Amphipoda of the Northeast Pacific (Equator to Aleutians, intertidal to abyss): VIII. Neomegamphopoidea – a review Donald B. Cadien, LACSD, 22 July 2004 (revised 21 Apr 2015)

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 Neomegamphopoidea

A relatively small superfamily created by Myers and Lowry (2003) based on their cladistic analysis of the corophioids. Myers had first identified its core group as a separate lineage in 1973. He erected the family Neomegamphopidae in 1981, later using it as the base for the superfamily. The superfamily, which is placed in the infraorder Corophiida, contains two families, the Neomegamphopidae and the Priscomilitariidae. The former is widespread, and occurs in the NEP, while the latter is restricted to the NWP. Only one of the members of this superfamily range into the waters of the SCB, and none are yet recorded on the SCAMIT Taxonomic Listing, not having been encountered in either POTW monitoring, regional monitoring, or local research programs.

Horton (2015) lists these families as in the superfamily Microprotopoidea, a position not supported by her cited source Myers & Lowry (2003). Those authors retained the Microprotopoidea for only the Microprotopidae, indicating it had no synapomorphies with any other group. This position is retained in Lowry & Myers (2013). No rationale is provided for this change, and we follow Myers & Lowry in retaining the present families in the superfamily Neomegamphopoidea.

Diagnosis of the Neomegamphopoidea

"Head rectangular, anterior distal margin recessed; lateral cephalic lobe extended, eye at least partly enclosed in extended lobe, anterior ventral margin moderately recessed and moderately excavate. Mandible palp article 3 subsymmetrical, distally flattened, with setae mostly distal. Gnathopod 1 enlarged. Gnathopod 2 in male enlarged or not. Pereopod 5 carpus long, subrectangular. Pereopods 5-7 not subchelate, without accessory spines on anterior margin; pereopod 7 longer than pereopod 6. Urosomites not coalesced. Uropod 3 peduncle short. Telson without hooks or denticles." (Myers and Lowry 2003).

Ecological Commentary

Few representatives of the group have been described, and ecological information is very limited. According to the morphological comments of Myers (1981), neomegamphopids are probably domicolous. Barnard (1979) states that *Varohios* were taken from small polychaete-like tubes, possibly self-constructed. Shoemaker (1942) recorded the type material of *Neomegamphopus roosevelti* as coming from filamentous green algae, but did not mention tubes. In his careful sampling of various intertidal substrates for amphipods, J. L. Barnard (1969) reported *N. roosevelti* species as coming from mixed red and brown algae, kelp holdfasts, tunicates at surf-grass bases, tunicates

with soft polychaete tubes, and soft polychaete tubes. Perhaps these latter are actually self-constructed, as suggested for *Varohios*. Munguia et al (2007) describe *Neomegamphopus hiatus* as tubicolous. Myers (1968) made no mention of tubes for *Pseudomegamphopus*, noting only that the species came from shallow coarse sand or sandy/shelly bottoms. These do not normally facilitate tube-dwelling species, although the ischyrocerid *Notopoma* sp A is known from wave swept bottoms, where its tube is only intermittently attached.

Given the setosity of the gnathopods of these animals, it is highly likely that they are surface detritus feeders. The antennae, while setose, are not so densely setose as to suggest filter-feeding. Sifting of the surface sediments through the setal filter on the outside of the gnathopods should allow organic rich detritus to be collected and eaten. Perhaps small living infauna might also be caught, although this is not likely to be the major nutrient input for this feeding method.

Key to NEP Neomegamphopoid genera

1. Gnathopod 1 consisting of 6 segments, with propod closing on carpochelate palm as a pincher.....*Varohios*
   Gnathopod 1 consisting of 7 segments, either carpo or propodochelate.....2
2. Gnathopod 1 propodochelate.....*Pseudomegamphopus*
   Gnathopod 1 carpochelate.....*Neomegamphopus*

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

Family Neomegamphopidae

Neomegamphopus heardi J. L. Barnard and Thomas 1987 – Bahia Hondo: 4m

Neomegamphopus pachiatus J. L. Barnard and Thomas 1987 – Bahia Hondo, Panama: 4m

Neomegamphopus roosevelti Shoemaker 1942 – Florida, Venezuela; Corona del Mar, southern California to Ecuador: 0-42m

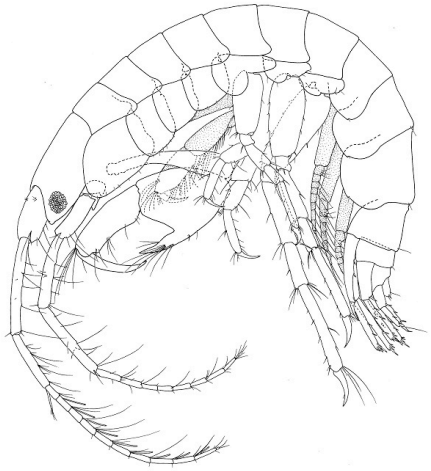
Pseudomegamphopus barnardi Myers 1968 – Salinas Bay, Costa Rica: 3m

Varohios topianus J. L. Barnard 1979 – Gulf of California to Galapagos Ids.: 0m

Family Priscomilitariidae – no representatives in the NEP

Comments by Family

<u>Family Neomegamphopidae</u> – Horton and Lowry (2015) list six genera as constituting the family. Of these, *Neomegamphopus*, *Pseudomegamphopus*, and *Varohios* occur within the NEP. Nearly all the representatives of this group are tropical in distribution, with only a single taxon occurring in the SCB. Most easily separated from local corophioids with protuberant eyes by the reversed polarity of the gnathopods, with G1 larger than G2.



Neomegamphopus hiatus from the Caribbean (from J. L. Barnard & Thomas 1987)

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

Antenn*a 1 shorter than antenna 2, or subequal to antenna 2; peduncle with sparse robust and slender setae; 3-articulate; peduncular article 1 shorter than article 2; article 2 longer than article 3; peduncular articles 1-2 not geniculate;* ***accessory flagellum present****; antenna 1 callynophore absent. Antenna 2 present; medium length; articles not folded in zigzag fashion; without hook-like process; flagellum shorter 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 present. Maxilla 1 present; inner plate present, strongly setose along medial margin or weakly setose apically (start); palp present, not clavate, 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.

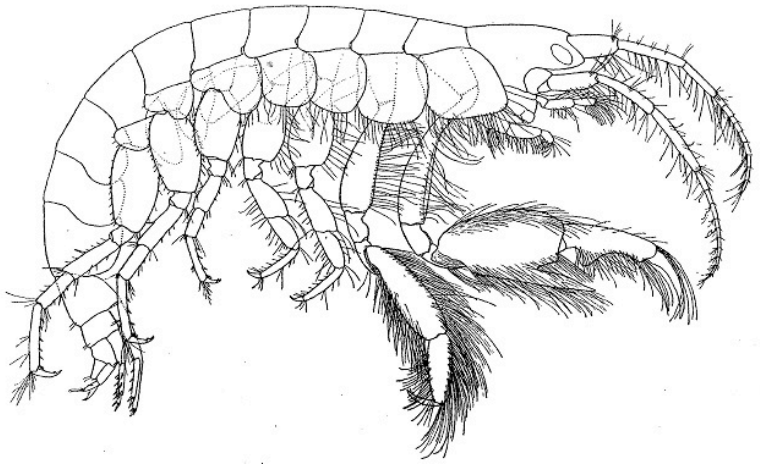
Gnathopod 1 sexually dimorphic, or not sexually dimorphic; subequal to gnathopod 2, or larger (or stouter) than gnathopod 2; subequal to coxa 2, or larger than coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; subequal to propodus, or longer than propodus; 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 parachelate; coxa 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 elongate, subequal to propodus or longer than propodus, not produced along posterior margin of propodus.

Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly) or homopodous (3-7 directed posteriorly), none prehensile. Peraeopod 3 well developed. Peraeopod 4 well developed. 3-4 with glandular basis, or 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, 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 smaller than coxa 4****, with posterodorsal lobe;* ***basis*** *expanded,* ***subovate****, without posteroventral lobe; merus/carpus free; carpus linear; setae absent. Peraeopod 6 shorter 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 slightly 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****. Uropod 2 well developed; without ventromedial spur, without dorsal flange; inner ramus subequal to outer ramus. Uropod 3 not sexually dimorphic; peduncle short or elongate; outer ramus longer than peduncle, 1-articulate or 2-articulate, without recurved spines. Telson thickened dorsoventrally; entire; longer than broad, or as long as broad; apical robust setae present, or absent*." (Lowry and Springthorpe 2001).

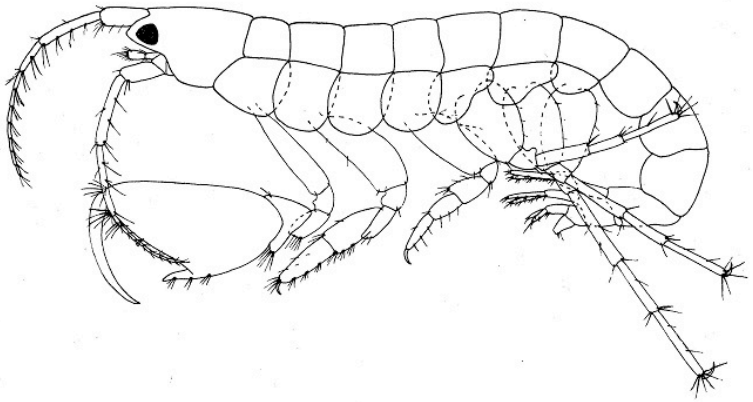


Neomegamphopus roosevelti male (from Shoemaker 1942)

Neomegamphopus – The only member of the genus which occurs in the SCB is *N. roosevelti*, which reaches its northern distributional endpoint at Corona del Mar. Two other species are known from Pacific Panama. The remaining three members of the

genus are from the Caribbean (1), and the Indian Ocean (2). This is the largest genus in the superfamily.

Diagnosis: "*Body slender. Head with lateral lobes considerably projecting. Eyes well developed. Antennae 1 and 2 slender and 1 the shorter. Accessory flagellum very small, 2-jointed. Mandibular palp stout, third joint shorter than second and distally truncate. Maxilla 1, inner plate with 1 or 2 setae; outer plate with 10 spine teeth. Maxilla 2, outer plate broader and longer than inner, inner plate bearing oblique row of spinules. Maxillipeds, inner plate shorter than outer and bearing two teeth on truncate extremity; outer plate bearing a few teeth on inner edge and a few plumose spines and a few spine teeth on upper margin. Lower lip with very well-developed inner lobe. Gnathopod 1 in male the larger; fifth joint greatly developed with lower margin produced forward into a tooth; sixth.. and seventh joints slender. Gnathopod 2 in male long and slender; sixth joint shorter than fifth and bearing the mere suggestion of a palm. Gnathopods 1 and 2 in female simple and much like gnathopod 2 of male. Side plate 4 not excavate behind. All peraeopods with second joint about equally expanded . Peraeopod 5 the longest. All uropods with outer ramus shorter than inner. Outer ramus of uropod 3 apparently with a very small indistinct second joint. Telson simple, tumid.*" (from Shoemaker 1942)



Pseudomegamphopus barnardi male (from Myers 1968)

Pseudomegamphopus – Five species are listed for this genus in WoRMS, but *P. pseudochelatus* has been transferred to *Variohios*. *Pseudomegamphopus chelatus* of Ledoyer 1979 was recognized as a homonym of *P. chelatus* (Walker 1904), prompting the proposal of the replacement name *P. pseudochelatus*. Both are retained as valid species in *Pseudomegamphopus* on WoRMS (Lowry 2015), leaving only three species actually in the genus. Of these one occurs in Pacific Costa Rica, its cognate in Caribbean Venezuela, and one in South Africa.

Diagnosis: "*Head with the lateral lobes strongly produced, acute, lower part of head cut back behind the eye. Antenna subequal to or longer than the antennule, slender, with multi-articulate flagellum and deeply inserted on lower surface of head; accessory flagellum reduced, two jointed. Mandibular palp with article 2 the longest, article 3 distally truncate gnathopod 1 (=peraeopod 1) in the male, larger than gnathopod 2, with article 5 very reduced and article 6 massively developed; gnathopod 2 sub-chelate; peraeopods 3 and 4 glandular. Uropod 3 biramous, the rami and peduncle subequal in length.*" (from Myers 1968)

Strongly setose pincher-like G1 of male *Varohios topianus* (from J. L. Barnard 1979)

Varohios – A very small genus with the sole NEP representative, *V. topianus*, its type. The other two species are from the Indian Ocean off Madagascar, and Sri Lanka. Diagnosis: "*Antenna 2 inserted deeply below head and behind eye, ocular lobes strongly protuberant; article 3 of antenna 1 longer than article 1, accessory flagellum 2-articulate; antennae 1-2 extending subequally, thin, of medium length. Mandibular palp article 3 tumid, heavily setose. Inner plate of maxilla 1 small, bearing 1 medial seta. Maxillipedal palp article 4 short, stubby, with stout apical spine and several subapical setae. Male gnathopod 1 much larger than gnathopod 2, bearing only 6 articles (either article 5 or article 7 absent or resorbed in adjacent articles), article 6 forming dactyl bearing large inner tooth and closing on long chela of article 5 (forming hand), gnathopod 2 small, moderately setose, article 6 longer than article 5, female gnathopods 1-2 small like male gnathopod 2, subequal in size to each other. Coxae overlapping serially, coxa 1 of male broader than coxa 2, coxa 5 with anterior lobe as long as coxa 4. Rami of uropod 3 extending equally and subequal to peduncle, latter slightly elongate (in familial context), outer ramus with small barrelshaped article 2*." (from J. L. Barnard 1979)

Family Priscomilitariidae – Both genera included in this family post-date the monographic treatment of gammarids by J. L. Barnard and Karaman (1991), which effectively ceased adding new taxa in 1986. Since *Priscomilitaria* was erected by Hirayama in 1988, and *Pseudophotis* by Ren in 1997, neither are included in the monograph. These two monotypic genera are currently known only from the Northwest Pacific, with no representatives in the NEP.

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