

Key to Female Parasitic Copepods of Genus *Caligus* from Japanese Waters*

SATYU YAMAGUTI

(Received for publication; Jan. 30, 1974)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Carapace distinctly more than half of total length2
 Carapace about half of total length...12
 Carapace distinctly less than half of total length3</p> <p>2. Abdomen less than half as long as genital segment.....4
 Abdomen half as long as genital segment or more.....10</p> <p>3. Abdomen 1-segmented.....6
 Abdomen 2-segmented.....7</p> <p>4. Genital segment rounded quadrate, half as wide as carapace; abdomen quadrangular, about half as long as genital segment; furcal base rounded, with a papilliform protuberance on each side; furcal branches plump, slightly divergent, flanged at tip
 <i>latigenitalis</i> Shiino, 1954
 Genital segment subquadrate, broadly rounded posterolaterally; abdomen with convex sides; furca broad-based, with simple, gently incurved truncate branches; body pigmented.....
 <i>punctatus</i> Shiino, 1955
 Genital segment flask-shaped, slightly depressed on each side; abdomen quadrate, one third as long as genital segment; furcal branches wide apart,</p> | <p>incurved; body pigmented.....
 <i>cordiventris</i> Shiino, 1952
 Genital segment discoid, concave anteriorly and posteriorly; abdomen quadrate, with convex sides, less than half as wide as genital segment; furcal base rounded, with papilliform protuberance on each side; furcal branches stout, divergent, narrowly flanged.....
 <i>calotomi</i> Shiino, 1954
 Genital segment quadrate, with convex or nearly parallel sides, right-angled or rounded posterolaterally; abdomen quadrate, 1-segmented.....5</p> <p>5. Furca broad-based, with flanged, divergent branches... <i>dieuzeidei</i> Brian, 1933
 Furca with large quadrangular base and blunt, incurved branches.....
 <i>brevis</i> Shiino, 1954</p> <p>6. Genital segment quadrate, with nearly parallel sides; abdomen as long as genital segment; furca with oval base and simple divergent branches..... <i>quadratus</i> Shiino, 1954
 syn. <i>coryphaenae</i> of Yamaguti, 1936
 Genital segment subcordate, with convex sides; abdomen less than half-length of genital segment; furca with slightly incurved, flanged branches; ventral surface of thoracic segment spinose...
 <i>spinus</i> Yamaguti, 1939
 Genital segment subcordate, with broadly rounded posterior lobes; abdomen parallel-sided, less than one third as long as genital segment; with oval median tubercle posteriorly; furca with only slightly divergent or parallel</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

* This key is mainly based on different body proportions, body pigmentation and different characters of the sternal furca. Of the 26 known species the males are known for 13 species only, so that the key to the males is omitted here. The original description of *Caligus mebachii* Marukawa being inaccessible to me is excluded.

- branches.....*oviceps* Shiino, 1952
7. Genital segment bottle-shaped, with slightly convex or parallel sides.....8
 Genital segment subcordate.....9
 Genital segment large, subquadrate, with convex sides; abdomen a little shorter than genital segment; furca with quadrangular base and plump, slightly incurved, divergent branches; body pigmented.....
*macarovi* Gussev, 1951
 syn. *fulvipurpureus* Shiino, 1954
 Genital segment deeply reentrant mid-posteriorly, with very prominent posterior lobes; furca with rounded base, and narrowly flanged, distally slightly incurved, pointed, divergent branches; body pigmented.....*productus* Dana, 1852
 syn. *katuwo* Yamaguti 1936
 Genital segment rounded, shorter than abdomen; abdomen long; furca with quadrangular base longer than wide; furcal branches nearly parallel to each other, conspicuously flanged.....
*seriolae* Yamaguti, 1936
8. Furca with large rounded base and slender, distinctly incurved branches, on each side of which is a mammiferous projection.....*pagrosomi* Yamaguti, 1939
 Furca with rounded base; furcal branches narrowly flanged, wide apart from each other, slightly incurved distally.....*epinepheli* Yamaguti, 1936
 Furca with triangular base and U-shaped branches.....
fugu Yamaguti et Yamasu, 1959
 Furca with plump, only slightly divergent branches; a transverse chitinous arch connecting small knobs across furca.....
*hoplognathi* Yamaguti et Yamasu, 1959
9. Genital segment large, longer than abdomen, with nearly parallel sides; abdomen constricted at middle, furca with broad base and almost parallel, simple branches.....*fistulariae* Yamaguti, 1936
 Genital segment with convex sides; abdomen elongate; furcal branches narrowly flanged, slightly incurved.....
*tanago* Yamaguti, 1939
 Genital segment large, longer than abdomen, with convex sides; abdomen elongate; furca with rounded base and truncate, more or less divergent, flanged branches.....
*kuroshio* Shiino, 1959
 syn. *bonito* of Yamaguti, 1936
10. Abdomen 1-segmented.....11
 Abdomen 2-segmented.....12
11. Genital segment convex laterally and produced posterolaterally; abdomen half as long as genital segment
 a) Furca with widely divergent branches.....
*polycanthi* Gnanamuthu, 1950
 b) Furca with parallel branches.....
*canthidermis* Yamaguti et Yamasu, 1959
- Genital segment acorn-shaped, less than half as large as carapace, nearly right-angled posterolaterally; furca inverted V-shaped, with anterolaterally rounded base and distally parallel, long, slender, divergent branches.....
*dasyaticus* Rangnekar, 1957
- Genital segment triangular, angular posterolaterally; abdomen half as long as genital segment; furca with quadrangular base and nearly parallel branches.....*triangularis* Shiino, 1954
12. Genital segment bottle-shaped, concave anteriorly and posteriorly, with nearly parallel sides and triangular posterior lobes; furca inverted V-shaped, with a papilliform protuberance on each side.....
*coryphaenae* Steenstrup et Lütken, 1861
 syn. *tesserifer* Shiino, 1952
- Genital segment rounded; furcal base rounded; furcal branches plump, divergent, distally flanged.....
*laticaudus* Shiino, 1960
- Genital segment large, acorn-shaped, more than half as wide as carapace, broadly rounded posterolaterally; furca inverted Y-shaped, with broad, flanged, divergent branches.....

..... *glandifer* Shiino, 1954

Literature

- 1) Brian, A. G. G. (1932) : Sur une espèce nouvelle de *Caligus* (*Caligus dieuzeidei*) du *Diplodus sargus* L. Sur quelques copépodes parasites d'Algérie. Bull. Trav. Stat. Aquic. et Pêche Castiglione (Algérie) (1931) 2. fasc. [45]-60.
- 2) Brian, A. G. G. (1934) : I. *Caligus* parassiti dei pesci del Mediterraneo (copepodi). Ann. Mus. Civ. Storia Nat. Genova (1934-35), v. 17, 152-211. Abstract in Zool. Ber. 43 (4-6), 123.
- 3) Dana, J. D. (1852-53) : United States Exploring Expedition during the years 1838-42 under the Command of Charles Wilkes U.S.N. M. Vol. XIII. Crustacea. Pt.-I. & II. Synopsis of characters of parasitic copepods in Proc. Am. Acad. Art & Sci. Vol. 2 (1852), 9-61.
- 4) Gnanamuthu, C. P. (1950) : Sex differences in the chalimus and adult forms of *Caligus polycanthi* sp. nov. (Crustacea : Copepoda) parasitic on *Balistes maculatus* from Madras. Rec. Ind. Mus. 47(1) : 159-170.
- 5) Gussev, A. B. (1951) : Parasitic Copepoda of some marine fishes. Collected papers on parasitology from Zoological Institute, Academy of Science SSSR XIII, 394-463.
- 6) Rangnekar, M. P. (1957) : *Caligus dasyaticus* sp. nov. and *Caligus dussumieri* sp. nov. (Copepoda) parasitic on Bombay fishes. J. Univ. Bombay, 25(5), 16-22.
- 7) Shiino, S. M. (1952) : Copepods parasitic on Japanese fishes. I. On the species of *Caligus* and *Lepeophtheirus*. Rep. Fac. Fish. Pref. Univ. Mie, 1(2), 79-113.
- 8) Shiino, S. M. (1954) : On *Caligus latigenitalis* n. sp. a copepod parasitic on the fish, *Sparus macrocephalus* (Basilewsky). Bull. Jap. Soc. Scient. Fish. 20(1), 21-25.
- 9) Shiino, S. M. (1954) : On the new copepod, *Caligus calotomi* n. sp., parasitic on the fish, *Calotomus japonicus*. Ibid. 20(1), 16-20.
- 10) Shiino, S. M. (1954) : Note on *Caligus quad-ratus* n. sp., a copepod parasitic on the fish, *Neothynnus macropterus* (T. et Schl). Ibid. 20(1), 26-29.
- 11) Shiino, S. M. (1954) : Note on a new parasitic copepod, *Caligus brevis* n. sp. Ibid, 20(3), 178-183.
- 12) Shiino, S. M. (1954) : Record on *Caligus dieuzeidei* Brian newly found in Japan. Ibid. 20(4), 268-272.
- 13) Shiino, S. M. (1954) : On *Caligus triangularis* n. sp., a copepod parasitic on *Hali-choerus poecilopterus* (T. et S.). Annot. Zool. Jap. 27(3) : 146-149.
- 14) Shiino, S. M. (1955) : A new piscicola copepod belonging to the genus *Caligus* from Matusima Bay. Bull. Biogeogr. Soc. Japan. vol. 16-19, 135-140.
- 15) Shiino, S. M. (1956) : Copepods parasitic on Japanese fishes. X. The redescription of three species of *Caligus*. Rep. Fac. Fish. Pref. Univ. Mie. 2(2), 233-241.
- 16) Shiino, S. M. (1959) : Neuer Artname für Japanische Exemplare von *Caligus bonito*. Bull. Biogeogr. Soc. Jap. 20(11), 51-57.
- 17) Shiino, S. M. (1959) : Sammlung der parasitischen Copepoden in der Präfekturuniversität von Mie. Rep. Fac. Fish. Pref. Univ. Mie. 3(2), 334-374.
- 18) Shiino, S. M. (1959) : Ostpazifische parasitierende Copepoden. Ibid. 3(2), 267-333.
- 19) Shiino, S. M. (1960) : Copepods parasitic on fishes from Seto, Province Kii, Japan. Ibid. 501-517.
- 20) Steenstrup, J. J. S. and Lütken, C. F. (1961) : Bidrag til Kundskab om det aabne Havs Snyltekrebs og Lernaer samt om nogle andre nye eller hidtil kun ufuldstaen digt kjendte parasitiske Copepoker. K. Danske Vidensk. Selsk. Skr., Natuurv. og Math. Afd. 5. R. v. 5, 341-432.
- 21) Yamaguti, S. (1936) : Parasitic copepods from fishes of Japan. Pt. 2. Caligoida, I. Published by author, 22 pp.
- 22) Yamaguti, S. (1939) : Parasitic copepods from fishes of Japan. Pt. 5. Caligoida III. Vol. Jubil. pro Prof. Sadao Yoshida v. 2, 443-487 w. 33 pls.
- 23) Yamaguti, S. (1963) : Parasitic Copepoda and Branchiura of fishes. Interscience Publishers, New York. 1104 pp. 333 pls.
- 24) Yamaguti, S. and Yamasu, T. (1959) : Parasitic copepods from fishes of Japan, with descriptions of 26 new species and remarks on two known species. Biol. J. Okayama University 5(3-4), 89-165.

日本水域より報告された魚に寄生する橈脚頭 *Caligus* の雌の検索表

山口 左伸

(京都市上京区塔の投桜木町 453)

本検索表は主として雌の体の各部分の計測比, 体の色素斑, 胸叉の性状に基いて既知の 26 種について作成したもので雄の方が大半不明のためこれを除外している. また *Caligus mebachii* Marukawa は原著をみることが出来なかつたので省いている. 異名の処理は主として椎野季雄博士に従ったが *C. canthidermis* Yamaguti et Yamasu, 1959 は胸叉枝の性状の差異から *C. poly-*

canthi Gnanamuthu, 1950 から分離した. 体検索表では胸叉以外の附属物の性状の詳細な差異を重視しなかつたからその部分の差異は原記載によつて検討して頂きたい. 太平洋以外の地域から報告されているものが太平洋にも見出されたのは洋の東西を問わず分布している魚を宿主とした場合であることに注意されたい.