

Amphipoda of the Northeast Pacific (Equator to Aleutians, intertidal to abyss): XII.
Bogidielloidea – an updated 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 Bogidielloidea

A group of predominantly freshwater hypogean amphipods common and widely distributed in the groundwater biota. J. L. Barnard and C. M. Barnard (1983) discuss the group (pp. 63-67), noting that it is confined to the tropics in the Western Hemisphere, while ranging to 53°N in Europe. Only a single representative occurs in brackish mangrove environments in the southern portion of the NEP. It is possible that additional species will be detected in similar habitats, but the superfamily will remain a minor component of the NEP marine gammarid fauna.

While we follow Bousfield in allotting superfamily level status to the group, this was felt unsupported by Barnard and Karaman (1980), a position echoed by Stock (1981) in his treatment of the family Bogidiellidae. The group apparently stems from the middle Cretaceous (Bousfield 1982), a suggestion supported by Stock's zoogeographic analysis. Subsequent analysis (Lowry and Myers 2013) supports not only superfamily rank to the Bogidielloidea, but also supports infraordinal rank of the Bogidiellida. These fall within their newly erected subclass Senticaudata, along with the infraorders Talitrida, Hadziida, and Gammarida.

Aside from the members of the family Bogidiellidae, the completely freshwater families Artesiidae and Salentinellidae are included in the superfamily. Consequently, the superfamily as treated here is composed only of the Family Bogidiellidae in the NEP.

Diagnosis of the Bogidielloidea

“Highly apomorphic, hypogean, eyeless amphipods distinguished by the following characters: body generally elongate, unarmed, non-carinate; pleosome deep, urosome very weakly toothed, spinose or setose dorsally; head with pronounced inferior antennal sinus; coxal plates 1-4 usually shallow or vestigial, barely or not continuous; coxae 5-7, anterior lobe deeper; antennae short, 1 longer than 2, peduncle, 2 not elongate, accessory flagellum small; calceoli (on A 1) slender rod-like, lacking on antenna 2; mouthparts modified and/or reduced; upper lip apically shallow-incised; mandible, molar reduced, triturate, palp strong, segment 3 not shortened, segment 2 setose on inner margin; lower lip broad, inner lobes weakly to strongly developed; maxilla 1, outer plate with (6-8) apical spine-teeth, inner plate with 1-8 (usually 2) apical setae; maxilla 2, plates with apical setae only; maxilliped, plates small, weakly armed, palp large, strongly dactylate; gnathopods 1 and 2 powerfully subchelate, differing in size (usually the larger) and form (carpus of 2 longer, less deep), slightly sexually dimorphic, basis of

gnathopod 1 stouter than 2; peraeopods 3 and 4 slender, basis often “broadened” in middle; peraeopods 5-7, basis sublinear, not broadly expanded, segment 6 often long-setose, dactyls simple or pectinate; pleopods variously reduced, rami (especially inner) small or lacking, when present, often sexually dimorphic, highly modified in ♂, uropods 1 and 2, short, outer ramus shorter (occasionally lacking), baso-facial spine usually present; uropod 3 strong, variously biramous, spinose only (not setose); telson short, lobes variously fused or entire, apices truncate, spinose. Coxal gills small, pedunculate, on peraeon segments 2-6 (or fewer); accessory gills (when present) on peraeon 2-7 (or fewer); brood lamellae linear or lacking; marginal setae variable in length and number.” (Bousfield 1977).

Ecological Commentary

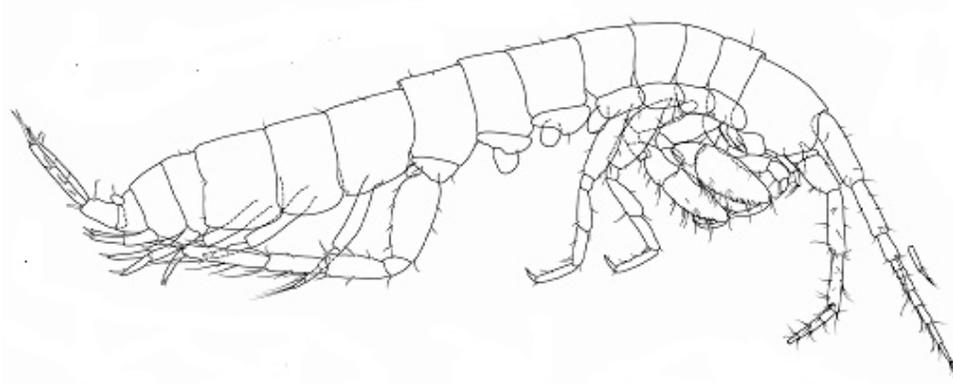
No information on the ecology of bogidiellids is currently available. All are, however, small, a few exceptional taxa exceeding 5mm in length. They are generally elongate and vermiform, although a few of the taxa are more typically amphipod shaped. They do not have setosity of mouthparts or anterior appendages which would be appropriate for suspension feeding, or the winnowing of sediments for organic particles. For lack of a better guess, I would assume that they are micropredators of small copepods, or other groundwater or interstitial forms.

NEP Bogidielloidea

Family Bogidiellidae

Bogidiella coipana Ortiz, Winfield & Lalana 2001 – Panama; among mangroves

Comments by Family



Xystriogidella juliani a marine interstitial bogidiellid from Australia (from Coleman 2009)

Family Bogidiellidae – Although consisting of thirty-six genera, nearly all the family representatives are fresh-water. Only one brackish-water species within the group occurs in the Northeast Pacific, all other species and genera being either extralimital, freshwater, or both. Some forms live in interstitial intertidal habitats where outflowing fresh water mixes to form poikilohaline waters in which bogidiellids live (Stock 1994). Truly marine bogidiellids do occur interstitially in coralligenous sands around reefs in the Indo-Pacific (Stock 1984, Coleman 2009).

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 cylindrical, or subcylindrical; cuticle smooth.

Antenna 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, or longer than article 2; antenna 1 article 2 longer than article 3; peduncular articles 1-2 not geniculate; accessory flagellum present, or absent; antenna 1 calynophore absent. *Antenna 2* present; short, or medium length; articles not folded in zigzag fashion; without hook-like process; flagellum shorter than peduncle; less than 5-articulate, or 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, triturate; palp present. *Maxilla 1* present; inner plate present, weakly setose apically or without setae; palp present, not clavate, 1-2 -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, article 3 without rugosities. *Labium* smooth.

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

Coxae 1-7 vestigial or absent or reduced, none fused with peraeonites. *Coxae 1-4* as long as broad or broader than long, overlapping or discontinuous, 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, or larger (or stouter) than gnathopod 2; smaller than coxa 2, or subequal to coxa 2; gnathopod 1 merus and carpus not rotated; gnathopod 1 carpus/propodus not cantilevered; shorter than 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* not sexually dimorphic; simple, or subchelate; 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 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, longer than broad or broader than long; carpus shorter than propodus or subequal to propodus, not produced; dactylus well developed. Coxa subequal to coxa 3 or larger than 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 or subequal to coxa 4 or larger than coxa 4, with posterodorsal lobe or without posterior lobe; basis expanded or slightly expanded or linear, subrectangular or subovate, with posteroventral lobe or without posteroventral lobe; merus/carpus free; carpus linear; setae absent or with a few subterminal setae. *Peraeopod 6* shorter than peraeopod 7;

merus/carpus free; dactylus without setae, or with a few subterminal setae. *Peraeopod 7* with 6-7 well developed articles; longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded or slightly expanded or linear, without dense slender setae; dactylus without setae or with a few subterminal setae.

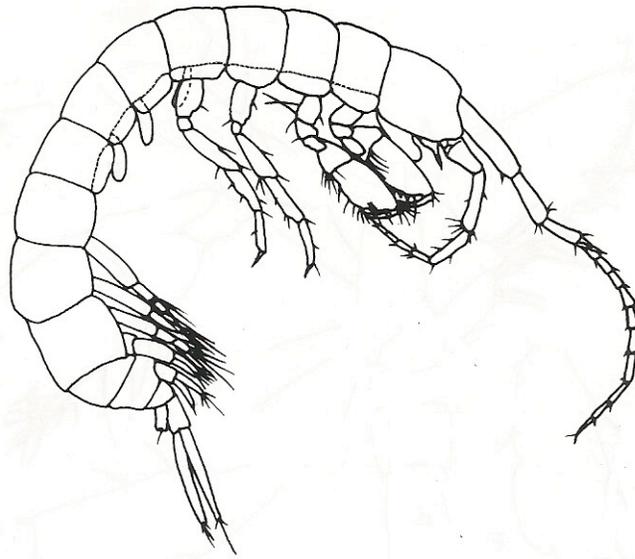
Peraeopods heteropodous (3-4 directed posteriorly, 5-7 directed anteriorly), none prehensile. *Peraeopod 3* well developed. *Peraeopod 4* well developed. **3-4 not glandular**; 3-7 without hooded dactyli, 3-7 propodi without distal spurs. Coxa well developed, longer than broad or broader than long; carpus shorter than propodus or subequal to propodus, not produced; dactylus well developed. Coxa subequal to coxa 3 or larger than 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 or subequal to coxa 4 or larger than coxa 4, with posterodorsal lobe or without posterior lobe; basis expanded or slightly expanded or linear, subrectangular or subovate, with posteroventral lobe or without posteroventral lobe; merus/carpus free; carpus linear; setae absent or with a few subterminal setae. *Peraeopod 6* shorter than peraeopod 7; merus/carpus free; dactylus without setae, or with a few subterminal setae. *Peraeopod 7* with 6-7 well developed articles; longer than peraeopod 5; similar in structure to peraeopod 6; with 7 articles; basis expanded or slightly expanded or linear, without dense slender setae; dactylus without setae or with a few subterminal 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, with 1 or 2 basofacial robust setae or 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 or elongate; outer ramus longer than peduncle, 1-articulate, without recurved spines. *Telson* laminar; moderately cleft, or weakly cleft, or emarginate, or entire; longer than broad, or broader than long; apical robust setae present, or absent." (Lowry and Springthorpe 2001).

The family has been treated several times in the literature. Stock (1981), concentrating on the West Indian fauna, reviewed the family and found it to clearly adhere to the pattern of Tethyan relict distribution. There are, however, bogidiellids known from areas outside the boundary of the former Tethys Sea. Most, if not all of these, were rejected as members of the Bogidiellidae by Koenemann and Holsinger (1999) based on a cladistic analysis.

The origin of the family is variously attributed to either fresh or marine waters. The question was left unresolved during the last comprehensive review, and as new species are discovered in additional habitats, will probably become even more confusing. The sole NEP marine representative was described after the treatment of Koenemann and Holsinger; all other species in the family are from either other areas, or from inland fresh waters in Mexico, and Central America.



Bogidiella coipana (from Ortiz et al 2001)

Bogidiella – The genus is very widely distributed, with 66 species worldwide (Lowry 2014). Virtually all are restricted to fresh groundwaters, although in some island forms these waters are mixohaline. A single species is known from reduced salinity seawater in mangroves in Panama, the only record of the family in the NEP from marine waters. Other species are known from the region, but only in fresh groundwater (Ruffo and Vigna Taglianti 1973).

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