Vercoia japonica, a New Species of Crangonid Shrimp
(Crustacea: Decapoda: Caridea) from Japan

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Abstract
A third species of the rare crangonid genus Vercoia Baker, 1904, V. japonica sp. nov., is described and illustrated on the basis of a single ovigerous female specimen from off Izu-Oshima Island, Central Japan. No representative of the genus has been recorded from Japan or anywhere in East Asia. The new species is readily distinguishable from the two known congeners, V. gibbosa Baker, 1904, and V. socotrana Duris, 1992, in the abdomen which lacks a median carina on the third to sixth somites. The genus Vercoia is rediagnosed and its phylogenetic position is briefly discussed.

Key words: Decapoda, Caridea, Crangonidae, Vercoia japonica sp. nov., Japan.

Recently Duris (1992) revised the small crangonid genus Vercoia Baker, 1904, and recognized two species: V. gibbosa Baker, 1904, known from South Australia, Queensland, and the Marshall Islands (Baker, 1904; Balss, 1921; Devaney and Bruce, 1987); and V. socotrana Duris, 1992, known only from the type-locality in the Gulf of Aden, western Indian Ocean. Up to the present the genus has not been recorded from Japan or anywhere in East Asia despite increased scientific activities in coastal to bathyal zones.

In October 1993, T/S Shinyo-Maru of the Tokyo University of Fisheries conducted a survey of the benthic fauna around Izu-Oshima Island in depths of 70-200 m by means of dredge. The crustacean material contained a specimen of a small unusual crangonid, which is assignable to Vercoia. Through the courtesy of Mr. M. Osawa of the Tokyo University of Fisheries, this specimen was kindly offered for study and is described here as a new species. The holotype is deposited in the Natural History Museum and Institute, Chiba, with a code of CBM-ZC. The abbreviation CL is used to indicate the postorbital carapace length.

Vercoia japonica sp. nov.
(Figs. 1-4)


Description. Small crangonid shrimp (Fig. 1), with body robust, gibbous and bearing several carinae. Integument without setae or pubescence, minutely densely pitted.

Rostrum (Fig. 2A, B) short and broad, reaching beyond distal end of antennular peduncles; posterior part depressed; anterolateral lobes rounded, with anterior margins nearly straight; lateral margin posterior to anterolateral lobe weakly sinuous, without notch; anterior part produced into rather narrow, elongate median process occupying approximately 0.3 of rostral length, and T-shaped in transverse section, concave dorsally and with sharp ventral carina along entire rostral length, apex pointed, slightly upturned in lateral view. Rostrum continuing posteriorly into broad smooth shield-like platform in gastric region, bordered laterally by low dorsolateral carinae (Fig. 1); median carina beginning abruptly from level of anterior two-fifths of carapace, not subdivided, confluent with somewhat elevated posterior area of carapace; dorsolateral carinae extending beyond level of mid-length of carapace, with feebly sinuous dorsal margin. Orbits well developed (formed dorsally by proximal rostrum, posteriorly and ventrally by orbital margin of carapace, and anteriorly by stylocerite and antennular pro-
Vercoia japonica sp. nov. Female holotype, CL 3.8 mm, lateral and dorsal views, abdomen somewhat damaged.

Sixth to eighth thoracic sternites deeply depressed, without any median structures; praecoxae of second pereopods fused, forming ventral plate with vertical anterior ridge terminating in strong, anteriorly directed tooth overreaching articulation of first pereopods.

Abdomen (Figs. 1, 2D) somewhat damaged especially in second and third somites. First somite with anterior and posterior sections separated by transversely concave setose ridge continuing along anterior margin of pleura, distinctly overhanging anterior dorsal section; posterodorsal margin not raised; tergite with obtuse median tubercle on posterior section. Second somite separated into two sections by blunt transverse carina, anterior section depressed below; posterior section with no trace of median carina; pleuron very broad, slightly sculptured. Third somite without median...
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Fig. 2. *Vercoia japonica* sp. nov. Female holotype, CL 3.8 mm, various parts. Appendages dissected from left side. A, anterior part of carapace and eye, lateral; B, rostrum, dorsal, left side damaged; C, left branchiostegite, ventral; D, third to sixth abdominal somites, telson, and uropods, posterodorsal or dorsal; E, antennule, dorsomesial; F, same, ventral; G, antenna, dorsal; H, distal part of scaphocerite, dorsal, setae omitted; I, first pleopod, dorsal; J, second pleopod, dorsal; K, distal part of exopod of uropod, dorsal, setae omitted.
carina; pleuron with anterior area depressed, corresponding to posterior expansion of pleuron of second somite. Fourth and fifth somites without median and lateral carinae. Posterodorsal margin of third somite slightly convex, those of fourth and fifth nearly straight, without median notch. Pleura broadly rounded on first and second somites, rounded posterovertrally in third to fifth somites. Sixth somite broadened posteriorly, broader than long, without median carina; posterodorsal margin slightly produced posteriorly as broadly rounded lobe; posterolateral angle slightly produced posteriorly, but rounded.

Abdominal sternites depressed, anterior four sternites unarmed, fifth sternite with flattened posteromedian tooth; sixth somite with smooth anterior sternal plate lacking median pair of teeth.

Telson (Fig. 2D) 1.8 times as long as sixth abdominal somite and 1.6 times as long as anterior breadth; lateral margins somewhat convex on anterior two-fifths, tapering posteriorly therefrom. Posterior margin almost truncate with 6 plumose, spine-like setae (one at left angle missing). Dorsal surface sulcate medially, with 2 pairs of small dorsal spines on pair of rather obscure submedian carinae, anterior pair situated at level of midlength of telson, posterior pair at level of approximately 0.8 of telson length.

Eye (Fig. 2A) with well-developed cornea narrower than eyestalk; eyestalk short and swollen, without anterolateral lobe.

Antennular peduncle (Fig. 2E, F) reaching nearly to end of rostrum. Basal segment enlarged, anterodorsal margin strongly elevated over articulation with intermediate segment, bearing few setae; dorsal surface concave, with deep depression obscured by stout setae near base; anteromesial angle with long setae. Stylocerite enlarged, expanded anterolaterally, reaching distal margin of intermediate segment of peduncle, with sharp transverse carina on ventral surface and with rounded submarginal vertical lobe on anterior part; lateral margin angular; mesial margin convex. Intermediate segment short, broad; anterolateral process strongly ascending, not reaching distal end of distal segment; ventrolateral and ventromesial angle somewhat produced, latter with long setae. Distal segment with anterior margin somewhat produced forward. Dorsal flagellum stout, consisting of 7 articles, first article not noticeably elongated, distal 5 articles each with tuft of aesthetascs (proximal 2 tufts much shorter) on ventral face. Ventral flagellum short, not reaching distal margin of second article of dorsal flagellum, rigid, incompletely 2 articulated, with few setae.

Antenna (Figs. 1, 2G) with stout basicerite bearing conspicuous process strongly ascending over articulation with scaphocerite. Scaphocerite exceeded by antennular dorsal flagellum, broadly subtriangular with maximal breadth across proximal one-fourth, 0.7 times as broad as long; dorsal surface with submedian ridge extending from basal articular knob with basicerite, extending beyond midlength; lateral margin slightly convex, terminating distally in inconspicuous minute tooth (Fig. 2H); mesial margin broadly rounded; anterior and mesial margin with plumose setae becoming noticeably longer proximally. Carpo-cerite subcylindrical, reaching beneath distal one-third of scaphocerite. Flagellum missing.

Mandible (Fig. 3A) slender, divided distally into 4 teeth, terminal pair much stronger than subterminal pair, with obtuse notch. Maxillule (Fig. 3B) with palp feebly bilobed and without setae; distal endite with truncate mesial margin bearing 5 strong spines arranged in 2 rows, anterior margin with row of long stiff setae; proximal endite slightly smaller than distal endite, with sparse setae on anterolateral margin. Maxilla (Fig. 3C) with palp tapering distally to pointed tip, with thick setae distolaterally, inflated basally; endites poorly developed; scaphognathite with posterior lobe elongated, bearing group of very long setae, nearly as long as scaphognathite proper. First maxilliped (Fig. 3D) with simple elongated palp bearing row of plumose setae on mesial margin, increasing in length proximally; exopod with well-developed lash; caridean lobe moderately broad, with convex lateral margin bearing row of setae distally; epipod large, not bilobed. Second maxilliped (Fig. 3E) with dactyl subrectangular in shape, broader than
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**Fig. 3.** *Vercoia japonica* sp. nov. Female holotype, CL 3.8 mm, left mouthparts. A, mandible, inset, distal part; B, maxillule; C, maxilla; D, first maxilliped; E, second maxilliped.

...long, bearing dense assemblage of short plumose setae and 3 long spines proximally on mesial margin; propodus with row of long setae on mesial margin; exopod with well-developed lash; epipod well developed, posterior margin concave. Third maxilliped (Fig. 4A, B) overreaching scaphocerite by length of ultimate segment and half of penultimate segment, distal 2 segments flat and broad; ultimate segment 1.8 times as long as broad, distal margin apparently subtruncate, but with minute pointed tip mesially, lateral margin convex, unarmored, mesial margin mostly straight excepting distal part, with stiff setae and vertical tracts of strong spines; penultimate segment as long as and slightly narrower than ultimate, mesial margin with dense stiff setae, lateral margin with 3 long spines, dorsal surface with thick assemblage of long stiff setae basally; antepenultimate segment shorter than 2 distal segments combined, ventral margin bearing 2 deep rounded compressed lobes subdistally and basally, proximal lobe deeper, directed ventromesially; exopod reaching level of distal one-third of antepenultimate segment, with well developed lash.

First pereopod (Fig. 4C, D) considerably stout, subchelate, overreaching scaphocerite by length of half of palm. Palm 2.0 times as long as maximal breadth, tapering distally in lateral view, lateral margin nearly straight, mesial margin sinuous, terminating distally in strong fixed finger; cutting edge slightly obliquely transverse, with submarginal row of setae ventrally and dorsally. Carpus short, strongly sculptured by irregular ridges and depressions, with strong ventrolateral tooth. Merus slightly excavated ventrally, with prominent subproximal tubercle on ventral face. Ischium short, obliquely articulated with merus.

Second pereopod (Fig. 4E) very stout for crangonid, not reaching level of distal margin of scaphocerite. Dactyl (Fig. 4F, G) stout, tapering distally to acute, slightly curved unguis, with scattered spines laterally. Propodus (Fig. 4F, G) slightly longer than dactyl, slightly com-
Fig. 4. Vercoia japonica sp. nov. Female holotype, CL 3.8 mm, left thoracic appendages. A, third maxilliped, lateral; B, same, distal two segments, dorsal; C, first pereopod, lateral; E, second pereopod, lateral; F, same, dactyl, propodus, and distal part of carpus, lateral; G, same, mesial; H, third pereopod, lateral; I, fourth pereopod, lateral, dactyl and distal part of propodus lost; J, fifth pereopod, lateral.
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pressed, not tapering distally, bearing 1 very strong spine at distodorsal corner; lateral face with scattered spines; dorsal surface with irregularly arranged spines becoming dense distally. Carpus 1.5 times as long as propodus, with 2 long spines at ventrodistal corner. Merus and ischium partially fused, strongly compressed laterally, maximal depth 0.4 times length of merus-ischium fused segment; dorsal margin very slightly convex, with sparse short plumose setae; ventral margin convex, with 4 widely spaced long spines. Basis short, with 1 stout plumose setae and 1 long spine at subterminal ventrodistal angle.

Third pereopod (Fig. 4H) very slender, overreaching scaphocerite by length of distal two segments. Dactyl very slender, nearly straight, without patch of subterminal setae. Propodus slightly tapering distally. Carpus 1.8 times as long as propodus, subdivided into 2 articles, basal article very short. Merus 0.8 times as long as carpus. Ischium 1.3 times as long as merus. Basis very short. Coxa compressed laterally.

Fourth pereopod (Fig. 4I) broken, dactyl and distal part of propodus missing, but distinctly stouter than third pereopod. Carpus becoming deep distally, with short distodorsal process. Merus 1.5 times as long as carpus. Ischium 0.8 times as long as merus, with few setae on dorsal margin.

Fifth pereopod (Fig. 4J) overreaching level of tip of branchiostegal spine of carapace by length of dactyl. Dactyl simple, compressed laterally, slightly curved, 0.4 times as long as propodus. Propodus armed with 4 spines widely spaced and becoming long distally on flexor margin. Carpus 0.5 times as long as propodus, becoming deep distally, without distodorsal process. Merus 1.5 times as long as carpus. Ischium 0.8 times as long as merus.

Pleopods with enlarged protopods facing outwards; appendices internae absent from all pleopods. First pleopod (Fig. 2I) with endopod narrow subrectangular, about half length of exopod; exopod broad; protopod relatively slender. Second pleopod (Fig. 2J) with endopod somewhat curved outward; exopod very broad, almost lacking marginal setae; protopod strongly flattened, becoming narrow pro-

### Table 1. *Vercoia japonica* sp. nov. Branchial formula.

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Uropods (Fig. 2K) with rami broad, overreaching posterior margin of telson. Exopod lacking diaeresis; lateral margin feebly convex, bearing row of short setae on distal one-third and 1 small distolateral spine (Fig. 2K). Endopod narrower than and subequal in length to exopod, noticeable proximolateral expansion forming marginal sinuation with concave mediate part; dorsal surface with obscure submedian carina. Protopod stout, with small process at articulation with endopod; posterolateral angle rounded.

Apices of pleurobranchs directed anteriorly. Branchial formula summarized in Table 1.

**Coloration.** No field data are available on the coloration in life of the specimen; in preserved condition, body straw-color entirely; ventral flagellum of antennule with scattered red spots.

**Habitat.** The present specimen was dredged on a coarse sand bottom mixed with volcanic rubble and shell fragments. The shrimp apparently resembles small rubble, and its resemblance may make it cryptic on such a bottom.

**Distribution.** Omurodashi, off Izu-Ohshima Island, Izu Islands, at depths of 137-168 m.

**Etymology.** The species is named after the country where the holotype was collected.

**Discussion**

Although *Vercoia japonica* is quite distinctive, differing markedly from the two known congeners, *Vercoia gibbosa* Baker and *V. socotrina* Duris, unusual generic characters, such as the specialized orbit formed by the anterior carapace and the antennular peduncle and the well-developed but non-chelate second pereopod with a subdivided carpus, clearly place the...
the new species in *Vercoia*. *Vercoia japonica* is immediately distinguished from both *V. gibbosa* and *V. socotrana* by the absence of lateral carinae on the posterior part of carapace and of median carinae on the third to fifth abdominal somite, and by the smooth lateral margin of the supraorbital expansion of the rostrum. On the other hand, in *V. gibbosa* and *V. socotrana*, the carapace bears sharp lateral carinae on its posterior half, and the third to fifth abdominal somites are provided with distinct median carinae; the lateral margin of the supraorbital expansion bears a distinct concavity (Duris, 1992). The absence of the paired sternal teeth on the sixth abdominal somite and the incomplete fusion of the merus with the ischium in the second pereopod have not been reported in the two congeners. In *V. gibbosa* and *V. socotrana*, the sixth abdominal somite bears a median pair of acute teeth situated just anterior to the anus; the merus and ischium of the second pereopod are distinctly articulated.

The discovery of this new species has shown that the definition of *Vercoia* given by Duris (1992) includes several characters that now seem to be only of species level significance. In addition, comparison between the present new species and Duris' account of *Vercoia* has proved that some of characters, which were not cited in his generic diagnosis, seem to provide generic significance. Therefore I present a somewhat modified generic diagnosis.

**Vercoia** Baker, 1904

*Diagnosis (males unknown for all known species).* Body short and robust, sculptured with obtuse prominences. Carapace as long as deep, with flat frontal region continuing to broad rostrum; anterior part of rostrum narrow and T-shaped in cross section with sharp ventral carina; orbits well developed; anterolateral region with moderately strong antennal and branchiostegal spines; ventral margin with inner hooked process at anterior one-third and obtusely angled about middle; anterior part of carapace bearing dorsolateral ridge, posterior part possessing at least median ridge. Telson with 2 pairs of dorsal spines; posterior margin broadly rounded or subtruncate, with minute posterolateral spines and some stout plumose setae. Fifth thoracic sternite narrow, fused with upturned praecoxae of second pereopods, bearing long sternal tooth; posterior 3 thoracic sternites broadly flat or depressed in ovigerous females, but with deep compressed median processes in non-ovigerous females and immature specimens; first to fifth abdominal sternites each with median tooth in non-ovigerous females and immature specimens, but unarmored in ovigerous females; sixth abdominal somite with flat sternal plate. Eye with cornea subglobular; eye-stalk short and swollen. Antennular peduncle short and stout, with laterally expanded stylolcrerite and peduncular processes forming anterior part of orbital cavity; dorsal flagellum short and stout, ventral flagellum reduced. Antenna with broad and short scaphocerite, distolateral angle with inconspicuous or subacute tubercle; basicerite with prominent process anterodorsally; antennal flagellum short. Maxillule with palp lacking setae on internal lobe. Maxilla without endites; scaphognathite with posterior lobe not elongate, bearing long setae on posteromesial margin. Third maxilliped with distal 2 segments broadly spatulate; antepenultimate segment with 2 ventral expansions; exopod with well developed lash; arthrobranch absent. Second pereopods unusually stout, not chelate; propodus with scattered small spines and 1 strong subdistal spine dorsally. Third pereopod slender; carpus with distinct articulation subproximally. Fourth and fifth pereopods short; dactylis simple. Pleopods with protopods and rami strongly flattened; appendices internae absent. Uropods with protopod stout, lacking lateral spine; exopod without subdistal articulation; endopod with lateral margin strongly sinuous.

*Type-species.* *Vercoia gibbosa* Baker, 1904.

*Affinities.* *Vercoia* has been compared with the genera in which the second pereopod is simple (Holthuis, 1955; 1993; Dardeau and Heard, 1983; Christoffersen, 1988; Duris, 1992), i.e., *Sabinea* Ross, 1835, *Prionocrangon* Wood-Mason and Alcock, 1891, and *Lissosabinea* Christoffersen, 1988, since it possesses a nonchelate second pereopod. However, the morphological difference of the second pereopod between *Vercoia* and other three genera is so

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great that the importance of the homology of the apparent non-chelate condition shown by these taxa is very questionable. In *Vercoia*, the second pereopod is well developed and unusually robust for a crangonid; the propodus bears a strong spine at the dorsodistal angle and small spines elsewhere; the dactyl is subconical in shape and terminates in a sharply pointed unguis. Dr. F. A. Chace, Jr., has suggested to me the possibility that the spine at the dorsodistal angle of the propodus is the true dactyl, forming a degenerate chela, and that the other, larger spine, elsewhere termed the dactyl, is an extension of the propodus, with a false basal articulation (somewhat as in *Psalidopus* Wood-Mason and Alcock, 1892). The exact homology of these spine-like structures may be resolved by an ontogenetic study. On the other hand, according to the description and figures given by Yaldwyn (1960), the second pereopod of *Prionocrangon* is moderately stout, and does not show great size reduction; the propodus and dactyl are simple, without conspicuous armature. In *Sabinea* (two specimens of *S. sarsii* Smith at hand) and *Lissosabinea* (according to the description of *L. indica* given by De Man, 1920), the second pereopod is greatly reduced in size; the distal two segments are also simple. Therefore, the apparently non-chelate condition of the second pereopod is less significant to evidence the close phylogenetic relationship between *Vercoia* and these genera. At present, unfortunately, I cannot find evidence to phylogenetically relate *Vercoia* to other crangonid genera. To resolve the phylogenetic position of *Vercoia*, a thorough revision of the family is recommended.

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Literature Cited


日本のVercoia 属（十脚目：コエビ下目：エビジャコ科）の1新種の記載

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伊豆大島沖の水深138-167 mからドレッジにより採集された抱卵雌個体もとづき、エビジャコ科Vercoia 属の新種V. japonica（新称：カワリエビジャコ）を記載した。本属には、オーストラリアとマーシャル諸島から記録のあるV. gibbosa Baker, 1904とインド洋のアデン湾から記録のあるV. socotrana Duris, 1992の2種がこれまでに知られていたが、本新種は第3から第6腹節に正中隆起を欠くなどの点で既知種から容易に識別される。本属の改訂を行ったDuris（1992）により本属の定義形質として引用された形質のいくつかが、種レベルの特徴であることが本新種の発見により明らかになった。さらに、Durisにより引用されなかった形質のいくつかが属の定義形質として有効であることが判明したので、属の標識を新たに提唱した。さらに、Vercoia 属のエビジャコ科内における系統の位置について論議した。