Americorophium brevis

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Peracarida, Amphipoda, Senticaudata, Corophiida, Corophiidira

Family: Corophioidea, Corophiidae, Corophiinae, Corophiini

Taxonomy: *Corophium brevis* was described in 1949 by Shoemaker and was transferred to the genus *Americorophium* in 1997 based on morphological characters (Bousfield and Hoover 1997) (see **Possible Misidentifications**). Not all researchers have followed this transition in other *Americorophium* species (e.g. *A. spinicorne*, Lester and Clark 2002; Sakamaki and Richardson 2009), but we follow the nomenclature used in other current local intertidal guides (Chapman 2007).

Description

Size: Males range in size from 3.5 (Shoemaker 1949) to 8 mm (South Slough of Coos Bay). Females are 4 (Siuslaw Estuary) to 4.5 mm (Shoemaker 1949).

Color: Transparent, with brown mottled markings, especially on large second antenna.

General Morphology: The body of amphipod crustaceans can be divided into three major regions. The **cephalon** (head) includes antennules, antennae, mandibles, maxillae and maxillipeds (collectively the **mouthparts**). Posterior to the cephalon is the **pereon** (thorax) with seven pairs of pereopods attached to pereonites followed by the **pleon** (abdomen) with six segments comprising three **pleonites** (together the pleosome), three **urosomites** (together the urosome), and finally a **telson** at the animal posterior (see Plate 254, Chapman 2007). In members of the genus *Americorophium*, the body is flattened dorso-ventrally and rarely exceeds 1 cm in total length (including antennae) in local specimens (see Fig 46, Kozloff 1993).

Cephalon:

Rostrum: Small central triangle is shorter than sharp ocular runes (Fig. 1).

Eyes:

Antenna 1: Reaches a little beyond fourth article of second antenna in males and the flagellum ranges from approximately 11 joints (Siuslaw Estuary specimens) to 9-14 (Coos Bay specimens, Fig. 1) (Shoemaker 1949). Antenna base is not expanded laterally. The female flagellum consists of 7–8 joints and is almost as long as second antenna (Shoemaker 1949) (Fig. 6).

Antenna 2: Male antenna large, almost as long as body and is with groups of setae. The fourth article is a large, distal tooth forming a half-moon with an accessory tooth within (Fig. 2). The fifth article has two small teeth: one distal and one proximal (Fig. 2). The second antenna in females is not as large as in males, and instead of a half-moon tooth and an accessory tooth, there are three pairs of equally spaced, heavy spines on the lower margin (Shoemaker 1949) (Fig. 5).

Mouthparts:

Pereon:

Coxae:

Gnathopod 1:

Gnathopod 2: Filtering type, with fine long setae, present in both sexes (Fig. 3).

Pereopods 3 through 7: Quite setose.

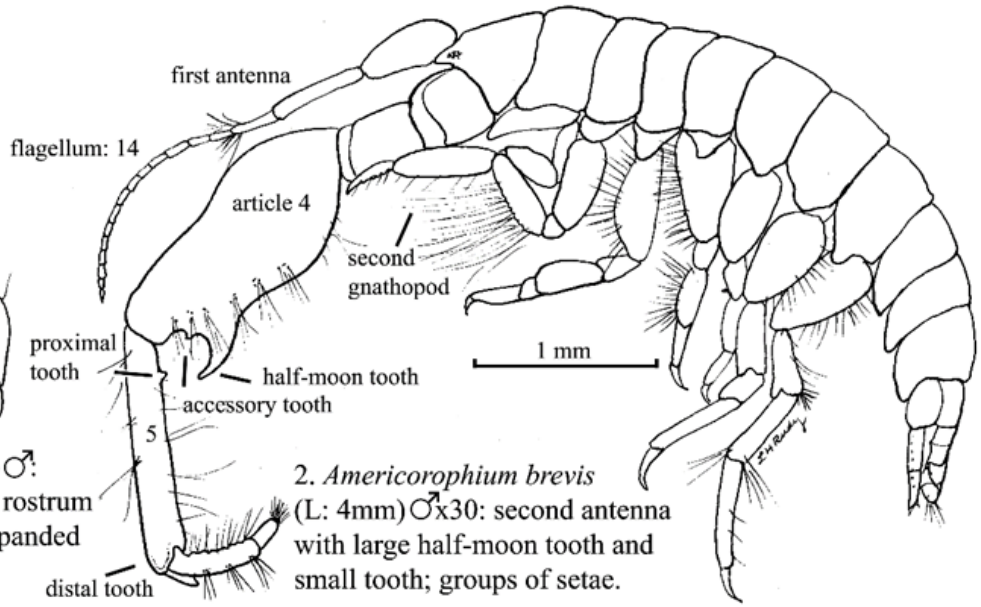
Pleon:

Pleonites:

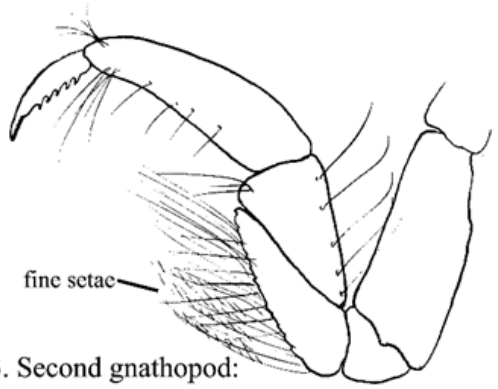
Urosomites: Three segments of urosome separate and distinguishable (Fig. 4) in both sexes. The lateral edge of peduncle with about eight short, blunt spines on first uropods (Fig. 4). Third uropods with few fine se-

Americorophium brevis

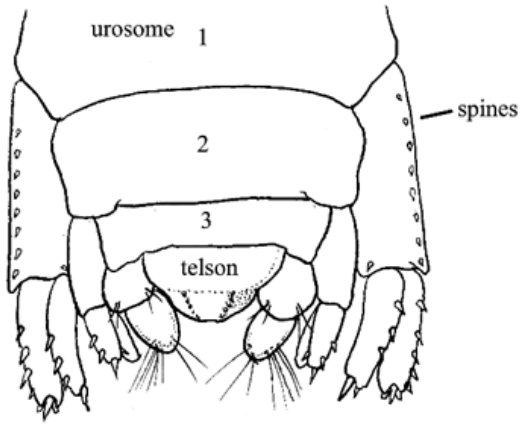
1. Head (dorsal view)♂: small, low, triangular rostrum antennal bases not expanded laterally.



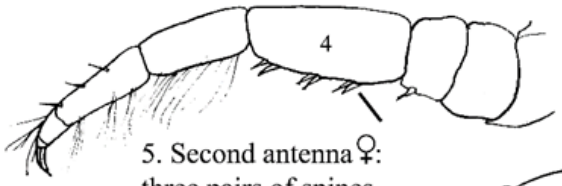
2. *Americorophium brevis* (L: 4mm)♂x30: second antenna with large half-moon tooth and small tooth; groups of setae.



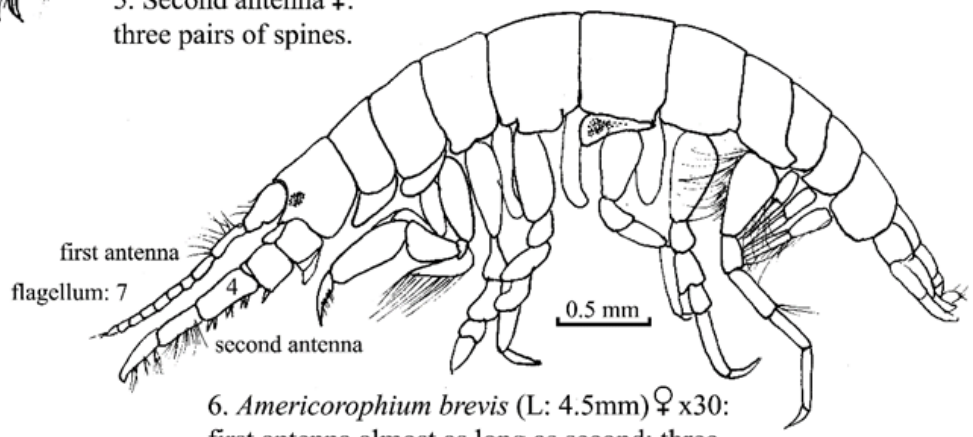
3. Second gnathopod: "filtering" type.



4. Urosome and telson♂: three distinct segments, telson convex, with rows of small spines; first uropods with eight small spines.



5. Second antenna♀: three pairs of spines.



6. *Americorophium brevis* (L: 4.5mm)♀ x30: first antenna almost as long as second; three pairs of spines on article four, below.

Hiebert, T.C. 2015. *Americorophium brevis. 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.

tae, on distal end only, in both sexes (Fig. 4).

Epimera:

Telson: Posterior rounded and convex with parallel rows of spines (Fig. 4).

Sexual Dimorphism: Males and females exhibit differing morphology in characters of Antenna 1 and 2 as well as overall body size.

Possible Misidentifications

The gammarid family Corophiidae is characterized by individuals that build U-shaped tubes in both soft sediments and on hard surfaces, sometimes forming dense aggregations. Species can be dramatically sexually dimorphic and, although males may be easier to identify with taxonomically relevant characters including the rostrum and peduncle of second antennae, most females can be reliably identified to species as well (Chapman 2007). Five corophiid genera occur locally, *Americorophium*, *Corophium*, *Crassicorophium*, *Laticorophium* and *Monocorophium*. The three common estuarine species in this guide (*A. brevis, A. salmonis, A. spinicorne*) were previously members of the genus *Corophium* (see Shoemaker 1949), but were transferred to the genus *Americorophium* in 1997 (Bousfield and Hoover 1997).

All *Americorophium* species have filtering-type second gnathopods and long setae on the third uropods. Of the four local *Americorophium* species, sexual dimorphism is strong in the three species *A. brevis*, *A. salmonis*, and *A. stimpsoni*. In particular, the second antenna and fourth segment differ between males and females (Shoemaker 1949). This is not the case, however, for the fourth *Americorophium* species, *A. spinicorne,* where male and female morphologies are similar. Additional characteristics that differ between species (particularly *A. brevis* and *A. salmonis*) include first antenna, telson, first uropods and third uropods.

Americorophium stimpsoni, principally a northern California species, does not seem to occur in Oregon. Its chief key characteristic is a prominent male rostrum, almost as long as the ocular lobes. The females are much like those of *A. salmonis*.

Americorophium spinicorne, another prominent northwest species, has less sexual dimorphism than other *Americorophium* species. Both males and females have a half-moon tooth on the fourth article of the second antenna, but without the small accessory tooth. *Americorophium spinicorne* is also strongly euryhaline and often found in fresh-water habitats. Segments of urosome are separate and not fused in *A. spinicorne* and males and females can be distinguished by the second antennal features and by the presence of lamellae and/or eggs in females.

Males: Of the *Americorophium* species in which males have urosome segments dissimilar to females, *A. stimpsoni*, *A. brevis*, and *A. salmonis* all have a half-moon and accessory tooth on the fourth article of the second antenna. *Americorophium brevis* and *A. salmonis* often have similar rostrums, but that of *A. stimpsoni* has a prominent central lobe nearly as long as the ocular lobes. In *A. salmonis* the first antenna reaches only to the middle of the fourth article. *Americorophium brevis* does not have the flat expanded first articles of the first antenna and *A. salmonis* usually has 14–16 articles in the flagellum, (though occasional specimens will have 11–12). In *A. brevis,* the males have about 11 articles in the flagellum of the first antenna. The uropods of *A. salmonis* and *A. brevis* are quite dissimilar. In *A. salmonis*, the peduncle of the first uropod is armed on the outside edge with three to six long, slender spines and at the distal edge with two to three short, blunt spines.

Americorophium brevis has instead only eight short, blunt spines. The third uropods of *A. salmonis* have many more and longer setae than those of *A. brevis*. The telson shape and spination of the two species are also quite different (compare Figs. 4, *A. brevis*, and Fig. 5, *A. salmonis*).

Females: *A. salmonis* and *A. stimpsoni* females are very much alike, with no strong distinguishing characteristics, so the species should not be differentiated solely by female specimens. The only *Americorophium* female of this group to have the half-moon hook is *A. spinicorne*, so this species is easily distinguished from others. *Americorophium brevis* has three pairs of spines, as well as a spine on the gland cone, instead of having two single spines on the underside of the fourth article of the second antenna. The first antenna has eight joints in the flagellum, while that of *A. salmonis* has ten.

Ecological Information

Range: Type locality is Puget Sound, Washington. Known range includes Alaska to San Francisco Bay (Shoemaker 1949; Coyle and Müller 1981).

Local Distribution: Coos Bay estuarine distribution including South Slough. Distribution also known in other Oregon estuaries (e.g. Siuslaw Estuary, Barnard 1954).

Habitat: Members of the Corophiidae inhabit small U-shaped tubes in soft sediments, or on hard surfaces (Chapman 2007). Occurs in muddy habitats (e.g. South Slough) and sometimes in a mud and wood chip mix. Especially abundant in brackish estuaries with a high degree of silt and mud (Raymond et al. 1985; Kozloff 1993). Comparisons of macrofaunal communities within and outside of *Dendraster excentricus* beds found *Americorophium* species to be more prevalent where sand dollars were not present (Smith 1981). Corophiid amphipods are frequently used in tests of sediment toxicity and/or water quality (e.g. fluoranthene, Swartz et al. 1990).

Salinity:

Temperature:

Tidal Level: A high intertidal species.

Associates: Known associates include tanaidaceans, small polychaetes and other Corophiidae.

Abundance: Populations are often very dense and easily observed or collected in the field. The abundance of *Americorophium* species measured in the Campbell River Estuary ranged from zero to ~15,000–31,000 per square meter in July (Raymond et al. 1985).

Life-History Information

Reproduction: Development in most amphipods is direct, lacking a larval stage, and little is known about the reproduction and development in *A. brevis.* Ovigerous *A. brevis* females have been observed in summer months whereas ovigerous *A. spinicorne* females have been observed in February, March, May and December (Eriksen 1968). In the European species, *Corophium volulator*, breeding occurs in February (overwintering population) and again in July–August. Young remain in brood pouch four weeks and females produce up to four broods per year (Green 1968).

Larva: Since most amphipods develop directly, they lack a definite larval stage. Instead the young developmental stage resembles small adults (e.g. Fig. 39.1, Wolff 2014).

Juvenile:

Longevity:

Growth Rate: Amphipod growth occurs in conjunction with molting where the exoskeleton is shed and replaced. Post-molt individuals will have soft shells as the cuticle gradually hardens (Ruppert et al. 2004).

Food: A detritovore, *Americorophium brevis* sorts material with filtering gnathopods. Ab-

dominal appendages create a water current that is filtered by the fine hairs on the gnathopods, and the filtrate is then scraped off and ingested (Miller 1984; Kozloff 1993).

Predators:

Behavior: Females often in tubes, while males are out on mud surface

Bibliography

1. BARNARD, J. L. 1954. Marine amphipoda of Oregon. Oregon State Monographs, Studies in Zoology. No. 8:1-103.
2. BOUSFIELD, E. L., and P. M. HOOVER. 1997. The amphipod superfamily Corophioidea on the Pacific coast of North America. Part 5. Family Corophiidae: Corophiinae, new subfamily. Systematics and distributional ecology. Amphipacifica. 2:67-139.
3. CHAPMAN, J. W. 2007. Amphipoda: Gammaridea, p. 545-611. *In:* The Light and Smith manual: intertidal invertebrates from central California to Oregon. J. T. Carlton (ed.). University of California Press, Berkeley, CA.
4. COYLE, K. O., and G. J. MUELLER. 1981. New records of Alaskan marine crustacea, with descriptions of two new gammaridean amphipoda. Sarsia. 66:7-18.
5. ERIKSEN, C. H. 1968. Aspects of the limno-ecology of *Corophium spinicorne* (Stimpson) (Amphipoda) and *Gnorimosphaeroma oregonensis* (Dana) (Isopoda). Crustaceana. 14:1-12.
6. GREEN, J. 1968. The Biology of estuarine animals. University of Washington Press, Seattle.
7. KOZLOFF, E. N. 1993. Seashore life of the northern Pacific coast: an illustrated guide to northern California, Oregon, Washington, and British Columbia. University of Washington Press, Seattle, WA.
8. LESTER, G. T., and W. H. CLARK. 2002. Occurrence of *Corophium spinicorne* (Stimpson, 1857) (Amphipoda: Corophiidae) in Idaho, USA. Western North American Naturalist. 62:230-233.
9. MILLER, D. C. 1984. Mechanical post-capture particle selection by suspension feeding and deposit feeding *Corophim*. Journal of Experimental Marine Biology and Ecology. 82:59-76.
10. RAYMOND, B. A., M. M. WAYNE, and J. A. MORRISON. 1985. Vegetation, invertebrate distribution, and fish utilization of the Campbell River Estuary, British Columbia, Canada. Canadian Manuscript Report of Fisheries and Aquatic Sciences:1-33.
11. RUPPERT, E.E., R.S. FOX, and R.D BARNES. 2004. Invertebrate Zoology: A Functional Evolutionary Approach, 7th Edition. Thomson Brooks/Cole, Belmont, CA.
12. SAKAMAKI, T., and J. S. RICHARDSON. 2009. Dietary responses of tidal flat macrobenthos to reduction of benthic microalgae: a test for potential use of allochthonous organic matter. Marine Ecology Progress Series. 386:107-113.
13. SHOEMAKER, C. R. 1949. The amphipod genus *Corophium* on the west coast of America. Journal of the Washington Academy of Sciences. 89:66-82.
14. SMITH, A. L. 1981. Comparison of macrofaunal invertebrates in sand dollar (*Dendraster excentricus*) beds and in adjacent areas free of sand dollars. Marine Biology. 65:191-198.
15. SWARTZ, R. C., D. W. SCHULTS, T. H. DEWITT, G. R. DITSWORTH, and J. O. LAMBERSON. 1990. Toxicity of fluoranthene in sediment to marine amphipods: a test of the equilibrium partitioning approach to sediment quality criteria. Environmental Toxicology and Chemistry. 9:1071-1080.
16. WOLFF, C. 2014. Amphipoda, p. 206-209. *In:* Atlas of crustacean larvae. J. H. Martin

J.W. Olesen, J.T. (ed.). Johns Hopkins University Press, Baltimore.

Updated 2015
T.C. Hiebert

Hiebert, T.C. 2015. *Americorophium brevis. 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.