Traskorchestia traskiana

A beach hopper

Phylum: Arthropoda, Crustacea

Class: Multicrustacea, Malacostraca, Eumalacostraca

Order: Peracarida, Amphipoda, Senticaudata, Talitrida, Talitridira

Family: Talitroidea, Talitridae

Taxonomy: The genus *Traskorchestia* was designated in 1982 by Bousfield based on taxonomic characters and individuals collected from field expeditions in 1955 from Alaska to Baja, California (for characters see Figs. 1–3, 5, Bousfield 1982). Many *Traskorchestia* species, including *T. traskiana* (e.g. *O. traskiana*) were previously members of *Orchestia* (Bousfield 1982; Bousfield 2007).

Description

Size: The illustrated individual (from South Slough of Coos Bay) is 20 mm in length. Individuals can be 13 mm or a little more (Barnard 1975).

Color: Pale brown, orange antennae. Overall body color dull green or gray-brown with slightly blue legs (see Plate 19, Kozloff 1993) (Ricketts and Calvin 1971).

General Morphology: The body of amphipod crustaceans can be divided into three major regions. The **cephalon** (head) or cephalothorax 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 pairs of pleopods. The first three sets of pleopods are generally used for swimming, while the last three are simpler and surround the telson at the animal posterior. Talitrid amphipods are in the suborder Gammaridea, one of the largest groups of amphipods in marine and estuarine habitats. They have smooth bodies that are only slightly compressed, are commonly called beach hoppers and can be highly abundant on coastal beaches, particularly at night (Bousfield 2007). *Traskorchestia* species are characterized by smooth unmodified bodies, lateral eyes and their small to medium size (for key see Bousfield 1982).

Cephalon:

Rostrum: Rostrum simple (Fig. 1).

Eyes: Eyes large and oval in shape (Fig. 1).

Antenna 1: Very short, consisting of five articles (Fig. 1) (Stebbing 1906).

Antenna 2: Short, peduncle not thickened, flagellum with 16 articles (16 in males, 12 in females) (Stebbing 1906). Both first and second antennae are less massive than the beach hoppers found on the more open coast (e.g. *M. pugettensis* Ricketts and Calvin 1971).

Mouthparts: Mandible without palp (Fig. 2) (Talitridae) and maxilliped with four articles, although the fourth is not well developed (Fig. 4) (Barnard 1954).

Pereon:

Coxae: The plate of coxa one is about half as long as coxa two (Fig. 1).

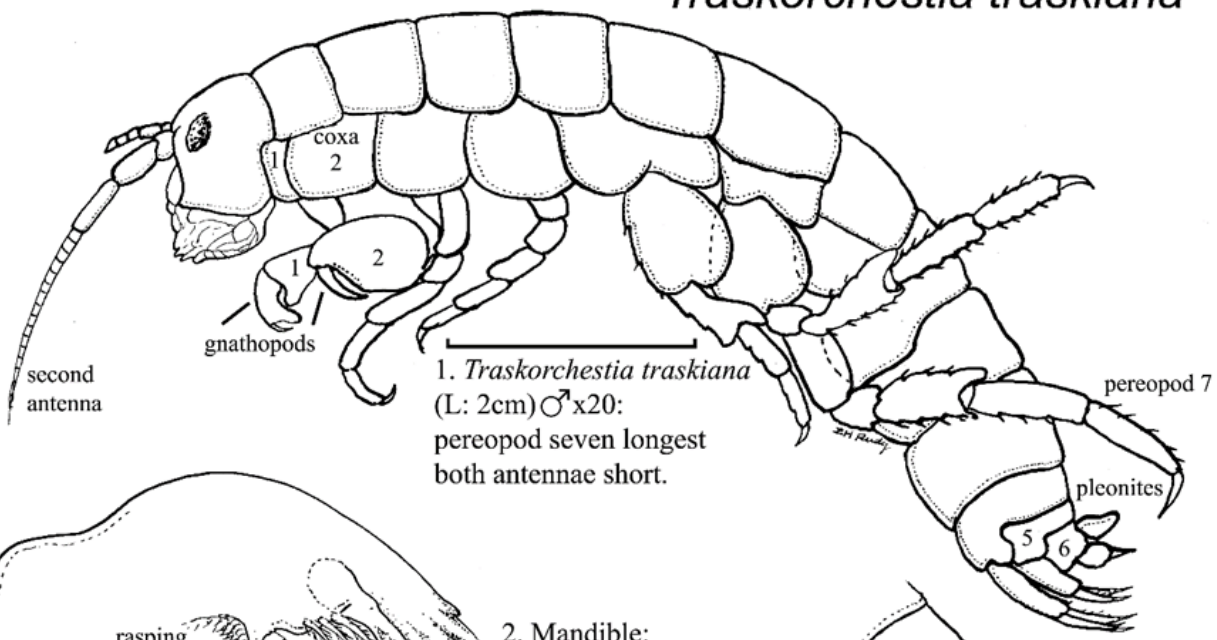
Gnathopod 1: Dactyl of gnathopod one is slender and subchelate, especially in mature males, although not as simple as in *Megalorchestia* (see *M. pugettensis*). Translucent process on article four (Fig. 5).

Gnathopod 2: Smooth convex palm with no spine at hinge of articles six and seven (Fig. 6).

Pereopods 3 through 7: Pereopod seven longer than six (Barnard 1975).

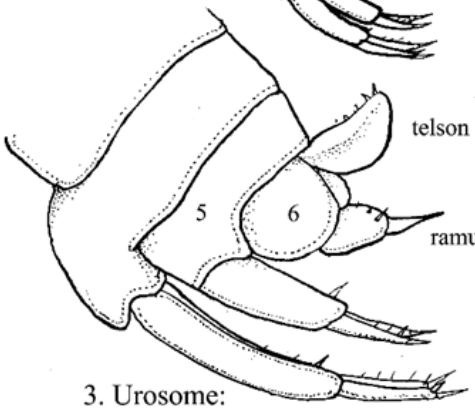
Pleon: Pleopods strong, biramous with the first three about equal in size and branches with 7–10 segments (not figured) (Barnard

Traskorchestia traskiana

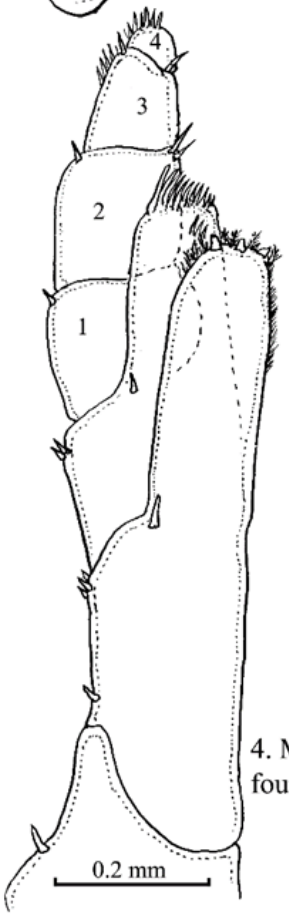


1. *Traskorchestia traskiana* (L: 2cm) ♂x20: pereopod seven longest both antennae short.

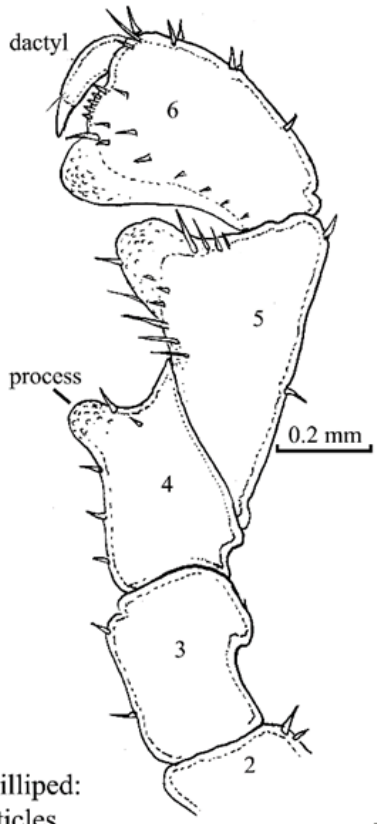
2. Mandible: no palp.



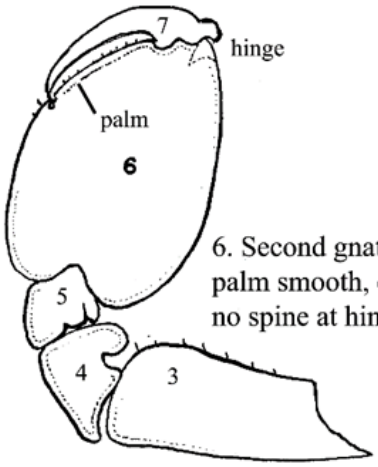
3. Urosome: Telson: several spines, puffy; third uropod:ramus narrowing, shorter than peduncle.



4. Maxilliped: four articles.



5. First gnathopod ♂: subchelate, dactyl slender; process on fourth segment.



6. Second gnathopod ♂: palm smooth, convex; no spine at hinge.

Hiebert, T.C. 2015. *Traskorchestia traskiana. 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.

1975).

Pleonites: Pleonites five and six not fused (Fig. 1) (Barnard 1975).

Urosomites: The third uropod is uniramous (Talitridae, Barnard 1954) with ramus shorter than peduncle and narrowing distally (Barnard 1975) (Fig. 3).

Epimera:

Telson: Telson puffy, split (not visible in lateral view) and with several spines (Fig. 3) (Barnard 1975).

Sexual Dimorphism: Males generally larger than females and with larger **gnathopods**. Populations in Washington state were dominated by females (63% compared to 37% male, Koch 1990).

Possible Misidentifications

The Talitridae are a family of gammarid amphipods called beach hoppers and are ubiquitous in damp sands, where they live within clumps of seaweed. They survive well in air. Talitridae are characterized by a single branched third uropod (Figs. 1, 4 *Megalorchestia pugettensis*) and a mandible without a palp (Fig. 2). Nine local talitrid species are currently reported (Bousfield 2007) including six *Megalorchestia*, two *Traskorchestia* and one *Transorchestia* species. Some authors differentiate *Megalorchestia* species as sand hoppers (intertidal on sandy beaches), while *Traskorchestia* species as beach fleas (intertidal in coastal leaf-litter) (Bousfield 1982; Pelletier et al. 2011).

The genus *Megalorchestia* are found on exposed beaches and are usually larger than *Traskorchestia*. Species in the latter genus have subchelate first gnathopods, not simple ones, and slender first gnathopod dactyls, not heavy ones. The seventh pereopods are also longer than the sixth, while the reverse is true in *Megalorchestia.* The third uropods narrows and branches in *Traskorchestia*, but is not broad.

Traskorchestia species are larger than *Megalorchestia* and found on exposed beaches. *Traskorchestia georgiana* is up to 13.5 mm in length and is found with *T. traskiana* in the drift line on rocky beaches and amongst seagrass and algal debris. *Traskorchestia georgiana* has weak pleopods with 4–6 segments on the rami and its first gnathopod lacks the process on the fourth article (male) that is found on *T. traskiana* (Bousfield 1982).

Transorchestia enigmatica is another local talitrid amphipod species that is up to 15 mm in length. It was introduced in solid ballast from the southern hemisphere and is now found in Lake Merritt near San Francisco Bay, California (Bousfield and Carlton 1967). It is a member of the *T. chiliensis* species group, an introduced species found under debris on sandy beaches. *Transorchestia chiliensis* has a long, inflated second antenna and the second gnathopod has a sinuous dactyl and a triangular tooth near the hinge.

Ecological Information

Range: Type locality is in California (Bousfield 1982). Known range includes Aleutian Islands in Alaska to Washington state and south to Magdalena Bay, Baja California (Barnard 1954; Koch 1989b).

Local Distribution: Locally present at several locations in Coos Bay, at North Bay and Cape Arago (Barnard 1954).

Habitat: Rocky and/or sandy beaches with algae, salt marshes (under debris and boards) (Barnard 1975). Also occurs under driftwood on high protected beaches and inner *Salicornia* marshes (e.g. Metcalf Preserve) (Kozloff 1993). Beach fleas (*Traskorchestia* species) are differentiated from sand hoppers (*Megalorchestia* species) in that the former group tend not to modify their habitat substrate (Bousfield 1982).

Salinity: Euryhaline. Salinity tolerance ranges from brackish slough (Ricketts and Calvin 1971) to high beaches of salty bays (Kozloff

1993) and the outer coast (Barnard 1954). The majority of individuals tested (95%) survived for 24 hours in salinities ranging from 2.5 to 50 (Koch 1991).

Temperature: Up to 30–38˚C (Morritt and Spicer 1998).

Tidal Level: Usually along the wrack line, but also found more than 20 meters above tidewater (Ricketts and Calvin 1971). A supralittoral species that can withstand desiccation of up to 25% of body water loss (Morritt and Spicer 1998), although desiccation resistance decreases in smaller individuals (Koch 1989b). Individuals prefer not to be inundated with water and will migrate upshore with an incoming tide (Koch 1989a).

Associates: In Metcalf Preserve, associates include other amphipods, sphaeromid isopods and the gastropod, *Ovatella*. Talitrid amphipods are known to host rhabditid nematodes under their dorsal pereonites (e.g. *Megalorchestia californiana* and *M. corniculata,* Rigby 1996) as well as within the intersegmental spaces in *T. traskiana* (Adamson and Rigby 1996). Talitrid amphipods also host and transport mites of Uropodina, Dermanyssina and Acaridida (Pugh et al. 1997) and an additional 12 mite species in the genus *Traskorchestianoetus* were reported from *Traskorchestia traskiana* in Vancouver Island, Canada (Fain and Colloff 1990). Black gill syndrome (BGS) is found in many decapod crustaceans and has been reported for *Traskorchestia traskiana*. It can be caused by a variety of things including bacterial, fungal or protozoan infections. BGS causes darkening and, ultimately, loss of gills which results in a reduction of oxygen uptake (Spicer 2013). Spicer (2013) found that the osmoregulatory ability of high-shore individuals was most negatively affected by BGS, suggesting this syndrome could reduce the number of *T. traskiana* in upper intertidal and brackish waters (Spicer 2013).

Abundance: Often observed by the hundreds under debris. Individuals can reach densities of 55 individuals per gram of dry wrack (Koch 1989b).

Life-History Information

Reproduction: Most amphipods have separate sexes with some sex determination correlated with environmental conditions (Straude 1987). Females brood embryos in an external thoracic brood chamber and irrigate embryos with a flow of water produced by pleopod movement. Development within this brood chamber is direct and individuals hatch as juveniles that resemble small adults, with no larval stage. Little is known about the reproduction and development in *T. traskiana*, but some ovigerous females were observed in March in Coos Bay and reported during spring and summer in northern populations, where females produce two broods per year (e.g. Alaska, Koch 1990). Breeding occurred in February in Washington state and continued through spring (see Fig. 1, Koch 1990) and brood sizes ranged between six and 16 individuals per brood (Koch 1990).

Larva: Since most amphipods are direct developing, they lack a definite larval stage. Instead, this young developmental stage resembles small adults (e.g. Fig. 39.1, Wolff 2014).

Juvenile: Sexual dimorphism develops once individuals are longer than 6 mm (Koch 1990).

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. During a molt, arthrorpods have the ability to regenerate limbs that were previously autotomized (Kuris et al. 2007). Growth in T. traskiana proceeds as one podomere (leg bearing segment) per molt for up to 13 and 16 podomeres in females and males, respectively. Growth of antennal segments is positively correlated with overall body size (Page 1979).

Food: Scavenges in debris for detritus and tends to prefer aged and decomposing seaweeds in the wrack line (e.g. *Salicornia*, Page 1997) to fresh algae (Pennings et al. 2000).

Predators: Talitrid amphipods are prey for a variety of intertidal and terrestrial predators and it is suggested that they represent a trophic link between the detritus of beach wrack and terrestrial ecosystems (via fish predation Koch 1989a; Morritt and Spicer 1998; Fox et al. 2014). Other predators include shorebirds (e.g. seagulls, Koch 1989a) and other birds (e.g. Varied Thrushes, *Ixoreus naevius,* Egger 1979) and the nemertean, *Pantinonemertes californiensis* (Roe 1993).

Behavior: Many talitrid amphipods, including *T. traskiana*, are probably completely nocturnal (Koch 1989b). *Traskorchestia traskiana* tend to migrate vertically along beaches, but rarely move laterally (Koch 1989a) and seek out beach wrack with olfactory cues (Pelletier et al. 2011).

Bibliography

1. ADAMSON, M. L., and M. RIGBY. 1996. Rhabditis (Crustorhabditis) stasileonovi (Belogurov) from beach hoppers (Talitridae; Amphipoda) from the Pacific Coast of North America. Fundamental and Applied Nematology. 19:579-584.
2. BARNARD, J. L. 1954. Marine amphipoda of Oregon. Oregon State College, Corvallis, OR.
3. —. 1975. Phylum Anthropoda: Crustacea, Amphipoda: Gammaridea, p. 313-366. *In:* Light's manual: intertidal invertebrates of the central California coast. S. F. Light, R. I. Smith, and J. T. Carlton (eds.). University of California Press, Berkeley.
4. BOUSFIELD, E. L. 1982. The amphipod superfamily Talitoroidea in the northeastern Pacific region 1. Famile Tallitridae systematics and distributional ecology. National Museum of Natural Sciences (Ottawa) Publications in Biological Oceanography:I-VIII, 1-73.
5. —. 2007. Talitridae, p. 611-618. *In:* The Light and Smith manual: intertidal invertebrates from central California to Oregon. J. T. Carlton (ed.). University of California Press, Berkeley, CA.
6. BOUSFIELD, E. L., and J. T. CARLTON. 1967. New records of Talitridae (Crustacea: Amphipoda) from the central Californian coast. Bulletin of the Southern California Academy of Science. 66:277-284.
7. EGGER, M. 1979. Varied thrushes feeding on Talitrid amphipods. Auk. 96:805-806.
8. FAIN, A., and M. J. COLLOFF. 1990. A new genus and two new species of mites (Acari: Histiostomatidae) phoretic on *Traskorchestia traskiana* (Stimpson, 1857) (Crustacea: Amphipoda) from Canada. Journal of Natural History. 24:667-672.
9. FOX, C. H., R. EL-SABAAWI, P. C. PAQUET, and T. E. REIMCHEN. 2014. Pacific herring *Clupea pallasii* and wrack macrophytes subsidize semi-terrestrial detritivores. Marine Ecology Progress Series. 495:49-64.
10. KOCH, H. 1989a. Desiccation resistance of the supralittoral amphipod *Traskorchestia traskiana* (Stimpson, 1857). Crustaceana. 56:162-175.
11. —. 1989b. The effect of tidal inundation on the activity and behavior of the supralittoral talitrid amphipod *Traskorchestia traskiana* (Stimpson, 1857). Crustaceana. 57:295-303.
12. —. 1990. Aspects of the populations biology of *Traskorchestia traskiana* (Stimpson, 1857) (Amiphoda: Talitridae) in the Pacific Northwest, USA. Crustaceana. 59:35-52.
13. —. 1991. Salinity tolerance and osmoregulation of *Traskorchestia traskiana* (Stimpson, 1857) (Amphipoda: Talitridae).

Crustaceana. 61:21-37.
14. 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.
15. KURIS, A. M., P. S. SADEGHIAN, J. T. CARLTON, and E. CAMPOS. 2007. Decapoda, p. 632-656. *In:* The Light and Smith manual: intertidal invertebrates from central California to Oregon. J. T. Carlton (ed.). University of California Press, Berkeley, CA.
16. MORRITT, D., and J. I. SPICER. 1998. The physiological ecology of talitrid amphipods: an update. Canadian Journal of Zoology. 76:1965-1982.
17. PAGE, H. M. 1979. Relationship between growth, size, molting, and number of antennal segments in *Orchestia traskiana* (Stimpson) (Amphipoda: Talitridae). Crustaceana. 37:247-252.
18. —. 1997. Importance of vascular plant and algal production to macroinvertebrate consumers in a southern California salt marsh. Estuarine Coastal and Shelf Science. 45:823-834.
19. PELLETIER, A. J. D., D. E. JELINSKI, M. TREPLIN, and M. ZIMMER. 2011. Colonisation of beach-cast macrophyte wrack patches by talitrid amphipods: a primer. Estuaries and Coasts. 34:863-871.
20. PENNINGS, S. C., T. H. CAREFOOT, M. ZIMMER, J. P. DANKO, and A. ZIEGLER. 2000. Feeding preferences of supralittoral isopods and amphipods. Canadian Journal of Zoology. 78:1918-1929.
21. PUGH, P. J. A., P. J. LLEWELLYN, K. ROBINSON, and S. E. SHACKLEY. 1997. The associations of phoretic mites (Acarina: Chelicerata) with sand-hoppers (Amphipoda: Crustacea) on the South Wales coast. Journal of Zoology. 243:305-318.
22. RICKETTS, E. F., and J. CALVIN. 1971. Between Pacific tides. Stanford University Press, Stanford, California.
23. RIGBY, M. C. 1996. The epibionts of beach hoppers (Crustacea: Talitridae) of the North American Pacific coast. Journal of Natural History. 30:1329-1336.
24. ROE, P. 1993. Aspects of the biology of *Pantinonemertes californiensis*, a high intertidal nemertean. Hydrobiologia. 266:29-44.
25. SPICER, J. I. 2013. Physiological changes accompanying the presence of black gill syndrome in the high shore amphipod *Traskorchestia traskiana*. Journal of Experimental Marine Biology and Ecology. 446:131-138.
26. STEBBING, T. R. R. 1906. Amphipoda: Gammaridea. Das Tierreich. 21:1-806.
27. STRAUDE, C. P. 1987. Phylum or subphylum Crustacea, class Malacostraca, order Amphipoda, p. 424-431. *In:* Reproduction and development of marine invertebrates of the northern Pacific coast. M. F. Strathmann (ed.). University of Washington Press, Seattle, WA.
28. WOLFF, C. 2014. Amphipoda, p. 206-209. *In:* Atlas of crustacean larvae. M. J.W., J. Olesen, and J. T. Høeg (eds.). Johns Hopkins University Press, Baltimore.

Updated 2015

T.C. Hiebert

Hiebert, T.C. 2015. *Traskorchestia traskiana. 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.