Fish Ecology of Littoral Weed Beds— II
Larvae Found among *Zostera* Beds

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Preface

As the second report of this series, author presented larvae and juveniles of 43 species collected from the submerged *Zostera marina* beds on the western part of the Seto Inland Sea, especially off coasts of Tabuse, Hirao and Yanai, Yamaguchi Prefecture. The description of species is arranged in order of the weed-bed observations from 1976 to 1988.

The materials and methods are the same as the former paper (Takai, 1994)

Materials and Methods

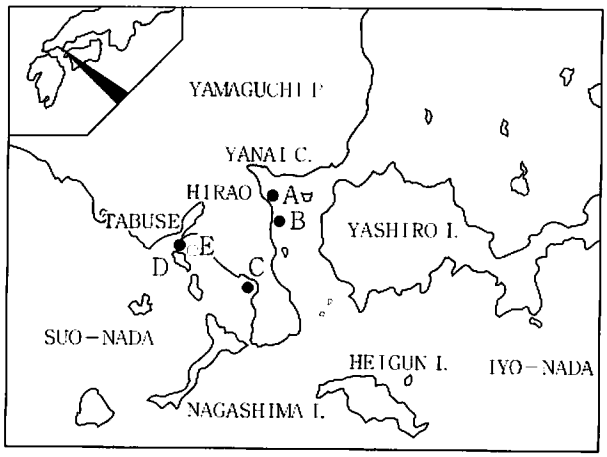

Fig.1. Map showing the sampling stations (solid cirle) in *Zostera* beds.

The research stations in *Zostera* beds were 5 (A~D) shown in the Fig. 1, in addition to some specimens collected from *Sargassum* beds (E) for reference. The collections were carried out all seasons, but mainly summer (July and August) and winter (January and February). Two collecting gears were used, one was a taw net with mouth diameter of 0.74m, and GG 38 and 28 in mesh size, the other was a dredge-type net (0.21×2 m) with mouth area of 0.43m².

Description of Species

1 - 1 *Hexagrammos otakii* JORDAN et STARKS

Post larva, 8.3mm in total length. (Early January)

Body slender, snout short and blunt. Lower jaw shorter than upper jaw. Anus situated at just below 14th myomere. Number of myomeres 14+36=50. Body pale blue in live condition.

Melanophores present on dorsal part of head and abdominal cavity. On lateral surface of body a row of about 30 melanophores present just below notochord from 15th myomeres to caudal part and about 50 melanophores along dorsal margin of body.

1 - 2 *Sebastes inermis* CUVIER et VALENCIENNES

Post larva, 5.3mm in total length. (Early January)

Head large, anus situated at 8th myomere, anterior part of midlength of body. Number of myomeres 8+18=26. Group of melanophores present on dorsal part of head and lower part of abdominal cavity. Seven melanophores on dorsal margin and about twelve melanophores on ventral margin of trunk and tail regions. A single melanophore on midline of 20th or 21st myomere.

In larger post larva of 11.3mm in total length, head armed with orbital spine, parietal spine, scapula spine, opercle spine, preopercle spine, preopercle spine and spines on outer margin of preopercle. Dorsal and anal fins differentiated, and caudal fin rays appeared. Melanophore pattern of larger larva not apparently different from that of 5.3mm larva.

1 - 3 *Ammodytes personatus* GIRARD

Post larva, 6.5mm in total length. (Early January)

Body slender. Anus just below 32nd myomere, slightly posterior of midlength of body. Number of myomeres 32+30=62. Melanophores present three on dorsal part of head, 15 or 16 on upper part of abdominal cavity, seven on dorsal margin and 14 on ventral margin from anus to caudal part. In larger post larva of 8.3mm in total length, caudal fin differentiated and melanophores increased.

2-1 *Limanda* sp.

Post larva, 4.8mm in total length. (Late June)

Body slender. Anus situated on 10th myomere, about anterior 1/3 length of body. Number of myomeres 10+29=39. Three melanophores on dorsal part of head, one on distal apex of lower jaw, one on articulated part between lower jaw and opercle. Group of many melanophores on upper part of abdominal cavity and a row of melanophores on ventral margin of trunk and tail region. Four melanophores on dorsal margin, five groups of melanophores on ventral margin of lateral surface. Moreover three to five small black spots present between them and five similar spots along dorsal margin of notochord.

2-2 *Sebastes schlegeli* HILGENDORF

Post larva, 6.5mm in total length. (Early January)

Head large. Anus situated at 9th myomere, slightly anterior of midlength of body. Number of myomeres 9+16=25. Head with one parietal spine, two spines on inner and outer margins of preopercle, two opercle spines, one scapula spine, and one supraorbital spine. Melanophores present in group on dorsal part of head, and abdominal cavity. Ten melanophores on vetral margin of posterior part of anus. Two small black spots on distal end of caudal.

2-3 *Sebastes pachycephalus pachycephalus* TEMMINCK et SCHLEGEL

Post larva, 6.6mm in total length. (Late January)

Body not compressed. Head large. Anus situated at 9th myomere, nearly midlength of body.

Number of myomeres 9+16=25. Head with one parietal spine, one supraorbital spine, two spines on inner and outer margins of preopercle, and one opercle spine. Melanophores present in group on dorsal part of head, apex of upper jaw and on most part of trunk. Moreover pectoral fin covered densely with melanophores, but scarce on caudal fin, and absent from dorsal and anal fins.

3-1 *Heteromycteris japonicus* (TEMMINCK et SCHLEGEL)

Post larva, 8.2mm in total length. (Late February)

Body rather slender. Total length about 2.6 times as long as preanal length. Anus situated at 10th myomere. Number of myomeres 10+27=37. Many melanophores scattered

over dorsal and ventral fin-folds, and a single row on dorsal and ventral margins of body and along midline of lateral surface. Moreover, several melanophores on head, abdomen, caudal end and caudal fin.

3 - 2 *Ernogrammus* sp.

Post larva. 8.9mm in total length. (Late February)

Body slender. Anus situated at 13th myomere, slightly anterior of midlength of body. Number of myomeres 13+31=44. About 35 melanophores present in row on ventral margin of body. Three melanophores on caudal fin, and eight on base of ventral fin and lower margin of abdominal cavity, but no melanophore on head.

3 - 3 *Enedrias nebulosus* (TEMMINCK et SCHLEGEL)

Juvenile, 34.4mm in total length. (Mid March)

Body slender and compressed. Head short as in adults. Anus situated at about midlength of body. Number of dorsal fin rays 76, and anal fin rays 40. Body yellowish brown in general, with brownish patches on dorsal and anal fins.

4 - 1 *Ernogrammus hexagrammus* (TEMMINCK et SCHLEGEL)

Post larva. 16.0mm in total length. (Mid March)

Body slender and compressed. All fin rays appeared. Anus situated at 14th segment of myomeres. Number of myomeres 14+29=43. Number of dorsal fin rays 43, anal fin rays 31. Urostyle bone strongly curved upward. Melanophore pattern not apparent different from that of post larva of 8.9mm in total length, but one melanophore appeared on posterodorsal end of head, nine melanophores on lateral line of posterior part of body, and groups of melanophores on abdominal cavity.

4 - 2 *Limanda yokohamae* (GÜNTHER)

Post larva, 10.3mm in total length. (Early February)

Body compressed. Total length about 2.8 times as long as preanal length. Anus situated at 10th myomere. Number of myomeres 10+28=38. All fin rays incomplete. Number of dorsal fin rays 66, anal fin rays 53. Melanophores present in five groups on dorsal part, three groups on ventral part of body, three or four groups on abdominal cavity. Three on midline and also on head, bases of caudal and ventral fins.

4-3 Pleuronectidae sp.

Post larva, 3.5mm in total length. (Late March)

Trunk and tail compressed, but head rounded. Pectoral fin large, circular in out line. Anus opened at 9th myomere. Number of myomeres 9 +29=38. Melanophores present on dorsal part and lower jaw on head region, on abdominal cavity in groups on trunk region. Seven or eight melanophores on midline from 6th to 9th myomeres, and a line of about 30 melanophores on ventral margin of body. Many melanophores scattered over pectoral and ventral fin-folds.

5-1 *Hemiramphus kurumeus* JORDAN et STARKS

Post larva, 14.2mm in total length. (Late March)

Body slender. Anus situated at 23rd myomere, slightly posterior of midlength of body. Number of myomeres 23+28=51. Two melanophores present on dorsal part of head and opercle. Dorsal and ventral margin of body with a longitudinal line of melanophores. Seven melanophores on gut, five on distal part of caudal and four on base of caudal fin.

In larger post larva, 15.9mm in total length, lower jaw slightly produced beyond upper jaw. Melanophores appeared on bases of dorsal, anal, and caudal fins. Ten melanophores newly added on midline of posterior part of body. Live color yellowish brown.

5-2 Callionymidae sp.

Post larva, 3.9mm in total length. (Mid April)

Head large, dorsal fin-fold started from upper jaw. Anus situated at 8th myomere, slightly anterior of midlength of body. Number of myomeres 8 +18=26. Melanophores present one on dorsal apex of head region, eleven along ventral margin of body from anus to caudal peduncle, and eleven in unequal size on abdominal cavity.

5-3 *Pseudoblennius cottoides* (RICHARDSON)

Post larva, 6.6mm in total length. (Mid April)

Body compressed with rounded head. Anus opened at 9th segment of myomeres. Number of myomeres 9 +30=39. Melanophores present four on dorsal part of head region, six on abdominal region, 29 along ventral margin of body and four on upper margin of urostyle.

Larger post larva, 11.8mm in total length, dorsal, anal and caudal fins differentiated.

In much larger post larva of 18.0mm in total length, all fin rays completed in number, melanophores increased in number from midline to dorsal margin of body. These larvae appeared in mid October, too.

6 - 1 *Dictyosoma burgeri* VAN DER HOEVEN

Post larva, 9.6mm in total length. (Early May)

Body slender and compressed. Anus opened at 22nd myomere, slightly anterior of midlength of body. Number of myomeres 22+45=67. Melanophores present three on anterior part of abdominal cavity, one on dorsal part of posterior gut and in line on lower margin of posterior part of body and base of caudal fin. No melanophores on head or fin-folds.

In larger post larva, 13.0mm in total length, dorsal and anal fins appeared, but distinction between spines and rays impossible: about D.(26)+34: A.44.

6 - 2 Gobiidae sp.

Post larva, 5.3mm in total length. (Early May)

Body slender and compressed. Anus opened at 19th myomere, slightly posterior of body. Number of myomeres 19+11=30. Melanophores present on dorsal and ventral margin of body, and along gut. Fin-folds near distal end of body scattered with many melanophores.

6 - 3 *Lateolabrax japonicus* (CUVIER)

Post larva, 3.2mm in total length. (Late May)

Body slender. Anus situated at 18th myomere, slightly posterior of midlength of body. Number of myomeres 18+19=37. Melanophores present in groups on dorsal margin of body from snout through opercle and abdomen to tail region. Moreover chin, throat and breast with melanophores.

7 - 1 *Chaenogobius* sp.

Post larva, 8.1mm in total length. (Early April)

Body slender and compressed. Anus opened at 14th myomere, nearly midlength of body. Number of myomeres 14+22=36. Melanophores symmetrically present on dorsal and ventral margin of body and also on basal part of caudal fin-fold.

In larger post larva, 13.8mm in total length, all fin rays appeared: D.VI-I.11: A.I-10.

7-2 *Mugil cephalus* LINNAEUS

Juvenile, 20.2mm in total length. (Mid April)

Body compressed, snout rounded. Scales appeared. Number of scales of longitudinal row 37 or 38. Preanal length about 3/5 of total length. All fin rays completed: D.IV-I, 8; A.III-8; V.I-4.

7-3 *Engraulis japonica* (HOUTTUYN)

Post larva, 7.4mm in total length. (Mid May)

Body slender and compressed. Anus situated at 29th myomere, extremely posterior of body. Number of myomeres 29+16=45. Dorsal fin differentiated on fin-folds from 25th to 30th myomeres and anal fin differentiated on fin-folds of five or six myomeres from just posterior of anus. One melanophore present on throat. 13 to 15 on ventral margin of body and 4 on lower part of gut.

8-1 *Chrysophrys major* TEMMINCK et SCHLEGEL

Juvenile, 19.1mm in total length. (Early June)

Body compressed. Apex of snout rather rounded. Anus situated at slightly anterior of midlength of body. All fin rays completed: D.XII-10; A.IV-8; V.I-5. Six or seven transverse bands of melanophores present on lateral surface of body. Abdomen white.

8-2 *Omobranchus elegans* (STEINDACHNER)

Post larva, 3.2mm in total length. (Early June)

Body rather slender and compressed. Head rather rounded and anterior margin of eye contacted with apex of snout. Anus situated at 10th myomere, slightly anterior of midlength of body. Number of myomeres 10+32=42. Pectoral fin well developed and composed of 12 rays, of these lower 6 soft rays with black fin membrane. One melanophore present on snout and dorsal side of head, and groups of melanophores on gut. One melanophore present on each myomere from 17th to near caudal end.

8-3 *Callionymus ornatipinnis* REGAN

Post larva, 2.5mm in total length. (Early June)

Head rounded. Anus situated at 9th myomere, slightly posterior of midlength of body. Number of myomeres 9+13=22. Melanophores well developed, especially densely covered

in abdomen. Moreover some melanophores present on fin-fold just posterior of anus.

9 - 1 *Trachurus japonicus* (TEMMINCK et SCHLEGEL)

Juvenile, 33.0mm in total length. (Early June)

Body showing adult form. All fin rays completed in number: D.VIII-I.33; A.II-I.29. Eight or nine spines on opercle and preopercle. Melanophores densely scattered on entire body, from dorsal part of head to lateral side.

9 - 2 *Ablennes anastomella* (CUVIER et VALENCIENNES)

Post larva, 15.0mm in total length. (Mid June)

Body slender and compressed. Both upper and lower jaws extending, but lower jaw longer. Fin-fold remaining anterior part of anus only. Pelvic fin not appeared, but dorsal and anal fins completed in number: D.18; A.23. Melanophores densely scattered over entire body, except abdomen.

9 - 3 *Saurida elongata* (TEMMINCK et SCHLEGEL)

Post larva, 4.0mm in total length. (Mid June)

Body compressed. Anus situated at 42nd myomere, posterior of midlength of body. Number of myomeres 32+23=55. Melanophores present three on gut, and one on tail region.

10- 1 *Rudarius ercodes* JORDAN et FOWLER

Post larva, 2.5mm in total length. (Mid June)

Head large, rather rounded and tail compressed. Anus situated at 7th myomere, anterior of midlength of body. Number of myomeres 7 +13=20. Melanophores distributed over head and trunk, such as group of melanophores on frontal, occipital, operele of head region and abdominal cavity on trunk region. No pigments appeared on fin-folds.

In larger post larva, 3.3mm in total length, dorsal fin spines, and dorsal, anal and caudal fins differentiated. All fin rays completed in number at post larva of about 5 mm in total length.

10- 2 *Hypoatherina tsurugae* (JORDAN et STARKS)

Post larva, 9.4mm in total length. (Late June)

Body slender and compressed, head rounded. Anus situated at 6th myomere,

extremely anterior of body. Number of myomeres 6 +39=45. Melanophores present three on top of head, one on opercle, and about ten along dorsal and ventral margins of body, several pigments along midline of lateral surface of tail. Groups of melanophores present on abdomen.

In larger post larva of about 15mm in total length, first dorsal fin rays and pelvic fin rays completed in number.

10-3 *Cypselurus opisthopus hiraii* ABE

Post larva, 6.6mm in total length. (Mid July)

Body rather slender. Anus situated at slightly posterior of midlength of body. Fin-fold remaining at tail region. Dorsal and anal fin rays partly differentiated: D.13:A.9. Melanophores scattered over entire body, but absent from fin-folds.

11-1 *Hemiramphus sajori* (TEMMINCK et SCHLEGEL)

Post larva, 15.5mm in total length. (Early July)

Body slender and slightly compressed. Anus situated at 40th myomere, posterior of midlength of body. Number of myomeres 40+20=60. Mouth opened obliquely upward, and lower jaw extending obliquely downward. Fin-fold remaining on ventral part of trunk. Dorsal fin and anal fin completed in number: D.15:A.16. Pectoral fin rays not appeared. Melanophores scattered on head region from top of head to opercle and lower jaw and also along gut. In remaining body parts, melanophores in three rows on dorsal and ventral margins and midline of lateral surface.

11-2 *Fugu niphobles* (JORDAN et SNYDER)

Post larva, 5.3mm in total length. (Early July)

Body rounded in outline. Pectoral, dorsal and anal fin rays completed in number: D. 12:A.10;P.15. Caudal fin not completed. Distal end of notochord curved upward. Melanophores densely scattered almost all body, but rather scarce on top of head, upper part of orbit, central part of trunk and tail, and also caudal peduncle. Abdomen covered with many rounded tubercles.

11-3 *Syngnathus schlegeli* KAUP

Post larva, 12.0mm in total length. (Early July)

Body extremely slender, snout produced, with lower jaw longer. Mouth opened obliquely upward. Anus situated at 20th myomere. Number of myomeres 20+40=60. Dorsal fins situated between 19th and 20th myomeres. Pectoral fin rays not appeared. Dorsal fin rays 36. Anal fin small, situated at just behind anus. Fin-folds remaining from anus to ventral part of tail. Three or four spines on each myomere. Yellow pigments scattered from head along gut to caudal fin and six transverse bands of same color from anus to caudal peduncle.

12-1 Gobiidae sp.

Post larva, 2.3mm in total length. (Early July)

Body rather slender. Anus opened at 9th myomere, slightly anterior of midlength of body. Number of myomeres 9 +17=26. Group of melanophores present at upper part of swim bladder, three on abdominal cavity, some branched pigments in row from 16th to 19th myomeres and single small one on dorsal near posterior end of tail.

12-2 *Sillago sihama* (FORSKAL)

Post larva, 3.3mm in total length. (Mid August)

Body slender and compressed. Anus opened at 11th myomere, nearly midlength of body. Number of myomeres 11+24=35. Dorsal and anal fins not differentiated. Melanophores present one on articulated part of jaws, ten on ventral margin of abdominal cavity, and about 20 in row on lower margin of body from trunk to tail.

12-3 *Allanetta bleekeri* (GÜNTHER)

Post larva, 7.0mm in total length. (Early September)

Body slender, and tail compressed. Anus opened at fifth myomere, extremely anterior of midlength of body. Number of myomeres 5 +38=43. Both upper and lower fin-folds from 24th to 30th myomeres, equivalent to position of dorsal and anal fins becoming opaque. Melanophores present three on top of head and opercle, six on lateral midline of tail and group of melanophores on abdominal cavity.

13-1 *Sebastes* sp.

Juvenile, 15.5mm in total length. (Early May)

Body compressed. Anus opened at near midlength of body. Head with nasal spine, preorbital spine, orbital spine, parietal spine, and opercle spines. All fin rays completed in number: D.XIII-14: A.III-8. Melanophores scattered densely over entire body, especially on dorsal part. In larger juvenile of 20mm in total length, five or sixth black transverse bands appeared.

13-2 *Luciogobius guttatus* GILL

Juvenile, 13.6mm in total length. (Late May)

Body slender and cylindrical. Head rather depressed. Anus opened at 16th myomere, slightly posterior of midlength of body. Number of myomeres 16+17=33. Dorsal and anal fin rays completed in number and situated at same position of the dorsal and vential margin : D.I-12: A.I-12. Melanophores present on top of head, lower jaw and from tip of snout to opercle area in head region, and dorsal and ventral margins of trunk and tail regions, and also lateral surface of caudal peduncle and base of anal fin.

13-3 *Hemiramphus* sp.

Post larva, 11.5mm in total length. (Late May)

Body slender and rather compressed. Anus opened at 41st myomere. Number of myomeres 41+19=60. Mouth small, lower jaw extended. Both dorsal and anal fin rays 15 and situated at same position of the dorsal and ventral margin. Melanophores present on snout, top of posterior part of head and opercle in head region, and dorsal margin of trunk and tail regions and dorsal part of gut, midlateral line, and also besa of caudal fin.

14-1 *Bregmaceros japonicus* TANAKA

Post larva, 7.8mm in total length. (Late October)

Head rather large, body compressed. Anus opened at 9 th myomere, anterior of midlength of body. Number of myomeres 9 +38=47. All fins differentiated, but incomplete in number: D.15+23: A.15+37. Pelvic fin situated at throat position and fin rays elongated, twice as long as head. Melanophores present one on articulated place of lower jaws, four on dorsal and ventral sides of gut. Two groups of melanophores present on lateral midline of posterior part of tail.

14-2 *Trichiurus lepturus* LINNAEUS

Post larva, 18.5mm in total length. (Mid November)

Body slender and compressed. Snout produced, mouth large. Lower jaw slightly longer than upper jaw. Both jaws densely with teeth. Anus opened at 36th myomere, rather posterior of midlength of body. Dorsal fin differentiated from posterior part of head to distal end of tail. Melanophores present on distal tip of snout, around orbit, posterior part of head, and dorsal midline of body (75 pigments in row).

14-3 Repomucenus sp.

Post larva, 3.2mm in total length. (Early December)

Body compressed and head rather large. Anus opened at 9th myomere, anterior of midlength of body. Number of myomeres 9+17=26. Several melanophores present on abdominal cavity and eleven on ventral margin of body.

15-1 *Paralichthys olivaceus* (TEMMINCK et SCHLEGEL)

Post larva, 12.8mm in total length. (Early April)

Body compressed and deep. Anus opened at three-tenth of body. Number of vertebrate 36. Right eye moved to left side. All fin rays completed in number: D.75; A.57. Anterior 2-6 soft rays of dorsal fin elongated. Several melanophores scarcely present on lateral surface of body and fin rays.

15-2·3 *Scomber japonicus* HOUTTUYN

Post larva, 6.8mm in total length. (Mid April)

Body rather compressed. Anus opened near midlength of body. Number of myomeres 11+19=30. Dorsal and anal fin rays differentiated at opaque area of dorsal and ventral fin-folds. Several melanophores present on head, dorsal part of abdominal cavity and distal end of tail.

In large post larva of 12.0mm in total length, position of anus similar to that of smaller post larva. Dorsal and anal fin rays completed in number, though remaining opaque color: D.XI-12+5; A.I-12+5. Melanophores increased in number, dorsal part of body pale black. No pigments on any fin ray.

16-1 *Minous monodactylus* (BLOCH et SCHNEIDER)

Post larva, 5.3mm in total length. (Mid October)

Head rather large, body compressed. Anus opened at 6th myomere, slightly anterior of midlength of body. Number of myomeres 6 +19=25. Head with parietal spine, orbital spine, and spines on shoulder and opercle. Pectoral fin large and long. Melanophores present one on midlength of dorsal margin, two on ventral margin of body, and eleven on distal part of pectoral fin rays. In large specimen of 11.0mm in total length, all fin rays completed in number: D.IX-12; A. II-9 ; P.12.

16-2 *Leiognathus nuchalis* (TEMMINCK et SCHLEGEL)

Post larva, 2.3mm in total length. (Mid June)

Body slender and compressed. Anus opened at 6th or 7th myomere, anterior of midlength of body. Number of myomeres 6 +19=25. Pectoral fin rays differentiated. Melanophores present on head, abdominal cavity and ventral margin of trunk and tail. Yellow pigments present on head, shoulder, and ventral side of trunk, central part of tail (transverseband) .

16-3 *Zoarchias glabber* TANAKA

Juvenile, 19.5mm in total length. (Mid June)

Body slender and compressed. Anus opened at one-third of body. All fin rays completed in number, but rays of dorsal fin undeveloped: D.XXXII-78; A. I-87; C.10. Body yellowish brown in ground color, with dark patches on lateral side.

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(In Japanese, except 1, 22 and 23)

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PLATE

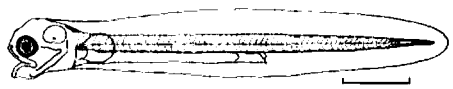
(scales indicate in mm)

1 – 1. *Hexagrammos olakii* JORDAN *et* STARKS
1 – 2. *Sebastes inermis* CUVIER *et* VALENCIENNES
1 – 3. *Ammodytes personatus* GIRARD
2 – 1. *Limanda* sp.
2 – 2. *Sebastes schlegeli* HILGENDORF
2 – 3. *Sebastes pachycephalus pachycephalus* TEMMINCK *et* SCHLEGEL
3 – 1. *Heteromycteris japonicus* (TEMMINCK *et* SCHLEGEL)
3 – 2. *Ernogrammus* sp.
3 – 3. *Enedrias nebulosus* (TEMMINCK *et* SCHLEGEL)
4 – 1. *Ernogrammus hexagrammus* (TEMMINCK *et* SCHLEGEL)
4 – 2. *Limanda yokohamae* (GÜNTHER)
4 – 3. Pleuronectidae sp.
5 – 1. *Hemiramphus kurumeus* JORDAN *et* STARKS
5 – 2. Callionymidae sp.
5 – 3. *Pseudoblennius colloides* (RICHRDSON)
6 – 1. *Dictyosoma burgeri* VAN DER HOEVEN
6 – 2. Gobiidae sp.
6 – 3. *Lateolabrax japonicus* (CUVIER)
7 – 1. *Chaenogobius* sp.
7 – 2. *Mugil cephalus* LINNAEUS
7 – 3. *Engraulis japonica* (HOUTTUYN)
8 – 1. *Chrysophrys major* TEMMINCK *et* SCHLEGEL
8 – 2. *Omobranchus elegans* (STEINDACHNER)
8 – 3. *Callionymus ornatipinnis* REGAN
9 – 1. *Trachurus japonicus* (TEMMINCK *et* SCHLEGEL)
9 – 2. *Ablennes anastomella* (CUVIER *et* VALENCIENNES)
9 – 3. *Saurida elongata* (TEMMINCK *et* SCHLEGEL)
10 – 1. *Rudarius ercodes* JORDAN *et* FOWLER
10 – 2. *Hypoatherina tsurugae* (JORDAN *et* STARKS)
10 – 3. *Cypselurus opisthopus hiraii* ABE
11 – 1. *Hemiramphus sajori* (TEMMINCK *et* SCHLEGEL)
11 – 2. *Fugu niphobles* (JORDAN *et* SNYDER)
11 – 3. *Syngnathus schlegeli* KAUP
12 – 1. Gobiidae sp.
12 – 2. *Sillago sihama* (FORSKAL)
12 – 3. *Allanetta bleekeri* (GÜNTHER)
13 – 1. *Sebastes* sp.
13 – 2. *Luciogobius guttatus* GILL
13 – 3. *Hemiramphus* sp.
14 – 1. *Bregmaceros japonicus* TANAKA
14 – 2. *Trichiurus lepturus* LINNAEUS
14 – 3. *Repomucenus* sp.
15 – 1. *Paralichthys olivaceus* (TEMMINCK *et* SCHLEGEL)
15 – 2. *Scomber japonicus* HOUTTUYN
15 – 3. *Scomber japonicus* HOUTTUYN
16 – 1. *Minous monodactylus* (BLOCH *et* SCHNEIDER)
16 – 2. *Leiognathus nuchalis* (TEMMINCK *et* SCHLEGEL)
16 – 3. *Zoarchias glabber* TANAKA

1–1

1–2

1–3



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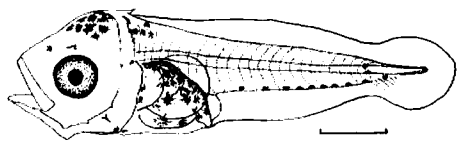
2–2



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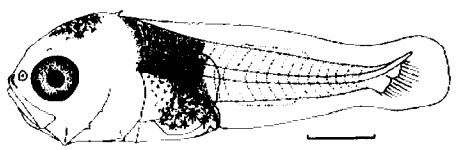

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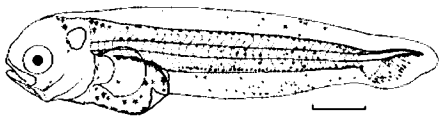

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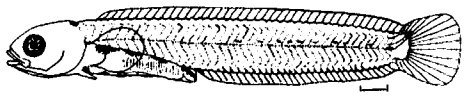
3–3

4–1



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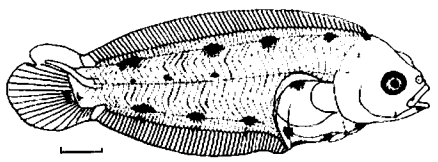

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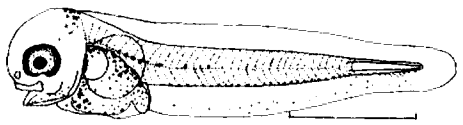

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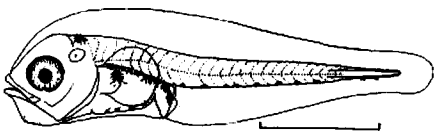

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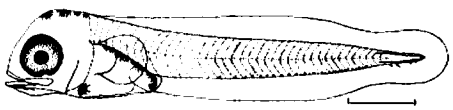

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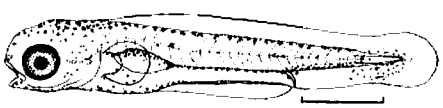
6–2



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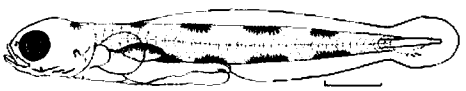
7–1



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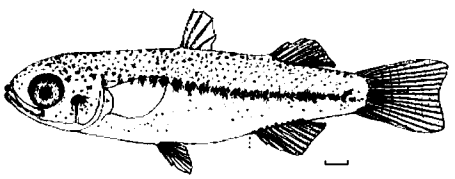

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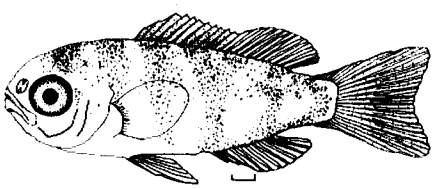
8–1



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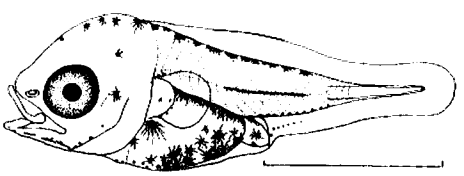
8–3



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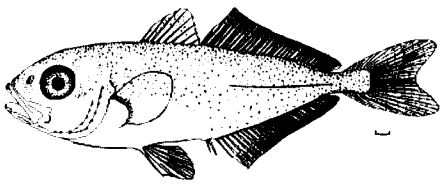

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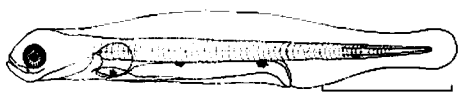
9–3



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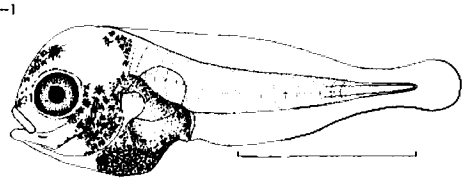

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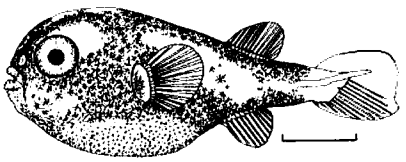
10–3

11–1

11–2



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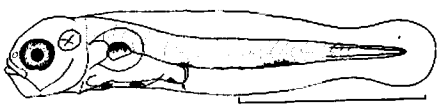

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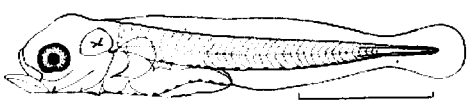

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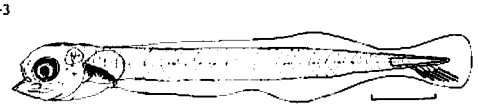

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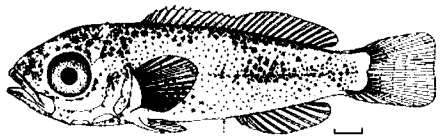

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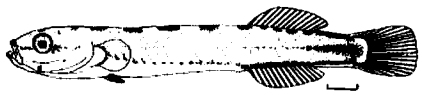

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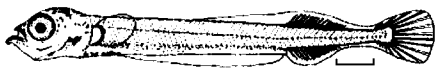

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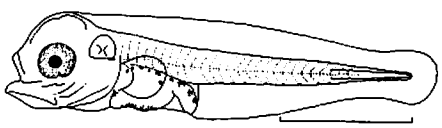
14–2

14–3



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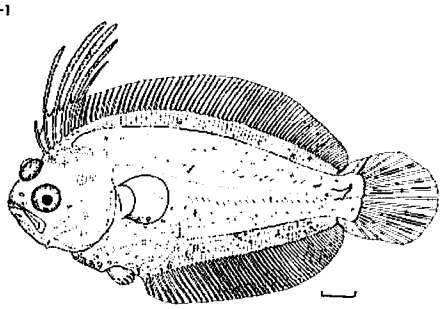

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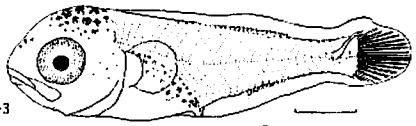

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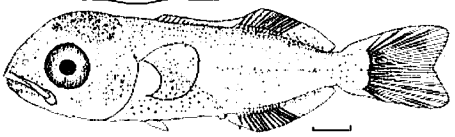

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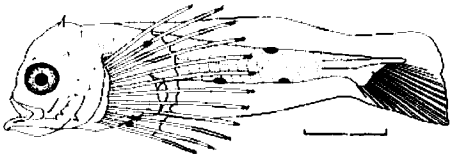

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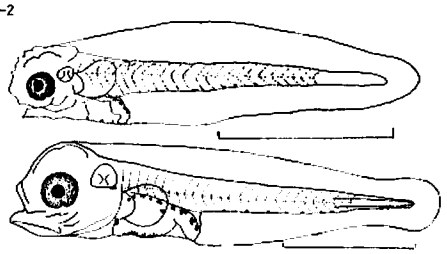

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