Detonella papillicornis

A sow bug

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Peracarida, Isopoda, Oniscidea

Family: Detonidae

Taxonomy: *Detonella papillicornis* was originally described by Richardson in 1904 as *Trichoniscus papillicornis*. Richardson described "about seven" articles on the flagellum of antenna two, but Lohmander later found 4–5 articles (including observations of the type specimen) and moved this species to a new genus, *Detonella* (Schultz 1972; Garthwaite 1988). Interspecific variation in characters (e.g. protopodite setae and pleotelson margin, Schmidt 2000) lead subsequent taxonomists to name new species, which were eventually synonymized as *D. papillicornis* (for full list of synonyms see Schmidt 2000).

Description

Size: Individuals 3.8 mm (Friday Harbor, Washington, Hatch 1947) to 6 mm in length (South Slough of Coos Bay).

Color: Body dark red and white mottled (Miller 1975).

General Morphology: Isopod bodies are dorso-ventrally flattened and can be divided into a compact **cephalon**, with eyes, two **antennae** and **mouthparts**, and a **pereon** (thorax) with eight segments, each bearing similar **pereopods** (hence the name "isopod"). Posterior to the pereon is the **pleon**, or abdomen, with six segments, the last of which is fused with the telson (the **pleotelson**) (see Plate 231, Brusca et al. 2007). The Isopoda can be divided into two groups: ancestral ("short-tailed") groups (i.e. suborders) that have short telsons and derived ("long-tailed") groups with long telsons, *D. papillicornis* groups among the former (see Fig. 9, Garthwaite and Lawson 1992; Brandt and Poore 2003; see Plate 249C, Brusca et al. 2007). The suborder, Oniscidea is the largest isopod suborder and the only fully-terrestrial crustacean group (Brusca et al. 2007).

Cephalon: Cephalon without rostrum, but slightly pronounced anteriorly and with concavity at apex (Fig. 2). Large anterior lobes at antero-lateral angles.

Eyes: Eyes with approximately eight (sometimes six) ocelli (Lohmander 1927).

Antenna 1: First antenna is vestigial among the suborder Oniscoidea.

Antenna 2: Peduncle of second antenna with 5–6 joints and the last three bear setose tubercules. The fifth joint has a distal process (Fig. 3) and the flagellum is composed of four articles (Richardson 1905; Schultz 1972).

Mouthparts:

Rostrum: Absent (Fig. 2).

Pereon: Body elongate and depressed with thorax composed of seven segments, the first of which is not fused with the head (Brusca et al. 2007).

Pereonites: Thoracic segments about equal in size, each with two rows of tubercules and postero-lateral angles directed backwards (Lohmander 1927).

Pereopods: Seven pairs of pereopods.

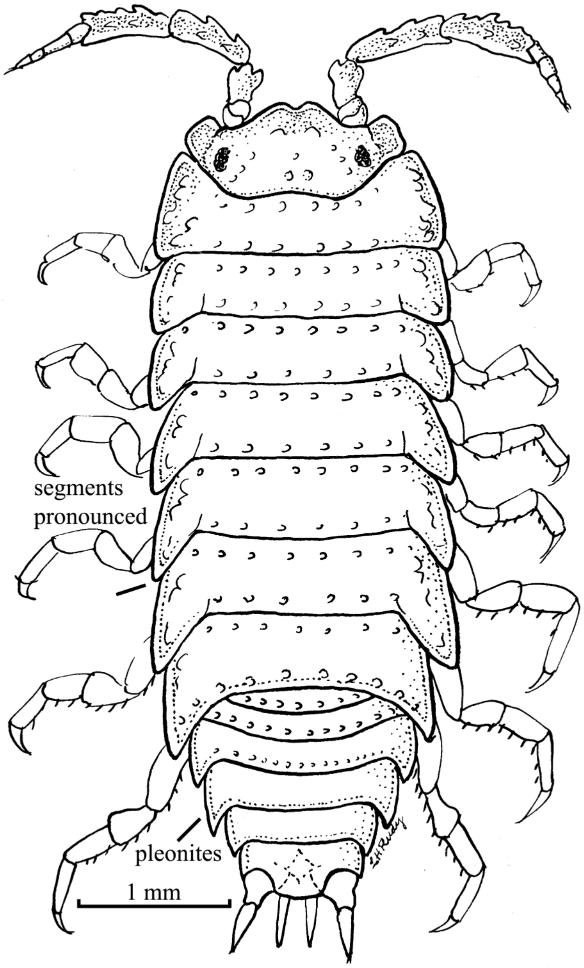
Pleon: Pleon narrower than pereon, but not abruptly so (Fig. 1).

Pleonites: Five free pleonites are present (Brusca et al. 2007) (Fig. 1).

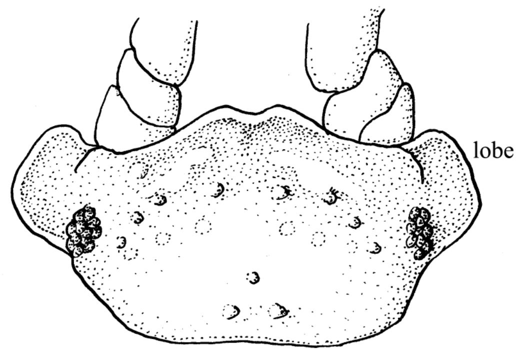
Pleopods:

Uropods: Styliform and extend beyond body with outer branch stouter and longer than the inner branch. Uropods are inserted postero-laterally, and the base is not expanded (Fig.

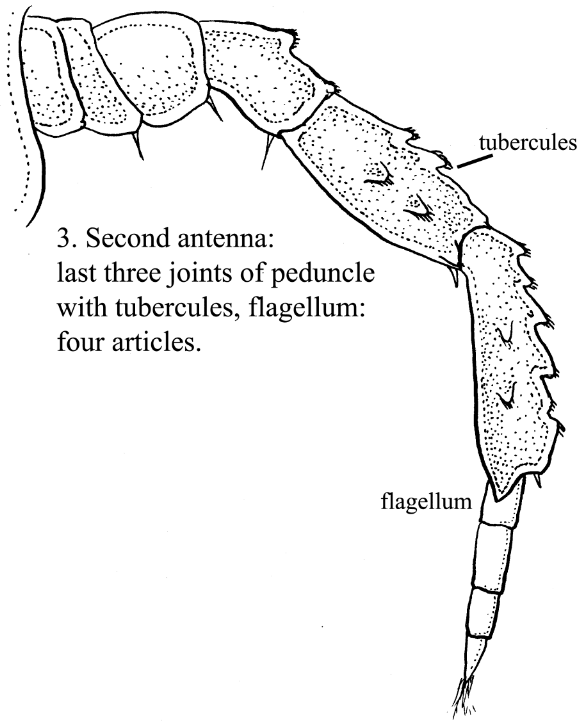
Detonella papillicornis



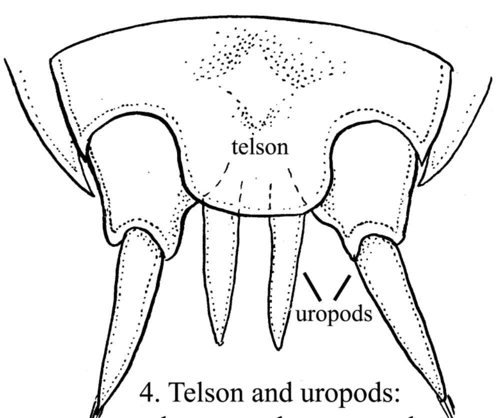
1. *Detonella papillicornis* (L: 6mm) x25:
thoracic segments extend backwards;
abdomen with five free pleonites.



2. Head:
no rostrum, simple eyes;
large lateral lobes.



3. Second antenna:
last three joints of peduncle
with tubercules, flagellum:
four articles.



4. Telson and uropods:
telson spatulate; uropods
styliform; bases not
expanded.

Hiebert, T.C. 2015. *Detonella papillicornis. 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.

4).
Pleotelson: Spatulate (Fig. 4) and morphologically variable. The pleotelson of the present specimen is more triangular in original description (Richardson 1905).
Sexual Dimorphism: The first and second pleopods are also elongated in males for copulation in oniscideans and reproductive females have a conspicuous marsupium.

Possible Misidentifications

The order Isopoda contains 10,000 species, 1/2 of which are marine and comprise 10 suborders, with eight present from central California to Oregon (see Brusca et al. 2007). Among isopods with small, short telsons, there are several groups (i.e. suborders) including Phreatoicidea, Asellota, Microcerberidea, Calabozoidea and Oniscidea.

The monophyletic Oniscidea (previously part of the paraphyletic Scyphacidae, see Holdrich et al. 1984 in Schmidt 2000, 2002) is a fully-terrestrial group composed of 4,000 described species, with 22 known locally (among 10 families, Schmidt 2002; Brusca et al. 2007). Members are characterized by seven pereonites, the first not fused with the head, seven pairs of pereopods, male penes on the sternum of pereonite seven, a pleotelson that does not curve dorsally, vestigal (or very small) antennules and a pleon with five free pleonites (Brusca et al. 2007). The first and second pleopods are also elongated in males for copulation, many species have a water conducting system and some have respiratory structures on pleopods called pseudotracheae.

The Detonidae have antennae flagella with four articles and the family comprises four species locally, three of which are in the genus *Armadilloniscus; Detonella* is monotypic locally (*D. papillicornis* is the only species). *Armadilloniscus* species have a definite rostrum and an oval body with no narrowing of the pleon. Their uropods have expanded bases and all four branches (which are small) are near the center line. The exopods are inserted on the medial margin in *Armadilloniscus* and are terminal in *Detonella* and conspicuously extend from body outline (Brusca et al. 2007). *Armadilloniscus lindahli* has a convex body and can roll into a ball. *Armadilloniscus coronacapitalis* has a spur-like extension on the lateral margin of the antenna penduncle article while *A. holmesi* does not. Both *A. lindahli* and *A. coronacapitalis* have a southern distribution from Marin County, California south, while *D. papillicornis* occurs from San Francisco Bay, California northward (Brusca et al. 2007). *Armadilloniscus holmesi* occurs from Friday Harbor, Washington to Bahia Megdalena, Baja California (Schultz 1972).

Ecological Information

Range: Type region is Alaska (*Trichoniscus papillicornis,* USNM# 28772, Garthwaite and Lawson 1992). Essentially an Arctic and Antarctic species (Lohmander 1927) with known range from Southern Alaska, to Washington and, recently, in San Francisco Bay area (Garthwaite and Lawson 1992).
Local Distribution: Coos Bay distribution at Day's Creek in the South Slough.
Habitat: Preferable substrates include sand and beach debris.
Salinity:
Temperature:
Tidal Level: Upper intertidal of beaches.
Associates: The amphipod, *Orchestra* and other Oniscoidea, including *Armadilioniscus tuberculatus* and *Philoscia richardsona* (Hatch 1947).
Abundance: Somewhat sparse locally, but rather common in littoral sites throughout San Francisco Bay, California (Garthwaite and Lawson 1992).

Life-History Information

Reproduction: Most isopods have separate sexes (i.e. dioecious, Brusca and Iverson 1985) (although protogynous and protandric species are known, Araujo et al. 2004; Boyko and Wolff 2014). Reproduction proceeds by copulation and internal fertilization where eggs are deposited within a few hours after copulation and brooded within the female marsupium (Brusca and Iverson 1985). The biphasic molting of isopods allows for copulation; the posterior portion of the body molts and individuals mate, then the anterior portion, which holds the brood pouch, molts (Sadro 2001). Embryonic development proceeds within the brood chamber and is direct with individuals hatching as manca larvae that resemble small adults, with no larval stage (Boyko and Wolff 2014).

Larva: Since most isopods are direct developing, they lack a definite larval stage. Instead this young developmental stage resembles small adults (e.g. Fig. 40.1, Boyko and Wolff 2014). Most isopods develop from embryo to a manca larva, consisting of three stages. Manca larvae are recognizable by lacking the seventh pair of pereopods, but otherwise resemble small adults. They usually hatch from the female marsupium at the second stage and the molt from second to third manca produces the seventh pair of pereopods and sexual characteristics (Boyko and Wolff 2014). Isopod development and larval morphology can vary between groups (e.g. Gnathiidae, Cryptoniscoidea, Bopyroidae, Cymothoidae) (see Boyko and Wolff 2014) and some oniscid isopod species are known to care for their young after hatching (Boyko and Wolff 2014). Parasitic isopods, for example, have larvae that are morphologically dissimilar from adults (Sadro 2001). Isopod larvae are not common members of the plankton, with parasitic larvae most likely to be observed. Occasionally, suspended benthic juveniles or pelagic species are collected in plankton samples, but these can be differentiated from larvae by their larger size (Sadro 2001).

Juvenile:

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), however, isopods do not autotomize limbs as readily as other groups (Brusca and Iverson 1985). Compared to other arthropods, isopods exhibit a unique biphasic molting, in which the posterior 1/2 of the body molts before the anterior 1/2 (Brusca et al. 2007).

Food:

Predators: Isopods play a significant role as intermediate food web links, like amphipods, (e.g. see *Americorophium salmonis*, this guide) that are consumed by more than 20 species of marine fish (Welton and Miller 1980; cabezon, Best and Stachowicz 2012) and whales (Brusca et al. 2007).

Behavior:

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T.C. Hiebert