023115, 041012, and 041667; detailed collection data are shown in Table 1. Ichthyoplankton samples collected from the field were fixed in 5% formalin and finally preserved in 70% alcohol. Individual larval fish were examined under a stereomicroscope with an image analysis system.

## Systematics

*Schindleria praematura* (Schindler) 1931 (Fig. 1)

*Hemirhamphus praematurus* Schindler 1931: 7

*Schindleria praematura* Giltay 1934

Diagnostic Features: 1 dorsal fin, long with 15-19 rays without fin membrane, 1 anal fin with 11-14 fin rays without membrane, pectoral fin base well developed with 14-18 fin rays, caudal fin round with 14-15 principle fin rays. Body slender with 31-36 myomeres and lacking pigments.

All specimens are in the post-flexion stage. They are in juvenile or adult stages with many larval characters. The body shape is slender, with a straight gut longer than half the body length. Body without scales and pigments is in transparent before being fixed in formalin. All specimens lack of pelvic fin, and the dorsal, anal, pectoral, and caudal fin rays are well developed at the larval stage of the fish. The origin of the dorsal fin is located at myomeres 13-17, and the origin of the anal fin is located at myomeres 18-22 after the anal opening. The head has large opercular gills, and the size is large as a larval stage of fish. The large brain in transparent skull can easily be seen from the head top (Fig 2A). The terminal section on the vertebral column is strong and rod shaped (Fig. 2B). The female is sexually mature, and a tubelike ovary with many eggs lies behind the gut (Fig. 2C). The male is sexually mature and has genital papilla extending over the anus (Fig. 2D).

The most distinctive characters between the two species of *Schindleria* are the count of anal fin rays and the origin of the anal fin. Our *Schindleria praematura* with 11-14 anal fin rays differs from *S. pietschmanni* with 17 anal fin rays. The anal fin origin at the middle of the dorsal fin base also differ from that of *S. pietschmanni* with the same origin site for both of anal and dorsal fins (Johns and Kumaran, 1964).

*Table 1.* Collection and meristic data of *Schindleria praematura*

| | Date | Standard length (mm) | No. of dorsal fin rays | No. of anal fin rays | No. of pectoral fin rays | No. of caudal fin rays | No, of myomeres | Sex |
|---|---|---|---|---|---|---|---|---|
| No. 010578 | 2 Aug. 1988 | 17.10 | 18 | 11 | 14 | 14 | 35 | ♀ |
| No. 013084 | 21 Aug. 1989 | 7.90 | 16 | 11 | 14 | 14 | 34 | ? |
| No. 012421-1 | 2 July 1991 | 7.14 | 17 | 11 | 17 | 15 | 31 | ? |
| No. 012421-2 | 2 July 1991 | 11.42 | 16 | 12 | 18 | 15 | 32 | ♀ |
| No. 009863 | 8 July 1991 | 18.95 | 19 | 14 | 15 | 15 | 35 | ♀ |
| No. 022711 | 2 June 1992 | 10.28 | 17 | 11 | 16 | 15 | 33 | ♂ |
| No. 023115 | 13 Aug.1992 | 12.30 | 17 | 11 | 16 | 14 | 36 | ♀ |
| No. 041012 | 6 Mar. 1996 | 11.70 | 15 | 11 | 15 | 14 | 33 | ♂ |
| No. 041667 | 15 July 1996 | 14.20 | 16 | 12 | 14 | 14 | 34 | ♂ |

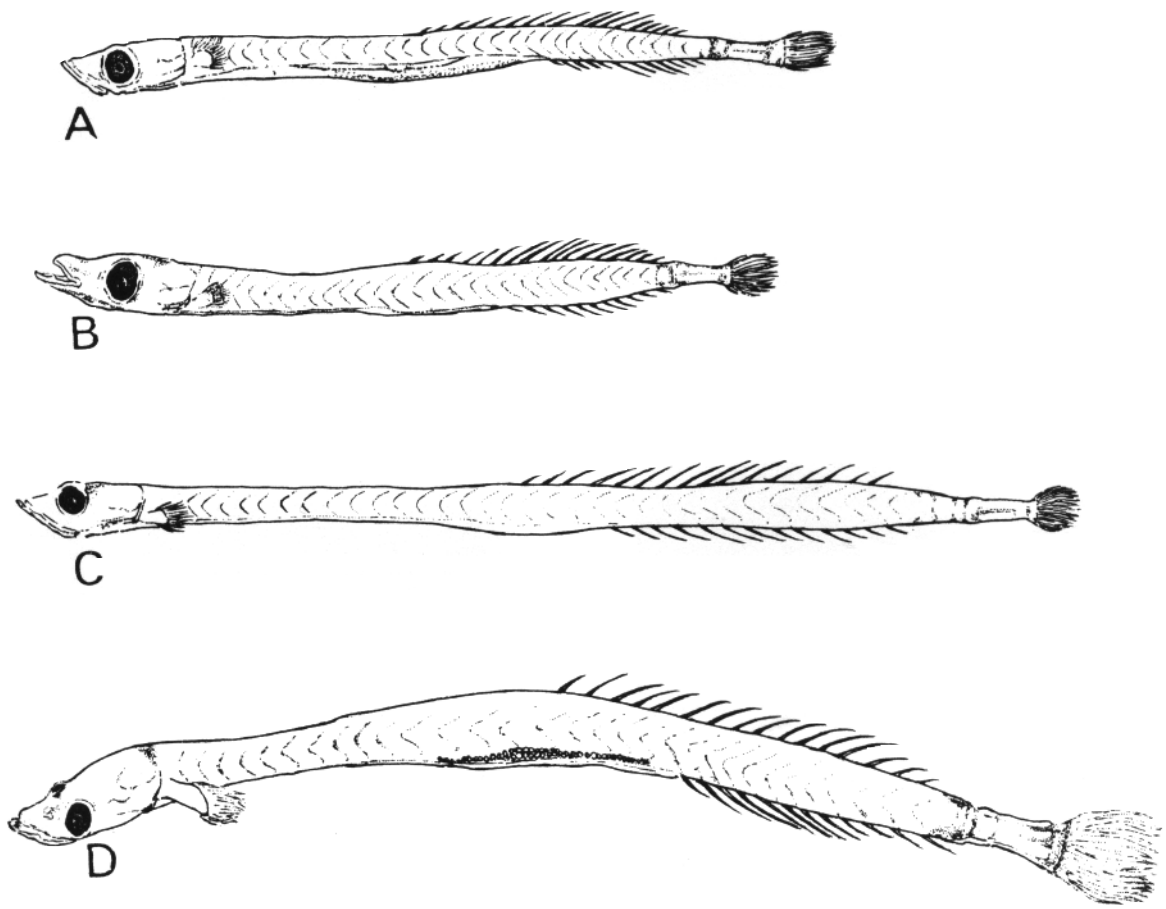


*Figure 1*. *Schindleria praematura*. A. ♂ 10.28 mm SL; B. 7.14 mm SL; C. 14.28 mm SL; D. ♀ 11.42 mm SL

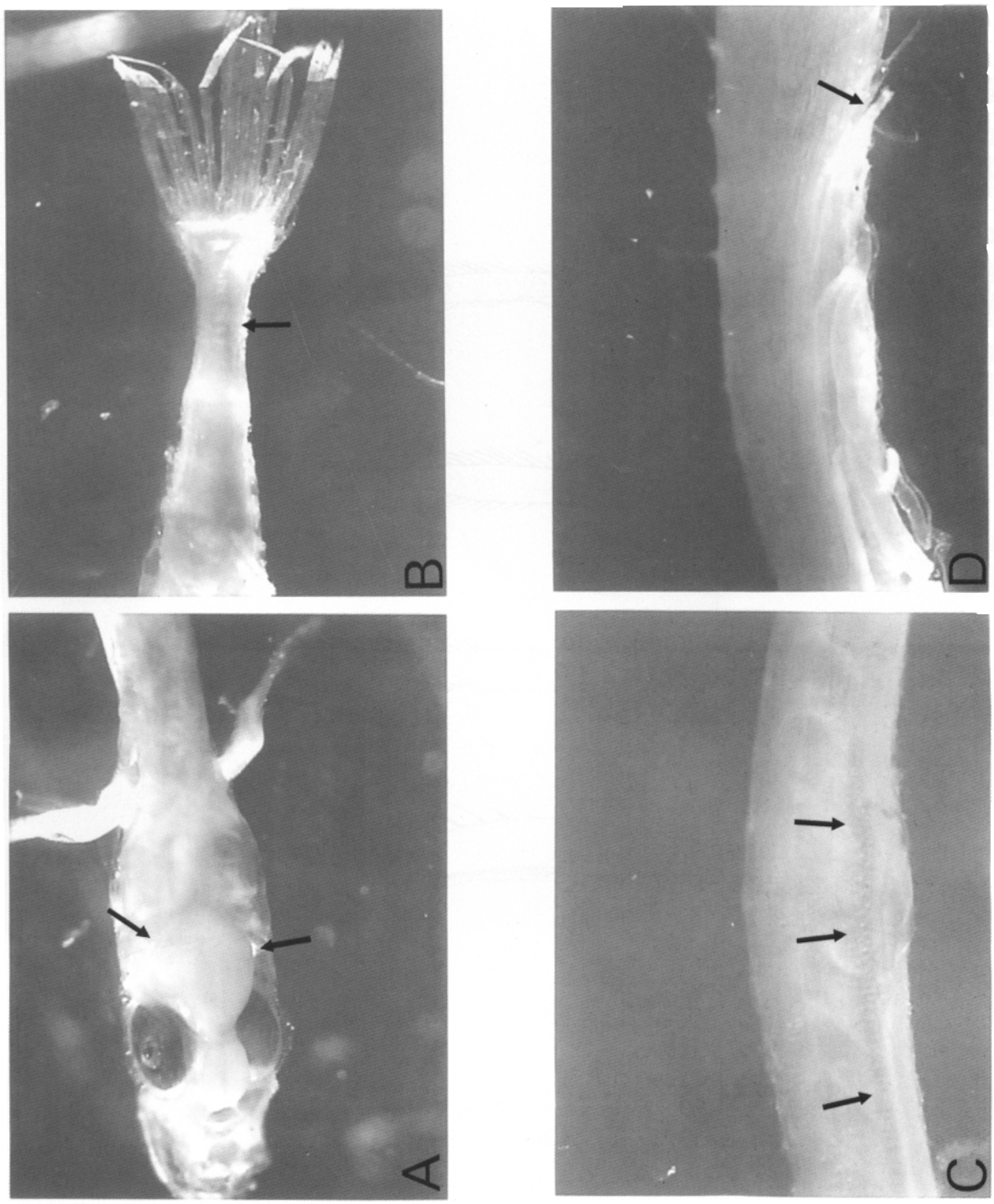


*Figure 2.* *Schindleria praematura.* A. top view of head, transparent skull and large brain inside; B terminal section of vertebral column; C. tube-like ovary with many eggs lying behind the gut; D. male genital papilla extending over the anus.

Most of our specimens were collected in June, July and August in different years, with only one in March (Table 1). The distribution data indicate that *S. prematura* living in neritic surface waters around Taiwan (Fig. 3).

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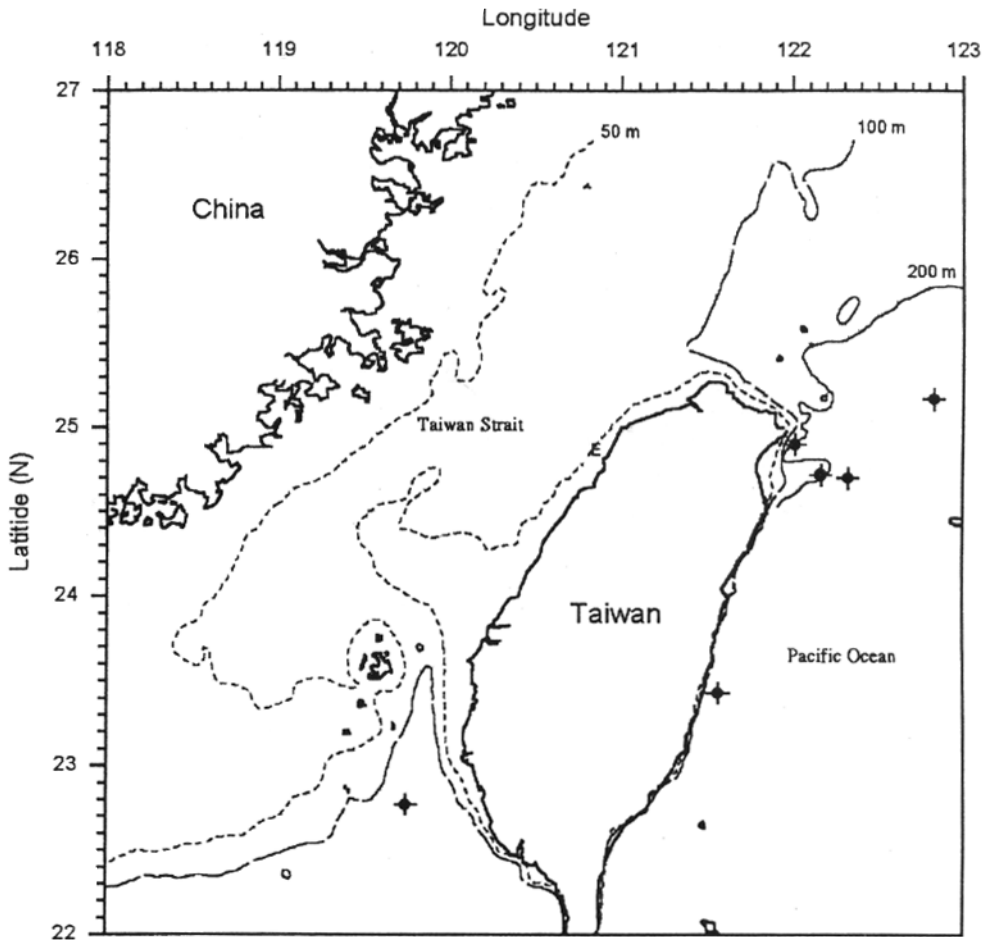


*Figure 3.* Map of locations where *Schindleria praematura* was found in the waters around Taiwan.

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# 台灣水域辛氏微體魚科早熟辛氏微體魚(*Schindleria praematura*)之新紀錄

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**摘　要**

本研究在共五個年度的八個航次採集紀錄中，發現九尾早熟辛氏微體魚 *Schindleria praematura*。 本報告首次描述在台灣發現的辛氏微體魚科 Schindleriidae 科及早熟型辛氏微體魚 *Schindleria praematura*。這些標本魚的性腺已成熟，但形態則仍停滯於幼稚魚階段，檢視魚體可發現諸多幼稚魚的特徵，而有幼形遺留的特性。

四尾成熟的雌魚，標準體長範圍 11.42-18.95 mm，卵巢內已經有發育中的卵，標本固定之前體色透明無色素點，體型細長，體表無鱗，腸道直行而不彎曲。三尾成熟的雄魚，標準體長範圍 10.28-14.20 mm，其生殖器的突起明顯且延長，其他身體型態特徵同於雌魚。

**關鍵詞：**魚綱、辛氏微體魚科、幼形遺留的。