

Coxae ordinary, moderately setose, coxa 1 rectangular or weakly expanded, coxa 4 lobate. Gnathopods diverse, gnathopod 1 small, wrist of medium length, weakly lobate, hand slightly longer than wrist, rectangular, palm slightly oblique, gnathopod 2 enlarged in both sexes, wrist in female of medium length, weakly lobate, hand elongate, rectangular, palm oblique, in male wrist short, strongly lobate, hand much enlarged, palm very oblique, often plain but usually sculptured with specific tooth formulas, dactyl elongate or short, gently or deeply curved, occasionally riding onto medial face of hand; other variables present.

Article 2 of pereopods 5-7 weakly expanded, scarcely to slightly lobate posteroventrally, naked, setulate or strongly setose posteriorly; pereopods 5-7 generally short and stout.

Rami of uropods 1-2 extending equally or subequally, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 scarcely extended, magni or variramous, occasionally almost parviramous, rami or at least outer ramus broad and short, outer ramus always strongly spinose, article 2 if present cryptically vestigial. Telson short to ordinary, deeply cleft, apically spinose, each lobe generally with naked apicomediaal protrusion.

Gills 2-6, broad. Oostegites slender.

Relationship.--Differing from Maera in the falcate article 3 of the mandibular palp.

Variations.--Urosome with tooth (neglectus, japonicus); basis of pereopods 5-7 unlobed (spinidactylus).

Species.--affinis Della Valle, 1893 (= congoensis Shoemaker, 1920b) (Monod, 1931a) [352];

antennatus (Stout, 1913) (J.L. Barnard, 1962a) [370];

atolgidus J.L. Barnard, 1965 [591];

bampo J.L. Barnard, 1979 [370];

barbatus Schellenberg, 1925a, 1939b [448];

besnardi Oliveira, 1951 (? = brasiliensis) [462];

bollonsi Chilton, 1915 (J.L. Barnard, 1974) [770];

brasiliensis (Dana, 1853) (J.L. Barnard, 1965) [TL=751];

buchneri Spandl, 1924 (Ruffo, 1969) [677];

calliactis Edmondson, 1951 (J.L. Barnard, 1970) [381];

caprai Maccagno, 1936 [677];

chevreuxi Cecchini, 1928a, 1928c [348];

- crassimana (Miers, 1884) [dubious] (Stebbing, 1910) [781];  
delaplata Stebbing, 1888 [751];  
dentiferus Schellenberg, 1938 [576, 578];  
dentipalmus Walker, 1916 [761];  
diplonyx Schellenberg, 1938 (?J.L. Barnard, 1970) [551];  
dubius Walker, 1904 (Nayar, 1967) [665];  
ecuadorensis Schellenberg, 1936b (J.L. Barnard, 1979) [546];  
erythraeus (Kossmann, 1880) (Sivaprakasam, 1970a) [685];  
excavatus Schellenberg, 1938a (J.L. Barnard, 1965) [580];  
fusimanus Oliveira, 1951 [751];  
gracilis Schellenberg, 1938a (Ruffo, 1969) [600];  
hawaiensis Schellenberg, 1938a (J.L. Barnard, 1970) [381];  
holgurus J.L. Barnard, 1962b, 1969a [373];  
hoohero J.L. Barnard, 1970 (Ledoyer, 1972) [381];  
japonicus Stephensen, 1932 (Sivaprakasam, 1970b) [600];  
levis (S.I. Smith, 1873) (Bousfield, 1973) [364];  
magnispinatus Kunkel, 1910 [367];  
mayo J.L. Barnard, 1979 [540];  
menurte J.L. Barnard, 1974 [788];  
miersi (Wrzesniowsky, 1879) [dubious] [548];  
minimus Chevreux, 1908c (Pirlot, 1936) [555];  
molokai J.L. Barnard, 1970 [381];  
mutatus J.L. Barnard, 1962a, 1979 [373];  
neglectus Chilton, 1915 (J.L. Barnard, 1972b) [775];  
ocoroni J.L. Barnard, 1979 [546];  
pectenicrus (Bate, 1862) (= serrula Walker, 1904) (J.L. Barnard, 1970) [421];

- perditus Reid, 1951 (A. Mateus & E. Mateus, 1966) [350];
- peruvianus (Dana, 1852, 1853) [dubious] [548];
- piikoi J.L. Barnard, 1970 [381];
- pocillimanus (Bate, 1862) (= brevicaudata Heller, 1867) (J.L. Barnard, 1970) [421];
- podotrichius Ruffo, 1969 [677];
- pseudaffinis Schellenberg, 1938a (Ledoyer, 1972) [600];
- rapax Costa, 1853 (Chevreux and Fage, 1925, any other possibly erroneous) [TL = 340];
- serricatus J.L. Barnard, 1969b, 1979 [535];
- smirnovi Bulycheva, 1952 (Tzvetkova, 1967) [391];
- spinibasus Sivaprakasam, 1970a [665];
- spinidactylus Chevreux, 1907b, 1908c (J.L. Barnard, 1970) [421];
- spinimanus Walker, 1904 (Nayar, 1967) [600];
- steinitzii Ruffo, 1959a, 1969 [677];
- temori J.L. Barnard, 1979 [546];
- tiburoni J.L. Barnard, 1979 [377];
- tubar J.L. Barnard, 1979 [369];
- vachoni A. Mateus and E. Mateus, 1966 (Afonso, 1976) [446];
- wahine J.L. Barnard, 1972b [775];
- yunde J.L. Barnard, 1974 [792];
- zoanthidea J.L. Barnard, 1979 [546];
- cosmopolitan, marine, littoral to sublittoral, sparse polewards, 58.

Pareiasmopus Stebbing

Figure 10

Pareiasmopus Stebbing, 1888: 1029 (Gammarus suluensis Dana, 1852, monotypy); 1906: 417.--J.L. Barnard, 1972a: 253.

Urosomites lacking spines but urosomite 1 with pair of longitudinal dorsal carinae. Rostrum small or absent, lateral cephalic lobes softly quadrate, sinus often forming notch.

Antennae elongate, antenna 1 much larger than 2, ratio of peduncular articles 27:29:9, primary flagellum as long as peduncle, accessory flagellum 2+ articulate. Antenna 2 slender.

Ratio of mandibular palp articles = 10:8:10 or 9:3:6 or other combinations, with article 2 always shorter than 1, latter often elongate, article 3 linear, setae = E. Inner lobes of labium present. Maxillae poorly setose to naked medially, inner plate of maxilla 1 slender, apically and subapically setose, outer plate with 7-9 spines, palps [?symmetric]. Inner plate of maxilla 2 lacking facial setae. Maxilliped palp article 3 weakly lobate, dactyl shorter than 3, unguiform, with nail.

Coxae medium to long, poorly setose, coxa 1 expanded below, coxa 4 strongly lobate posteroventrally, coxa 5 shorter than 4. Gnathopods diverse, gnathopod 1 small, wrist elongate, weakly lobate, hand about as long as wrist or slightly shorter, palm oblique, short, female gnathopod 2 scarcely enlarged, wrist elongate, not lobate, hand longer than wrist, very thin, rectangular, palm oblique, short, male gnathopod 2 greatly enlarged, wrist short, lobate, hand large, ovate, palm oblique, weakly sculptured.

Article 2 of pereopods 5-7 expanded or weakly so, poorly setose, usually lobate, this posteroventral lobe often sharp, posterior margin serrate or deeply toothed, sinuous or convex.

Epimeron 3 with multiple ventral serrations on teeth near posterior end. Outer rami of uropods 1-2 slightly shortened, all rami marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 not extended, short, magniramous, almost aequiramous, rami longer than peduncle, 1-articulate or outer ramus with tiny article 2. Telson of ordinary length, deeply to fully cleft, lobes weakly tapering, strongly spinose, usually notched apically.

Coxal gills [?2-6]. Oostegites [?slender].

Relationship.--Like Maera but urosomite 1 with pair of dorsal carinae and article 2 of mandibular palp much shorter than article 1. Like Mallacoota but mandibular palp always 3-articulate and article 3 always shorter than 1; and epimeron 3 with posteroventral serrations.

Species.--See J.L. Barnard, 1972a, for allocations;

albidus (Dana, 1852) [550];

echo J.L. Barnard, 1972a [788];

setiger Chevreux, 1901b [600];

suensis (Haswell, 1879a) [635];

suluensis (Dana, 1852) [635];

ya J.L. Barnard, 1972a [788];

tropical IndoPacific, littoral to sublittoral, 6.

Mallacoota J.L. Barnard

## Figure 44

Mallacoota J.L. Barnard, 1972a: 243 (Megamoera diemensis Haswell, 1880a, original designation).

Urosomites lacking spines but urosomite 1 with pair of longitudinal dorsal carinae. Rostrum small or absent, lateral cephalic lobes softly quadrate, sinus forming notch.

Antennae elongate, antenna 1 much larger than 2, ratio of peduncular articles = 24:23:7, primary flagellum longer than peduncle, accessory flagellum 2+ articulate. Antenna 2 slender.

Ratio of mandibular palp articles = 7:8:11, 7:8:8 or 0:0:0, article 3 linear or absent, setae = (D)E, article 2 present or absent. Maxillae not medially setose, inner plate of maxilla 1 ovate, apically setose, outer plate with [?9-11 spines, palps symmetric]. Inner plate of maxilla 2 lacking facial setae. Maxilliped palp article 3 weakly lobate, dactyl shorter than 3, unguiform, with nail.

Coxae medium to long, poorly setose, coxa 1 expanded below, coxa 4 strongly lobate posteroventrally, coxa 5 shorter than 4. Gnathopods diverse, gnathopod 1 small, wrist elongate, weakly lobate, hand about as long as wrist or shorter, palm oblique, short; female gnathopod 2 scarcely enlarged, wrist elongate, not lobate, hand longer than wrist, very thin, rectangular, palm oblique, short; male gnathopod 2 greatly enlarged, wrist short, lobate, hand large, ovate, palm oblique, weakly sculptured, often strongly setose.

Article 2 of pereopods 5-7 expanded or weakly so, poorly setose, lobate, this posteroventral lobe often somewhat attenuate (never sharp), posterior margins serrate, often thickly crenellated, sinuous or convex; remainder of appendage thick.

Epimeron 3 lacking serrations. Outer rami of uropods 1-2 slightly shortened or rami extending equally, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 scarcely extended, magniramous, almost aequiramous, rami longer than peduncle, 1-articulate or article 2 vestigial. Telson of ordinary length, or short, deeply to fully cleft, lobes weakly tapering, strongly spinose.

Coxal gills [?2-6]. Oostegites [?slender].

Variants.--Mandibular palp variable, absent to 3-articulate, but final article always linear and article 1 never longer than 2.

Relationship.--Differing from Maera and Ifalukia in the bicarinate urosomite 1; from Elasmopus in the non-falciform mandibular palp; from Parelasmpus in the long or absent article 2 of the mandibular palp and the absence of multiple posteroventral teeth on epimeron 3.

Species.--carausui Ortiz, 1976a, 1976b [483];

carteta J.L. Barnard, 1972a [780];

diemenensis (Haswell, 1879b) (J.L. Barnard, 1972a) [782];

insignis (Chevreux, 1901b) (Ledoyer, 1972) [600];

latibrachium (Walker, 1905) (Ledoyer, 1967a, 1967b)  
(Sivaprakasam, 1970) [690];

latibrachioides (Sivaprakasam, 1970a) [665];

marilla J.L. Barnard, 1972a [780];

odontoplax (Pirlot, 1936) [646];

?petriei (Thomson, 1882) (Chilton, 1883) [775];

sokotrae (Walker and Scott, 1903) (Sivaprakasam, 1968) [690];

subcarinata (Haswell, 1879a) (Stebbing, 1888) (J.L. Barnard, 1972a, 1972b)  
[780];

circumtropical, littoral to sublittoral (but not yet western Africa or east Pacific), ll.

Ifalukia J.L. Barnard

Ifalukia J.L. Barnard, 1972a: 243 (Parelasomopus resacus  
J.L. Barnard, 1965, original designation).

Urosomites naked. Rostrum absent, lateral cephalic lobes moderate, rounded, sinus forming notch.

Antennae elongate, antenna 1 much larger than 2, ratio of peduncular articles = 26:26:9, of primary flagellum = 86, accessory flagellum 2-articulate. Antenna 2 slender.

Mandibular incisor poorly toothed, mandibular molar small but triturative, ratio of palp articles = 12:8:8, article 3 linear, setae = E, palp feeble. Inner lobes of labium [?present]. Maxillae poorly setose or naked medially, inner plate of maxilla 1 [?slender, apically setose, outer plate with 9 spines, palps symmetric]. Inner plate of maxilla 2 [?lacking facial and medial setae]. Outer plate of maxilliped [?medially spinose, palp article 3 weakly lobate, dactyl shorter than 3, unguiform, with nail].

Coxae long, poorly setose, coxa 1 expanded below, coxa 4 strongly lobate posteroventrally, coxa 5 shorter than 4. Gnathopods diverse, gnathopod 1 small, wrist elongate, unlobate, hand slightly shorter than wrist, palm oblique, short, female gnathopod 2 scarcely enlarged, wrist elongate, weakly lobate, hand about as long as wrist, thin, rectangular, palm oblique, scarcely excavate, male gnathopod 2 greatly enlarged, wrist short, lobate, hand large, ovate, palm oblique, weakly sculptured.

Article 2 of pereopods 5-7 expanded, lobate, poorly setose, posteriorly serrate; pereopods 5-7 otherwise short and stout.

Outer rami of uropods 1-2 slightly shortened, all rami marginally spinose, [?peduncle of uropod 1 with basofacial spine]. Uropod 3 not extended, short, magniramous, almost aequiramous, rami scarcely longer than peduncle, 1-articulate. Telson short, cleft halfway, lobes weakly tapering, weakly armed apically.

Coxal gills [?2-6]. Oostegites [?slender].

Relationship.--Like Pareiasmopus but dorsal carinae of urosome and serrations on epimeron 3 absent.

Species.--resacus (J.L. Barnard, 1965) [582];

Eniwetok, Marshall Islands, sublittoral, 1.

Beudettia J.L. Barnard

Figures 4, 5, 18, 20, 44

Beudettia J.L. Barnard, 1965: 514 (Beudettia palmeri J.L. Barnard, 1965, original designation).

Urosomites naked. Rostrum absent, lateral cephalic lobes moderate, softly quadrate, sinus forming notch.

Antennae of medium extent, antenna 1 much larger than 2, ratio of peduncular articles = 24:20:6, primary flagellum [probably about as long as peduncle], accessory flagellum 2-articulate. Antenna 2 small, slender.

Labrum ventrally truncate. Mandibular incisor poorly toothed, molar scarcely triturative but large, palp absent. Inner lobes of labium present. Maxillae not medially setose, inner plate of maxilla 1 slender, with several apical or subapical setae, outer plate with [?] spines, palps [?symmetrical]. Plates of maxilla 2 slender, without facial and medial setae. Outer plate of maxilliped poorly spinose, mostly setose medially, palp article 3 weakly lobate.

Coxae of medium extension, poorly setose, coxa 1 scarcely expanded apically, coxa 4 scarcely concave posteriorly, coxa 5 as long as 4. Gnathopods diverse, gnathopod 1 small, wrist of medium length, weakly lobate, hand slightly longer than wrist, rectangular, palm oblique, gnathopod 2 enlarged in female, wrist of medium length, lobate, hand ovate, palm very oblique, of medium length, member of male greatly enlarged, wrist very short, and strongly lobate, hand very large, ovate, palm oblique, long, weakly sculptured, strongly setose.

Article 2 of pereopods 5-7 expanded, lobate, poorly setose, posteriorly serrate; pereopods 5-7 otherwise short and stout.

Rami of uropods 1-2 extending equally, marginally spinose, peduncle of uropod 1 [?with basofacial spine]. Uropod 3 not extended, short, parviramous, outer ramus shorter than peduncle, 1-articulate, inner ramus thin, scale-like, naked. Telson short, broad, almost entire, apex weakly excavate, each lateral corner with thick spine.

Coxal gills [?2-6]. Oostegites [?slender].

Relationship.--Like Elasmopus and Ifalukia but mandibular palp absent, telson entire, uropod 3 reduced and essentially parviramous. Like Mallacoota and Pareiasmopus but lacking dorsal carinae of urosome. Differing from Pareiasmopus in absence of serrations on epimeron 3. Apparent derivative of Ifalukia.

Species.--palmeri J.L. Barnard, 1965 [582];

Eniwetok, Marshall Islands, sublittoral, 1.

#### Parapherusids

Inner lobes of lower lip full and fleshy. Maxillae fully setose medially. Gnathopod 1 of Ceradocid form, gnathopod 2 of Melitid form. Article 2 of pereopod 7 scarcely expanded, unlobate. Uropod 3 miniaturized, aequiramous, both rami similar in size and armaments but much shorter than peduncle, outer ramus with hasp-spine apically. Telson elongate, entire. Uropod 1 with interramal tooth.

Differing from all family groups in this vicinity by the elongate and uncleft telson, the very short rami on uropod 3, and the interramal tooth on uropod 1. Possibly derivative from Ceradocopsid ancestors but modifications of uropod 3 obscure the relationships. Retention of fully Melitid lower lip suggests affinities with that family are closer than to Ceradocopsids.

#### Parapherusa Stebbing

Figures 18, 20, 23, 45

Harmomia [lapsus for Harmonia] Haswell, 1879a: 330 [name unavailable as misspelling, ICZN article 19] (Harmomia crassipes Haswell, 1879a, monotypy).

Harmonia Haswell, 1879a: 349 [homonym, Coleoptera] (same type-species).

Chloris Haswell, 1880b: 33 [homonym, Aves] (no type-species).

Parapherusa Stebbing, 1906: 383 [new name for Harmonia].

Lateral cephalic lobes quadrate.

Antennae elongate, extending equally, ratio of peduncular articles on antenna 1 = 13:13:4, ratio of primary and accessory flagella = 55:17, accessory flagellum with 9+ articles.

Ratio of mandibular palp articles = 3:10:11, article 3 falcate, setae = ADE. Inner lobes of labium fleshy. Maxillae medially setose, inner plate of maxilla 1 pyriform, fully setose medially, outer plate with 11 spines, palps weakly asymmetrical. Inner plate of maxilla 2 with row of facial setae. Maxilliped dactyl nail short.

Coxae ordinary to short, poorly setose, coxa 1 quadrate or weakly protruding anteroventrally, coxa 4 short, rectangular, unexcavate. Gnathopod 1 of Melitid form, wrist of medium length, unlobate, hand scarcely longer than wrist, palm oblique; female gnathopod 2 enlarged, wrist weakly ovate, hand enlarged, ovate, palm oblique, unsculptured; male gnathopod 2 much enlarged, wrist relatively shortened and lobate, hand large, palm oblique, sculptured.

Article 2 narrow and almost unexpanded on pereopod 5, progressively slightly broadened to pereopod 7, posteroventral corner scarcely produced on pereopod 5, not on pereopod 7, posterior margins smooth or weakly serrate, remainder of pereopods thick but not flabellate.

All but inner ramus of uropod 2 with marginal spines, all spinose apically, outer rami slightly to moderately shortened, uropod 1 with large interramal tooth, no basofacial spine. Uropod 3 not extended, magniramous, thick but short, peduncle of ordinary size but rami reduced in length and shorter than peduncle, subovate, thickly spinose apically, spines greatly ornamented. Telson elongate, entire, weakly armed.

Coxal gills [2-6], sausage shaped. Oostegites of medium breadth.

Relationship.--Unusual Gammaridan because of greatly reduced rami on uropod 3, these rami resembling those of Ampithoidae, plus interramal tooth on uropod 1; elongate uncleft telson not necessarily creating affinity to Gammarellus; because of gnathopods ancestry probably similar to that of Elasmopus and Maera or especially of Paraceradocus; broadened oostegites somewhat unusual for marine Gammaridans.

Species.--crassipes (Haswell, 1879a) (Chilton, 1916b)  
(Stephensen, 1949) (J.L. Barnard, 1972b) [835];

circum-antiboreal, littoral-sublittoral, 1.

#### Ceradocopsids

Inner lobes of lower lip absent. Maxillae fully setose medially. Gnathopod 1 of Ceradocid form. Gnathopod 2 of Ceradocid form. Article 2 of pereopod 7 expanded and lobate but not of hatchet form. Uropod 3 essentially parviramous, miniaturized. Telson cleft.

Antenna 1 not geniculate.

Differing from Melitids in full loss of inner lobes on lower lip combined with miniaturization of uropod 3. See Gammarella, Beaudettia.

#### Ceradocopsis Schellenberg

Ceradocopsis Schellenberg, 1926: 364 (Ceradocopsis kergueleni  
Schellenberg, 1926, monotypy).

Maeracunha Stephensen, 1949: 22 (Maeracunha tristanensis  
Stephensen, 1949, monotypy).

Lateral cephalic lobes broadly rounded, sinus present but mandible inserted there, not antenna 2.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 14:12:6, flagellar ratio = 20:7, accessory flagellum with 4 articles. Antenna 2 slender.

Mandibular incisor almost smooth, molar small and poorly triturative, palp small, ratio of articles = 6:15:12, article 3 linear, setae = E and sparse. Inner lobes of labium absent. Maxillae medially setose, inner plate of maxilla 1 pyriform to triangular, with medial setae on apical half only, outer plate with 7-11 spines, palps [?symmetric]. Inner plate of maxilla 2 with oblique row of facial setae. Outer plate with naked medial margin, palp article 3 weakly lobate, dactyl shorter than 3, unguiform, lacking or bearing nail.

Coxae of medium extension, poorly setose, coxa 1 expanded below, coxa 2 with anteroventral acuity, coxae 3-4 weakly shorter than 1-2, coxa 4 unexcavate posteriorly, coxa 5 as long as 4. Gnathopods diverse, gnathopod 1 small, of Melitid form, wrist scarcely elongate, scarcely lobate, hand longer, rectangular, palm weakly oblique, short, gnathopod 2 enlarged, wrist short to medium, lobate or weakly, hand elongate, large, rectangular, palm weakly oblique, weakly sculptured or strongly spinose.

Article 2 of pereopods 5-7 expanded, alike, lobate, poorly setose, serrate and straight posteriorly, appendages otherwise stout.

Rami of uropods 1-2 subequally extended, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 not extended, short, magniramous, dispariramous, outer ramus with small article 2. Telson of ordinary length, fully cleft, lobes tapering, moderately to strongly armed apically.

Coxal gills [2-6]. Oostegites [slender].

Variants.--Outer plate of maxilla 1 with 11 spines (peke) but other species poorly known; though uropod 3 stated as magniramous, actually appearing to be parviramous kind with reduced outer ramus now so small as to match inner.

Relationship.--Differing from Maera in the strongly setose maxilla 2 (facial) and the strong article 2 on the outer ramus of uropod 3. Differing from Ceradocus by uropod 3 in the same way stated for Maera. Differing from Paraceradocus in the short dispariramous uropod 3 and short, slender antenna 2. Differing from Ceradocoides in the short, dispariramous uropod 3 and fully cleft telson. Differing from Ceradocus in the short dispariramous uropod 3. Differing from various genera near Melita in the absence of inner lobes on the labium and the miniaturized uropod 3.

See Hurleya.

Species.--kergueleni Schellenberg, 1926 (Bellan-Santini and Ledoyer, 1974) [851];

peke J.L. Barnard, 1972a [774];

tristanensis (Stephensen, 1949) [731];

Antarctica and antiboreal, especially insular, 3.

#### Gammarellids

Inner lobes of lower lip absent. Maxillae strongly setose medially. Gnathopods 1-2 of Melitid form. Article 2 of pereopod 7 broadly expanded and hatchet-shaped. Uropod 3 parviramous, miniaturized. Telson cleft. Coxal gills not pediculate.

Eyes moderately developed to weak.

Antenna 1 geniculate between articles 1 and 2 or 2 and 3.

Differing from Ceradocopsids in the hatchet shape of article 2 on pereopod 7 and the geniculate antenna 1.

## Key to the Genera of Gammarellids

Maxilla 1 styliform . . . . . Tabatzius  
 Maxilla 1 not styliform . . . . . Gammarella

Gammarella Bate

Figures 9, 18, 44

- Pherusa Leach, 1814b: 432 (homonym, Polychaeta) (Pherusa fucicola Leach, 1814b, monotypy).  
Gammarella Bate, 1857b: 143 (Gammarella orchestiformis Bate, 1857b, monotypy, = Pherusa fucicola Leach).--Stebbing, 1906: 449.  
 --Karaman and Barnard, 1979: 155.  
Pherusana J.L. Barnard, 1964a: 62 (new name for Pherusa, same type-species).  
Nuuanu J.L. Barnard, 1970: 166 (Nuuanu amikai J.L. Barnard, 1970, original designation).  
Cottesloe J.L. Barnard, 1974: 27 (Cottesloe berringar J.L. Barnard, 1974, original designation).

Body laterally compressed, carinate or smooth, urosomites carinate or smooth, weakly spinose, urosomite 2 often with pair of dorsal spines. Lateral cephalic lobes acute at upper corner but actually forming large quadrate extension with narrow incision. Eyes often poorly developed.

Antennae elongate to medium, joints often geniculate, peduncular article 1 slender to stout, article 2 longer or shorter than article 1, article 3 shorter than 2, typical ratio of articles = 26:30:10; accessory flagellum 3+ articulate. Antenna 2 thin, shorter than antenna 1.

Mandibular palp article 1 weakly to strongly elongate, article 2 slender, elongate, article 3 falcate, shorter than or equal to article 2, typical ratio = 5:14:11, setae = DE. Inner lobes of labium absent or faintly marked. Maxillae strongly setose medially, inner plate of maxilla 1 leaf-like or subtriangular, heavily setose medially, outer plate with 9 spines, palps asymmetric, 2-articulate. Inner plate of maxilla 2 with oblique facial row of setae. Maxillipedal plates large, palp strong, dactyl with weak nail.

Anterior coxae of medium extension or long, coxa 1 scarcely expanded apically, coxa 4 lobed (coxa 3 rarely shortened), coxa 5 shorter than 4. Gnathopods subchelate, of female almost feeble, dissimilar, almost of equal size, wrists elongate, unlobed, hands narrow, rectangular or subrectangular, palm of gnathopod 1 usually transverse, of gnathopod 2 oblique and often obsolescent; male gnathopod 1 like female, male gnathopod 2 greatly enlarged, wrist very short, cryptic (type) or strongly lobed, hand elongate, ovate, palm oblique and long or merging with posterior margin, dactyl elongate, curved or short and stout.

Article 2 of pereopods 5-7 usually strongly serrate posteriorly, but not in type), otherwise dissimilar in shape, of pereopods 5-6 weakly expanded, tapering distally, moderately lobate posteroventrally, of pereopod 7 broadly expanded, shield-like, these pereopods usually short, pereopod 6 often slightly the longest.

Rami of uropods 1-2 extending equally, spinose marginally, uropod 1 with basofacial spine. Uropod 3 not extended, parviramous, inner ramus occasionally however with medial spine(s), outer ramus short (thus making inner ramus appear much larger than it is relative to genera such as Melita), spinose, article 2 small (possibly absent in male of type-species). Telson short, deeply cleft, lobes tapering sparsely, spinose apically.

Coxal gills 2-6, ovate, not pediculate. Oostegites slender.

Variants.--Articles of peduncle on antenna 1 often fixed in geniculate fashion in preserved material (especially species of Nuuanu); article 2 of antenna 1 varying between 0.55 and 1.25 times length of article 1; article 2 of pereopods 5-7 scarcely serrate (fucicola), or strongly serrate (all other species); urosomite 1 with dorsal tooth (fucicola, berringar) or not (most other species); body cuticle with straw-setules (fucicola, species of Nuuanu) or villose (berringar, merringannee).

Remarks.--When Nuuanu was originally described its affinity with Gammarella was overlooked because of the much more strongly developed expansions and serrations on pereopods 5-7 and the strange head shape not previously noted for Gammarella except by Sowinsky (1898) and overlooked by Barnard. Then Cottesloe was established with affinities to Nuuanu but strong differences in antenna 1 articular ratios, cuticle but especially robust body size and opaque cuticle (as seen in retrospect). Finally, Tabatzius McKinney and Barnard was described on the basis of parasitic maxillae and a specimen of Gammarella reappraised. We have now examined more specimens of G. fucicola and have concluded, despite a wide variety or paired extremes of urosomal teeth, cuticles, antennae, eyes, robust bodies, pereopodal shapes and serrations that no discontinuity exists among Gammarella, Nuuanu and Cottesloe. One species, Nuuanu mokari J.L. Barnard (1974) has a much shortened coxa 3 and could be elevated to generic status but we reserve this action until more exploration in the IndoPacific disproves any intergradation for this character. Meanwhile Tabatzius is retained but without strong conviction that it may also be found to have intergradational relatives to be discovered.

In McKinney and Barnard (1977, fig. 3) the middle gnathopod labeled "G2" should be labeled "G2c".

Species.--amikai (J.L. Barnard, 1970) [381];

berringar J.L. Barnard, 1974 [780];

fucicola (Leach, 1814b) (Sowinsky, 1898b) (Chevreux and Fage, 1925, but not well depicted) [352];

merringannee (J.L. Barnard, 1974) [782];

mokari (J.L. Barnard, 1974) [782];

numbadi (J.L. Barnard, 1974) [782];

eastern Atlantic, Mediterranean, IndoPacific, especially Australia and Hawaii (as yet explored), 6.

Tabatzius McKinney and Barnard

Tabatzius McKinney and Barnard, 1977: 163 (Tabatzius copillius McKinney and Barnard, 1977, original designation, = Nuuanu muelleri Ortiz, 1976b)

Like Gammarella but maxilla 1 styliform.

Species.--muelleri Ortiz, 1976b (= copillius McKinney and Barnard, 1977) [460];

Caribbean Sea, sublittoral, 1.

## Hadziids and Weckeliids

A Weckeliid lacks eyes and has aequiramous uropod 3. A Hadziid lacks ommatidial eyes though occasionally has ocular pigment but uropod 3 is dispariramous. Hadziids further differ from neighboring blind taxa in the elongate uropod 3, cleft telson and loss of inner lobes on the lower lip.

The two groups at times have been considered congruent but there remains the possibility that two or more ancestries occur, the Weckeliids from a Paraweckelia-Ceradocus ancestry and the Hadziids from a Melitid ancestry. As shown in the Key to the Groups of Hadzioids the groups are so contrived that elevation to family level is impossible.

## Key to Hadziids and Weckeliids

1. Outer ramus of uropod 3 with 2 articles . . . . . (Hadziids) 2  
Outer ramus of uropod 3 with 1 article. . . . . (Weckeliids) 10
2. Inner plate of maxilla 1 lacking medial setae, inner  
plate of maxilla 2 lacking oblique facial row of  
setae, medial margin setose or not . . . . . 3  
Inner plates of maxillae 1-2 strongly setose medially,  
maxilla 2 with oblique facial row of setae. . . . . 4
3. Uropod 3 magniramous. . . . . Paraweckelia (twice)  
Uropod 3 parviramous. . . . . Psammoniphargus
4. Coxa 4 with large posterodistal lobe. . . . . Saliweckelia  
Coxa 4 unlobed. . . . . 5
5. Wrists of gnathopods 1-2 unlobed, their setae marginal. . . . . 6  
Wrists of gnathopods 1-2 lobed, some of their lateral  
setae facial. . . . . 9
6. Telson shortened (uropod 3 variramous, gnathopods and  
telsonic spination like Metahadzia couplet below)  
. . . . . Metaniphargus  
Telson of ordinary length or elongate . . . . . 7
7. Gnathopod 1 lacking medial setal brush on article 5,  
palm of male gnathopod 2 densely spinose, palm  
of female gnathopod 2 distinct, weakly spinose,  
telson with medial spines, uropod 3 magniramous. . . . . Metahadzia

- Gnathopod 1 with medial setal brush, palm of male  
 gnathopod 2 poorly spinose, palm of female  
 gnathopod 2 indistinct, telson lacking medial  
 spines, uropod 3 parviramous . . . . . 8
8. Palm of male gnathopod 2 densely setose,  
 telson naked laterally . . . . . Dulzura  
 Palm of male gnathopod 2 not densely setose,  
 telson with lateral spines . . . . . Protohadzia
9. Telson with lateral spination, article 5  
 of gnathopod 1 elongate . . . . . Liagoceradocus  
 Telson naked laterally, article 5 of gnathopod 1  
 as long as 6 . . . . . Hadzia
10. [In contradistinction to couplet 1, uropod 3 actually with  
 vestigial article 2 on outer ramus], otherwise gnathopod 2  
 of both sexes of typical Ceradocid or Melitid form, hand  
 well inflated, palm long, minutely serrate, lacking Hadziid  
 setae, wrist very short, strongly lobed, maxilla 2 lacking  
 oblique facial row of setae, inner plate of  
 maxilla 1 with setae mostly apical . . . . . Paraweckelia (twice)  
 [Like couplet 1, uropod 3 lacking article 2 on  
 outer ramus], otherwise gnathopod 2 not typical of  
 Melitids or Ceradocids, hand either poorly inflated or  
 palm poorly defined in either sex or short, or not serrate, or  
 bearing Hadziid setae, wrist in either sex relatively elongate,  
 maxillae well setose medially, inner plate of  
 maxilla 2 with oblique row of facial setae. . . . . 11
11. Coxa 4 with posterodistal lobe. . . . . 12  
 Coxa 4 without posterodistal lobe . . . . . 13
12. Inner lobes of lower lip present, palp of  
 mandible 1-articulate. . . . . Weckelia  
 Inner lobes of lower lip absent, palp of  
 mandible 3-articulate. . . . . Alloweckelia
13. Coxa 1 not enlarged, right lacinia mobilis present. . . . . 14  
 Coxa 1 much larger than coxa 2, right lacinia mobilis absent . . . . 16
14. Wrist of gnathopods lobate. . . . . Mexiweckelia  
 Wrist of gnathopods not lobate. . . . . 15
15. Gnathopod 1 not merochelate . . . . . Paramexiweckelia  
 Gnathopod 1 merochelate . . . . . Mayaweckelia
16. Mouthparts projecting anteriorly as far as article 2  
 of antenna 1. . . . . 17  
 Mouthparts (except maxilliped) projecting less than  
 halfway along article 1 of antenna 1. . . . . 18
17. Dactyl of maxilliped short, article 3 stout, inner plates  
 of maxillae 1-2 elongate, outer plate of maxilla 1  
 with 7 spines, inner plate of maxilliped ordinary . . . Holsingerius  
 Dactyl of maxilliped elongate, article 3 thin, inner  
 plates of maxillae 1-2 ordinary, outer plate of maxilla 1  
 with 14 spines, inner plate of maxilliped  
 broadly expanded . . . . . Texiweckeliopsis
18. Hand of gnathopod 1 like that of gnathopod 2, longer  
 than wrist, gnathopods of sexes alike, article 2  
 of pereopods 3-4 strongly expanded . . . . . Allotexiweckelia

Hand of gnathopod 1 different from gnathopod 2,  
shorter than wrist, gnathopods of sexes strongly  
distinct, article 2 of pereopods 3-4 thin . . . . . Texiweckelia

Paraweckeliid (subgroup of Ceradocids)

Inner lobes of lower lip moderately developed, almost fleshy. Maxillae weakly setose medially. Gnathopod 1 of Melitid form. Gnathopod 2 in female of Melitid form, enlarged, wrist short, palm long and oblique, bearing tiny bifid spines. Uropod 3 magniramous, aequiramous, rami elongate, outer ramus 1-articulate. Telson cleft, midlateral setules at M. 67+. Coxal gills not pediculate, uniarticulate, gill 7 absent.

Accessory flagellum 4-articulate. Pereopods 3-4 ordinary. Article 2 of pereopods 5-7 expanded, lobate, dactyls simple. Pleopods normal. Urosomite 2 with one dorsolateral spine on each side. Oostegites narrow.

Possibly belonging to group ancestral to Hadziids and Weckeliids, differing in the enlarged gnathopod 2 hand with very small bifid spines, thus gnathopod 2 not fully Hadziid, but transitional to Protohadzia. Inner lobes of lower lip somewhat more fleshy than in most Hadziids. Trend towards Hadziids marked by apicad shift in telsonic setules. Differing from most Melitids in the even distribution of weakly bifid spines on palm of gnathopod 2, but more significantly in the fully magniramous and aequiramous uropod 3.

Paraweckelia Shoemaker

Map 56

Paraweckelia Shoemaker, 1959: 279 (Paraweckelia silvai Shoemaker, 1959, original designation).

Urosomite 2 with 2 dorsal spines. Lateral cephalic lobes large, strongly protruding, mammillofalciform. Eyes absent.

Antennae 1-2 elongate, antenna 1 longer than 2, ratio of peduncular articles = 17:17:7, ventral margin of article 1 without spines. Accessory flagellum 4-articulate. Antenna 2 ordinary.

Labrum ["symmetrical"]. Ratio of mandibular palp articles = 13:20:12, article 2 setose, article 3 linear, with one D seta and 3 E setae, all distad. Labium with weak but fleshy inner lobes, not gaping. Maxillae 1-2 poorly setose medially; inner plate of maxilla 1 ovoid, with 7 setae but not fully setose medially, outer plate with 9 toothed spines, palps [?symmetric], with distal setae. Inner plate of maxilla 2 weakly setose medially but without oblique facial row of setae, plates moderately narrow. Maxilliped dactyl with weak nail.

Coxae long, coxa 1 not expanded, coxa 4 with strong posterodistal lobe, coxa 5 shorter than coxa 4. Gnathopods subchelate, gnathopod 1 small, Melitid, article 5 slightly elongate, unlobed, article 6 shorter, palm almost transverse; gnathopod 2 of female enlarged, article 5 short, strongly lobed, article 6 large, ovate, palm oblique but well defined, weakly setose and setulose, no Hadziid setae (like Melita).

Pereopod 5 much shorter than pereopods 6-7; article 2 of pereopods 5-7 expanded, weakly lobate, dactyl with one setule on inferior margin.

Outer rami of uropods 1-2 scarcely shortened, all rami marginally spinose, uropod 1 with basofacial spine. Uropod 3 elongate, peduncle slightly elongate, magniramous, almost aequiramous, outer ramus 2-articulate but article 2 vestigial. Telson of ordinary length, deeply cleft, lobes gaping, pointed, armed apically only with tiny spinule and setule, main setules at M. 65-80.

Coxal gills ovate, 2-6, unstalked. Oostegites narrow.

Relationship.--Close to Ceradocus but maxillae weakly setose.

Species.--silvai Shoemaker, 1959 [483]; Cuba, caves, 1.

#### Weckeliids

Inner lobes of lower lip formed by weak creases. Inner plates of maxillae fully setose or oblique row on maxilla 2 absent. Gnathopod 1 of Melitid form. Gnathopod 2 of female of Melitid form, very feeble, palm distinct, lined with small spines but lacking Hadziid setae except on posterior margin of hand. Uropod 3 aequiramous. Telson cleft.

Rami of uropods 1-2 marginally spinose except where stated.

Differing from Hadziids in the presence of a palm on female gnathopod 2 bearing small spines but lacking clumps of Hadziid setae and in the aequiramous uropod 3 lacking article 2 on the outer ramus.

See Metaceradocoides.

#### Weckelia Shoemaker

##### Map 56

Weckelia Shoemaker, 1942a: 11 (Gammarus caecus Weckel, 1907, original designation).

W. (Neoweckelia) Dancau, 1973c: 223 (Weckelia cubanica Dancau, 1973c, original designation, = Gammarus caecus Weckel).

Urosomite 2 with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes subfalciform. Eyes absent.

Antennae elongate, antenna 1 longer than antenna 2, ratio of peduncular articles = 27:30:12, ventral margin of article 1 with only 1 apical spine. Accessory flagellum 3-4 articulate.

Mandibular palp reduced to small single article with 2 E-setae. Labium with weakly marked inner lobes, not gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially. Outer plate with 9 toothed spines, palps symmetric [interpretation] strongly setospinose. Plates of maxilla 2 moderately narrow, inner with oblique facial row of setae.

Coxae long, coxa 1 not expanded, coxa 4 with large posterodistal lobe, coxa 5 shorter than 4. Gnathopods subchelate, nearly feeble, gnathopod 1

small, article 5 slightly elongate, weakly lobed, some setae slightly facial, article 6 slightly shorter, palm weakly oblique. Gnathopod 2 of female with large article 5 of ordinary size, moderately lobed (Stock, 1977 notwithstanding), setae marginal, hand small but well formed, ovate, palm oblique, well defined, bearing spines and Hadziid setae; male gnathopods like female.

Article 2 of pereopods 5-7 expanded, poorly lobate, dactyls with one setule on inferior margin.

Pleopods [?ordinary]. Uropods 1-2 ordinary though outer rami slightly shortened, that of uropod 1 lacking marginal spines, uropod 1 with basofacial spine. Uropod 3 elongate, magniramous, almost aequiramous, apices truncate and spinose, outer ramus 1-articulate. Telson short, cleft to base, gaping, lobes pointed, with apicad spines slightly on medial sides of apices, main setules at M. 65-80.

Coxal gills 2-6, ovate, scarcely stalked. Oostegites slender.

Relationship.--Like Paraweckelia but mandibular palp vestigial and maxillae more strongly setose, female gnathopod 2 much smaller and bearing Hadziid setae. Differing from Alloweckelia in the vestigial mandibular palp.

Species.--41 caecus Weckel, 1907 (Shoemaker, 1942a) [483];

Cuba, caves, 1.

#### Alloweckelia Holsinger and Peck

Map 56

Alloweckelia Holsinger and Peck, 1968: 250 (Alloweckelia gurneei Holsinger and Peck, 1968 original designation).

Urosomites 1-2 each weakly spinulate dorsally. Rostrum absent, lateral cephalic lobes subrounded. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 23:19:12, ventral margin of article 1 with 3 weak spines. Accessory flagellum 2-articulate. Antenna 2 gland cone elongate.

Ratio of mandibular palp articles = 9:20:18, article 3 linear, with 2 weak D setae apicad and 3 E setae. Labium without inner lobes, weakly gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 rounded-triangular, almost fully setose medially, outer plate with 7 serrate spines (8 in figure), palps [?symmetric]. Plates of maxilla 2 narrow, inner with oblique facial row of setae.

Coxae long, anterior coxae tapering, coxa 4 with large posterodistal lobe, length of coxa 5 [unknown]. Gnathopods subchelate, scarcely dimorphic sexually, gnathopod 1 small, article 5 of ordinary length, unlobed, article 6 slightly longer than 5, palm short, almost transverse. Gnathopod 2 enlarged, article 5 of ordinary length, unlobed, setae marginal, palm oblique, densely furnished with weakly bifid spines, female gnathopod 2 with somewhat more linear hand than in male.

Pereopods 5-7 elongate, pereopod 6 longest, article 2 of pereopods 5-7 weakly expanded, weakly lobate, dactyls with one setule on inferior margin.

Uropods 1-2 ordinary, uncombed, outer rami not or scarcely shortened, uropod 1 with basofacial spine. Uropod 3 elongate, almost magniramous, outer ramus with article 2 fused to article 1 but junctional acclivities present, inner ramus then reaching about to base of fused article 2, both rami with thick spines, peduncle slightly elongate. Telson short, cleft about three fourths its length, lobes sharply notched apically, each with one apical spine, main setules at M. 70-80.

Coxal gills 2-6, suboval, biarticulate (stalks articulated). Oostegites narrow.

Relationship.--Differing from Paraweckelia in loss of inner lobes on the labium, strong maxillary setation, and stalked articulate gills. Differing from Saliweckelia in uniarticulate outer ramus of uropod 3.

Species.--51 guerneeii Holsinger and Peck, 1968 [489];

Puerto Rico, caves, 1.

Mexiweckelia Holsinger and Minckley

Figure 14, Map 56

Mexiweckelia Holsinger and Minckley, 1971: 426 (Mexiweckelia colei Holsinger and Minckley, 1971, original designation).

Urosomites 1-3 with 1-2 spines each side dorsally. Rostrum obsolescent, lateral cephalic lobes [unknown]. Eyes absent.

Antennae elongate, antenna 1 longer than 2, peduncular articles = 20:11:8, ventral margin of article 1 lacking spines. Accessory flagellum vestigial or absent (smaller than in other Hadziids). Mandibular palp absent. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose, inner plate of maxilla 1 ovate to triangular, almost fully setose medially, outer plate with 7 serrate spines, palps weakly asymmetric. Plates of maxilla 2 narrow, inner plate with long oblique row of medial setae. Maxilliped dactyl as long as 3.

Coxae of medium size, coxa 4 unlobed, coxa 5 [?shorter than coxa 4]. Gnathopods subchelate, strongly dimorphic sexually, those of female almost feeble; article 5 broadly lobed on all gnathopods of both sexes and with facial (not marginal) setae; wrist of female gnathopod 1 elongate, hand slightly shorter than wrist, palm rounded-transverse, short; wrist of male gnathopod 1 short, hand more tumid than in female, palm slightly oblique; wrist of female gnathopod 2 slightly elongate, hand longer than wrist, slightly expanded, palm very oblique, with several simple spines and few Hadziid setae; male gnathopod 2 enlarged, wrist short, hand large, ovate, palm oblique, long, spinose, spines simple, Hadziid setae very few.

Pereopod 5 shorter than 6-7; article 2 of pereopods 5-7 slightly expanded, lobate or not, dactyls with one setule on inferior margin.

Uropods 1-2 with equally extending rami, or outer rami shortened, outer ramus of uropod 1 marginally naked, or all rami naked, peduncle with basofacial spine(s). Uropod 3 elongate, magniramous, almost aequiramous, outer ramus 1-articulate, inner ramus slightly longer than outer, each

ramus with long stout apical spine resembling article plus other apical spines. Telson slightly elongate, cleft about two-thirds, each lobe with about 3 large apical spines, main setules M. 60.

Coxal gills 2-6, at least some ovate, with long stalks, 2-articulate. Oostegites narrow.

Relationship.--Like Weckelia and Alloweckelia but coxa 4 unlobed; differing from Hadzia in the aequiramous uropod 3 lacking article 2 on outer ramus.

Species.--15 colei Holsinger and Minckley, 1971 [195];

16 mitchelli Holsinger, 1973 [195];

Mexico, Coahuila and Durango, springs, probably hypogean, 2.

### Paramexiweckelia Holsinger

Map 56

Paramexiweckelia Holsinger, 1981x:00 (Mexiweckelia particeps Holsinger, in Holsinger and Minckley, 1971, original designation).

Urosomites 1-3 with 3-2 spines each side dorsally. Rostrum absent, lateral cephalic lobes weakly protruding, subquadrate, weak anteroventral sinus present. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 25:12:9, ventral margin of article 1 lacking spines. Accessory flagellum 1-articulate.

Labrum [unknown]. Mandibular palp absent. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose, inner plate of maxilla 1 subovate, almost fully setose medially, outer plate with 9 serrate spines, palps asymmetric. Plates of maxilla 2 narrow, inner plate with oblique row of facial setae.

Coxae short, coxa 4 unlobed, coxa 5 [?as long as coxa 4]. Gnathopods subchelate, almost feeble, weakly dimorphic sexually; wrist of gnathopod 1 slightly elongate, unlobed, hand as long as wrist, thin, subrectangular, palm short, oblique; female gnathopod 2 with elongate unlobed wrist, hand as long as wrist, narrow, palm short, oblique, dactyl overlapping palm; male gnathopod 2 with hand slightly more elongate, slightly stouter, palm longer and more poorly defined but as long as dactyl, palms of all gnathopods with sparse, poorly bifid spines, second gnathopods with sparse Hadziid setae.

Pereopod 5 shorter than 6-7; article 2 of pereopods 5-7 poorly expanded, weakly lobate, dactyls with one setule on inferior margin.

Outer rami of uropods 1-2 slightly shortened, uropod 1 with 2 basofacial spines, peduncle of uropod 2 with medial comb. Uropod 3 elongate, magniramous, almost aequiramous, outer ramus 1-articulate, apex of each ramus truncate and strongly spinose, one middle spine scarcely enlarged. Telson elongate, almost fully cleft, each lobe with 3 apical spines and several lateral spines, main setules at M. 40.

Coxal gills 2-6, at least some ovate, with stalks, 2-articulate. Oostegites narrow [but full development unknown].

Relationship.--Differing from Alloweckelia in the unlobed coxa 4. Differing from Mexiweckelia in the absence of posterior lobes on gnathopodal wrists, the marginal setation of the wrists and the presence of lateral spines on the telson.

Species.--35 particeps Holsinger, 1971 (Holsinger and Langley, 1980) [195];

Mexico, Coahuila, hypogean, 1.

#### Mayaweckelia Holsinger

Map 56

Mayaweckelia Holsinger, 1977c: 15 (Mayaweckelia yucatanensis Holsinger, 1977c, original designation).

Urosomites 1-3 each with 2-6 setules dorsally. Rostrum obsolescent, lateral cephalic lobes short, rounded, anteroventral sinus shallow. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 37:20:15, ventral margin of article 1 lacking spines. Accessory flagellum 3-articulate.

Mandibular palp absent. Labium with inner lobes small to vestigial but apparently present and slightly fleshy, not gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 elongate-triangular, with 4-6 medial setae but margin not fully occupied; outer plate with 9 serrate spines, palps [?asymmetric]. Plates of maxilla 2 narrow, inner pointed and with oblique facial row of setae. Outer plate of maxilliped medially setose (only), article 2 of palp not greatly elongate, dactyl almost as long as 3.

Coxae long to medium, coxa 1 not dilated, coxa 4 unlobed, coxa 5 [length unknown]. Gnathopods subchelate, almost feeble, gnathopod 1 small, merochelate (article 4 elongate and with ventral tooth projecting distad), article 5 also weakly elongate, weakly lobed, article 5 trapezoidal (expanding distad) or subrectangular, palm transverse to oblique; female gnathopod 2 like gnathopod 1 but not merochelate, article 4 short but article 5 with longer free posterior margin, palm well defined, with several Hadziid setae; male gnathopod 2 slightly to moderately enlarged, hand enlarged, ovate or elongate, rectangular, palm oblique, poorly to well spinose, with few Hadziid setae on palm, some spines on palms of all gnathopods bifid, most simple.

Pereopod 6 longest, article 2 of pereopods 5-7 expanded, lobate, dactyls with about 2 setules on inferior margin.

Uropod 1 lacking basofacial spine, rami equal or outer ramus shortened, outer ramus of uropod 2 shortened. Uropod 3 elongate, peduncle slightly elongate, magniramous, rami sublamelliform, scarcely dispariramous, outer ramus 1-articulate, setation sparse. Telson of ordinary length, cleft to base, spinose apically, medially, and laterally, main setules [unknown].

Coxal gills 2-6, ovate, stalked, jointed. Oostegites narrow.

Relationship.--Allied to Mexiweckelia and Paramexiweckelia but gnathopod 1 merochelate, inner plate of maxilliped with medial margin setose (not spinose).

Species.-- 25 cenoticola Holsinger, 1977c [198];

26 yucatanensis Holsinger, 1977c [198];

Mexico, Yucatan region, hypogean, 2.

### Texiweckelia Holsinger

Map 56

Texiweckelia Holsinger, 1980b: 7 (Mexiweckelia texensis Holsinger, 1973, original designation).

Body thin, urosomites 1-3 each with 2-6 dorsal spines. Rostrum small, lateral cephalic lobes broad, obsolescent but anteroventral sinus weak. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 15:9:6, ventral margin of article 1 lacking spines. Accessory flagellum vestigial (smaller than in other Hadziids) or absent.

Labrum apically incised but in grosser view subrounded. Mandibular right lacinia mobilis absent (unusual), palp absent. Labium without inner lobes, not gaping. Maxillae medially setose, inner plate of maxilla 1 falcato-triangular, fully setose medially, outer plate with 7 serrate spines, palps [?asymmetric]. Plates of maxilla 2 moderately narrow, inner plate with oblique row of medial setae. Outer plate of maxilliped medially spinose (but weakly); article 3 of palp thin, with lobe forming weak apical chela, dactyl very long, thin, with nail (maxilliped palp thus prehensile).

Coxae medium to short but coxa 1 larger than coxa 2 (unusual), coxa 4 unlobed, coxa 5 [?shorter than coxa 4]. Gnathopods subchelate, strongly dimorphic sexually, those of female feeble; article 5 broadly lobed on all gnathopods of both sexes and with facial setae; wrist of female gnathopod 1 elongate, hand thin, shorter than wrist, palm rounded-transverse, short; wrist of male gnathopod 1 slightly shorter, hand scarcely shorter than wrist, more tumid than in female, palm more oblique than in female; wrist of female gnathopod 2 elongate, anteriorly setose (unusual), hand thin, as long as wrist, palm rounded-oblique, very short, with 2 Hadziid setae; male gnathopod 2 scarcely enlarged but hand relatively slightly longer than in female and slightly longer than wrist, hand scarcely expanded, mostly linear, palm very oblique, of medium length, lined with weakly bifid spines, dactyl spinose.

Pereopod 7 especially elongate, article 2 of pereopods 5-7 weakly expanded, weakly lobate, elongate, dactyls with several setules on inferior margin.

Outer rami of uropods 1-2 slightly shortened, uropod 1 with several basofacial spines. Uropod 3 elongate, magniramous, almost aequiramous,

outer ramus 1-articulate, inner equal, each ramus with medium to small apical spine plus other apical spines. Telson short, cleft only halfway, cleft gaping, each lobe with 3 various spines-setae, main setules at M. 80. Coxal gills 2-6, ovate, stalked, biarticulate. Oostegites slender.

Relationship.--Differing from Mexiweckelia and its allies in the enlarged coxa 1 and absence of right lacinia mobilis.

Species.--45 insolita Holsinger, 1980b [185];

samacos Holsinger 1980b [185];

texensis Holsinger 1973 (Holsinger, and Langley, 1980) [185];

Texas, Hays County (including San Marcos Well), hypogean, 1.

#### Allotexiweckelia Holsinger

Map 56

Allotexiweckelia Holsinger, 1980b: 26 (Allotexiweckelia hirsuta Holsinger, 1980b, original designation).

Body slender, urosomites 1-3 with 2, 2 and 4 dorsal spines respectively. Lateral cephalic lobes mammilliform. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 25:12:8, ventral margin of article 1 lacking spines. Accessory flagellum vestigial or absent (smaller than in other Hadziids). Antenna 2 with relatively well spinose articles 4 and 5 (unusual).

Mandibular right lacinia mobilis absent (unusual), palp absent. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose, inner plate of maxilla 1 subtriangular, fully setose medially, outer plate with 7 poorly serrate spines, palps weakly asymmetric. Inner plate of maxilla 2 slightly broadened, with oblique facial row of setae. Maxilliped palp article 3 thin, with lobe forming weak apical chela, article 4 very long, thin, with nail (maxilliped palp thus prehensile).

Coxae of medium size, but coxa 1 larger than coxa 2, coxa 4 unlobed, coxa 5 [shorter than coxa 4]. Gnathopods subchelate, not sexually dimorphic, almost feeble; of both pairs of medium length, strongly lobate, with facial setation, hands longer than wrists on both pairs and palms identical, oblique, long, armed with weakly bifid spines, dactyls long, Hadziid setae poorly developed on gnathopod 1, present on gnathopod 2.

Article 2 of pereopods 3-4 strongly expanded and spinose. Pereopod 5 shorter than 6-7; article 2 of pereopods 5-7 expanded, lobate, dactyl short and with numerous setules on inferior margin, anterior margin of article 6 strongly spinose (spines fine), posterior margin of article 6 on pereopods 5-6 strongly setose.

Outer rami of uropods 1-2 slightly shortened, uropod 1 with several basofacial spines, comb of uropod 2 [unknown]. Uropod 3 elongate, magniramous, almost aequiramous, outer ramus 1-articulate, apices of rami scarcely truncate, weakly spinose. Telson scarcely elongate, cleft about

two thirds, each lobe with 2-3 apical spines, several medial, lateral and dorsal spines, main setules [unknown].

Coxal gills 2-6, at least some ovate, with long stalks, 2-articulate. Oostegites narrow.

Relationship.--Differing from Texiweckelia in the uniform gnathopods of the sexes, with palms of both pairs alike, oblique, long, densely spinose; and in the strongly expanded spinose article 2 of pereopods 3-4.

Species.--55 hirsuta Holsinger, 1980b [185];

Texas, hypogean, 1.

Texiweckeliopsis Karaman and Barnard

Map 56

Texiweckeliopsis Karaman and Barnard, 1982: 179-180 (Texiweckelia insolita Holsinger, 1980b, original designation).

Body slender, urosomites 1-3 each with 2, 4, and 2 dorsal spines respectively. Lateral cephalic lobes truncate, without sinus. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 23:8:6, ventral margin of article 1 lacking spines. Accessory flagellum vestigial or absent (smaller than in other Hadziids).

Mandibles and maxillae projecting forward as far as article 2 of antenna 1. Mandibular right lacinia mobilis absent, palp absent. Labium without inner lobes, not gaping. Mxillae medially setose, inner plate of maxilla 1 triangular, fully setose medially, outer plate with 14-15 serrate spines, palps [?asymmetric]. Plates of maxilla 2 slightly broadened, short, inner with oblique facial row of setae. Inner plate of maxilliped extremely broad, outer plate medially setose; article 3 of palp thin, with very small lobe forming weak apical chela, dactyl very long, thin, with nail (maxilliped palp thus weakly prehensile).

Coxae of medium size to short, but coxa 1 larger than coxa 2, coxa 4 unlobed, coxa 5 [?shorter than coxa 4]. Gnathopods subchelate, scarcely dimorphic sexually, feeble; gnathopods 1-2 almost alike, mittenform, wrists elongate, broadly lobate, setation facial, hands slightly shorter than wrists, narrow but not perfectly linear or rectangular, slightly expanded in middle and then tapering towards palm, palms weakly oblique, short, spines tiny or sparse, weakly bifid, Hadziid setae few, elongate only on gnathopod 2 and sparse on palm, male gnathopods slightly stouter than in female, especially on hands.

Pereopod 5 slightly shorter than 6-7, article 2 of pereopods 5-7 slightly expanded, weakly lobate, dactyls with several setules on inferior margin, article 6 weakly setose or spinose.

Rami of uropods 1-2 subequally extended, uropod 1 with 2 basofacial spines, comb of uropod 2 absent, outer ramus of uropod 2 dorsally naked. Uropod 3 elongate, magniramous, almost aequiramous, outer ramus 1-articulate, apices of rami weakly truncate, with several spines of which

one elongate. Telson of ordinary length, cleft about two thirds, each lobe with 2 apical spines, main setules M.90.

Coxal gills 2-6, ovate, with long stalks, 2-articulate. Oostegites narrow.

Relationship.--Differing from Texiweckelia in the strong forward projection of the mandibles and maxillae, and mittenform gnathopods. See Holsingerius.

Species.--61 insolita (Holsinger, 1980b) [185];

Texas, hypogean, 1.

Holsingerius Karaman and Barnard

Map 56

Holsingerius Karaman and Barnard, 1982: 180 (Texiweckelia samacos Holsinger, 1980b, original designation).

Body slender, urosomites 1-3 each with 2, 2 and 4 dorsal spines respectively. Rostrum obsolescent, lateral cephalic lobes sharply mammilliform. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 30:16:9, ventral margin of article 1 lacking spines. Accessory flagellum vestigial or absent (smaller than in other Hadziids).

Mandibles and maxillae projecting forward as far as article 2 of antenna 1. Mandibular right lacinia mobilis absent, palp absent. Labium without inner lobes, gaping. Maxillae medially setose, inner plate of maxilla 1 enlarged, triangular, fully setose medially, outer plate with 7 serrate spines, palps [?asymmetric]. Inner and outer plates of maxilla 2 greatly elongate, inner with oblique facial row of setae. Outer plate of maxilliped medially setose; article 3 of palp stout, apically expanded and weakly chelate, dactyl of ordinary length, thin, with nail (palp scarcely prehensile).

Coxae of medium size to short, but coxa 1 larger than coxa 2, coxa 4 unlobed, coxa 5 [?shorter than coxa 4]. Gnathopods subchelate, sexually dimorphic, those of female feeble; wrist of both pairs in both sexes of medium length, strongly lobate, with facial setation; hand of female gnathopod 1 shorter than wrist, rectangular, palm short, weakly oblique, minutely spinose, male hand enlarged, palm long, strongly oblique, well spinose; hand of female gnathopod 2 as long as wrist (thus elongate), thin, rectangular, palm short, weakly oblique, minutely spinose and with several Hadziid setae; anterior margin of hand lined with setae; hand of male gnathopod 2 enlarged, palm long, rounded-oblique, densely spinose (spines weakly bifid), with 2 Hadziid setae, dactyl very long.

Article 2 of pereopods 3-4 scarcely expanded, poorly spinose. Pereopod 5 shorter than 6-7; article 2 of pereopods 5-7 expanded, lobate, dactyls short, with several setules on inferior margin, article 6 weakly setose or spinose.

Rami of uropods 2-3 subequally extended, uropod 1 with several basofacial spines, comb of uropod 2 absent. Uropod 3 elongate, magniramous, almost aequiramous, outer ramus 1-articulate, apices of rami weakly truncate, with several spines, of which one elongate. Telson scarcely elongate, cleft almost three fourths, each lobe with 3 apical spines and occasional lateral spine, main setules M. 65.

Coxal gills 2-6, at least some ovate, with long stalks, 2-articulate. Oostegites narrow [but full adult unknown].

Relationship.--Differing from Texiweckeliopsis in the ordinary dactyl of the maxilliped, ordinary outer plates of maxillae and maxillipeds but the elongate inner plates of the maxillae.

Species.--65 samacos (Holsinger, 1980b) [185];

Texas, San Marcos Well, hypogean, 1.

#### Hadziids

Inner lobes of lower lip absent. Inner plates of maxillae fully setose medially. Gnathopod 1 of Melitid form. Gnathopod 2 of Hadziid form in female. Telson cleft. Uropod 3 dispariramous. Telson cleft.

Pereopods 3-4 ordinary. Article 2 of pereopods 5-7 weakly expanded, lobate or not, dactyls simple. Pleopods normal. Urosomite 2 usually with apicolateral spine on each side, but variable. Brood plates narrow.

Accessory flagellum 1-4 articulate.

Differing from both Melitids and Paraweckelia in the special form of female gnathopod 2, with obsolescent palm and full development of stiff, apically curved setae in sparse groups. Unlike Melitids, the inner lobes on the lower lip of Hadziids are absent.

See Eoniphargus.

#### Saliweckelia Stock

##### Map 56

Saliweckelia Stock, 1977: 70 (Saliweckelia emarginata Stock, 1977, original designation).

Urosomites 1-2 each with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes mammilliform. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 17:13:5, ventral margin of article 1 with one spine. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 11:36:36, article 2 setose, article 3 subfalciiform, with strongly marginal D setae and 3-4 E setae. Labium without inner lobes, ungaping. Maxillae 1-2 setose medially, inner plate of maxilla 1 triangular, fully setose medially, outer plate with 9 spines, palps asymmetric. Plates of maxilla 2 narrow, inner with oblique facial row of setae.

Coxae of medium size, coxa 4 strongly lobed, coxa 5 [presumably shorter than coxa 4]. Gnathopods subchelate, gnathopod 2 closely similar in male and female, gnathopod 1 small, article 5 elongate, unlobed, with medial brush of setae, article 6 shorter, rectangular, palm short, transverse. Gnathopod 2 enlarged, article 5 slightly elongate, unlobed, setae marginal, palm extremely oblique, poorly or weakly defined, spinose in male (spines scarcely bifid), weakly setose in female, medial face of hand with strong to weak brush in both sexes.

Article 2 of pereopods 5-7 expanded, lobate, dactyls with setules on inferior margin.

Pleopods ordinary in female, rami with basal swellings in male. Uropods 1-2 with slightly shortened outer rami, uropod 1 with basofacial spine, outer ramus in male with fan-shaped spine not present in female. Uropod 3 elongate, magniramous, dispariramous, inner ramus as long as article 1 of outer ramus, article 2 of outer ramus about 25 percent as long as article 1. Telson somewhat shortened, almost fully cleft, spinose apically and weakly on medial margin, but not laterally, main setules at M. 65.

Coxal gills 2-6 ovate or trapezoidal, unstalked. Oostegites slender.

Relationship.--The basic Hadziid. Differing from Paraweckelia in loss of inner lobes on lower lip, strongly setose maxillae, dispariramous uropod 3. Differing from Dulzura in the strong lobe of coxa 4.

Species.--11 emarginata Stock, 1977 [462];

12 holsingeri Stock, 1977 [462];

Curacao and Bonaire, marine and salty anchialine, 2.

#### Metahadzia Stock

Map 55

Metahadzia Stock, 1977: 32 (Hadzia tavaresi A. Mateus and E. Mateus, 1972, original designation).

Urosomite 2 with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes falciform. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 18:14:9, ventral margin of article 1 lacking spines. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 8:12:20, articles 1-2 without setae, article 3 scarcely subfalciform, with D and E setae (6-8 total) poorly distinguished, all apicad. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially, outer plate with 10 serrate spines, palps asymmetric (setose and spinose). Plates of maxilla 2 narrow, inner with oblique facial row of setae. Maxilliped dactyl with long nail.

Coxae of medium size, coxa 4 scarcely lobed (posterior margin weakly excavate), coxa 5 much shorter than coxa 4 [original body figures partially erroneous, note 8 segments in thorax]. Gnathopods subchelate, nearly feeble, gnathopod 1 small, article 5 of medium length, poorly lobed, article 6 subequal to article 5, palm short, transverse to weakly oblique. Male gnathopod 2 enlarged, article 5 of ordinary length, poorly lobed, setation barely submarginal, palm very oblique, armed with bifid spines and posterior Hadziid setae. Female gnathopod 2 slightly enlarged, palm excavate and defined, poorly spinose, with 2 long posterior Hadziid setae.

Article 2 of pereopods 5-7 expanded, only lobed on pereopod 7, dactyls with few setules on inferior margin.

Pleopods unmodified in male. Uropod 1 ordinary, with basofacial spine. Male uropod 2 with large distolateral tooth on peducle, absent in female; outer ramus slightly shortened and lacking dorsal spines (known for male, not described for female). Uropod 3 elongate, magniramous, dispariramous, inner ramus exceeding article 1 of outer ramus, article 2 of outer ramus about 20 percent as long as article 1.

Telson of ordinary length, cleft to base, spinose apically and medially but not laterally, main setules M. 50.

Coxal gills [?2-6], ovate, with distinct basal stalk but not articulate. Oostegites narrow.

Relationship.--Differing from Saliweckelia in loss of lobe on coxa 4; from both Saliweckelia and Hadzia in the short coxa 5, unlobed article 5 of gnathopod 2, sexually dimorphic uropod 2, clearly stalked gills, and somewhat shortened article 1 of mandibular palp. Scarcely differing from Metaniphargus except in slightly longer telson, sexually dimorphic uropod 2 ("elongate" article 3 of antenna 1 and magniramous uropod 3 also found in Metaniphargus).

Species.--4 acutus Andres, 1978 [442];

5 adriatica Pesce, 1979 [098];

6 ?minuta Ruffo, 1948b [098];

7 tavaresi A. Mateus and E. Mateus, 1972 [114];

Portugal to Greece, hypogean, 3 and ?1.

#### Protohadzia Zimmerman and Barnard

Map 56

Protohadzia Zimmerman and Barnard, 1977: 569 (Eriopisa schoenerae Fox, 1973, original designation).

Urosomites naked. Rostrum absent, lateral cephalic lobes obsolescent, rounded-quadrate. Eyes not ommatidial, formed of cuticular stain.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 19:18:6, ventral margin of article 1 lacking spines. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 11:22:28, article 2 with 2 setae, article 3 falciform, with many strongly marginal D and 3 E setae. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose, inner plate of maxilla 1 triangular, fully setose medially, outer plate with 10 serrate spines, palps asymmetric (setose and spinose). Plates of maxilla 2 narrow, inner with oblique facial row of setae.

Coxae short to moderately long, coxa 4 unlobed, coxa 5 as long as 4. Gnathopods subchelate but female gnathopod 2 almost simple, nearly feeble, gnathopod 1 small, article 5 elongate, unlobed, in male with setal brush, article 6 much shorter, palm short, almost transverse. Gnathopod 2 of female slightly enlarged, article 5 slightly elongate, poorly lobed, setae marginal, palm very oblique, not clearly defined, armed with long Hadziid setae, male gnathopod 2 much larger, article 5 short, setae marginal, article 6 large, ovoid and elongate, short falciform transverse palm differentiated from normal palmar extent as marked by extension of dactyl along posterior margin, palm with sparse short spines and setae, much of palm naked, then posterior margin more heavily setose, dactyl deeply curved.

Article 2 of pereopods 5-7 scarcely expanded, weakly lobate, pereopod 5 much smaller than pereopods 6-7, with few setules on inferior margin.

Pleopods unmodified in male. Outer rami of uropods 1-2 naked or poorly spinose dorsally, uropod 1 with basofacial spine. Uropod 3 elongate, parviramous, inner ramus scale-like, article 2 of outer ramus about 20 percent as long as article 1. Telson of ordinary length, cleft to base, spinose apically and laterally but not medially, main setules at M. 60.

Coxal gills 2-6, ovate, with distinct basal stalk but not articulate. Oostegites short, narrow.

Description.--Uropod 2 with apicomedial comb on peduncle.

Relationship.--Differing from Hadzia in the parviramous uropod 3 and reversed medial to lateral spination on the telson. Differing from Protohadzia in the setose palm of male gnathopod 2 and laterally naked telson. Differing from Metaniphargus in the unshortened telson, and much larger male gnathopod 2 with poorly armed palm.

Species.--schoenerae Fox, 1973 [460];

Caribbean, sublittoral; 1.

Dulzura J.L. Barnard

Figures 12, 13, 14, 41, Map 53

Dulzura J.L. Barnard, 1969<sup>o</sup>: 114 (Dulzura sal J.L. Barnard, 1969<sup>a</sup>, original designation).

Urosomites with 2 weak dorsal setae or spines. Rostrum absent, lateral cephalic lobes obsolescent, weak sinus present. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 15:13:5, ventral margin of article 1 with one spine. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 6:14:17, article 2 weakly setose, article 3 subfalciform, with strongly marginal D setae and 3 E setae. Labium without inner lobes, scarcely gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially, outer plate with 9 serrate spines, palps [?asymmetric]. Plates of maxilla 2 narrow, inner with oblique facial row of setae.

Coxa of medium size, coxa 4 unlobed, coxa 5 as long as 4. Gnathopods subchelate but female gnathopod 2 almost simple, nearly feeble, gnathopod 1 small, article 5 of medium length, unlobed, article 6 subequal to article 5, palm short, almost transverse. Male gnathopod 2 enlarged, article 5 of ordinary length, unlobed, setae marginal, palm very oblique, very densely setose, setae not of thick curled Hadziid form but slender and of moderate length; female gnathopod 2 with smaller hand, feeble palm with few setae and only 2 Hadziid setae, posterior margin with several Hadziid setae.

Article 2 of pereopods 5-7 scarcely expanded, scarcely lobate, dactyls with setule on inferior margins.

Pleopods [unknown]. Uropod 1 ordinary, with basofacial spine, uropod 2 with shortened outer ramus, rami of uropods 1 2 otherwise normally spinose. Uropod 3 elongate, parviramous, inner ramus scale-like. Article 2 of outer ramus less than 20 percent as long as article 1. Telson of ordinary length, not fully (or fully) cleft to base, only spinose apically (though with apicomedial spines nearly matching position in Metaniphargus), main setules M.50.

Coxal gills and oostegites [unknown].

Description.--Peduncle of uropod 2 with apicomedial comb; telson of laakona short and bearing only 2 spines per lobe.

Relationship.--Differing from Protohadzia in the setose palm of male gnathopod 2 and laterally naked telson.

Species.--A gal J.L. Barnard, 1977 [546];

B hamakua (J.L. Barnard, 1970) [381];

C ?laakona (J.L. Barnard, 1970) [381];

D sal J.L. Barnard, 1969a [373];

Hawaii, Galapagos, Pacific America, marine sublittoral; 4.

→ Metaniphargus - (by stock & later by Vong (in no.))

Metaniphargus Stephensen

Map 56

Metaniphargus Stephensen, 1933c: 426 (Metaniphargus curasavicus Stephensen, 1933c, monotypy.--Stock, 1977: 34.

Urosomite 2 with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes subrounded. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 24:23:11, ventral margin of article 1 lacking spines. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 12:21:26, article 2 with setae, article 3 scarcely subfalciform, with strongly marginal D setae and 3-4 E setae. Labium without inner lobes. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially, outer plate with 11 spines, palps asymmetric. Plates of maxilla 2 narrow, inner with oblique facial row of setae. Maxilliped dactyl with long nail.

Coxae of medium size, coxa 4 unlobed, coxa 5 as long as coxa 4. Gnathopods subchelate, but female gnathopod 2 almost simple, gnathopod 1 small, article 5 slightly elongate to medium in length, poorly lobed, article 6 shorter than 5, palm short, transverse to weakly oblique. Male gnathopod 2 enlarged, article 5 slightly elongate, unlobed, setae marginal, palm very oblique, lined with weakly bifid spines. Female gnathopod 2 slightly enlarged, palm poorly spinose or setose.

Article 2 of pereopods 5-7 weakly expanded, lobate or not, dactyls with several setules on inferior margin.

Pleopods ordinary or often modified in male by presence of accessory lobes on bases of rami. Uropod 1 with basofacial spine, outer rami of uropods 1-2 usually shortened, otherwise no sexual dimorphism. Uropod 3 elongate, variramous, length of inner ramus variable from species to species, article 2 of outer ramus variable, 15-40 per cent as long as article 1. Telson very short, not or fully cleft to base, spinose apically, medially and laterally, main setules M.40-70 and M.20.

Coxal gills [2-6], ovate, with long thin basal stalks only weakly or not articulate. Oostegites narrow.

Description.--Peduncle of uropod 2 with or without comb; inner ramus of uropod 3 with or without plumose setae.

Relationship.--Differing from other Hadziids in the short telson. Differing from Hadzia in the short article 1 of the mandibular palp and unlobed article 5 of gnathopod 2 with marginal armaments.

Species.--1 beattyi Shoemaker, 1942a [489];

2 bousfieldi Stock, 1977 [489];

3 christophorensis Stock, 1977 [462];

4 curasavicus Stephensen, 1933c [462];

5 jamaicae Holsinger, 1974c [486];

6 longipes Stock, 1977 [462];

7 nicholsoni Shoemaker, 1959 [491];

8 orientis Stock, 1977 [462];

9 palpator Stock, 1977 [491];

Caribbean Islands, hypogean, 9.

Liagoceradocus J.L. Barnard

Figures 4, 12, 17, 19, Map 53

Liagoceradocus J.L. Barnard, 1965: 504 (Liagoceradocus pusillus

J.L. Barnard, 1965, original designation).

Hadzia (Liagoceradocus) J.L. Barnard, 1977: 286.

Body ordinary to subvermiform, urosomites 1-2 each with 2 dorsal spines. Rostrum absent, lateral cephalic lobes short, broadly rounded. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 26:24:12, ventral margin of article 1 with at least one large apical spine. Accessory flagellum 2-articulate.

Ratio of mandibular palp articles = 11:21:24, article 2 weakly setose, article 3 subfalciform, with strongly marginal D setae and 3 E setae. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially outer plate with 10 serrate spines, palps asymmetric. Plates of maxilla 2 narrow, inner with oblique facial row of setae.

Coxae of medium size, coxa 4 unlobed, coxa 5 as long as 4. Gnathopods subchelate, nearly feeble, female gnathopod 2 like male, gnathopod 1 small, article 5 elongate, unlobed, article 6 much shorter than 5, palm short, transverse. Gnathopod 2 slightly enlarged, article 5 of ordinary length, with deep lobe bearing strongly submarginal setation, palm very oblique, with several simple (with triggers but not distinctly bifid) spines and sparse Hadziid setae.

Article 2 of pereopods 5-7 scarcely expanded, weakly lobate, dactyls with few setules on inferior margin. Pleopods unmodified in male. Uropods 1-2 ordinary, uropod 1 with basofacial spine, uropod 2 not sexually dimorphic. Uropod 3 elongate, magniramous, dispariramous, inner ramus well exceeding article 1 of outer ramus, article 2 of outer ramus about 30 percent as long as article 1. Telson of ordinary length, cleft to base, spinose apically, medially and laterally, main setules M.60.

Coxal gills 2-6, ovate, with poorly developed basal stalk but not articulate. Oostegites [undescribed].

Description.--Uropod 2 with apicomedial comb on peduncle.

Relationship.--Differing from Hadzia in presence of lateral spines on telson, shorter article 1 of mandibular palp, and elongate article 5 of gnathopod 1. Differing from Metaniphargus in lamellar expansion of article 5 on gnathopod 2 and longer telson.

Species.--K lonomaka J.L. Barnard, 1977 [381];

L pusillus J.L. Barnard, 1965 [591];

Hawaii to Caroline Islands, anchialine or atoll-lagoon, brackish to marine, 2.

Notes: J.L. Barnard, 1977: fig. 12G2 gnathopod 2 depiction of setae on article 5 not showing clearly true situation of deep submarginal attachment, confirmed by examination of original pencil drawings.

### Hadzia S. Karaman

Map 55

Hadzia S. Karaman, 1932: 214 (Hadzia fragilis S. Karaman, 1932, selected by G.S. Karaman, 1969c).--G.S. Karaman, 1969c: 75.  
--Stock, 1977: 29.

Urosomites free, naked. Rostrum obsolescent, lateral cephalic lobes subrounded. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 26:20:10, ventral margin of article 1 lacking spines. Accessory flagellum 1-2 articulate.

Labrum [unknown]. Ratio of mandibular palp articles = 16:17:19, article 2 with or without setae, article 3 subfalciform, with strongly marginal D setae and 3 E setae. Labium without inner lobes, not gaping. Maxillae 1-2 medially setose; inner plate of maxilla 1 triangular, fully setose medially, outer plate with 9-10 serrate spines, palps asymmetric (setose and spinose). Plates of maxilla 2 narrow, inner with oblique facial row of setae. Maxilliped dactyl with long nail.

Coxae of medium size, coxa 4 unlobed, coxa 5 as long as coxa 4. Gnathopods subchelate, nearly feeble, female gnathopod 2 almost simple, gnathopod 1 small, article 5 of medium length, poorly lobed, article 6 subequal to article 5, palm short, transverse to weakly oblique. Gnathopod 2 of both sexes alike, slightly enlarged, article 5 of ordinary length, with deep lobe bearing strongly submarginal setation, palm very oblique, with long Hadziid setae, spines few and not bifid.

Article 2 of pereopods 5-7 expanded, indistinctly lobed, dactyls with several setules on inferior margin.

Pleopods unmodified in male. Uropod 1 ordinary [basofacial spine unknown]; uropod 2 ordinary, not sexually dimorphic [comb unknown]. Uropod 3 elongate, magniramous, dispariramous, inner ramus exceeding article 1 of outer ramus, article 2 of outer ramus about 20 percent as long as article 1. Telson of ordinary length, cleft to base, spinose apically and medially but not laterally, main setules at M.55.

Coxal gills [?2-6], ovate, with poorly developed basal stalk but not articulate. Oostegites narrow.

Relationship.--Differing from Liagoceradocus in loss of lateral telsonic spines and shortened article 5 of gnathopod 1.

Species.--1 crispata G.S. Karaman, 1969c [087];

2 fragilis S. Karaman (G.S. Karaman, 1969c) [087];

3 gjorgjevici S. Karaman, 1932 (G.S. Karaman, 1969c) [087].

Yugoslavia, hypogean, 3.

#### Psammoniphargus Ruffo

Map 54

Psammoniphargus Ruffo, 1956a: 89 (Psammoniphargus pauliani  
Ruffo, 1956a, original designation.

Body thin, urosomite 2 with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes rounded, sinus [unknown]. Eyes absent.

Antennae elongate, antenna 1 longer than 2, peduncular article 2 barely shorter than article 1, but article 3 much shorter, [spines on article 1 unknown]. Accessory flagellum 2-articulate.

Mandibular palp vestigial, 1-articulate, scale-like, with one apical setule. Labium without inner lobes, not gaping. Maxillae 1-2 moderately setose medially; inner plate of maxilla 1 subtriangular, with 6 apicomedia setae and many medial "hairs", outer plate with 7 spines, palps asymmetric. Plates of maxilla 2 narrow, inner lacking oblique facial row of setae but with 4 marginal medial setae. Outer plate of maxilliped strongly scalloped but weakly spinose medially.

Coxae of medium size, coxa 1 not dilated, coxa 4 with weak posterodistal lobe. Gnathopods subchelate, nearly feeble, gnathopod 1 small, article 5 of ordinary length, scarcely lobed, article 6 subequally long, palm transverse; female gnathopod 2 slightly enlarged, article 5 ordinary, scarcely lobed, hand subrectangular, palm oblique but well defined, poorly spinose (spines weakly bifid), with few Hadziid setae barely inside palm; male gnathopod 2 enlarged, article 5 ordinary, weakly lobed, setae marginal, hand enlarged, palm oblique, defined, spines few, small, simple, posterior margin with few short Hadziid setae.

Article 2 of pereopods 5-7 weakly expanded, poorly lobate, dactyls with one inferior setule.

Uropods 1-2 ordinary, uropod 1 with basofacial spine, outer ramus naked marginally. Uropod 3 elongate, parviramous, inner ramus scale-like, article 2 of outer ramus about 30 percent of article 1. Telson short, slightly broader than long, almost fully cleft, apices broad and jaggedly toothed, with apical and apicodorsal spines, main setules M.70.

Gills [?2-6]. Oostegites narrow.

Relationship.--Differing from various Hadziids and Weckeliids in the absence of oblique facial row of setae on the inner plate of maxilla 2 but mediomarginal setae remain in Psammoniphargus. Differing from Paraweckelia in the parviramous uropod 3.

Species.--62 pauliani Ruffo, 1956a [697];

Reunion, hypogean, 1.

#### Metacrangonigids

Lower lip without inner lobes. Maxillae fully setose medially. Gnathopod 1 of Melitid form. Female gnathopod 2 of Hadziid form. Uropod 3 parviramous or uniramous, outer ramus never longer than peduncle. Telson short, broad, entire. Coxal gills 2-6.

Differing from the Hadziids in the uncleft telson and from the northern Crangonyctoids in the absence of sternal gills and presence of Melitid gnathopod 1. Pleopods normal.

See Salentinellids.

#### Metacrangonyx Chevreux

Figures 5, 13, 18, 21, Map 58

Metacrangonyx Chevreux, 1909: 27 (Metacrangonyx longipes Chevreux, 1909, monotypy).

Rostrum obsolescent, lateral cephalic lobes protruding, rounded-falcate. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 26:32:23, ventral margin of article 1 lacking spines. Accessory flagellum 3-4 articulate.

Mandibular palp feeble, thin, 3-articulate or less, poorly setose. Labium without inner lobes, weakly gaping or not. Maxillae 1-2 well setose medially, inner plate of maxilla 1 triangular, fully setose medially, outer plate with 8-11 spines, palps asymmetric. Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped elongate, dactyl lacking [?type] or bearing nail.

Coxae elongate, coxa 1 not expanded, coxa 4 strongly lobed, coxa 5 much shorter than 4. Gnathopods almost feeble, subchelate, gnathopod 1 small, Melitid, article 5 elongate, unlobed, article 6 short, palm transverse, female gnathopod 2 slightly enlarged, article 5 weakly elongate, scarcely lobed, article 6 longer than 5, subrectangular, palm oblique, bearing bifid spines; male gnathopod 2 enlarged, article 5 like female, article 6 enlarged, subovate, palm oblique, lines with bifid spines, posterior margin with few Hadziid setae.

Article 2 of pereopods 5-7 expanded, weakly to strongly lobate or not.

Uropods 1-2 ordinary, uropod 1 with basofacial spine (new). Uropod 3 vestigial, with lamellar peduncle, inner ramus obsolescent, scale-like, outer ramus 1-articulate, shorter or longer than peduncle but rectangular,

weakly spinose or setulose, with 2 short apical setules. Telson short, broader than long, entire, apically setulose.

Coxal gills 2-6, moderately broad to thin, weakly stalked. Oostegites thin.

Description.--Gland cone long or short.

Relationship.--Differing from Hadziids in vestigial uropod 3 and uncleft telson.

Transfer.--M. remyi is transferred to Pygocrangonyx.

Species.--1 longicaudus Ruffo, 1954d [135];

2 longipes Chevreux, 1909 [100];

3 panousei Ruffo, in Balazuc and Ruffo, 1953, [135];

North Africa; Spain to Yugoslavia; Balearic Islands, hypogean, 3.

#### Pygocrangonyx Karaman and Barnard

Map 58

Pygocrangonyx Karaman and Barnard, 1979: 151 (Metacrangonyx remyi Ruffo in Balazuc and Ruffo, 1953, original designation).

Body [?slender], urosomites naked. Rostrum obsolescent, lateral cephalic lobes subrounded, sinus [?present]. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 20:16:12, accessory flagellum [?2-articulate].

Mandibular palp vestigial, 1-articulate, setae = E. Labium without inner lobes. Maxillae 1-2 fully setose medially, inner plate of maxilla 1 triangular, outer plate with 10 spines, palps asymmetrically armed. Inner plate of maxilla 2 with oblique facial row of setae. Both plates of maxilliped of medium size, outer plate [?medially spinose], dactyl [?unguiform, ?with apical nail].

Coxae elongate, [?with short to medium setae], coxa 1 not expanded, coxa 4 unlobed, [?coxa 5 shorter than 4]. Gnathopods feeble, gnathopod 1 of Melita form, article 5 elongate, palm transverse; gnathopod 2 slightly larger, both articles 5 and 6 elongate and thin, palm very oblique, armed with bifid spines, posterior margin of hand with long curved Hadziid-like setae.

Pereopod 7 slightly longer than 5, article 2 of pereopods 5-7 lobate or not (7), weakly to strongly expanded, dactyls simple.

Rami of uropods 1-2 ordinary, evenly extended, marginally spinose, basofacial spine of uropod 1 [unknown]. Uropod 3 uniramous, very short, peduncle large, broader and longer than ramus; inner ramus absent, outer ramus 1-articulate, weakly longer than broad, stout, with 5 very long distal spines much longer than ramus itself. Telson very short, entire, broader than long, with 2 long distal spines longer than telson plus

several setules. Coxal gills 2-6, narrow. Oostegites [unknown]. No secondary sexual dimorphism.

Relationship.--Allied to Metacrangonyx Chevreux but differing by the loss of the inner ramus on uropod 3, the much shortened outer ramus, the elongate distal spine on that ramus (1-2 shorter spines found in Metacrangonyx), the presence of long spines on the telson (setae in Metacrangonyx) and by the absence of a lobe on article 2 of pereopod 7.

Species.--4 remyi (Ruffo in Balazuc and Ruffo, 1953) [135];

Morocco, hypogean, 1.

#### Melitids

Inner lobes of lower lip weakly developed to fleshy. Maxillae fully or not setose medially. Gnathopod 1 of Melitid form. Gnathopod 2 in female of Melitid form, palm distinct, male of enlarged Melitid form or like female, palm of gnathopod 2 in male lacking spines or spines irregularly distributed. Uropod 3 parviramous, rarely variramous. Telson cleft. Coxal gills various, gill 7 absent.

Accessory flagellum 2+ articulate. Pereopods 3-4 ordinary. Article 2 of pereopods 5-7 various, dactyls simple. Pleopods normal. Pleonites and urosomites occasionally dentate. Brood plates narrow.

Psammoniphargus of the Hadziids is included in the following key.

#### Key to the Genera of Melitids

1. Uropod 3 variramous . . . . . Psammogammarus (part)
- Uropod 3 parviramous. . . . . 2
2. Peduncle of uropod 3 elongate, gnathopod 2 feeble, wrist  
    highly elongate . . . . . 3
- Peduncle of uropod 3 not elongate, or if so, gnathopod 2  
    not feeble or scarcely so, or wrist not elongate. . . . . 4
3. Female gnathopod 2 enfeebled, telsonic lobes turgid,  
    outer plate of maxilla 1 with 6 spines . . . . . Galapsiellus
- Female gnathopod 2 not enfeebled, telsonic lobes not  
    turgid, outer plate of maxilla 1 with 7 spines. . . . . Anchialella
4. Lower lip lacking inner lobes, mandibular  
    palp 1- articulate. . . . . Psammoniphargus
- Lower lip with inner lobes, mandibular palp 2-3  
    articulate. . . . . 5
5. Telson with square to rectangular lobes, broad  
    and excavate apices . . . . . 6
- Telson with tapering lobes. . . . . 7
6. Head notched, article 2 of pereopods 5-7 expanded  
    and lobate. . . . . Nainaloa
- Head unnotched, article 2 of pereopods 5-7 scarcely  
    expanded and scarcely lobate. . . . . Rotomelita
7. Uropod 3 not exceeding uropod 1 . . . . . Melitoides
- Uropod 3 exceeding uropod 1 . . . . . 8

8. Anterior coxae not longer than posterior coxae. . . . . 9  
 Some anterior coxae significantly longer than posterior coxae. . . . . 11
9. Basal articles of flagellum on antenna 2 fused together,  
 maxilla 2 lacking facial row of setae, article 4  
 of pereopod 7 dilated. . . . . Victoriopisa  
 Basal articles of flagellum on antenna 2 discrete,  
 maxilla 2 with facial row of setae, article 4 of  
 pereopod 7 not dilated. . . . . 10
10. Article 2 of pereopods 5-7 uniform,  
 article 1 of mandibular palp short . . . . . Psammogammarus (part)  
 Article 2 of pereopods 5-7 diverse,  
 article 1 of mandibular palp elongate . . . . . Eriopisa
11. Maxillae not setose medially. . . . . 12  
 Maxillae weakly to fully setose medially. . . . . 13
12. Article 2 of outer ramus on uropod 3 present, coxa 1  
 tapering, wrist of gnathopod 2 strongly lobate. . . . . Maleriopa  
 Article 2 of outer ramus on uropod 3 absent, coxa 3  
 not tapering, wrist of gnathopod 2 poorly lobate . . . Paraniphargus
13. Gnathopod 2 weakly or not diverse bilaterally, not chelate . . . . . 14  
 Gnathopod 2 strongly diverse bilaterally, one member  
 enlarged and strongly propodochelate . . . . . Dulichhiella
14. Mandibular palp 3-articulate . . . . . Melita  
 Mandibular palp 2-articulate . . . . . Tegano

Melita Leach

Figures 8, 12, 13, 17, 19, 43, Map 54

Melita Leach, 1814a: 403; 1814b: 432 (Cancer palmatus Montagu, 1804,  
 monotypy).--Stebbing, 1906: 421.

Boscia Leach, 1814a: 435 (nomen nudum).

Megamoera Bate, 1862: 224 (Gammarus dentatus Kroyer, 1842,  
 selected by J.L. Barnard, 1969c).

Caliniphargus Stout, 1913: 640 (Caliniphargus sulcus Stout,  
 1913, monotypy).

Body smooth or toothed, urosomites smooth or toothed. Rostrum small or  
 absent, lateral cephalic lobes rounded, quadrate, sinus present or absent,  
 often slit-like. Eyes present or absent.

Antennae elongate, slender, antenna 1 longer than 2, ratio of  
 peduncular articles = 14:16:10, ratio of flagella = 50:10, accessory  
 flagellum 2+ articulate. Antenna 2 gland cone often large.

Labrum weakly notched or entire. Mandibular incisor toothed, molar  
 triturative, ratio of palp articles = 4:12:12, article 3 faintly falciform  
 or linear, setae = DE or E. Inner lobes of labium well developed, fleshy.  
 Maxillae medially setose, inner plate of maxilla 1 falcatotriangular,  
 setose on at least distal half of medial margin, outer plate with 7+  
 spines, palps often asymmetric. Inner plate of maxilla 2 with or without  
 oblique facial row of setae.

Maxilliped dactyl weakly unguiform, shorter than 3, with nail(s).

Coxae ordinary to short, without or with posteroventral notches, poorly to moderately setose, coxa 1 undilated or dilated, coxa 4 lobate, or lobe obsolescent, coxa 6 of female rarely hooked. Gnathopods 1-2 diverse, gnathopod 1 smaller, of "Melitid" form generally in female, wrist elongate, unlobed, hand short subrectangular, palm usually short and transverse, rarely oblique, male gnathopod 1 often with unusual palmar and dactylar formations; gnathopod 2 enlarged, of female slightly larger than gnathopod 1, wrist of medium length, scarcely lobed, hand ovate or subrectangular, slightly enlarged, palm oblique, short to long, male gnathopod 2 much enlarged, wrist usually very short, lobate, hand enlarged, sculptured or not, palm transverse to oblique, dactyl often overriding palm onto face of hand armed with ridges and setae or with smooth areas outlined by setae.

Article 2 of pereopods 5-7 moderately expanded, ventrally lobate or not, poorly setose.

Rami of uropods 1-2 extending equally or outer rami weakly shortened, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 extended, parviramous, outer ramus elongate, with or without short article 2. Telson of ordinary length, cleft to base, lobes gaping, tapering, spinose apically and often medially, laterally or dorsally.

Coxal gills 2-6, broad, not strongly pediculate. Oostegites narrow.

Relationship.--This is a basic kind of Gammaridan amphipod to which many other taxa bear comparison. The genus differs from Gammaroids, especially Echinogammarus, in the lack of coxal gill 7, and the small, almost mittenform gnathopod 1; from Crangonyx, Melita differs in the absence of sternal gills and coxal gill 7.

See Melitoides, Eriopisa, Psammogammarus, Rotomelita, Dulichhiella, Nainaloa, Victoriopisa and others following.

Species.--abyssorum Stephensen, 1944c [211];

aculeata Chevreux, 1911 [100];

amoena Hansen, 1888 (Gurjanova, 1951) [253];

awa J.L. Barnard, 1972b [774E];

bulla G.S. Karaman, 1978c [345]; ✓

californica Alderman, 1936 [371];

celericula Croker, 1971 [579];

coronini Heller, 1867 (Chevreux and Fage, 1925) [340];

dentata (Kroyer, 1842) (Sars, 1895b) (Bousfield, 1973) [200];

④ denticulata Nagata, 1965c [395];

desdichada J.L. Barnard, 1962a [379];

- festiva (Chilton, 1885) [791 + ?755];  
formosa Murdoch, 1885 (Gurjanova, 1951) [200];  
gayi (Nicolet, 1849) (?Ledoyer, 1967b) [760];  
gladiosa Bate, 1862 (Chevreux and Fage, 1925) [352];  
grandimana Chevreux, 1908a, 1935 [443];  
hergensis Reid, 1951 (Myers, 1969c) [352];  
inaequistylis (Dana, 1852) (J.L. Barnard, 1972b) [775];  
insatiabilis Fritz Muller, 1864 [unknown];  
• japonica Nagata, 1965c [395];  
kauerti J.L. Barnard, 1972a (ssp. of zeylanica);  
kodiakensis J.L. Barnard, 1964b [273];  
koreana Stephensen, 1944b [391];  
laevidorsum Stephensen, 1944b [391];  
lagunae Oliveira, 1953 [751];  
lignophila J.L. Barnard, 1961 [501];  
longicauda (Brandt, 1851, homonym) [389];  
machaera K.H. Barnard, 1955 (Griffiths, 1975) [740];  
mangrovi Oliveira, 1953 [751];  
matilda J.L. Barnard, 1972a [788];  
messalina Fritz Muller, 1865 [unk];  
n. cronata Griffiths, 1975 [740];  
nitida S.I. Smith, 1873 (Bousfield, 1973) [360];  
"99" nitidula Ruffo, 1958a [698F];  
oba J.L. Barnard, 1972a [795];  
obtusata (Montagu, 1813) (Chevreux and Fage, 1925) [352];  
oregonensis J.L. Barnard, 1954 [268];

• → abundomelita

orgasmos K.H. Barnard, 1940 (Griffiths, 1975) [690];

oxyura Catta, 1875 [348];

pahuwai J.L. Barnard, 1970 [381];

pallida Sars, 1879, 1885 (Gurjanova, 1951) [220AB];

palmata (Montagu, 1804) (Sars, 1895b) [352];

parvimana Holmes, 1905 (?Crangonyx by Bousfield, 1958) [254];

pellucida Sars, 1883, 1895b [335]; → now allomelatas

planaterga Kunkel, 1910 [367Q];

podager (Milne Edwards, 1830) (Bate, 1862) [353];

quadrispinosa Vosseler, 1889 (Gurjanova, 1951) [200];

reidi Hamond, 1965 [237];

richardi Chevreux, 1900 [240AB];

rylovæ Bulycheva, 1955 [391];

shimizui (Ueno, 1940b) [396]; - spring in coastal region

solada J.L. Barnard, 1961 [715B];

somovaë Bulycheva, 1952 [391];

subchelata Schellenberg, 1925a (Griffiths, 1975) [743];

sulca (Stout, 1913) (J.L. Barnard, 1969a) [379];

tenuicornis (Stimpson, 1856b, homonym) [398];

tristanensis K.H. Barnard, 1965 [731];

tuberculata Nagata, 1965c [395];

valida Shoemaker, 1955 [267];

valesi S. Karaman, 1955 [345]; ✓

zeylanica Stebbing, 1904 [600E];

marine cosmopolitan, littoral to abyssal, estuarine, anchialine, rarely freshwater, 61.

↑ Additional spp. since 1983

Stygalini ? →

Dulichchiella Stout

## Figure 45

Dulichchiella Stout, 1912: 140 (Dulichchiella spinosa Stout, 1912, monotypy).--Karaman and Barnard, 1979: 152.

Body somewhat slender, metasomites and urosomites transversely crenulated or toothed dorsally. Lateral cephalic lobes subquadrate.

Antennae elongate, well setose, antenna 1 longer than 2, ratio of peduncular articles = 16:18:4, ratio of flagella = 63:12, accessory flagellum multiarticulate (5-articulate in type). Ratio of peduncular articles 3,4,5 and flagellum on antenna 2 = 6:16:14:28.

Labrum ["slightly bilobed"]. Ratio of mandibular palp articles = 3:8:10 (approximate), article 3 weakly clavate, setae = ADE. Inner lobes of lower lip well developed, fleshy. Maxillary setae diverse; inner plate of maxilla 1 long, narrow, tapering, curved, with 1-2 strong apical plumose setae, medial margin hairy, outer plate with 9 spines, palp 2-articulate [symmetry unknown]. Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped medially serrate and finally spinulose, dactyl nail weak.

Coxae medium to short, moderately setose, coxa 1 scarcely expanded apically, coxa 4 poorly lobed and scarcely longer than 5. Gnathopods subchelate, gnathopod 1 small, of Melita form, wrist elongate, unlobed, hand shorter than wrist, palm almost transverse; female gnathopod 2 slightly enlarged, wrist of same length as gnathopod 1 but hand much longer than wrist (thus wrist short), wrist scarcely lobate, palm weakly oblique, short, article 4 with tooth; one side (right or left) male gnathopod 2 like female gnathopod 2; other male gnathopod 2 (right or left) immensely enlarged and chelate, resembling crab claw as in fiddler crabs, articles 3-5 tiny, hand immense, with giant chela, dactyl immense and thick, closing on transversely extended palm.

Article 2 of pereopods 5-7 scarcely expanded, scarcely lobate ventrally.

Rami of uropods 1-2 extending equally, marginally spinose, uropod 1 with basofacial spine on peduncle. Uropod 3 extended, parviramous, outer ramus elongate, article 2 short. Telson of ordinary length, cleft to base, but partially gaping, apically and laterally spinose.

Coxal gills [2-6, ovate]. Oostegites [slender].

Relationship.--Like Melita but male gnathopod 2 of strong diversity right to left sides, part of body with numerous transverse dorsal serrations, inner plate of maxilla 1 with sickle form and setae 1-2 only and fully apical.

The species of this genus have been included with Melita since the late part of the 19th Century; Stout accidentally described this genus on the mistaken idea that uropod 3 lacked rami (because they had broken off) and thus compared the genus to Dulichia. Since Stout's time the genus has always been synonymized with Melita but we believe the unusual male gnathopods analogous to those of a fiddler crab deserve generic recognition. In this way we also believe that the several species heretofore synonymized with Melita fresneli or M. appendiculata must be

revived, reexamined and redescribed as there may be several valid species. For the moment, then, we revive the following species.

Species.--appendiculata (Say, 1818) [365];

australis (Haswell, 1879b) [781];

(exilii Fritz Muller, 1864) [type locality= ?453];

fresneli (Audouin, 1826) (?= cotesi Giles, 1890) (?= validus Dana, 1852) (= pilosus Dana, 1852) (= setipes Dana, 1852) (= ?anisochir Kroyer, 1845) (?= valida Dana, 1852) [600];

spinosa Stout, 1912 [373];

tropicopolitan in shallow seas, ?5+.

Psammogammarus S. Karaman

Figure 17, Maps 53-55

Psammogammarus S. Karaman, 1955: 223 (Psammogammarus caecus S. Karaman, 1955, original designation).--Karaman and Barnard, 1979: 147.

Body vermiform to subvermiform or ordinary. Rostrum obsolescent or small, lateral cephalic lobes rounded, shallow sinus obsolescent. Eyes absent or present.

Antennae elongate, antenna 1 much longer than 2, ratio of peduncular articles = 20:19:7, accessory flagellum 2-articulate. Antenna 2 flagellum short, articles free.

Labrum entire or weakly emarginate (type). Ratio of mandibular palp articles = 4:9:6, article 3 linear, setae = DE, very sparse. Labium with small but fleshy inner lobes partially fused together (like pleustid), gaping. Maxillae medially setose, inner plate ovate, not fully setose medially (3+ setae), outer plate with 9 spines, palps symmetric. Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped medially spinose (or only setose), dactyl as long as 3, nail absent or obsolescent.

Coxae very short, coxa 1 blunt anteriorly, coxa 4 unlobed. Gnathopods 1-2 subchelate, gnathopod 2 enlarged, wrist of gnathopod 1 of medium length, ovate, poorly lobed, hand weakly trapezoidal, weakly expanding apically, palm oblique, wrist of gnathopod 2 short, weakly lobed, hand enlarged, elongate, ovate, palm very oblique, poorly defined, often sculptured, female gnathopod 2 smaller than male, unsculptured, occasionally with weak Hadziid setae.

Pereopods 5-7 progressively longer, last one elongate, article 2 of pereopods 5-7 alike, scarcely expanded, almost linear, scarcely to strongly lobate.

Outer rami of uropods 1-2 slightly shortened, of uropod 1 often lacking marginal spines, peduncle of uropod 1 with basofacial spine(s), of uropod 2 often with apicomедial comb. Uropod 3 highly extended, variramous or parviramous, outer ramus hugely elongate, article 2 usually as long as

article 1 but occasionally much shortened. Telson weakly elongate, deeply cleft, apices sharp, spinose, often with lateral spines, main dorsal setules highly apicad.

Coxal gills 3-6 on type-species!, ovate to sausage shaped, 2-6 on other species. Oostegites [unknown on type-species] slender.

Variants.--Species quite variable, for example; labrum rounded (philippensis); mandibular molar bulbous and poorly triturative (gracilis); article 3 of mandibular palp as long as article 2 (seurati); article 2 of antenna 1 shorter than article 1 (gracilis); lower lip normally Melitid with fully discrete fleshy inner lobes, no gape (longiramus); inner plate of maxilla 1 fully setose medially (longiramus and seurati); nail of maxilliped discrete and inner plate only setose medially (philippensis); gnathopod 1 palm transverse (philippensis) or parachelate (seurati); article 2 of pereopods 3-4 expanded (philippensis); article 2 of pereopods 5-7 well lobate (philippensis); uropods 1-2 poorly spinose (gracilis); inner ramus of uropod 3 as long as article 1 of outer ramus (longiramus) or half as long (caeca); article 2 on outer ramus of uropod 3 short (seurati); telson broadened (gracilis).

Relationship.--Differing from Eriopisa in the lack of diversity on article 2 of pereopods 5-7 and the shorter article 3 of the mandibular palp, which in Eriopisa is much longer than article 2 and which in Psammogammarus is shorter than article 2.

Species.--8 caeca S. Karaman, 1955 (= peresi Ledoyer, 1968) [105Q];

P garthi (J.L. Barnard, 1952b) [376];

9 gracilis Ruffo and Schiecke, 1976a [106];

76 longiramus (Stock and Nijssen, 1965), [677J];

77 philippensis Chilton, 1921b [641J];

10 seurati (Gauthier, 1936) [131J];

cosmopolitan in low latitudes, in inland wells, anchialine or near brackishwater or littoral, 6.

#### Victoriopisa Karaman and Barnard

Figures 13, 44, Map 54

Victoriopisa Karaman and Barnard, 1979: 149 (Niphargus chilkensis Chilton, 1921a, original designation).

Body subvermiform, urosomites short. Rostrum very short, lateral cephalic lobes subrounded, with poorly marked anteroventral lobe, sinus obsolescent. Eyes weak or absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 29:26:7 (or article 2 longer, epistomata); accessory flagellum

2-articulate. First article of flagellum on antenna 2 elongate and composed of several articles fused together, total free articles about 2-3.

Ratio of mandibular palp articles = 4:11:16, article 3 linear, setae = DE. Inner lobes of labium partially fused together, obsolescent. Maxillae well setose medially, inner plate of maxilla 1 ovatotriangular, fully setose medially, outer plate with about 7 distal spines, palps [?symmetric] [palp of epistomata shown to be 1-articulate]. Inner plate with several medial marginal setae only (none obliquely positioned). Maxilliped nail weak or absent.

Coxae very short, discontinuous, coxa 1 not produced, (or produced in epistomata), coxa 4 unlobed. Gnathopods 1-2 dissimilar, subchelate, gnathopod 2 enlarged, wrist of gnathopod 1 elongate, ovate, unlobed, hand trapezoidal, expanding distally, palm almost transverse but convex; wrist of gnathopod 2 short, weakly lobed or not, hand enlarged, elongate, ovate, palm very oblique, long, poorly defined, slightly sculptured, dactyl elongate.

Pereopods 5-7 almost equal in length and short, article 2 of pereopods 5-7 diverse, of 5 unexpanded and almost linear, of 6 weakly expanded, of 7 broadly expanded and lobate; article 4 of pereopod 7 dilated (unusual character).

Rami of uropods 1-2 subequally extended, with marginal spines, peduncle of uropod 1 with basofacial spine, of uropod 2 with weak apicomedial comb. Uropod 3 greatly extended, parviramous, outer ramus huge, article 2 also huge and nearly as long as article 1. Telson of ordinary length, cleft to base, lobes tapering, weakly armed apically or apicolaterally.

Coxal gills 2-6, some of them broadly pyriform. Oostegites [?slender].

Relationship: Allied to Eriopisa and Psammogammarus but differing by the basal fusion of articles on the flagellum of antenna 2, the obsolescence of inner lobes on the labium, the absence of the oblique facial row of setae on maxilla 2, the dilated article 4 of pereopod 7, and the subequal pereopods 5 and 7.

Species: 92 australiensis (Chilton, 1923a) [781, tidal lagoon];

93 chilkensis (Chilton, 1921a) [664];

94 epistomata (Griffiths, 1974a) [743];

Southern Australia west to South Africa and India, littoral to anchialine, 3.

#### Eriopisa Stebbing

##### Figure 17

Eriopis Bruzelius, 1859: 64 (homonym, Insecta) (Eriopis elongata Bruzelius, 1859, monotypy).

Eriopsis Wrzesniowsky, 1890: 632 (spelling variant).

Eriopisa Stebbing, 1890: 193 (new name); 1906: 411 (same type-species).--  
Karaman and Barnard, 1979: 146.

Body vermiform to subvermiform. Rostrum obsolescent, lateral cephalic lobes rounded, with deep thin sinus (notch). Eyes absent.

Antennae elongate, antenna 1 much longer than 2, ratio of peduncular articles = 24:26:8, accessory flagellum 2-articulate. Antenna 2 flagellum short; articles free.

Ratio of mandibular palp articles = 4:11:16, article 3 linear, setae = ADE. Labium with small but fleshy inner lobes, gaping. Maxillae medially setose, inner plate of maxilla 1 ovatotriangular, fully setose medially. Outer plate with 9 spines, palps almost symmetric. Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped medially setose, dactyl about as long as article 3.

Coxae very short, often discontinuous, coxa 1 sharp anteriorly, coxa 4 unlobed. Gnathopods 1-2 dissimilar, subchelate, gnathopod 2 enlarged, wrist of gnathopod 1 of medium length, ovate, unlobed, hand trapezoidal, expanding distally, palm oblique, wrist of gnathopod 2 short, weakly lobed, hand enlarged, elongate, ovate, palm very oblique, long, poorly defined, often sculptured; female gnathopod 2 smaller than male, palm simple.

Pereopods 5-7 progressively longer but together not elongate, article 2 of pereopods 5-7 diverse, of 5 almost linear, of 6 slightly expanded, of 7 broadly expanded, 6-7 scarcely lobate.

Rami of uropods 1-2 equally extended, with marginal spines, peduncle of uropod 1 with basofacial spine, of uropod 2 with [?apicomedial comb]. Uropod 3 greatly extended, parviramous, outer ramus huge, article 2 also huge and nearly as long as article 1. Telson of ordinary length to elongate, deeply cleft, narrow, lobes tapering to apical notch, poorly spinose or setose.

Coxal gills 2-6, slender-ovate. Oostegites narrow.

Notes.--We reexamined type-species to find inner lobes of lower lip complete and fleshy (contrary to Sars, 1895b, sketchy depiction).

Relationship.--Differing from Melita in the elongate article 2 of outer ramus on uropod 3, extremely thin body, small coxae, with coxa 4 unlobed.

Species.--elongata (Bruzelius, 1859) (Sars, 1895b) [210];

bathyal north Atlantic, and ?Pacific (we question precise identification), 1.

#### Melitoides Gurjanova

Melitoides Gurjanova, 1934: 127 (Melitoides makarovi Gurjanova, 1934) monotypy).

One pleonite with dorsal hump, urosomites 1-2 each with dorsal tooth. Lateral cephalic lobes prominent, mammilliform. Eyes absent.

Antennae elongate, antenna 1 slightly longer than 2, ratio of peduncular articles = 20:20:8, ratio of primary flagellum = 55, accessory flagellum 3+ articulate. Antenna 2 slender, flagellum longer than article 5 of peduncle.

Ratio of mandibular palp articles = 3:4:8, article 3 linear, setae = DE. Inner lobes of labium present. Maxillae medially setose, inner plate

of maxilla 1 slender, outer plate with [?7 spines], palps [?symmetrical]. Inner plate of maxilla 2 with medial setae, none facial. Outer plate of maxilliped medially [?spinose], article 3 of palp lobate, dactyl [?without nail].

Coxae long and large, poorly setose, coxa 1 expanded and adz-shaped, coxa 4 lobate posteroventrally, coxa 5 much shorter than 4, coxa 6 weakly hooked. Gnathopods diverse, gnathopod 1 small, of Melitid form, wrist elongate, unlobed, hand shorter, rectangular, palm weakly oblique, short, gnathopod 2 very large, wrist short, lobate, hand huge, rectangular, palm almost transverse, sculptured; [sexes not distinguished].

Article 2 of pereopods 5-7 expanded, alike, weakly lobate, poorly setose, posterior margins convex or weakly sinuous, remainder of appendage elongate.

Rami of uropods 1-2 evenly extended, [?marginally spinose, peduncle of uropod 1 with basofacial spine]. Uropod 3 not extended (because uropods 1-2 also very long), but very long, parviramous, outer ramus elongate, 1-articulate. Telson slightly elongate, deeply cleft, lobes tapering, weakly armed apically.

Coxal gills [?2-6]. Oostegites [?slender].

Relationship.--Differing from Melita in the strange urosomal relationships: uropod 3 remains as long as in Melita but because uropods 1-2 are so elongate, uropod 3 does not overextend the others. The well developed medial setae of the maxillae and the attenuate mandibular palp complete the distinctions.

Species.--makarovi Gurjanova, 1934, 1951 [287];

Siberian and Bering Seas, sublittoral, 1.

Rotomelita J.L. Barnard

Figures 9, 19, Map 53

Rotomelita J.L. Barnard, 1977: 291 (Rotomelita lokoa J.L. Barnard, 1977, original designation).

Body smooth, urosomites poorly armed. Rostrum absent, lateral cephalic lobes weakly mammilliform or rounded, sinus weak. Eyes absent.

Antennae elongate, slender, antenna 1 longer than 2, ratio of peduncular articles = 14:15:9, ratio of flagella = 45:4, accessory flagellum 3+ articulate. Antenna 2 gland cone large.

Ratio of mandibular palp articles = 6:10:9, article 3 linear, setae = E. Inner lobes of labium moderately developed, fleshy. Maxillae not or scarcely setose medially, inner plate of maxilla 1 ovato-rectangular, with 2 apical and one apicomедial setae, outer plate with 9 spines, palps asymmetrical. Inner plate of maxilla 2 with 2-3 apicomедial setae, no facial setae. Outer plate of maxilliped medially toothed and facially spinose.

Coxae ordinary, poorly setose, coxa 1 undilated, coxa 4 posteroventrally lobate. Gnathopods 1-2 diverse, gnathopod 1 the smaller,

of Melitid form generally in female, wrist elongate, unlobed, hand short, subrectangular, palm short and transverse, gnathopod 2 enlarged, almost alike in both sexes, wrist of medium length, scarcely lobed (broadly), hand elongate, subrectangular, only of medium size, palm oblique, short to medium, well defined, dactyl fitting palm; male gnathopod 2 scarcely larger than in female.

Article 2 of pereopods 5-7 moderately expanded, scarcely lobate posteroventrally, poorly setose (only setulose).

Rami of uropods 1-2 extending equally, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 extended, parviramous, outer ramus elongate, with medium article 2. Telson of ordinary length but very broad, cleft to base, lobes quadrate, tightly appressed, apices very wide and excavate, with sparse spines apicomediaally, apicolaterally and dorsally.

Coxal gills 2-6, ovate, strongly pediculate. Oostegites slender.

Relationship.--Differing from Melita in the broad quadrate tightly appressed telsonic lobes, strongly pediculate coxal gills.

Species.--H ana J.L. Barnard, 1977 [381];

J. lokoa J.L. Barnard, 1977 [381];

Hawaiian Islands, anchialine, 2.

#### Nainaloa Karaman and Barnard

Map 53

Nainaloa Karaman and Barnard, 1979: 154 (Melita latimerus Bousfield, 1971, original designation).

Body smooth, urosomite 2 with 2 dorsal spines. Rostrum obsolescent, lateral cephalic lobes subrounded, prominent.

Antennae elongate, antenna 1 longer than 2, peduncle almost slender, ratio of peduncular articles = 29:29:17; accessory flagellum 2-articulate.

Mandibular palp slender, articles 2 and 3 subequally long, article 3 with 3 apical setae (E). Labium ordinary, with small fleshy inner lobes. Maxillae 1-2 not medially setose, inner plate of maxilla 1 with 3 apical setae, outer plate with 9 serrate spines, palp ordinary, 2-articulate, with distal setae and spines. Both plates of maxilla 2 narrow, inner lacking oblique facial row of setae. Both plates of maxilliped of medium size, outer plate setose along inner margin, palp article 2 elongate, article 3 short, slightly lobed, dactyl as long as article 3, nail [unknown].

Coxae of medium size, coxa 1 not expanded, coxa 4 with shallow posterodistal lobe. Gnathopods strongly diverse, subchelate, sexually dimorphic; article 5 of gnathopod 1 slightly longer than 6, unlobed, palm transverse; gnathopod 2 enlarged but weakly so in female, article 5 short to very short, with broad to narrow lobe, article 6 large, ovoid, palm strongly oblique, poorly defined.

Pereopods 5-7 not elongate, pereopod 5 weakly shorter than 7, article 2 of all expanded, ovoid, lobate. Pleopods weak but rami multiarticulate. Uropod 1 slightly reduced [?apparently peduncle without basofacial spine], outer ramus slender, naked dorsally, inner ramus slightly elongate, dorsally spinose. Uropod 2 ordinary, reaching as far as uropod 1, rami normally spinose. Uropod 3 strongly exceeding uropod 1, parviramous, peduncle shorter than outer ramus, inner ramus scale-like, outer ramus rectangular, with medium article 2. Telson short, cleft to base, each lobe quadrate, weakly excavate apically, weakly spinose.

Coxal gills simple, 2-6, ovate to linear, not strongly pediculate. Ootegites narrow.

Relationship.--Allied to Rotomelita J.L. Barnard (1977), but differing from it in the partially reduced uropod 1, subequally long pereopods 5-7, simple gills, sexual dimorphism of gnathopod 2, lobed article 2 of pereopods 5-7, presence of eyes and prominent lateral cephalic lobes.

Species.--N latimera (Bousfield, 1971) [595];

Bismarck Archipelago, brackish lakes and lagoons, 1.

Tegano Karaman and Barnard

Map 53

Tegano Barnard and Karaman, 1982: 176-177 (Melita seticornis Bousfield, 1970, original designation, here selected).

Body smooth, urosomite 1 with small middorsal posterior mucronation. Rostrum obsolescent, lateral cephalic lobes strongly mammilliform.

Antennae elongate, slightly thickened, antenna 1 scarcely longer than 2, ratio of peduncular articles = 12:15:5, ratio of flagella = 30:3, accessory flagellum 2-articulate. Antenna 2 gland cone large.

Ratio of mandibular palp articles = 4:8:0 or 3:10:0 (article 3 absent), apical setae of article 2 = D (one long only). Inner lobes of labium well developed, fleshy. Maxillae moderately setose medially, inner plate of maxilla 1 ovate, with 6 apical and medial setae, outer plate with "9-10" (but see figure) spines, palps [?asymmetric]. Inner plate of maxilla 2 with several marginal medial setae, nonfacial setae. Outer plate of maxilliped minutely spinose medially, dactyl with tiny nail.

Coxae of ordinary length, poorly setose, coxa 1 undilate, coxa 4 unlobed. Gnathopods 1-2 diverse, gnathopod 1 the smaller, of Melitid form, wrist weakly elongate, hand subrectangular, or trapezoidally expanded apically, palm transverse, convex in female, acquiring rugose process in terminal males, gnathopod 2 slightly enlarged, wrist of medium length, scarcely lobed (broadly), hand elongate, subrectangular in female, with oblique short palm, in male larger, more ovate, palm longer, softly excavate, dactyl longer and more curved.

Article 2 of pereopods 5-7 scarcely expanded, scarcely lobate or not posteroventrally, poorly setose (only setulose).

Rami of uropods 1-2 extending equally, marginally spinose, peduncle of uropod 1 with basofacial spine. Uropod 3 extended, parviramous, outer ramus elongate, with medium article 2. Telson short, cleft to base, lobes leaf-like, tapering apically, sparsely setose apically.

Coxal gills 2-6, ovate, that on pereonite 2 pediculate. Oostegites narrow.

Description.--Antennae of male with whorls of setae on peduncles and flagella.

Relationship.--Differing from Melita in the reduced mandibular palp.

Species.--seticornis (Bousfield, 1970) [596];

Solomon Islands (Rennell) and Bismarck Archipelago (Mussau), anchialine, 1.

### Paraniphargus Tattersall

Figure 5, Map 54

Paraniphargus Tattersall, 1925: 241 (Paraniphargus annandalei Tattersall, 1925, monotypy).

Body slender, urosomites with or without weak dorsal tooth. Rostrum weak or obsolescent, lateral cephalic lobes strongly protruding, rounded, sinus obsolescent or absent. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 18:18:12, primary flagellum longer than peduncle, accessory flagellum 2-articulate. Antenna 2 flagellum not longer than article 4 of peduncle.

Ratio of mandibular palp articles = 5:16:16, article 3 linear, setae = E. Inner lobes of labium well developed and fleshy, no gape. Maxillae not medially setose, inner plate of maxilla 1 ovate, with 3-4 apical setae, outer plate with 9-7 spines, palps 2-articulate, apically setose [?symmetric]. Inner plate of maxilla 2 without facial or medial setae. Outer plate of maxilliped [?medially spinose], dactyl [?with nail].

Coxae elongate, poorly setose, coxa 1 rectangular, coxa 4 lobate. Gnathopod 1 small, of Melitid form, wrist weakly elongate, unlobed, hand short, rectotrapezoidal, palm transverse, dactyl fitting palm gnathopod 2 much enlarged, wrist of medium length, weakly lobate, hand large, ovatorectangular, palm oblique, smooth or weakly sculptured, poorly defined, palm lacking large spines; no sexual dimorphism.

Article 2 of pereopods 5-7 weakly to moderately expanded, not lobate to scarcely produced posteroventrally, posterior margin moderately to weakly serrate, lacking large setae.

Pleopods [?ordinary]. Rami of uropods 1-2 extending equally, marginally spinose, peduncle of uropod 1 with basofacial spine [assumed in type]. Uropod 3 strongly extended, peduncle weakly elongate, parviramous, outer ramus elongate, 1-articulate. Telson of ordinary length, fully cleft, lobes tapering, each with 2 long apical spine-setae.

Coxal gills [?2-6, ovate]. Oostegites [?slender].

Variants.--Mandibular lobes of lower lip strongly extended (annandalei); pleopods weak, inner rami longer than outer (ruttneri); gills well developed but simple, no sternal gills (ruttneri).

Relationship.--Scarcely distinct from Melita, differing mainly by loss of eyes and medial maxillary setae.

Species.--63 annandalei Tattersall, 1925 [662];

64 ruttneri Schellenberg, 1931b [648];

Andaman Isles and Java, jungle streams and springs, probably hypogean, 2.

Maleriopa Barnard and Karaman

Maleriopa Barnard and Karaman, 1982: 176 (Eriopisella dentifera Ledoyer, 1978, original designation).

Body slender, urosomites [?free, naked]. Lateral cephalic lobes weak, rounded, sinus absent.

Antennae moderately extended, ratio of peduncular articles = 26:19:8, primary flagellum slightly longer than peduncle, accessory flagellum 2-articulate.

Labrum [?entire, rounded]. Right mandible with only 3 rakers, molar weakly tritulative, ratio of palp articles = 3:10:9, article 3 linear, setae = E, sparse. Inner lobes of labium present, fleshy, mandibular lobes extended. Maxillae not setose medially, inner plate of maxilla 1 subrectangular, with 2 distal setae, outer plate with about 7 spines, palps 2-articulate, [?symmetric]. Inner plate of maxilla 2 without facial and medial setae. Outer plate of maxilliped [medially spinose, article 3 of palp unlobed, dactyl shorter than 3, unguiform, with nail].

Coxae of ordinary length, poorly setose, coxa 1 tapering, coxa 4 [?unlobed]. Gnathopods small to moderate, gnathopod 1 with elongate wrist, hand subrectangular, palm weakly oblique; gnathopod 2 moderately enlarged, wrist short, strongly lobed, lobe bending distad, hand subrectangular, weakly expanded apically, palm oblique, well defined, strongly spinose.

Article 2 of pereopods 5-6 weakly expanded, moderately lobate, posterior margin straight, of pereopod 7 expanded, lobate, posterior margin convex, all posterior margins weakly setose; dactyls ordinary.

Pleopods [?ordinary]. Rami of uropods 1-2 extending equally, marginally spinose except for outer ramus of uropod 1, latter [?with basofacial spine]. Uropod 3 slightly extended, parviramous, article 2 on outer ramus short. Telson short, deeply cleft, lobes broad but weakly tapering, each apex with subapical spine.

Coxal gills [?2-6, ovate]. Oostegites [?narrow].

Relationship.--Differing from Eriopisa, Victoriopisa and Psammogammarus in the loss of medial setae on the maxillae. Differing from Paraniphargus in the presence of eyes and article 2 on the outer ramus of uropod 3, the tapering coxa 1 and more strongly lobate bases of pereopods 5-7 and more strongly lobate wrist of gnathopod 2. Differing from Tegano in the presence of article 3 on the mandibular palp, the short article 2 of

antenna 1 and the loss of medial setae on maxilla 2. Differing from Eriopisella in the slightly enlarged gnathopod 2 with strong, spinose palm.

Species.--déntifera (Ledoyer, 1978) [697];

Mauritius, sublittoral, 1.

Anchialella J.L. Barnard

Map 53

Anchialella J.L. Barnard, 1979: 53 (Anchialella vulcanella, J.L. Barnard, 1979).

Body subvermiform, urosomite 2 with 2 spines. Rostrum obsolescent, lateral cephalic lobes rounded, sinus weak. Eyes absent.

Antennae of medium length, antenna 1 scarcely longer than 2, ratio of peduncular articles = 24:25:11, accessory flagellum 2-articulate. Antenna 2 flagellum short, articles free.

Ratio of mandibular palp articles = 6:12:9, article 3 almost fully linear, setae = DE, very sparse. Labium with obsolescent inner lobes, slightly gaping. Maxillae poorly setose medially, inner plate of maxilla 1 ovate, with about 4 apicomедial setae, outer plate with 7 spines, palps symmetrical. Inner plate of maxilla 2 without facial setae, medial setae poorly developed. Maxilliped dactyl almost as long as 3, with strong nail.

Coxae very short, weakly setose, coxa 1 rounded below, unproduced, coxa 4 unexcavate. Gnathopods (only female known) weak, wrist of gnathopod 1 scarcely elongate, unlobed, hand rectangular, stout, palm slightly oblique; wrist of gnathopod 2 scarcely elongate, thick, unlobed, hand rectangular, palm oblique, poorly defined, gnathopod 2 larger than gnathopod 1.

Article 2 of pereopods 5-6 weakly expanded, almost linear, of pereopod 7 more strongly expanded, unlobed, all poorly setose.

Rami of uropods 1-2 evenly extended, outer ramus of uropod 1 lacking marginal spines, peduncle of uropod 1 with facial spines. Uropod 3 greatly extended, parviramous, peduncle slightly elongate, outer ramus 1-articulate. Telson of ordinary length, almost fully cleft, lobes tapering, poorly armed or with one dorsomedial spine each.

Coxal gills 2-6, slender, ovate. Oostegites slender.

Relationship.--Transitional between Psammogammarus and Galapsiellus, differing from Eriopisa, Psammogammarus, and Victoriopisa in the elongation of the peduncle on uropod 3, weak inner lobes of lower lip, weak maxillary setation and absence of article 2 on the outer ramus of uropod 3. Differing from Paraniphargus in the short anterior coxae, slightly stronger maxillary setation, weak mandibular lobes of the lower lip. See Galapsiellus. Differing from Maleriopa in the absence of article 2 on the outer ramus of uropod 3, unlobed article 2 of pereopods 5-7, unlobate wrist of gnathopod 2; from Tegano in the presence of article 3 on the mandibular palp, and poorly developed inner lobes on the labium.

Species.--E vulcanella J.L. Barnard, 1979 [546Q]; Galapagos Islands, anchialine, 1.

Galapsiellus J.L. Barnard

Figures 6, 19, Map 53

Galapsiellus J.L. Barnard, 1976b: 422 (Paraniphargus leleuporum Monod, 1970, original designation).

Body subvermiform, urosomites naked. Rostrum absent, lateral cephalic lobes weak, broad, subquadrate, weak sinus present. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 20:23:9, primary flagellum much longer than peduncle, accessory flagellum 2-articulate. Antenna 2 flagellum short, 4-articulate, gland cone large.

Ratio of mandibular palp articles = 6:12:9, setae on linear article 3 = E (2 only). Inner lobes on labium weak, no gape. Maxillae not or scarcely setose medially, inner plate of maxilla 1 linear-ovate, armed with 4 apical setae, outer plate with 6 spines, palps symmetric. Inner plate of maxilla 2 without facial setae or possibly with one weak apical member, with one weak medial seta. Maxilliped dactyl with strong nail (contrary to Monod).

Coxae very short, barely contiguous, scarcely setulate, apices somewhat rounded and tapering, coxa 4 unlobate, coxa 5 as long as 4. Gnathopods small, almost mittenform, sexes alike, thin, wrists elongate, unlobed, hands shorter, subrectangular, weakly expanding (thus weakly trapezoidal), palms oblique, poorly armed, gnathopod 1 somewhat smaller and with slightly shorter hand than on gnathopod 2.

Article 2 of pereopods 5-7 scarcely expanded, weakly pyriform, slightly tapering apically, posterodistal corners sharp but scarcely produced, dactyls with one inferior setule.

Rami of uropods 1-2 extending subequally, naked dorsally, peduncle of uropod 2 with basofacial spine (Mark 45), apex of peduncle extended. Uropod 3 extended, parviramous, peduncle greatly elongate, as long as outer ramus, latter 1-articulate. Telson of ordinary length, cleft to base, lobes tapering, each armed with one apicomедial spine.

Coxal gills 2-6, ovate, weakly pediculate, not biarticulate. Oostegites narrow, sausage shaped.

Relationship.--Like Anchialella but outer plate of maxilla 1 with only 6 spines, female gnathopod 2 enfeebled, peduncle of uropod 3 even more greatly elongate, and telsonic lobes turgid.

Species.--G leleuporum (Monod, 1970) [546];

Galapagos Islands, Isla Santa Cruz, phreatic and anchialine, 1.

## Eriopisellids

Inner lobes of lower lip various. Maxillae not medially setose. Gnathopod 1 of Melitid form, gnathopod 2 mittenform; or both gnathopods mittenform. Uropod 3 parviramous or uniramous. Telson cleft.

## Key to the Genera of Eriopisellids

1. Gnathopod 1 with lobe on article 5 . . . . . 2  
Gnathopod 1 lacking lobe on article 5. . . . . 3
2. Outer ramus of uropod 3 with 2 articles, mandibular  
palp article 3 linear. . . . . Microniphargus ✓  
Outer ramus of uropod 3 with one article, mandibular  
palp article 3 falcate. . . . . Indoniphargus ✓
3. Inner ramus of uropod 3 absent . . . . . Giniphargus ✓  
Inner ramus of uropod 3 present. . . . . 4
4. Article 2 on outer ramus of uropod 3 absent. . . . . Netamelita  
Article 2 on outer ramus of uropod 3 present . . . . . 5
5. Wrist of gnathopod 2 lobate. . . . . Eriopisella  
Wrist of gnathopod 2 unlobate . . . . . Eriopisella madagascarensis

Eriopisella Chevreux

Figures 5, 8, 14, Map 54

Eriopisella Chevreux, 1920: 81 (Eriopisella pusilla Chevreux, 1920, monotypy).

Body subvermiform. Rostrum obsolescent, lateral cephalic lobes rounded, sinus absent or poorly developed, or anteroventral corner of head produced. Eyes weak or absent.

Antenna 1 elongate, much longer than 2, ratio of peduncular articles = 30:31:10 [30:30-33:6-12], accessory flagellum 1-articulate. Antenna 2 short. Mandibular raker spines usually absent, ratio of palp articles = 5:10:12 (or article 3 shorter than article 2), article 3 slender, setae = E and few (2). Inner lobes of labium fleshy, often partly fused to outer lobes. Maxillae naked medially, inner plate of maxilla 1 ovate, with few apical setae, outer plate narrow, with 7-9 spines, palps [?symmetric]. Inner plate of maxilla 2 without medial and facial setae. Outer plate of maxilliped medially setose (type) or spinose, dactyl [?without, type, or] with nail.

Coxae very short, scarcely touching, coxa 1 anteriorly produced, coxa 4 unlobed. Gnathopods 1-2 feeble, mittenform, of similar size, wrists of medium length, hands usually shorter and rectangular, palms slightly oblique, short, wrist of gnathopod 1 unlobed, of gnathopod 2 lobed (except madagascarensis).

Pereopods 5-7 progressively longer but together not greatly elongate, article 2 of pereopods 5-7 alike, unexpanded, unlobate, almost linear (type) or article 2 of pereopod 7 expanded and ventrally lobate.

Outer rami of uropods 1-2 scarcely shortened or not, outer rami often without marginal spines, (uropod 1 often with basofacial spine [type unknown]). Uropod 2 occasionally with apicomedial comb row on peduncle. Uropod 3 greatly extended, parviramous, outer ramus elongate, article 2 of medium length (type) or shorter.

Telson of ordinary length, almost to fully cleft, with weak or slender apical armaments.

Coxal gill [?2-6], ovate and stalked [type unknown]. Oostegites narrow.

Notes.--Several species bear 2 elongate apicolateral setae on the outer plate of maxilla 2 (similar to Allocrangonyx).

Relationship.--The basic member of the Eriopisellid group including Indoniphargus, Microniphargus and Giniphargus. Netamelita differs only in the loss of article 2 on the outer ramus of uropod 3; E. madagascarensis deviates in the loss of the wrist lobe on gnathopod 2.

Differing from Eriopisa in the reduced mittenform gnathopods of both pairs and full loss of medial maxillary setae.

Species.--capensis K.H. Barnard (1916) [743];

✓ epimera Griffiths, 1974a [745];

madagascarensis Ledoyer, 1967a [698];

nagatai Gurjanova, 1965 [663],

✓ propagatio Imbach, 1969 [655];

✓ pusilla Chevreux (Chevreux and Fage, 1925) [353];

✓ 96 sechellensis (Chevreux, 1901) [600];

✓ upolu J.L. Barnard, 1970 [381]; eye of coral + algae / medium size  
circumtropical and warm-temperate, marine and brackish, 0-300 m, 8.

#### Netamelita J.L. Barnard

Netamelita J.L. Barnard, 1962a: 110 (Netamelita cortada J.L. Barnard, 1962a, original designation).

Body subvermiform. Rostrum absent, lateral cephalic lobes rounded, sinus absent. Eyes moderately developed.

Antenna 1 elongate, much longer than 2, ratio of peduncular articles = 20:15:4, primary flagellum slightly longer than peduncle, accessory flagellum 1-articulate. Antenna 2 very small, article 5 shorter than 4.

Mandibular raker spines [?absent], ratio of palp articles = 7:13:11, palp feeble, article 3 linear, setae = sparse, E. Inner lobes of labium fleshy, well developed. Maxillae naked medially, inner plate of maxilla 1

(8)

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Stygofauna  
Mundi

not stygofauna

ovate, with 2 apical setae, outer plate with [?spines, palps ?symmetric]. Inner plate of maxilla 2 without facial and medial setae. Outer plate of maxilliped [?medially spinose, article 3 of palp unlobed, dactyl shorter than 3, unguiform, with nail].

Coxae short, scarcely touching, coxa 1 anteriorly produced, coxa 4 unlobed, scarcely longer than coxa 5. Gnathopods 1-2 feeble, mittenform, of similar size, wrists elongate, hands shorter than wrists, rectangular, palms slightly oblique, short, wrist of gnathopod 1 unlobed, of gnathopod 2 lobed.

Pereopods 5-7 progressively longer but together not greatly elongate, article 2 of pereopods 5-7 alike, moderately to strongly expanded, progressively unlobate.

Outer rami of uropods 1-2 scarcely shortened, not marginally spinose, uropod 1 with [?basofacial spine], uropod 2 with weak apicomedial comb row on peduncle. Uropod 3 greatly extended, parviramous, outer ramus elongate, 1-articulate. Telson of ordinary length, almost fully cleft, with weak and strong apical armaments.

Coxal gills [?2-6, ovate, stalked]. Oostegites [?narrow].

Relationship.--Differing from Eriopisella in the loss of article 2 on the outer ramus of uropod 3.

Species.--cortada J.L. Barnard, 1962a [370];

California, sublittoral l.

#### Indoniphargus Straskraba

Figure 14, Map 54

Indoniphargus Straskraba, 1967: 127 (Niphargus indicus Chilton, 1923b, original designation).

Body weakly subvermiform, sparsely setose dorsally, urosomites with scattered setae. Rostrum absent, lateral cephalic lobes mammilliform. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 24:16:12, primary flagellum longer than peduncle, with rhabdal calceoli (or aesthetes?) accessory flagellum 2-articulate. Antenna 2 relatively long.

Ratio of mandibular palp articles = 8:20:10, article 3 strongly falcate, setae = DE (numerous). Inner lobes of labium absent, no gape. Maxillae almost naked medially, inner plate of maxilla 1 slender, elongate, with 2 apical setae, outer plate with 8 spines, palps 2-articulate, asymmetrical. Inner plate of maxilla 2 with one medial seta on margin at apex, medially hairy.

Coxae 1-4 longer than broad, contiguous or overlapping, each with several long apical setae, coxa 4 lobate. Gnathopods 1-2 feeble, mittenform, of similar width, but gnathopod 2 longer than gnathopod 1, hands subrectangular, palms weakly oblique, short, wrists lobate (or weakly on gnathopod 2), wrist of gnathopod 1 of medium length, hand slightly

shorter, wrist of gnathopod 2 elongate, hand also elongate and scarcely shorter than wrist.

Pereopods 5-7 of medium size, progressively longer, article 2 weakly expanded, small posteroventral lobe progressively slightly stronger, posterior margins convex, densely setuloserrate; dactyls short, with one inferior setule.

Pleopods [?ordinary]. Rami of uropods 1-2 extending subequally, rami well spinose marginally except outer ramus of uropod 2, apical spines notably dense, uropod 1 with at least 4 facioventral spines, uropod 2 with 4 apicolateral spines. Uropod 3 extended, parviramous, outer ramus elongate, uniarticulate. Telson of ordinary length, cleft about three fourths, lobes appressed, untapered, apically and dorsally spinose.

Coxal gills [?2-6], ovate, pedunculate. Oostegites [unknown]. Sternal gills [?].

Relationship.--Differing from Eriopisella, Netamelita and Giniphargus in the lobate wrist of gnathopod 1; from Microniphargus in the falcate article 3 of mandibular palp and loss of article 2 on outer ramus of uropod 3.

With the facies of certain Crangonyctids, or Oriental Gammarids, because of multiple facial spination on peduncle of uropod 3, general appearance and spinosity of pereopods and uropods and urosomites, strongly falcate mandibular palp, well developed and spinose plates of maxillipeds; thus, differing from Neoniphargus in the broadness of wrist lobes on gnathopods; differing from Asiatic Gammarids and Crangonyctids in the mittenform gnathopods. Sternal gills have not been reported and Crangonyctid affinities cannot be confirmed. See Eoniphargus.

Species.--86 indicus (Chilton, 1923b) (Stephensen, 1931) [963];

India, mines, springs and wells, 1.

#### Microniphargus Schellenberg

Map 65

Microniphargus Schellenberg, 1934b: 215; 1942: 80 (Microniphargus leruthi Schellenberg, 1934b, monotypy).

Body [?slender]. Rostrum [?absent], lateral cephalic lobes subrounded, [?sinus present]. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles [unknown, but article 1 as long as articles 2-3 together], primary flagellum longer than peduncle, accessory flagellum 1-articulate.

Labrum strongly incised. Ratio of mandibular palp articles = 4:12:7, article 3 linear, setae sparse, E. Inner lobes of labium large, thereby widely spreading outer lobes. Maxillae not medially setose, inner plate of maxilla 1 slender, with one apical seta, outer plate with 7 spines, palp [?2-articulate], reaching to middle of spines on outer plate, with 3 apical setae [apparently palps symmetric]. Inner plate of maxilla 2 shortened, lacking facial setae. Outer plate of maxilliped [?medially spinose, article 3 of palp unlobed, dactyl shorter than 3, unguiform, ?with nail] [maxilliped said to be normal].

Coxae 1-4 longer than broad, with about 2 long apical setae each, coxa 4 weakly lobed. Gnathopods 1-2 feeble, mittenform, of similar size, wrists of medium length, wrist of gnathopod 1 with distinct lobe pointing weakly apicad, of gnathopod 2 lobate, hands slightly longer than wrists, rectangular, palms weakly oblique, short.

Pereopods 5-7 elongate, slender, alike, article 2 moderately expanded, lobate posteroventrally, dactyls elongate, almost becoming flagellate.

Rami of uropods 1-2 extending subequally, not marginally spinose, [apparently not basofacially armed]. Uropod 3 strongly extended, parviramous, outer ramus elongate, article 2 of medium length (slightly less than half as long as article 1), both articles almost naked. Telson short, as broad as long, cleft almost halfway, gaping, each lobe armed with one apical setule.

Coxal gills 2-4 short and slender, 5-6 ovate. Oostegites [?slender].

Relationship.--Like Indoniphargus but mandibular palp article 3 linear, outer ramus of uropod 3 with 2 articles. Differing from Eriopisella and Giniphargus in the presence of a lobe on the wrist of gnathopod 1.

Species.--leruthi Schellenberg, 1934b [108];

Belgium, hypogean, 1.

#### Giniphargus Karaman and Barnard

Figures 5, 14, Map 8

Giniphargus Karaman and Barnard, 1979: 150 (Niphargus pulchellus Sayce, 1899 original designation).

Body subvermiform, segments with weak posterodorsal setules. Rostrum obsolescent, lateral cephalic lobes shallow, rounded, with sinus below and then extended bulbous corner. Eyes absent.

Antennae slightly elongate, antenna 1 scarcely longer than 2, ratio of peduncular articles = 30:24:9; accessory flagellum 4-articulate. Article 4 of peduncle on antenna 2 slightly inflated, longer than article 5, flagellum ordinary, articles free.

Ratio of mandibular palp articles = 10:18:15 (article 1 thus elongate), article 3 weakly falcate, setae = CDE. Inner lobes of labium discrete, small, fleshy. Maxillae moderately setose medially, inner plate of maxilla 1 ovate, with about 5 medial setae near apex, outer plate with about 8 serrate spines, palps [?symmetric]. Inner plate of maxilla 2 with oblique facial row of setae (as stated by description).

Coxae very short, barely touching each other, coxa 1 not produced, coxa 4 unlobed. Gnathopods 1-2 similar to each other, feeble, subchelate, mittenform, wrists unlobed, hands trapezoidal, small, expanding apically, palms transverse, short, wrist of gnathopod 1 of ordinary length, wrist of gnathopod 2 elongate, gnathopods otherwise identical in size.

Pereopods 5-7 progressively longer than each other but together not of elongate form, article 2 unexpanded, ovato-linear, unlobate, dactyls apparently with only one setule on inferior margin.

Rami of uropods 1-2 extending subequally, marginally spinose, peduncle apparently lacking basofacial spine. Uropod 3 greatly extended, of "parviramous" form because inner ramus absent, outer ramus huge, article 2 also huge and nearly as long as article 1. Telson short, broad, cleft halfway, apices broadly rounded, dorsally spinose.

Coxal gills 2-6, ovoid, pedunculate, 2-articulate. Oostegites [unknown].

Relationship.--Differing from Indoniphargus and Microniphargus in the absence of a lobe on the wrist of gnathopod 1; from Eriopisella in the absence of the inner ramus on uropod 3, the presence of an oblique setal row on maxilla 2, the elongate article 2 on the outer ramus of uropod 3 and in the absence of a lobe on the wrist of gnathopod 2.

Species.--45 pulchellus (Sayce, 1899) [943];

Australia, Victoria, Gippsland, presumed hypogean, 1.

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#### Bathyonigids

Head enlarged; antennae medium; body ordinary but all coxae short, scarcely contiguous, irregular in shape; gnathopods feeble, almost mittenform, wrists elongate, spination [unknown]; all pereopods 3-7 very slender, short. Uropod 3 variramous, article 2 on outer ramus well developed; telson elongate, deeply cleft, lateral setules shifted apicad; pleopods normal; gills and broodplates [unknown].

Outer plate of maxilla 1 with only 4 spines.

Probably juveniles of Gammarus.

#### Bathyonyx Vejdovsky

Bathyonyx Vejdovsky, 1905: 2 (Bathyonyx devismesi Vejdovsky, 1905, original designation); 1907: 228.--Stebbing, 1906: 729.

Possibly brood juveniles of Gammarus (Schellenberg, 1937:270). Urosomites free, weakly setulose dorsally. Head large, rostrum obsolescent, lateral cephalic lobes broadly rounded-truncate, sinus absent. Eyes incompletely developed.

Antennae medium to short, antenna 1 slightly longer than 2, ratio of peduncular articles = 18:14:12, primary flagellum scarcely longer than peduncle, each middle article with aesthetasc, accessory flagellum 2-articulate. Antenna 2 gland cone long and slender.

Labrum [unknown]. Ratio of mandibular palp articles = 8:15:11, article 3 clavate, setae = E, about 6 in row across apex. Inner lobes of labium [unknown]. Inner plate of maxilla 1 [unknown], outer plate narrow, weak, with 4 pectinate spines of 2 kinds, palp large, 2-articulate, article 2 elongate, with 5 thin apical spines [palps ?symmetric]. Inner plate of maxilla 2 with medial row of setae not apparently submarginal or oblique. Maxilliped [?palp article 3 unlobed, dactyl shorter than 3, unguiform, with nail].

Coxae very short, barely contiguous, anterior coxae not longer than posterior coxae, anterior coxae rounded and tapering (1 and 4) or weakly and softly bilobed (2-3) below, aetose; coxae 5-7 not bilobed. Gnathopods feeble, mittenform, wrists of medium length, weakly lobate, hands about as long as wrists, subrectangular, palms weakly oblique, short, hand of gnathopod 1 larger than of gnathopod 2, palm thus longer and more oblique than on gnathopod 2.

Pereopods 5-7 of medium length, alike, article 2 ovatolinear, aetose.

Rami of uropods 1-2 extending equally, not marginally setose, basofacially naked. Uropod 3 extended, variramous, inner ramus more than half as long as article 1 of outer ramus, with 1 medial and 2 apical setae, article 2 of outer ramus elongate, about 0.40 times as long as article 1, outer ramus sparsely armed with long setae. Telson elongate, deeply cleft, lobes tapering, almost acute, each with 2 apical setal spines, one setule, lateral setule pairs highly apicad.

Coxal gills [?2-7, ovate]. Oostegites [broad or slender].

Relationship.--Probably juveniles of another genus; most characters of neotenic facies. To be held in reserve near mittenform genera such as Eriopisella until rectified.

Species.--devismesi Vejdovsky, 1905 [126];

Ireland, Lough Mask, freshwater, 1.

#### Pseudoniphargids

Inner lobes of lower lip well developed; maxillae not medially setose; gnathopod 1 Melitid, hammer-shaped; gnathopod 2 enlarged, Melitid, wrist short, palm oblique, with mixture of setae and spinules; uropod 3 parviramous, sexually dimorphic, female lacking article 2, male with elongate article 2; telson weakly emarginate; coxal gills 2-6.

#### Pseudoniphargus Chevreux

Figures 14, 20, 48, Map 58

Pseudoniphargus Chevreux, 1901a: 211 (Pseudoniphargus africanus Chevreux, 1901a, original designation).

Body slender. Lateral cephalic lobes mammilliform.

Antennae elongate, antenna 1 much longer than 2, ratio of peduncular articles = 15:11:7, primary flagellum longer than peduncle, accessory flagellum 2-articulate. Antenna 2 article 1 enlarged.

Ratio of mandibular palp articles = 6:13:13, article 3 almost linear or weakly clavate, setae = ACDE, but only E setae well developed. Inner lobes of labium well developed. Maxillae not medially setose, inner plate of maxilla 1 ovato-rectangular, only setose apically, outer plate with 7 spines, palps [?symmetrical]. Inner plate of maxilla 2 without facial setae, bearing only thin hair-like medial armaments, outer plate with 2 kinds of setae (like Allocrangonyx). Outer plate of maxilliped setose medially, with apical spines.

Coxae of ordinary dimensions, poorly setose, coxa 1 slightly expanded apically, coxa 4 scarcely lobate. Gnathopods diverse; gnathopod 1 small, hammer-like, wrist short, unlobate, hand short, subrectangular, palm almost transverse; gnathopod 2 enlarged, wrist short, unlobate, hand subrectangular, palm oblique, armed with setae and spinule-setules, defined by spines, smooth; no sexual differences.

Article 2 of pereopods 5-7 expanded, scarcely to weakly lobate serratosetulate posteriorly.

Rami of uropods 1-2 extending equally, not marginally spinose, peduncle of uropod 1 with basofacial spine [fide J.R. Holsinger]. Uropod 3 extended, parviramous, peduncle slightly elongate, outer ramus very long, with one article in female and 2 long articles in male. Telson short, almost entire, apex with weak incision, sublobes strongly spinose apically.

Coxal gills 2-6, ovate, some pediculate, 2-articulate. Oostegites slender.

Variants.--Only sexual differences found on uropod 3, female lacking long article 2 on outer ramus.

Relationship.--Probably evolved laterally from ancestors similar to those of Niphargids but gnathopods diverse.

Species.--adriaticus S. Karaman, 1955 (G.S. Karaman, 1978d)  
[129] (not mapped);

africanus Chevreux, 1901a (Margalef, 1970) [129] (mapped);

circum-Mediterranean, anchialine, in Africa 100+ km inland, wells, 1.

### Niphargids

Inner lobes of lower lip present; maxillae not medially setose or weakly so; both pairs of gnathopods hammer-like, wrists unlobed, hands mittenform to expanded, palmar slopes alike in both pairs, lacking densely packed spines; uropod 3 variramous to parviramous; telson cleft to entire.

#### Key to the Genera of Niphargids

1. Uropod 3 variramous. . . . . Pontoniphargus  
Uropod 3 parviramous . . . . . 2
2. Maxilla 1 and rakers of mandible of filtrative form . . . . Niphargopsis  
Maxilla 1 and mandible ordinary. . . . . 3
3. Uropod 3 minute, inner ramus absent. . . . . Carinurella  
Uropod 3 large, inner ramus present. . . . . 4
4. D-setae of mandibular palp absent. . . . . Niphargellus  
D-setae of mandibular palp present . . . . . 5
5. Article 2 on outer ramus of uropod 3 present . . . . . Niphargus  
Article 2 on outer ramus of uropod 3 absent . . . . . Haploginglymus

Pontoniphargus Dancau

## Map 65

Pontoniphargus Dancau, 1970: 276 (or 2) (Pontoniphargus racovitzai Dancau, 1970, original designation).

Body slender, urosomite 2 with 2 dorsal spines. Rostrum [obsolescent], lateral cephalic lobes [?weakly protuberant, rounded, sinus present]. Eyes absent.

Antennae greatly elongate, antenna 1 longer than 2, ratio of peduncular articles = [?16:12:8], primary flagellum with 28-30 articles [?longer than peduncle], accessory flagellum 2-articulate. Antenna 2 flagellum with 8 articles.

Labrum [?broader than long, rounded, entire]. Mandibular molar small but triturative, ratio of palp articles = 5:12:13, article 3 weakly falciform, setae = ABDE. Inner lobes of labium [?present]. Inner plate of maxilla 1 very small, subrectangular, with one apical seta, outer plate very broad, armed with 7 curved and strongly pectinate spines, palp 2 articulate, article 2 flabellate, moderately but broadly setose apically, [?palps symmetric]. Inner plate of maxilla 2 much narrower than outer, with row of 3 medial setae. Outer plate of maxilliped apically spinose, medially naked; palp large, dactyl as long as 3, unguiform, with fused flagellate nail.

Coxae of medium length, weakly setose, coxa 1 unexpanded, coxa 4 weakly lobate. Gnathopods small to feeble, hammer-like, of similar form and size, wrists elongate but longer on gnathopod 2, unlobate, hands trapezoidal, expanded apically, palms short, transverse-parachelate (hands definitively chelate), dactyls fitting palms.

Article 2 of pereopods 5-7 moderately expanded and lobate, posterior margins weakly convex, setose, faces setose. Dactyls slightly elongate, with 2 inferior setules.

Rami of uropods 1-2 extended evenly marginally spinose, peduncle of uropod 1 with several outer facial spines. Uropod 3 extended, variramous, outer ramus elongate, 2-articulate, second article about one third as long as first, inner ramus reaching M. 60-75 on article 1 of outer ramus, with side setae; peduncle elongate. Telson slightly elongate, deeply cleft, lobes tapering, sparsely spinose apically, medially, laterally, dorsally.

Coxal gills [?2-6, ovate]. Oostegites [?slender].

Variants.--Right lacinia mobilis not distinguished from raker spines.

Relationship.--Probably plesiomorphic to Niphargus owing to the enlarged inner ramus of uropod 3.

Species.--racovitzai Dancau, 1970 [071];

Rumania, near the Black sea, hypogean, 1.

Niphargus Schiodte

Figures 14, 26, 47, 48, Maps 59-64

- Niphargus Schiodte, 1849: 26 (Niphargus stygius Schiodte, 1849, monotypy).--Stebbing, 1906: 405.
- Stygodytes Absolon, 1913: 104 (nomen nudum); 1927: 293 (Stygodytes balcanicus Absolon, 1927, original designation).
- Antroplotes Absolon, 1916 [not seen] (?nomen nudum) (Antroplotes herculeanus Absolon, 1916, ?monotypy).
- Martynovia Derzhavin, 1945b: 33 (Martynovia submersus Derzhavin, 1945b, monotypy).
- N. (Phaenogammarus) Dudich, 1941d: 72 (Niphargus thermalis Dudich, 1941a, original designation).
- N. (Supraniphargus) S. Karaman, 1950b: 80 (Niphargus illidzensis Schaferna, 1923b, selected by S. Karaman, 1960b).
- N. (Orniphargus) S. Karaman, 1950b: 120 (Niphargus orcinus Joseph, 1869, here selected).
- N. (Stygoniphargus) S. Karaman, 1952a: 5 (Niphargus stygius Schiodte, 1849, here selected).
- N. (Protoniphargopsis) Sket, 1957a: 485 (no type-species).
- ?Haploginglymus A. Mateus and E. Mateus, 1958: 7 (Haploginglymus bragai A. Mateus and E. Mateus, 1958, original designation) (= valid subgenus).
- N. (Carpathoniphargus) S. & G.S. Karaman, 1959b: 152 (Niphargus carpathicus Dobreanu and Manolache, 1939, here selected).
- N. (Jovaniphargus) S. Karaman, 1960b: 77 (Niphargus jovanovici S. Karaman, 1931d, here selected).
- Karamaniella Sket, 1962: 27 (Karamaniella pupetta Sket, 1962, original designation).

Body ordinary to vermiform, urosomites free, or partly coalesced, smooth or body grossly spinose. Rostrum strong to absent, lateral cephalic lobes strong to absent, sinus present or absent. Eyes absent (or rarely present and non-ommatidial).

Antennae medium to elongate, antenna 1 longer than 2, ratio of peduncular articles = 19:15:7, primary flagellum longer than peduncle, accessory flagellum 1-2 articulate.

Ratio of mandibular palp articles = 5:11:9, article 3 weakly falciform, setae = (ABC)DE. Inner lobes of labium present. Maxillae not setose medially, inner plate of maxilla 1 ovate, sparsely setose apically, outer plate with 6-7 spines, palps symmetric. Inner plate of maxilla 2 lacking facial and medial setae (or medial hairs present). Maxilliped dactyl longer or shorter than 3.

Coxae long to short, strongly overlapping to barely touching, poorly setose or glabrous, coxa 1 rectangular or weakly dilated, coxa 4 strongly lobate or unlobate. Gnathopods various, typically large, similar, or gnathopod 1 smaller than 2, both usually hammer-like, wrists short, poorly lobed, hands broad, short, palms transverse or weakly oblique, thick palmar spines absent, sexually dimorphic or not.

Article 2 of pereopods 5-7 narrow and unlobed or weakly expanded and lobate.

*U.1 without basofacial spine*

Rami of uropods 1-2 extending equally or one or the other slightly shortened. Uropod 3 very long or somewhat shorter, parviramous, article 2 of outer ramus usually very elongate, rarely short or absent. Telson short to long, cleft halfway or more, apically spinose, often laterally.

Coxal gills 2-6, ovate, often pediculate and 2-articulate. Oostegites broad.

Variants.--Article 2 on outer ramus of uropod 3 absent (Haploginglymus bragai, valid subgenus); body multispinose (balcanicus); dactyls of pereopods multispinose (occasional); gnathopods with Eusirid attachment between articles 5 and 6 (often); head enlarged (Haploginglymus bragai); article 2 on outer ramus of uropod 3 shortened in female (stygius).

Relationship.--Like Eriopisa and its allies but maxillae without major medial setae; gnathopods often appearing as enlarged mittenforms like those of Eriopisella and allies.

Species.--See Chevreux and Fage, 1925; Balazuc, 1954, 1957; Hoffmann, 1962; Schellenberg, 1937b, 1942; Carausu et alia, 1955; Sket, 1972; Stock, 1972d; G.S. Karaman, 1963, 1972c, 1973f, 1973g, 1974c; Dedju, 1967a; Ruffo, 1972b. N = unknown subspecies.

- 1 aberrans Sket, 1972 [087];
- 2A ablaskiri Birstein, 1940 [066], 2B a. inermis Birstein, 1940 [066],  
2C a. georgievi S. and G.S. Karaman, 1959a [089];
- 3 abricossovi Birstein, 1932 (Derzhavin, 1938) [066],  
a. inornatus Derzhavin, 1945b [066];
- 4 adbipus G.S.Karaman, 1973f [087];
- 5 adei S. Karaman, 1933a [088];
- 6 alasonius Derzhavin, 1945b [066];
- 7 altagahizi Alouf, 1973 [049];
- 8 alutensis Dancau, 1971 [083];
- 9 ambulator G.S. Karaman, 1975a [098];
- 10 anatolicus G.S. Karaman, 1950b [068];
- 11 andropus Schellenberg, 1940c, (Carausu et alia, 1955) [083];
- 12A aquilex Schiodte, 1855 (Chevreux and Fage, 1925), 12B a. vejdivskyi  
Wrzesniowski, 1890 (Schellenberg, 1942), 12C a. moldavicus  
Dobreanu, Manolache and Puscariu, 1953 (Carausu et alia, 1955), 12D  
a. pretneri Sket, 1959 [107];

- 13 asper G.S. Karaman, 1972b [087];
- 14 balazuci Schellenberg, 1951a [108];
- 15 balcanicus (Absolon, 1913, 1927) (Carausu et alia, 1955) [087];
- 16 bilecanus S. Karaman, 1953b [087];
- 17 bitoljensis S. Karaman, 1943a [088];
- 18 boskovici S. Karaman, 1952c, 1953b, b. borkanus S. Karaman, 1960b,  
b. alatus G.S. Karaman 1973a [087];
- 19 boulangei Wichers, 1964 [108];
- 20 bragai A. Mateus & E. Mateus, 1958 (Haploginglymus) [114];
- 21 brevicuspis Schellenberg, 1937d (G.S. Karaman, 1968a),  
b. sketi G.S. Karaman, 1966a [087];
- 22 brevirostris Sket, 1971a [087];
- brusinae Grochowsky, 1904 [not seen] (Schellenberg, 1935a) [poorly known];
- 24 buresschi Fage, 1926 (S. & G.S. Karaman, 1959a) [089];
- 25 buturovici S. Karaman, 1958 [087];
- 25C canui G.S. Karaman, 1976d [098];
- 26A carpathicus Dobreanu and Manolache, 1939, 1948 (Carausu et alia, 1955),  
26B c. meridionalis (homonym) and 26C c. romanicus Dobreanu and  
Manolache, 1943, 26D c. affinis and 26E c. variabilis Dobreanu  
et alia, 1953; 26F c. cavernicolus [see Dancau, 1972b] [081];
- 28 castellanus S. Karaman, 1960b [087];
- 29 cepelarensis S. and G.S. Karaman, 1959a [089];
- 30A ciliatus Chevreux in Peyerimhoff, 1906 (Chevreux and Fage, 1925),  
30B c. cismontanus Margalef, 1952a, 1970 [111];
- 31 corsicanus Schellenberg, 1950 [101] (Stock, 1972 --->longicaudatus);
- 32 costozzae Schellenberg, 1935a, 1937b (S. Karaman, 1954, incl. unisetosa)  
[098];
- 33 croaticus (Jurinac, 1887) (S. Karaman, 1950), c. pachytelson Sket, 1960  
[087];
- 34 cubanicus Birstein, 1954 [061];

- 35 cvijici S. Karaman, 1950b (G.S.Karaman, 1976c) [087];
- 36 dacicus Dancau, 1963a [083];
- 37 deelemanae G.S. Karaman, 1973e [087];
- 38 delamarei Ruffo, 1953d [108];
- 39 dimorphus Birstein, 1961 [071];
- 40 dobrogicus Dancau, 1964 [083];
- 41 dudichi Hanko, 1924 (Schellenberg, 1935a) [082];
- 41S duplus G.S. Karaman, 1976d [098];
- 42A elegans Garbini, 1894, 1895b (including var. imperfectus, technically a senior synonym) (S. Karaman, 1954b), 42B e. zagrebensis S. Karaman, 1950b (G.S. Karaman 1977d) [092];
- 43 eugeniae Derzhavin, 1945b [066] (See Birstein, 1952:35);
- 44 fontanus Bate, 1859b (Chevreux and Fage, 1925) [080];
- 45A foreli Humbert, 1876 (Chevreux and Fage, 1925), 45B f. thienemanni Schellenberg, 1934a, 45C f. transylvanicus Schellenberg, 1934a, 45D f. gebhardti Schellenberg, 1934a, 45E f. vornatscheri Schellenberg, 1934a, 45F f. speziae Schellenberg, 1937b, 45G f. setiferus Schellenberg, 1937d, 45H f. apuanus Ruffo 1937b, 45I f. dubius Dobreanu and Manolache, 1939a, 45J f. bihorensis Schellenberg, 1940c, 45K f. effosus Dudich, 1943, 45L f. korosensis Dudich, 1943, 45M f. somesensis Motas, Dobreanu & Manolache, 1948 [reference unknown, see Carausu et alia, 1955], 45N f. carsicus Straskraba, 1956a [060];
- 46 galenae Derzhavin, 1939 [066];
- 47 gallicus Schellenberg, 1935a (Dancau, 1963b) (Balazuc, 1954) [108];
- 48 galvagnii Ruffo, 1953a [098];
- 49 gineti Bou, 1965 [108];
- 50 glenniei Spooner, 1952 [124];
- 51 glontii Behning, 1940a [066];
- 52 godeti Wrzesniowsky, 1890 [108];
- 53 graecus S. Karaman, 1933a [088];
- 54 gurjanovae Birstein, 1941 [066];

- 55 hadzii (Rejic, 1956) (Sket, 1958a) [087];
- 56 hebereri Schellenberg, 1933b (G.S. Karaman, 1974f) [087];
- 57 hrabei S. Karaman, 1932 (Straskraba, 1959b) [081];
- 58 hvarensis S. Karaman, 1952b, 1952c, 1958 [087];
- 59A illidzensis Schaferna, 1923b, 59B i. dalmatina Schaferna, 1923b,  
59C i. slovenicus S. Karaman, 1932, 59D i. orientalis  
S. Karaman, 1950b, 59E i. pannonicus S. Karaman, 1950b,  
59F i. montenigrinus G.S. Karaman, 1962 [087];
- 60 inclinatus G.S. Karaman, 1973a [087];
- 61 inopinatus Schellenberg, 1932a [085];
- 62 ivanovi Schaferna, 1933 (nomen nudum), 1935 [083];
- 63A jovanovici S. Karaman, 1931d, 63B j. bajuvaricus Schellenberg, 1932b,  
63C j. kieferi Schellenberg, 1936d, 63D j. grandii Ruffo, 1937b,  
63E j. incertus Dobreanu et alia, 1951, 63F j. multipennatus Sket,  
1957b, 63G j. ponoricus Dancau, 1963a, 63H j. burgundus Graf and  
Straskraba, 1967 [060];
- 64A kochianus Bate, 1859b (= casparianus Wrzesniowsky, 1890),  
64B k. irlandicus Schellenberg, 1932c, 64C k. petrosani  
Dobreanu & Manolache, 1933, 64D k. pachypus Schellenberg, 1933e,  
64E k. wolfi Schellenberg, 1933e, 64F k. polonicus Schellenberg,  
1936d, 64G k. longidactylus Ruffo, 1937c, 64I k. tamaninii Ruffo,  
1953b, 64J k. minor Sket, 1957b, 64K k. labacensis Sket, 1957b,  
64L k. melticensis Dancau and Andreev, 1973, 64M k. dimorphopous  
Stock and Gledhill, 1977 [060];
- 65A kolombatovici (S. Karaman, 1950b, 1953b), 65B k. subtypicus Sket,  
1960 [087];
- 66 krameri Schellenberg, 1935a, (= spinulifer S. Karaman, 1954b),  
s. timavi S. Karaman, 1954b (Sket, 1958a), [087];
- kurdus Derzhavin, 1945b [066];
- 67 ladmiraulti Chevreux, 1901a (Chevreux and Fage, 1925) [108];
- 68 laisi Schellenberg, 1936d [082];
- 69 leopoliensis Jaworowski, 1893 (Skalski, 1970) [063];
- 70 lindbergi (S. Karaman, 1956) [088];

- 72A longicaudatus Costa 1851a:45 (= longicauda, 1851a:23, nomen nudum) (Ruffo, 1948a) (= montanus Costa, 1851 [see Stebbing, 1906]); 72B l. plateaui Chevreux, 1901a (Chevreux and Fage, 1925) (= elongatus Chevreux, 1901a) (= meridionalis Vire, 1902); 72C l. robustus Chevreux, 1901a (Schellenberg, 1937d), 72D l. remyi S. Karaman, 1934b, 72E l. thuringius Schellenberg, 1934a, 72F l. anticolanus D'Ancona, 1934; 72G l. hungaricus Mehely, 1937; 72H l. debilis Ruffo, 1937b, 72I l. magnus Birstein, 1940, 72J l. versluyi S. Karaman, 1950a (Balazuc, 1954, 1957) [005];
- 73 lori Derzhavin, 1945b [066];
- 74 macedonicus S. Karaman, 1929a, 1954a [088];
- 75A maximus S. Karaman, 1929a (G.S. Karaman, 1963), 75B m. tenuicaudatus Schellenberg, 1940, 75C m. laticaudatus Schellenberg, 1940, 75D m. petkovskii G.S. Karaman, 1963, 75E m. vulgaris G.S. Karaman, 1968a [090];
- 77 microcerberus Sket, 1972 [092];
- 78 miljeticus Straskraba, 1959a [087];
- 79 minutus (Gervais, 1835) (Stebbing, 1906) [dubious] [108];
- 80 molnari Mehely 1927 [not seen] (Carausu et alia, 1955) [084];
- 81 moniezi Wrzesniowski, 1890 (Stebbing, 1906) [dubious] [108];
- 82 nadarini Alouf, 1972 [049];
- 83 nicaeensis Isnard, 1916 (Chevreux and Fage, 1925) [108];
- 84 ohridanus S. Karaman, 1929a, 1943a (= fontophilus S. Karaman, 1943a) [139];
- 85A orcinus Joseph, 1869 [not seen] (Ruffo and Vigna-Taglianti, 1968b), 85B o. vjeternicensis S. Karaman, 1932 (= herculeanus Absolon, 1928, nomen nudum), 85C o. steueri Schellenberg, 1935a, 85D o. hercegovinensis S. Karaman, 1930, 85E o. kusceri S. Karaman, 1950b, 85F o. longiflagellum S. Karaman, 1950b, 85G o. redenseki Sket, 1959, 85H o. patrizii Ruffo and Vigna-Taglianti, 1968a, 85I o. parenzani Ruffo and Vigna-Taglianti, 1968a [099];
- 86 pachypus Schellenberg, 1933e (Stock, 1972) (Stock and Gledhill, 1977) [107];

- 87 pancici S. Karaman, 1929a (= jakupicae S. Karaman, 1960a)  
(= peristerica S. Karaman, 1960a) (= prespensis S. Karaman,  
1960a), p. vlkanovi S. and G.S. Karaman, 1959a, p. dojranensis  
G.S. Karaman, 1960b [088];
- 88 parvus S. Karaman, 1943a [088];
- 89 pasquinii Vigna-Taglianti, 1966 [098];
- 89V pavicvici G.S. Karaman, 1976c [087];
- 90 pectenicauda Sket, 1971a [087];
- 91 pellagonicus S. Karaman, 1943a (G.S. Karaman, 1960b) [088];
- 92 pliginskii Martynov, 1931b [071];
- 93 podgoricensis S. Karaman, 1934b, 1950b [087];
- 94 ponticus Czerniavsky, 1868 [not seen] [089];
- 95 potamophilus Birstein, 1954 [071];
- 96 pseudocaspicus G.S. Karaman, 1979x (= caspicus Derzhavin, 1945a,  
homonym) [332];
- 97 pseudkochianus Dobreanu, Manolache and Puscariu, 1953 (Carasu et alia,  
1955) [071];
- 98 pulevici G.S. Karaman (1967b) [087];
- 99 pupetta Sket, 1962) (G.S. Karaman, 1975a) [092];
- 100A puteanus (Koch, 1835) (Stock, 1974a), 100B p. komareki S. Karaman, 1932,  
100C p. spoeckeri Schellenberg, 1933e, 100D p. banaticus Dobreanu  
and Manolache, 1936, 100E p. pater Mehely, 1927 [not seen], 1941  
[not seen] (= baloghi Dudich, 1940), 100F p. iniochus Birstein,  
1941, 100G p. derzhavini Birstein, 1952, 100H p. otharicus Birstein,  
1952, 100I, p. carpathorossicus Straskraba, 1956b, 100J p. abchasicus  
Martynov, 1932) (= stadleri S. Karaman, 1932) [005];
- 101 rajecensis Schellenberg, 1938c [085];
- 102 rejici Sket, 1958a [087];
- 103 rhenorhodanensis Schellenberg, 1937d (Ginet, 1972) [107];
- 104 rhodi S. Karaman, 1950a [088];
- 105 romuleus Vigna-Taglianti, 1967 [098];
- 106 rostratus Sket, 1971a [087];

- 107 rucneri G.S. Karaman, 1962 [087];
- 107F ruffoi G.S. Karaman, 1976d [098];
- 108 salonitanus (S. Karaman, 1950, 1953) [087];
- 109 sanctinaumi S. Karaman, 1943a (G.S. Karaman, 1963) [088];
- 109A schellenbergi S. Karaman (1932) (was aguilex) (Stock, 1972) (Straskraba, 1972) [107];
- 110 serbicus S. Karaman, 1960b (Sket, 1972) [087];
- 111A skopljensis (S. Karaman, 1929b), 111B s. angelieri (Ruffo, 1953d), 111C s. danconai (Benedetti, 1943), 111D s. phreaticolus (Motas, Dobreanu and Manolache, 1948) (Carausu et alia, 1955) [081 + 099];
- 112 smederevanus S. Karaman, 1950b [084];
- 113 smirnovi Birstein, 1952 [066];
- 114 sphagnicolus (Rejic, 1956) [087];
- [stadleri--->putaneus, not tatrensis];
- 115 stankoi G.S. Karaman, 1974c [088];
- 116 stebbingi Cecchini, 1928c, 1929) [098];
- 117 stefanelli Ruffo and Vigna-Taglianti, 1968a [098];
- 118 stenopus Sket, 1960 [087];
- 119 strouhali Schellenberg, 1933b [082];
- 120A stygius (Schiodte, 1847) (= borutzkyi Birstein, 1933), 120B s. dolegnaniensis Lorenzi, 1898 [not seen] (= danconae S. Karaman, 1954b, 120C s. karamani Schellenberg, 1935a, 120D s. brixianus Ruffo, 1937b, 120E s. pedemontanus Ruffo, 1937b, 120F s. bosniacus S. Karaman, 1943b, 120G s. ravanicanus S. Karaman, 1943b, 120H s. brachytelson S. Karaman, 1952a, 120I s. kenki S. Karaman, 1952a, 120J s. likanus S. Karaman, 1952a, 120K s. savensis S. Karaman, 1952a, 120L s. novomestanus S. Karaman, 1952a, 120M s. gabrovceci S. Karaman, 1952a, 120N s. podpecanus S. Karaman, 1952a, 120-O s. valvasori S. Karaman, 1952a, 120P s. latimanus Birstein, 1952, 120Q s. caelestis G.S. Karaman, 1979 (= longidactylus Birstein, 1952, homonym), 120R s. pseudolatimanus Birstein, 1952, 120S s. polonicus Straskraba, 1956b, 120T s. birsteini Dedju, 1963a, 120U s. corinae Dedju, 1963b, 120V s. hoverlicus Dedju, 1963b, 120W s. jaroschenkoi Dedju, 1963a, 120Z borutzkyi Birstein, 1933 (Sket, 1974) [005];

121A stygocharis Dudich, 1943, 121B s. italicus G.S. Karaman, 1976d  
[098, 084, 089];

121R submersus (Derzhavin, 1945b) [066];

122 subterraneus (Leach, 1814a) (Kane, 1904) [124];

123A tatrensis\* Wrzesniowski, 1888, 1890, 123B t. aggtelekiensis  
Dudich, 1932 (Schellenberg, 1938d), 123C t. reyersdorfensis  
Schellenberg, 1935a, 123D t. schneebergensis Schellenberg, 1935a,  
123E t. otscherensis Schellenberg, 1935a, 123F t. lurensis  
Schellenberg, 1935a, 123G t. lunsensis Schellenberg, 1935a,  
123H t. salzburgensis Schellenberg, 1935a [085];

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\*apuanus of foreli, pedemontanus of stygius, romuleus  
and speziae of foreli belong to a ?tatrensis group (fide  
Vigna-Taglianti, 1972).  
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124A tauri Schellenberg, 1933b, 124B, t. kragujevensis S. Karaman, 1943b,  
124C t. jurinaci S. Karaman, 1950b, 124D t. medvednicae S.  
Karaman, 1950b, 124E t. osogovensis S. Karaman, 1959a,  
124F t. pecarensis S. and G.S. Karaman, 1959a,  
124G t. carniolicus Sket, 1960a [005];

125 thermalis Dudich, 1941a [083];

126 toplicensis Andreev, 1966 [089];

127 transitivus Sket, 1971a (G.S. Karaman, 1975a) [098];

127X trullipes Sket, 1958b [087];

128 vadimi Birstein, 1961 [071];

129 valachicus Dobreanu and Manolache, 1933 (= mediodanubialis  
Dudich, 1941d) (including aschizotelson) (G.S. Karaman, 1974f)  
[081];

130 vandeli Barbe, 1961 [108];

131 velesensis S. Karaman, 1943a (G.S. Karaman, 1960) [088];

132 virei Chevreux, 1896b (= enslini S. Karaman, 1932) (= bispinosus  
Barbe, 1961) (= auerbachii Schellenberg, 1934a, 1942) [107];

133 vodnensis S. Karaman, 1943a (v. banjanus and v. kosanini  
S. Karaman, 1943a) [088];

134 vranjinae G.S. Karaman, 1967c [087];

135 zavalanus S. Karaman, 1950b [087];

136 zorae G.S. Karaman, 1967c [087];

Palaearctica, predominantly western, south of farthest line of glaciation but absent in most of Iberia and southern Italy, hypogean to epigeal,  
139 species and 126 additional subspecies.

Haploginglymus A. Mateus and E. Mateus

Figure 48, Map 64

Haploginglymus A. Mateus and E. Mateus, 1958: 7 (Haploginglymus  
bragai Mateus and Mateus, 1958, original designation).

Like Niphargus but article 2 on outer ramus of uropod 3 absent.  
See Niphargus where this genus is placed at subgeneric level.

Species.--20 bragai A. Mateus and E. Mateus, 1958 [114];

Portugal, hypogean, 1.

Niphargopsis Chevreux

Figures 5, 7, 48, Map 65

Niphargopsis Chevreux, 1922: 487 (Niphargopsis legeri Chevreux,  
1922, monotypy, = Gammarus caspary Pratz, 1866).

Lateral cephalic lobe rounded, sinus present, but often weak. Eyes absent.

Antennae moderately elongate, antenna 1 longer than 2, ratio of peduncular articles = 18:15:7, primary flagellum much longer than peduncle, accessory flagellum 2-articulate.

Labrum [?entire, rounded]. Mandibular raker row immense, ratio of palp articles = 7:10:15, article 3 scarcely falciform, setae = DE. Inner lobes of labium vestigial. Maxillae not medially setose, inner plate of maxilla 1 narrow, subrectangular, with 1-2 apical setae, outer plate very broad, superspinose, with 10-11 pectinate spines in groups and 17-26 simple spines in outer group; palps symmetric, 2-articulate, feeble. Inner plate of maxilla 2 with few apicomarginal setae, no setae on face. Outer plate of maxilliped sparsely spinose medially, dactyl nail present [in trispinosus at least].

Coxae of ordinary size, anterior coxae rounded below, poorly setose, coxa 1 unexpanded, coxa 4 lobate. Gnathopods small, alike, hammer-like, wrist of gnathopod 1 short, of 2 elongate, unlobed, hands short, stout, rectotrapezoidal, parachelate, palms short, lacking spines.

Article 2 of pereopods 5-7 slightly expanded and lobate, posterior margins convex, poorly setose.

Outer rami of uropods 1-2 scarcely shortened, all rami marginally spinose, peduncles [?without basofacial armaments]. Uropod 3 extended, parviramous, outer ramus elongate, with small article 2. Telson slightly elongate, deeply cleft, lobes tapering, apically spinose.

Coxal gills [?2-6], ovate. Oostegites very broad.

Variants.--Telson laterally spinose (trispinosus); wrists of gnathopods alike (trispinosus).

Relationship.--Differing from Niphargus in the filtrative maxilla 1 and large mandibular raker row. Possibly descended from same ancestors as Niphargus skopljensis.

Species.--caspari (Pratz, 1866) (as legeri in Chevreux and Fage, 1925) [060];

trispinosus Dancau and Capuse, 1959 (Motas and Capuse, 1965) [083];

midsouthern and eastern Europe, hypogean, 2.

### Niphargellus Schellenberg

Map 65

Niphargellus Schellenberg, 1938b: 246 (Niphargus arndti Schellenberg, 1933b, original designation).

Body slender, urosomites weakly setospinose dorsally. Rostrum obsolescent, lateral cephalic lobes rounded. Eyes absent.

Antennae of moderate extent, antenna 1 longer than 2, ratio of peduncular articles = [?00:00:00], primary flagellum longer than peduncle, accessory flagellum 2-articulate. Antenna 2 article 1 enlarged.

Ratio of mandibular palp articles = 6:11:8 or 10:14:14, article 3 linear, setae = E. Inner lobes of lower lip [?present]. Maxillae not setose medially, inner plate of maxilla 1 subrectangular, thin, armed with 2 apical setae, outer plate with 7 spines, palps symmetric. Inner plate of maxilla 2 without facial and medial setae. Maxilliped palp article 3 weakly lobed.

Coxae short, broad, barely contiguous, poorly setose, coxa 1 rectangular, coxa 4 unlobed, coxa 5 almost as long as 4. Gnathopods of medium size, similar, hammer-like, wrists weakly elongate, unlobed, hands subquadrate, or subcircular, palms almost transverse.

Article 2 of pereopods 5-7 unexpanded, ovatorectangular, weakly setose posteriorly, unlobate.

Rami of uropods 1-2 extending subequally or outer shortened, [?not marginally spinose, ?lacking peduncular basofacial armaments]. Uropod 3 extended, parviramous, outer ramus with small or medium article 2. Telson slightly elongate, deeply cleft, apices tapering, weakly armed.

Coxal gills 2-6 or 2-5, [?ovate]. Oostegites [?narrow].

Relationship.--Like Niphargus but D setae of mandibular palp absent.

Species.--arndti (Schellenberg, 1933b) (Wichers, 1964) [082];

nolli Schellenberg, 1938b, 1942 (Wichers, 1964) [079];

central Europe, hypogean, 2.

Carinurella Sket

Map 65

Carinurella Sket, 1971a: 21, 24 (Karmaniella paradoxa Sket, 1964, original designation).

Body able to roll up like isopod, pereopods 5-7 and pleopods being very short for this adaptation; urosomite 1 enlarged, laterally plate-like, largely covering poorly defined and small urosomites 2-3. Rostrum small, lateral cephalic lobes huge, adziform, strong sinus present. Eyes absent.

Antennae of medium extension, antenna 1 longer than 2, ratio of peduncular articles = 14:7:3, article 1 with crest (not of generic value), primary flagellum as long as peduncle, accessory flagellum 1-articulate. Antenna 2 small, article 5 shorter than 4, flagellum about as long as article 4, about 3-articulate.

Labrum [?broader than long, entire, rounded]. Mandibular incisor [?toothed], molar [?tritulative], ratio of palp articles = [?00:00:00], article 3 [?weakly falciform, setae = ADE]. Inner lobes of labium [?absent, present]. Inner plate of maxilla 1 lanceolate, with 1 apical seta, outer plate with 7 spines, palps symmetric. Inner plate of maxilla 2 [?without facial and medial setae]. Outer plate of maxilliped [?medially spinose, palp article 3 unlobed, dactyl as long as 3, unguiform, with nail].

Coxae medium to long, poorly setose, coxa 1 rectangular or tapering, coxa 4 poorly lobate. Gnathopods feeble, almost alike, wrists elongate, unlobed, hands small, weakly trapezoidal, hand of gnathopod 1 slightly larger than 2, palm transverse or weakly parachelate, hand of gnathopod 2 ovate, palm weakly oblique.

Article 2 of pereopods 5-7 weakly expanded, strongly lobate, posterior margins weakly concave or sinuous, articles 4-5 slightly expanded, these pereopods short.

Pleopods short but rami 4-6 articulate. Rami of uropods 1-2 short, not marginally spinose, outer slightly shorter than inner, [?lacking basofacial peduncular armaments]. Uropod 3 not extended, minute, uniramous, ramus short, uniarticulate. Telson of ordinary length to short, deeply cleft, ungaping, lobes tapering, apically spinose.

Coxal gills [?2-6, ovate]. Oostegites [?slender].

Variants.--Crested antenna 1 and elongate coxa 5 (as long as 4) not of generic value as these attributes approached in Niphargus (through synonym Karamaniella).

Relationship.--Like Niphargus but inner ramus of uropod 3 absent, uropod 3 otherwise minute; urosomite 1 enlarged and strongly dominant.

Species.--paradoxa (Sket, 1964) [092];

Yugoslavia and Northeast Italy, hypogean, 1.

## Salentinellids

Accessory flagellum 1-articulate; antennae medium short; mandibular palp article 3 very short; lower lip lacking inner lobes; maxillae lacking medial setae; coxae 1-3 very short, coxa 4 elongate; gnathopods small, not sexually dimorphic, almost mittenform, with medial fuzz, wrists elongate, palms oblique; article 2 of pereopods 5-7 weakly to moderately expanded, strongly lobate; uropod 3 short, vari- to parviramous to uniramous; telsonic lateral setules shifted apicad; coxal gills 2-6, sternal gills absent.

Differing from Metacrangonigids in the elongate coxa 4, and medially naked maxillae.

## Key to the Genera of Salentinellids

Uropod 3 biramous, telson elongate, cleft. . . . . Salentinella  
 Uropod 3 uniramous, telson short, entire. . . . . Parasalentinella

Salentinella Ruffo

Figure 46, Map 57

Salentinella Ruffo, 1948b: 181 (Salentinella gracillima Ruffo, 1948b, original designation).--Coineau, 1963: 120.--G.S. Karaman, 1967a: 15 (key).

Body ordinary or somewhat slender. Lateral cephalic lobes mammilliform, sharp or rounded. Eyes absent.

Antennae of medium extension, extending equally, ratio of peduncular articles on antenna 1 = 24:12-17:4-11, primary flagellum subequal to peduncle, accessory flagellum 1-articulate. Antenna 2 flagellum short, gland cone often large.

Labrum entire, rounded (concave in Coineau, 1963). Mandibular molar triturative (or becoming bulbous and flagellate (denticulata), ratio of palp articles = 5:17:6 (thus article 3 very short), article 3 linear or clavate or tapering, setae sparse, = DE. Inner lobes of labium absent, poorly gaping. Maxillae not medially setose, inner plate of maxilla 1 ovatotriangular, with 2-3 apical plumose setae, outer plate with 8-9 spines, palp 2-articulate, asymmetric. Inner plate of maxilla 2 shortened, without medial setae, without oblique facial row of setae, or with one facial seta. Plates of maxilliped large, poorly armed, outer plate medially setose or spinose sparsely, palp thin, long, dactyl weakly unguiform, with long nail, short body.

Coxae poorly setose, 1-2 short, broader than long, 3 slightly longer, then 4 longer than broad, unlobed, 5 slightly shorter than 4, not bilobed, 6-7 progressively smaller. Gnathopods feeble, subchelate, gnathopod 2 very slightly stouter but shorter than 2, wrists elongate (or not on gnathopod 1), unlobed, as long as hand on gnathopod 1, longer on gnathopod 2, hands mittenform, posterior margin swollen, palms oblique, long, weakly defined, or almost absent, often excavate, often almost absent, poorly armed, dactyls fitting weakly defined palmar area.

Pereopods 3-4 elongate. Pereopods 5-7 weakly diverse, generally of similar length, short, article 2 moderately to strongly (7) expanded, with moderate to strong (7) posteroventral lobe progressively, poorly setose (mainly sparse setules), pereopod 5 (6-7) with long setae on apex of article 6.

Pleopodal rami 3-4 articulate. Outer rami of uropods 1-2 shortened and generally lacking marginal dorsal spines, inner rami with marginal spines; basofacial armaments absent. Uropod 3 moderately extended, variramous to parviramous, inner ramus very thin, outer ramus subflabellate, poorly armed with small article 2. Telson of ordinary length or weakly elongate, cleft about two thirds or slightly more (rarely one third), apices tapering, notched, weakly armed, main dorsolateral setule pairs apicad.

Coxal gills 2-6, ovate. Oostegites [?slender].

Variants.--Dactyls of pereopods becoming flagellate (prognatha); spines on outer plate of maxilla 1 simple (prognatha); telsonic lobes unnotched (petiti).

Relationship.--Like Argissa in shortness of anterior coxae, with short coxa 3 and longer coxa 4 and in lobate article 2 of pereopods 5-7 but differing from Argissa in robust proportions of mandibular palp, article 2 being longest, in the lack of facial setae on maxilla 2 and the distinctness of gnathopodal subchelation.

Species.--1A angelieri Deboutteville and Ruffo, in Ruffo and Deboutteville, 1952 (= denticulata Salvador, 1952) [105],  
1B a. balcanica S. Karaman, 1953b [087],  
1C a. pisana Ruffo, 1953b [098];

2A delamarei Coineau, 1962 [112], 2B d. macrocheles Coineau, 1968 [112];

3 franciscloi Ruffo, 1953b [096];

4 gineti Balazuc, 1957 [112];

5 gracillima Ruffo, 1948b [092];

6 juberthieae Coineau, 1968 [109];

7 lescherae Coineau, 1968 [108];

8 major Barbe, 1965 [108];

9 petiti Coineau, 1963 [108];

10 prognatha Barbe, 1963 [112];

Western and southern Europe, hypogean, 10.

Parasalentinella Bou

Figure 46, Map 65

Parasalentinella Bou, 1971a: 482 (Parasalentinella rouchi Bou, 1971a, original designation).

Body somewhat slender. Lateral cephalic lobes sharply mammilliform. Eyes absent. Antennae of medium and equal extension, ratio of peduncular articles on antenna 1 = 30:13:5 (or 28:10:5 without cusps), articles 1-2 cuspidate, primary flagellum about as long as peduncle, accessory flagellum 1-articulate. Antenna 2 flagellum short, gland cone large.

Labrum [?broader than long, entire, rounded]. Ratio of mandibular palp articles = 7:21:7, article 3 linear, setae = BDE. Inner lobes of labium absent, poorly gaping. Maxillae not setose medially, inner plate of maxilla 1 ovatotriangular, with one apical and one apicomедial seta, outer plate with 9 spines, palps 2-articulate, [?asymmetric]. Inner plate of maxilla 2 shortened, without medial setae, without oblique facial row of setae. Plates of maxilliped large, moderately armed, palp thin, long, dactyl as long as article 3, weakly unguiform, with long nail, short body.

Coxae 1-2 short, poorly setose, broader than long, 3 slightly longer, then 4 longer than broad, unlobed, 5 about as long as 4 and weakly bilobed, 6-7 progressively shorter. Gnathopods feeble, subchelate, of similar robustness but 2 slightly the longer, wrists elongate, unlobed, as long as hand on gnathopod 1, longer on gnathopod 2, hands mittenform, posterior margin swollen, palms oblique, long, weakly defined, poorly armed, dactyls fitting weakly defined palmar area.

Pereopods 3-4 elongate. Pereopods 5-7 weakly diverse, generally of similar length, short, article 2 moderately to strongly (7) expanded, with moderate to strong posteroventral lobe progressively, poorly setose (mainly sparse setules), apices of article 6 with short-medium setae (pereopods 5-7), dactyls weakly flagellate.

Pleopodal rami 3-articulate. Rami of uropods 1-2 extending equally, without marginal spines, basofacial armaments absent. Uropod 3 not extended, very short, uniramous, peduncle and ramus short and of equal length, ramus uniarticulate, with apical notch and sparse setae. Telson very short and broad, entire, with broadly spread apical setules.

Coxal gills [?4-6], ovate. Oostegites [?slender].

Relationship.--Differing from Salentinella in the uniramous uropod 3 with uniarticulate ramus and the short, broad, uncleft telson.

Species.--T rouchi Bou, 1971a [112];

mid-Pyrenees, France, hypogean, 1.

## APPENDIX VII

## Handbook of Other Freshwater Amphipod Genera

These are listed in alphabetical order so as to facilitate their location from discussion in Part I.

Descriptions appear for several of the taxa most closely related to Gammaridans. The same basic descriptive method used for Gammaridans applies to these descriptions. Remote taxa are not described but simply listed with their synonymy, list of species and distribution.

Afrochiltonia K.H. Barnard

Maps 18, 68

Afrochiltonia K.H. Barnard, 1955: 93 (Chiltonia capensis K.H. Barnard, 1916, original designation).--Griffiths, 1976: 31.  
Austrochiltonia Hurley, 1958: 767 (Hyalella australis Sayce, 1901a, original designation).

Species.--41 australis (Sayce, 1901a) (Williams, 1962) [944];

42 capensis (K.H. Barnard, 1916) (Griffiths, 1974b, 1974c, 1975) [917]  
[capensis = subtenuis by Griffiths, 1976, but doubtful here];

43 subtenuis (Sayce, 1902) (Williams, 1962) [945];

southern Australia, Tasmania, South Africa, epigeal, 3.

Awacaris Ueno

Map 22

Awacaris Ueno, 1971d: 241 (Awacaris kawasawai Ueno, 1971d, original designation).

Urosomites unarmed. Rostrum obsolescent, lateral cephalic lobes weak, rounded, weak sinus present. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 20:14:9, flagellum much longer than peduncle, accessory flagellum 1-articulate, longer than broad, antenna 2 gland cone large.

Mandibular molar large and triturative, ratio of palp articles = 4:12:12, article 3 scarcely subfalcate, setae = ADE. Inner lobes of labium absent, weak gape present. Maxillae medially setose, inner plate of maxilla 1 triangular, fully setose medially, outer plate broad, with 9-10 S-shaped apicomediaally pectinate spines forming weak mop, palp reduced, thin, scarcely reaching apex of outer plate or strongly failing apex, article 1 elongate, article 2 very short, button-shaped, bearing one apical setule.

Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped medially spinose (but spines apparently thin), article 3 of palp linear, apical nail [?obsolescent].

Coxae of medium size, poorly setose, coxa 1 undilated, coxa 4 weakly lobate posteroventrally. Gnathopods small, slender, wrist of gnathopod 1 moderately elongate, unlobed, hand narrow, subrectangular, almost as long as wrist, tapering distally, palm transverse, very short, dactyl short but strongly overlapping palm; wrist of gnathopod 2 elongate, unlobed, hand thin, rectangular, scarcely tapering distally, but much shorter than wrist, palm oblique but very short, dactyl short but overlapping palm.

Pereopods 3-4 dactyls with 1-2 inferior setules. Article 2 of pereopods 5-7 scarcely expanded, alike, weakly pyriform, posteriorly setulose, posteroventral corners weakly extended but not distinctly lobate.

Outer rami of uropods 1-2 shorter than inner rami, all rami dorsally spinose (weakly). Uropod 3 not exceeding uropod 1 but nevertheless long and thin, magniramous, aegiramous, peduncle short, apices of rami slightly blunted and bearing setules, sides of rami with sparse short spines and sparse long setae (rami more like those of Bogidiellids than of Eusirids). Telson elongate, cleft three fourths, weakly gaping, lobes tapering but weakly truncate, each with apical setule and lateral setule at M. 70.

Coxal gills 2-6, elongate-ovate to finger-like to long and slender. Oostegites [unknown, absent from specimens studied].

Description.--Right and left palps of maxilla 1 differing in length and position of attachment to outer plate.

Relationship.--Awacaris is very close to Laothoes; the two genera resemble each other in head (special shape), antennae, coxae, pereopods, epimera, urosome, uropods 1-2, gnathopods and in mouthparts other than those discussed below. Awacaris differs from Laothoes in the absence of eyes, broader outer plate of maxilla 1 with S-shaped spines, cleft telson, thinner rami of uropod 3, facial setae of maxilla 2, longer article 3 of the mandibular palp and the presence of an accessory flagellum. Like Relictomoera but palp of maxilla 1 reduced, head abnormal and hand and palm of gnathopod 1 weaker.

Species.--31 kawasawai Ueno, 1971d [028];

Japan, Shikoku, cave, stream, 1.

#### Chiltonia Stebbing

Map 53

Chiltonia Stebbing, 1899c: 408 (Hyaella mihiwaka Chilton, 1898, original designation).--Hurley, 1954a: 565.

Species.--See Hurley, 1954a;

F enderbyensis Hurley, 1954a [843];

M mihiwaka (Chilton, 1898) [937];

Q minuta Bousfield, 1964 [844];

R rivertonensis Hurley, 1954a [937];

New Zealand, Auckland Is., Campbell Is., freshwater and beach kelp, 4.

#### Caspicola

#### Figure 50

Caspiella Derzhavin, 1944: 21, 24 (homonym, Mollusca) (Caspiella knipovitschi Derzhavin, 1944, monotypy).

Caspicola Derzhavin 1945y: [not seen] (same type-species).--Birstein and Romanova, 1968: 285.

Species.--knipovitschi (Derzhavin, 1944) [332];

Caspian Sea; 1.

#### Corophium Latreille

Corophium Latreille, 1806: 58 (Corophium longicorne Latreille, 1806, monotypy, = Oniscus volutator Pallas, 1776).--Crawford, 1937a: 591.

Species.--Many marine species; only freshwater and PontoCaspian species follow:

aquafuscum Heard and Sikora, 1972 [365B];

chelicorne Sars, 1895a (Carausu, 1943) (Carausu et alia, 1955) [335];

curvispinum Sars, 1895a (=devium Wundsch, 1912) (=spongiicola Welitchkovsky, 1914) (Carausu, 1943) (Carausu et alia, 1955) [335, 235, 239];

lacustre Vanhoffen, 1911 (Bousfield, 1973) [250] (species extends almost to freshwater in many estuaries);

maeoticum Sowinsky, 1898a (Carausu, 1943) (Carausu et alia, 1955) [333];

minutum Dang Ngoc Thanh, 1965 [653B];

monodon Sars, 1895a (Birstein and Romanova, 1968) [332];

mucronatum Sars, 1895a (Mordhukhai-Boltovskoi, 1969) [332];

multisetosum Stock, 1952 (Ingle, 1963) (Jazdzewski, 1976) [240];

nobile Sars, 1895a (Carausu, 1943) (Mordhukhai-Boltovskoi, 1969) [335];

- orientalis Schellenberg, 1928 (Carausu et alia, 1955) (Stock, 1960) [343S];  
rioplatense Giambiagi, 1929 (Shoemaker, 1947) [751];  
robustum Sars, 1895a (= bidentatum Sars, 1895a) (Carausu, 1943) [336];  
salmonis Stimpson, 1857 (Shoemaker, 1949a) [368];  
sowinskyi Martynov, 1924a (= villosus Carausu et alia, 1955)  
 (Straskraba, 1962) [334];  
spinicorne Stimpson, 1857 (Shoemaker, 1949a) [371];  
spinulosum Sars, 1896 (Birstein and Romanova, 1968) [332];  
spongicolum (Welitchkowsky, 1914) (= sowinskyi Martynov, 1924a)  
 (= villosus Carausu et alia, 1955) (Straskraba, 1962) [334];  
stimpsoni Shoemaker, 1941b, 1949a [371];  
volutator (Pallas, 1766) (Sars, 1895b, as grossipes) (Bousfield,  
 1973) [250];
- almost cosmopolitan (antipolar), marine (40) and freshwater-PontoCaspian  
 (18), total 58.

Dogielinotus Gurjanova

Map 67

Dogielinotus Gurjanova, 1953: 235 (Allorchestes moskvitini Derzhavin,  
 1930a, original designation).

Species.--23 cimbaluki Kudrjaschov, 1972 [283];

24 loquax J.L. Barnard, 1967 [379];

25 moskvitini (Derzhavin, 1930a) (Gurjanova, 1962) [390F];

boreal north Pacific margins and proximate streams [1] and estuaries, 3.

Grandidierella Coutiere

Map 66

Grandidierella Coutiere, 1904: 3 (Grandidierella mahafalensis Coutiere,  
 1904, monotypy).--Myers, 1970: 136.--J.L. Barnard, 1977: 270.

1 africana Schellenberg, 1936b [445];

2 bispinosa Schellenberg, 1938a (Bousfield, 1971) [595];

- 2 bispinosa Schellenberg, 1938a (Bousfield, 1971) [595];
- 3 bonnieri Stebbing, 1908a (Nayar, 1956, 1959, 1967) (Monod, 1951) [664E];
- 4 bonnieroides Stephensen, 1947b (Myers, 1970) [421E];
- 5 chelata K.H. Barnard, 1951 [743E];
- 6 dentimera Myers, 1970 [381];
- 7 gilesi Chilton, 1921a (?Imbach, 1969) [640 to 670];
- 8 gravipes K.H. Barnard, 1935 [666F];
- 9 grossimana Ledoyer, 1967b (Myers, 1972) [698];
- 10 japonica Stephensen, 1938a (Chapman and Dorman, 1975) [395E];
- 11 koa J.L. Barnard, 1977 [381Q];
- 12 lignorum K.H. Barnard, 1935, 1952 (Griffiths, 1975) [743E];
- 13 lutosa K.H. Barnard, 1952 (Griffiths, 1975) [743E];
- 14 macronyx K.H. Barnard, 1935 [664Q];
- 15 mahafalensis Coutiere, 1904 (Myers, 1972) [919Q];
- 16 megnae (Giles, 1888) (Tattersall, 1922a) [663];
- 17 nottoni Shoemaker, 1935 [537E];
- 18 palama J.L. Barnard, 1977 [381Q];
- 19 perlata Schellenberg, 1938a [576];
- 20 spinicoxa Myers, 1972 [698];
- 21 vietnamica Dang, 1968 [954F];

circumtropical and warm-temperate, littoral, brackish, anchialine,  
21 [not counted as freshwater].

#### Haustorioides Oldevig

Haustorioides Oldevig, 1958: 343 (Haustorioides munsterhjelmi  
Oldevig, 1958, original designation)  
Species.--munsterhjelmi Oldevig, 1958 (J.L. Barnard, 1967) [?285].<sup>1</sup>

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<sup>1</sup> Sakashama, Sakhalin, not located

Hyalella S.I. Smith

Hyalella S.I. Smith, 1874: 645 (Hyalella dentata S.I. Smith, 1874, here selected, = Amphitoe aztecus Saussure, 1858, = Allorchestes Knickerbockeri Bate, 1862, ? = A.[mpithoe] dentata Say, 1818).-- Stebbing, 1906: 574.

Lockingtonia Harford, 1877: 53 (Lockingtonia fluvialis Harford, 1877, monotypy).

Species.--anophthalma Ruffo, 1957 [927C];

armata (Faxon, 1876) [934];

azteca (Saussure, 1858) (= knickerbockeri Bate, 1862) (= dentata S.I. Smith, 1874) (= inermis S.I. Smith, 1875b) (= fluvialis Lockington, 1877) (= faxoni Stebbing, 1903) (= ornata Pearse, 1911) (? = dentata Say, 1818) (Bousfield, 1973) [150];

cuprea (Faxon, 1876) (Chevreux, 1907a) [934];

curvispina Shoemaker, 1942d (= simplex Schellenberg, 1943c) (= cangallensis Schellenberg 1943c) (both fide Oliveira, 1953) [927];

dybowski (Wrzesniowsky, 1879) [921];

echinus (Faxon, 1876) [934];

fossamancinii Cavalieri, 1959 [924];

gracilicornis (Faxon, 1876) (?= andina Philippi, 1860) [934] (not dentatus, not inermis, mihi);

jelskii (Wrzesniowsky, 1879) [927];

lalage Brehm-Lunz, 1925 [924];

latimana (Faxon, 1876) [934];

longipalma (Faxon, 1876) (Chevreux, 1907a) [934];

longipes (Faxon, 1876) [934];

longistilus (Faxon, 1876) [934];

lubomirskii (Wrzesniowsky, 1879) [921];

lucifugax (Faxon, 1876) [934];

meinerti Stebbing, 1899c (Spandl, 1924) [927];

montezuma Cole and Watkins, 1977 [182];

- montforti Chevreux, 1907a [934];  
neveulemairei Chevreux, 1904, 1907a [934];  
pampeana Cavalieri, 1968 [924];  
patagonica (Cunningham, 1871) (= patagonica Ortmann, 1911,  
homonym) (Schellenberg, 1931a) [924];  
pernix (Moreira, 1903) [927];  
pteropus Schellenberg, 1943c (Monod, 1970) [921];  
robusta Chevreux, 1907a [934];  
sapropelica Brehm, 1939 [198];  
solida Chevreux, 1907a [934];  
texana Stevenson and Peden, 1973 [185];  
thomsoni Brehm, 1928 [924];  
warmingi Stebbing, 1899c [927];

Neotropica, especially Lake Titicaca; Nearctica, widespread but poorly diverse, freshwater, 31.

Kamaka Derzhavin

Map 52

Kamaka Derzhavin, 1923a: 188 (Kamaka kuthae Derzhavin, 1923a, monotypy).

- Species.--1 biwae Ueno, 1943 [027];  
2 derzhavini Gurjanova, 1951 [013];  
3 kuthae Derzhavin, 1923a (Gurjanova, 1951) [013];  
4 palmata Dang, 1968 [954];

east Asia from Viet Nam to Kamchatka, Japan, fresh or brackish, 4.

Metoediceropsis Dang

Metoediceropsis Dang, 1968: 212 (Metoediceropsis dadoensis Dang, 1968, original designation).

Species.--69 dadoensis Dang, 1968 [954].

Viet Nam, freshwater, 1.

Monoculodes Stimpson

Map 67

Monoculodes Stimpson, 1853: 54 (Monoculodes demissus Stimpson, 1853, monotypy).

Kroyera Bate, 1857b: 140 (Kroyera carinata Bate, 1857b, monotypy).

Species.--Many marine species, freshwater species follow:

21 limnophilus Tattersall, 1922a (Shen, 1955) [031ER];

22 1. japonicus Nagata, 1965a [395E];

China and Japan, rivers near sea and estuaries, (2) plus 51 marine species, 53.

Onisimus Boeck (Pseudalibrotus Della Valle)

Onisimus Boeck, 1871: 111 (Anonyx litoralis Kroyer, 1845, selected by Boeck, 1876).

Pseudalibrotus Della Valle, 1893: 798 (Anonyx litoralis Kroyer, 1845, monotypy).

Species.--See Gurjanova, 1951; Stephensen, 1935; Holmquist, 1965; caspius (Sars, 1896) (Birstein and Romanova, 1968) [332];

glacialis (Sars, 1900) (Just, 1970) [200];

litoralis (Kroyer, 1845) (= birulai Gurjanova, 1929a) (Sars, 1895b) [200];

nanseni (Sars, 1900) (J.L. Barnard, 1959d) [200];

platyceras (Sars, 1896) (Birstein and Romanova, 1968) [332];

circumarctic marine shallows, Caspian Sea [2], 5 [No maps].

Orchestia Leach

Orchestia Leach, 1814a: 402; 1814b: 432 (Cancer [Gammarus] littoreus Montagu, 1808, monotypy, = Oniscus gammarellus Pallas, 1766). [Scamballa White, 1847: 86; name unavailable by ICZN 11d, name originally published as synonym].  
Parorchestia Stebbing, 1899a: 402 (Orchestia tenuis Dana, 1852, here selected).

Several species of this genus have been reported from freshwaters; some records may be accidental drownings or fall-ins but others such as those of Hurley (1975) are accompanied by confirmed habitat data. We have not taken time to peruse the vast literature on this genus for aquatic members other than those brought to our attention in the past few years. A full list of species will be presented by Barnard and Karaman (in prep.).

Representative freshwater species.--ochotensis Brandt, 1850 (=ditmari Derzhavin, 1923a) (Bulycheva, 1957) [020];

recens (G.M. Thomson, 1884) (Hurley, 1975) [936];

remyi Schellenberg, 1950 [347H];

species A Hurley, 1975 [936]; species B Hurley, 1975 [936];

circumtropical strand and terrestrial, 67 [No maps].

Paracalliope Stebbing

Maps 53, 54, 68

Paracalliope Stebbing, 1899a: 210 (Calliope fluviatilis Thomson, 1879a, original designation).--J.L. Barnard, 1972b: 70.

Species.--1 australis (Haswell, 1880a) [781];

2 fluviatilis (Thomson, 1879a) (J.L. Barnard, 1972b) [935];

3 indica K.H. Barnard, 1935 (Nayar, 1959) (Sivaprakasam, 1968) [670E];

4 karitane J.L. Barnard, 1972b [936];

larai Knott, 1975 [783];

5 novaecaledoniae Ruffo and Paiotta, 1972 [586F];

V,6 novizealandiae (Dana, 1852, 1853) (?J.L. Barnard, 1972b) [775];

7 sp. Chilton, 1921c (as fluviatilis) [641M];

southeast Asia and Australasia, freshwater [4] and marine shallows, 7.

Paracorophium Stebbing

Maps 18, 53

Paracorophium Stebbing, 1899b: 350 (Corophium excavatum Thomson, 1884, monotypy).--Hurley, 1954c: 450.

Species.--2 excavatum (Thomson, 1884) (Hurley, 1954c) [770E];

66 hartmannorum Andres, 1975 [765E];

Y lucasi Hurley, 1954c [936];

New Zealand, southeastern Australia, Chile, brackish to freshwater epigeal,  
3.

Paraleptamphopus Stebbing

Maps 6, 7

Paraleptamphopus Stebbing, 1899a: 209 (Calliope subterranea Chilton, 1882, here selected).--Stebbing, 1906: 294.--Chilton, 1924: 273.

Lateral cephalic lobes weakly mammilliform, sinus absent. Eyes absent.

Antennae elongate, antenna 1 longer than 2, ratio of peduncular articles = 30:20:10, primary flagellum much longer than peduncle, accessory flagellum 1-articulate, elongate. Both pairs of antennae with tympanic calceoli in male.

Labrum broader than long [?fused to epistome], entire, truncate. Ratio of mandibular palp articles = 5:17:15, article 3 sickle-shaped (curved), setae = DE. Inner lobes of labium [?present]. Maxillae medially setose, inner plate of maxilla 1 ovate, partially setose medially, outer plate with 11 spines, palps asymmetrical. Inner plate of maxilla 2 with oblique facial row of setae. Outer plate of maxilliped medially spinose (poorly), dactyl stubby but subunguiform, nail small.

Coxae of medium size, poorly setose, coxa 1 not expanded, coxa 4 unlobate. Gnathopods diverse; male gnathopod 1 huge, wrist short, unlobed, hand giant, ovate, palm oblique, poorly defined, occupying most of posterior margin of hand, lined with tufts of setae, defined by weak hump and thick spines, gnathopod 2 smaller, wrist more elongate and weakly lobate, hand elongate, ovate, palm oblique, of medium length, armed with tiny setules, defined by several spines (Acanthogammarus-type hand); female gnathopods feeble, gnathopod 1 with medium weakly lobate wrist, small rectangular hand with short oblique palm, gnathopod 2 thinner, elongate, wrist and hand elongate, unlobed, palm transverse, short, article 3 slightly elongate as in Lysianassids.

Article 2 of pereopods 5-7 slightly expanded, slightly lobate, weakly setulose posteriorly.

Rami of uropods 1-2 marginally spinose, outer of both slightly shortened, peduncle of uropod 1 [?without basofacial spines]. Uropod 3 slightly extended, magniramous, almost aequiramous, peduncle elongate, rami

1-articulate, lanceolate. Telson of ordinary length, entire, weakly emarginate apically, poorly armed.

Coxal gills [?2-6], ovate, [?some pediculate]. Sternal gills [?absent]. Oostegites broad.

Variants.--Gnathopods 1-2 of female closely similar, wrists elongate (caeruleus); inner lobes of labium absent (caeruleus); dactyls of maxillipeds not stubby, with well developed nails (caeruleus); anterior coxae elongate (caeruleus); eyes present (caeruleus); cephalic sinus present (caeruleus).

Relationship.-- Like Phreatogammarus but accessory flagellum reduced, telson entire, and calceoli tympanic, not paddle-shaped.

Species.--See Hurley (1975);

41 caeruleus (Thomson, 1885) (Stebbing, 1887) [937];

42 subterraneus (Chilton, 1882, 1894) [935];

New Zealand, epigeal and subterranean.

#### Paramoera Miers

Maps 67, 68

Paramoera Miers, 1875: 75 (Paramoera australis Miers, 1875, monotypy).

Stebbingia Pfeffer, 1888: 110 (Stebbingia gregaria Pfeffer, 1888, monotypy).

Aucklandia Walker, 1908: 35 (Aucklandia enderbyi Walker, 1908, monotypy).

Species.--Many marine species; only freshwater or inland or brackish species listed;

1 carlottensis Bousfield, 1958 [155E];

2 columbiana Bousfield, 1958 [155E];

3 lokowai J.L. Barnard, 1977 [381Q];

4 paakai J.L. Barnard, 1977 [381Q];

5 rua J.L. Barnard, 1977 [381Q];

6 udehe (Derzhavin, 1930a) (Birstein, 1939) [024];

11 sp. (= aucklandicus of Chilton, 1909a) [843F];

biboreal littoral and sublittoral, anchialine and estuarine, 42 [not counted as freshwater in various tables].

Paramoerella Ruffo

## Map 18

Paramoerella Ruffo, 1974b: 412 (Paramoerella interstitialis Ruffo, 1974b, original designation).

Species.--39 interstitialis Ruffo, 1974b [743K];

interstitial on beach, South Africa (Cape Town), 1.

Parhyale Stebbing

Parhyale Stebbing, 1897: 26 (Parhyale fascigera Stebbing, 1897, monotypy).

Hyaloides Schellenberg, 1939b: 126 (Hyaloides dartevillei Schellenberg, 1939b, monotypy).

Species.--Several marine species and one species of mixed habitat:

hawaiensis (Dana, 1853) (= brevipes Chevreux, 1901b) (= trifoliadens Kunkel, 1910) (= dartevillei Schellenberg, 1939b) [421];

circumtropical, marine, brackish and occasionally into freshwater, 10 [no maps] [not counted as freshwater].

Pseudomoera Schellenberg

## Map 8

Pseudomoera Schellenberg, 1929: 281 (Atyloides gabrieli Sayce, 1901a, monotypy).

Species.--21 fontana (Sayce, 1902) [943];

44 gabrieli (Sayce, 1901a) [943];

Victoria, epigeal, 1500-3000 feet altitude, 2.

Relictomoera Barnard and Karaman

Map 67

Relictomoera Barnard and Karaman, 1982: 168 (Paramoera relicta Ueno, 1971a, original designation).

Species.--11 relicta (Ueno, 1971a) [029gC];

12 tsushimana (Ueno, 1971b) [029tJ];

Islands of Tsushima and Goto, off Kyushu, Japan, hypogean or cave dwelling,  
2.

Seborgia Bousfield

Maps 20, 53, 56

Seborgia Bousfield, 1970: 164 (Seborgia minima Bousfield, 1970, original designation).

Species.--W minima Bousfield, 1970 [595L];

S, 81 relicta Holsinger, 1980b [185];

Rennell Island, Bismarck Archipelago, in a lake; Texas, in Edwards aquifer;  
2.

Spelaeorchestia Bousfield and Howarth

Map 67

Spelaeorchestia Bousfield and Howarth, 1976: 144 (Spelaeorchestia koloana Bousfield and Howarth, 1976, original designation).

Species.--18 koloana Bousfield and Howarth, 1976 [381C];

Kauai, Hawaii, lava-tube cave, 1 [not counted as freshwater].

Stenocorophium G.S. Karaman

Stenocorophium G.S. Karaman, 1979b: 580 (Stenocorophium bowmani G.S. Karaman, 1979b, original designation).

Species.--bowmani G.S. Karaman, 1979b [594];

Palau, freshwater, 1.

Sternomoera Barnard and Karaman

## Map 67

Sternomoera Barnard and Karaman, 1982: 169 (Paramoera yezoensis Ueno, 1933a, original designation).

Species.--13 hayamenensis (Stephensen, 1944) [027];

14 japonica (Tattersall, 1922a) [017];

15 yezoensis (Ueno, 1933a) [026];

Japan, lakes and torrents, 3.

## LIST OF OTHER FRESHWATER GAMMARIDEANS

Ampelisca sp. (?pusilla Sars); Chilton, 1920c [963]; Ganges River, 600 miles from mouth at Buxar;

98 Hyale milloti Ruffo, 1958a [694F]; Comores Islands, Map 54;

97 Microphotis blachei Ruffo, 1952b [655 E]; Lower Mekong River, Map 54;

Talitroides alluaudi Chevreux, 1901b (Bousfield and Howarth, 1976) [421]; almost tropicopolitan; lava-tube caves of Kauai, Hawaii [no maps];

Talitroides topitotum Burt, 1934 (Bousfield and Howarth, 1976) [421]; almost tropicopolitan; lava-tube caves of Kauai, Hawaii [no maps];

?Talorchestia fernandoi (Wignarajah, 1958) (originally placed in Paracalliope, obviously a Talitrid) [665F]; Ceylon, tapwater [no maps].

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Italics are omitted on Latin names if omitted by author.

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First letters of words of titles in English are given as capitals, except for articles and connectives. This is not our preference but we decided time was not useful to reduce these to their proper state. This was a style we have now abandoned as being tedious and superfluous.



