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On the Larvae of Three Species of Rockfish
(Genus: *Sebastes*) in Hokkaido

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Abstract

It has been difficult to identify the larvae of rockfishes in the field. This paper describes the three species of extruded rockfish larvae, *Sebastes steindachneri*, *S. taczanowskii* and *S. schlegeli*.

They could be apparently identified by the number of melanophores and the pigment pattern.

Introduction

There are many species of ovoviparous rockfishes, genus *Sebastes* inhabiting off the coast of Hokkaido, and they are commercially very important. However, the development of the egg, the condition of the larvae at extruding period and the morphology of larval stages are nearly unknown, though there is some provisional information with regard to the morphological studies on a few species of southern Japan such as *S. pachycephalus nigricans*,¹⁾ *S. oblongus*,²⁾ and *S. pachycephalus pachycephalus*.³⁾

In the present paper the author describes the morphology of the rockfish larvae at the extruding period of 3 species, *S. steindachneri*, *S. taczanowskii* and *S. schlegeli*, which are very common species in Hokkaido, and he reveals specific differences useful for the identification of larvae.

The author wishes to express his appreciation to retired professor Shun Okada of Hokkaido University, for making this study possible. He is also indebted to Drs. Takao Igarashi and Kunio Amaoka of the same University for helpful suggestions in this study.

Material and Methods

The scorpaenid larvae used in the present study are *S. steindachneri*, *S. taczanowskii* and *S. schlegeli*. The material was collected at the fish markets of Shikabe and Usujiri near Hakodate from June to July in 1973, just at the extruding period of the larvae. These larvae are artificially pressed out of the belly of matured females of *S. steindachneri* (4 specimens, 343-454 mm TL.), *S. taczanowskii* (5 specimens, 210-286 mm TL.) and *S. schlegeli* (4 specimens, 454-552 mm TL.). A part of them are fixed in 5% formalin solution.

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Results

S. steindachneri: 20 specimens, 3.5–4.8 mm TL. Fig. 1

Yolk sack mostly absorbed. Head large, 4–5 in total length. Mouth comparatively large, 7–8 in total length. Somites very clear, 26–27 in number. Anus opens beneath 9th somite. Alimentary canal nearly formed. Pectoral fin large fan-like in shape. Membraneous vertical fin beginning behind head and reaching to ventral part through dorsal and caudal part; each height 5–6 in total length. Urochord slightly behind upward; small melanophores present on head and along dorsal part of alimentary canal and along dorsal and ventral margins of body. The number of them are 19 on dorsal part and on ventral part respectively.

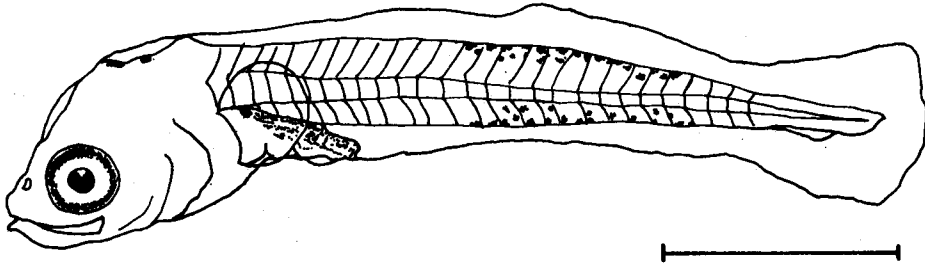


Fig. 1. Larva of *Sebastes steindachneri*, 3.76 mm in total length, collected on July 7, 1973 from matured female, 343 mm in total length. Scale indicates 1 mm.

S. taczanowskii: 20 specimens, 4.5–5.4 mm TL. Fig. 2

Yolk sack mostly absorbed. Head large, 4–5 in total length. Mouth large. Somites clear, 26–27 in number. Anus opens beneath 8th somite. Alimentary canal nearly formed. Pectoral fin large fan-like in shape, but base of fin not clear. Membraneous vertical fin begins behind head and continues dorsal to ventral through caudal around the body. Rediment of caudal fin ray unrecognizable. Urochord slightly bending upward. Small melanophores present on head, along

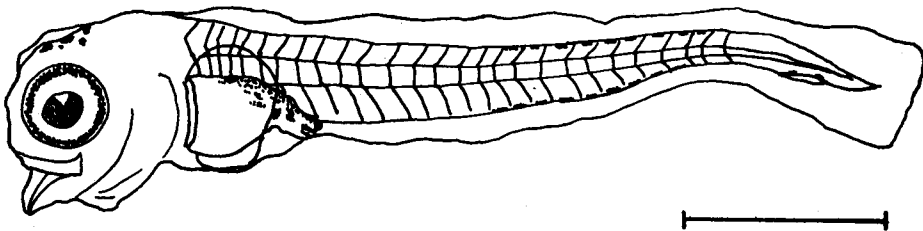


Fig. 2. Larva of *Sebastes taczanowskii*, 4.50 mm in total length, collected on June 25, 1973 from matured female, 210 mm in total length. Scale indicates 1 mm.

dorsal part of alimentary canal and along dorsal and ventral margins of posterior half of body and hypural region.

S. schlegeli: 20 specimens, 5.1–6.1 mm TL. Fig. 3

Yolk sack completely absorbed. Head smooth and very large. Length as well as depth of head about 4 in total length. Mouth large, upper jaw 6–7 in total length. Somites clear, 26–27 in number. Anus opens beneath 9th somite. Alimentary canal nearly formed. Pectoral fin large, but base of fin ray not clear. Membraneous vertical fin begins behind head and continues dorsal to ventral through caudal around the body. Posterior end of urochord straight. Melanophores present on head, dorsal part of alimentary canal, along dorsal and ventral margins of posterior half of body and hypural region.

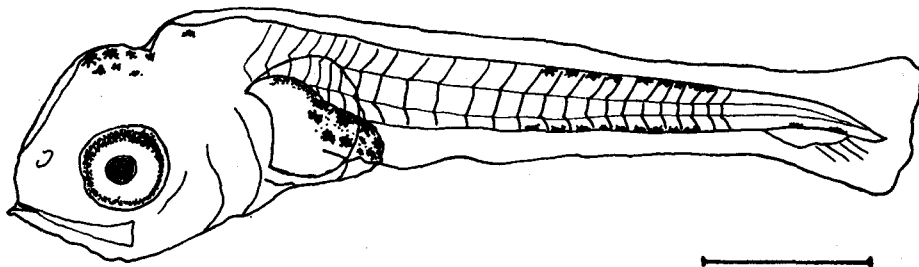


Fig. 3. Larva of *Sebastes schlegeli*, 5.69 mm in total length, collected on July 5, 1973 from matured female, 552 mm in total length. Scale indicates 1 mm.

Discussion

Three species of *Sebastes* studied here may be just extruding larvae after the yolk sack is nearly or completely absorbed. Comparing the size at the extruding period in these 3 species with those of other southern rockfishes already reported, it was found that the total length, 3.5–4.8 mm in *S. steindachneri*, 4.5–5.4 mm in *S. taczanowskii* and 5.1–6.1 mm in *S. schlegeli* is smaller than those 6.9–7.0 mm in *S. pachycephalus nigricans*,¹⁾ 7.25–7.5 mm in *S. oblongus*²⁾ and 6–7 mm in *S. pachycephalus pachycephalus*,³⁾ but is rather larger than 3.5–4.6 mm in *Sebasticus marmoratus*.⁴⁾

These larvae of 3 species of *Sebastes*, have clearly specific patterns and number of melanophores throughout extruding period. *S. steindachneri* has the largest number of melanophores along the dorsal and ventral margin, they are small in size and not lined straightly along the body margin but somewhat scattered. In *S. taczanowskii* there are small melanophores along the ventral margin and on the head. *S. schlegeli* has larger and clearer melanophores than the two former species, on the head, the dorsal part of the alimentary canal, and the dorsal and ventral margins. But the number of melanophores between *S. schlegeli* and *S. taczanowskii* is indistinguishable. It is a general tendency that the dorsal mela-

Table 1. Number of melanophores on dorsal and ventral margins of *Sebastes* larvae. Counts were made from 20 specimens of each species.

Species	Dorsal		Ventral	
	\bar{x}	Range	\bar{x}	Range
<i>S. steindachneri</i>	18.7	13-29	16.3	11-22
<i>S. taczanowskii</i>	9.3	7-11	9.9	7-12
<i>S. schlegelii</i>	10.3	8-13	9.5	7-11

Table 2. Pigment patterns of 7 species of larval rockfish.

Items	Present results			Fujita 1957	Fujita 1958	Tsukahara 1962	Shiokawa and Tsukahara 1961
	<i>S. stein.*</i>	<i>S. tacz.*</i>	<i>S. schl.*</i>	<i>S. p. nigri.*</i>	<i>S. obl.*</i>	<i>S. p. phach.*</i>	<i>S. marmo.*</i>
Ventral pigment row present	+	+	+	-	+	-	+
Ventral row stops short of anus	+	+	+	-	-	-	+
Ventral row multiple or irregular	+	-	-	-	+	-	-
Dorsal row pigment present	+	+	+	-	+	-	-
Dorsal row stops short of anus	+	+	+	-	-	-	-
Dorsal row multiple or irregular	+	-	-	-	+	-	-
Head or nape at least some pigment	+	+	+	+	+	+	+
Head with 2 to 5 melanophores	+	-	-	-	-	-	-
Head with more than 5 melanophores	-	+	+	+	+	+	-
Lower jaw with some pigment	-	-	-	-	-	-	-
Hypural region with pigment spot(s)	-	+	+	-	-	-	-
Total length of larvae approximately at birth (mm)	3.5-4.8	4.4-5.4	5.1-6.1	6.9-7.0	7.25-7.5	6-7	3.5-4.5

* See text

nophores are in larger number than the ventral ones in the 3 species (Table 1).

The author summarized eleven characters of the pigment patterns of these 3 species including 4 species of Japanese rockfish already reported (Table 2). It is very clear that each species is characterized by a peculiar pigment pattern. Morris⁵⁾ and DeLacy *et al.*⁶⁾ indicated that the North American rockfishes have pigment on the head and ventral margins and the upper-jaw. But in the Japanese species there is no pigment on the upper-jaw in this period.

When these characters are compared with those of the North American species shown by DeLacy *et al.*⁶⁾ and Moser,⁷⁾ there are specific differences in the appearance of the melanophores among these species.

It is thought that the number of melanophores and the pigment pattern are very useful for identification of the larvae in these species.

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