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Chace, Fenner A., Jr.

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INVERTEBRATE
ZOOLOGY
Crustacea

ZOOLOGY. —*Revision of the bathypelagic prawns of the family Acanthephyridae, with notes on a new family, Gomphonotidae.*¹ FENNER A. CHACE, JR., Museum of Comparative Zoology. (Communicated by WALDO L. SCHMITT.)

Owing to difficulties at this time in the publication of these observations in monographic form as was the original intention, it has seemed advisable to present an abstract of that data in the form of a key to the species of the family with one important reference for each species, together with the synonyms of each. Inasmuch as many of these forms are cosmopolitan, it is deemed unnecessary to discuss the distribution of the group at this time.

The material covered has been drawn from the collections in the Museum of Comparative Zoölogy and the U. S. National Museum made by the U. S. Steamers *Blake* and *Albatross* and the auxiliary ketch *Atlantis* of the Woods Hole Oceanographic Institution.

This opportunity is taken to acknowledge the invaluable assistance offered to me by the staffs of the Museum of Comparative Zoölogy and the U. S. National Museum, without which this paper would have been impossible. I wish to thank especially Dr. Hubert Lyman Clark, Dr. Elisabeth Deichmann, Dr. Thomas Barbour, and Dr. Henry B. Bigelow of the Museum of Comparative Zoölogy and Dr. Waldo L. Schmitt, Dr. Mary J. Rathbun, and Mr. Clarence R. Shoemaker of the U. S. National Museum.

The Acanthephyridae may be defined as that group of the Decapoda Natantia in which the first two pairs of pereopods or "walking legs" are chelate, similar, of moderate size, and with an undivided carpus; the last three pairs of pereopods are neither chelate nor abnormally long; all the pereopods are provided with an exopod; there is no lash on the exopod of the first maxilliped; and the mandibles are imperfectly cleft.

The seven genera and 59 species and varieties listed by de Man in 1920 are here reduced to six genera and 44 species.

The genus omitted is *Gonatonotus*, of which there is but one species, *G. crassus* A. Milne Edwards, 1881. Although only two specimens of this aberrant form have heretofore been recorded, it has been my privilege to examine no less than 13 specimens, many of them from the Philippine region, despite the fact that the species had not been previously recorded from the Pacific. An examination of the mouthparts disclosed that the mandible is composed of but one lobe and

¹ Received August 27, 1935.

the exopod of the first maxilliped is provided with a long lash very similar to that found in the Pandalidae. Inasmuch as this character completely excludes this prawn from the Acanthephyridae, and the undivided carpus of the second pair of pereopods prevents uniting it with the Pandalidae, it is proposed that this form be placed in a separate family. Since the name *Gonatonotus* is preoccupied for a genus of Parthenopid crabs (White, Proc. Zool. Soc., London, 15: 58, 1847), I suggest the name **Gomphonotus**² for the genus of prawns, and the family may then be known as the **Gomphonotidae**.

Eleven species not examined by the author have been marked with an asterisk (*) in the key below.

KEY TO THE GENERA OF THE ACANTHEPHYRIDAE

1. Exopods of at least the third maxillipeds and first pair of pereopods foliaceous and generally rigid; outer margin of antennal scale usually armed with a series of spines; telson not truncate at tip, but ending in a sharp point; eyes large and well pigmented. Genus 6. *Oplophorus*
 None of the exopods of the pereopods foliaceous or rigid. 2
2. Last four abdominal somites, at least, carinate along dorsal midline. 3
 Sixth abdominal somite never dorsally carinate. 4
3. No straight ridge or carina running entire length of lateral surface of carapace from orbit to hind margin along median lateral line; hind margin of hepatic furrow not cut off abruptly by an oblique ridge or carina; incisor process of mandible toothed for its entire length. Genus 1. *Acanthephyra*
 Carapace decorated with at least one straight carina traversing the lateral surface from hind margin of orbit to posterior edge of carapace; hind margin of hepatic furrow abruptly cut off from branchial region by an oblique carina; anterior half of incisor process of mandible unarmed. Genus 2. *Notostomus*
4. Ischial and meral joints of pereopods very broad and much compressed laterally. Genus 3. *Ephyrina*
 Pereiopods normal. 5
5. Eyes very small and poorly pigmented; anterior margin of first abdominal somite entire, not toothed; telson terminating in a truncate, spinose tip. Genus 4. *Hymenodora*
 Eyes very large and well pigmented; anterior margin of first abdominal somite armed with a distinct lobe or tooth overlapping hind margin of carapace; telson terminating in a sharp-pointed end-piece laterally armed with spines. Genus 5. *Systellaspis*

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² γομφος, νωτος.

Genus I. ACANTHEPHYRA A. Milne Edwards, 1881

KEY TO THE SPECIES OF ACANTHEPHYRA

1. Posterior third, at least, of carapace not dorsally carinate. 2
 Carapace dorsally carinate throughout its length. 13
2. Integument thin and soft. 3
 Integument hard and firm. 7
3. Carina supporting branchiostegal spine not reaching to posterior half of
 carapace. 4
 Carina supporting branchiostegal spine reaching almost or quite to hind
 margin of carapace. 6
4. Rostrum very high and laterally compressed to a thin crest; small spine
 on third abdominal somite (See: Balss, 1925, p. 262).
 *A. tenuipes* (Bate, 1888)*
 (= *Tropiocaris tenuipes* Bate, 1888) 5
 Rostrum depressed, not thin and high. 5
5. Large, laterally compressed spine on third abdominal somite reaching to
 posterior third of fifth somite (See: Lenz and Strunck, 1914, p. 327). . .
 *A. brevirostris* Smith, 1885.
 (= *Hymenodora duplex* Bate, 1888)
 No spine on third abdominal somite (See: Kemp, 1906, pp. 19 and 23)
 *A. rostrata* (Bate, 1888)*
 (= *Hymenodora rostrata* Bate, 1888)
6. Rostrum little more than half as high as long (See: Balss, 1925, p. 264)
 *A. indica* Balss, 1925.*
 (= *Acantheephyra* sp. de Man, 1920)
 Rostrum higher than long (See: Balss, 1925, p. 262).
 *A. cucullata* Faxon, 1893.
7. Telson dorsally sulcate on proximal portion. 8
 Telson dorsally ridged on proximal portion. 12
8. Carina supporting branchiostegal spine very prominent and reaching
 to anterior margin of branchial region. 9
 Carina supporting branchiostegal spine, if present, short and obscure. .
 10
9. Rostrum less than half as long as carapace (See: Balss, 1925, p. 261). . .
 *A. curtirostris* Wood-Mason, 1891.
 (= *A. acutifrons* Bate, 1888, part)
 Rostrum more than three-fourths as long as carapace (See: Bate, 1888,
 p. 736). *A. media* Bate, 1888.
 (= *A. media* var. *obliquirostris* de Man, 1916)
10. Eyes minute, very much narrower than eyestalks (See: Alcock, 1901,
 p. 80). *A. microphthalmia* Smith, 1885.
 (= *A. longidens* Bate, 1888)
- Eyes normal, slightly broader than eyestalks. 11

- 11. Branchiostegal spine supported by a short carina (See: Stephensen, 1923, p. 44) *A. purpurea* A. Milne Edwards, 1881.
 (= *Miersia agassizii* Smith, 1882; *A. sica* Bate, 1888; *A. acanthitelsonis* Bate, 1888; *A. kingsleyi* Bate, 1888; *A. rectirostris* Riggio, 1900; *A. purpurea*, var. *multispina* Coutière, 1905; *A. parva* Coutière, 1905; *A. haeckeli* Thiele, 1905; *A. batei* Stebbing, 1905)
 Branchiostegal spine minute and supported by neither carina nor ridge (See: Balss, 1925, p. 256) *A. sanguinea* Wood-Mason, 1892.
- 12. No carina supporting branchiostegal spine (See: de Man, 1920, p. 61) *A. armata* A. Milne Edwards, 1881.
 Prominent carina supporting branchiostegal spine (See: Wood-Mason and Alcock, 1894, p. 156) *A. fimbriata* Wood-Mason, 1894.
 (= *A. armata* var. *fimbriata* Wood-Mason, 1894; *A. armata* (part) of many authors)
- 13. First abdominal somite dorsally carinate 14
 First abdominal somite not dorsally carinate 16
- 14. Hepatic spine on carapace (See: Balss, 1925, p. 260)
 *A. corallina* (A. Milne Edwards, 1883)
 (= *Notostomus corallinus* A. Milne Edwards, 1883; *Acanthephyra valdiviae* Balss, 1914)
 No hepatic spine on carapace 15
- 15. Telson dorsally grooved (See: Balss, 1925, p. 261)
 *A. acutifrons* Bate, 1888.
 Telson distinctly ridged on proximal half (See: Balss, 1925, p. 257)
 *A. carinata* Bate, 1888.
- 16. Telson dorsally ridged 17
 Telson dorsally grooved 19
- 17. Rostrum armed dorsally almost to tip (See: Faxon, 1895, p. 162)
 *A. approxima* Bate, 1888.
 Distal half of rostrum dorsally unarmed 18
- 18. Second abdominal somite not dorsally carinate (See: Kemp, 1906, p. 21) *A. pulchra* A. Milne Edwards, 1890.*
 Second abdominal somite dorsally carinate (See: Balss, 1925, p. 258)
 *A. eximea* Smith, 1884.
 (= *A. brachytelsonis* Bate, 1888; *A. edwardsi* Bate, 1888; *A. angusta* Bate, 1888)
- 19. Integument firm and pubescent (See: Balss, 1925, p. 259)
 *A. kempfi* Balss, 1925.*
 Integument thin and membranous (See: de Man, 1920, p. 69)
 *A. sibogae* de Man, 1916.

Genus 2. NOTOSTOMUS A. Milne Edwards, 1881.

KEY TO THE SPECIES OF NOTOSTOMUS

- 1. First two abdominal somites not dorsally carinate; dorsal carina of

- carapace not denticulate on posterior two-thirds of its length; only one complete longitudinal carina on carapace..... 2
- All abdominal somites dorsally carinate; dorsal carina of carapace denticulate for practically its entire length; two or more complete longitudinal carinae on lateral surface of carapace..... 3
2. Integument soft but firm; sixth abdominal somite more than twice as long as fifth (See: Balss, 1925, p. 267)..... *N. vescus* Smith, 1886.
(= *Acanthephyra brevirostris* Bate, 1888; *Acanthephyra batei* Faxon, 1895; *Notostomus batei* Balss, 1925)
- Integument extremely thin and fragile; sixth abdominal somite once and a half as long as fifth (See: Balss, 1925, p. 266)..... *N. mollis* (Smith, 1882)
(= *Meningodora mollis* Smith, 1882; *Hymenodora mollis* Bate, 1888; *Notostomus fragilis* Faxon, 1895)
3. No semi-carina on posterior half of lateral surface of carapace immediately below the post-orbital..... 4
- A semi-carina on posterior half of lateral surface of carapace immediately below the post-orbital..... 5
4. Only two longitudinal carinae on lateral surface of carapace (See: Bate, 1888, p. 829)..... *N. murrayi* Bate, 1888.*
- Three longitudinal carinae on lateral surface of carapace (See: A. Milne Edwards, 1881, p. 7)..... *N. gibbosus* A. Milne Edwards, 1881.*
5. Four longitudinal carinae on posterior half of lateral surface of carapace..... 6
- Five longitudinal carinae on posterior half of lateral surface of carapace; a median lateral carina at base of rostrum..... 9
6. A median lateral carina at base of rostrum (See: A. Milne Edwards, 1881, p. 8)..... *N. elegans* A. Milne Edwards, 1881.*
- No median lateral carina at base of rostrum..... 7
7. Carina along lower margin of rostrum continuous with post-orbital (See: Balss, 1925, p. 268)..... *N. perlatus* Bate, 1888.
(= *N. brevirostris* Bate, 1888)
- Carina along lower margin of rostrum not continuous with post-orbital... 8
8. Post-orbital and post-antennal carinae nearly parallel (See: Bate, 1888, p. 830)..... *N. japonicus* Bate, 1888.*
- Post-orbital and post-antennal carinae sharply divergent behind hepatic region (See: Smith, 1886 p. 676)..... *N. robustus* Smith, 1885.
(= *N. bechei* Boone, 1930)
9. Dorsal carina of carapace straight along central portion and not very high (See: Balss, 1925, p. 269)..... *N. westergreni* Faxon, 1893.
- Dorsal carina of carapace very high and arched..... 10
10. Rostrum not reaching end of antennal scale (See: Bate, 1888, p. 826)..... *N. patentissimus* Bate, 1888.*
- Rostrum reaching considerably beyond end of antennal scale (See: Balss, 1925, p. 268)..... *N. longirostris* Bate, 1888.
(= *N. atlanticus* Lenz, 1914)

Genus 3. EPHYRINA Smith, 1885.

- Ephyrina benedicti* Smith, 1885 (See: Balss, 1925, p. 269)
 (= *Tropiocaris planipes* Bate, 1888; *Ephyrina hoskyni* Wood-Mason, 1891; *Ephyrina bifida* Stephensen, 1923)

Genus 4. HYMENODORA G. O. Sars, 1877.

KEY TO THE SPECIES OF HYMENODORA

1. Integument smooth, soft and membranous; rostrum not reaching beyond tips of eyes in adults (See: Balss, 1925, p. 270)
 *H. glacialis* (Buchholz, 1874)
 (= *Pasiphae glacialis* Buchholz, 1874; *Hymenodora gracilis* Smith, 1886; *H. glauca* Bate, 1888; *H. mollicutis* Bate, 1888)
- Integument rugose, soft but not particularly membranous; rostrum exceeding eyes in length and reaching to end of antennular peduncle in adults (See: Rathbun, 1904, p. 28) *H. frontalis* Rathbun, 1902.

Genus 5. SYSTELLASPIS Bate, 1888.

KEY TO THE SPECIES OF SYSTELLASPIS

1. Abdomen not dorsally carinate on any somite; rostrum about one-third as long as carapace (See: Balss, 1925, p. 245) . . . *S. braueri* (Balss, 1914)
 (= ? *S. echinurus* Coutière, 1911; *Acantheephyra braueri* Balss, 1914; *S. densispina* Stephensen, 1923)
- Abdomen carinate on third and fourth somites; rostrum more than half as long as carapace 2
2. Hind margins of fourth and fifth abdominal somites crenate on either side of the median spine (See: Balss, 1925, p. 242)
 *S. debilis* (A. Milne Edwards, 1881)
 (= *Acantheephyra debilis* A. Milne Edwards, 1881; *Miersia gracilis* Smith, 1882; *Acantheephyra debilis* var. *europaea* A. Milne Edwards, 1883; *Acantheephyra gracilis* Smith, 1886; *S. bouvieri* Coutière, 1905; *S. debilis* var. *indica* de Man, 1920)
- Hind margins of fourth and fifth abdominal somites not crenate on either side of the median spine 3
3. A sharp longitudinal carina near lower margin of carapace (See: Balss, 1925, p. 244) *S. cristata* (Faxon, 1893)
 (= *Acantheephyra cristata* Faxon, 1893)
- No sharp carina near lower margin of carapace 4
4. Sixth abdominal somite and anterior portion of telson smoothly rounded dorsally (See: Faxon, 1896, p. 162) *S. affinis* (Faxon, 1896)
 (= *Acantheephyra affinis* Faxon, 1896)
- Sixth abdominal somite and telson deeply grooved along dorsal midline (See: Bate, 1888, p. 758) *S. lanceocaudata* Bate, 1888.

Genus 6. OPHOPHORUS A. Milne Edwards, 1837.

KEY TO THE SPECIES OF OPHOPHORUS

1. Second, third, and fourth abdominal somites terminating in a long spine; no spine at postero-lateral angle of carapace (See: A. Milne Edwards, 1883, Pl. 30).....*O. spinicauda* A. Milne Edwards, 1883.
(=*O. foliaceus* Rathbun, 1906; *Hoplophorus foliaceus* Kemp, 1913; *Acantheephyra anomala* Boone, 1927)
Third, fourth and fifth abdominal somites terminating in a long spine. 2
2. No spine at postero-lateral angle of carapace. 3
A distinct spine at postero-lateral angle of carapace; outer margin of antennal scale spinose. 4
3. A distinct barb on inner margin of antennal scale near the tip; outer margin of same spinose (See: Balss, 1925, p. 249).....
.....*O. grimaldii* Coutière, 1905.
(=*Hoplophorus grimaldii* Courtière, 1905; ? *Acantheephyra pellucida* A. Milne Edwards, ms. fide Perrier. See Kemp, p. 66, 1906)
No barb on inner margin of antennal scale; outer margin of same devoid of spines (See: de Man, 1931, p. 369).....
.....*O. novae-zeelandiae* de Man, 1931.*
4. The median lateral carina at base of rostrum is subparallel to the dorsal margin; distal sixth of antennal scale unarmed; rostrum distinctly longer than antennal scale; small spine on lower margin of pleuron of first abdominal somite (See: Kemp, 1913, p. 63).....
.....*O. gracilirostris* A. Milne Edwards, 1881.
(=*O. longirostris* Bate, 1888; *Hoplophorus smithii* Wood-Mason, 1891; *Hoplophorus typus* (part) Balss, 1925)
The median lateral carina at base of rostrum converges posteriorly toward the dorsal midline; distal fourth of antennal scale unarmed; rostrum rarely reaching beyond tip of antennal scale; no spine on lower margin of pleuron of first abdominal somite (See: Bate, 1888, p. 762).....
.....*O. typus* H. Milne Edwards, 1837.
(=*O. brevirostris* Pate, 1888)

Note: Since this paper was written, a specimen of *Bentheocaris stylostratis* Bate has come to hand. It was collected with a closing net in 900 fathoms just west of the Gulf Stream off the coast of New Jersey on September 1, 1935 by the *Atlantis* of the Woods Hole Oceanographic Institution. This specimen is 57 mm. long, the largest of the five recorded specimens, and is apparently an adult female. An examination of the mouth-parts discloses that this species belongs in the genus *Acantheephyra* near *A. cucullata* Faxon. This same conclusion was reached previously by Dr. W. T. Calman and published in Union S. Africa Fish. Mar. Biol. Survey 4(3): 14. 1925.

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