

## Arthropoda: Isopoda

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Isopoda is the second-largest order of crustaceans. It comprises eight suborders, seven of which are known from Pacific Northwest waters. Although most of the 4,000 species are marine (of which nearly 90 are local), some species are found in fresh or brackish water and some terrestrial species are found in damp habitats. There is considerable morphological plasticity in this order, yet most isopods are characterized by ovoid or elongate bodies that are frequently dorsoventrally compressed.

Sexual dimorphism in isopods is rare, but where it occurs (e.g., gnathiids, some epicarideans and bopyrids) it can be quite pronounced. Sexual reproduction is facilitated through copulation, resulting in internal fertilization. Copulation must occur between molts during the biphasic molt cycle of the female. The molting process of isopods is unique: the posterior portion of the body is molted first, allowing copulation, followed by the anterior portion, which creates a brood pouch, or marsupium. Egg laying may begin within a few hours of copulation, and eggs are typically brooded in the marsupium. Free-living forms typically have direct development, with juvenile development largely complete by the time of hatching. The emerging young are essentially miniatures of the adults. Juveniles are characterized by a lack of the last pair of thoracic legs, those of the eighth thoracomere (Lee and Miller, 1980; Schram, 1986).

Some parasitic isopods have larval stages markedly different in morphology from the adult forms, but few of the species, and none locally, have been described in any detail (Bonnier, 1900; Shino, 1942a,b; Markham, 1974; Bourdon and Bruce, 1979; Sassaman, 1985). Members of the suborder Epicaridea (Table 1), whose adult forms are ectoparasitic on other crustaceans, have larvae that are also parasitic. Eggs, which are brooded as in the free living forms, hatch into free-swimming 12-legged epicarid larvae (or epicaridium) with seven distinct thoracic and six abdominal segments. This free-swimming larva then parasitizes a zooplankter, usually a copepod. While on the zooplanktonic host, it transforms into a 14-legged microniscus (or microniscium) larva. The third and final larval molt yields the cryptoniscus (or cryptoniscium) larva (Fig. 1), which is

**Table 1. Species in the order Isopoda from the Pacific Northwest (from Kozloff, 1996) that produce planktonic larvae**

**Suborder Epicaridea**

**Family Bopyridae**

*Argeia pugettensis*  
*Bopyroides hippolytes*  
*Hemiarthrus abdominalis*  
*lone cornuta*  
*Munidion parvum*  
*Phyllodurus abdominalis*  
*Pseudione galacanthae*  
*Pseudione giardi*

**Family Dajidae**

*Arthrophryxus beringanus*  
*Holophryxus alaskensis*  
*Prophryxus alascensis*

**Family Entoniscidae**

*Portunion conformis*

**Family**

**Hemioniscidae**

*Hemioniscus balani*

**Family Liriopsidae**

*Liriopsis pygmaea*

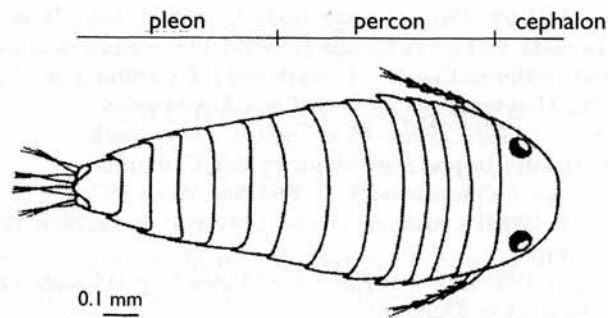


Fig. 1. Cryptoniscus stage larva, dorsal view. (Modified from Sassaman, 1985)

longer, up to 7 mm, and has a seventh pereonite with another pair of legs. The cryptoniscus larva detaches from its zooplanktonic host and enters a benthic phase as it searches for its ultimate crustacean host. Once a suitable host is found, the cryptoniscus larva either metamorphoses into a female or undergoes lesser modification to become a male. Keying the larvae beyond the suborder is difficult since the larval stages in the four epicaridean families are superficially indistinguishable. Further investigation into the fine morphological structure of epicaridean larvae will most likely open the way for more precise identification (Hatch, 1947; Schultz, 1969; Miller, 1975).

The likelihood of encountering isopod larvae in the plankton is low. Of the three larval stages discussed above, the cryptoniscium larvae are perhaps those most likely to be encountered. Special care should be given in examining specimens, since some adult isopod species are pelagic, and benthic species can get suspended in the plankton as well. It should be possible to distinguish between cryptoniscium larvae and other superficially similar adult isopods on the basis of size and number of pereonites and legs.

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