Well over 200 species of the class Polychaeta are found in waters off the shores of the Pacific Northwest. Larval descriptions are not available for the majority of these species, though descriptions are available of the larvae for at least some species from most families. This chapter provides a dichotomous key to the polychaete larvae to the family level for those families with known or suspected pelagic larva. Descriptions have been gleaned from the literature from sites worldwide, and the keys are based on the assumption that developmental patterns are similar in different geographical locations. This is a large assumption; there are cases in which development varies with geography (e.g., Levin, 1984).

Identifying polychaetes at the trochophore stage can be difficult, and culturing larvae to advanced stages is advised by several experts in the field (Bhaud and Cazaux, 1987; Plate and Husemann, 1994).

Reproduction, Development, and Morphology
Within the polychaetes, the patterns of reproduction and larval development are quite variable. Sexes are separate in most species, though hermaphroditism is not uncommon. Some groups undergo a process called epitoky at sexual maturation; benthic adults develop swimming structures, internal organs degenerate, and mating occurs between adults swimming in the water column. Descriptions of reproductive pattern, gamete formation, and spawning can be found in Strathmann (1987). Larval polychaetes generally develop through three stages: the trochophore, metatrochophore, and nectochaete stages. Trochophores are ciliated larvae (see Fig. 1). A band of cilia, the prototroch, is used for locomotion and sometimes feeding. Trochophore larvae are generally broad anteriorly and taper posteriorly. The anterior and posterior sections of the larva are called the episphere and hyposphere, respectively. They are usually pelagic.

By the metatrochophore stage, two to three segments have usually formed. Parapodia (with or without setae) may by this developmental stage become apparent. Doral and ventral podia are known as neuropodia and notopodia, respectively. The anterior-most segment is called the prostomium. Just posterior
Fig. 1. Parts of a generalized polychaete trophophore (A) and nectochaete (B). (From Korn, 1960)

to the prostomium is the peristomium. These two anterior segments form the head. Eyes and antennae form in the prostomium. The mouth, palps, or tentacular cirri form in the peristomium. Larvae may be planktotrophic and develop a mouth and gut while in the plankton. Others are lecithotrophic and survive on yolky substances. Once a larva has developed setae, the segments with setae are called setigers. The most posterior segment is called the pygidium. New segments develop from the pygidium in a stepwise manner.

Advanced larvae are called nectochaetes (see Fig. 1). Nectochaetes typically have many more setigers than metatrochophores. Depending on the species, the larval ciliation may have been lost and the larvae may no longer be pelagic. After settlement, larvae may go through a benthic stage called the erpochaete stage, or they may metamorphose to become juvenile worms (Strathmann, 1987).

Polychaete larvae are morphologically complex and diverse. Because of this complexity, a large number of technical terms have been coined to help describe larval anatomy. Fig. 1 and the following glossary should help to make sense of this “foreign language.” The definitions in the glossary are from Lacalli (1980) and Bhaud and Cazaux (1987).

**achaetous**: without setae

**acicula (pl. aciculae)**: a stout chitinous rod embedded in one or both parapodial lobes

**acrotroch**: circllet of cilia in front of the prototroch

**antenna**: sensory appendage arising from the anterior or the dorsal surface of the prostomium
anal cirrus: elongated appendage arising from the pygidium
apical tuft: bundle or group of a few cilia projecting from the anterior pole of the larva
capillary seta: hairlike bristle that may be ornamented
chevron: V-shaped teeth laterally on the proboscis
ciliated pit: small dorsal ciliated cavity in segment 1, 2, or 3, limiting posteriorly the neurotroch of the spionidae
cirrus: respiratory and tactile appendage of the setiger, without blood vessel
compound seta: jointed bristle most often composed of two parts: the base and the distal part
crest (nuchal crest): mediodorsal zone of the cephalic area in the Spionidae bounded by two ciliated grooves
elytron (pl. elytra): dorsal scale, inserted on the dorsal side of the parapodium, arising from transformation of some dorsal cirri
erpochaeta: creeping stage, moving on or in the sediment using its setae
erposoma: creeping stage, without setae, moving by undulation or contraction of the body
gastrotroch: ventral troch
geniculate seta: seta that is bent but not articulated
hooded hook: seta that is curved distally and covered with a transparent envelope
limbate seta (spatulate seta): seta with a bladelike flattened margin
melanophore: black pigment cell or group of cells
meniscotroch: crescent-shaped area of short cilia in the region anterior to the prototroch; the cilia of the central part are longer, bent, and form a pointed brush
mesotroch: transversal ciliated ring in the middle part of the larval body
metatrochophore: larval planktonic stage with marked segmentation; if parapodia are not yet formed, stage 1; if parapodia are present but not yet functioning, stage 2
monostichious: troch made of one ring of long cilia
nectochaeta: developmental stage bearing functioning parapodia serving locomotion
neuropodium: ventral section of the parapodium
neuroseta: seta of the neuropodium
neurotroch: row of short cilia running along the ventral side of the larva
notopodium: dorsal section of the parapodium
notoseta: seta of the notopodium
palea (pl. paleae): simple and stout seta, often enlarged as an oar (palea of parapodium) or simple and stout seta, not enlarged, but regularly tapering (opercular palea)
palpi: paired projections arising from the prostomium, used for food gathering and tactile purposes
papilla (pl. papillae): conus-like projection
parapodium: lateral segment footlike projections, composed of two parts, neuropodia and notopodia, each bearing a cirrus and setae
peristomium: buccal segment
polystichious: troch made of several rings of long cilia
proboscis: eversible anterior portion of the alimentary tract; with or without papillae
prostomium: preoral lobe that contains the cerebral ganglia and bears the most important sense organs; posteriorly and ventrally, the prostomium is delimited by the peristomium
prototroch: on the equatorial part of the trochophore, a ring of cilia anterior to the mouth; the single ciliated ring of certain trochophores
pygidium: posterior part of the body bearing the anus, always devoid of coelomic cavity
serrated seta: seta or part of seta with one or two edges notched like a saw
seta (pl. setae): slender chitinous structure projecting from the parapodium, used for locomotion and defense
setiger: segment bearing setae
simple seta: unjointed bristle
telotroch: ring of cilia near the anus
troch: ciliated ring of embryonic or larval stage, used in locomotion
trochophore: free pelagic larval stage, top-shaped structure, without visible segmentation, bearing one or two equatorial ciliated rings; in the latter case, the metatroch is situated behind the mouth
uncini: stout spines curved at the distal part; referred to as hooded hooks when the distal part is protected by hoods (see hooded hook); when they are more or less rectangular, with numerous teeth, they are called uncini

Description and Identification of Local Taxa

Key to larvae of polychaete families from the Pacific Northwest (adapted from Bhaud and Cazaux, 1987; Plate and Husemann, 1994)

1. Larval tube present
   a1. Tube transparent with diameter constant throughout length, larva bearing 1–several large tentacles, always directed toward body and equaling at least half its length............................ TEREBELLIDAE (p. 73)
   a2. Tube nontransparent and conical, no large tentacles, external paleae directed forward...............PECTINARIDAE (p. 73)

1b. Larva without tube ................................................................. 2

2. Larva bearing 1 or several stout anterior tentacles ................................................................. TEREBELLIDAE (p. 73)

2b. No stout anterior tentacles present .................................................. 3

3. Trochophore or metatrochophore with 2 large prototrochal-ventral lobes fused into funnel, resulting in dorsoventral asymmetry................................................................. PECTINARIDAE (p. 73)

3b. Lateral lobes not present ............................................................ 4

4. Presence of heavy projecting acicular sickle-shaped hooks on notopodium of several segments...... PILARGIDAE (p. 60)
4b. Dorsal sickle-shaped acicular hooks not present ............... 5
5a. Body and prostomium covered with stout spherical papillae .......... SPHAERODORIDAE (p. 63)
5b. Spherical papillae not covering body ........................................ 6
6a. Larva with 50–100+ segments ...................................................... TROCHOCHAETIDAE (p. 72)
6b. Larva with <50 segments ......................................................... 7
7a. Setae absent .............................................................................. 8
7b. Setae present ............................................................................ 13
8a. Prostomium broad with marked frontal notch ............................... TOMOPTERIDAE (p. 64)
8b. Prostomium rounded or conical .................................................... 9
9a. Prototroch present with no other ciliary bands .............................. LOPADORHYNCHIDAE (p. 56)
9b. Multiple ciliary bands present, or atrochus ciliation covering majority of larva ............................................................. 10
10a. Ciliation present as broad and definitive prototroch, metatroch, telotroch, and neurotroch ............... EUNICIDAE (p. 49)
10b. Ciliation in distinctly narrow bands or not in defined bands ....... ................................. 11
11a. Eyespots absent, or if present only in conjunction with segmentation .................. CIRRATULIDAE (p. 67)
11b. Segmentation absent, eyespots present .................................... 12
12a. Cilia arranged in narrow bands at segment definitions, with or without short cilia covering rest of larva ................................................ DORVILLEIDAE (p. 49)
12b. Cilia long and nearly covering entire larva ................................ LUMBRINERIDAE (p. 50)
13a. 2 bundles of well-delineated setae .............................................. 14
13b. Setae not clumped in 2 bundles but distributed on numerous parapodia or segments .................... 20
14a. Pair of well-developed tentacles present .................................... 15
14b. No such pair of tentacles ............................................................. 17
15a. 2 long tentacles, covered with adhesive papillae and internal blood vessel, without ciliated groove, tentacles motile and often coiled in spiral ........................................ MAGELONIDAE (p. 68)
15b. Tentacles not papillated, with 1–2 ciliated grooves, not coiled .. .......................................................... 16
16a. Tentacles with 2 ciliated grooves, tentacles projecting dorsally and not laterally, conical prostomium without terminal antenna ........................................................... AMPHINOMIDAE (p. 46)
16b. 2 laterodorsal tentacles, each with 1 ciliated groove; 2 narrow lateral bundles of setae, slightly bent and armed with regular denticulated collars ................................... SABELLARIIDAE (p. 73)
17a. Top-shaped larva with roughly conical episphere....................... 18
17b. Umbrella-, bell- or mushroom-shaped larva............................ 19

18a. Transparent body; 2 lateral bundles of slender setae that are smooth or slightly serrated and bright............ OPHELIDAE (p. 51)
18b. Opaque body; 2 lateral bundles of bent larval setae that are thick, dark, and coarsely serrated on the convex side; transversely striated noto-setal spines and paleae; neither tentacles or palpi present .................. CHRYSOPELIDAE (p. 53)

19a. Umbrella-shaped larva; main part of larval body a transparent, unpigmented umbrella; setal sacs set close together inside umbrella ........................................................................ OWENIIDAE (p. 52)
19b. Mushroom-shaped body with umbrella and foot; umbrella opaque, with pigmentation; separate setal sacs set laterally ......................................................... SABELLARIIDAE (p. 73)

20a. Compact, barrel-shaped larva nearly as wide as long ............ 21
20b. Larva clearly longer than wide, formed by series of similar segments ................................................................................................................................. 23

21a. 1–2 narrow ciliated rings, 1 pygidal cirrus present, adult setae present in early planktonic stages ................................................................. CHAEOTOPTERIDAE (p. 67)
21b. 1–2 broad ciliated bands present; no or 2 anal cirri present .... ................................................................................................................................. 22

22a. Metatrochophore with broad ciliary bands covering most of larva; erpochaete with bulbous prostomium ................................................................................................................................. LUMBRINERIDAE (p. 50)
22b. Metatrochophore with broad prototroch, remaining bands narrow; prostomium rounded or spatulate ........................................................................ EUNICIDAE (p. 49)

23a. 1–2 pairs of palps on prostomium ........................................ 24
23b. No palps on prostomium ..................................................... 25

24a. 1 palp projecting from each side of prostomium; larval setae on notopodia and neuropodia on each segment; body opaque and often with pigment spots ................................ SPIONIDAE (p. 68)
24b. 2 palps projecting from each side of prostomium; 3 pairs of palps projecting from peristomium; setae on neuropodium ........................................ LOPADORHYNCHIDAE (p. 56)

25a. 2 distinct nuchal organs; slight pigmentation with transverse spots ................................................................................................. OPHELIDAE (p. 51)
25b. Nuchal organs absent ......................................................... 26

26a. Ocular spots large ............................................................ 27
26b. Ocular spots small ............................................................ 30

27a. Jaws and anal cirri present ................................................. NEREIDAE (p. 56)
27b. Jaws and anal cirri absent ................................................ 28
28a. 2 pairs of anterior tentacles at extreme end of prostomium ................................................. ALCIOPIDAE (p. 53)
29b. Prostomial tentacles absent ........................................................................................................... 29
29a. Prostomial collar extending posteriorly to third segment ............................................................... SPIRORBIDAE (p. 66)
29b. Prostomium without collar ............................................................................................................ SERPULIDAE (p. 65)
30a. Trochophore and metatrochophore elongated with diameter not varying substantially along length of body; larva at least 3 to 4 times longer than wide ......................................................................................................................... 31
30b. Trochophore and metatrochophore bulky; nectochaeta with dorsal elytra, lamellar or elongated dorsal cirri .................................................................................................................................................. 39
31a. Prostomium and pygidium with large zones of short cilia .............................................................. 32
31b. Prostomium and pygidium with only 1 ring of long cilia ................................................................ 35
32a. 2 pairs of eyes; 3 antennae, possibly short; poorly developed acrotroch, prototroch, and metatroch present, telotroch absent in early trochophore; peristomium achaetous, remaining segments uniramous ................................................................................................................. SYLLIDAE (p. 64)
32b. No or 1 pair of eyes ............................................................................................................................ 33
33a. Ciliated zones reduced to prototroch and telotroch; conical prostomium with rudiment of the first tentacle; no statocyst ............................................................. TERESELLIDAE (p. 73)
33b. Larva with multiple ciliary bands, including acrotroch (in early forms), prototroch, metatroch, telotroch, and neurotroch ......................................................................................................................... 34
34a. Larva lacking observable mouth; possessing 13 tufts of cilia on apical end of prostomium; larva with 3 setigerous segments bearing 1 pair of short and 1 pair of long notopodial setae on each segment ......................................................................................................................................... SABELLIDAE (p. 65)
34b. Larva with defined mouth; buccal segment lacking setae, following segment bearing metatroch; first setae on third segment of nectochaeta ........................................................................................................... ORBINIIDAE (p. 51)
35a. Parapodia present ............................................................................................................................... 36
35b. Parapodia absent ................................................................................................................................ 38
36a. Prostomium flat, rectangular; and short, without antennae; 1 unpaired anal cirrus; parapodia developed from first segment onward ................................................................................................................. NEPHTIDAE (p. 56)
36b. Prostomium conical and annulated, with 4 terminal antennae; 2 anal cirri; parapodia reduced on first and/or second segment ........................................................................................................................................ 37
37a. Parapodia uniramous; 0–4 eyes; parapodia of first segment reduced; erpochaeta bearing chevrons on proboscis; no jaws; opaque body; brown pigmentation ................................................ GONIADIDAE (p. 54)
37b. Parapodia reduced and uniramous on first and second segments; parapodia biramous from third segment onward; eyes absent; proboscis of erpochaeta lacking chevrons; 4 jaws; body transparent and colorless ............................................................................................................. GLYCERIDAE (p. 53)
38a. Each setigerous segment bearing 1 pair of capillary and 1 pair of spatulate setae; prostomium the largest segment ........................................ ARENICOLIDAE (p. 47)

38b. Each setigerous segment bearing 1 pair of capillary setae; posterior segments bearing hooked setae ............................................... CAPITELIDAE (p. 47)

39a. Trochophore with curved acrotroch and tuft of long, thin cilia pressed against hyposphere at level of prototroch; elytra present on dorsal surface of metatrochophore .................. 40

39b. Trochophore with equatorial ciliated ring; long tuft of cilia absent from hyposphere or present on episphere; metatrochophore without elytra .................................................. 42

40a. Tentacular cirri present on peristomium ................................................ APHRODITIDAE (p. 53)

40b. Tentacular cirri absent on peristomium ................................................ 41

41a. 4–5 pairs of elytra; segments lacking elytra bearing dorsal cirri; simple setae; 7–10 larval segments .................. POLYNOIDAE (p. 61)

41b. Four pairs of elytra or elytrophores; dorsal cirri absent or present only in third segment; setae of neuropodia compound, of notopodia simple; 5–6 larval segments ........................................ SIGALIONIDAE (p. 63)

42a. Trochophore with ventral menisotroch; metatrochophore with 2 pairs of eyes and segmentation indistinct; nectochaeta with 4–5 antennae, unarmed proboscis, lamellate dorsal cirri, several pairs of smooth and nonarticulate tentacular cirri, compound and spingigerous notosetae and neurosetae ........................................ PHYLLODOCIDAE (p. 58)

42b. Trochophore lacking ventral menisotroch; metatrochophore with >2 pairs of eyes; clearly delineated segments; anterior part broad; nectochaeta with long and cylindrical dorsal cirri, jointed tentacular cirri, compound and bent neurosetae ........................................ HESIONIDAE (p. 55)

Order Amphinomida

Family Amphinomidae (Local Species 2, Local Species with Described Larvae 0). Development of this family includes a rostraria larva (Fig. 2). Amphinomids are called fire worms because of the discomfort caused when coming in contact with the spines of the adult worms (Fauchald, 1977).

Chloeia entypa (Notopygos labiatus)
Chloeia pinnata

Family Euphosinidae (Local Species 2, Local Species with Described Larvae 0). Euphosinids are considered closely related to, but distinct from, the Amphinomidae (Fauchald
1977). Adults are short and thick-bodied with one pair of antennae, tufts of neurosetae, and no palps. Development is not described.

*Euphrosine bicirrata*

*Euphrosine hortensis*

### Order Capitellida

#### Family Arenicolidae (Local Species 4, Local Species with Described Larvae 2)

Arenicolid worms spawn freely, brood larvae in burrows, or produce benthic egg masses. Larvae are non-feeding. Two local species (*) are briefly pelagic during larval development prior to settling (Strathmann, 1987). *Abarenicola pacifica* develops in gelatinous masses that are brooded within adult tubes. *Branchiomaldane vincenti* undergoes direct development.

*Abarenicola claparedi oceanica* (*A. vagabunda oceanica, Arenicola pusilla*)

*Abarenicola pacifica* (*Arenicola pusilla, in part*)

*Arenicola marina*

*Branchiomaldane vincenti* (*B. simplex, Protocapitella*)

#### Key to pelagic arenicolid larvae (Fig. 3)

1a. Larva bearing apical tuft, broad prototroch; vague indentations marking segments; brown eyes ......................................... *Arenicola marina*

1b. Larva lacking apical tuft; narrow prototroch; red eyes .......................................................... *Abarenicola claparedi*

#### Family Capitellidae (Local Species 8, Local Species with Described Larvae 2)

Intratubular brooding of larvae is quite common among the Capitellidae, though some species are known to broadcast spawn. Likewise, development ranges from direct within the parental tube to lecithotrophic and planktotrophic swimming larvae (Rouse, 1992). *Capitella capitata* appears to have two different developmental strategies: direct development from jelly masses, and a short pelagic phase. *Capitella capitata* may be a complex of six sibling species (see Strathmann, 1987), and therefore it is likely that different sibling species use different developmental strategies.

*Heteromastus filiformis* egg masses are attached to the end of the female’s tube, and larvae develop to the trochophore stage before release into the plankton (Rasmussen, 1956). Generalization of the development of capitellids based on trochophores is difficult because of generic differences (Lacalli, 1980).

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Fig. 3. (A) *Arenicola marina* and (B) *Arenicola claparedi*, Family Arenicolidae. (From Okuda, 1946; Newell, 1948)
Capitella capitata
Heteromastus filiformis
Heteromastus filobranchus
Mediomastus californiensis
Notomastus giganteus (N. magnus)
Notomastus lineatus
Notomastus magnus
Notomastus tenuis (N. lineatus var. balanoglossi)

Key to pelagic capitellid larvae (Fig. 4)

Ia. Long apical tuft present; gut subdivided into several sections; body light green ........................................ Heteromastus filiformis
ib. Apical tuft absent or reduced; gut not subdivided ............................................. Capitella capitata

Family Maldanidae (Local Species 13, Local Species with Described Larvae 0). Development for the maldanids was presumed to be primarily nonpelagic by Thorson (1946). Rouse (1992) cites two examples of free-spawned lecithotrophic larvae in the genera Euclymene and Axiothella. Wilson (1983) suggests that Axiothella rubrocincta is a sibling pair with one type brooding larvae and the other broadcasting demersal lecithotrophic larvae (Fig. 5).

Asychis disparidentata
Axiothella rubrocincta
Euclymene reticulata
Isocirrus longiceps
Maldane sarsi
Maldanella harai (Maldane robusta)
Nicomache lumbricalis
Nicomache personata
Notoproctus pacificus
Praxillella affinis var. pacifica
Praxillella gracilis
Rhodine bitorquata

Order Cossurida

Family Cossuridae (Local Species 1, Local Species with Described Larvae 0). Adult cossurids are common in sand and deep slope and abyssal muds, where they apparently feed on detritus through a pharynx (Fauchald, 1977). Development is not described.

Cossura modica
Order Ctenodrilida

**Family Ctenodrilidae** (Local Species 1, Local Species with Described Larvae 0). Fauchald (1977) describes adult worms of this family as small and grub-shaped. They are especially common in areas of aquaculture and may be commensal with *Flabelliderma commensalis* and *Strongylocentrotus purpuratus*. Bhaud and Cazaux (1987) warn that some species of this family are also holoplanktonic, and adults are often confused for larval stages.

*Ctenodrilus serratus*

Order Eunicida

**Family Arabellidae** (Local Species 4, Local Species with Described Larvae 0). Arabellids are often parasitic on other animals, especially polychaetes and echinoderms. Parasitism may be a larval stage or a lifelong condition. For example, Allen (1952) found larvae through young worms of *Arabella iricolor* present in a single *Diopatra cuprea* host. Descriptions and figures of arabellid development are not known, though Pettibone (1957) indicates that *A. iricolor* spawns throughout the summer.

*Arabella iricolor*  
*Drilonereis falcata*  
*Drilonereis filum*  
*Notocirrus californiensis*

**Family Dorvilleidae** (Local Species 4, Local Species with Described Larvae 0). Adult dorvilleids are mainly small and common in shallow water (Fauchald, 1977). The described larva, *Schistomerigos longicornis* (Fig. 6), is free-spawned, lecithotrophic, and has been collected swimming at the water surface (Moore, 1903).

*Dorvillea moniloceras*  
*Dorvillea pseudorubroovitata*  
*Protodorvillea gracilis* (*Dorvillea, P. kefersteini, P. recuperata, Stauronereis*)  
*Schistomerigos longicornis* (*Dorvillea, Stauronereis, D. rudolphii, D. atlantica, Stauronereis articulata*)

**Family Eunicidae** (Local Species 3, Local Species with Described Larvae 0). Eunicids are large polychaetes, mostly associated with hard substrates and shallow water, mainly carnivorous, burrowers, and tube builders (Fauchald, 1977). *Eunice valens* is known to brood benthic non-feeding larvae (Akesson, 1967). Richards (1967) describes several species that produce benthic egg masses in which the larvae develop.
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Eunice segregata
Eunice valens (E. kobiensis)
Marphysa stylobranchiata

Family Lumbrineridae (Local Species 8, Local Species with Described Larvae 2). Adults brood directly developing larvae in the two local species (*) for which development has been described. Lumbrinerids are mostly free-living burrowers in sand and mud or in algal holdfasts. They occur in shallow and deep water (Fauchald, 1977).

Lumbrineris aff. abyssicola
Lumbrineris bicirrita (L. bifurcata)
Lumbrineris californiensis
Lumbrineris cruzensis
Lumbrineris japonica
Lumbrineris latreilli*
Lumbrineris zonata*
Ninoe gemmea

Family Onuphidae (Local Species 7, Local Species with Described Larvae 1). Onuphid development is either lecithotrophic or direct, with only one known example of planktotrophy (Sarsonuphis elegans, Fig. 7; Blake, 1975a). Diopatra cuprea broods larvae in egg masses attached to the adult tube and produces either nonpelagic (Monro, 1924) or swimming larvae (Allen, 1959).

Diopatra ornata (Onuphis longibranchiata)
Mooreonuphis stigmatis (Nothria)
Nothria occidentalis (Onuphis)
Nothria geophiliformis (Onuphis)
Nothria iridescens (Onuphis)
Sarsonuphis elegans (Onuphis, Nothria)
Sarsonuphis lepta (Onuphis, Nothria, N. abyssalis)

Order Fauveliopsida

Family Fauveliopsidae (Local Species 1, Local Species with Described Larvae 0). This deep-water family is not well known. Adults are smooth-bodied without anterior appendages (Fauchald, 1977).

Fauveliopsis armata

Order Flabelligerida

Family Flabelligeridae (Local Species 3, Local Species with Described Larvae 0). Development has not been described for
any local species. Thorson (1946) suggests that Flabelligera affinis larvae are non-pelagic.

Flabelligera affinis (F. infundibularis)  
Pherusa inflata (Stylaroides, Trophonia)  
Pherusa plumosa (Stylaroides, P. papillata, P. neopapillata)

Order Ophelida

Family Ophelidae (Local Species 7, Local Species with Described Larvae 2). Ophelids have either direct or pelagic development. Armandia brevis is planktotrophic and settles at the 20 setiger stage (Hermans, 1978). Euzonus mucronata larvae are lecithotrophic and pelagic.

Armandia brevis (A. bioculata)  
Euzonus mucronata (Thoracophelia)  
Euzonus williamsi (Thoracophelia)  
Ophelia limacina (O. borealis)  
Ophelina acuminata (Ammotrypane aulogaster)  
Travisia brevis  
Travisia pupe (T. carneae)

Key to pelagic ophelid larvae (Fig. 8)

1a. Apical tuft present in metatrochophore; setae long, extending to or past pygidium ............................................. Euzonus mucronata
1b. Apical tuft absent; setae not extending past pygidium; 2–3 pairs of setae per setiger ............................................. Armandia brevis

Family Scalibregmidae (Local Species 3, Local Species with Described Larvae 0). Thorson (1946) collected young polychaetes of this family at 2 m above the sea bottom and therefore assumes that larvae are able to swim or float. Further developmental characteristics are not available:

Asclerocheilus beringianus  
Hyboscolex pacificus (Oncoscolex)  
Scalibregma inflatum

Order Orbinida

Family Orbinidae (Local Species 7, Local Species with Described Larvae 4). Three of the four described local species (*) develop in gel masses and spend only a short time swimming as nectochaetes after hatching. Scoloplos armiger larvae have been described as nonpelagic (Blake, 1980) and pelagic (Plate and Husemann, 1994).

Leitoscoloplos elongatus (Scoloplos, Haploscoloplos, L. pugettensis)
Leitoscoloplos panamensis (Scoloplos, Haploscoloplos, H. alaskensis)
Naineris dendritica (N. laevigata)*
Naineris uncinata (N. berkeleyorum)
Phylo felix (Aricia michaelseni, Orbinia)
Scoloplos acmeceps
Scoloplos armiger*

**Key to pelagic orbiniid larvae (Fig. 9)**

1a. Prototroch band continuous dorsally ........................................... 2
1b. Prototroch discontinuous dorsally ........................................ Scoloplos armiger

2a. Pygidium deeply grooved; prototroch and metatroch of nearly equal width in metatrochophore and nectochaete stage.......................................................... Naineris dendritica

2b. Pygidium rounded or not grooved; prototroch and metatroch of unequal widths in metatrochophore or nectochaete stage .... 3

3a. Prototroch widest ciliary band in nectochaete stage ..................... Leitoscoloplos elongatus

3b. Metatroch as wide as prototroch in nectochaete stage .................. Scoloplos acmeceps

**Family Paraonidae** (Local Species 5, Local Species with Described Larvae 0). Development of Oregon species is not known.

* Aedicira pacifica
* Allia ramosa (Aricidea)
* Aricidea wassi
* Cirrophorus lyra (Paraonis)
* Tauberia gracilis (Paraonis, P. ivanovi)

**Order Oweniida**

**Family Oweniidae** (Local Species 2, Local Species with Described Larvae 2). Oweniidae worms live in tubes and spawn or deposit stalked gelatinous egg masses. Trochophores are
planktotrophic and develop into a characteristic stage called the mitraria, in which they have triangular bodies with undulating ciliated margins and numerous long flotation bristles (Strathmann, 1987).

Myriochele oculata (M. heeri)
Owenia fusiformis (Ammochares)

Key to pelagic oweniid larvae (Fig. 10)

1a. Umbrellar lobes evident (except at early stages); prototroch broad with yellow pigment ..................................... Owenia fusiformis
1b. Umbrellar margin continuous, lacking lobes; greenish gut, irregular yellow-orange pigment around girdle, red blotches near mouth during metamorphosis ...................... Myriochele oculata

Order Phyllodocidae

Family Alciopidae (Local Species 2, Local Species with Described Larvae 0). Descriptions of larvae of local species are not known, though an undetermined alciopid larva is illustrated in Srikrishnadhas and Ramamoorthi (1975); see Fig. 11. Adults of this family are slender-bodied, exclusively pelagic, and known for their large and complex eyes (Fauchald, 1977). Because alciopids are holoplanktonic, adults are often confused with larval stages (Bhaud and Cazaux, 1987).

Alciopa reynaudi
Alciopina tenuis (Plotohelmis)

Family Aphroditidae (Local Species 5, Local Species with Described Larvae 0).

Aphrodita japonica
Aphrodita longipalpa
Aphrodita magellanicus
Aphrodita parva
Aphrodita refulgida

Family Chrysopetalidae (Local Species 2, Local Species with Described Larvae 1). The larvae of Paleanotus bellis (Fig. 12) are known for their sluggish behavior, presence of dorsal paleae, and red coloration of the gut (Blake, 1975b). Cazaux (1968) described similar features for Chrysopetalum debile, which may indicate that these characteristics are general for the family.

Paleanotus bellis (P. chrysolepis)
Paleanotus occidentale (Chrysopetalum)

Family Glyceridae (Local Species 8, Local Species with Described Larvae 4). Glycerids adults are long, slender-bodied
Fig. 12. Paleanotus bellis, (A) late metatrochophore, (B) nectochaete, family Chrysopetalidae. (From Blake, 1975b)

Fig. 13. (A) Hemipodus borealis, late metatrochophore, and (B) Glycera convoluta, late metatrochophore, family Glyceridae. (From Bhaud and Cazaux, 1987; Plate and Husemann, 1994)

with numerous segments, mainly carnivorous, have a long eversible pharynx with four black jaws at the tip, and live in soft sand or mud. Larvae are planktotrophic as trochospheres and later, during a benthipelagic stage, they feed on detritus and algae until their jaws are formed (Strathmann, 1987).

Glycera americana
Glycera capitata (G. nana)
Glycera convoluta
Glycera gigantea
Glycera oxycephala (G. tenuis)
Glycera robusta
Glycera tesselata
Hemipodus borealis

Key to glycerid metatrochophores (Fig. 13)
1a. Metatrochophore conical, narrowing posteriorly; menisotroch present ................................................................. Hemipodus borealis
1b. Metatrochophore barrel- or cigar-shaped; lacking menisotroch ................................................................. Glycera convoluta

Key to glycerid nectochaetes (Fig. 14)
1a. Prototroch present ........................................................................................................ 2
1b. Prototroch absent; weak annulations of prostomium ................................................................. Glycera oxycephala

2a. Prototroch a double band of cilia ............................................................................... 3
2b. Prototroch a single band of cilia ............................................................................... Hemipodus borealis

3a. Prostomium with distinct annulations; body clear with red chromatophores near prototroch; 9 setigers .... Glycera capitata
3b. Annulations on prostomium less distinct; 8 setigers; possible brownish pigment near prototroch .......... Glycera convoluta

Family Goniadidae (Local Species 4, Local Species with Described Larvae 2). Goniadids resemble glycerids in form, but their pharyngeal organs are much larger. Goniadid species may also be distinguished by differences in pharyngeal teeth (Fauchald, 1977).
Polychaeta

Glycinde armigera
Glycinde polygnatha
Glycinde picta
Goniada brunnea

Key to goniadid nectochaetes (Fig. 15)
  Ia. Body pale green with red eyes and deep red intestine; prostomium broadly tapering anteriorly............ Glycinde armigera
  Ib. Body with numerous reddish granular pigment markings on each segment and on parapodial lobes of medial and posterior setigers; prostomium narrowly tapered ........ Glycinde polygnatha

Family Hesionidae (Local Species 2, Local Species with Described Larvae 2). There are few descriptions of hesionid larvae. Direct development and short pelagic lecithotrophic larvae have been described for a few species. *Ophiodromus pugettensis* produces lecithotrophic larvae with a short pelagic phase (Blake, 1975). Adults are common in shallow water and hard substrates; they are fragile and fragment easily (Fauchald, 1977).

*Ophiodromus pugettensis* (Podarke)
Podarkeopsis brevipalpa (*Gyptis arenicola glabra; Gyptis*)

Key to hesionid metatrochophores (Fig. 16)
  Ia. Metatrochophore with several long tentacular cirri, some reaching nearly to posterior margin of body .................................................. Podarkeopsis brevipalpa
  Ib. Elongated tentacular cirri, none extending to posterior end of body; 2 lateral antennae on prostomium .................................................. *Ophiodromus pugettensis*
Family Lopadorhynchidae (Local Species 2, Local Species with Described Larvae 1). This is an exclusively pelagic family with short-bodied adults (Fauchald, 1977). Distinction between the local species is based on characteristics of the setae.

Lopadorhynchus uncinatus (L. varius)
Pelagobia longicirrata

Key to lopadorhynchid larvae (Fig. 17)

1a. Dorsal and ventral cirri long and digitiform ........................................ Pelagobia longicirrata

1b. Dorsal and ventral cirri thick and lanceolate ........................................ Lopadorhynchus uncinatus

Family Nephtyidae (Local Species 12, Local Species with Described Larvae 1). Worms of the genus Nephtys are predatory, free-spawn, and have pelagic development. Typical trochoophores have a large dome-shaped episphere, one pair of eyes, and a barrel-shaped trunk with simple setae. Larvae are predatory as well (Strathmann, 1987). Lacalli (1980) suggests that the pigmentation pattern of irregular ruby red to red-brown bands on the larval tegument near the prototroch and pygidium is typical of larvae of the genus. Nephtys caeca (Fig. 18) has brownish pigmentation on the episphere and developing prostomium and pygidium, an olive-colored gut, and no blue pigmentation typical of other larvae in this family.

Nephtys assignis
Nephtys caeca
Nephtys caecoides
Nephtys californiensis
Nephtys cornuta cornuta
Nephtys cornuta franciscana
Nephtys ferruginea
Nephtys longosetosa
Nephtys paradoxa
Nephtys punctata
Nephtys rickettsi (N. discors)
Nephtys schmitti

Family Nereidae (Local Species 17, Local Species with Described Larvae 5). Nereid embryos develop in the plankton or in gelatinous benthic egg masses. Larvae do not feed until lipid drops in the gut are depleted and feeding structures have developed (Strathmann, 1987). Nereids either hatch as nectochaetes or proceed rapidly to the nectochaete stage if hatched at an earlier stage of development (Lacalli, 1980).
Polychaeta

Ceratonereis paucidentata
Cheilonereis cyclurus
Micronereis nanaimoensis (M. variegata, M. bodegae, Phyllodocella)
Nereis brandti (Neanthes)
Nereis eakini
Nereis grubei (N. callaona, N. mediator)
Nereis limnicola (N. lighti, N. diversicolor, N. japonica, Neanthes)
Nereis natans
Nereis neoneanthes
Nereis pelagica
Nereis procera
Nereis texillosa
Nereis virens (Neanthes)
Nereis zonata
Nicon moniloceras (Platynereis)
Perinereis monterea
Playtnereis bicanaliculata (P. dumerili var. agassizi)

**Key to nereid nectochaetes (Fig. 19)**

1a. Tentacular cirri present ................................................................. 2
1b. Tentacular cirri absent ............................................................... Micronereis nanaimoensis

2a. Prostomium rounded ........................................................................ 3
2b. Prostomium blunt or indented slightly at anterior margin ..............

3a. Pygidium conical or bilobed; telotroch present but discontinuous ................................................................................. Nereis limnicola
3b. Pygidium rounded with distinct and continuous telotroch ..........

4a. Eyes posterior to prototroch at setiger stage 3, yolk reserves minimal; pygidium lacks posterior cleft .............................. Nereis virens
4b. Eyes anterior to or at level of prototroch at setiger stage 3,
    abundant blue-green oil droplets in gut; posterior cleft in
    pygidium ................................................................................... Platynereis bicanaliculata

Fig. 18. (A, B) Nephtys caeca trochophore and metatrochophore and (C) general Nephtys nectochaete, family Nephtyidae. (From Lacalli, 1980)
Fig. 19. Larvae of local species from the family Nereidae. (A) Micronereis nanaimoensis (B) Nereis limnicola, (C) Nereis pelagica, (C) Nereis virens (D) Platynereis biconicalata. (From Dales, 1950; Berkeley and Berkeley, 1953; Korn, 1960; Blake, 1975b; Plate and Husemann, 1994)

**Family Pholoididae** (Local Species 1, Local Species with Described Larvae 0). Though development of this family is not known, elytra may be seen in larval forms since the family is part of the scale worm group.

*Pholoides aspera*

**Family Phyllodocidae** (Local Species 19, Local Species with Described Larvae 6). Female phyllodocids spawn near the bottom or deposit strings of small eggs in benthic gelatinous masses. Larvae hatch and spend several weeks in the plankton. Nectochaetes are large and predatory (Strathmann, 1987). No illustrations of local *Phylloco* larvae are available, but descriptions of the genera from Bhaud and Cazaux (1987) are included in the key.

*Anaitides groenlandica* (Phyllodoce)
*Anaitides hartmanae* (Phyllodoce)
*Anaitides medipapillata* (Phyllodoce)
*Anaitides mucosa* (Phyllodoce)
*Anaitides multiseriata* (Phyllodoce)
*Anaitides williamsi* (Phyllodoce)
*Eteone californica*
*Eteone longa*
*Eteone pacifica* (E. bistrata, E. maculata, E. spitsbergensis var. pacifica)
*Eulalia bilineata*
*Eulalia leviscornuta*
Polychaeta

Eulalia nigrimaculata (Bergstroemia, Eumida, Genetyllis, Phyllodoce)
Eulalia quadrioculata (E. aviculiseta)
Eulalia sanguinea (Eumida)
Eulalia viridis
Notophyllum imbricatum
Notophyllum tectum (Hesperophyllum)
Phyllodoce castanea (Genetyllis)
Phyllodoce polynoides (Paranaitis)

Key to phyllodocid metatrochopores (Fig. 20)
1a. 2–3 pairs of tentacular cirri .......................................................... 5
1b. 4 pairs of tentacular cirri ............................................................... 2

2a. Well-developed proboscis; cirri are foliaceous Phyllodoce
2b. Dorsal cirri just budding, proboscis not well developed ........ 3

3a. Prototroch a distinct double band of cilia .................................. 4
3b. Prototroch with 1 band of cilia facing anteriorly on ventral surface; larva grayish olive green Anaitides groenlandica

4a. Prototroch with thick, long anterior cilia band and thin posterior band; uniform dark green color with deep red eyes Anaitides williamsi
4b. Bands of prototroch of equal thickness; larva light green; eyes red Anaitides mucosa

5a. 2 pairs of tentacular cirri; anal cirri not distinct in metatrochophore Eteone longa
5b. 3 pairs of tentacular cirri; anal cirri distinct .......... Eulalia sanguinea

Fig. 20. (A) Anaitides groenlandica, (B) A. williamsi, (C) A. mucosa, (D) Eteone longa, and (E) Eulalia sanguinea, family Phyllodocidae. (From Thorson, 1946; Blake, 1975b; Lacalli, 1980; Bhaud and Cazaux, 1987; Plate and Husemann, 1994)
Key to phyllodocid nectochaetes (Fig. 21)

1a. Rounded or oval prostomium ................................................................. 2
1b. Triangular prostomium, no dorsal cirri on setiger 1; pigmented prostomium and pygidium ................................. Eteone longa

2a. Oval dorsal cirri .................................................................................. 3
2b. Rounded dorsal cirri ........................................................................... 4

3a. 1 pair of red eyes; 1 pair of rounded anal cirri; slight olive-brown to dark green gut; olive-brown pygidium .......... Eulalia viridis
3b. 2 pairs of red eyes; 1 pair of tapering anal cirri; body greenish with yellow-white pigmentation posterior to prototroch; dark brown gut ................................................................. Eulalia sanguinea

4a. Dorsal cirri foliaceous and not glandular ........................................ Phyllodoce
4b. Dorsal cirri broadly rounded, palmlike, and glandular; first 2 pairs of dorsal cirri digitated .................................. 5

5a. Prototroch strongly present or reduced ............................................ 6
5b. Prototroch absent; body grayish olive green; anal cirri spaced slightly apart and bulbous ............................... Anaitides groenlandica

6a. Dorsal ciliation beginning on setiger 6 .......................................... Anaitides williamsi
6b. Dorsal ciliation beginning prior to setiger 6 ................................. Anaitides mucosa

Family Pilargiidae (Local Species 4, Local Species with Described Larvae 0). Adults of this family are found in moderately coarse mixed sediments at shelf depths (Fauchald, 1977). Development of local species has not been described, but an unidentified Ancistroyllis (Fig. 22) is described in Blake (1975b).
Polychaeta

Ancyrochloris aff. groenlandica
Pilargus berkeleyi
Sagitta lentaculata
Syphelus aff. khatti

Family Polynoidae (Local Species 21, Local Species with Described Larvae 5). This is the most common family of the scale worm complex. Those polynoids with smooth elytra are often commensal, whereas those with heavily ornamented elytra are free-living (Fauchald, 1977). Some species brood early embryos beneath dorsal elytra; other species spawn freely. Larvae are pelagic for long periods (Strathmann, 1987). Harmothoe brevisetosa larvae develop in the plankton, as do H. imbricata and Lepidonotus squamatus. Harmothoe extenuata and Harmothoe multisetosa larvae are brooded for a period of time between the parapodia (Pettibone, 1954, 1963).

Arctonoe fragilis
Arctonoe pulchra
Arctonoe vittata
Bygglides macrolepida (Anitonoell, Anitone)
Eunoce nodosa
Eunoce oerstedii (E. barbata)
Eunoce senta (Gattyana)
Halosydna brevisetosa
Harmothoe extenuata (Lagisca, H. triannulata, L. rarispina)
Harmothoe fragilis
Harmothoe imbricata (H. hartmanae)
Harmothoe lunulata (Maligngenia, M. nigrula)
Harmothoe multisetosa (Lagisca)
Harmothoe tenebricosa (H. pellucelytris)
Hermadion truncata
Hesperonoe adventor
Hesperonoe complanata
Lepidosthenia longicirrata
Lepidonotus squamatus (L. caecorus)
Polyacma canadensis (Eutipo)
Polyacma gracilis (Eutipo, Eutipo cirrata)

Key to polynoid late trochophores (Fig. 23)
1a. Episphere flattened and careened orally... Halosydna brevisetosa
1b. Episphere domed ................................................................. 2
2a. Flat lenticular body; colorless tegument; ventral side of intestine green, diameter at prototroch 160 μm ...... Harmothoe extenuata
2b. Spherical lenticular body .......................................................... 3
Fig. 23. Late trochophores of species in the family Polynoidae.
(A) Halosydra brevisetosa,
(B) Harmothoe extenuata,
(C) Harmothoe imbricata,
(D) Harmothoe lunulata,
and (E) Lepidonotus squamatus. (From Blake, 1975b; Lacalli, 1980; Bhaud and Cazaux, 1987; Plate and Husemann, 1994)

Fig. 24. Metatrochophores of species in the family Polynoidae.
(A) Halosydra brevisetosa,
(B) Harmothoe extenuata,
(C) Harmothoe imbricata,
(D) Harmothoe lunulata,
and (E) Lepidonotus squamatus. (From Blake, 1975b; Lacalli, 1980; Bhaud and Cazaux, 1987; Plate and Husemann, 1994)

3a. Ventral side of intestine brown, diameter 180 μm ...................... Harmothoe imbricata
3b. Ventral side of intestine purplish violet, diameter 240 μm .......... Harmothoe lunulata
3c. Ventral side of intestine greenish blue, diameter 200 μm ............. Lepidonotus squamatus

Key to polynoid metatrochophores (Fig. 24)
1a. 8 segments ................................................................. Lepidonotus squamatus
1b. 9 segments .................................................................. 2

2a. Prostomium broad and flattened .......... Halosydra brevisetosa
2b. Prostomium rounded .................................................. 3
3a. 4 pairs of elytra ................................................................. 4
3b. 5 pairs of elytra, ventral side of intestine light yellow-green .......
......................................................................................... Harmothoe lunulata
4a. Pale red-brown pigmentation on prostomium, peristomium, and
mouth ........................................................................ Harmothoe extenuata
4b. Pale yellow spots, ventral side of intestine purple-brown ..............
......................................................................................... Harmothoe imbricata

**Key to polynoid nectochaetes (Fig. 25)**

1a. 8 segments, 4 pairs of elytra, short dorsal cirri ................................
......................................................................................... Lepidonotus squamatus
1b. More than 8 segments, 5 pairs of elytra ....................................... 2

2a. Dorsal cirri almost twice as long as neuropodia .............................. 3
2b. Dorsal cirri only slightly longer than neuropodia; light red-brown
pigmentation on prostomium and mouth .................................... Harmothoe extenuata

3a. Elytra with papillae; whitish intestine ........................................ Harmothoe imbricata
3b. Elytra without papillae; purple-brown intestine ........................... Harmothoe lunulata

**Family Sigalionidae** (Local Species 4, Local Species with
Described Larvae 1). Larvae of this family are quite similar to
those of the Polynoidae. They are somewhat smaller, the elytra
are less developed, and they have compound setae rather than
simple setae (Lacalli, 1980). *Sthenelais* lack all dorsal elytra;
*Pholoe* have dorsal elytra (Plate and Husemann, 1994). Blake
(1975b) notes that nectochaetes of *Pholoe caeca* (Fig. 26) feed on
algae in culture, though the yolky gut seen in early larval stages
suggests that they are lecithotrophic as early larvae. Other
members of this family are also described as planktotrophic.

*Neoleanira areolata* (*Leanira calcis*)
*Pholoe caeca* (*Pholoe tuberculata, P. minuta*)
*Sthenelais berkeleyi* (*S. fusca*)
*Sthenelais verruculosa*

**Family Sphaerodoridae** (Local Species 4, Local Species with
Described Larvae 0). Development mode has been described
only for *Sphaerodoropsis minuta*. Mileikovskii (1967) states that
development is direct and nonpelagic for this species.

*Sphaerodoropsis biserialis* (*Sphaerodorum, Sphaeroderidium*)
*Sphaerodoropsis sphaerulifer* (*Ephesiella, Sphaeroderidium*)
*Sphaerodorum papillifer* (*Ephesiella*)
*Sphaerodoropsis minuta* (*Sphaerodorum, Ephesiella,
*Sphaeroderidium*)

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Fig. 25. Nectochaetes of species in the family Polynoidae. (A)
*Harmothoe imbricata*,
(B) *Harmothoe lunulata*,
(C) *Lepidonotus squamatus*, and
(D) *Harmothoe extenuata*. (From Blake, 1975b; Lacalli, 1980;
Bhaud and Cazaux, 1987; Plate and Husemann, 1994)
Family Syllidae (Local Species 25, Local Species with Described Larvae 1). Several species are known to have direct development (*), and Pocklington and Hutcheson (1983) suggest that all Exogone species are direct developers (Fig. 27).

- Amblyyllis sp. (A. lineata var. alba)*
- Autolytus cornutus (A. prismaticus)
- Autolytus varius
- Ehlersia cornuta (Syllis, S. heterochaeta, S. alternata, S. oerstedii, Langerhansia)
- Eusyllis assimilis
- Eusyllis blomstrandii
- Exogone lourei (E. uniformis)*
- Exogone naidina (E. gemmifera)*
- Exogone verugera*
- Haplosyllis spongicola
- Odontosyllis parva
- Odontosyllis phosphorea (O. phosphorea var. nanaimensis)
- Pionsyllis gigantea
- Sphaerosyllis californiensis
- Sphaerosyllis hystrix*
- Sphaerosyllis pirifera
- Syllis adamanica (S. spenceri, Typosyllis)
- Syllis alternata (Typosyllis)
- Syllis armillaris (Typosyllis)
- Syllis elongata (Typosyllis)
- Syllis hyalina (Typosyllis)
- Syllis pulchra (Typosyllis)
- Syllis variegata (Typosyllis)
- Trypanosyllis gemmipara
- Trypanosyllis ingens

Family Tomopteridae (Local Species 3, Local Species with Described Larvae 0). There are no descriptions of local tomopterid larvae. Adults of this family are holoplanktonic, transparent, and flattened (Fauchald, 1977).

- Tomopteris cavalli
- Tomopteris pacifica (T. elegans, T. renata)
- Tomopteris septentrionalis

Family Typhloscolecidae (Local Species 2, Local Species with Described Larvae 0). This is a poorly known family. Adults are holoplanktonic, transparent, and fusiform (Fauchald, 1977).

- Sagitella kowalevskii
- Travisiopsis lobifera
Order Sabellida

**Family Sabellidae** (Local Species 25, Local Species with Described Larvae 2). Patterns of development in this family include brooded lecithotrophs, direct developers, freely spawned eggs developing into lecithotrophic larvae, and those that develop in gel masses (reviewed by McEuen et al., 1983).

- Chone ecaudata (C. minuta, C. gracilis)
- Chone gracilis
- Chone infundibuliformis (C. teres)
- Chone magna
- Chone mollis
- Demonax media (Sabella, S. aulaconota, Distylyia rugosa, Parasabella, P. maculata, Potamilla californica)
- Euchone analis
- Euchone sp. cf. hancocki
- Euchone incolor (E. rosea, E. trisegmentata, E. barnardi)
- Eudistylia polymorpha
- Eudistylia vancouveri (E. tenella, E. plumosa, E. abbreviata)
- Fabricia brunnea (F. sabella)
- Fabricia oregonia
- Fabricia sabella (F. dubia)
- Fabriciola berkeleyi (F. pacifica, F. sabella)
- Megalomma splendida (Branchiomma burrardum)
- Myxicola aesthetica
- Myxicola infundibulum
- Oriopsis gracilis
- Potamilla intermedia (Pseudopotamilla, P. reniformis)
- Potamilla neglecta
- Potamilla occelata (Pseudopotamilla)
- Sabella crassicornis
- Schizobranchia insignis

**Key to pelagic sabellidae larvae** (Fig. 28)

1a. 3 setigers at metatrochophore stage; otocysts absent; telotroch absent or reduced ......................................................... Demonax media

1b. 3–4 setigers; otocysts and telotroch present ........................................

............................................................ Chone infundibuliformis

**Family Serpulidae** (Local Species 7, Local Species with Described Larvae 1). Adults of this family build calcareous tubes (Fig. 29).

- Apomatus geniculatus
- Apomatus timsi
- Crucigera irregularis
- Crucigera zygophora
Fig. 28. Larvae
(A) Demonax media and
(B) Chone infundibuliformis, family Sabellidae.
(From Okuda, 1946; McEuen et al., 1983)

Pseudochitinopoma occidentalis (Chitinopoma, C. groenlandica)
Salmacina tribranchiata (S. dysteri var. tribranchiata)
Serpula columbiana (S. vermicularis)

Family Spirorbidae (Local Species 11, Local Species with Described Larvae 2). All spirorbid genera found in Pacific Northwest waters brood their larvae, either within the adult tube or externally (Fauchald, 1977). Larvae have a characteristic complex of gland cells in the ventral and lateral ectoderm of the thorax.

Circeis amoricana (C. spirillum, Spirorbis rugatus)
Circeis spirillum (Dexiospira, Spirorbis)
Janura rugata (Spirorbis, Dexiospira)
Paradexiospira violacea
Paradexiospira vitrea (Laeospira, Eulaeospira, Spirorbis, S. variabilis, S. semidentatus, S. racemosus)
Pileolaria langerhansi
Pileolaria potswaldi (Laeospira, Spirorbis, S. moerchi)
Pileolaria quadrangularis
Protolaeospira eximia (Spirorbis, S. ambilateralis)
Sinistrella media (Spirorbis, Laeospira, Romanchella)
Spirorbis bifurcatus

Key to pelagic spirorbid larvae (Fig. 30)
I a. Body and pygidium of metatrochophore tapering narrowly; collar extending over setiger 1 ................................................................ Circeis spirillum
I b. Pygidium flanged; collar extending over setiger 2 ............... Pileolaria potswaldi

Order Spionida

Family Acrocirridae (Local Species 1, Local Species with Described Larvae 0). Little is known about the larval development in this family. It may be similar to that in the Cirratulidae and Flabelligeridae (Banse, 1969).

Acrocirrus heterochaetus
Family Apistobranchidae (Local Species 1, Local Species with Described Larvae 0). Development in this family has not been described. Adults are tube dwellers but can exist outside tubes in loosely constructed burrows. They are common in shelly sands and muds (Fauchald, 1977).

*Apistobranchus ornatus*

Family Chaetopteridae (Local Species 4, Local Species with Described Larvae 2). Chaetopterid larvae are separated by comparison of the modified setae on the fourth anterior segment.

*Chaetopterus variopedatus*
*Mesochaetopterus taylori*
*Phyllochaetopterus prolifica*
*Spiochaetopterus costarum* (Telepsavus)

**Key to chaetopterid genera (Fig. 31)**

1a. 1 pair of setae on setiger 4 .................................................. 2
1b. Several setae on setiger 4 ............................................................. 3

2a. Modified setae with enlarged heart-shaped distal section............

................................................................................................. *Spiochaetopterus*
2b. Setae not enlarged distally ...................................................... *Phyllochaetopterus*

3a. Distal part of setae blade-shaped .................................. *Mesochaetopterus*
3b. Distal part of setae with lateral tip ................................. *Chaetopterus*

Family Cirratulidae (Local Species 11, Local Species with Described Larvae 1). Development in this family includes many species that produce lecithotrophic larvae (*) that hatch from eggs laid in a gel mass as well, as species that are direct developers (+). Christie (1985) notes that all larvae of this family are large and yolky (Fig. 32).

*Caulleriella alata*
*Caulleriella hamata* (Tharyx)*
*Chaetozone setosa* *
**Cirratulus cirratus cirratust** *(Chaetozone berkeleyorum, Caulleriella gracilis)*

**Cirratulus spectabilis** *(C. cirratus cingulatus, C. robustus)*

**Cirriformia spirabranchia**

**Dodecaceria choncharum**

**Dodecaceria fewkesi**

**Dodecaceria fistulicola**

**Tharyx multifilis**

**Tharyx parvus** *(T. multifilus var. parvus)*

**Family Magelonidae** (Local Species 1, Local Species with Described Larvae 0). An unknown magelonid, possibly *Magelona cerae,* is often found in plankton samples taken from Coos Bay, Oregon (K. Johnson, pers. comm.). Adults are common in sandy substrates and move through the sediment with a shovel-like prostomium and thread-like body. Larvae of this family have characteristically long larval tentacles that are flexible and often coiled. *Magelona alleni* illustrates characteristics of the family (Fig. 33), but it is not a species known to be in local waters.

*Magelona* sp.

**Family Spionidae** (Local Species 27, Local Species with Described Larvae 18). The spionids are a large and diverse group of polychaetes. Adult habitat and development modes vary across the family. A large number of larvae of local species have been described.

*Boccardia columbiana* *(Polydora)*

*Boccardia polybranchia*

*Boccardia proboscidea* *(B. californica)*

*Boccardiella hamata* *(Boccardia, B. uncata, Polydora)*

*Laonice cirrata* *(Nerine)*

*Paraprinospio pinnata* *(Prionospio, P. ornata)*
Polychaeta

Polydora alloporis
Polydora armata
Polydora brachycephala
Polydora cardalia
Polydora commensalis
Polydora giardi
Polydora ligni
Polydora pygidialis (P. ciliata)
Polydora socialis (P. caeca, P. caeca var. mangna, P. plena)
Polydora spongicola (P. ciliata var. spongicola)
Polydora websteri
Prionospio lighti (Minuspio cirrifera)
Prionospio steenstrupi (P. malmgreni)
Pseudopolydora kempi (Neopygospio laminifer, Polydora, Polydora kempi japonica)
Pygospio elegans
Scolelepis foliosa (Nerine)
Scolelepis squamata (S. acuta)
Spio filicornis
Spiophanes berkeleorum (S. cirrata)
Spiophanes bombyx
Streblospio benedicti

Key to spionid nectochaetes (Fig. 34)
1a. Branchiae absent; setiger 1 with 1–2 large curved neuropodial spines in addition to normal capillaries .... Spiophanes bombyx
1b. Branchiae present; setiger 1 without specialized setae .......... 2

2a. Setiger 5 modified, with specialized setae ........................................ 11
2b. Setiger 5 not modified, without specialized setae ............... 3

3a. Prostomium distally pointed (may appear conical with rounded apex in extremely contracted specimens), with or without subdistal lateral horns ......................................................... 4
3b. Prostomium not distally pointed, with distal lateral or frontal horns, broadly rounded or incised on anterior margin .......... 5

4a. Prostomium bell-shaped, orange-pigmented; gut blue-green......
................................................................................................................................. Scolelepis squamata
4b. Prostomium triangular and lacking orange pigment; gut blackish-brown ................................................................. Scolelepis foliosa

5a. Branchiae limited to middle and posterior setigers except for single pair on setiger 2 in males .......... Pygospio elegans
5b. Branchiae beginning on setiger 1 or 2 and continuing for variable number of setigers ....................................................... 6

6a. Branchiae concentrated in anterior setigers 1–2, absent posteriorly ................................................................. 7
6b. Branchiae present over most of body ......................................................... 10
Fig. 34.
Nectochaetes of species in the family Spionidae. (A) Spiophanes bombyx, (B) Spiophanes squamata, (C) Spiophanes foliosa, (D) Pygospio elegans, (E) Prionospiro steentjupi, (F) Polydora light, (G) Pseudopolydora kampti, (H) Polydora socialis, (M) Polydora ligii, (N) Polydora commensalis, and (O) Polydora websteri. (From Hannerz, 1956; Hatfield, 1965; Dean and Blake, 1966; Blake, 1969; Blake and Woodwick, 1975; Lacalli, 1980; Yokoyama, 1981; Plate and Husemann, 1994)
7a. Branchiae beginning on setiger 1 ...................................................... 9
7b. Branchiae beginning on setiger 2 ...................................................... 8

8a. Peristomial palps short; 1 pair of anal cirri in early larvae, 2 pairs of anal cirri present in later larvae; eyes dark red .......... *Prionospio steenstrupii*
8b. Peristomial palps differentiate only in late larval stages; 1 pair of anal cirri in late larvae ........................................... *Prionospio lightii*

9a. 1 pair of cirriform branchiae; dorsal collar across setiger 2 ........
................ ................................................................. *Streblospio benedictia*
9b. 3 or more pairs of branchiae; no dorsal collar on setiger 2 ..........
........................ ......................................................... *Paraprilonospio pinnata*

10a. Branchiae beginning on setiger 1; hooded hooks only in neuropodia ................................................................. *Spio filicornis*
10b. Branchiae beginning on setiger 2; prostomium broad, bluntly rounded or squared on anterior margin; branchiae free from dorsal lamellae .................................................. *Laonice cirrata*

11a. Branchiae beginning on setiger 2 ............................................... 12
11b. Branchiae beginning on setigers 6–12 ......................................... 13

12a. Major spines of setiger 5 of one type: simple, falcate, with smaller companion setae .................................................. *Bocardiella hamata*
12b. Major spines of setiger 5 of two types: first with expanded ends bearing cusps or bristles, second simple, falcate ........
...... ................................................................. *Bocardiella proboscis*

13a. Setiger 5 slightly to moderately modified, usually with prominent parapodia; major spines of two types: first simple, acicular or falcate, second pennoned with both types usually arranged in U- or J-shaped row. Hooded hooks with secondary tooth placed close to main fang ............ *Pseudopolydora kempi*
13b. Setiger 5 greatly modified, with reduced parapodia; major spines of one or two types in curved row, neither J- or U-shaped; hooded hooks with prominent angle between teeth 14

14a. Larvae with distinct ventral chromatophores (black, yellow-green, or iridescent) ..................................................... 15
14b. Larvae without ventral pigment, or if present not in distinct chromatophores ......................................................... 16

15a. Ventral pigment black ....................................................... *Polydora socialis*
15b. Ventral pigment yellow-green or iridescent .......... *Polydora ligna*

16a. Single dorsal row of melanophores present, at least posterior to segment 3 .................................................. *Polydora commensalis*
16b. Multiple rows of dorsal melanophores present .................. 17

17a. Prostomium with yellow-brown pigment; gastrotrochs on segments 7, 10, 13, 15 ........................................... *Polydora websteri*
17b. Edges of prostomium with black pigment; gastrotrochs on segments 3, 5, 7, 10, 13, 15, 17, 19 .................. *Polydora pygidialis*

*Levin (1991) illustrates lecithotrophic pelagic larvae that lack swimming setae.
 Development of this species is described in Woodwick (1977).*
Family Trochochaetidae (Local Species 1, Local Species with Described Larvae 0). This is a small family (nine species) of non-tubiculous worms that live in soft substrates in mainly shallow water. Adults are cylindrical with a slightly flattened body (Fauchald, 1977). An image of *Disoma multisetosum* is included for reference (Fig. 35).

*Trochochaeta multisetosa* (*T. franciscanum*)

Order Sternaspida

Family Sternaspidae (Local Species 1, Local Species with Described Larvae 0). This small family has approximately ten recognized species. Adults are common in sand and mud at all depths, but usually at 100–200 m. Adults are rarely found in large numbers, are burrowers, and have dark yellow or reddish chitinized shields (Fauchald, 1977).

*Sternaspis scutata* (*S. fossor, S. affinis*)

Order Terebellidae

Family Ampharetidae (Local Species 14, Local Species with Described Larvae 0). Thorson (1946) suggests that several species (*) in this family are direct developers. Nyholm (1950), however, describes *Melinna cristata* as a free-spawned lecithotrophic larva. This is a fairly large, deep-water family (Fauchald, 1977).

*Amage anops*
*Ampharete acutifrons* (*A. grubei*)*
*Ampharete finnarchica* (*A. arctica*)*
*Ampharete goesi goesi*
*Amphictetes mucronata*
*Amphictetes scaphobranchiata*
*Amphisamytha bioculata*
*Anobothrus gracilis* (*Ampharete gagarae*)*
*Asabelides lineta* (*Pseudosabellides*)
Polychaeta

Asabellides sibrica
Hobsonia florida (Amphictegis gunneri floridus)*
Lysippe annectens
Melinna cristata (M. denticulata)
Schistocomus hiltoni

Family Pectinariidae (Local Species 3, Local Species with Described Larvae 3). Trochophores of this family are easily confused with nephtyid larvae (Lacalli, 1980). Pectinariids construct and live in fragile tusk-shaped tubes (Fauchald, 1977).

Amphictene moorei (A. auricoma, Pectinaria)
Cistenides granulata (C. brevicoma, Pectinaria)
Pectinaria californiensis (P. belgica)

Key to pectinariid metatrochophores (Fig. 36)
1a. Prototroch and telotroch pronounced ........................................ 2
1b. Cilia of prototroch and telotroch short or reduced

........................................................................................................ Pectinaria californiensis

2a. Eyes red, body surface with regular rows of round dark red to brown spots; lobes of oral hood blunt and indented

........................................................................................................ Cistenides granulata
2b. Oral hood winglike and large, neurotroch present, oral cilia long

........................................................................................................ Amphictene moorei

Family Sabellariidae (Local Species 4, Local Species with Described Larvae 0). Larval morphology is quite similar among sabellariid species (Ecklebarger, 1975, 1977). Opercular characteristics are useful for distinguishing genera according to Bhaud and Cazaux (1987). The key below is modified from Bhaud and Cazaux (1987) for the two local genera. Sabellaria alveola (Fig. 37) is not a local species.

Idanthrysus armatus
Idanthrysus ornamentatus
Sabellaria cementarium
Sabellaria gracilis

Key to sabellariid genera
1a. Opercular peduncles fused; lacking opercular hooks ... Sabellaria
1b. Opercular peduncles not completely fused; opercular hooks present ........................................................................ Idanthrysus

Family Terebellidae (Local Species 20, Local Species with Described Larvae 2). Terebellids are common shallow-water polychaetes and are found in a diversity of environments. They inhabit permanent tubes from which they extend a crown of elongated extensile tentacles that they use to capture small food...
particles from the surface of the substrate or water (Fauchald, 1977).

Amphitrite cirrata (A. palmata)
Artacama coniferi
Eupolympnia heterobranchia (E. crescentis)
Lanice conchilega
Loimia medusa
Neoamphitrite robusta (Amphitrite, A. scionides dux)
Neoleprea spiralis
Pista brevibranchiata (P. fasciata)
Pista cristata
Pista elongata
Pista fasciata
Pista fimbriata (P. brevibranchiata)
Pista moorei
Pista pacifica
Polycirrus californicus (P. californicus)
Scionella japonica
Thelepus cincinnatus (T. hamatus)
Thelepus crispus
Thelepus hamatus
Thelepus setosus

Key to terebellidae larvae (Fig. 38)

1a. Larva with peristomial tentacles; colorless with pale olive-green intestine and faint brownish anal pigment; tentacles yellow-brown; each parapodium with 2–3 setae adhering at distal ends; eyes yellow-brown ...................................................... Lanice conchilega

1b. No tentacles present; anal segment yellowish-brown; 1 pair of setae per setiger; eyes red ...................................................... Amphitrite cirrata

Family Trichobranchidae (Local Species 3, Local Species with Described Larvae 0). Developmental patterns for Artacamella and Trichobranchus are not known. Terebellides stroemi develops directly in egg masses (Thorson, 1946).

Artacamella hancocki
Terebellides stroemi
Trichobranchus glacialis

References


