Americorophium spinicorne

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Peracarida, Amphipoda, Senticaudata, Corophiida, Corophiidira

Family: Corophioidea, Corophiidae, Corophiinae, Corophiini

Taxonomy: *Corophium spinicorne* was among the first corophiid amphipods described in North America by Stimpson 1857. It 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. Lester and Clark 2002; Sakamaki and Richardson 2009), but we follow the nomenclature used in other current local intertidal guides (Chapman 2007).

Description

Size: Largest species of *Americorophium* on the west coast with females 8–10 mm, in length (South Slough of Coos Bay) and males 6 mm in length (Shoemaker 1949).

Color: Clear, with dark brown markings on antennae and thoracic segments.

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: Rounded in both sexes (Fig. 3b, 4), but male rostra are sometimes straight (Fig. 3a) (Shoemaker 1949).

Eyes:

Antenna 1: Reaching to the middle of the fifth segment of the second antenna. Flagellum with 11 (female) or 14–16 joints (male). Female may have one to three spines on the first and second peduncular joints (Fig. 5).

Antenna 2: Long as or longer than body in males. Fourth joint with large distal half-moon tooth and no small accessory tooth. Fifth joint with distal spine and proximal spine, which is well within tooth when joint is flexed (Fig. 1). Females have similar toothed fourth joint (Fig. 5), with spines also on the fifth joint. The fifth joint has a proximal spine that opposes the large half-moon tooth when the joint is flexed. Both sexes have prominent gland cones on the second article (Figs. 1, 5), but that of the female is acute and curves forward sharply (Fig. 5).

Mouthparts:

Pereon:

Coxae: Setose lamellae (pairs of brood plates attached to bases of coxae) (Fig. 6) are present in females only. Do not confuse with fleshy gills that are present on both sexes.

Gnathopod 1:

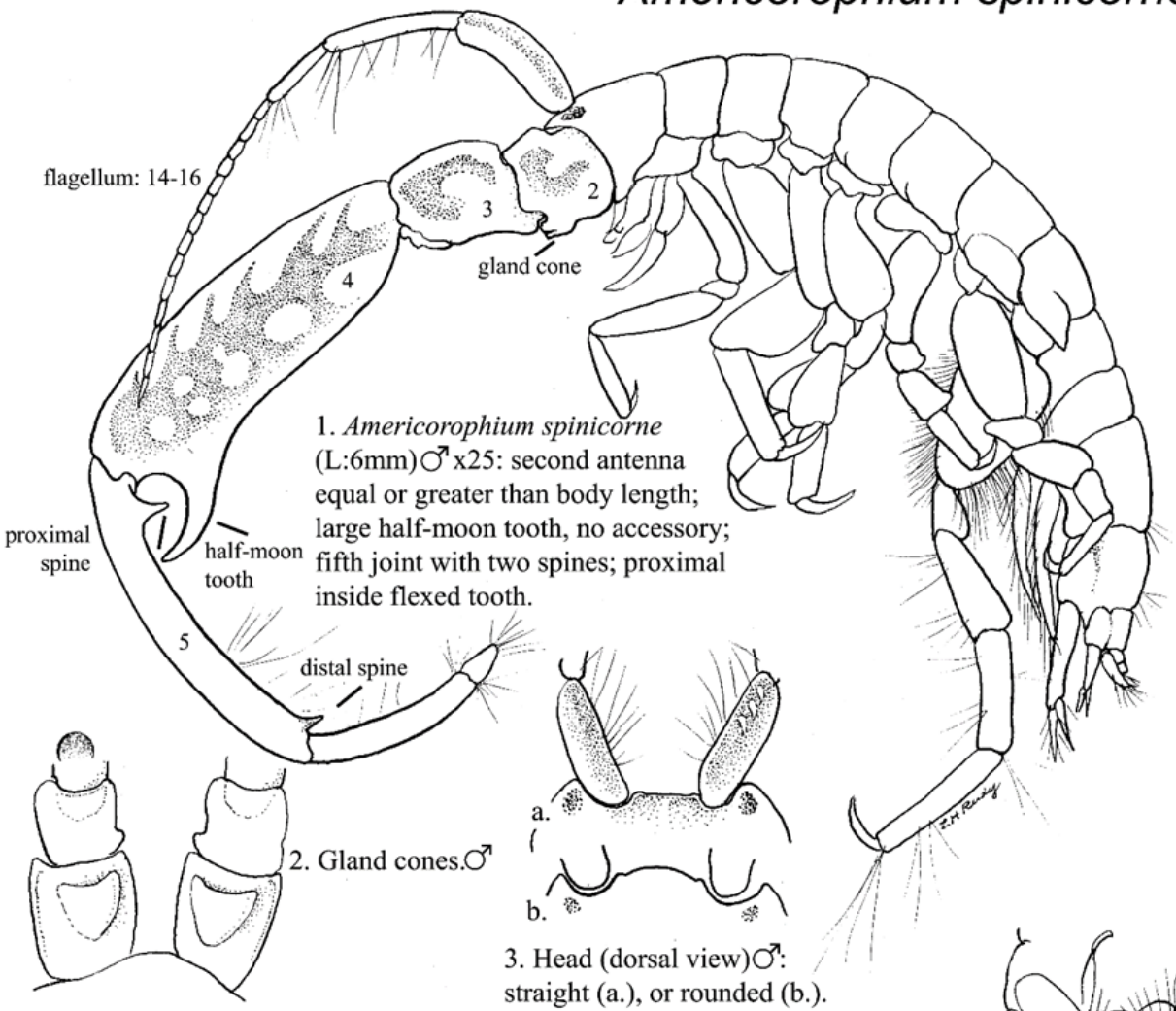
Gnathopod 2: Filtering type, with fine long setae, present in both sexes, morphology as in other *Americorophium* species.

Pereopods 3 through 7:

Pleon:

Pleonites:

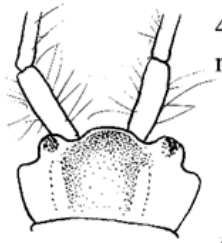
Americorophium spinicorne



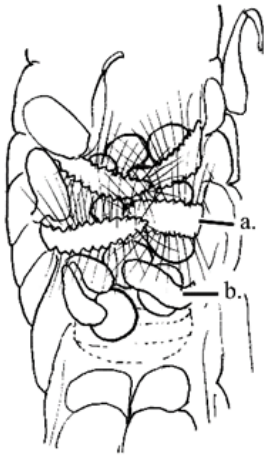
1. *Americorophium spinicorne* (L:6mm)♂x25: second antenna equal or greater than body length; large half-moon tooth, no accessory; fifth joint with two spines; proximal inside flexed tooth.

2. Gland cones.♂

3. Head (dorsal view)♂: straight (a.), or rounded (b.).



4. Head (dorsal view) ♀: rostrum rounded.



6. Broodplates ♀: pairs of setose lamellae (a.); gills (b.).

5. *Americorophium spinicorne* (L:8mm) ♀x20: second antenna like male's but small; fifth joint spine opposes flexed tooth; gland cone acute.

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Urosomites: Urosome and third uropod morphology as in other *Americorophium* species (see *A. brevis*, Figs. 3, 4).

Epimera:

Telson:

Sexual Dimorphism: Sexes share a more similar morphology, than other *Americorophium* species.

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 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 that 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 no fused in *A. spinicorne* and males and females can be distinguished by the second antennal features (see **Antenna 2**) 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* in this guide).

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 San Francisco, California (Bousfield and Hoover 1997). Known range includes estuaries and brackish waters from Santa Cruz, California to Alaska (Chapman 2007). Additionally, *A. spinicorne* has been reported from two locations along the Snake River in Idaho (Lester and Clark 2002).

Local Distribution: Oregon estuaries and lakes including South Slough of Coos Bay, Tillamook Bay and Floras Lake.

Habitat: Members of the Corophiidae inhabit small U-shaped tubes in soft sediments, or on hard surfaces (Chapman 2007). Muddy substrates as well as sandy beaches (Barnard 1954), gravel and clay (Aldrich 1961). Individuals occur in areas of heavy silting (Kozloff 1993), but prefers sand (Eriksen 1968). 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: Brackish to freshwater where salinities range from 0.02–33.6 (Eriksen 1968).

Temperature: 10–22.8°C (Eriksen 1968).

Tidal Level:

Associates:

Abundance: Populations often very dense and easily observed or collected in the field. The abundance of *Americorophium* species was measured in the Campbell River Estuary and ranged from zero to ~15,000–31,000 per square meter in July (Raymond et al. 1985). Abundances in excess of 100 individuals per square meter have also been documented (Eriksen 1968). *Americorophium spinicorne* is the dominant invertebrate in the river bottom of the San Joaquin river estuary (Aldrich 1961).

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. spinicorne.* Ovigerous females have been observed in February, March, May and December (Eriksen 1968). In the European species, *Corophium volulator*, breeding occurs in February (over-wintering 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 individual will have soft shells as the cuticle gradually hardens (Ruppert et al. 2004).

Food: A detritovore, ingesting particulate organic matter (Sakamaki and Richardson 2009), *A. spinicorne* sorts material with filtering gnathopods. Abdominal 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: The tidewater goby, *Eucyclogius newberryi* (Swenson and McCray 1996), young Chinook salmon (Forsberg et al. 1977; Busby and Barnhart 1995) and white sturgeon (*Acipenser transmontanus*, McCabe et al. 1993) all feed on *A. spinicorne*. Avery and Hawkinson (1992) also found that grey whale populations exhibited greater feeding activity in areas with high density of corophid tube mats and dominated by the species *A. spinicorne,* in northern California.

Behavior:

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