Leptochelia sp.

A green tanaid

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Peracarida, Tanaidacea, Tanaidomorpha

Family: Paratanaoidea, Leptocheliidae, Leptocheliinae

Taxonomy: The taxonomic history of *Leptochelia dubia* and *L. savignyi* is confusing and remains to be resolved. In 1842, Krøyer described *Tanais dubia* and *Tanais savignyi*, the former species possessing one less segment on the uropod endopod. These species were later transferred to the new genus *Leptochelia* based on their elongate cheliped morphology. Due to morphological disparity between males and females, some *Leptochelia* females were described as new species, including the genus *Paratanais*. Eventually, most of the variation between individuals (males and females) of newly described species was determined to be intraspecific and species were synonymized under the "*L. dubia* group" (= "*Leptocheliae*-Group 2", Lang 1973 in Ishimaru 1985), which included *L. savignyi,* among others. This group encompasses a wide geographic distribution (Miller 1968) and it is likely composed of several cryptic species (Cohen 2007; Jarquin-Gonzalez et al. 2015). In 2010, Bamber redescribed *L. savignyi* to include many of the species previously in the "*L. dubia* group", but the full synonymy of the two species is still uncertain. Because the name *L. savignyi* is older, there is also current debate around which name should be the senior synonym (Cohen 2007; Bamber 2010). Until the taxonomy is resolved we will use the name *Leptochelia* sp., but for the sake of clarity we include species names used by authors we cite.

Description

Size: Individuals are rather small, up to 1 cm in length. The illustrated specimen (from South Slough of Coos Bay) was 6 mm in length. British Canadian species were reported to 4.5 mm (Fee 1927).

Color: Transparent white to light green with some specimens bearing slight orange tinge (Kozloff 1993; Cohen 2007). Brightly colored females were found in early spring (South Slough of Coos Bay) that had red striped antennae. Males found in August were almost transparent.

General Morphology: Tanaids resemble small, elongated and dorso-ventrally flattened lobsters with claws that extend anteriorly. Their bodies can be divided into three sections, a cephalothorax (**cephalon** and first two **pereonites**), a thorax or **pereon** (including **pereonites** 3–8) and a **pleon** (abdomen), consisting of **pleonites**, with the posterior-most fused with the telson (**pleotelson**), and five pairs of **pleopods** as well as a single pair of **uropods** (see Plate 253A, Cohen 2007). *Leptochelia dubia* is a tube dweller (Cohen 2007) and resembles a slender isopod (see Fig. 340, Kozloff 1993).

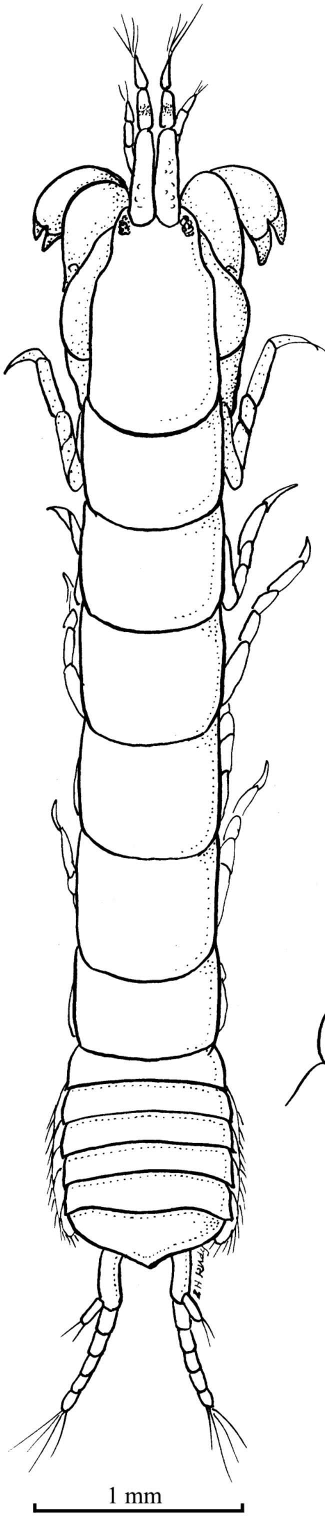
Cephalon: Head narrows anteriorly and is fused with first two thoracic segments (Tanaidacea) (Fig. 1).

Eyes: Stalked, large, and anterolateral (Figs. 1, 2).

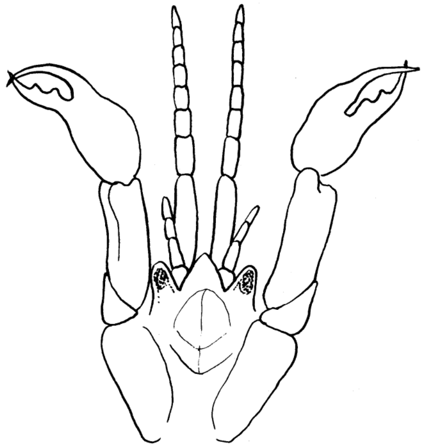
Antenna 1: Male first antenna is long, and has flagellum with seven articles (Fig. 2). The female first antenna, on the other hand, is short, and consists of three articles (Figs. 1. 4).

Antenna 2: Male second antenna is shorter than the basal article of the first antennae and consists of four articles (Fig. 2). The female second antenna is longer than that of the male, also with four articles (Fig.

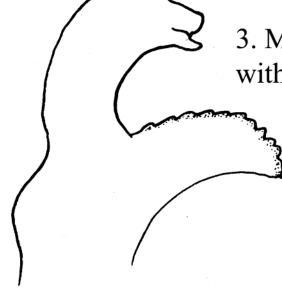
Leptochelia sp.



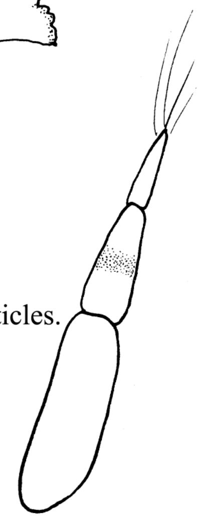
1. *Leptochelia* sp. ♀ x32:
carapace: head, first two segments fused, six thoracic segments, five abdominal segments, and telson.



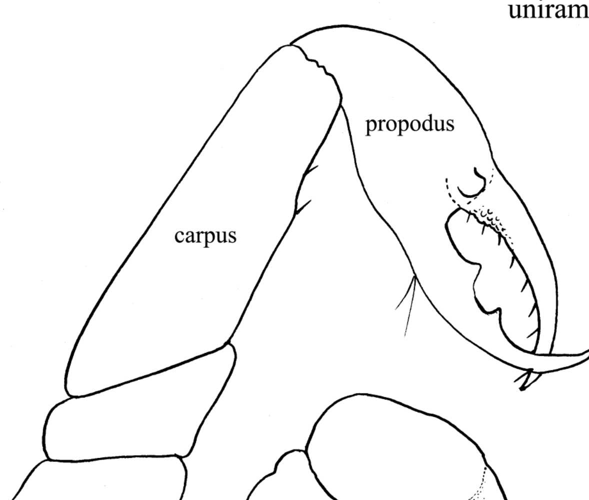
2. Head ♂ (ventral view):
long first antenna, with seven articles in flagellum, eyes separate from head, long chelipeds.



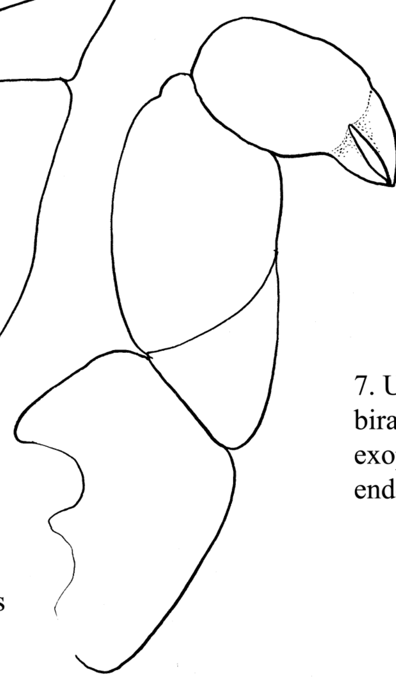
3. Madible ♀:
without palp.



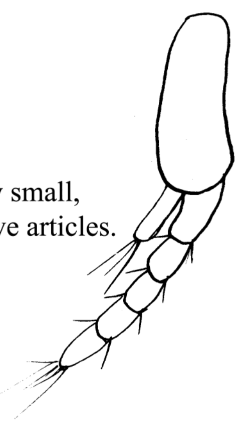
4. First antenna ♀:
uniramous, three articles.



5. Gnathopod ♂ x100:
carpus longer than basal article of first antenna, propodus shorter than fingers, fingers with two teeth.



6. Gnathopod ♀:
short, heavy chela.



7. Uropod:
biramous,
exopodite very small,
endopodite: five articles.

Hiebert, T.C. 2015. *Leptochelia* sp. *In:* Oregon Estuarine Invertebrates: Rudys' Illustrated Guide to Common Species, 3rd ed. T.C. Hiebert, B.A. Butler and A.L. Shanks (eds.). University of Oregon Libraries and Oregon Institute of Marine Biology, Charleston, OR.

1).

Mouthparts: Fused in males, and can be dissected in females. Mandible is without palp (Tanaidomorpha, Fig. 3).

Carapace:

Chelipeds: Chelipeds are very prominent, but sexually dimorphic. Male chelipeds are long and slender and with carpus longer than basal article of the firstantenna (Figs. 2, 5). The propodus is shorter than the fingers, which have two teeth on the inner side (Fig. 5). Female chelipeds are short and heavy (Figs. 1, 6).

Pereon: Consists of six uniform segments (Fig. 1).

Pereopods: Six pairs plus the anterior chelate gnathopods (see **chelipeds**). A small and inconspicuous penal process is attached between the last pair of these legs in the male.

Pleon: Consists of five similar segments and a telson (Fig. 1).

Pleopods: Five pleopod pairs are biramous and leaf-like.

Uropods: Both sexes have biramous uropods, with exopodite very small and endopodite consisting of five articles (Fig. 7).

Pleotelson: Fused with posterior pleonite and bears medial posterior point (Fig. 1).

Sexual Dimorphism: The first **antenna** is longer in males than females, while the opposite is true for the second antenna. **Chelipeds** are long and slender in males (Fig. 5) and short and stout in females (Fig. 6) (Kozloff 1993), a character that lead many taxonomists to describe them as separate species (see **Taxonomy**).

Possible Misidentifications

The Tanaidacea differ from the closely related Isopoda in the number of pereonites generally present: six in tanaids and seven in isopods. In addition, tanaids have a jointed uropod branch and pair of chelipeds anteriorly. The three tanaidacean suborders proposed by Sieg (1980) include Apseudomorpha, Neotanaidomorpha and the Tanaidomorpha, to which *Leptochelia* belongs. Members of the Apseudomorpha and Tanaidomorpha occur locally (Cohen 2007). Apseudomorpha species are not tube dwellers, they have a biramous flagellum of the first antenna, they sometimes lack pleopods, they have mandibles with palps (3-articulated), and the marsupium in females in composed of four pairs of oostegites only. Conversely, the Tanaidomorpha are usually tube-dwellers and are characterized morphologically by an unbranched flagellum of the first antenna, mandibles without palps, the presence of pleopods, and a marsupium consisting of 1–4 pairs of oostegites.

Within the Tanaidomorpha there are at least two local families, the Tanaidae and the Leptocheliidae (see Cohen 2007). The Tanaidae are characterized by 3–5 pleonites plus a pleotelson and three pairs of pleopods, while Leptocheliidae species have five pleopods.

The genus *Leptochelia* is the only one in the family Leptocheliidae occurring locally, but the number of species is currently unknown. *Leptochelia dubia* is suspected to be a complex of several species and may or may not be synonymized with *L. savignyi* (Cohen 2007) (see **Taxonomy**). *Leptochelia savignyi* from Puget Sound, has four (sometimes six) segments in the endopodite of the uropod (Kozloff 1974), has larger eyes and stubbier first antennae than does *L. dubia* (Lang 1957). In *L. savignyi* the first free thoracic segment is shorter than the others, but they are fairly equal in *L. dubia*. The male chelipeds of the two species are almost identical. For re-description of *L. savignyi*, see Bamber 2010. *Leptochelia filum*, another Puget Sound species is small (2.5 mm), white, and found at 37 meters sandy benthos, which is quite a different habitat from that of *L. dubia*. The endopodite of the uropod in this species has 3–4 articles, and not five as in *L. dubia*.

Ecological Information

Range: Type locality is off Brazil (Bamber 2010). Cosmopolitan (see Miller 1968) and is almost certainly an assemblage of several divergent species (Cohen 2007; Jarquin-Gonzalez et al. 2015). Northwest distribution from Puget Sound, Washington to southern California (Cohen 2007).

Local Distribution: In Coos Bay at Metcalf preserve and South Slough. Also found at Tillamook Bay (Forsberg et al. 1977).

Habitat: A tube-dweller, *L. dubia* is found in flimsy slime tubes much like those of amphipod *Americorophium* (see *A. brevis*, this guide), in a substrate of mud and wood chips (e.g. Metcalf Preserve). Additional habitats include dead coral (Richarson 1902; Lewis 1998), sponge beds (at 45 meters, Fee 1927), within sand in the strand line at low tide (Hatch 1947), and near the water surface on hydroids and algae (Fee 1927). The upper limit of sand grain size is 200 µm (Wieser 1959). Higher abundances of *L. dubia* were observed in areas of intermediate or low pH (see Tables 1–2, Cigliano et al. 2010). *Leptochelia savignyi* was found at the ends of empty spionid polychaete (*Dipolydora armata*) burrows or amongst calcareous hydrozoan (*Millepora complanata*) branches in Barbados (Lewis 1998). Individuals were reported to be particularly dense, although not necessarily males or reproductive females, on the calcareous green macroalga, *Penicillus capitatus* (Stoner 1986).

Salinity: Collected at salinities of 30.

Temperature:

Tidal Level: +0.9 meters (Metcalf Preserve) to 45 meters (Fee 1927). In Tomales Bay, California, tidal level ranged from +0.5 meters and -0.8 MLLW, with highest density reported at -0.5 MLLW (Mendoza 1982).

Associates: Associates include the amphipod, *Americorophium*, small polychaetes, and the clam, *Macoma nasuta*. *Leptochelia dubia* exhibited a positive response to the presence of mussel mats created by the non-native mussel *Musculista senhousia*, potentially due to the additional structure and substrate the mats provide for tube building (Crooks and Khim 1999).

Abundance: The dominant invertebrate, when observed (e.g., Metcalf Preserve) and can be present in enormous numbers (Kozloff 1993). In False Bay, San Juan Island, Washington, *L. dubia* was an abundant species, with average density 416 to 2,600 individuals per sediment sample (100 square cm by 14 cm deep, Brenchley 1981). Average densities can be very high and were reported to be greater than 30–50,000 individuals per square meter (Tomales Bay, California, Mendoza 1982; Friday Harbor, Washington, Highsmith 1983).

Life-History Information

Reproduction: Tanaidaceans are gonochoristic, sequentially (protogynous) or simultaneously hermaphroditic (Highsmith 1983; Boyko and Wolff 2014) and sexual reversal may be determined by environmental factors (e.g. temperature, Masanuri 1983; Highsmith 1983). Reproduction in tanaidaceans, like isopods, is direct and proceeds within the female brood chamber (i.e. marsupium) to a larval form, called a manca that resembles a small adult. Ovigerous *L. dubia* females and nests of young were found in February and in Tomales Bay, California, brooding females were found throughout the year (see Fig. 5, Mendoza 1982). Female size is positively correlated to brood size. Young females occasionally transition into males before they reach sexual maturity (Kozloff 1993). Fighting occurs among males and larger males tend to win fights and dominate within the population. However, the entire population is usually sex-skewed strongly toward females (Mendoza 1982; Highsmith 1983; Stoner 1986). However, more males were observed, locally, in

August at Metcalf Preserve.

Larva: Since most tanaidaceans are direct developing, they lack a definite larval stage. Instead, this developmental stage resembles small adults (e.g. Fig. 40.2, Boyko and Wolff 2014). Most tanaidaceans develop from embryo to a manca larva, comprising of four stages. Larvae hatch from the female marsupium at the second manca stage (the first and second manca stages are not marked by a molt, Boyko and Wolff 2014). The third manca stage in tanaidaceans has partially developed sixth pereopods, and the first and second pereonites are fused with the cephalon as in adults. The fourth manca stage can be recognized by the presence of small pleopods (Boyko and Wolff 2014) (but only in those species that possess pleopods like *L. dubia*). Dispersal by rafting is a possibility for this small species that requires very little sediment and diatoms for food (Highsmith 1985). Manca larval stages in *L. savignyi* were described by Masunari (1983). The manca II stage was 880 µm in length (range 650–1,100 µm), lacked the last pairs of pereopods and pleopods and had uropodal endopods of three segments. Manca III were 1,050 µm in length (range 700–1,400 µm) and possessed all pereopods and pleopods. Masunari (1983) described two post-manca stages called neutrum I and II. In the first, all pereopods and pleopods were fully developed and body length was 1,580 µm, and in the second, uropodal endopods were composed of four segments (rather than three in all previous stages) and mean body length was 4,000 µm (see Fig. 1, Masunari 1983).

Juvenile: Newly released juveniles were 600–700 µm in length (Mendoza 1982) and resemble small adults, with fully formed pereopods and pleopods (Boyko and Wolff 2014).

Longevity:

Growth Rate: Growth among isopods occurs in conjunction with molting where the exoskeleton is shed and replaced. Post-molt individuals will have soft shells as the cuticle gradually hardens. During a molt, arthropods have the ability to regenerate limbs that were previously autonomized (Kuris et al. 2007).

Food: Detritus and associated microorganisms, often scraped from the surface of larger organisms (Kozloff 1993).

Predators: Predators of this small tanaidacean include many fishes. For example, *Parophrys vetulus* (English Sole), *Platichthys stellatus* (Starry Flounder), and *Oncorhynchus tshawytscha* (Chinook Salmon) (Tillamook Bay, Forsberg et al 1977), and juvenile *Leptocottus armatus* (Staghorn Sculpin) (Tamales Bay, California, Mendoza 1982). *Leptochelia dubia* populations showed a larger abundance when the non-native and co-occurring green crab (*Carcinus maenas*) was removed (Bodega Bay, California Grosholz et al. 2000) suggesting predation or competition between the two species.

Behavior: Cements together particles to construct a tube, and in doing so stabilizes the substrate (Kozloff 1993). The rate of tube building is 70–600 (average 350) grams per square meter per day, with highest rates occurring during autumnal months and lowest in late-winter months (Yaquina Bay, Oregon, Krasnow and Taghon 1997). The tube of *L. savignyi* is 400 µm in diameter, 1 cm in length and is open at both ends (Lewis 1998).

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