Amphipoda of the Northeast Pacific (Equator to Aleutians, intertidal to abyss): II. Talitroidea - a review.

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Preface

The purpose of this review is to bring together information on all of the species reported to occur in the NEP fauna. It is not a straight path to the identification of your unknown animal. It is a resource guide to assist you in making the required identification in full knowledge of what the possibilities are. Never forget that there are other, as yet unreported species from the coverage area; some described, some new to science. The natural world is wonderfully diverse, and we have just scratched its surface.

Introduction to the Talitroidea

Four families are now considered to be members of this superfamily under the Serejo classification (Serejo 2004), three of which occur in the NEP. Her key should allow separation of the families, although status of some has been altered by Lowry & Myers (2013).Their more recent analysis resubmerges the phliantoids back into the talitroids, and returns groups treated as subfamilies by Serejo to full family status, yielding 9 families within the Superfamily, seven present in the NEP. The dogielinotids, eophliantids, hyalellids, hyalids, najnids, phliantids and talitrids all have at least one representive in the NEP. They are primarily shallow in distribution, with the family Talitridae strictly above the water line in the inter- and supra-tidal zones.

The remaining families range a bit deeper, but nearly all reported species occur too shallowly for most monitoring programs. In regional samplings of estuaries and bays these species should feature more prominently. The vast majority of NEP talitroid species are distributed to the north in the boreal fauna, as is apparent from the zoogeographic summary presented after each taxon in the list below.

Whether talitroids are primitive or advanced remains an issue in debate. The classification of the senticaudates suggests that talitroids are one of the more primitive groups (Lowry & Myers 2013). There is, however, no doubt that terrestrial forms, as many talitroids are, are derived from earlier aquatic ancestors, and then migrated into terrestrial habitats from both the sea and freshwaters (Little 1990)

Diagnosis of the Talitroidea

"*Apomorphic mostly smooth-bodied, arostrate, benthonic marine, freshwater and terrestrial gammarideans, lacking a pelagic terminal male stage, calceoli, or brush setae on antennae; antenna 1 usually shorter than 2, accessory flagellum totally lacking; peduncle of 2 occasionally elongate (Talitridae); eyes various, usually rounded, subrectangular, lateral, occasionally large (Talitridae): mouthparts modified; upper lip rounded below; lower lips tall, lacking inner lobes; mandible usually with strong molar and incisor, palp lacking; maxilla 1, inner plate slender with 2 (usually) apical setae, outer plate with 9 (typically) apical spine teeth; maxilla 2 distally setose; maxilliped plates well developed, palp 4th segment occasionally reduced or lacking; coxal plates medium deep, 4th strongly excavate, 2 and 3 often with posterior marginal process; coxae 5-7 posteriorly lobate; gnathopods 1 and 2 typically strongly amplexing, variously dissimilar, subchelate, chelate, or simple; peraeopods 5-7 homopodous, secondarily*

heteropodous in some Talitridae; brood plates basically broad, linear or lacking (in some Talitridae), marginal setae with hooked tips; coxal gills simple, occasionally lobate, lacking on peraeopod 7; sternal gills present in some Hyalellidae; pleopods normal, modified (Phliantidae, Eophliantidae), reduced or vestigial (especially Talitridae); urosome segments 2 and 3 very short, telescoping dorsally; uropods linear, tips spinose, rami of 1 and 2 sub-equal; uropod 3 small, uniramous (or with minute inner ramus), 1-segmented; telson lobes separated to base or variously fused, apices spinose." (Bousfield 1978)

Ecological Commentary

The vast majority of the ecological information available on the superfamily concerns the talitrids, including beach-hoppers and leaf-hoppers restricted to more terrestrial habitats. Some of this material is broadly characteristic of other aquatic members of the group, but some is associated with living at least partly out of water. Some specialized members of the talitrids occur only above extreme high water of spring tides, and occupy the "driftwood ecological niche (Wildish 1982, Wildish et al 2012).

The emergence of aquatic organisms into terrestrial habitats was reviewed by Little (1990), who devoted some consideration to the impacts of osmoregulatory demands on animal physiology. Animals coming from fresh water tend to have few changes in physiological demand other than dealing with desiccation stress. Those coming from marine habitats are faced with a need to actively osmoregulate to adjust to the salinity of what moisture they are exposed to. Under strand line litter the atmosphere may be fully marine, while exposure to rain, fog or dew present a hyposaline environment. Spicer et al (1987) explore water handling issues at some length, providing data and a division of the talitrids into four classes based on their ecophysiology first proposed by Bousfield (1984). Morritt & Spicer (1998) also discuss the ecophysiology of talitrids.

Orchestoidea female excavating a burrow (from Crustáceos Peracáridos Chilenos)

Many talitroids, particularly the larger beach-hoppers, construct extensive burrows in the upper beach (Reid 1938). During the day, when sun exposure leads to desiccation, they remain within the burrow, which typically reaches to the permanently damp water-table of the beach. Williams (1983) demonstrated that for *Talitrus saltator* burrow depth was maintained so as to achieve a moisture content of between 2 and 4% in the internal air. Such burrows are often plugged during much of the day, leaving the internal air saturated with moisture (Bowers 1964). Gills are able to exchange gases in both aquatic and aerobic settings, but have an optimum efficiency point at a given relative humidity (Spicer & McMahon 1994). Other talitrids (the non-substrate modifiers of MacIntyre 1963) do not burrow, living on the sediment surface. Other groups, such as the Hyalidae do not burrow, and occur in situations where they remain moist during tidal emersion (under rocks or amongst dense algae). Eophliantids typically are burrowers into kelps (Lörz et al 2007), and are usually found only below low water level in the shallow sublittoral. Dogielinotids, as exemplified by *Proboscinotus*, burrow very shallowly on exposed sandy beaches, and spend much of their time swimming; riding the wave swash up and down the beach to seek optimal conditions by altering their position. Others, like *Allorchestes*, are probably less mobile and more associated with algal substrates than other members of the family. I do not believe they burrow, although some may excavate in plant tissues as do eophliantids (Hendrycks & Bousfield 2001). Hyalellidae also appear not to burrow, being characterized as epigean in freshwater (Lowry & Myers 2013). Najnidae apparently are burrowers in algal tissues like Eophliantidae, or among the root masses of eel-grass (Bousfield & Marcoux 2004). Phliantidae are non-burrowers, living among haptera in kelp holdfasts, among turfs and under rocks (J. L. Barnard 1969a).

Locomotion is strongest among the Talitridae, where night-time excursions involve upright walking (Bowers 1964), and escape response is by hopping (Wildish 1988). This latter method is very effective, as anyone who has tried to catch even one of the hundreds of hopping beach-hoppers exposed by turning over debris on the strand-line can attest. Such locomotion is, however, far from random. It is strongly organized with reference to both circadian and tidal rhythms, guaranteeing that maximum activity occurs just after high tide in several beach-hopper species (Wildish 1970). Not all talitrids restrict their excursions to periods of low or no light. *Talorchestia* brito (now *Britorchestia*), for instance, is diurnally active, and is conspicuously active when other species are in their burrows (Vader 1970). Movements of other families in the superfamily differ, but nearly all are less frequent and intense than seen in talitrids. Eophliantids probably only move to the extent necessary to enlarge their burrow in the tissues of a macroalga. Phliantids move slowly among the invertebrate and algal turfs they inhabit, looking for all the world like armored vehicles in low gear. Most of the group is not well adapted for swimming, the dogielinotid *Proboscinotus* being the exception (J. L. Barnard 1967a). Bousfield & Hendrycks (2002) also point out that some hyalids are morphologically specialized for swimming by the possession of so called hydrodynamic shelves.

Two *Megalorchestia californiana* males in a territorial dispute at a burrow opening (photo: the Iyengar Lab, Dept. of Biology, Villanova University)

Some of the larger talitroids are both gregarious (living in colonies within physiologically favorable beach zones) and territorial. Males of *Megalorchestia californiana* engage in agonistic encounters over possession of burrows (Bowers 1964). These are head-to-head grapplings with the enlarged antennae. Often such encounters are unavoidable given the density (hundreds of burrows/m2) produced by some species) of habitation on narrower beaches. Similar encounters may occur in leaf-hoppers, but are as yet unreported in the literature. Bouslama et al (2007) report an average sex ratio of 0.85 for *Talitrus saltator*, guaranteeing that females are nearly always more common than males in the population. This must be reassuring for a male sitting in his burrow and waiting for a mate to arrive. Reproduction was continual in this species through much of the year, producing 8-9 new cohorts per season. Life-span was estimated at 6-9 months with females producing multiple broods. In *Megalorchestia corniculata* in California Bowers (1964) reported that males and females pair (presumably locating one another with the aid of pheromones and sensory hairs – Dahl 1973), the female molts, and the male carries her until fertilization. For the talitrid *Orchestia gammarella* this order differs, with males ignoring females until after they molt, when those which are fertile become attractive, again presumably through pheromones (Williamson Members of both the Talitridae and the Hyalellidae are mate-carriers according to Conlan (1991). She separates them into semi-terrestrial and aquatic groups, among which the Hyalidae are also listed as mate-carriers, as are *Allorchestes* in the Dogielinotidae. It is doubtful that either the eophliantids or the phliantids could engage in mate guarding or carrying because of their morphology.

Structure of the prehensile dactyl of P6 in *Hyachela*, adapted for grasping and holding on to the tough slippery lining of the mouth in *Chelonia mydas* (from J. L. Barnard 1967b)

Associations with other organisms are usually through parasitism or predation. There is, however, a single talitroid which has established a seemingly obligatory commensal relationship with another organism; the sea turtle *Chelonia mydas* (J. L. Barnard 1967b). The adaptations of this amphipod are for position keeping on the host, that position being on the gums and around the base of the tongue within the oral cavity. Examination of collected specimens suggest it feeds on the host food, and not on the host itself, and so is a commensal rather than an ectoparasite.

Talitroids are afflicted with several different parasites. The most prominent of which are small ectoparasitic mites invariably found on large intertidal talitroids (Scurlock 1975). They also fall prey to nematode internal parasites (Poinar 2002) as do many other arthropods.

Seabird tracks and probe marks created by search for beach-hoppers
(photo: Clement Philippe © Arterra Picture library)

Predators of talitroids are many, but the most frequent and effective are birds. Bowers (1964) provides a list of bird species who have been observed to actively predate talitrids in their sand burrows on California beaches. He also mentions observations of raccoons feeding on them, as well as attacks by the predatory staphylinid beetles with which they share the upper beach. Other arthropods also will feed on injured talitroids, including isopods (Bowers 1964) and even the talitroids themselves (Dorsman 1955).

The fact that surf-fishermen have learned to use them as bait argues for some consumption of beach-hoppers by surf-zone fishes such as croaker. In freshwater habitats hyalellids have sticklebacks as a major predator (Wellborn 1995),

Information on the feeding of talitroids is sparse, although most seem strongly associated with vegetative material. Morton & Richardson (1984) experimented with food preferences for two Tasmanian species and reported that they preferred the decomposed leaves of several specific plants, As one of these was a Eucalyptus, a genus well known for the pungent aromatics it invests it's tissues with, the preference for decayed over fresh leaves seems quite reasonable. Their tests also revealed that sterilizing the leaves (and thus removing associated bacterial growth) did not reduce their attractiveness to the amphipods. Beach-hoppers in California typically seek out and consume drift kelp debris, usually that buried in sand and decaying. Whether this makes the tissues easier to consume is likely, but unproven. They will also scavenge decaying animal remains, and lifting the carcass of a dead bird on a strand line generally releases hordes of madly leaping beach-hoppers. Given their association with tidal strand lines, it is likely than most of the local species are opportunistic omnivores, utilizing whatever food comes their way. Bowers (1964) characterizes them as macrophagous omnivores, stipulating that very small individuals use micro food sources. Leaf hoppers in fresh-water areas have also been observed feeding on earthworms (Dorsman 1955)

Humans serve as vectors for a number of different talitroids, particularly the leaf hoppers found under plant debris in vegetated areas. These species are often transported as unwonted and probably unwilling passengers with ornamental plants. Consequently greenhouses are often their point of penetration of new territory (Stephensen 1924, Shoemaker 1936, Vader 1972). Under appropriately moist conditions (particularly after rains) they become very active and have been reported to swarm into new feeding areas.

NEP Talitroidea based on McLaughlin et al. (2005). Valid taxa **bolded**, synonyms not.
*= Taxa on SCAMIT Ed. 9 List (Cadien & Lovell 2014).

Family Dogielinotidae

Allorchestes angusta Dana 1856 – Aleutians to Baja California: 0-3m

Allorchestes bellabella Barnard 1974 – Kamchatka to Oregon: 1.2-12m

Allorchestes carinata Iwasa 1939 – Sea of Japan to Northern British Columbia: 0.5-4m

Allorchestes priceae Hendrycks & Bousfield 2001 – SE Alaska to S. British Columbia: 0-6m

Allorchestes rickeri Hendrycks & Bousfield 2001 – N. British Columbia to Monterey, California: 0-2m

Dogielinotus loquax J. L. Barnard 1967 (see Proboscinotus loquax)

Parhyalella barnardi Lazo-Wazem & Gable 2001 – Ensenada, Baja California: 0m

Proboscinotus loquax (J. L. Barnard 1967a) – Alaska to N. California: 0-1m

Family Eophliantidae

Lignophliantis pyrifera J. L. Barnard 1969a – SCB, associated with kelp: 0-3m

Family Hyalellidae

Amphitoe aztecus Saussure 1858 (see Hyalella azteca)

Hyalella azteca (Saussure 1858) – NEP in fresh and brackish-waters of estuaries and stream-mouths, Alaska to Mexico: 0-2m

Family Hyalidae

Subfamily Hyachelinae

Hyachelia tortugae J. L. Barnard 1967b – Southeast Atlantic, Senegal, Galapagos, commensal in the oral cavity of sea-turtles: 0m

Subfamily Hyalinae

Allorchestes anceps J. L. Barnard 1969 (see Apohyale anceps)

Allorchestes frequens Stout 1913 (see Protohyale frequens)

Allorchestes hawaiensis Dana 1853 (see Parhyale hawaiensis)

Allorchestes ochotensis Brandt 1861 (see Parallorchestes ochotensis)

Allorchestes plumulosa Stimpson 1857 (see Ptilohyale plumulosa)

Allorchestes pugettensis Dana 1853 (see Apohyale pugettensis)

Apohyale anceps (J. L. Barnard 1969) – Aleutians to Monterey: 0-2m

Apohyale californica (J. L. Barnard 1969) – SE Alaska to Kino Bay, Gulf of California, Mexico: 0m

Apohyale humboldti (J. L. Barnard 1979) – Galapagos Ids.: 0m

Apohyale pugettensis (Dana 1853) – Washington to N. Baja California: 0m

Hyale californica J. L. Barnard 1969 (see Apohyale californica)

Hyale canalina J. L. Barnard 1979 (see Protohyale canalina)

Hyale darwini J. L. Barnard 1979 (see Protohyale darwini)

Hyale guasave J. L. Barnard 1979 (see Protohyale guasave)

Hyale humboldti J. L. Barnard 1979 (see Apohyale humboldti)

Hyale yaqui J. L. Barnard 1979 (see Protohyale yaqui)

Hyale zuaque J. L. Barnard 1979 (see Ptilohyale zuaque)

Parallorchestes alaskensis Bousfield & Hendrycks 2002 – Aleutians: 0m

Parallorchestes americana Bousfield 1981 – SE Alaska to Monterey: 0-2m

Parallorchestes carinata Bousfield & Hendrycks 2002 – Aleutians: 0m

Parallorchestes cowani Bousfield & Hendrycks 2002 – SE Alaska to Laguna Beach, CA: 0m

Parallorchestes kabatai Bousfield & Hendrycks 2002 – Aleutians to Vancouver Island: 0m

Parallorchestes leblondei Bousfield & Hendrycks 2002 – Vancouver Island to Oregon: 0m

Parallorchestes minima Bousfield & Hendrycks 2002 – Vancouver Island: 0m

Parallorchestes nuda Bousfield & Hendrycks 2002 – Vancouver Island: 0m

Parallorchestes ochotensis (Brandt 1851) – Sea of Okhotsk to Aleutians: 0m

Parallorchestes subcarinata Bousfield & Hendrycks 2002 – Aleutians to SE Alaska: 0m

Parallorchestes trispinosa Bousfield & Hendrycks 2002 – Vancouver Island: 0m

Parhyale fascigera Stebbing 1897 – Tropical West Atlantic; NEP from Central West Mexico to Peru: 0m

Parhyale hawaiensis (Dana 1853) – Seychelles, Indian Ocean; SW Pacific, Marshall Ids.; Hawaii; NEP, outer coast of Baja California to Ecuador: 0m

Parhyale penicillata Shoemaker 1956 – Gulf of California, Mexico: 0-1m

Protohyale (Boreohyale) hiwatarii Bousfield & Hendrycks 2002 – SE Alaska to Puget Sound: 0m

Protohyale (Boreohyale) jarrettae Bousfield & Hendrycks 2002 – SE Alaska to Oregon: 0m

Protohyale (Boreohyale) lamberti Bousfield & Hendrycks 2002 – SE Alaska to Central California: 0m

Protohyale (Boreohyale) neorionensis Bousfield & Hendrycks 2002 – Vancouver Island: 0m

Protohyale (Boreohyale) oclairi Bousfield & Hendrycks 2002 – SE Alaska to Oregon: 0m

Protohyale (Boreohyale) oculata Bousfield & Hendrycks 2002 – British Columbia to N. Washington: 0m

Protohyale (Boreohyale) seticornis Bousfield & Hendrycks 2002 – SE Alaska to Central California: 0-4m

Protohyale (Leptohyale) longipalpa Bousfield & Hendrycks 2002 – SE Alaska to Oregon: 0-3m

Protohyale (Protohyale) canalina (J. L. Barnard 1979) – Catalina Island to Cedros Island, N. Baja California: 0-5m

Protohyale (Protohyale) darwini (J. L. Barnard 1979) – Panama to Galapagos Ids.: 0-6m

Protohyale (Protohyale) frequens (Stout 1913) – Pt. Conception to San Diego: 0-7m

Protohyale (Protohyale) guasave (J. L. Barnard 1979) – Cabo San Lucas to the Galapagos Islands: 0-6m

Protohyale (Protohyale) mohri Bousfield & Hendrycks 2002 – Laguna Beach: 0m

Protohyale (Protohyale) yaqui (J. L. Barnard 1979) – Bahia San Quintin, N Baja California throughout Gulf of California: 0-7m

Protohyale (Protohyale) zuaque (J. L. Barnard 1979): Gulf of California, Mexico to Galapagos: 0m

Ptilohyale plumulosa (Stimpson 1857) – Southeastern Alaska to Bahia Tortugas, outer coast of Baja California, Mexico: 0-2m

Family Najnidae

Carinonajna barnardi Bousfield & Marcoux 2004 – SE Alaska to Oregon: 0-15m

Carinonajna bicarinata Bousfield & Marcoux 2004 – N. British Columbia to N. California: 0-10m

Carinonajna bispinosa Bousfield & Marcoux 2004 – N. British Columbia to Central Oregon: 0-15m

Carinonajna botanica Bousfield & Marcoux 2004 – SE Alaska to British Columbia: 0-10m

Carinonajna carli Bousfield & Marcoux 2004 – SE Alaska to S. Oregon: 0-20m

***Carinonajna kitamati** (J. L. Barnard 1979) – Central and S. California: 0-16.5m

Carinonajna lessoniophila Bousfield & Marcoux 2004 – S. Oregon to Central California: 0-5m

Carinonajna longimana Bousfield & Marcoux 2004 – Vancouver Island and Puget Sound: 0m
Carinonajna oculata Bousfield & Marcoux 2004 – Vancouver Island: 0-15m
Najna amchitkana Bousfield & Marcoux 2004 – Aleutians: 0m
Najna consiliorum (of J. L. Barnard 1962c see Carinonajna kitamati)
Najna kitamati J. L. Barnard 1979 (see Carinonajna kitamati)
Najna parva Bousfield & Marcoux 2004 – Aleutians to N. British Columbia: 0-5m

Family Phliantidae

Heterophlias seclusus escabrosa J. L. Barnard 1962 (see Pariphinotus escabrosus)
Heterophlias galapagoanus J. L. Barnard 1979 (see Pariphinotus galapagoanus)
*__Pariphinotus escabrosus__ (J. L. Barnard 1962) – SCB to the Gulf of California, 0-16m, in invert turfs
Pariphinotus galapagoanus (J. L. Barnard 1979) – Galapagos, 0m

Family Talitridae

Chelorchestia costaricana (Stebbing 1906): Costa Rica to Galapagos: 0m
Megalorchestia benedicti (Shoemaker 1930) – Eureka to Central Baja California: 0m
Megalorchestia californiana Brandt 1851 – Vancouver Id. to Pt. Conception: 0m
Megalorchestia columbiana (Bousfield 1958) - SE Alaska to Monterey: 0m
Megalorchestia corniculata (Stout 1913) - Tomales Bay to Central Baja: 0m
Megalorchestia dexterae Bousfield 1982 – Bahia San Juanico, Baja California: 0m
Megalorchestia minor (Bousfield 1957) - San Luis Obispo to Ensenada: 0m
Megalorchestia pugettensis (Dana, 1853) – SE Alaska to Monterey: 0m
Orchestia costaricana Stebbing 1906 (see Chelorchestia costaricana)
Orchestia enigmatica Bousfield & Carlton 1967 (see Transorchestia enigmatica)
Orchestia georgiana Bousfield 1958 (see Traskorchestia georgiana)
Orchestia ochotensis Brandt 1851 (see Traskorchestia ochotensis)
Orchestia marquesana Stephensen 1935 – Central West Mexico, Clipperton Id.: supralittoral
Orchestia pugettensis Dana 1853 (see Megalorchestia pugettensis)
Orchestia traskiana Stimpson 1857 (see Traskorchestia traskiana)
Orchestoidea benedicti Shoemaker 1930 (see Megalorchesia benedicti)
Orchestoidea biolleyi Stebbing 1908 (see Pseudorchestoidea biolleyi)
Orchestoidea columbiana Bousfield 1958 (see Megalorchestia columbiana)
Orchestoidea corniculata Stout 1913 (see Megalorchestia corniculata)
Orchestoidea gracilis Bousfield and Klawe 1963 (see Pseudorchestoidea gracilis)
Orchestoidea meridionalis Schuster 1954 (see Pseudorchestoidea meridionalis)
Orchestoidea minor Bousfield 1957 (see Megalorchestia minor)
Paciforchestia klawei (Bousfield 1959) – British Columbia to N. Baja CA: 0m
Parorchestia klawei Bousfield 1959 (see Paciforchestia klawei)
Platorchestia chathamensis Bousfield 1982 – Victoria, British Columbia: 0m
Pseudorchestoidea biolleyi (Stebbing 1908) – Costa Rica to Panama; supratidal
Pseudorchestoidea gracilis (Bousfield and Klawe 1963) – Outer coast of Baja California to Gulf of California: 0m

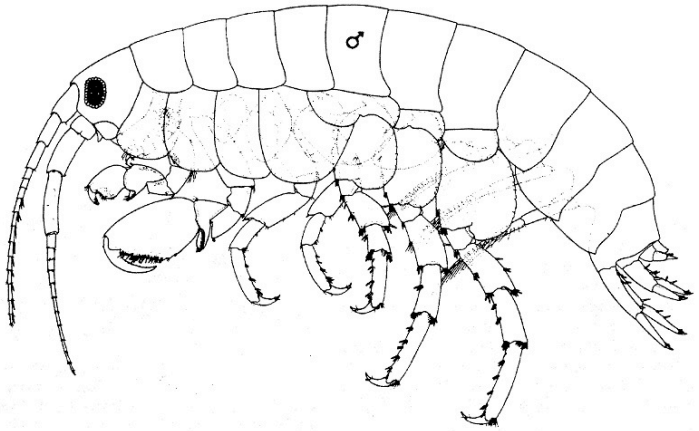
Pseudorchestoidea meridionalis (Schuster 1954) – El Salvador: 0m
Pseudorchestoidea mexicana Bousfield 1982 – Gulf of California to Central West Mexico: 0m
Talorchestia fritzi Stebbing 1903 – Costa Rica to Galapagos Ids.: supralittoral
Transorchestia enigmatica (Bousfield & Carlton 1967) – Lake Merritt, San Francisco Bay; probably introduced from southern hemisphere: 0m
Traskorchestia georgiana (Bousfield 1958) – British Columbia to Northern Baja California, Mexico: 0m
Traskorchestia ochotensis (Brandt 1851) - Japan to Prince William Sound: 0m
Traskorchestia traskiana (Stimpson 1857) – Aleutians to Northern Baja California, Mexico: 0m

Comments by Family

Family Dogielinotidae – The family contains nine genera, of which 3 have NEP representatives. The cladistic analysis of Serejo places *Proboscinotus* , *Allorchestes* and *Parhyalella* in this family. These genera were recently revised in the NEP by Hendrycks & Bousfield (2001). The Ed. 9 SCAMIT list has only *Parhyalella* sp. The only *Parhyalella* known from the NEP is *P. barnardi* Lazo-Wasem & Gabel 2001. It was described from Ensenada, but may range into southern California. A second species *P. pietschmanni* Schellenberg 1938 is reported from Hawaii, but is not suspected to occur in the NEP. Two *Allorchestes* are now reported from the SCB in the SCAMIT Ed. 9 list, but *Proboscinotus* has not been found to range into southern California waters. Hendrycks & Bousfield (2001) provide a key to the hyalellid genera, but all these other than Hyalella itself are currently placed in Dogielinotidae (Lowry & Myers 2013). There is no comprehensive key to the genera included in this family currently available, but the keys of Hendrycks & Bousfield (2001)to "hyalellids" and J. L. Barnard and Karaman (1991) to Dogielinotidae together cover nearly all the currently included dogielinotid genera as well as Hyalella.

Diagnosis: "*All pereonal and pleonal segments free, never grossly distorted or enlarged, unornamented, cuticle smooth; rostrum distinct but small; antennae stout, peduncles short, heavily spinose or rugose; accessory flagellum absent; eyes present; epistome proboscoid; upper lip rounded below; mandible lacking paIp, bearing strongly triturate molar, well toothed incisor and lacinia mobilis; lower lip lacking inner lobes; inner plate of maxilla 1 short, bearing a few setae, outer plate with long pectinate spines, palp minute, 1-articulate; maxillipedal palp 4 or ?3-articulate, terminal article clavate, lacking nail, maxillipedal plates well developed but outer smaller than inner; coxa plates all of normally large size, first never reduced, fourth excavate posteriorly and with posterodistal quadrate lobe; gnathopods present, subchelate, 7 -articulate, gnathopod 2 larger than 1 in male and of distinct shape, subequal to gnathopod 1 in female and scarcely different in structure; pereopods 3-5 increasing in length consecutively, strongly spinose and setose; peduncles of uropods 1-2 strongly setose, rami sabrelike; uropod 3 reduced in size, composed only of peduncle or of peduncle and one ramus; telson broader than long, slightly cleft; gills simple sacs on gnathopod 2 and pereopods 1-4,*

accessory lobes absent; four pairs of brood lamellae large, subtriangular, margins lined with short, curl-tipped setae." (from J. L. Barnard 1967a)



Allorchestes angusta (from Hendrycks & Bousfield 2001)

Allorchestes – Ten species are recognized in the genus, most from the North Pacific, either west or east. Several species of *Allorchestes* are known from local waters. These are shallow water animals most frequently taken in association with algae in shallow embayments. *Allorchestes angusta* and *A. rickeri* are indicated as occurring in our area, and are included in the SCAMIT Ed 9 listing (Cadien & Lovell 2014). See the discussions and keys for separation of the species in Hendrycks & Bousfield (2001). The discussion of the genus in Barnard (1979) should also be consulted. If further information is desired consult Barnard (1974) where the genus was revised, and several species previously considered members were removed.

Diagnosis: "*Body small to medium large, smooth or weakly carinate posterodorsally. Eyes medium, rounded. Antennae generally short, antenna 2 slightly the longer, peduncle (male) stouter than in female; gland cone small.*

Mandible, left lacinia 5-6 dentate; both molar setae present. Maxilla 1, palp minute l-segmented. Maxilliped palp, dactyl unguiform, without whip seta.

Coxae 1-4, posterior marginal cusp or process (acclivity of J. L. Barnard 1979) weak or lacking; coxa 4 large, broadly subquadrate. Gnathopods strongly sexually dimorphic. Gnathopod 1, carpus and propod usually hammer-shaped; dactyl often modified for preamplexus with female. Gnathopod 2 (male) large, carpal lobe large, inner margin with comb setae.

Peraeopods 3-7 regular, slender, weakly spinose; posterior margin of basis lacking "surge seta" and pit; marginal spines simple or striate, locking spines absent; dactyls short, unarmed.

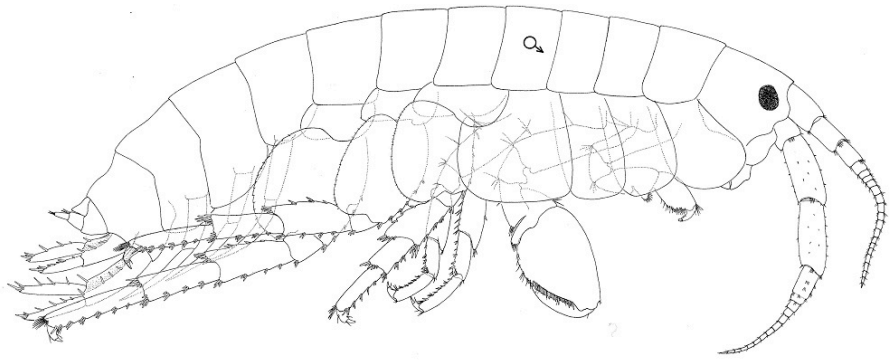
Epimeral plate 2 deepest; pleopods with 2-3 peduncular retinacula. Uropod l, peduncule often lacking distal outer marginal spines; outer ramus usually lacking marginal spines. Uropod 2, outer ramus the shorter. Uropod 3 uniramous, ramus short, apex with setae and spine(s).

Telson plate-like, apically notched, lobes separated distally but not diverging.

Coxal gills sac-like, subequal. Sternal gills lacking.

Female: Precopulatory notch of peraeon segment 2 large, variable, often complex; locking slit also present in more advanced species. Brood plates narrowly

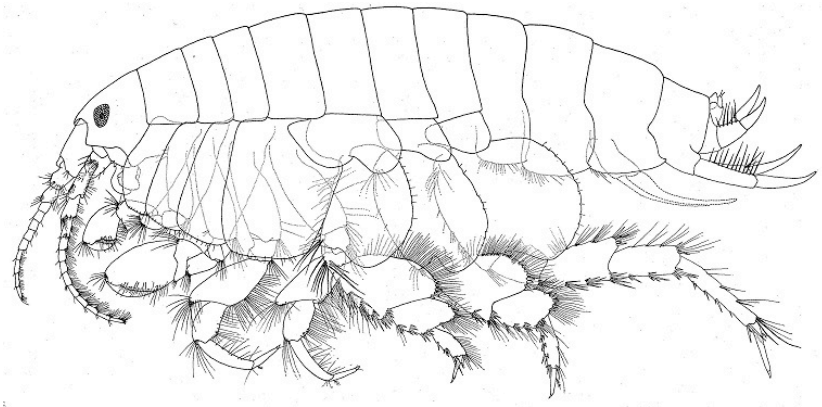
spade-shaped to subrectangular, marginal setae short." (from Hendrycks & Bousfield 2001)



Parhyalella kunkeli (from Lazo-Wasem & Gable 2001)

Parhyalella – The genus, containing a dozen species, was reviewed by Lazo-Wasem & Gable (2001), who described the only local member, *Parhyalella barnardi*. While this species was based on material collected near Ensenada, it has not yet been recognized within the SCB. The genus is represented on the SCAMIT Ed 9 list (Cadien & Lovell 2014),but only as a generic level identification. A key to the genus is provided by Lazo-Wasem & Gable (2001).

Diagnosis: "*Male antenna 2 inflated, much larger than antenna 1, first article of flagellum conjointed. Female antenna 2, flagellum with aesthetascs. Right mandible molar with plumose accessory seta. Maxilla 1 lacking a palp, with distinct shelf on outer margin of outer lobe, distal margin of outer lobe bearing nine teeth. Maxilliped palp 4-articulate, article 4 unguiform, lacking whip-like seta. Male gnathopod 1 much smaller than gnathopod 2, palm of article 6 varying from transverse to oblique; gnathopod 2, article 6 broad, palm moderately oblique. Female gnathopod 1, palm of article 6 transverse; gnathopod 2 much larger than gnathopod 1, palm moderately oblique, of distinctly different morphology than gnathopod 1. Female gnathopod 2 of similar morphology to that of male, but smaller. Uropods 1 and 2 (both sexes), outer rami spinose along margin. Telson entire*." (from Lazo-Wasem & Gable 2001)



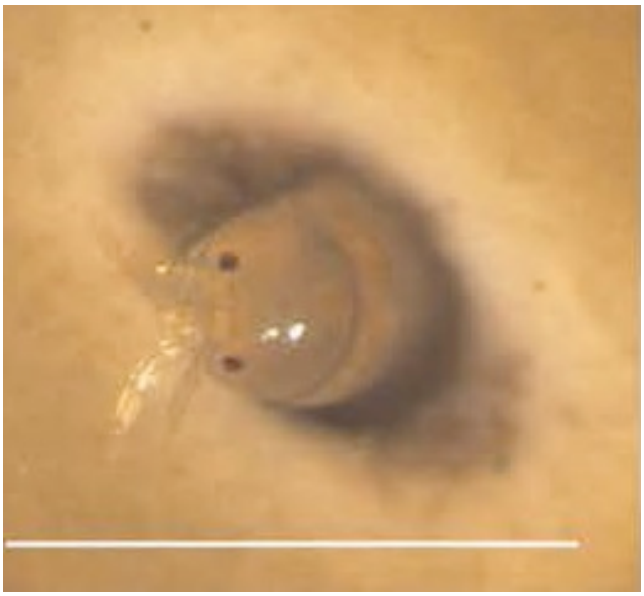
Proboscinotus loquax (from J. L. Barnard 1967a)

Proboscinotus – Created by Bousfield & Tzvetkova (1982) to house *Dogielinotus loquax*, a NEP regional endemic. This remains the only species in the genus. It is an

intertidal/shallow sublittoral sand diver and swash rider from sandy beaches. I have collected it at the type locality at Clam Beach just north of Eureka, California. It was present in considerable numbers swimming in the wave swash across the beach, and was taken by the simple expedient of sticking a small aquarium net across the swash. We neither sample the habitat in any of our programs, nor expect to see the animal this far south. It has not yet been reported from within the Southern California Bight. The original description by Barnard (1967) illustrates the animal well. It was also discussed and illustrated by Bousfield & Tzvetkova (1982), while transferring it to the new genus *Proboscinotus*.

Diagnosis: "*Epistome proboscoid; dactyl of maxilliped multisetose; articles 4-5 of pereopods 3-4 multisetose, article 4 with weak blunt anterodistal lobe; article 5 of pereopod 6 expanded; articles 4-5 of pereopods 6-7 multisetose; epimera 1-2 with weak tooth, epimeron 3 with medium tooth; uropod 3 with ramus*." (from J. L. Barnard & Karaman 1991)

Family Eophliantidae – The family contains six genera, only one of which is represented in the NEP fauna. It is described by Lowry & Myers (2013) as being widespread in both hemispheres, but most of the genera are primarily austral. In their examination of the family Lörz et al (2009) felt *Lignophliantis* did not belong in the family because of a number of unique characteristics which other family members lacked. This removal is pending a cladistic reexamination for confirmation, and the genus currently remains here. These are gribble like animals, and most are known to form galleries or burrows in kelp tissue. A key to both the genera and species in the family is provided by Lörz et al (2009).



Bircinna macayai at the mouth of its kelp burrow. Scale is 1mm. (from Lörz et al 2009)

Description: "***Head*** *free, not coalesced with peraeonite 1; exposed; as long as deep, or longer than deep; rostrum present or absent, short; eyes present, well developed or obsolescent; not coalesced; 1 pair; not bulging.* ***Body cylindrical****; cuticle smooth.*

Antenn*a 1 subequal to antenna 2, or longer than antenna 2; peduncle with sparse robust and slender setae; 3-articulate; peduncular article 1 shorter than article 2, or subequal to article 2; article 2 subequal to article 3, or longer than article 3; peduncular articles 1-2 not geniculate;* ***accessory flagellum absent****; antenna 1 callynophore present, or absent. Antenna 2 present; short; articles not folded in zigzag fashion; without hook-like process; flagellum shorter than peduncle; 5 or more articulate, or less than 5-articulate; not clavate; calceoli absent.*

Mouthparts well developed. ***Mandible incisor smooth****; lacinia mobilis present on left side only; accessory setal row without distal tuft; molar present or absent, medium, non-triturative; palp present or absent. Maxilla 1 present; inner plate present, weakly setose apically; palp present or absent, not clavate, 0 -articulate or 1 -articulate. Maxilla 2 inner plate present; outer plate present. Maxilliped inner and outer plates well developed or reduced, palps present, well developed or reduced; inner plates well developed, separate; outer plates present, large; palp 4-articulate, article 3 without rugosities. Labium smooth.*

Peraeon*. Peraeonites 1-7 separate; complete; sternal gills absent; pleurae absent.*

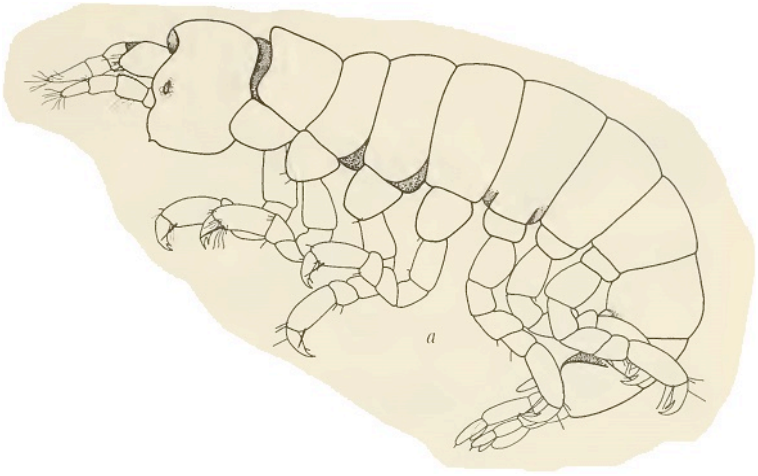
Coxae 1-7 well developed, none fused with peraeonites. Coxae 1-4 broader than long, overlapping or discontiguous, coxae not acuminate. Coxae 1-3 not successively smaller, none vestigial. Coxae 2-4 none immensely broadened.

Gnathopod 1 not sexually dimorphic; subequal to gnathopod 2; subequal to coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; subequal to propodus, or longer than propodus; gnathopod 1 not produced along posterior margin of propodus; dactylus large. Gnathopod 2 not sexually dimorphic; subchelate, or parachelate; coxa subequal to but not hidden by coxa 3; ischium elongate; merus not fused along posterior margin of carpus or produced away from it; carpus/propodus not cantilevered, carpus short, subequal to propodus or longer than propodus, not produced along posterior margin of propodus.

Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly), none prehensile. Peraeopod 3 well developed. Peraeopod 4 well developed. 3-4 not glandular; 3-7 without hooded dactyli, 3-7 propodi without distal spurs. Coxa well developed or vestigial, as long as broad or broader than long; carpus shorter than propodus, not produced; dactylus well developed. Coxa subequal to coxa 3, not acuminate, without posteroventral lobe; carpus not produced. Peraeopods 5-7 with few robust or slender setae; dactyli without slender or robust setae. Peraeopod 5 well developed; shorter than peraeopod 6; coxa larger than coxa 4, without posterior lobe; basis expanded, subrectangular or subovate, with posteroventral lobe or without posteroventral lobe; merus/carpus free; carpus expanded, or weakly expanded; setae absent. Peraeopod 6 subequal in length to peraeopod 7; merus/carpus free; dactylus without setae. Peraeopod 7 with 6-7 well developed articles; longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded, without dense slender setae; dactylus without setae.

Pleon*. Pleonites 1-3 without transverse dorsal serrations, without dorsal carina; without slender or robust dorsal setae. Epimera 1-3 present. Epimeron 1 well developed. Epimeron 2 without setae.*

Urosome not dorsoventrally flattened; urosomites 1 to 3 free, or 1 free, 2 and 3 coalesced; urosomite 1 longer than urosomite 2, or much longer than urosomite 2; urosome urosomites not carinate; urosomites 1-2 without transverse dorsal serrations. Uropods 1-2 apices of rami without robust setae. Uropods 1-3 similar in structure and size. Uropod 1 peduncle without long plumose setae, without basofacial robust seta, without ventromedial spur. Uropod 2 well developed; without ventromedial spur, without dorsal flange; inner ramus longer than outer ramus. Uropod 3 not sexually dimorphic; peduncle short. ***Telson weakly thickened dorsoventrally****; deeply cleft, or entire; apical robust setae absent.*" (Lowry and Springthorpe 2001).



Lignophliantis pyrifera (from J. L. Barnard 1969a)

Lignophliantis – Our local eophliantid is *Lignophliantis pyrifera* J. L. Barnard 1969a. This tiny beast was taken by Barnard from giant kelp holdfasts, thus the name *pyrifera*. Guts were filled with woody material which seemed to come from the haptera of the kelp. The holotype is only 1.4mm long, and of indeterminate sex. The animal probably attains a greater size, but I know of no additional material outside the type lot. See the original description in J. L. Barnard 1969a for illustration and details of the animal.

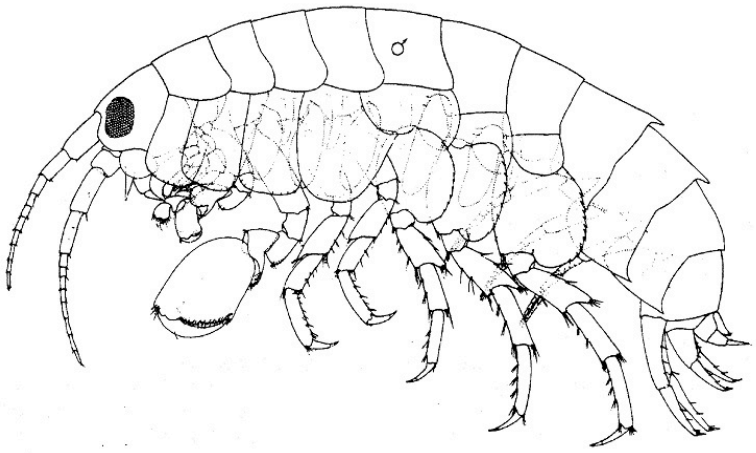
Diagnosis: "*Flagella of antennae 1-2 with only 1 article. Pereonite 1 without ventral cradle. Coxae 3-7 discontiguous. Articles 4-5 of pereopods 5-7 neither lobate nor setose, nor bearing basal setae on article 4. Pleopods with 2 rami, inner ramus short, peduncles not expanded. Telson uncleft, fused to urosomites 2-3*." (from J. L. Barnard & Karaman 1991)

Family Hyalellidae

The Hyalellidae contains only *Hyalella*, an exclusively freshwater genus, with a few representatives that can penetrate brackish water in estuaries. The genus has grown to considerable size, currently containing 69 recognized species in three subgenera (Horton & Lowry 2015). While occurring both above and below the equator, all members of the family currently known are from the Americas (Lowry & Myers 2013)

Diagnostic description: "*Body laterally compressed. Eyes well developed or absent, if present then round or ovoid. Antennae 1–2 calceoli absent. Antenna 1 shorter than, subequal in length to, or longer than antenna 2; peduncular article 1 longer than article*

2; article 2 subequal to or longer than article 3; article 3 shorter than article 1; peduncular articles 1–2 not geniculate; accessory flagellum absent. ***Antenna 2 peduncular article 1 enlarged, bulbous****. Mandible molar triturative; palp absent. Maxilla 1 basal endite apically setose; palp present or absent, symmetrical. Maxilla 2 basal endite without oblique setal row. Labium inner lobes vestigial or absent. Coxal gills on pereopods 2–7, not stalked; sternal gills present, simple; sternal blisters absent;* ***oostegites fringing setae curl-tipped****. Gnathopod 1 similar in males and females (not sexually dimorphic); smaller (or weaker) than or similar in size to gnathopod 2; propodus palm without robust setae along palmar margin. Gnathopod 2 carpus slightly produced along posterior margin of propodus.* ***Pereopods 3–4 not sexually dimorphic. Pereopod 4 with small posteroventral lobe****. Pereopod 5 shorter than pereopod 6; coxa equilobate or with posteroventral lobe. Pereopod 7 longer than pereopod 5. Pleonites 1–3 each with dorsal carina or carinae (small) or without dorsal carinae. Urosomites 1–3 free; without slender or robust dorsal setae. Urosomite 1 without large distoventral robust seta. Urosomite 2 without dorsal setae. Uropod 1 without basofacial robust setae.* ***Uropod 3*** *not sexually dimorphic;* ***uniramous****, without plumose setae. Telson entire; dorsal or lateral robust setae absent; apical robust setae present or absent*." (from Lowry & Myers 2013)



Hyalella azteca (from Hendrycks & Bousfield 2001)

Hyalella – Our local form seems to be *Hyalella azteca*, which has been reported in regional monitoring samples from southern California estuaries, and is included on the SCAMIT Ed 9 list (Cadien & Lovell 2014). It is entirely possible, however, that this is in fact an unrecognized congener similar to *H. azteca*. Relictual populations of *H. azteca* are being identified all over the Laurentian Shield, and in some cases new taxa are being erected from what were initially reports of *H. azteca*. The species may, however, be here as an introduction via either natural or artificial means. Good description and illustration of this animal is presented by Bousfield (1973) and additional illustrations by Hendrycks & Bousfield (2001). No comprehensive key to the genus is currently available, and the pace of description of new species in South America continues unabated. Keys to species known from Brazil are available, although not comprehensive even for that country because of recent additions; González et al 2005, Rodrigues et al 2014)

Diagnosis: "*Body smooth,* ***mucronate, or processiferous.*** *Antennae short to medium. Antenna 2 (male), peduncular segments regular, not stoutly expanded; flagellar segments not incrassate (conjoint); gland cone large, prominent.*

Mouthparts regular. Mandible: molars with distal plumose seta; left lacinia 5-dentate. Maxilla 1, palp small, 1-segmented. Maxilliped, palp unguiform, dactyl without whip.

Coxal plates 1-4 deep, subquadrate, lacking posterior marginal cusps. Coxae 5 & 6 posterolobate. Gnathopods strongly ***sexual1ydimorphic;gnathopod*** *1 ,dactyl basally stout, unguis simple; propodal postero-distal spines unmodified. Gnathopod 2 (male) propod large, palm oblique. Peraeopods 3-7 slender, spines simple; dactyls simple. Coxal gills large, sac-like, subequal. Paired sternal gills ventrally on peraeon segments (2) 3-7.*

Pleopod peduncles with 2 retinacula. Uropods 1 & 2, rami marginally spinose. Uropod 3 uniramous; ramus slender, apex with slender spines.

Telson entire; lobes fused apically.

Female: Peraeon segment 2, pre-amplexing notch regular, simple. Gnathopod 1 regularly subchelate, propod shorter than carpus. Gnathopod 2 subchelate to parachelate; propod longer than carpus.

Brood plates relatively short and broad, marginal setae short to medium." (from Hendrycks & Bousfield 2001)

Family Hyalidae – Members of this family are exceedingly common among intertidal and shallow subtidal algae in many parts of the world, including the NEP. This habitat guarantees that they are almost never captured during POTW monitoring programs. Regional monitoring surveys of shallow embayments encounter them frequently, and local information continues to accumulate based on these regional samplings.

The boundaries are not quite the same using the classification of Serejo (2004) as they are in Bousfield & Hendrycks (2002). The Kuriidae, which B & H include within the Hyalidae as subfamily Kuriinae, were identified as a separate clade outside the other talitroids by Serejo's analysis. It was treated as a superfamily Kurioidea, with a single family, the Kuriidae by her, and this status was recently retained (Lowry & Myers 2013). They do not occur in the NEP. Within the Hyalidae there are two subfamilies represented in the NEP, the Hyachelinae and the Hyalinae. The former contains only the genus *Hyachela*, with a single representative in tropical NEP waters, *Hyachela tortugae*. This is the only known commensal hyalid, living in the oral cavity of the sea-turtle *Chelonia mydas* (J. L. Barnard 1967b). The dactyls of the pereiopods are modified to serve as grasping organs, presumably to aid in maintenance of contact with the host. Given this unusual habitus, it is unlikely to be confused with any other hyalid. As the sole member of its subfamily it can also be distinguished with the subfamily key provided by Serejo (2004, pg. 585).

A number of species of hyalids occur in the NEP. The group was recently reviewed by Bousfield & Hendrycks (2002), who erected several new genera within the group as part of a major reorganization. The group has been troubling for many workers, and gave J. L. Barnard in particular a lot of trouble. He kept trying to resolve the problems, however, leaving a trail of nomenclatural modification in the literature (J. L. Barnard 1952, 1954, 1962c, 1969b, 1975, 1979). The various reports of species in those publications should be sorted out in the Bousfield and Hendrycks revision of the family,

appearing in the synonymies of the species listed above. All of these are very shallow-water algal associated organisms

Description: *"**Head free, not coalesced with peraeonite 1;** exposed; as long as deep, or longer than deep, or deeper than long; anteroventral margin weakly recessed, anteroventral margin deeply excavate; rostrum present or absent, short; eyes present, well developed or obsolescent; not coalesced; 1 pair; not bulging. Body laterally compressed; cuticle smooth.*

Antenna 1 shorter than antenna 2, or longer than antenna 2; peduncle with sparse robust and slender setae; 3-articulate; peduncular article 1 subequal to article 2, or longer than article 2; antenna 1 article 2 subequal to article 3, or longer than article 3; peduncular articles 1-2 not geniculate; accessory flagellum absent; antenna 1 callynophore absent. Antenna 2 present; short, or medium length, or long; articles not folded in zigzag fashion; without hook-like process; flagellum shorter than peduncle, or longer than peduncle; 5 or more articulate; not clavate; calceoli absent.

*Mouthparts well developed. Mandible incisor dentate; lacinia mobilis present on both sides; accessory setal row without distal tuft; molar present, medium, triturative; **palp absent**. Maxilla 1 present; inner plate present, weakly setose apically; palp present or absent, not clavate, 0 -articulate or 1 -articulate or 2 -articulate. Maxilla 2 inner plate present; outer plate present. Maxilliped inner and outer plates well developed or reduced, palps present, well developed or reduced; inner plates well developed, separate; outer plates present, small; palp 4-articulate, article 3 without rugosities. Labium smooth.*

***Peraeon**. Peraeonites 1-7 separate; complete; sternal gills absent; pleurae absent.*

Coxae 1-7 well developed, none fused with peraeonites. Coxae 1-4 longer than broad or as long as broad or broader than long, overlapping, coxae not acuminate. Coxae 1-3 not successively smaller, none vestigial. Coxae 2-4 none immensely broadened.

Gnathopod 1 not sexually dimorphic; smaller (or weaker) than gnathopod 2, or subequal to gnathopod 2; smaller than coxa 2, or subequal to coxa 2, or larger than coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; shorter than propodus, or subequal to propodus; gnathopod 1 strongly produced along posterior margin of propodus, or slightly produced along posterior margin of propodus, or not produced along posterior margin of propodus; dactylus large. Gnathopod 2 sexually dimorphic; simple, or subchelate, or parachelate; coxa smaller than but not hidden by coxa 3, or subequal to but not hidden by coxa 3, or larger than coxa 3; ischium short; merus not fused along posterior margin of carpus or produced away from it; carpus/propodus not cantilevered, carpus short, shorter than propodus, strongly produced along posterior margin of propodus or not produced along posterior margin of propodus.

*Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly), none prehensile. Peraeopod 3 well developed. Peraeopod 4 well developed. 3-4 not glandular; 3-7 without hooded dactyli, 3-7 propodi without distal spurs. Coxa well developed, longer than broad or broader than long; carpus shorter than propodus, not produced; dactylus well developed. Coxa subequal to coxa 3 or larger than coxa 3, not acuminate, with well developed posteroventral lobe; carpus not produced. **Peraeopods 5-7** with few*

robust or slender setae; ***dactyli without slender or robust setae****.* ***Peraeopod 5*** *well developed; shorter than peraeopod 6; coxa smaller than coxa 4,* ***with ventrally produced posterior lobe****; basis expanded, subrectangular or subovate, with posteroventral lobe; merus/carpus free;* ***carpus expanded, or weakly expanded****; with a few subterminal setae or setae absent. Peraeopod 6 shorter than peraeopod 7, or subequal in length to peraeopod 7; merus/carpus free; dactylus with a few subterminal setae, or without setae. Peraeopod 7 with 6-7 well developed articles; longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded, without dense slender setae; dactylus with a few subterminal setae or without setae.*

Pleon*. Pleonites 1-3 without transverse dorsal serrations, without dorsal carina; without slender or robust dorsal setae. Epimera 1-3 present. Epimeron 1 well developed. Epimeron 2 without setae.*

Urosome not dorsoventrally flattened; urosomites 1 to 3 free; urosomite 1 longer than urosomite 2, or much longer than urosomite 2; urosome urosomites not carinate; urosomites 1-2 without transverse dorsal serrations. Uropods 1-2 apices of rami with robust setae. Uropods 1-3 similar in structure and size. Uropod 1 peduncle without long plumose setae, without basofacial robust seta, without ventromedial spur. Uropod 2 well developed; without ventromedial spur, without dorsal flange; inner ramus subequal to outer ramus, or longer than outer ramus. Uropod 3 not sexually dimorphic; peduncle short; outer ramus shorter than peduncle, 1-articulate, without recurved spines. Telson weakly thickened dorsoventrally, or thickened dorsoventrally; deeply cleft, or moderately cleft, or entire; broader than long; apical robust setae present, or absent." (Lowry and Springthorpe 2001).

Subfamily Hyachelinae – The subfamily contains only one genus, which is itself monotypic. This is *Hyachela*, the only known commensal hyalid.

Diagnosis: "*Sexually dimorphic: ectoparasitic in the buccal cavity of marine tortoises. Body smooth, uncarinated. Eye large, lenticular, black. Antennae short, flagellum 8-9 segmented. Antenna 2, peduncular gland cone small, segments 4 and 5 swollen (male).*

Mandibular left lacinia 4-5 dentate? Maxilla 1 palp very reduced (as in Hyalellidae). Maxilliped palp, plates slender, dactyl short, nail very small.

Coxae 1-4 large, deep, smoothly overlapping, hind margins lacking posterior marginal shelf and cusp. Coxae 5 anterolobate; coxae 6 & 7 posterolobate. Coxal gills sac-like, broadly cross-pleated.

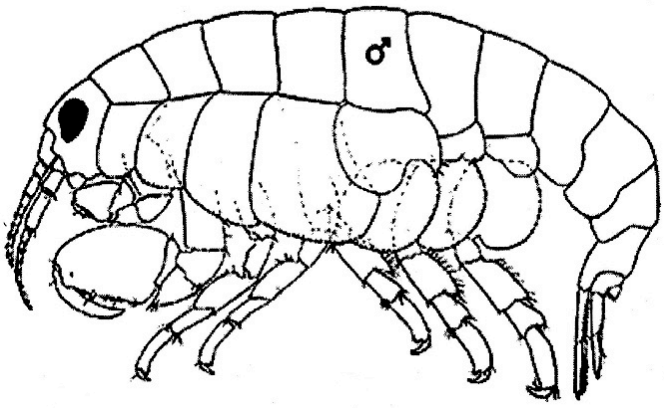
Gnathopods strongly sexually dimorphic, typically hyalid in form. Hydrodynamic lobe of basal and ischia segments weak or lacking in gnathopod 1, weakly present in gnathopod 2 (both sexes). Carpus of gnathopod 2 (male) lacking posterior lobe.

Peraeopods very smooth, lacking marginal armature, distally weakly subcheliform, palm with short curved spines; dactyl stout, striated.

Pleopods strongly natatory, rami elongate, fully pulmose-setose. Uropods 1 and 2 strong; rami variously marginally setose, natatory; Uropod 3 minute, peduncle subtriangular, lacking rami. Telson fully bilobate, margins smooth.

Female: Gnathopods 1 and 2 subsimilar in size and form; carpal lobe slender; dactyl overlapping short palm. Brood plates elongate triangular, brood setae medium long, curl-tipped. Peraeon 2 with distinct subquatrate preamplexing notch, lacking

unguisial groove; posteroventral lobe of peraeon 2 short, small rounded." (from Bousfield & Hendrycks 2002)



Hyachela tortugae (from Hendrycks & Bousfield 2001)

Hyachela – A monotypic genus with the same characteristics as the subfamily. This is the only member of the superfamily which is a known commensal of another organism.

Diagnosis: "*Talitroidean with first maxillary palp vestigial, fourth article of maxillipedal palp reduced in size, blunt, not claw-shaped; gnathopods 1 and 2 of both sexes normally subchelate, gnathopod 2 enlarged in male, lacking a produced lobe of article 5; all pereopods somewhat subchelate, with short palms armed with several short, blunt, curved, grasping spines; pleopods long and biramous ; urosomal segment **3** obsolescent, bearing vestigial third uropod that lacks rami ; telson formed of 2 separated lobes attached obliquely in a vertical plane, urosomal segments 1 and 2 each produced ventrally and posteriorly to form a false peduncle for uropods 1 and 2*." (from J. L. Barnard 1967b)

Subfamily Hyalinae – All of the remaining genera in the family fall in this subfamily. This includes eleven genera, of which five are represented in the NEP fauna. An extended discussion of the character states taxonomically useful in the subfamily, along with a key to the world genera is provided by Bousfield & Hendrycks (2002).

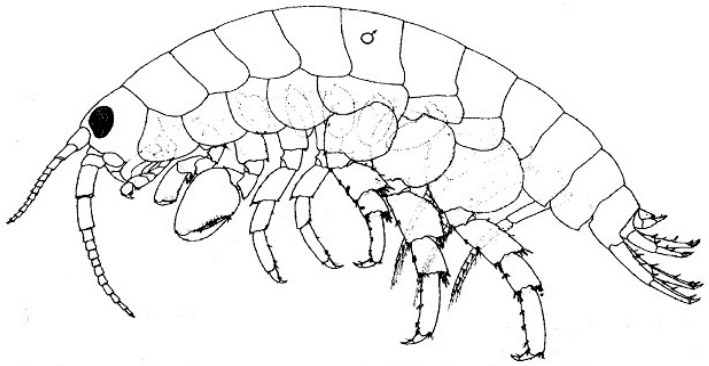
Diagnosis: "*Small to medium large, free-living, morphologically and behaviourally basic members of the Talitroidean Reptantia. Combinational diagnostic character states include: Antenna 2 medium to elongate.*

Coxal plates 1-4, posterior marginal "shelf anterior cusp often strongly developed. Coxal gills large, platelike or sac-like. Sternal gills lacking. Gnathopods I & 2 subchelate, strongly differing in form and size (male), subsimilar (female); gnathopod I weakly, and gnathopod 2 usually strongly sexually dimorphic. Hydrodynamic lobes of basis and ischium of gnathopods variously developed (both sexes).

Peraeopods 5-7; basis broad, hind margin often crenulated, with single notch and "surge seta".

*Pleopods slender, with reduced retinacula, but fully developed plumose-setose rami. Uropods 1 & 2, rami stout, marginally irregularly spinose (not slender, serially spinose and natatory). Uropod **3** uniramous or weakly biramous. Telson short, fully*

bilobate. Brood lamellae large, broad, variously subovate to subrhomboidal. Preamplexing notch present." (from Bousfield &Hendrycks 2002)



Apohyale californica (from Bousfield & Hendrycks 2002)

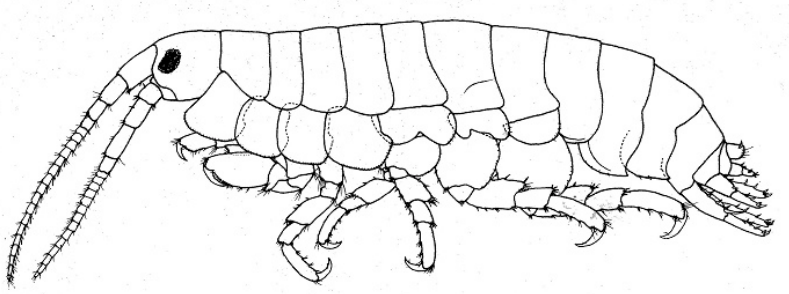
Apohyale – Although only created in 2002, this genus now houses 24 species, only four of which occur in the NEP. The genus is distributed world-wide, although most species are in the Pacific. A key to the NEP forms is presented in Bousfield & Hendrycks (2002).

Diagnosis: "*Body medium to large, robust, smooth, often strikingly pigmented. Eyes medium large, usually broadly reniform, nearly meeting mid-dorsally. Antennae short. Antenna 2, peduncular segments 4 & 5 stout, nearly bare; flagellum short (<20 segments), weakly (or not) setose posteriorly Mandible, left lacinia 5- 6-dentate. Maxilla* ***1,*** *palp I -segmented, short to medium, not extending beyond base of apical spines of outer plate. Maxilla 2, plates slender, inner plate with single inner marginal seta. Maxilliped palp stout, segment 2 broader than long, dactyl normal, not sexually dimorphic (lacking apical whip seta in male). Coxa 1 broadened distally, smooth; coxae 1-4 with distinct hind marginal cusp in both sexes. Coxa 5 mostly antero- to aequilobate. Coxae 6 and 7 posterolobate. Coxal gills plate-like, largest posterior1y. Gnathopod l normal, slightly sexually dimorphic; bases, hydrodynamic lobe weak or lacking; carpal lobe distinct, broad; propod slightly broadening distally, lacking mediofacial guiding spine (d);dactyl simple. Gnathopod 2 strongly sexually dimorphic; basis (male) with weak to medium hydrodynamic lobe; carpus short, posterior lobe usually lacking (often very thin, short); propod large, variable. Peraeopods 3-7 stout, dactyls short, with distinct*

inner marginal seta. Peraeopods 5-7, bases broad, margin nearly smooth, notch and surge seta variously developed; segment 4 relatively short and broad; segment 6, inner distal locking spine variously developed, rarely striated. Epimeral plates 2-3 smooth below, hind corners acuminate. Pleopods normal. Uropod I, peduncular distomedial and lateral spines typically short, weak; rami with marginal and strong apical spines. Uropod 2, outer ramus the shorter, with few marginal spines. Uropod 3 uniramous; ramus short, blunt, not longer than peduncle, with apical, and occasionally posterodorsal, marginal spine(s).

Telson lobes subtriangular, usually short, apical margins unarmed. Female: Gnathopod I, hydrodynamic lobes lacking; propod deep. Gnathopod 2 always larger, often strong; basis with weak hydrodynamic lobe. Brood plate (Gn2) very large, proximally broad, narrowing distally to acute apex; marginal setae very short, numerous. Preamplexing

notch simple, shallow, obtuse; unguisial groove lacking or very short; peraeon 2, posteroventral lobe medium to large." (from Bousfield & Hendrycks 2002)



Parallorchestes cowani (as *P. ochotensis* in J. L. Barnard 1962)

Parallorchestes – The twelve species in the genus are all North Pacific, with ten from the NEP. Lowry (2015) ignores *P. americana* of Bousfield 1981, possibly because he does not feel that it is appropriately described and available. It is not listed in WoRMS in consequence, and does not appear either in synonymy of another *Parallorchestes*, or in any other genus of the subfamily. A key to the genus from the NEP is provided by Bousfield & Hendrycks (2002) which includes *P. americana*.

Diagnosis: "*Male. Body generally stout, medium to large. Peraeonal and abdominal segments often posteriorly ridged or mid-dorsally carinate. Eyes medium, sub-ovate. Antennae medium, subequal (antenna 1 slightly shorter, exceeding peduncle of antenna 2); peduncles stout, flagella and peduncles often posteriorly setose.*

Upper lip, epistome large. Lower lip regular. Mandible, left lacinia 5 (6) dentate; spine row with 2-3 blades. Maxilla l, palp 2-segmented, proximal segment very short. Maxilla 2, inner plate with inner marginal plumose stout setae. Maxilliped regular; palp stout, dactyl large, lacking whip seta in male.

Coxal plates 1-4 regularly broad, deep; posterior marginal shelf weak or lacking, cusps lacking. Coxal plates 5 variably aequilobate, occasionally aequi- or anterolobate; coxa 6 and 7 posterolobate. Coxal gills large, plate-like, on peraeopods 2-6.

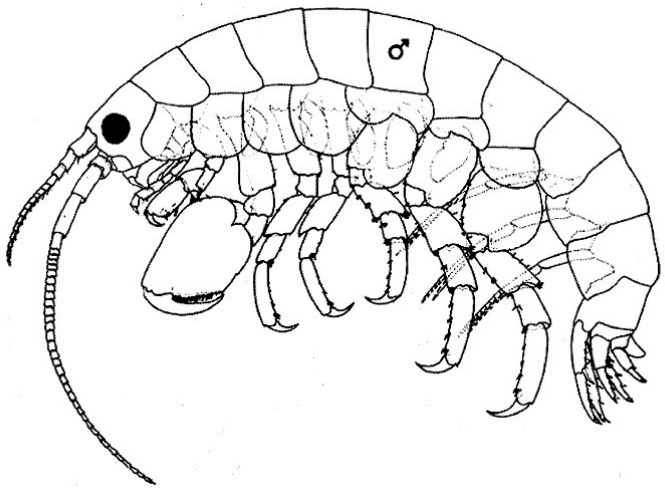
Gnathopod l ordinary, weakly sexually dimorphic; basis propod with 1-2 posterodistal spines, neither modified as a mediofacial guiding spine; palm smooth, not excavate; dactyl rarely bifid, overlapping posterodistal angle. Gnathopod 2 strongly sexually dimorphic; hydrodynamic lobe of basis and ischium moderately to strongly developed, overlapping (except in carinated and ridged species); carpal lobe small but distinct; propod large, palm regular; dactyl simple,

Peraeopods 3-4 stout, spinose, segment 6 often with inner distal marginal locking spine. Peraeopods 5-7 stout, homopodous; bases broad, posterior margin with well-developed notch and surge seta. Peraeopod 5 shortest; segment 4 often widened; segment 5 short; segment 6 often with stout anterodistal subterminal clasping spine; dactyls large, simple, inner marginal seta small or lacking. Peraeopod 7, basis mediodistally sharply incised.

Epimeral plates regular, 2 deepest, hind corners squared. Pleopods regular, natatory, rami longer than slender peduncles. Uropods 1 and 2, rami longer than peduncle, with marginal and apical spines; peduncle with distolateral spine. Uropod 3 biramous, inner ramus small, rounded, with apical seta; outer ramus longer than peduncle, with marginal and apical spines.

Telson, lobes short, wide, separated to base, apical margin with spine(s) and setae.

Female: Gnathopod 1, hydrodynamic lobe weak or lacking on basis, and/or lacking on ischium. Gnathopod 2 regular, similar to but larger than gnathopod 1 ; carpal lobe well developed. Brood lamellae large, rounded apically; marginal setae numerous, long, hook-tipped. Preamplexing notch simple, shallow, lacking unguisial groove." (from Bousfield & Hendrycks 2002)



Protohyale lamberti (from Bousfield & Hendrycks 2002)

Protohyale – A large genus divided up into four subgenera by Bousfield & Hendrycks (2002), three of which – *Boreohyale*, *Leptohyale*, and *Protohyale ss* – occur in the NEP. These authors provide a key to the subgenera, and keys to *Protohyale ss*, and *Boreohyale*. *Leptohyale* currently contains but a single species, and so no key is needed beyond that which separates the subgenera. While the genus is extensively speciated in the NEP, it is distributed much more widely.

Diagnosis: "*Male (9.0 mm.): Anterior head margin oblique, nearly straight. Eyes medium, irregularly round Antenna I, peduncular article 2 short, subequal to 3; segment 3 not exceeding distal end of peduncle 4 of antenna 2; flagellar segments each bearing 2 aesthetascs. Antenna 2 medium long, more than twice length of antenna l ; peduncular segments 4,5 with posterodistal clusters of setae; flagellum 33-segmented, 2.3 times as long as peduncle.*

Upper and lower lips regular. Mandible, left lacinia 6-dentate, with 3 accessory blades. Right mandible with 2 accessory blades. Maxilla 1, palp extending beyond base of apical spine teeth on outer plate. Maxilla 2, inner plate apically with inner marginal pectinate setae, proximal plumose seta elongate. Maxilliped, palp medium stout; dactyl not longer than segment 3, unguis short.

Coxae 1-3, posterior marginal shelf shallow but distinct, lower margins shallowly convex, not crenulated. Coxa 4, posteroproximal excavation lacking median cusp. Coxa 5 aequilobate. Coxal gills sac-like.

Gnathopod I, h.-d. lobe of basis medium, rounded; lobe of ischium weakly developed; carpal lobe medium, lower margin bearing 6-8 comb setae; propod subrectangular, upper and lower margins slightly convex, but lacking stout anterodistal spine, palm shallowly oblique, slightly convex; posterodistal spines short, slightly separated, distal portion of posterior margin with single group of short setae; dactyl with

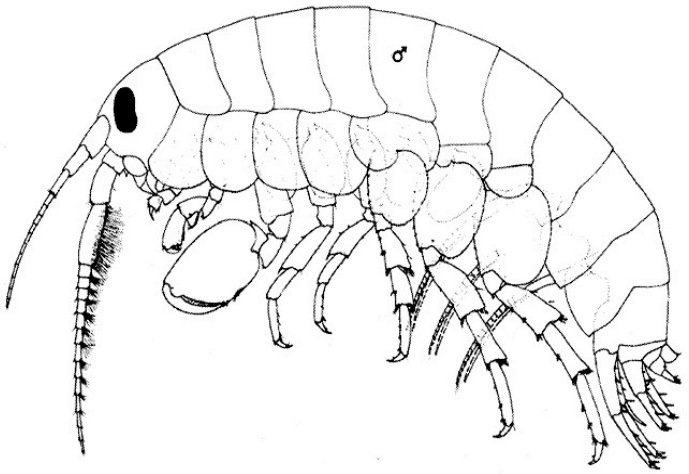
minute posterior marginal setules, slightly overlapping palm. Gnathopod 2, basis and ischium with broadly rounded overlapping hydrodynamic lobes; merus acutely produced carpal lobe lacking; propod deeply subovate, slightly narrowing distally, anterior margin proximally with two short spines, palm oblique, slightly convex, with weak hinge tooth, slightly shorter than posterior margin having two very short setal groups; dactyl stout, with slight posterior marginal bulge near hinge.

Peraeopods 3-4 ordinary; segment 5 short; segment 6, posterior margin with 6-7 short spines; dactyls slender, curved, slightly small than those of peraeopods ***5-****7. Peraeopods 5-7, hind margin of basis rounded, crenulate, rounded, with slight notch and surge seta; segment 4 of peraeopod 5 short, little longer than segment 5; in peraeopods 6 & 7, segment 5 is distinctly shorter and segment 4; segment 6 with 4-5 singly inserted or paired anterior marginal short spines and distally a pair of clasping (locking) spines.*

Epimeral plates 2 and 3, hind corners weakly acuminate. Uropod 1, peduncle with 3-4 outer marginal spines, and prominent distolateral spine; outer ramus with 3 marginal spines. Uropod 2, outer ramus with 2-3 marginal spines. Uropod 3, peduncle stout, with 2 posterodistal spines; ramus slender, tapering, shorter than peduncle, apex with 2-3 short spines.

Telson lobes longer than wide, each tapering to acute apex, margins unarmed.

Female ov (7.0 mm): Gnathopod 1, hydrodynamic lobe prominent, rounded on basis, weakly developed on ischium; carpal lobe small, with few marginal comb setae; propod slender subrectangular, palm short, oblique, distal half of posterior margin with single group of short setae; dactyl slightly overlapping palm. Gnathopod 2 very similar to gnathopod l. Brood plates and preamplexing notch originally undescribed, but probably similar to those of ***P. (P.) mohri .”*** (from Bousfield & Hendrycks 2002)



Ptilohyale plumosa (from Bousfield & Hendrycks 2002)

Ptilohyale - A moderately sized genus of eleven members, all covered by Bousfield & Hendrycks (2002) who provide a key to the nine NEP representatives.

Diagnosis: “*Body medium, smooth. Eyes lenticular, vertical, medium. Antenna 1 medium, peduncular segments not shortened, flagellum slender. Antenna 2, peduncle 4 short; flagellum short to medium* ***(<20-*** *segmented), posteromedial margin of flagellum and peduncular segment 5 strongly plumose-setose.*

Mandibular left lacinia 5-dentate (rarely 6),spine row with 3-6 blades. Maxilla 1, palp stout, l-segmented reaching base of apical spines of outer plate. Maxilla 2, inner plate with 1-2 inner marginal plumose setae. Maxilliped, inner plate relatively short; outer plate distally obtuse; palp, segment 2 not broader than long; dactyl slender, unguis short.

Coxae 1-4 rounded below, with posterior marginal cusps. Coxa I slightly distally broadened. Coxa 5 anterolobate; coxae 6 and 7 posterolobate. Coxal gills slender-subovate, sac-like, largest on coxa 6.

Gnathopod I (♂)larger and slightly different in form to female; basis lacking hydrodynamic lobe; carpal lobe distinct, relatively broad; propod hatchet-shaped broadening distally, lacking mediofacial guiding spine; palm distinct, oblique, dactyl simple. Gnathopod 2 (♂) powerfully subchelate, regular; basis with medium hydrodynamic lobe; carpal lobe small, thin, evanescent; propod subrectangular to subovate, narrowing distally, palm short, oblique, not incised or toothed; dactyl regular.

Peraeopods 3-7 slender, regular; dactyls small, with distinct but weak inner marginal seta. Peraeopods 5-7, bases medium broad, rounded hind margin not strongly crenulate, lacking surge seta and notch; segments 4-6 slender, not broadened; marginal spines weak, not striated, clasping spine weak or lacking.

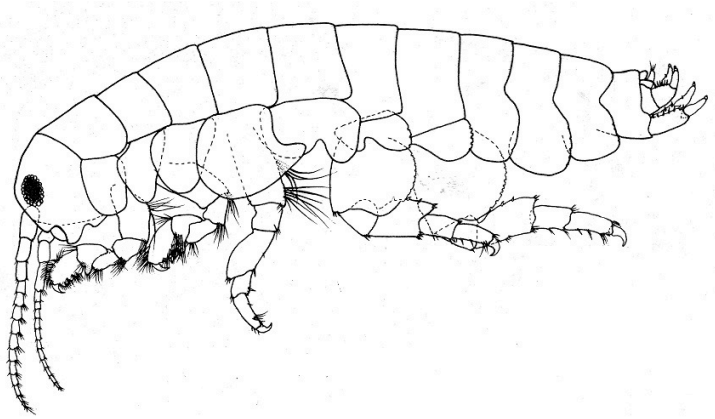
Epimeral plates relatively broad, margins weakly armed, hind corner not produced. Pleopods well developed, rami normal. Uropod 1, peduncle longer than rami, with strong distomedial spine; rami with marginal spines, and medium apical spines. Uropod 2, rami subequal, with marginal spines. Uropod 3 short, peduncle with lateral setal row and postero-distal spine; inner ramus variously fused to peduncle; outer ramus subequal to peduncle, with stout apical spines .

Telson lobes triangular, longer than wide, margins smooth.

Female: Gnathopod 2 , propod similar to, but larger and deeper than in gnathopod I. Brood plate large, medium broad, apically acute; marginal setae short, hook-tipped, numerous. Preamplexing notch shallow, with short to medium unguisial groove; posteroventral lobe of peraeon 2 large, anterior margin convex." (from Bousfield & Hendrycks 2002)

Family Najnidae - In previous classifications the najnids have moved from place to place after their erection as a separate family by Barnard (1972). In the Serejo analysis they nested within the Dogielinotidae as a subgroup given subfamily status as Najninae. This subfamily was small, with only two genera; *Najna* from the north Pacific and *Insula* from Bermuda in Serejo (2004). Bousfield & Marcoux (2004) treated Najnidae as a separate family (continued by Lowry & Myers 2013), and subdivided *Najna* into two genera *Najna* and *Carinonajna*. *Najna* is interpreted as the more plesiomorphic genus, and points to origin of the najnids in the Northwest Pacific, with subsequent spread to the NEP. There is a single najnid on the SCAMIT Ed. 9 list, *Najna* (now *Carinonajna*) *kitamati* Barnard 1979. This was taken in regional monitoring collections off Catalina Island. The species was initially reported as *Najna consiliorum* by Barnard (1962), who later recognized its distinctness from that Northwest Pacific species. Bousfield & Marcoux (loc. cit.) suggest that *Carinonajna lessioniophila* may also occur in Southern California, but there are currently no records of the species from the Bight. The animal is known to form galls on the alga *Lessoniopsis littoralis*, whose southern range limit is Monterey

County (Abbott & Hollenberg 1976). Unless it switches hosts, it is unlikely to be taken south of that point. The genus *Carinonajna* is diversified primarily in the boreal NEP, where seven other species occur. *C. kitamati* is easily identified as a najnid in the nature and placement of its antennae. They are short, thin, and seem to erupt from the middle of the head, appearing displaced ventrally from normal antennal insertion in amphipods. Details of its separation from other family members should be sought in the key and descriptions in Bousfield & Marcoux (2004). Barnard, in his erection of the taxon, did not re-illustrate it, referring instead to the figures provided in 1962 as *N. consiliorum*.



Carinonaja kitamati (as *Najna consiliorum* in J. L. Barnard 1962)

Carinonajna – A nine member genus endemic to the North Pacific. All nine species occur within the coverage of this treatment, but for most this is an eastern range limit for species more common in the NWP. A key to separate the species is provided by Bousfield & Marcoux (2004). Only *C. kitamati* penetrates south into the SCB, and is represented on the SCAMIT Ed. 9 list (Cadien & Lovell 2014).

Diagnosis: "*Abdominal pleosome 3 and urosome 1 variously dorsally bicarinate. Antenna 1 relatively short «9 segments); flagellar segments with conspicuous posterior marginal tufts of aesthetascs, more strongly developed in males.*

Mandible, lacinia 7-8 dentate; incisor 9-]] dentate. Maxilliped, outer plate relatively narrow, variously longer than broad; palp segment 4 small or minute, not Ionger than broad.

Coxal plates 1-3 unlike, barely overlapping, coxa 2 pyriform; coxa4 acutely attenuated posteriorly; peraeon segments 1-4 more or less separated ventrally, occasionally dorsally. Coxae 5&6 shallowly posterolobate.

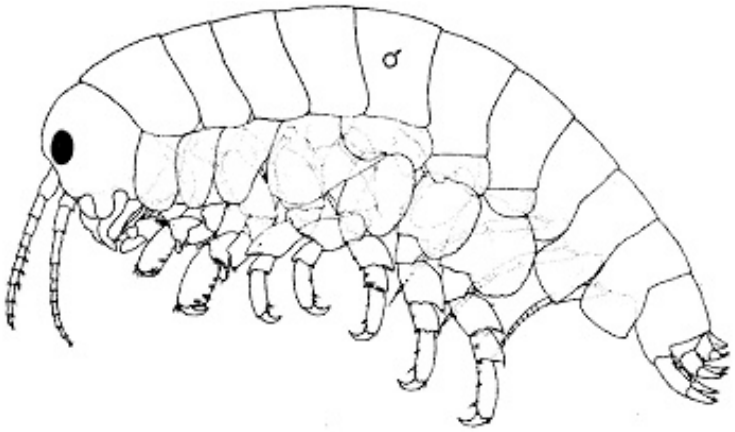
Gnathopod 1 & 2 weakly subchelate, dissimilar. Gnathopod 1, propod distally narrowing, anterodistal margin strongly setose; palmar margin short, with 1(2) prominent posterodistal spine(s), overlapped by dactyl. Gnathopod 2, propod narrowing distally, anterior margin variously setose or bare; palm oblique, convex or concave, with 1 (2) posterodistal spines; carpal lobe variable in size.

Peraeopods 3 & 4, segment 4 variously arched anteriorly, widest medially. Peraeopods 5-7, bases with shallow posterodistal lobes; segment 4 often broadened. Dactyls short, strongly curved.

Abdominal side plate usually weakly crenulate behind; pleopod retinacula 5-8. Uropods 1 & 2, peduncular outer marginal spines few (2-6); outer ramus marginally

bare, inner ramus with 1-3 marginal spines. Uropod 3, peduncle short, deep; ramus very short to minute, not longer than deep; with 2-10 slender apical setae.

Telson short, broader than long, often slightly emarginate apically, lateral margins slightly convex." (from Bousfield & Marcoux 2004)



Najna parva (from Bousfield & Marcoux 2004)

Najna – A small genus of only three species, two of which are reported from NEP waters. These small animals bore into kelp tissues, and are only found directly associated with kelps. Although *N. consiliorum* was recorded in earlier literature as occurring locally, subsequent investigation have restricted it to the NWP, and separated off other members of the family confused under that name (Bousfield & Marcoux 2004). A key to the members of the genus is provided by those authors.

Diagnosis: "*Abdomen dorsally smooth, lacking distinct carinations on pleon 3 and urosome 1. Antennae slender; flagellum of antenna 1 usually elongate (> 9 segments); posterior clusters of aesthetascs (males) not strongly conspicuous. Antenna 2, margins bare or very weakly setose.*

Mandibular lacinia 7-dentate; incisor 9-10 dentate. Maxilliped outer plate usually short, broader than long; palp segment 4 conspicuous, longer than broad.

Coxal plates 1-3 overlapping, little separated distally; coxae 2-3 regular, not distinctly pyriform; coxa 4 regularly attenuated posteriorly, width little greater than depth; coxae 5 & 6 variously postero-lobate.

Gnathopods 1 & 2 regularly subchelate, subsimilar, slightly sexually dimorphic (slightly larger in male); propods usually subrectangular, anterodistal margins with apical cluster of setae only); palms distinct, convex, nearly vertical; carpal lobe of gnathopod 2 relatively large, protruding anteriorly beneath propod.

Peraeopods 3 & 4, segment 4 regularly widening distally, not strongly arched anteriorly. Peraeopods 57, bases with deep posterodistal lobes; segment 4 of peraeopod 7 not broader than long.

Epimeral plate 3, hind margin minutely crenulate, hind corner obtuse. Pleopods slender, peduncles with 4-5 retinacula.

Uropods 1 & 2, peduncular outer marginal strongly spinose; rami usually marginally spinose. Uropod 3, peduncle longer than deep; ramus distinct, longer than deep.

Telson subquadrate, little (or not) wider than deep, apex subacute (female), or medially notched or emarginate (male).

Coxal gills on peraeopods 5 & 6 smaller, posterior accessory lobes relatively short and narrow.

Brood plate (gnathopod 2, female) elongate, apex acute." (from Bousfield & Marcoux 2004

Family Phliantidae – Our local phliantid is equally interesting, a bit larger, and more often taken than the eophliantid *Lignophliantis pyrifera*. *Pariphinotus escabrosus* was originally erected as a subspecies of *Heteroplias seclusus* (Shoemaker 1933) by J. L. Barnard (1962b). It is listed in that form in J. L. Barnard 1969, and 1979; and as *P. escabrosus* in J. L. Barnard & Karaman 1991, and in Lazo-Wasem et al 1989. J. L. Barnard & Karaman do not list the latter paper, nor credit the authors in their text, so they appear to have reached the same conclusion regarding the status of *Heteroplias* independently. In his 1979 paper J. L. Barnard lists *Pariphinotus* as "presumed senior synonym of *Heterophlias*" but treated the two as separable until the status of the mandibular molar in Kunkels genus could be verified. This apparently had happened to his satisfaction by the publication of the world monograph in 1991. While J. L. Barnard & Karaman list five species in the genus occurring around the Americas, they also indicate these are probably all one superspecies. Good illustrations of the local species are provided by J. L. Barnard (1979, fig. 40). How closely they approximate *P. seclusus* grossly can be gauged by examination of the figures of that species in J. L. Barnard & Karaman (1991, fig. 105 A). The animal is not very large, but is very robust, looking like a squat armored vehicle. It is associated with rocky epifauna. It can be quite common in invertebrate turfs. Should these eventually be proven to belong to a single superspecies by genetic means, the name would revert to that of the generotype *P. tuckeri* Kunkel 1910, which has priority.

Description: "***Head*** *free, not coalesced with peraeonite 1; exposed; as long as deep; rostrum present, long; eyes present, well developed or obsolescent; not coalesced; 1 pair; not bulging. Body laterally compressed, or dorsoventrally flattened; cuticle smooth.*

Antenna 1 longer than antenna 2; peduncle with sparse robust and slender setae; 3-articulate; peduncular article 1 longer than article 2; antenna 1 article 2 subequal to article 3, or longer than article 3; peduncular articles 1-2 not geniculate; accessory flagellum absent; antenna 1 callynophore absent. Antenna 2 present; short; articles not folded in zigzag fashion; without hook-like process; flagellum shorter than peduncle; less than 5-articulate; not clavate; calceoli absent.

Mouthparts well developed. Mandible incisor dentate; accessory setal row without distal tuft; molar present, medium, non-triturative; palp absent. Maxilla 1 present; inner plate present, weakly setose apically; ***palp absent****, 0 -articulate. Maxilla 2 inner plate present; outer plate present. Maxilliped inner and outer plates well developed or reduced, palps present, well developed or reduced; inner plates well developed, separate; outer plates present, large; palp 4-articulate or 3-articulate, article 3 without rugosities. Labium smooth.*

Peraeon*. Peraeonites 1-7 separate; complete; sternal gills absent; pleurae absent.*

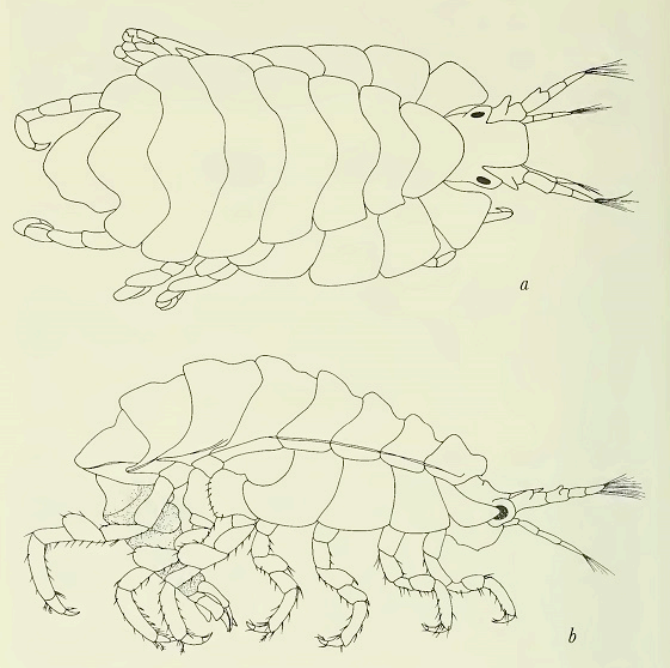
Coxae 1-7 well developed, none fused with peraeonites. ***Coxae 1-4*** *longer than broad,* ***splayed****, coxae not acuminate. Coxae 1-3 not successively smaller, none vestigial. Coxae 2-4 none immensely broadened*

Gnathopod 1 not sexually dimorphic; smaller (or weaker) than gnathopod 2, or subequal to gnathopod 2; smaller than coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; shorter than propodus; gnathopod 1 not produced along posterior margin of propodus; dactylus large. Gnathopod 2 not sexually dimorphic; simple, or subchelate; coxa smaller than but not hidden by coxa 3, or subequal to but not hidden by coxa 3; ischium elongate; merus not fused along posterior margin of carpus or produced away from it; carpus/propodus not cantilevered, carpus short, shorter than propodus, not produced along posterior margin of propodus.

Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly), some or all prehensile or none prehensile. Peraeopod 3 well developed. Peraeopod 4 well developed. 3-4 not glandular; 3-7 without hooded dactyli, 3-7 propodi without distal spurs. Coxa well developed, longer than broad or as long as broad; carpus shorter than propodus, not produced; dactylus well developed. Coxa larger than coxa 3, not acuminate, with well developed posteroventral lobe; carpus not produced. Peraeopods 5-7 with few robust or slender setae; dactyli without slender or robust setae. Peraeopod 5 well developed; subequal in length to peraeopod 6; coxa smaller than coxa 4, without posterior lobe; basis expanded, subrectangular, with posteroventral lobe or without posteroventral lobe; merus/carpus free; carpus linear; setae absent. Peraeopod 6 shorter than peraeopod 7, or subequal in length to peraeopod 7; merus/carpus free; dactylus without setae. Peraeopod 7 with 6-7 well developed articles; subequal to peraeopod 5, or longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded or linear, without dense slender setae; dactylus without setae

Pleon*. Pleonites 1-3 without transverse dorsal serrations, without dorsal carina; without slender or robust dorsal setae. Epimera 1-3 present. Epimeron 1 well developed. Epimeron 2 without setae.*

Urosome not dorsoventrally flattened; urosomites 1 to 3 free, or 1 to 3 coalesced (superficially); urosomite 1 subequal to urosomite 2, or longer than urosomite 2, or much longer than urosomite 2; urosome urosomites not carinate; urosomites 1-2 without transverse dorsal serrations. Uropods 1-2 apices of rami with robust setae. Uropods 1-3 similar in structure and size. Uropod 1 peduncle without long plumose setae, without basofacial robust seta, without ventromedial spur. Uropod 2 well developed; without ventromedial spur, without dorsal flange; inner ramus shorter than outer ramus, or subequal to outer ramus. Uropod 3 not sexually dimorphic; peduncle short; outer ramus shorter than peduncle, without recurved spines. Telson laminar, or weakly thickened dorsoventrally; entire; longer than broad; apical robust setae absent." (Lowry and Springthorpe 2001).



Pariphinotus seclusus (as *Heterophlias seclusus* in J. L. Barnard 1969c)
a. Dorsal view, b. lateral view

Pariphinotus – At one time this was considered as perhaps separate from *Heterophlias* since Kunkels type was damaged and the status of the mandibular molar was uncertain. This was resolved by Lazo-Wasem et al (1989) and the two have been synonymized, with *Pariphinotus* having priority. The local species was initially viewed as identical with *P. seclusus* of Shoemaker 1933, then separated as a subspecies before being finally elevated to full specific standing as *P. escabrosus* (J. L. Barnard 1962).

Diagnosis: "*Mandibular molar conical, terminating in a large spine, lower lip possessing inner lobes, maxilla 1 lacking palp, maxillipedal palp 4-articulate, gnathopods simple, inner ramus of pleopod 3 one-half length of outer ramus, uropod 3 lacking rami*." (from Lazo-Wasem et al 1989)

Family Talitridae – All members of the Talitridae are intertidal to supra-tidal in distribution. For detailed descriptions and keys to the fauna consult Bousfield (1982). Field keys to the appearance of these organisms when live are provided by Bowers (1963) as well as in Light's Manual. The family key in Serejo (2004) should allow detection of members of this family if they occur**.**.

Description: "***Head*** *free, not coalesced with peraeonite 1; exposed; as long as deep, or longer than deep, or deeper than long; rostrum present or absent, short; eyes present, well developed or obsolescent, or absent; not coalesced; 1 pair; not bulging. Body laterally compressed; cuticle with deep sensory pits, or smooth.*

Antenna 1 shorter than antenna 2*; peduncle with sparse robust and slender setae; 3-articulate; peduncular article 1 shorter than article 2, or subequal to article 2, or longer than article 2; antenna 1 article 2 shorter than article 3, or subequal to article 3, or longer than article 3; peduncular articles 1-2 not geniculate; accessory flagellum absent; antenna 1 callynophore absent. Antenna 2 present; short, or medium length, or long; articles not folded in zigzag fashion; without hook-like process; flagellum shorter*

than peduncle, or longer than peduncle; 5 or more articulate; not clavate; calceoli absent.

Mouthparts well developed. Mandible incisor dentate; lacinia mobilis present on both sides; accessory setal row without distal tuft; molar present, medium, triturative; ***palp absent****. Maxilla 1 present; inner plate present, weakly setose apically; palp present or absent, not clavate, 0 -articulate or 1 -articulate or 2 -articulate. Maxilla 2 inner plate present; outer plate present. Maxilliped inner and outer plates well developed or reduced, palps present, well developed or reduced; inner plates well developed, separate; outer plates present, small or vestigial; palp 4-articulate or 3-articulate, article 3 without rugosities. Labium smooth*

Peraeon*. Peraeonites 1-7 separate; complete; sternal gills absent; pleurae absent.*

Coxae 1-7 well developed, none fused with peraeonites. Coxae 1-4 longer than broad or as long as broad or broader than long, overlapping, coxa 1 anteroventrally acuminate or coxae not acuminate. Coxae 1-3 not successively smaller, none vestigial. Coxae 2-4 none immensely broadened.

Gnathopod 1 sexually dimorphic*; smaller (or weaker) than gnathopod 2, or subequal to gnathopod 2; smaller than coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; shorter than propodus, or subequal to propodus, or longer than propodus; gnathopod 1 slightly produced along posterior margin of propodus, or not produced along posterior margin of propodus; dactylus large. Gnathopod 2 sexually dimorphic; subchelate, or chelate; coxa smaller than but not hidden by coxa 3, or subequal to but not hidden by coxa 3; ischium short; merus not fused along posterior margin of carpus or produced away from it; carpus/propodus not cantilevered, carpus short, shorter than propodus or subequal to propodus or longer than propodus, slightly produced along posterior margin of propodus or not produced along posterior margin of propodus.*

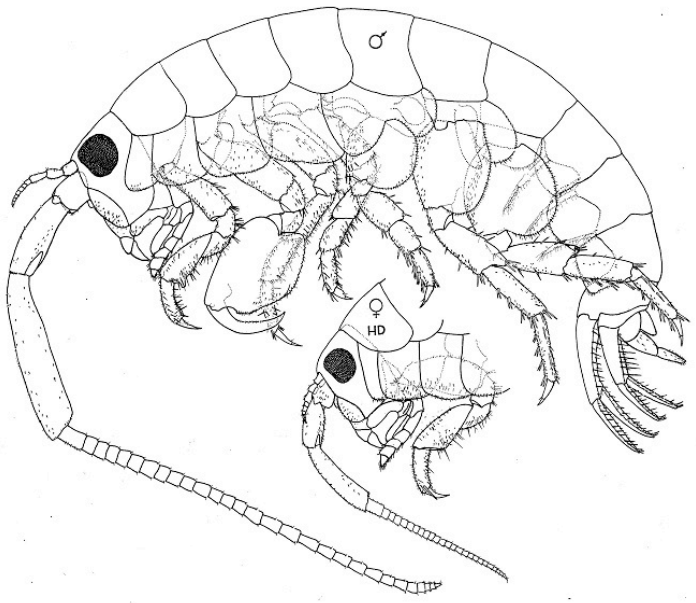
Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly), none prehensile. Peraeopod 3 well developed. Peraeopod 4 well developed. 3-4 not glandular; 3-7 without hooded dactyli, 3-7 propodi without distal spurs. ***Coxa*** *well developed,* ***broader than long****; carpus subequal to propodus, not produced; dactylus well developed. Coxa subequal to coxa 3 or larger than coxa 3, not acuminate, with well developed posteroventral lobe or without posteroventral lobe or with small posterior lobe; carpus not produced. Peraeopods 5-7 with few robust or slender setae; dactyli without slender or robust setae. Peraeopod 5 well developed; shorter than peraeopod 6; coxa smaller than coxa 4 or subequal to coxa 4 or larger than coxa 4, with ventrally produced posterior lobe and with posterodorsal lobe; basis expanded, subovate, with posteroventral lobe or without posteroventral lobe; merus/carpus free; carpus linear; setae absent. Peraeopod 6 shorter than peraeopod 7, or longer than peraeopod 7; merus/carpus free; dactylus without setae. Peraeopod 7 with 6-7 well developed articles; longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded, without dense slender setae; dactylus without setae.*

Pleon*. Pleonites 1-3 without transverse dorsal serrations, without dorsal carina; without slender or robust dorsal setae. Epimera 1-3 present. Epimeron 1 well developed. Epimeron 2 without setae.*

Urosome not dorsoventrally flattened; urosomites 1 to 3 free; urosomite 1 longer than urosomite 2; urosome urosomites not carinate; urosomites 1-2 without transverse dorsal serrations. Uropods 1-2 apices of rami with robust setae. Uropods 1-3 similar in structure and size. Uropod 1 peduncle without long plumose setae, without basofacial robust seta, with ventromedial spur or without ventromedial spur. Uropod 2 well developed; without ventromedial spur, without dorsal flange; inner ramus subequal to outer ramus, or longer than outer ramus. Uropod 3 not sexually dimorphic; peduncle short; outer ramus shorter than peduncle, 1-articulate, without recurved spines. Telson weakly thickened dorsoventrally, or thickened dorsoventrally; moderately cleft, or weakly cleft, or notched, or entire; as long as broad, or broader than long; apical robust setae present, or absent." (Lowry and Springthorpe 2001).

Chelorchestia – A small genus of sand-hoppers composed of six species (Lowry 2015b), of which one, *Chelorchestia costacricana*, occurs in the southern portion of the study area (Garcia Madrigal 2007). A key to the members of the genus is provided in Valencia & Giraldo (2009).

Diagnosis: "*Small, slender bodied, semiterrestrial; ·rarely terrestrial, talitrid amphipods, endemic to salt marshes and mangrove swamps (occasionally coastal terrestrial habitats) of tropical and warm-temperate Atlantic and eastern Pacific regions. Characterized by antenna 1 very short (not exceeding peduncle 4 of A2); antenna 2 slender, geniculate at flagellum; maxilliped palp short, appearing 3-segmented, segments 1-3 medium-broad, weakly medially spinose; gnathopod 1 (male) slender subchelate, segments 4, 5, and 6 tumescent posteriorly; gnathopod 1 (female) nearly simple, dactyl greatly exceeding short palm, distal segments not tumescent behind: gnathopod 2 (mature male) strongly chelate or parachelate, propod produced distad at posterior angle into a finger-like process against which closes the sinuous dactyl, segment 5 usually fused with segment 6; gnathopod 2 (female), basis short, sublinear, segment 3 elongate, 4 and 5 posteriorly tumescent; coxae 2-4 shallow, elongate, cuspate behind; coxa 5 anterolobate; coxa 6 shallowly posterolobate; peraeopods 3 and 4 closely similar, simplidactylate; peraeopods 5-7 slender, elongate, weakly heteropodous, dactyls short, with trace of outer marginal cusps; pleopods slender, slightly reduced, peduncles with 2 retinacula; uropods 1 and 2 of medium length, outer ramus of U1 usually without, of U2 usually with, marginal spines; inter-ramal spine prominent; uropod 3, ramus very short or partly fused with peduncle, weakly armed; telson lobes narrowing distally, with apical and dorso-lateral spines; coxal gills medium-large, sac-like, weakly lobate; brood plates subovate, marginal setae simple, medium length, distal*." (from Bousfield 1984)

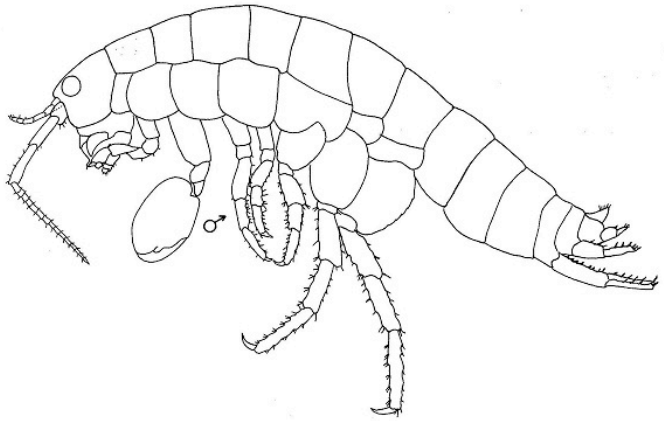


Megalorchestia californiana. Antenna 2 of female (inset) is less robust (from Bousfield 1982)

Megalorchestia – An endemic NEP genus of sand-hoppers with seven members. These are the largest and most visible of the local forms, and are probably familiar to most who have walked beaches in California. A key to the genus is provided by Bousfield (1982).

Diagnosis: "*Medium to large, smooth-bodied, heavily spinose substrate-modifying talitrids of the eastern North Pacific rim region, characterized by: head short, deep, inferior antennal sinus wide, shallowly incised, but deep to accommodate large segment 1 of antenna 2 peduncle; buccal mass directly ventral; eye medium to very large. Antenna 1 shorter than peduncle 4 of antenna 2, flagellum shorter than peduncle. Antenna 2 sexually dimorphic, often elongate and/or peduncle incrassate in male, peduncle 4 (♀) not shortened. Mandibular left lacinia cleanly 5-6 dentate, right lacinia tricuspate; maxilliped palp 3-segmented, "tall", segment 2 with pronounced/ spinose mediodistal lobe, segment 3 subconical, narrowing distally. Coxa 1 deep, anterodistal angle subacute; coxae 2-4 subquadrate, variously cuspate behind. Gnathopod 1 (♂) powerfully fossorial, spinose, carpus elongate (anterior margin nearly equal to basis) with posterodistal tumescence; propod elongate, narrowing distally, lacking true palm, postero-distal blister very shallow or lacking; gnathopod 1 (♀) segments 5 and 6 lacking blister, 6 without palm. Gnathopod 2 (♂) powerfully subchelate, palm of propod variously oblique and toothed, dactyl often with posterior marginal tooth near hinge; gnathopod 2 (♀), basis more or less strongly expanded anteromedially; segment 3 short; 4 with elongate posterior process; 5 shallow-tumescent behind; 6 shorter than 5. Peraeopods 3-7 cuspidactylate, dactyls slender; peraeopod 4, segment 5 and dactyl shorter than in peraeopod 3, dactyl constricted distally, overhanging base of unguis. Peraeopods 5-7 tending to dissimilarity (in southern species); peraeopod 6 slightly longer than peraeopod 7, all strongly spinose, dactyls moderately long. Coxa 5 anterolaobate; coxa 6 posterolobate. Abdominal side plates nearly smooth behind and below, hind corners weakly acuminate, 2 deepest, lower margin convex. Pleopods strongly reduced, 3rd shortest; peduncular outer margin long-spinose, inner margin with*

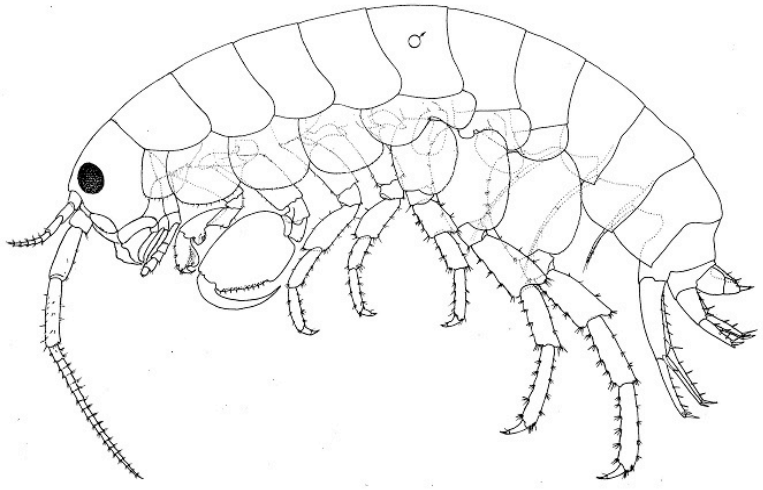
2 retinacula. Uropods 1 and 2, peduncles and both rami marginally strongly spinose; uropod 3 medium, short spinose; ramus longer than peduncle, laterally compressed, apex rounded. Telson short, broad, lobes nearly totally fused, with dorsal and apical short spines. Coxal gills small, longest on peraeopod 6. Brood plates subovate, lacking on peraeopods -4 in some species, margins with simple setae, small on peraeopod 5." (from Bousfield 1982)



Orchestia cavimana (from Bellan-Santini 1993a)

Orchestia – A medium sized genus of 22 species, although a much larger number of taxa have been assigned here in older literature. Only a single member of the genus is reported from the NEP, *O. marquesana* (Garcia Madrigal 2007). A key to differentiate the "beach-flea" genera, to which *Orchestia* belongs, is provided by Bousfield (1982). There is no comprehensive key to the genus, but since there is but a single representative in the NEP, the Bousfield key will suffice. The species is illustrated in Shoemaker (1942) based on material from Clipperton Island.

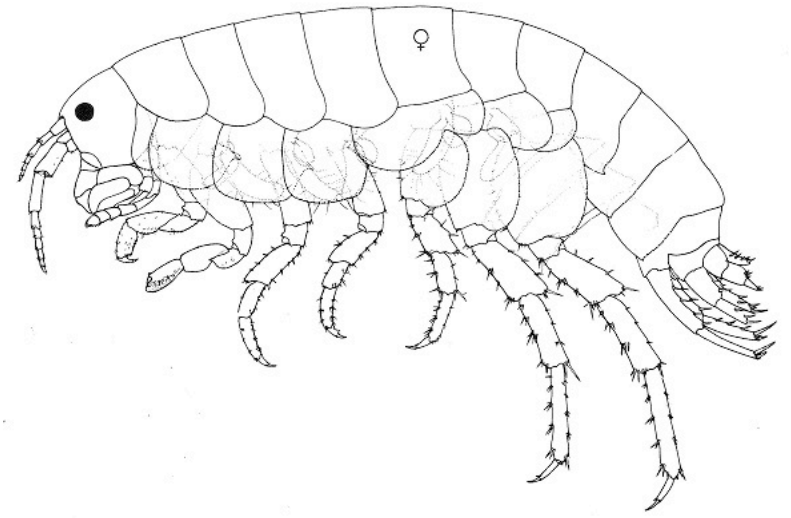
Diagnosis: "*Mx l usually with palp 2-articulate or absent. Gnathopods subchelate in both sexes, male Gn 2 larger than Gn l, female Gn 2 with propodus expanded distally, dactylus produced beyond a minute chela-forming finger. U3 lacking inner ramus, telson entire.*" (from Bellan-Santini 1993a)



Paciforchestia klawei (from Bousfield 1982)

Paciforchestia – A small genus of only three species endemic to the North Pacific. Only *Paciforchestia klawei* is reported from the NEP, with the other two species from the western North Pacific. Bousfield (1984) characterizes this group as supralittoral and associated with forest habitat. *P. klawei*, however, was described from beach habitat and not from forest litter (Bousfield 1959).

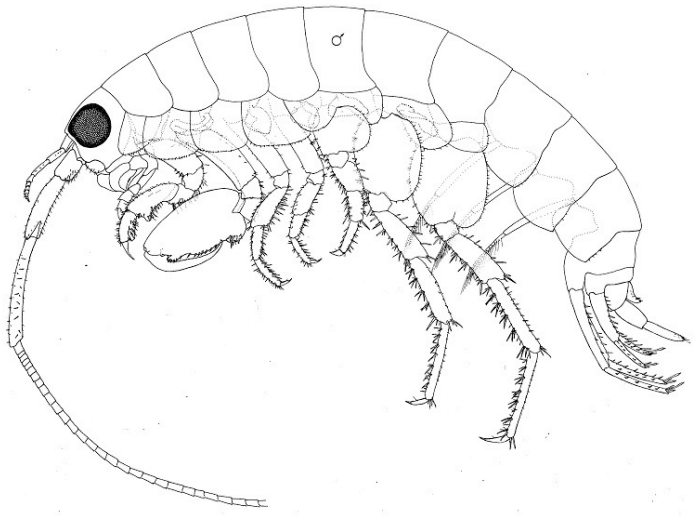
Diagnosis: "*Medium to medium-large beach fleas, characterized by: smooth, unmodified bodies; eyes lateral, medium, not dorsally contiguous; inferior antennal sinus distinct, shallow; antenna 1 extending beyond peduncular segment 4 of antenna 2, peduncle 3 longest, flagellum upturned distally; antenna 2 slender, elongate, geniculate at flagellum, not incrassate (♂). Buccal mass directly beneath head, not very deep; mandible, left lacinia fully 5-dentate; right lacinia tricuspate; maxilliped palp obscurely 4-segmented (4th minute, masked by distal spines of 3), segment 2 broad, inner distal lobe large. Coxae 2-4 broad, rounded ventrally, cuspate posteriorly. Gnathopod 1 (♂), segments 4, 5 and 6 tumescent behind, palm not exceeded by dactyl; gnathopod 1 (♀) blister vestigial or lacking on segment 4; dactyl not exceeding palm. Gnathopod 2 (♂) powerfully subchelate, palm smoothly oblique, unguis of dactyl attenuate. Gnathopod 2 (♀), basis slightly to moderately expanded anteriorly, segment 3 slightly elongate, segments 4 and 5 with weak or low posterior blisters. Peraeopods 3 and 4 elongate, unequal, cuspidactylate, dactyls short, that of peraeopod 4 weakly pinched; peraeopod 4, segment 5 shorter than in peraeopod 3; peraeopods* ***5-7*** *homopodous, increasing posteriorly, bases rounded behind; coxa 5 anterolobate; peraeopod 7 sexually dimorphic in length but not in form. Abdominal side plates deep, weakly setulose behind, hind corners minutely acuminate. Pleopods more or less reduced, pleopod 3 shortest, rami shorter than peduncles, peduncular margins smooth, retinacula 2-8. Uropods 1 and 2 slender, rami and peduncles marginally spinose, peduncle 1 with laterodistal (inner-ramal) spine. Uropod 3, peduncle very deep, strongly spinose posteriorly, ramus shorter, spinulose posteriorly and apically. Telson long, narrowing, lobes separated near tip, with a few short apical spines, occasionally singly inserted dorsolateral spines. Coxal gills reduced, modified, that of peraeopod 6 elongate, sinuous. Brood plates large, subovate, marginal setae numerous, long, simple-tipped*." (from Bousfield 1982)



Platorchestia chathamensis (from Bousfield 1982)

Platorchestia – This 20 member genus is broadly distributed, but only a single species is reported from the NEP. They are a group of cuspidactylate land-hoppers, spending their time mostly out of water, but also frequenting sandy beaches (Bousfield 1982). They burrow shallowly, and often serve as pioneer species which are displaced later by more specialized fossorial beach-hoppers. They are the northern hemisphere analogue to the southern *Talorchestia*. A key to the genus as known at the time (which had six members) that includes *P. chathamensis* is provided by Bousfield (1982). Based on a number of characters, not the least the degree of sexual dimorphism in the males and females, Miyamoto & Morino (2004) subdivided the genus into three subgenera.

Diagnosis: "*Medium-sized, smooth bodied, semi-fossorial talitrids, little evolved from the "beach flea" facies (relatively weakly spinose appendages), characterized by: antenna 1 short, not exceeding peduncle 4 of antenna 2, peduncular segments subequal; antenna 2 short, sexually dimorphic (peduncle usually strongly incrassate in male); inferior antennal sinus shallow, distinct; eyes medium to small, vertically subrectangular, quadrate to round. Buccal mass directly beneath head; left mandibular lacinia cleanly 5-dentate; maxilliped palp relatively short, broad, obscurely 4-segmented, segment 2 strongly spinose medially, with mediodistal lobe, segment 3 rounded apically, spines masking minute 4th segment. Coxa 1 shallow, shorter than cuspate coxae 2-4, anterodistal border rounded, not sharply acute. gnathopod 1 (♂) distinctly subchelate, dactyl equal to or slightly exceeding palm, propod not narrowing distally, carpus not elongate, segments 5 and 6 with posterior tumescence; gnathopod 1 (♀), propod with short palm, greatly exceeded by dactyl, segments 4-6 not tumescent behind; gnathopod 2 (♂) powerfully subchelate, palm nearly vertical, notched or sinuous, dactyl stout; gnathopod 2 (♀), basis broadened anteroproximally; segment 3 short, segment 5 (not 4) shallow-tumescent posteriorly, segment 6 shorter than carpus. Peraeopods 3-7 cuspidactylate, nails short. Peraeopods 3 and 4 unequal; in peraeopod 4, segment 5 often very short (width nearly equal length), body of dactyl usually strongly pinched or sharply constricted; peraeopods 5-7 more or less similar in form, increasing in length posteriorly, bases rounded behind, peraeopod 7 (and often peraeopod 6) sexually. dimorphic in form, segments 4 and 5 incrassate in male; coxa 5 anterolobate; coxa 6, hind lobe nearly vertical, antero-distal corner right-angled, or with short distal process. Abdominal sideplates 1-3, hind margin weakly serrulate, hind corners acute; pleopods normal, linear, outer margins of peduncles 2 and 3 weakly spinulose, inner with 2 retinacula. Uropods short, not heavily spinose; uropod 1, distolateral (interramal) spine not developed, outer ramus marginally bare or nearly so, terminal spines long; uropod 2, inner ramus spinose on inner and outer margins. Uropod 3, peduncle moderately broad, spinose posteriorly; ramus shorter than peduncle, with short posterior and apical spines. Telson short, lobes distally rounded, with dorsal and apical spine groups. Coxal gills reduced especially on peraeopods 3-5, 2 and 6 longest. Brood plates (♀), elongate-ovate, smallest on 5, marginal setae long, simple-tipped*." (from Bousfield 1982)

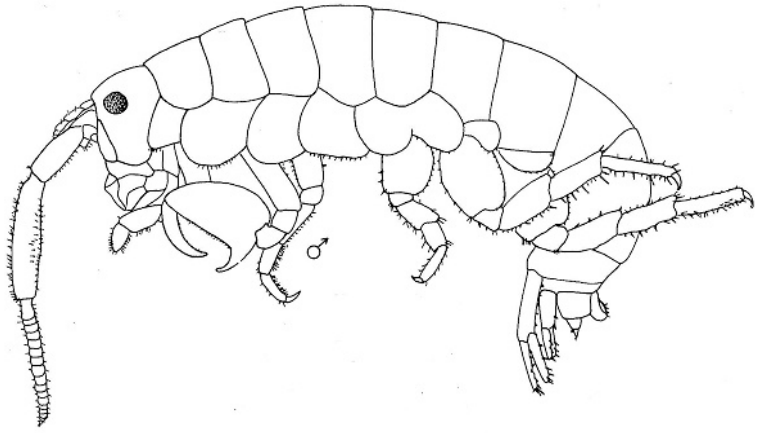


Pseudorchetoidea gracilis (from Bousfield 1982)

Pseudorchestoidea – A small genus of four members, endemic to the southern reaches of the NEP. Bousfield (1982) provides a key to the genus, including *P. brito*, since removed to *Britorchestia*. There or records of *P. gracilis* being bioluminescent, presumably because of luminous bacteria in the food they consume (Bousfield 1982)

Diagnosis: "*Small to medium, smooth, 'shallow-bodied, slender-legged sand hoppers characterized by: head and buccal mass shallow, inferior antennal sinus short, sharply incised. Eyes very large, bulging, nearly contiguous dorsally (especially male). Antenna 1 short, peduncular segments 2 and 3 subequal, flagellum shorter than peduncle. Antenna 2 slender, elongate (especially male), peduncular segments slender, not incrassate in male. Mandibular left lacinia 4-dentate, or with very weak 5th (proximal) tooth, right lacinia tricuspate; maxilliped palp tall, appearing 3-segmented, segment 2 with small mediodistal spinose lobe, segment 3 rounded-subconical, segment 4 minute (masked by spines of 3) or lacking. Coxa 1 shallower than 2-4, anterodistally subacute; coxae 2-4 shallow, wider than deep, hind margins cuspate. Gnathopod 1 (♂and♀) strongly fossorial, spinose; carpus elongate; propod distinctly shorter, lacking true palm; dactyl strong; carpus and propod with small posterior marginal blister in male only. Gnathopod 2 (♂) more· or less powerfully subchelate (or neotenically arrested at partly transformed stage); propod ovate, palm usually oblique; dactyl strong, with posterior marginal process near hinge; gnathopod 2 (♀), basis short, expanded anteriorly; segment 3 short; 4 with small posterior tumescent process (occasionally also in male); 5 deeply tumescent behind; 6 mitten-like, subequal to 5, lobe well beyond dactyl. Peraeopods 3-7 slender, lightly spined, cuspidactylate, dactyls slender; peraeopod 4 slightly shorter than 3, segment 4 not greatly shortened, dactyl weakly pinched, body not overhanging base of unguis. Coxa 5 aequilobate, elongate, lobes shallow; coxa 6, hind lobe shallow, anterior margin usually oblique. Peraeopods 5-7 heteropodous, peraeopod 5 markedly shorter than, and basis and segments 3-6 of different form from, those of peraeopods 6 and 7; dactyl of 5 very short, thick, with "fuzz" setae posteriorly, nail vestigial; peraeopods 6 and 7 elongate, 7 longer. Abdominal side plates 1-3 medium deep, nearly smooth below and behind, hind corners acuminate. Pleopods slender; peduncles sublinear, elongate, inner margin with 2 retinacula, 2 and 3*

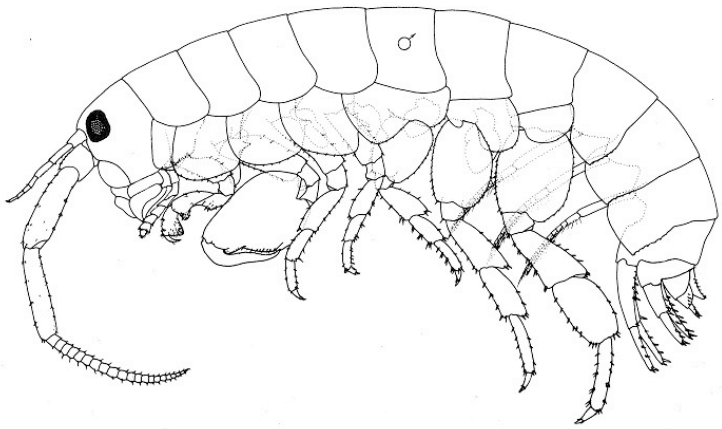
always with outer marginal spines; rami subequal, multisegmented or partly reduced, shorter than respective peduncles. Uropods 1 and 2 slender, weakly spinose, with terminal spade spines; uropod 1, outer ramus bare, or with outer marginal spines only; prepeduncle of urosome 1 elongate; uropod 2, rami usually subequal, outer ramus with outer marginal spines only. Uropod 3 usually elongate, occasionally sexually dimorphic; peduncle not expanded but weakly spinose behind; ramus equal to or longer than peduncle, laterally compressed, margins and apex short spinose. Telson usually narrowing distally, apex slightly notched or entire, lobes with short apical and dorsal spines. Coxal gills small, sinuous, those of peraeopods 3-5 smallest, that of peraeopod 6 not elongate. Brood plates small, narrowly ovate, smallest on peraeopod 5, margins distally and sparsely simple-setose." (from Bousfield 1982)



Talorchestia deshayesi (from Bellan-Santini 1993b)

Talorchestia – A medium sized genus of 29 species, although many more species formerly assigned to this genus have been reassigned to newly created genera in recent years. Bousfield (1984) refers to this as a southern hemisphere genus analogous to *Chelorchestia* in the northern hemisphere. In reality there are both northern and southern species flocks, and the genus is well represented both in austral regions and in the North Atlantic. A single species is present in the NEP, *T. fritzi*, known from the Pacific side of central America. Nomenclature within this genus has changed over the years so that species originally treated as *Talorchestia* (i.e. in Morino 1972) now are placed in other genera. He did, however, make interesting comparisons of body form and habitat, pointing out that those with rounded bodies (his *Talorchestia*, now *Sinorchestia* and *Trinorchestia*) were sand dwellers, while those compressed laterally lived among stones on rocky shores.

Diagnosis: "*Like Orchestia, except that gnathopod 1 in ♀ is simple, instead of subchelate. Peraeopod 2 usually has the inner margin of the finger more sharply constricted than in allied genera*." (from Stebbing 1906)

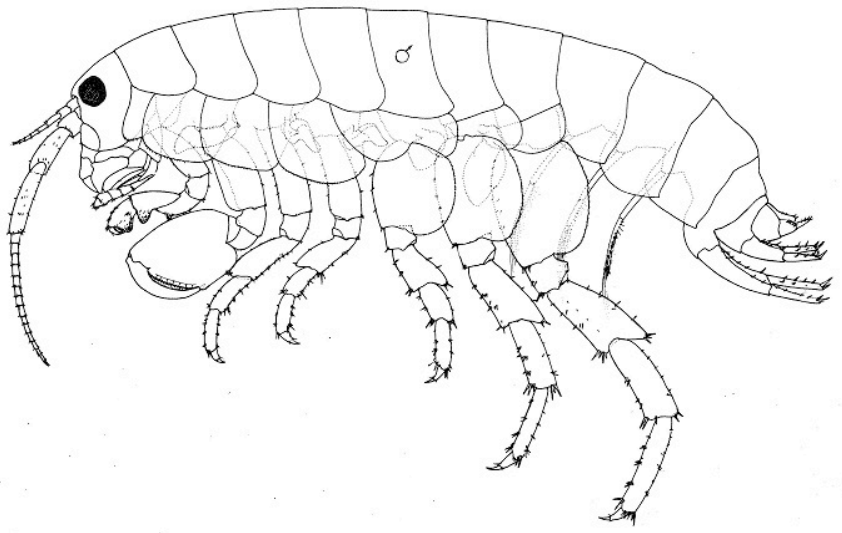


Transorchestia chilensis (from Bousfield 1982)

Transorchestia – A small genus of large smooth bodied beach fleas, almost exclusively Southern Hemisphere in distribution (Bousfield 1982). The single species known from NEP waters, *T. enigmatica*, was assumed introduced to Lake Merritt near San Francisco from a southern hemisphere source (Bousfield & Carlton 1967). While the source has not yet been located, Bousfield (1982) remains confident that it is a species as yet unnamed within the *T. chilensis* complex of species, all known from the southern hemisphere. The genus currently contains six described species. Bousfield (1982) provides a key to the genus, but this does not separate the members of the *T. chilensis* group.

Diagnosis: "*Medium to medium-large smooth-bodied beach fleas, almost exclusively southern hemisphere, characterized by: eyes medium, lateral; antenna 1, peduncular segment 3 longest; antenna 2 sexually dimorphic, peduncle incrassate in male;, inferior antennal sinus distinct, medium deep; buccal mass directly ventrally; mandibular left lacinia cleanly 4-dentate (rarely with 5th vestigial tooth), right lacinia tricuspate; maxilliped palp obscurely 4-segmented (4th minute, masked by spines of 3rd), segment 2 broad, with distinct medio-distal lobe. 1 (0) deeply subchelate, palm much exceeding dactyl, segments 5 and 6 strongly, and 4 tumescent behind; gnathopod 1 (♀) fully subchelate, dactyl slightly (or not) exceeding transverse palm, segments 4-6 lacking tumescent process; gnathopod 2 (0), propod powerfully expanded, palm oblique, usually with stout (hinge) tooth, dactyl sinuous; gnathopod 2 (♀), basis little expanded, segment 3 short, 4 and 5 shallowly tumescent behind. Coxae 2-4 rounded ventrally, strongly cuspate behind. Peraeopods 3-7 cuspidactylate, dactyls short; peraeopod 4 shorter than peraeopod 3, segment 5 shorter, dactyl weakly pinched; peraeopods 5-7 weakly heteropodous, peraeopod 7 longest, peraeopods 6 and 7 sexually dimorphic in size and form; coxa 5 anterolobate, coxa 6 posterolobate, anterior margin of hind lobe nearly vertical. Abdominal side plates 2 and 3 weakly serrate behind, hind corners subacute; pleopods slender, normal (rami usually longer than peduncle), outer margin of peduncles very weakly spinose and/or lined with fine "fuzz" setae. Uropod 1, peduncular distolateral (inter-ramal) spine not developed, rami weakly marginally spinose; uropod 2, inner ramus,· both margins spinose. Uropod 3, peduncle deeply broadened, posterior margin short-spinose; ramus short. Telson elongate, tongue-shaped, lobes distally narrowing, separated apically, each with long dorsolateral marginal row of short stout spines, and apical spines. Coxal gills 3-5 somewhat reduced, those of peraeopod 2 and*

peraeopod 6 large and bladder-like. Brood plates (♀) broadly subovate, margins with numerous long hook tipped setae." (from Bousfield 1982)



Traskorchestia traskiana (from Bousfield 1982)

Traskorchestia – A four member genus of North Pacific endemics, three of which occur in the NEP. Bousfield (1982), who provides a key to the species, views this genus as close to the southern hemisphere *Transorchestia*. He classifies them ecologically as beach-fleas and as non-sediment modifiers following the division of MacIntyre (1963). They do not form burrows, living freely on the sand surface and among strand-line litter.

Diagnosis: *"Small to medium-large beach fleas characterized by: smooth, unmodified bodies; eyes lateral, not dorsally contiguous; antenna 1 equal to or slightly exceeding peduncle 4 of antenna 2, peduncle 3 longest; antenna 2 not elongate, peduncle not incrassate in male; inferior antennal sinus distinct, medium deep; buccal mass directly beneath head, not significantly prognathous; mandible, left lacinia 4 1/2 (-5) - dentate, right lacinia tricuspate; maxilliped palp medium, obscurely 4-segmented (4th minute, masked by spines of 3), segment 2 broadly expanded medially, with distinct mediodistal lobe. Coxa 1 medium, half-overlapped by 2; coxae 2-4 broader than deep, lower margins nearly straight, hind margins cuspate. Gnathopod 1 (♂), dactyl shorter than palm, segments 5 and 6 (occasionally 4) tumescent behind; gnathopod 1 (♀), palm short, slightly exceeded by dactyl, segment 4, 5 not, 6 slightly posterodistally tumescent behind; gnathopod 2 (♂) powerfully subchelate, propod short, deep, palm smoothly convex; gnathopod 2 (♀), basis moderately expanded anteriorly, segment 3 short, segments 5 and 6 shallow-tumescent posteriorly. Peraeopods 3-7 cuspidactylate, dactyls (especially unguis) short; peraeopod 4, segment 5 distinctly shorter, and dactyl strongly pinched, differing from respective segments of peraeopod 3; peraeopods 5-7 more or less homopodous, increasing in length posteriorly, bases rounded behind, that of peraeopod 7 may be sexually dimorphic (e.g., T. ditmari); coxa 5 aequi- or slightly antero-lobate, coxa 6 hind lobe steeply oblique, anterodistally rounding. Abdominal side plates medium deep, hind corners subacute, posterior margins weakly spinulose; pleopods slender, rami normal or variously reduced, peduncles with 2 retinacula, all peduncles with a few outer*

marginal spines. Uropods 1 and 2 short to medium, outer ramus marginally spinose, inner ramus both margins spinose, peduncles lacking laterodistal (inter-ramal) spine; uropod 3,
peduncle deep, posterior margin spinose, ramus tapering, margins and apex short-spinose. Telson short to medium, with apical and dorsal groups of spines, apex notched. Coxal gills lobate, 3-5 much smaller than 2 and 6. Brood plates (♀) large, subovate, margins with numerous long hook-tipped setae." (from Bousfield 1982)

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