

On *Callianassa (Callichirus) novaebritanniae* Borradaile  
(Thalassinidea, Crustacea) from Japan<sup>1)</sup>

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In the summer of 1963, some specimens of *Callianassa (Callichirus) novaebritanniae* were collected at the lower tidal zone of Amakusa, Kumamoto, Japan. It is the first record from Japan, and shows the northern limit of distribution so far as is known to us. This species, as well as *Callianassa minor* Gourret, is well known of having the exopod of the third maxilliped, and this fact is systematically interested by De Man (1928a, p. 48) and Holthuis (1948, p. 62). After Borradaile De Man (1928a) reported from unknown locality a female under the name *Callianassa (Callichirus) novaebritanniae* var. and said that "It appears to me very probable that this species should be considered as a variety of *Call. (Callichirus) novaebritanniae*, but further researches will perhaps evince *Call. (Callichirus) aequimana* Baker to be identical with *Call. (Callichirus) novaebritanniae*." It is sure that two species, *Callianassa (Callichirus) novaebritanniae* and *aequimana*, and one variety, *C. (Callichirus) novaebritanniae* var. are confused one another on their characters, so a description and figures to the Japanese specimens of *Callianassa (Callichirus) novaebritanniae* are given here.

Prior to the description the author wishes to express the deepest appreciation to Dr. L. B. Holthuis of the Rijksmuseum, Leiden, Netherland, for his kindness of examining a pair of the Japanese specimens and of giving me a lot of valuable suggestion to this species (remarks 1 and 2 almost quoted from Holthuis' letter). A male and a female of the Japanese specimens collected at the same time are registered in his Rijksmuseum (reg. No. Crust. D. 21085).

*Callianassa (Callichirus) novaebritanniae* Borradaile, 1899

*Callianassa novae-britanniae* Borradaile, 1899, p. 419, fig. 14a-d—New Britain (Type locality).

<sup>1)</sup> Contributions from the Zoological Laboratory, Faculty of Agriculture, Kyushu University, No. 349.

*Callianassa (Callichirus) novae-britanniae*, Borradaile, 1903, p. 547; De Man, 1928a, p. 48.

*Callianassa (Callichirus) Novae-britanniae*, De Man, 1928b, p. 29, 114—Goindu, Goifur-fehendu Atoll (Maldive Archipelago).

*Diagnosis.* Living material ivory white in colour. Rostrum acute triangular. Carapace much convex transversally on the dorsal surface. Posterior cervical groove and linea anomurica marked. Antennular peduncle has the ultimate segment about one-third shorter than the penultimate. Third maxilliped operculiform, bearing exopod. First legs subequal: In the larger leg merus bears a row of denticles on the proximal half of the lower margin, while its distal half slightly concave, and smooth without denticles; upper margin of ischium smooth, its lower margin denticulate. In the smaller leg fixed finger much depressed in the proximal half. Male's first pleopod of two joints, its ultimate segment forms a kind of chela with appendix interna. Female's first pleopod of two joints and flagellum.

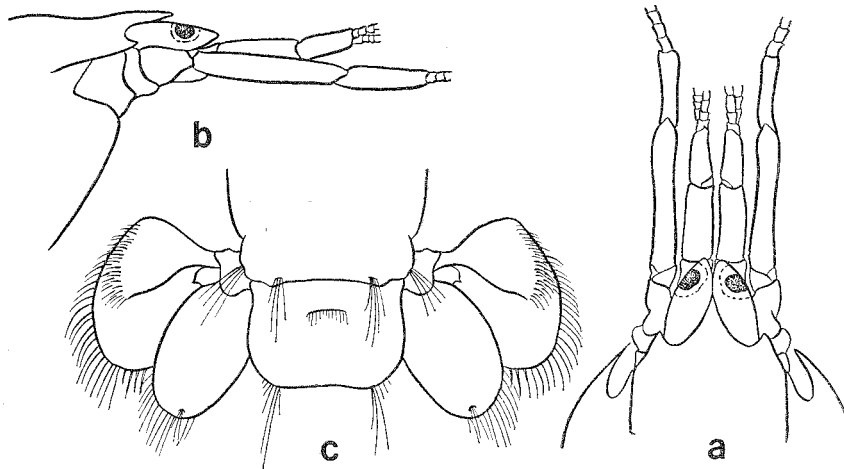


Fig. 1. Head and distal part of abdomen of *Callianassa (Callichirus) novae-britanniae* Borradaile. a, anterior part of carapace with eyes, antennular and antennal peduncles, dorsal view,  $\times 8$ ; b, the same, lateral view,  $\times 8$ ; c, telson and uropods,  $\times 10$ .

*Description.* Rostrum in Fig. 1a acute triangular, its tip reaches beyond the middle of eyes. Carapace strongly convex transversally on the narrow dorsal region. Cervical groove runs across at the posterior two-fifths of carapace including rostrum. The posterior cervical groove (Calmann, 1906) and linea anomurica traceable as a crease. No transverse groove behind rostrum.

Eyes in Fig. 1a-b cylindrical with a blunt tip, corneae situated just

before the middle of eyes. Antennular peduncle slightly overreaches an apex of eye by its basal segment; the basal segment about as long as, and the ultimate segment one third shorter than, the penultimate; flagella slightly more than twice as long as the peduncle, and two thirds times as long as carapace. Antenna; in the larger specimens the junction between the ultimate and penultimate segments reaches about to the end of the antennular peduncle. In some of the larger specimens (males Cat. No. 10344-1, -2, -3 and one female Cat. No. 10344-21) the junction reaches slightly beyond the end of the antennular peduncle, in others (males Cat. No. 10342, Cat. No. 10344 -5, -6, -8, -9, -12 and one female Cat. No. 10343) the junction is almost placed at the same level with the end of the antennular peduncle, while in younger specimens it falls slightly or distinctly short of the end. The antennal ultimate segment more than one half times as long as the penultimate; scaphocerite small with a blunt tip; flagellum three times as long as that of antennule.

Mandible in Fig. 2a-b armed with a row of yellowish triangular teeth, the molar process bears two blunt teeth. Maxillule in Fig. 2c; the distal endite spinulate on the ultimate surface; palp of two joints, its ultimate segment turns backwards at its base, bearing one distinct bristle at the tip. Maxilla in Fig. 2d; palp slender and bears some bristles at the tip. First maxilliped in Fig. 2e; exopod broadly triangular, its tip reaches distinctly beyond the distal endite. Second maxilliped in Fig. 2f pediform; exopod a broad lamella, reaching beyond merus; epipod biramous in primitive form. Third maxilliped in Fig. 2g; propodus much broader than long, its lower margin well convex proximally; carpus slightly longer than propodus; the continuation of merus and ischium much broad and operculiform; ischium distinctly longer than merus, its posterior angle of the inner margin makes a triangular projection with the posterior margin; exopod present with two-jointed flagellum, of which the tip reaches to the distal third of ischium.

First legs subequal. Larger leg represented in Fig. 3a. Dactylus slightly longer than fixed finger, its cutting edge shows a broad proximal tooth. This proximal tooth thin in the younger male and female and in the larger female, however, it becomes a molar tooth in the larger male. It is certain that this male's molar tooth smooth in some (Cat. No. 13344-2, -5, -7, -8), while it tuberculate on the brim in others (Cat. No. 10342, Cat. No. 10344-1, -3, -6). The outer surface of dactylus bears five tufts of hairs along the cutting edge, and two tufts along the upper margin; the upper surface seven tufts. Fixed finger in male broaden on the cutting surface; in the younger the outer edge of cutting surface rounded, not tuberculate, while in the larger it definite,

bearing a row of tubercles before the median tooth (17 in Cat. No. 10344-1, -3, more than 14 in Cat. No. 10344-6, more than 11 in Cat. No. 10344-2, 5 in Cat. No. 10344-8 and 4 in Cat. No. 10342) and some just behind that. Fixed finger in female simple with a row of tubercles before and behind the median tooth (11+3 in Cat. No. 10344-21, 12+6 in Cat. No. 10343). These tubercles in female more pointed than in male. The outer surface of fixed finger bears longitudinally 5-6 tufts

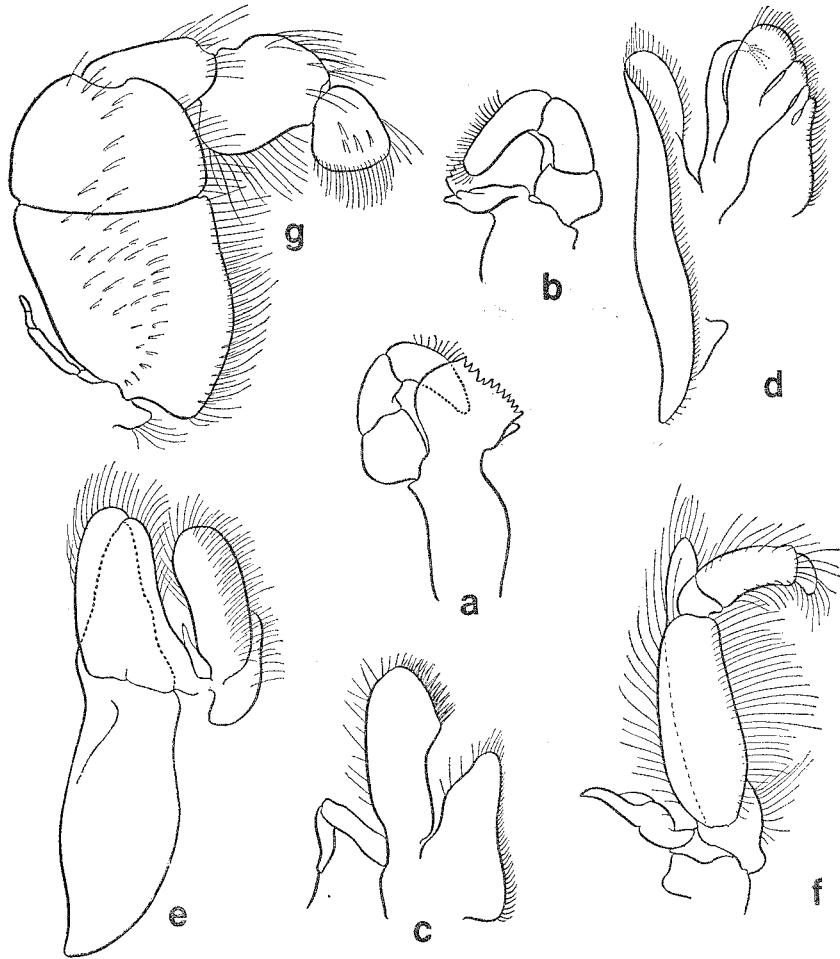


Fig. 2. Mouth parts of *Callianassa (Callichirus) novaebritanniae* Borradaile.  
 a, mandible of right side, outer view,  $\times 7$ ; b, the same, inner view,  $\times 7$ ; c, maxillule of right side,  $\times 7$ ; d, maxilla of right side,  $\times 7$ ;  
 e, 1st maxilliped of right side,  $\times 7$ ; f, 2nd maxilliped of right side,  $\times 7$ ;  
 g, 3rd maxilliped of right side,  $\times 7$ .

of hairs along the cutting edge. Palm distinctly longer than dactylus; male's upper margin longer than high, while female's scarcely shorter than high (the largest female Cat. No. 10344-21 shows that the upper margin about as long as high). The outer surface of palm slightly depressed around the cutting cleft. Carpus slightly less than half the length of palm, about 1.5 times as high as long; the upper and lower margins, as well as those of palm, brimmed. Merus longer than carpus; its upper margin smooth, about 1.8 times as broad; the lower margin in the proximal half rather straight with irregularly arranged

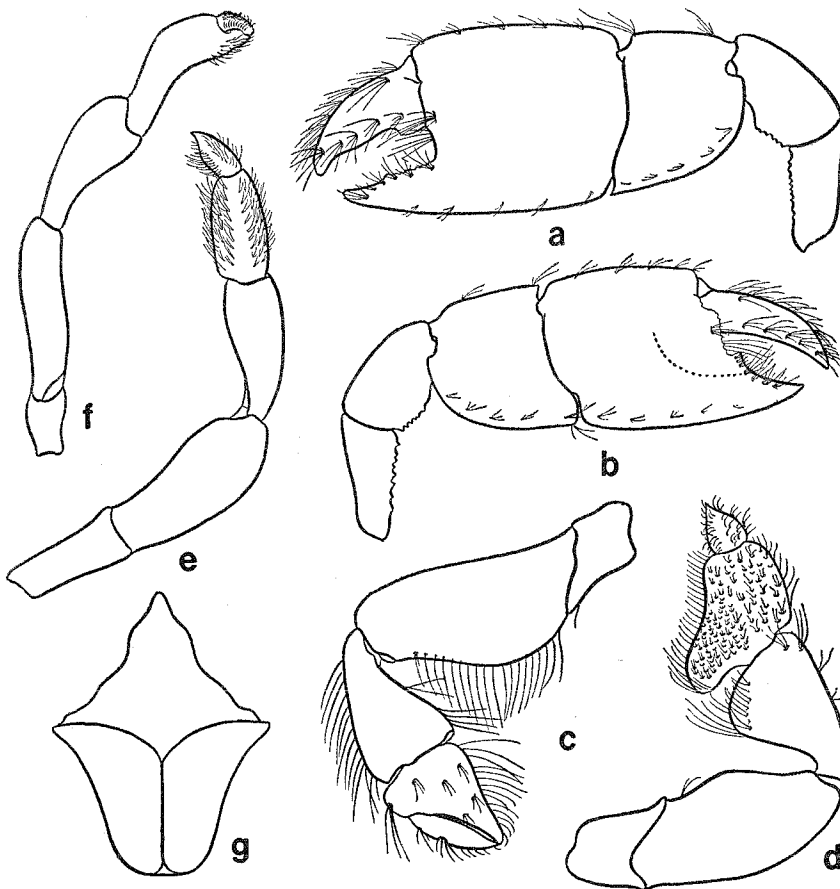


Fig. 3. Male pereiopods of *Callianassa (Callichirus) novaebritanniae* Borradaile. a, 1st leg of left side,  $\times 5$ ; b, the same of right side,  $\times 5$ ; c, 2nd leg of left side, outer view,  $\times 6$ ; d, 3rd leg of left side,  $\times 6$ ; e, 4th leg of left side,  $\times 6$ ; f, 5th leg of left side,  $\times 6$ ; g, the diamond-shaped thickening of 7th somite, ventral view,  $\times 8$ .

small denticles, and the ultimate half slightly concave and unarmed. Ischium as long as carpus; its upper margin smooth, the lower margin denticulate. The smaller leg represented in Fig. 3b. Dactylus smooth on the cutting edge; its outer surface bears five tufts of hairs along the cutting edge and seven tufts along the upper margin. Fixed finger provided with triangular proximal tooth with a narrow acute tip, and behind this tooth the cutting edge broadly concave downwards to the tip; the depression of female around the cutting edge of the outer surface much more distinct in the proximal half than that of male, extending backwards to the cutting cleft of palm. Palm a trifle longer than dactylus, about as long as high; the height less than that of the larger leg. Carpus three-fourths times as long as palm. Merus and ischium about as long as carpus, being quite similar in shape to those of the larger leg.

Second leg in Fig. 3c. Carpus much longer than chela. Merus about 1.8 times as long as carpus, its lower margin broadly convex proximally. Third leg in Fig. 3d. Propodus one third broader than long, as there is a well-developed posterior lobe on the lower margin, its outer surface, as well as that of dactylus, covered with many tufts of hairs except along the middle line. Fourth leg in Fig. 3e pediform. Propodus almost quadrangular, about 1.5 times as long as high. The diamond-shaped thickening (Holthuis, 1958) in the seventh thoracic somite characteristic, shown in Fig. 3g; the ventral surface well convex behind a median transverse groove, and from the middle of the transverse groove a longitudinal groove runs backwards. Fifth leg in Fig. 3f. Dactylus forms a kind of chela with a prolongation of propodus.

Male's abdominal segments arranged according to length, second, fifth, third, fourth and first segments; the second segment longest, 1.5 times as long as the first. Female's show a trifle different arrangement of length, second, third, fifth, first and fourth segments; the second segment, as well as the third, much more developed than in male, second segment three times as long as the first.

Male's first pleopod in Fig. 4a two-jointed, the ultimate segment forms a lamella depressed from side to side, its tip curved backwards. It shows a kind of chela with a bilobed end of appendix interna. Female's first pleopod in Fig. 4b consists of two joints and a segmented flagellum. The second pleopod in both male and female (Fig. 4c-d) lamellar, although female's pleopod much greater in shape than male's. Appendix masculina in male (Fig. 4c) stout, twice as long as appendix interna, reaching about to the tip of endopod; female's appendix interna slender. The third (Fig. 4e) to fifth pleopods lamellar, alike and much developed than that of the second, appendix interna situated at the middle of the inner margin. Telson in Fig. 1c quadrangular, one-third broader

than long, its posterior margin slightly concave; the transverse groove on the back distinct with a row of posteriorly directed hairs. Uropods in Fig. 1c; exopod oval and forms a triangular platform on the anterior half, its posterior margin bears a row of spinules; endopod also oval, as long as exopod, its outer surface bears a tuft of hairs shortly behind the posterior margin.

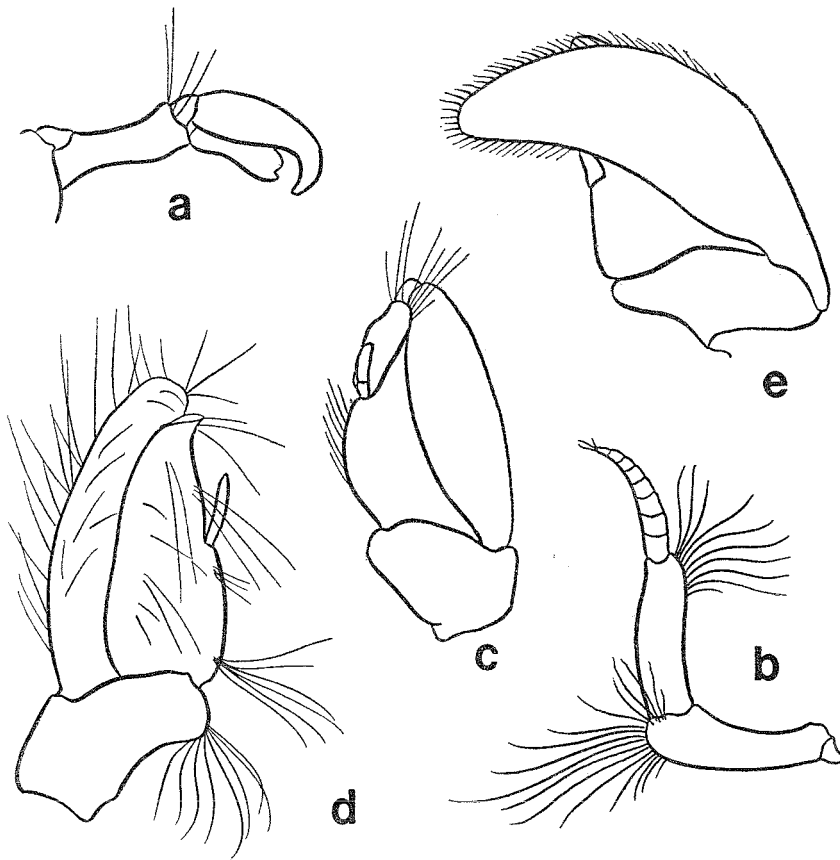


Fig. 4. Pleopods of *Callianassa (Callichirus) novaebritanniae* Borradaile. a, 1st pleopod of male of left side, outer lateral view,  $\times 16$ ; b, 1st pleopod of female in left side, outer lateral view,  $\times 16$ ; c, 2nd pleopod of male of left side, anterior view,  $\times 16$ ; d, 2nd pleopod of female of right side, anterior view,  $\times 16$ ; e, 3rd pleopod of male of left side, posterior view,  $\times 11$ .

*Materials examined.* Zoological Laboratory, Kyushu University (ZLKU), Cat. No. 10342, male; Cat. No. 10343, female; Cat. No. 10344,\* 20 males and 17 females, from Tomioka, Amakusa, western

Kyushu (32° 32'N, 130° 02'E), Aug. 24-25th, 1963; S. Miyake and K. Sakai leg.

Colour in life. Whole body ivory white, cornea blackish.

Habitats. The hollower, digging under about 30 cm depth, and found at the lower tidal zone of the sandy mud bottom with the zosteria vegetation.

*Distributions.* New Britain; Goidu, Goifurfehendu Atoll (Maldiva Archipelago); Tomioka, Amakusa, Kumamoto, Japan.

### Remarks

The Japanese specimens are surely *Callianassa (Callichirus) novaebritanniae* Borradaile, however their external characters are not always agreeable with the Borradaile's species. The problems for this species arised after the reference to the Japanese specimens as follows.

1. Practically the difference between *C. novaebritanniae* and *C. novaebritanniae* var. is the absence of a transverse groove on the telson in De Man's var., while of the typical *C. novaebritanniae* it is known that this groove is less sharp than in *C. aequimana*. On this point, the Japanese specimens seem to be identical with *C. novaebritanniae*.

2. The shape of the rostrum in the Japanese specimens shows a very important difference with that of either of Borradaile's or De Man's specimens. De Man described it as triangular, acute with the lateral borders making a right angle and with the tip reaching about one-third of the length of the eyestalks. Borradaile (1899, p. 419) described it as "short, triangular, not half the length of the eyestalks." While in the Japanese specimens the rostrum ends in narrow pointed tip which reaches almost to the end of the eyestalks. As Borradaile's specimen is 37 mm long, this difference evidently is not due to size.

3. As in *C. novaebritanniae* the third maxilliped of De Man's var. has a well-developed exopod, of which the stalk reaches to the middle of the ischium, the flagellum to the distal end, but the flagellum incomplete. While in the Japanese specimens the stalk of exopod falls short of the middle of ischium, and the two-jointed flagellum reaches to the distal third of ischium.

4. De Man (1928a) described that in the male of *C. novaebritanniae* the first legs are moderately unequal, but in De Man's var., a female, they are nearly equal as in *C. aequimana*. However, De Man mentioned continuously that the great difference between the first legs should perhaps be owing to the difference of sex. It is sure that in the Japanese specimens the first legs are moderately unequal in male, while they are nearly equal in female, so that the equality or inequality



of the first legs should depend on the difference of sex. To the difference of the left and right first legs De Man (1928a) gave only a trifle attention, and said that the first legs of *C. novaebritanniae* except equality and the shape of palm are apparently agreeable with those of *C. novaebritanniae* var. However, as shown in the description of this paper, the left and right first legs of the Japanese specimens show distinct difference, even in the female, in the shape of cutting edges of dactylus and fixed finger, in the depression around the cutting cleft of fixed finger, and in the relative length of palm, carpus, merus and ischium. On the other hand, there is another problem of the relative length of dactylus and palm. In either De Man's var. or Borradaile's species the pointed dactylus is almost as long as the upper border of the palm, however, in the Japanese specimens the larger leg of both male and female has palm longer than dactylus, although the difference of length between the right and left first legs is much more distinct in male than in female.

5. The first pleopod of male and female is much interested in systematics. Both *C. novaebritanniae* and *C. minor* Gourret are sufficiently characterized by the presence of an exopod in the third maxilliped, and the male's first pleopod between two species is closely related as the tip of the ultimate segment is curved towards the tip of the appendix interna, and forms a chela. However, the male's first pleopod is a trifle different between two species. The male in *C. minor* forms a two-jointed pleopod, and not bears the flagellum that *C. novaebritanniae* has.

Dimensions (in mm)

Cat. No.	Sex	Cl.	Cb.	Left		Right		Tl.
				Ch.	Pb.	Ch.	Pb.	
10342	m	10.0	4.5	20.0	6.0	19.0	5.3	36.5
10343	f	10.5	6.0	19.0	5.3	20.0	6.0	42.0
10344-1	m	10.5	6.0	22.0	6.8	20.0	6.0	41.0
10344-2	m	9.5	6.5	18.5	5.7	17.0	5.0	36.0
10344-3	m	9.0	3.5	18.0	5.7	16.0	5.0	34.0
10344-4*	m	9.0	5.0	17.0	—	15.0	—	33.0
10344-5	m	8.5	5.0	16.0	5.0	15.0	4.5	31.5
10344-6	m	8.5	4.5	—	5.6	—	4.9	—
10344-7	m	8.5	5.5	16.0	4.8	14.0	4.2	31.0
10344-8	m	8.0	4.0	14.0	4.6	13.0	4.0	29.0
10344-9	m	8.0	4.5	16.0	5.1	15.0	4.4	28.0
10344-10	m	7.0	3.5	12.0	3.5	13.0	4.1	26.5

Cat. No.	Sex	Cl.	Cb.	Left		Right		Tl.
				Ch.	Pb.	Ch.	Pb.	
10344-11	m	7.0	4.5	13.0	3.9	11.0	3.4	25.5
10344-12	m	6.0	4.0	—	—	—	—	24.0
10344-13	m	6.0	3.5	10.0	3.0	11.0	3.2	23.0
10344-14	m	6.0	3.0	11.0	3.1	10.0	2.8	22.0
10344-15	m	6.0	2.5	11.0	3.0	10.0	2.8	21.0
10344-16	m	5.5	3.5	11.0	3.1	10.0	2.7	21.0
10344-17	m	5.5	3.0	—	—	9.0	2.3	18.0
10344-18	m	4.5	2.5	7.0	1.7	—	—	15.5
10344-19	m	4.5	2.0	7.0	1.8	7.0	1.9	14.0
10344-20	m	3.5	2.0	6.0	1.5	6.0	1.7	13.0
10344-21	f	12.0	7.0	20.0	6.0	18.0	6.5	45.0
10344-22*	f	9.5	6.0	13.0	—	14.0	—	32.0
10344-23	f	8.5	4.0	13.0	4.5	13.0	5.0	28.5
10344-24	f	7.5	3.5	13.0	3.4	15.0	4.7	28.5
10344-25	f	6.5	3.0	12.0	3.1	11.0	3.9	—
10344-26	f	4.5	2.0	8.0	2.2	—	—	27.0
10344-27	f	6.0	3.5	11.0	3.0	11.0	3.3	21.5
10344-28	f	6.0	3.0	11.0	3.0	12.0	3.2	21.5
10344-29	f	5.5	3.5	11.0	3.0	10.0	2.8	20.5
10344-30	f	5.5	2.0	7.0	1.7	8.0	2.2	16.0
10344-31	f	4.5	2.0	8.5	2.4	7.0	2.0	16.0
10344-32	f	4.5	2.0	7.0	2.2	8.0	2.0	16.0
10344-33	f	4.0	2.2	7.0	2.0	7.5	2.1	15.0
10344-34	f	3.5	2.0	—	1.6	6.0	1.7	15.0
10344-35	f	3.5	2.0	—	1.8	7.0	—	15.0
10344-36	f	4.0	2.0	—	—	6.0	1.6	13.0
10344-37	f	3.5	2.5	5.0	1.5	5.0	1.5	10.5

\* Specimens incorporated by L. B. Holthuis in the Rijksmuseum, Netherland, under reg. No. Crust. D. 21085.

Abbreviations used in the measurements. Cl; length of carapace excluding rostrum. Cb; breadth of carapace. Ch; length of first leg or cheliped. f; female, m; male. Pb; breadth of palm. Tl; body length from the tip of rostrum to the posterior margin of telson.

## Literature

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