

## COLLECTED FISH LARVAE AND JUVENILES IN THE WESTERN NORTH PACIFIC FROM NOVEMBER TO DECEMBER, 1989

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To further our knowledge on fish larvae and juveniles in the western North Pacific, samples were collected using a larva net in an area from 12°06.1'N to 28°40.5'N latitude and from 130°43.0'E to 141°23.8'E longitude. The larva net used was 1.6 m in diameter, 7.35 m long and had a 0.53 mm mesh size. Towing speed was 2 knots and a three layer step-tow (100, 150 and 200 m wire out for each 10 minutes) method was used.

Ten samples were collected with a total of 7,532 individual fish larvae and juveniles which were grouped into 128 species or types. In the list below, the scientific name is succeeded by the number of specimens, range of standard length (mm) and developmental stage (the latter two are in parentheses). Taxonomic category is divided by semicolon. Abbreviations in the list: TN, total number of specimens; P, postlarval stage; M, metamorphosing stage; and J, juvenile stage.

Station 1 26°51.1' N 134°47.9' E Nov. 11, 23:58–00:50. TN,1123

Anguilliformes sp., 1 (8.2, P); *Avocettina infans*, 2 (55.0, 75.0, P); *Xenocongrigae* sp., 1 (35.5, P); *Ariosoma* sp.4, 1 (70.0, P); *Ariosoma* sp.7, 14 (44.5–77.5, P); *Gnathophis nystromi nystromi*, 1 (40.5, P); *Saurenhelys stylurus*, 2 (66.3, 73.5, P); *Myrophinae* sp.2, 1 (41.0, P); *Diplophos* spp., 8 (5.4–9.4, P); *Diplophos taenia*, 49 (5.8–23.0, P); *Diplophos orientalis*, 5 (15.0–22.0, P); *Vinciguerrria nimbaria*, 8 (4.3–14.8, P–M); *Cyclothone* spp., 3 (4.5–4.6, P); *Cyclothone alba*, 19 (4.0–8.6, P); *Cyclothone pseudopallida*, 10 (5.5–8.1, P); *Chauliodus* sp., 2 (9.1, 10.3, P); *Macrostomias pacificus*, 2 (5.7, 7.5, P); *Photonectes margarita*, 1 (6.3, P); *Eustomias bifilis*, 1 (19.8, P); *Gonorynchus* spp., 6 (20.8–38.0, P); *Scopelosaurus maui*, 2 (4.4, 11.3, P); *Myctophidae* spp., 30 (2.4–4.4, P); *Lampadena* sp.2, 1 (3.8, P); *Lampadena* sp.3, 33 (2.7–6.7, P); *Ceratoscop* 1974). *At present, a few farmers are changing their pasture*–2.8, P); *Lampanyctus* sp.5, 1 (6.9, P); *Lampanyctus* sp.6, 2 (3.0, 3.2, P); *Triphoturus microchir*, 1 (4.2, P); *Diaphus* A grp., 27 (2.6–5.6, P); *Diaphus* B grp., 16 (2.4–3.0, P); *Paralepididae* spp., 8 (2.8–5.2, P); *Sudis atrox*, 2 (8.6, 9.0, P); *Stemonosudis elegans*, 8 (7.2–9.6, P); *Coccorella atlantica*, 2 (5.2, 8.0, P); *Evermannella indica*, 1 (10.7, P); *Cryptosaras couesi*, 4 (2.2–4.8, P); *Lampridae* sp., 1 (5.8, P); *Bramidae* spp., 5 (2.7–4.7, P); *Coryphaena* sp., 1 (5.3, P); *Apogonidae* spp., 7 (2.8–3.7, P); *Mullidae* sp. 1, 2 (4.8, 4.9, P); *Labridae* spp., 31 (8.8–14.4, P); *Xyrichtys* spp., 18 (8.9–10.4, P); *Scaridae* spp., 2 (9.8, 10.0, P); *Chiasmodontidae* spp., 7 (5.6–12.7, P); *Gempylus serpens*, 3 (2.6–3.5, P); *Nomeidae* sp., 1 (5.0, P); *Gobiidae* sp., 1 (21.0, J); *Crossorhombus* spp., 2 (7.6, 7.9, P); *Crossorhombus kobensis*, 1 (8.1, P); *Crossorhombus kanekonis*, 1 (14.9, P); *Bothus myriaster*, 2 (21.7, 23.0, P); *Symphurus orientalis*, 1 (12.8, P); *Unknown* spp., 22; *Broken* spp., 10

Station 2 26°25.2' N 135°19.2' E Nov. 12, 03:55–04:47. TN,1239

*Ariosoma* sp.7, 1 (59.5, P); *G. n. nystromi*, 15 (31.0–47.8, P); *D. taenia*, 1 (9.4, P); *V. nimbaria*, 771 (3.2–15.0, P–M); *Cyclothone* sp., 1 (4.7, P); *C. alba*, 12 (2.5–9.5, P); *Eustomias* sp.4, 2 (8.4,8.6, P); *Gonorynchus* spp., 2 (34.0, 46.0, J); Synodontidae sp., 1 (17.0, P); *Synodus variegatus*, 2 (16.8, 18.0, P); *Synodus fuscus*, 1 (17.8, P); Myctophidae spp., 24 (2.7–11.0, P–J); *Hygophum proximum*, 1 (4.0, P); *Benthoosema suborbitale*, 3 (12.8–25.0, J); *Symbolophorus evermanni*, 5 (3.0–4.2, P); *Lampadena luminosa*, 4 (5.2–5.5, P); *Lampadena* sp.3, 2 (3.7–4.3, P); *Bolinichthys* sp.1, 4 (3.7–5.9, P); *C. warmingi*, 120 (2.3–6.3, P); *Lampanyctus* sp., 1 (broken, P); *Lampanyctus* sp.3, 1 (5.0, P); *Lampanyctus* sp.5, 1 (2.6, P); *D. A* grp., 27 (3.2–4.0, P); *D. B* grp., 24 (2.7–6.3, P); *Notoscooperus japonicus*, 3 (2.5–2.8, P); Paralepididae sp., 2 (4.8, broken, P); *S. atrox*, 3 (6.9–11.4, P); *Lestidium* spp., 74 (3.6–13.4, P); *Lestrolepis* spp., 11 (4.3–11.0, P); *Stemonosudis macrura*, 2 (10.4,16.6, P); *S. elegans*, 4 (7.8–14.0, P); *Uncisudis quadrimaculata*, 1 (7.7, P); *Odontostomops normalops*, 1 (5.9, P); *C. atlantica*, 2 (6.7,broken, P); *Melamphaes* sp., 1 (3.7, P); *Plectranthias longimanus*, 1 (7.5, P); Labridae spp., 3 (9.1–14.2, P); *Xyrichthys* sp., 1 (10.1, P); Scaridae spp., 6 (9.1–10.3, P); Chiasmodontidae sp., 1 (5.9, P); *Diplospinus multistriatus*, 4 (3.1–4.1, P); *Crossorhombus* spp., 33 (7.2–9.6, P); *Asterorhombus* sp., 1 (8.0, P); Unknown spp., 39; Broken spp., 20

Station 3 19°53.8' N 139°07.5' E Nov. 13, 23:56–00:48. TN, 797

*Nemichtys scolopaceus*, 1 (100.0, P); *G. n. nystromi*, 4 (16.5–20.0, P); Serrivomeridae sp., 20 (7.4–16.1, P); *D. taenia*, 10 (10.4–21.5, P); *V. nimbaria*, 390 (3.8–15.0, P–M); *Gonostoma* sp., 1 (4.0, P); *Gonostoma atlanticum*, 1 (4.5, P); *Cyclothone* spp., 3 (4.4–5.7, P); *C. alba*, 58 (3.0–8.9, P); *C. pseudopallida*, 3 (6.9–8.0, P); *Stomias neblous*, 1 (13.2, P); *M. pacificus*, 2 (8.5,9.2, P); Astronesthidae sp.2, 2 (9.3,9.8, P); Melanostomiidae sp., 1 (9.1, P); *Eustomias* sp.5, 1 (5.9, P); *Photostomias guernei*, 3 (9.2–12.0, P); *Aristostomias* sp., 1 (5.1, P); *S. maui*, 1 (8.0, P); *Scopelosaurus smithii*, 2 (6.5,7.6, P); *Ahliesaurus brevis*, 1 (7.5, P); Myctophidae spp., 11 (2.3–2.9, P); *H. proximum*, 34 (2.6–4.6, P); *Diogenichthys atlanticus*, 2 (3.7,3.8, P); *Diogenichthys laternatus*, 1 (2.9, P); *S. evermanni*, 7 (2.7–5.4, P); *L. luminosa*, 4 (5.0–6.0, P); *Lampadena* sp.2, 5 (3.0–4.8, P); *Lampadena* sp.3, 1 (3.3., P); *Bolinichthys* sp.1, 5 (3.4–4.6, P); *C. warmingi*, 35 (2.0–4.2, P); *Lampanyctus* spp., 5 (2.5–3.5, P); *Lampanyctus* sp.3, 20 (3.6–6.3, P); *Lampanyctus* sp.5, 5 (3.4–3.8, P); *T. microchir*, 3 (3.6–4.9, P); *Lobianchia gemellari*, 9 (2.4–3.4, P); *D. A* grp., 28 (2.8–5.6, P); *D. B* grp., 16 (2.4–5.8, P); *S. atrox*, 1 (13.1, P); *Lestidium* spp., 10 (4.1–8.5, P); *Lestrolepis* sp., 1 (5.1, P); *S. macrura*, 1 (8.0, P); *C. atlantica*, 3 (3.4–5.8, P); Ophidiidae spp., 2 (5.4,8.7, P); Cera-tioidei sp., 1 (2.4, P); Melanocetidae sp., 1 (3.7, P); *Melamphaes* spp., 20 (2.7–4.9, P); Veliferidae sp., 1 (4.5, P); *Synagrops japonicus*, 4 (2.7–2.9, P); *Coryphaena* sp., 1 (5.5, p); Bramidae spp., 5 (2.3–5.0, P); Mullidae sp., 1 (5.5, P); Mullidae sp.1, 8 (2.8–7.2, P); *Champsodon snyderi*, 5 (3.2–4.4, P); Chiasmodontidae spp., 7 (4.1–6.2, P); *Scombrolabrax heterolepis*, 1 (4.0, P); *Katsuwonus pelamis*, 1 (4.1, P); *G. serpens*, 6 (2.6–5.6, P); *D. multistriatus*, 1 (4.4, P); Scorpaenidae spp., 2 (2.6,2.7, P); Balistoidei sp., 1 (3.8, P); Unknown spp., 15; Broken spp., 1

Station 4 12°06.1' N 141°23.8' E Nov. 15, 23:38–00:28. TN,604

*Encrasicholina buccaneeri*, 464(5.3–14.8,P); *Anguilliformes* sp., 1 (7.4,P); *Serrivomeridae* sp., 1 (45.5, P); *Derichthys serpentinus*, 1 (29.0, P); *Pollichthys mauii*, 3 (2.5–5.8, P); *V. nimbaria*, 3 (3.3–3.5, P); *Gonostoma gracile*, 10 (5.0–7.8, P); *G. atlanticum*, 9 (3.2–4.9, P); *C. alba*, 1 (4.0, P); *Eustomias* sp.4, 1 (38.0, P); *Idiacanthus* sp., 2 (15.2,35.5,P); *Scopelarchus analis*, 1 (9.7, P); *Myctophidae* spp., 11 (2.0–5.0,P); *H. proximum*, 10 (2.6–4.4, P); *Hygophum reinhardtii*, 1 (6.0, P); *Myctophum asperum*, 1 (3.0, P); *Myctophum obtusirostre*, 3 (2.8–3.0, P); *S. evermanni*, 5 (3.8–5.0, P); *L. luminosa*, 1 (6.3, P); *Lampadena* sp.3, 5 (3.4–4.3, P); *C. warmingi*, 10 (2.2–3.6, P); *Lampanyctus* sp.3, 1 (4.5, P); *T. microchir*, 1 (29.0, J); *L. gemellarii*, 1 (3.0, P); *D. A* grp., 4 (2.6–4.3, P); *D. B* grp., 10 (3.2–5.3, P); *Paralepididae* sp., 1 (8.0, P); *Lestidium* sp., 1 (6.6, P); *Lestidiops j. jayakari*, 1 (8.7, P); *Exocoetidae* sp., 1 (4.0, P); *Bregmaceros* spp., 6 (2.0–3.7, P); *Bregmaceros maccllellandi*, 11 (2.5–3.2, P); *Labridae* sp., 1 (6.7, P); *Scobridae* sp., 2 (2.6, broken, P); *K. pelamis*, 1 (5.0, P); *Thunnus albacares*, 1 (4.8, P); *Gempylidae* spp., 2 (2.7,3.2,P); *G. serpens*, 2 (3.3,8.1, P); *Unknown* spp., 7; *Broken* spp., 6

Station 5 12°18.5' N 137°34.4' E Dec. 14, 23:57–00:42. TN,85

*E. buccaneeri*, 51 (10.4–15.8, P); *Serrivomeridae* sp., 3 (12.4–22.5, P); *Myctophidae* sp., 1 (broken); *Lampadena* sp.3, 1 (5.0, P); *C. warmingi*, 21 (2.8–4.9, P); *Lampanyctus* sp.3, 2 (4.0,5.0, P); *T. microchir*, 2 (3.8, 5.3, P); *Exocoetidae* sp., 1 (5.1, P); *Scaridae* sp., 1 (5.0, P); *Unknown* spp., 2

Station 6 12°42.6' N 136°54.9' E Dec. 15, 03:54–04:34. TN,39

*E. buccaneeri*, 2 (11.9,12.4, P); *Anguilliformes* spp., 2 (8.5,17.7, P); *Serrivomeridae* sp., 1 (16.0, P); *V. nimbaria*, 3 (8.0–9.7, P); *E. bifilis*, 1 (16.0, P); *Myctophidae* spp., 5 (2.5–2.9, P); *C. warmingi*, 19 (2.9–5.7, P); *D. B* grp., 1 (3.1, P); *L. j. jayakari*, 3 (12.1–16.8, P); *Xyrichtys* sp., 1 (16.7, P)

Station 7 14°34.8' N 134°03.5' E Dec. 15, 19:55–20:36. TN,25

*E. buccaneeri*, 5 (6.9–15.7, P); *Serrivomeridae* sp., 1 (22.0, P); *V. nimbaria*, 1 (broken); *C. warmingi*, 12 (3.8–6.1, P); *T. microchir*, 1 (26.0, J); *K. pelamis*, 2 (5.4,broken, P); *Unknown* spp., 3

Station 8 15°09.9' N 133°41.4' E Dec. 15, 23:55–00:39. TN,890

*E. buccaneeri*, 784 (2.9–15.5, P); *Anguilla marmorata*, 1 (24.7, P); *Serrivomeridae* sp., 1 (10.1, P); *D. taenia*, 1 (9.6, P); *V. nimbaria*, 7 (3.9–7.8, P); *C. alba*, 3 (3.3–4.1, P); *Chauliodus* sp., 1 (6.5, P); *P. guernei*, 2 (19.0,19.5, P); *Idiacanthus* sp., 1 (6.1, P); *Myctophidae* spp., 4 (2.5–3.5, P), *S. evermanni*, 2 (2.9,3.0, P); *Lampadena* sp.3, 3 (3.7–3.8, P); *C. warmingi*, 29 (2.6–4.2, P); *Lampanyctus* sp., 1 (3.3, P); *T. microchir*, 1 (broken); *L. gemellarii*, 4 (2.5–2.8, P); *D. A* grp., 4 (2.8–5.0, P); *D. B. grp.*, 1 (3.0, P); *Paralepididae* spp., 3 (6.5–6.6, P); *Lestidium* sp., 1 (5.5, P); *L. j. jayakari*, 2 (7.7,12.5, P); *Lestrolepis* spp., 2 (3.5,3.7, P); *S. elegans*, 1 (9.6, P); *Synagrops* spp., 2 (2.2,2.5, P); *Chiasmodontidae* sp., 1 (3.5, P); *K. pelamis*, 8 (2.9–3.6, P); *Thunnus alalunga*, 1 (3.3, P); *G. serpens*, 4 (2.5–6.2, P); *Unknown* spp., 6; *Broken* spp., 9

Station 9 15°43.7' N 133°20.4' E Dec. 16, 03:53–04:34. TN,327

*E. buccaneeri*, 28 (7.9–11.7, P); Anguilliformes spp., 2(8.2,9.0, P); Serrivomeridae sp., 7 (9.0–60.5, P); *D. taenia*, 5 (8.7–27.4, P); *V. nimbaria*, 49 (3.0–8.5, P); *C. alba*, 11 (3.8–6.1, P); *Cyclothone pallida*, 1 (8.0, P); Astronesthidae sp. 2, 1 (10.9, P); *Eustomias* sp. 4, 1 (20.7, P); *P. guernei*, 1 (22.8, P); Myctophidae spp., 4 (3.0–4.2, P); *H. proximum*, 3 (2.5–3.6, P); *S. evermanni*, 9 (2.9–4.6, P); *L. luminosa*, 3 (4.5–5.0, P); *Lampadena* sp.3, 5(3.1–4.4, P); *C. warmingi*, 106 (1.9–4.2, P); *Lampanyctus* sp., 1 (broken); *Lampanyctus* sp.3, 25 (3.4–4.9, P); *Lampanyctus* sp. 5, 1 (3.6, P); *T. microchir*, 4 (3.3–4.6, P); *L. gemellarii*, 2 (2.8,2.9, P); *D. A grp.*, 6 (3.3–4.4, P); *D. B grp.*, 2 (3.0–3.1, P); Paralepididae spp., 5 (4.0–7.4, P); *S. atrox*, 1 (3.8, P); *Lestidium* sp., 1 (4.6, P); *L. j. jayakari*, 3 (8.2–8.7, P); *Uncisudis* sp., 1 (6.3, P); Ophidiidae sp., 1 (6.5, P); Ceratioidei sp., 2 (2.1–2.4, P); Gigantactinidae sp., 1 (3.2, P); *Melamphaes* spp., 3 (2.6–3.1, P); Bramidae spp., 2 (3.0,3.6, P); Chiasmodontidae spp., 4 (4.3–7.0, P); *K. pelamis*, 2 (4.5,5.0, P); *T. albacares*, 1 (3.5, P); *G. serpens*, 4 (2.7–6.1, P); Unknown spp., 11; Broken spp., 8

Station 10 28°40.5' N 130°43.0' E Dec. 18, 23:58–00:40. TN,2403

Serrivomeridae sp., 1 (13.6, P); *Yarella* sp., 1 (7.4, P); *D. taenia*, 3 (20.6,broken, P); *P. maui*, 255 (2.2–21.5, P); *V. nimbaria*, 419 (3.5–14.7, P); *Gonostoma* spp., 478 (3.4–7.4, P); *G. gracile*, 113 (5.2–10.7, P); *Gonostoma elongatum*, 3 (6.3–7.2, P); *Cyclothone* spp., 18 (4.6–6.9, P); *C. alba*, 14 (2.8–7.0, P); *C. pseudopallida*, 14 (6.1–9.1, P); *S. nebulosus*, 3 (5.9–10.6, P); Synodontidae spp., 5 (4.5–5.4, P); *S. fuscus*, 2 (14.3,19.6, P); *Trachinocephalus myops*, 1 (5.1, P); Notosudidae sp., 1 (12.7, P); *Scopelosaurus hoedti*, 4 (11.0–15.9, P); *Scopelosaurus maui*, 28 (4.6–27.8, P); Myctophidae spp., 93 (2.6–5.1, P); *H. proximum*, 15 (2.9–5.7, P); *H. reinhardtii*, 10 (5.3–9.2, P); *Benthosema fibulatum*, 5 (3.9–6.0, P); *B. suborbitale*, 56 (2.7–29.0, P–J); *D. atlanticus*, 71 (2.9–6.0, P); *D. laternatus*, 22 (2.5–5.9, P); Myctophidae spp., 8 (broken); *Myctophum obtusirostre*, 2 (3.1–4.7, P); *Myctophum orientale*, 9 (2.7–5.7, P); *S. evermanni*, 11 (2.7–6.3, P); *L. luminosa*, 1 (5.6, P); *Lampadena* sp.1, 4 (2.9–4.1, P); *Lampadena* sp.2, 4 (2.9–6.2, P); *Lampadena* sp.3, 2 (3.3,3.9, P); *C. warmingi*, 94 (2.6–7.1, P); *Lampanyctus* spp., 13 (broken); *Lampanyctus* sp.1, 30 (3.4–6.9, P); *Lampanyctus* sp.2, 6 (2.8–4.4, P); *Lampanyctus* sp.5, (2.6–3.7, P); *Lampanyctus* sp.6, 11 (2.8–3.5, P); *Lampanyctus* sp.8, 12 (3.2–4.7, P); *Lampanyctus* sp.11, 90 (3.2–5.3, P); *T. microchir*, 2 (3.0,3.3, P); *L. gemellarii*, 7 (3.1–5.2, P); *Diaphus brachycephalus*, 1 (11.5, J); *D. A grp.*, 160 (3.0–7.1, P); *D. B grp.*, 19 (3.7–6.7, P); *N. japonicus*, 71 (2.8–5.0, P); Paralepididae sp., 1 (6.9, P); *Lestidium* spp., 2 (14.1,15.5, P); *Lestrolepis* sp., 1 (9.0, P); *S. elegans*, 5 (9.6–24.6, P); *C. atlantica*, 2 (3.2,4.1, P); *Bregmaceros* spp., 4 (2.8–3.0, P); *B. maclellandi*, 2 (2.7,3.9, P); *Bregmaceros nectabanus*, 10 (4.3–7.6, P); *Melamphaes* sp., 1 (4.2, P); *S. japonicus*, 1 (4.5, P); Serranidae spp., 9 (2.6–3.9, P); Labridae spp., 5 (4.5–5.8, P); Scaridae sp., 1 (7.6, P); Gempylidae spp., 2 (2.6,2.7, P); *Nesiarchus nasutus*, 2 (2.8,3.0, P); *D. multistriatus*, 22 (3.2–6.0, P); Trichiuridae spp., 2 (6.9,7.5, P); *Benthodesmus elongatus pacificus*, 19 (4.7–7.2, P); Gobiidae spp., 19 (4.0–7.6, P); *Schindleria praematura*, 4 (8.0–17.5, P–J); Scorpaenidae sp.13, 2 (2.2,3.0, P); Bothidae sp., 1 (4.5, P); *C. kobensis*, 1 (6.8, P); Samarinae sp., 1 (5.7, P); Unknown spp., 45; Broken spp., 37