



New records of spongicolid shrimps (Crustacea, Decapoda, Stenopodidea) from Taiwan

CHIEN-LIN CHEN¹ & TIN-YAM CHAN^{1,2*}¹*Institute of Marine Biology, National Taiwan Ocean University, Keelung 20224, Taiwan*✉ reginald@mail.ntou.edu.tw; <https://orcid.org/0000-0002-7037-0213>²*Center of Excellence for the Oceans, National Taiwan Ocean University, Keelung 20224, Taiwan*✉ tychan@mail.ntou.edu.tw; <https://orcid.org/0000-0002-8143-0007>

*Corresponding author

Abstract

Spongicolid shrimps of the three genera, *Engystenopus* Alcock & Anderson, 1894, *Spongicola* De Haan, 1844 and *Spongicoloides* Hansen, 1908 are recorded from Taiwan for the first time. The newly recorded species are *Engystenopus palmipes* Alcock & Anderson, 1894, *Spongicola andamanicus* Alcock, 1901, *S. goyi* Saito & Komai, 2008, *S. levigatus* Hayashi & Ogawa, 1987 and *Spongicoloides iheyaensis* Saito, Tsuchida & Yamamoto, 2006. A total of six genera and nine species of stenopodidean shrimps are now known from Taiwan. A key to the Taiwanese species of stenopodideans is provided.

Key words: deep-sea, East Asia, taxonomy, biodiversity, fauna

Introduction

Shrimps of the infraorder Stenopodidea Bate, 1888 inhabit mainly tropical and sub-tropical seas (Schram 1986; Goy 2010a). This infraorder is smallest in decapod crustaceans and only with three families, 12 genera and 96 species known to date (De Grave & Franssen 2011; Goy 2015; Komai 2015; Chen *et al.* 2016; Komai *et al.* 2016; Criales & Lemaitre 2017; Saito *et al.* 2017; Xu *et al.* 2017; Saito & Fujita 2018; Rodríguez Quintal & Goy 2019; Bochini *et al.* 2020; de Azevedo Ferreira *et al.* 2020; Chen & Chan 2021; Schnabel *et al.* 2021; Zhao *et al.* 2021). Although Taiwan is a tropical island, there are only five stenopodidean records, *Stenopus hispidus* (Olivier, 1811) (Balss 1914; Chan & Yu 2002), *Stenopus goyi* Saito, Okuno & Chan, 2009 (Saito *et al.* 2009), *Globospongicola spinulatus* Komai & Saito, 2006 (Wang *et al.* 2016) and *Odontozona spiridonovi* Chen & Chan, 2021 (Chen & Chan 2021). Chen *et al.* (2016) listed a Taiwanese specimen of *Spongicoloides iheyaensis* Saito, Tsuchida & Yamamoto, 2006 in their molecular phylogenetic work without details, this species is here formally recorded from Taiwan.

During recent extensive surveys on the decapod crustacean fauna of Taiwan, many stenopodidean specimens were collected. Amongst these stenopodidean material are four species of the family Spongicolidae Schram, 1986 not previously reported from Taiwan: *Engystenopus palmipes* Alcock & Anderson, 1894, *Spongicola andamanicus* Alcock, 1901, *S. goyi* Saito & Komai, 2008 and *S. levigatus* Hayashi & Ogawa, 1987. More specimens of *Spongicoloides iheyaensis* were also obtained. This study reports these five species from Taiwan and provides a key to all the stenopodideans known from Taiwan.

Material and Methods

The specimens are deposited in the National Taiwan Ocean University, Keelung (NTOU). The station (stn) designation is preceded by a prefix indicating the actual type of collecting equipment, as follows: Le Drezen type solo hard bottom 12.4 m otter trawl (CD), 4 m French beam trawl (CP), 2.5 m French beam trawl (PCP). Morphological

terminology mainly follows Saito & Komai (2008) and Goy (2010a). The carapace length (cl, in millimeters) is measured dorsally from the postorbital margin to the posterior margin of the carapace. The synonymy given is restricted to the key works on the species.

Results

Infraorder Stenopodidea Bate, 1888

Family Spongicolidae Schram, 1986

Genus *Engystenopus* Alcock & Anderson, 1894

Engystenopus palmipes Alcock & Anderson, 1894

(Fig. 1)

Engystenopus palmipes Alcock & Anderson, 1894: 149, pl. 9-fig. 1. (Type locality: Trincomalee, Sri Lanka).—Alcock 1901: 144, pl. 2-fig. 3.—A. Milne-Edwards & Bouvier 1909: 264.—Holthuis 1946: 45; 1955: 144, fig. 103; 1993: 313, fig. 308.—de Saint Laurent & Cleva 1981: 161, figs. 4–6.—Goy 2010b: 274, fig. 6.—Chen *et al.* 2016: 482—Bochini *et al.* 2020: 6.—Schnabel *et al.* 2021: 61.

Material examined. Donggang fishing port, Pingtung County, commercial trawler, 3 Mar 2001, about 200 m, 1 male cl 9.2 mm (NTOU M02475).

Diagnosis. Rostrum reaching middle of second segment of antennular peduncle; dorsal margin slightly concave, with 10 teeth; ventral margin bearing 1 tooth subdistally. Carapace with large acuminate rostral basal spine; antennal and hepatic spines absent, anterolateral margin with 3 teeth; cervical groove distinct. Cornea narrower than eyestalk and darkly pigmented. First 2 pairs of pereopods slender; grooming apparatus of first pereopod well-developed. Dactyli of fourth and fifth pereopods uniunguiculate, slender. Pleon smooth, first pleonite divided into 2 sections by distinct transverse carina. Second to fifth pleura armed with minute spines on ventral margins. Sixth pleonite widened posteriorly, with 2 minute spines on posteroventral margin. Telson lance-shaped; with 2 longitudinal dorsal ridges, each with 5 large spines; 2 pairs of basal spinules present. Uropods with lateral margin of endopod unarmed, that of exopod serrated with 6 teeth.

Coloration. Body generally reddish, covered with whitish spots (Goy 2010b).

Distribution. Indo-West Pacific: Madagascar, Sri-Lanka, Australia, Philippines, Indonesia, Australia, and now Taiwan, at depths from 174–640 m.

Remarks. The single Taiwanese specimen, though lacking the third pereopods, fits well with the descriptions of this species provided by de Saint Laurent & Cleva (1981) and Goy (2010b). The genus *Engystenopus* is now restricted only to *E. palmipes* (Goy 2010b). The present record slightly extends the northern-most distribution of this monotypic genus to Taiwan.

Genus *Spongicola* De Haan, 1844

Spongicola andamanicus Alcock, 1901

(Figs. 2, 6A)

Spongicola andamanica Alcock, 1901: 148, pl. 2-fig. 2 (Type locality: Andaman sea).—Rathbun 1906: 901.—A. Milne-Edwards & Bouvier 1909: 264.—Holthuis 1946: 66.—Saito & Takeda 2003: 120.

Spongicola andamanica andamanica—de Saint Laurent & Cleva, 1981: 188.

Spongicola henshawi Rathbun, 1906: 901, pl. 24-fig. 8 (Type locality: south coast of Molokai Island, Hawaii).—Holthuis 1946: 67.

Spongicola henshawi henshawi—de Saint Laurent & Cleva, 1981: 171, figs. 9, 10a, c–e, 11a, b, d–f, i.—Saito & Takeda 2003:120.

Spongicola henshawi spinigera de Saint Laurent & Cleva, 1981: 174, figs. 10b, 11c, g, h (Type locality: Philippines).—Saito & Takeda 2003:120.

Spongicola holthuisi de Saint Laurent & Cleva, 1981: 177, figs. 12a–i (Type locality: Philippines).—Saito & Takeda 2003: 120.

Spongicola andamanicus—Saito & Komai, 2008: 9, figs. 3–7.—Goy 2010a: 219.—De Grave & Fransen 2011: 251.—Goy 2015: 305, figs. 3, 4.—Bochini *et al.* 2020: 8.

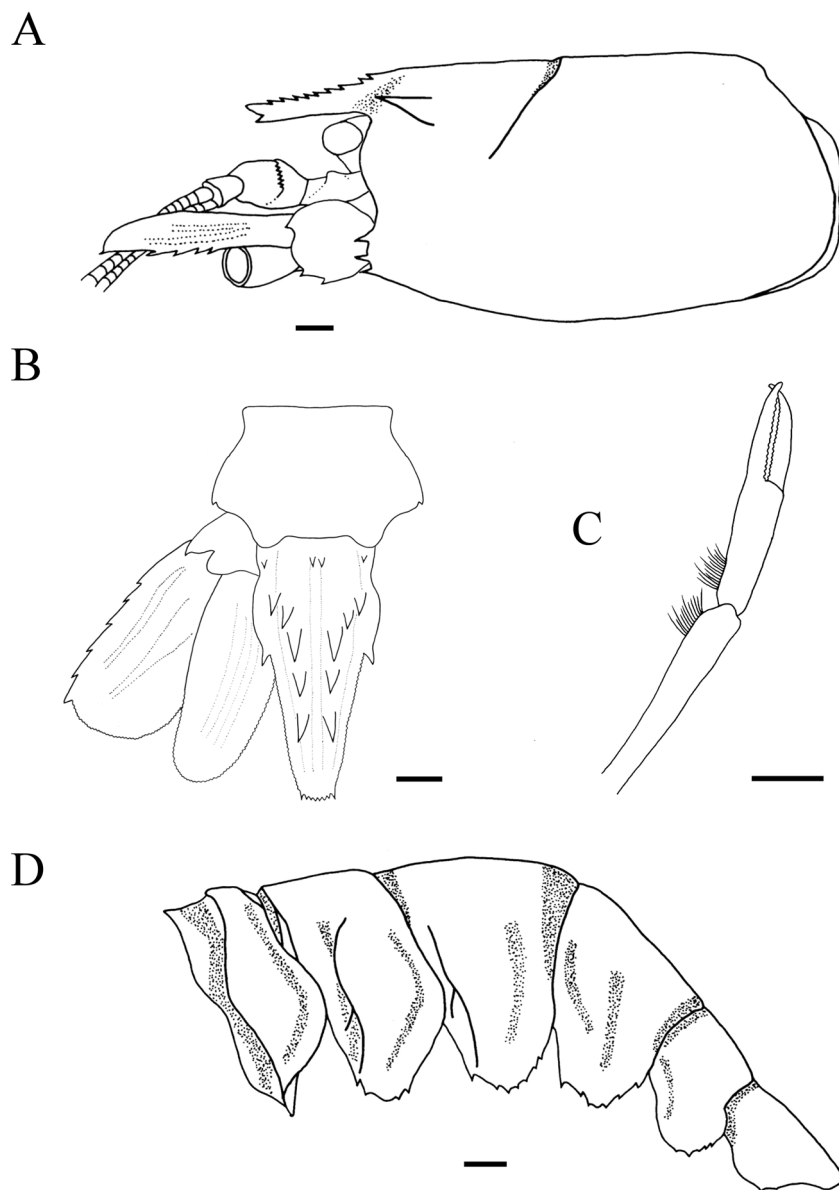


FIGURE 1. *Engystenopus palmipes* Alcock & Anderson, 1894, Donggang fishing port, Pingtung County, commercial trawler, male cl 9.2 mm (NTOU M02475). A, carapace, left lateral view; B, telson and left uropods, dorsal view (setae omitted); C, chela and carpus of right first pereiopod, mesial view, showing grooming apparatus; D, pleon, left lateral view. Scale bars: 1.0 mm.

Material examined. Taiwan 2000, stn CP 45, 22°48.3'N, 121°27.4'E, 2 Aug 2000, 423–439 m, 1 female cl 3.5 mm (NTOU M02476).

Diagnosis. Rostrum compressed, reaching distal margin of second segment of antennular peduncle; dorsal margin straight, with 9 teeth; ventral margin with 1 small tooth subdistally; lateral margin unarmed, median ridge extending to rostral basal spine. Carapace with moderately large rostral basal spine; hepatic spine absent; antennal spine acuminate; 4 relatively large anteroventral spines present, forming single oblique row. Cornea darkly pigmented, well-developed, eyestalk armed with numerous spinules. Third pereiopod overreaching antennal scale by carpus and chela; ischium with 3 dorsal spinules at midlength and 1 prominent distodorsal spine; merus with anterior parts of dorsal and ventral margins each with 1 spine, ventral medial region with row of spinules; carpus with

6 large distolateral spines; palm with dorsal and ventral margins distinctly serrated; fingers with cutting edges each armed with 1 large tooth near midlength, dactylus with dorsal margin bearing 3 large teeth. Pleon smooth; second pleonite with distinct transverse dorsal carina, second to fifth pleura unarmed. Sixth pleonite widened posteriorly, unarmed. Telson subtriangular, with 2 dorsal longitudinal ridges each bearing 4 large spines. Uropods with endopod and exopod serrated on lateral margins.

Coloration. Body whitish translucent, anterior cephalic appendages somewhat reddish pink. Cornea of eye light brown. Internal organs inside carapace light blue.

Distribution. Indo-West Pacific: Madagascar, Andaman Sea, Japan, Philippines, Indonesia, Australia, New Caledonia, Vanuatu, Fiji, Hawaii, and now Taiwan; at depths of 124–815 m.

Remarks. The revision on the genera *Spongicola* and *Paraspongicola* de Saint Laurent & Cleva, 1981 by Saito & Komai (2008) did not follow the subspecies division of *S. andamanicus* proposed by de Saint Laurent & Cleva (1981). Recently Goy (2019) synonymized these two genera following the suggestion from the results of molecular analyses provided by Chen *et al.* (2016). At present 12 species are known in *Spongicola* (Bochini *et al.* 2020), with *S. andamanicus* being the most widely distributed taxon.

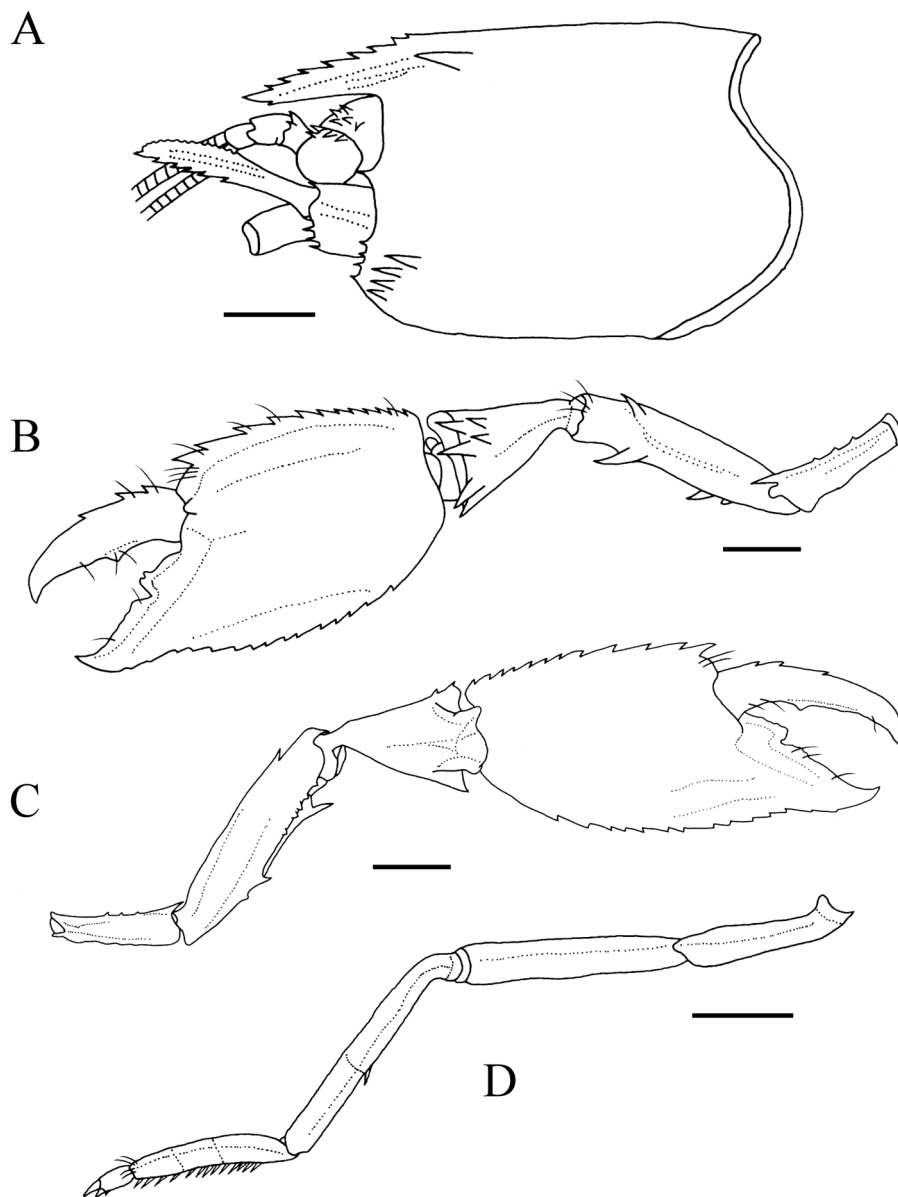


FIGURE 2. *Spongicola andamanicus* Alcock, 1901, Taiwan 2000, stn CP 45, female cl 3.5 mm (NTOU M02476). A, carapace, left lateral view; B, left third pereiopod, lateral view; C, left third pereiopod, mesial view; D, left fourth pereiopod, lateral view. Scale bars: 1.0 mm.

***Spongicola goyi* Saito & Komai, 2008**

(Figs. 3, 6B)

Spongicola goyi Saito & Komai, 2008: 21, figs. 11–15 (Type locality: New Caledonia).—Goy 2010a: 224; 2015: 307, figs. 5, 6.—De Grave & Fransen 2011: 251.—Bochini *et al.* 2020: 8.—Schnabel *et al.* 2021: 14, figs. 1–4.

Material examined. Taiwan 2003, stn CD 229, 22°13.35'N, 120°01.90'E, 30 Aug 2003, 1060–880 m, 1 male 4.9 mm cl (NTOU M02477). *R.V. Ocean Researcher I*, cruise 1135, stn CST 12, 22°04.86'N, 118°52.78'E, 29 Apr 2016, 1346–758 m, 1 ovig. female cl 4.8 mm (NTOU M02478).

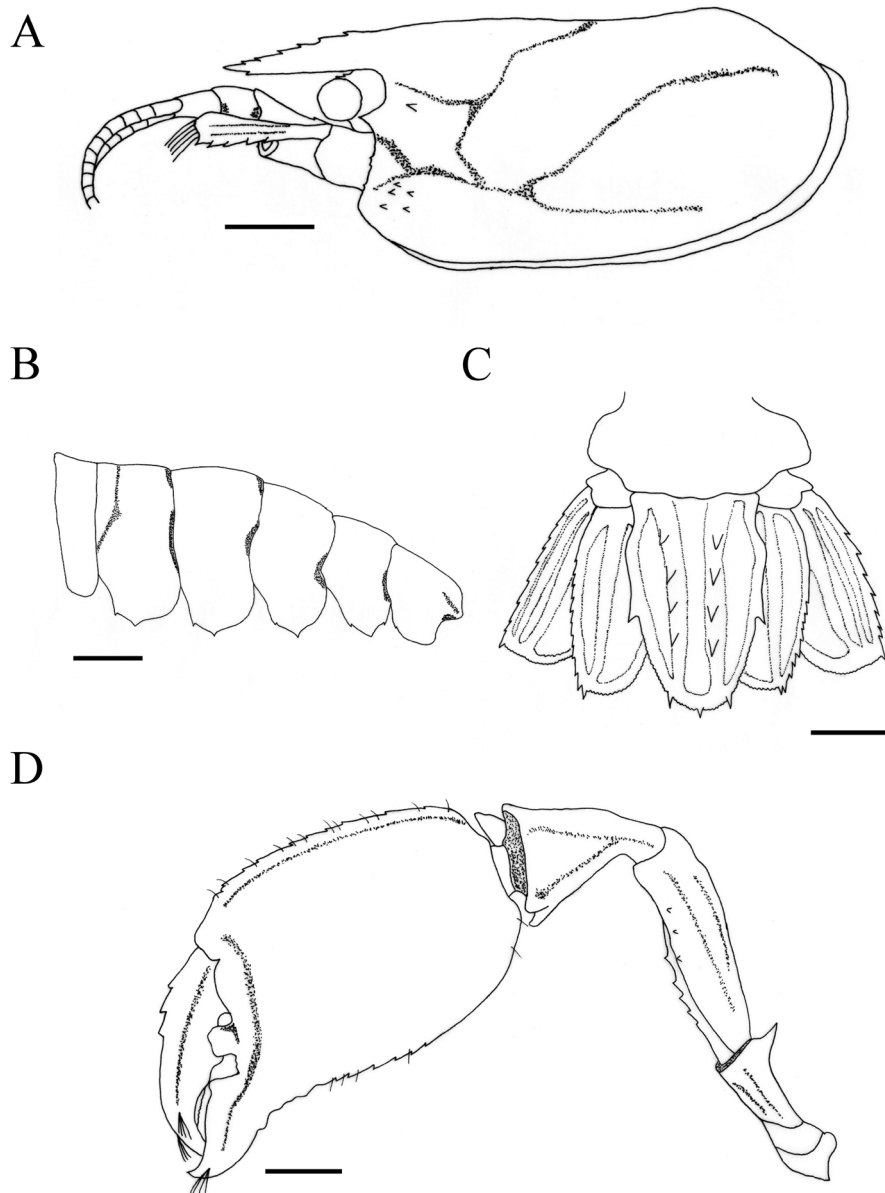


FIGURE 3. *Spongicola goyi* Saito & Komai, 2008, Taiwan 2003, stn CD 229, male cl 4.9 mm (NTOU M02477). A, carapace, left lateral view; B, pleon, left lateral view; C, telson and uropods, dorsal view (setae omitted); D, left third pereiopod, lateral view. Scale bars: 1.0 mm.

Diagnosis. Rostrum straight; dorsal margin armed with 7 teeth; ventral margin with 1 small subdistal tooth. Carapace smooth on postorbital region, antennal spine present, hepatic spine moderately small, cluster of small anteroventral spines present, cervical groove rudimentary. Conera relatively small, narrower than eyestalk, darkly pigmented. Third pereiopod overreaching antennal scale by chela; ischium with large dorsodistal spine, merus with row of small teeth on lateral surface and ventral margin, carpus unarmed, palm with dorsal margin distinctly carinate

and armed with row of small denticles, dactylus with 3 teeth on dorsal margin. Pleon smooth; second pleonite with rudimentary transverse dorsal carina. Second to fifth pleura each terminating ventrally in small spine, anterior margin with 1 small spine; fifth pleuron bearing 1 spine on posterior margin. Sixth pleonite widened posteriorly, with 1 small spine on anterior margin of pleuron. Telson with dorsal surface lacking proximal spines, dorsolateral carinae each bearing 4 large spines, lateral margin with proximal concavity and 1 large tooth at midlength.

Coloration. Body whitish translucent, mouthparts reddish. Cornea of eye dark brown. Internal organs inside carapace reddish, greenish and yellowish white. Fingers of chela of third pereiopod with tips and cutting edges yellowish translucent. Eggs greenish blue.

Distribution. Indo-West Pacific: Madagascar, Japan, Indonesia, Australia, New Caledonia, Vanuatu, and New Zealand, and now Taiwan; at depths of 315 to 1346 m.

Remarks. *Spongiocola goyi* is most similar to *S. andamanicus* (Saito & Komai 2008). They mainly differ in the spines at the anteroventral region (or anterior part of the branchial region) of the carapace are much smaller in *S. goyi* (Fig. 3A vs. Fig. 2A); and the merus of the third pereiopod being armed with large spines at the distal part of both the dorsal and ventral margins in *S. andamanicus* (Figs. 2B, D), but such large spines are absent in *S. goyi* (Fig. 3D).

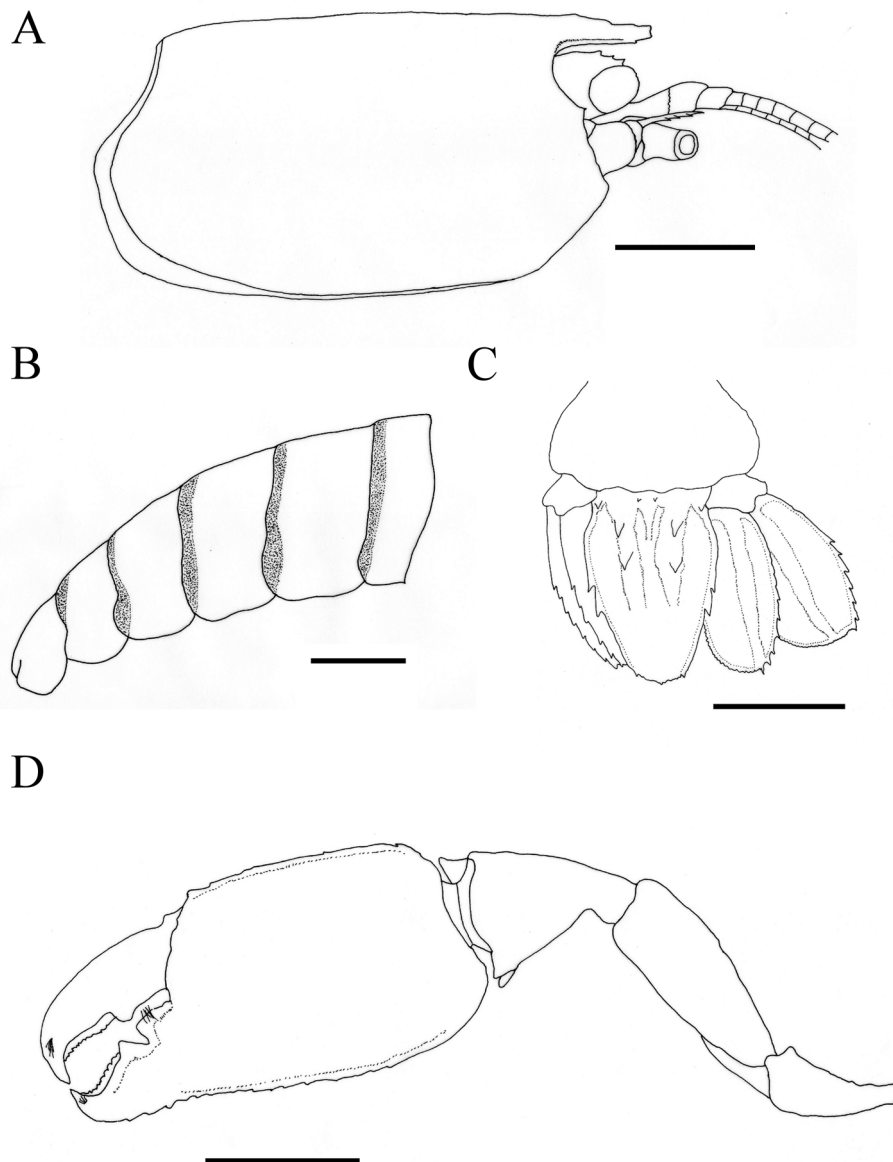


FIGURE 4. *Spongiocola levigatus* Hayashi & Ogawa, 1987, *R.V. Fishery Researcher 1*, ovig. female cl 2.9 mm (NTOU M02479). A, carapace, right lateral view; B, pleon, right lateral view; C, telson and uropods, dorsal view (setae omitted); D, left third pereiopod, lateral view. Scale bars: 1.0 mm.

Spongicola levigatus Hayashi & Ogawa, 1987

(Fig. 4)

Spongicola levigata Hayashi & Ogawa, 1987: 367 (Type locality: East China Sea).—Saito & Takeda 2003: 120.

Spongicola levigatus Saito & Komai 2008: 26, figs. 16–19.—Goy 2010a: 217; 2015: 307, figs. 7, 8.—De Grave & Fransen 2011: 251.—Komai 2015: 35.—Rodríguez Quintal & Goy 2019: 399.—Bochini *et al.* 2020: 8.

Material examined. *R.V. Fishery Researcher 1*, 26°46.11'N, 122°08.70'E, 200 m, 31 Jul 1998, 1 ovig. female cl 2.9 mm (NTOU M02479).

Diagnosis. Rostrum extending to distal margin of first segment of antennular peduncle; dorsal margin armed with 4 denticles; ventral margin with 1 denticle; lateral ridge extending posteriorly to base of rostrum. Carapace smooth; rostral basal, hepatic and anterolateral spines absent; antennal spine rudimentary; cervical groove absent. Cornea slightly narrower than eyestalk, darkly pigmented. Third pereopod with ischium bearing small dorsodistal spine, ventral margin smooth; merus and carpus unarmed; palm with dorsal margin slightly serrated while ventral margin distinctly serrated; tips of fingers strongly curved; cutting edge of dactylus with 1 stout tooth near midlength interlocking with similar-sized tooth at midlength of fixed finger. Pleon glabrous; first to fifth pleura unarmed. Sixth pleonite widened posteriorly, unarmed on ventral and posterior margins. Telson with 2 dorsal longitudinal ridges each bearing 2 spines; additional 2 pairs of spinules present near base. Uropods with endopod and exopod serrated on lateral margins.

Coloration. Not known.

Distribution. Western Pacific: Japan, East China Sea, Indonesia, New Caledonia, Loyalty Islands, Wallis and Futuna Islands, Tonga and now Taiwan, at depths of 200–480 m.

Remarks. The single Taiwanese specimen collected has the rostrum slightly broken distally. *Spongicola levigatus* closely resembles *S. teres* Komai, 2015 from French Polynesia (Komai 2015). These two species can be distinguished by the lateral rostral ridge being restricted to the rostrum in *S. levigatus* but extending to the anterior part of the gastric region in *S. teres*. In addition, the grooming apparatus of the first pereopod is well developed in *S. teres* but rudimentary in *S. levigatus* (see Komai 2015). The present species is also similar to *S. liosomatus* Rodríguez Quintal & Goy 2019 from Venezuela in having reduced armature on the body and appendages (Rodríguez Quintal & Goy 2019). The ventral margin of the third pereopod chela, however, is serrated in *S. levigatus* but smooth in *S. liosomatus* (Rodríguez Quintal & Goy 2019).

Genus *Spongicoloides* Hansen, 1908

Spongicoloides iheyaensis Saito, Tsuchida & Yamamoto, 2006

(Figs. 5, 6C)

Spongicoloides iheyaensis Saito, Tsuchida & Yamamoto, 2006: 224, figs. 3–8. (Type locality: Okinawa Trough, Japan).—Bochini *et al.* 2020: 8.—Schnabel *et al.* 2021: 61.

Material examined. Taiwan 2000, stn CP 55, 24°26.9'N, 122°18.1'E, 4 Aug 2000, 638–824 m, 1 female cl 8.0 mm (NTOU M02480). Taiwan 2001, stn CD 134, 22°16.56'N, 120°06.11'E, 22 Nov 2001, 736–1040 m, 1 male cl 7.4 mm (NTOU M02481). Taiwan 2005, stn CP 300, 22°14.555'N, 119°58.719'E, 11 Aug 2005, 960–972 m, 2 males cl 8.0, 9.0 mm (NTOU M02482). Taiwan 2006, stn PCP 342, 22°16.648'N, 119°59.960'E, 8 Mar 2006, 988–1010 m, 2 males cl 5.6, 7.4 mm (NTOU M01908).

Diagnosis. Rostrum straight or slightly upturned, reaching distal margin of first segment of antennular peduncle; dorsal margin armed with 8–11 small teeth along entire margin; ventral margin with 1–3 small teeth on distal half; ventrolateral ridge unarmed or with 1 small tooth. Carapace glabrous; epigastri, gastric and anterolateral regions scattered with many spinules; antennal spine small; cervical groove distinct. Antennal scale subquadrangular, with 5–8 spines on lateral margin; antennal basicerite with 1 large lateral spine in females, 2 or 3 large lateral spines in males. Eye well-developed, but cornea not pigmented. Third pereopod with ischium unarmed, almost equal in length to carpus; merus slightly shorter than palm; palm longer than other segments; tips of fingers strongly curved; cutting edge of dactylus forming chitinous ridge, with 1 stout tooth near midlength; fixed finger with row of 3–5

teeth on disto-dorsal margin. Pleon glabrous; first pleonite compact, divided into 2 sections by distinct transverse carina; second and third pleonites anteriorly with shallow transverse dorsal groove. Second to fourth pleura each with large basal articular knob and broadly rounded ventral margin. Fifth pleuron armed with 1 or 2 teeth on ventral margin. Sixth pleonite with median longitudinal row of 2–4 spinules flanked by 1 or 2 small spinules on either side. Telson quadrangular, with 2 dorsolateral carinae each with 6–9 large spines. Uropods with ovate endopod, shorter than telson, dorsal surface with median and submedian carinae; exopod broader than endopod, lateral margin serrated.

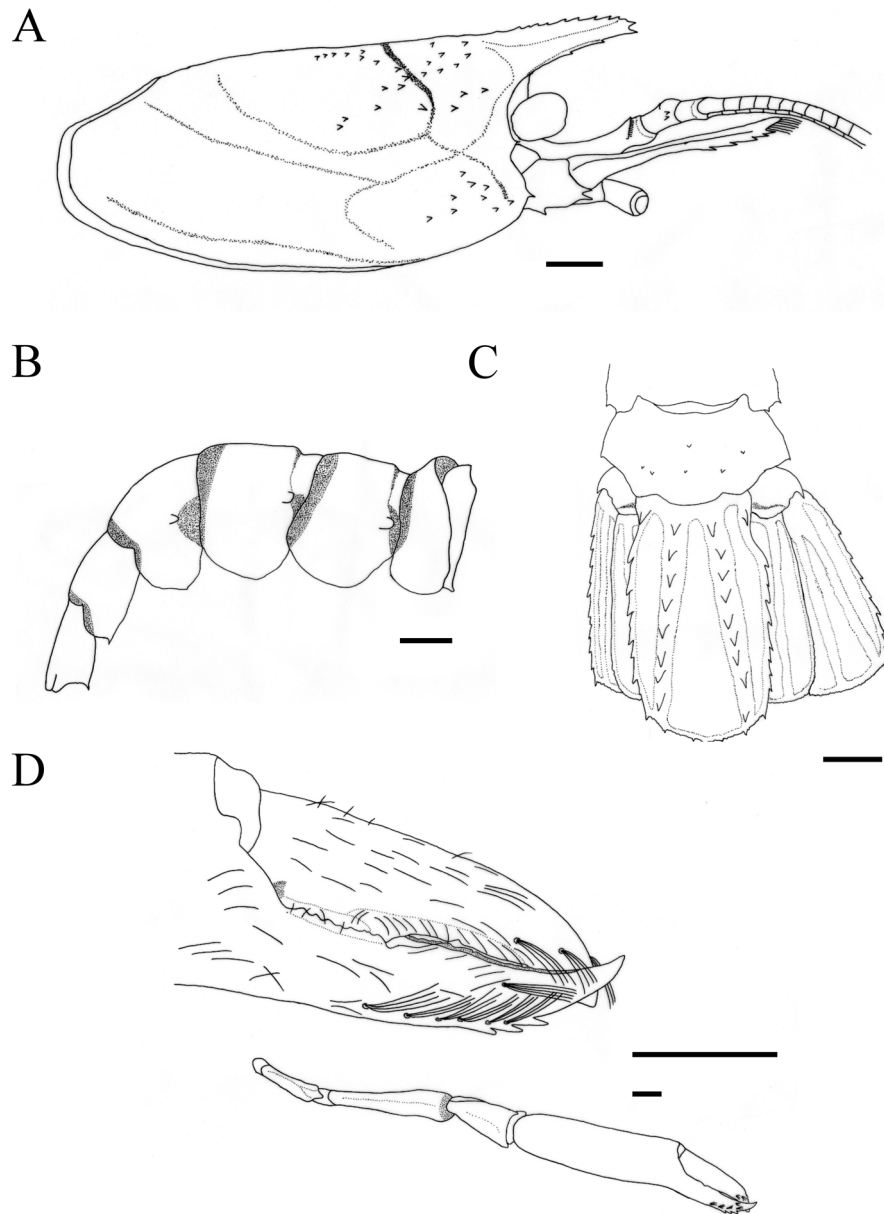


FIGURE 5. *Spongiocoloides iheyaensis* Saito, Tsuchida & Yamamoto, 2006, Taiwan 2001, stn CD 134, male cl 7.4 mm (NTOU M02481). A, carapace, right lateral view; B, pleon, right lateral view; C, telson and uropods, dorsal view (setae omitted); D, right third pereiopod and fingers of chela, lateral view. Scale bars: 1.0 mm.

Coloration. Body whitish translucent overall. Cornea unpigmented and with golden reflections.

Distribution. Restricted to Japan (Ryukyu Islands) and Taiwan, at depths of 638–1051 m.

Remarks. *Spongiocoloides iheyaensis* was heretofore known only from the Iheya Ridge, Okinawa Trough (Saito *et al.* 2006). One of the present specimens (NTOU M01908) was listed in a molecular work by Chen *et al.* (2016: table 1). The Taiwanese material extends its geographical distribution and shallowest vertical range from the depth of 988 to 638 m. *Spongiocoloides iheyaensis* closely resembles *S. zhoui* Zhao, Xu, Yang & Qiu, 2021 from the South

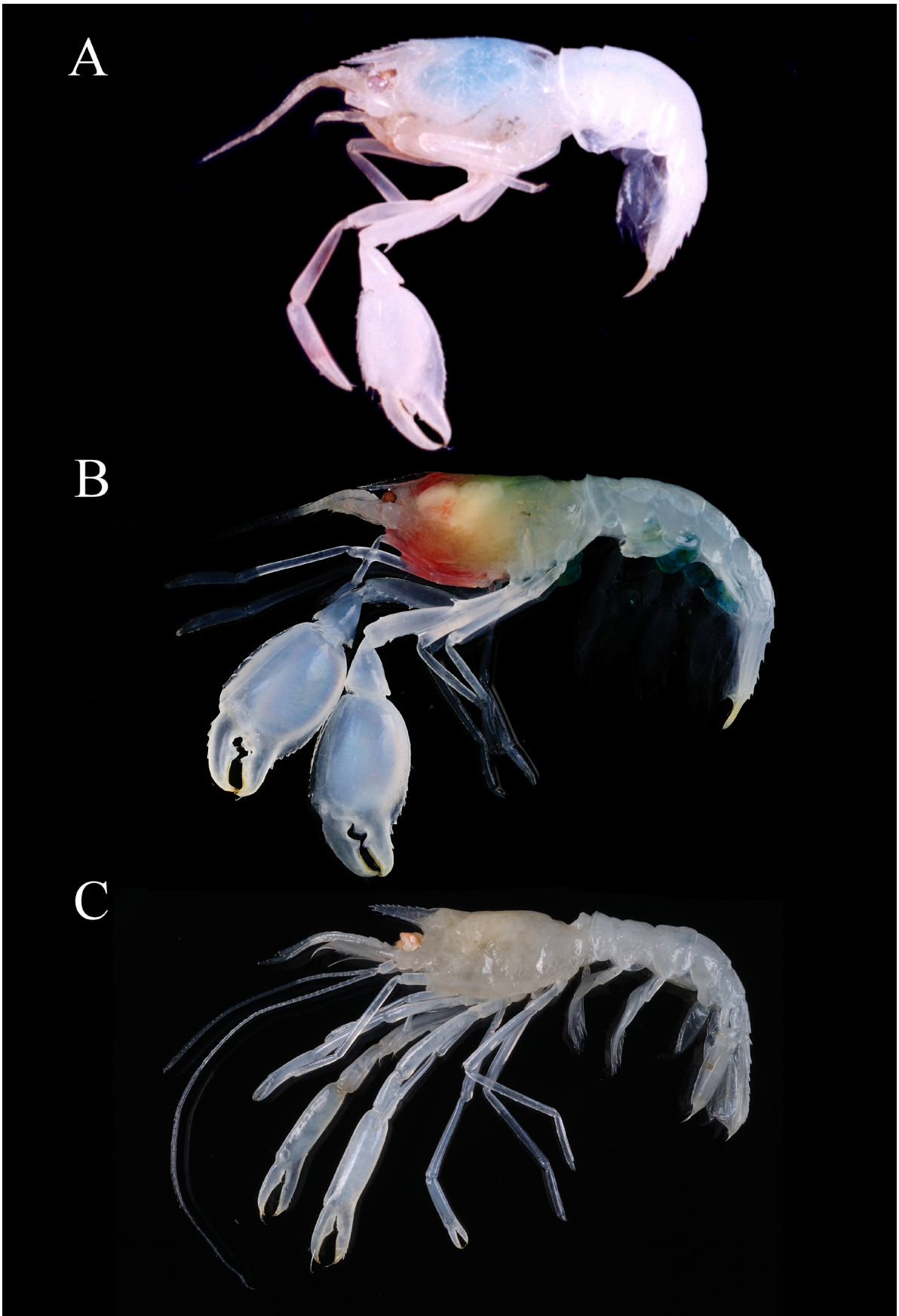


FIGURE 6. A, *Spongicola andamanicus* Alcock, 1901, Taiwan 2000, stn CP 45, female cl 3.5 mm (NTOU M02476). B, *Spongicola goyi* Saito & Komai, 2008, *R.V. Ocean Researcher I*, cruise 1135, stn CST 12, ovig. female cl 4.8 mm (NTOU M02478). C, *Spongicoloides iheyaensis* Saito, Tsuchida & Yamamoto, 2006, Taiwan 2006, stn PCP 342, male cl 5.6 mm (NTOU M01908).

China Sea (Zhao *et al.* 2021). They can be readily separated from congeners by the third pereopod bearing teeth on the disto-dorsal margin of the fixed finger but is unarmed on the ischium. These two species mainly differ in the numbers of lateral spines on the antennal basicerite in females (1 in *S. iheyaensis* vs. 3 in *S. zhoui*) and disto-dorsal teeth at the fixed finger of the third pereopod (3–9 in *S. iheyaensis* vs. 1–4 in *S. zhoui*, see Zhao *et al.* 2021).

Key to species of *Stenopodidea* of Taiwan

1. Body laterally compressed; carapace and pleon densely covered with spines; telson lanceolate, about 3 times longer than wide 2
- Body depressed; carapace and pleon not densely covered with spines; telson triangular, subtriangular, or subquadrangular . . . 3
2. Antennal scale with rows of spines on dorsal surface; chela of third pereopod with several rows of dense spines on ventral surface. *Stenopus hispidus*
- Antennal scale only with some small spines proximally on dorsal surface; chela of third pereopod with scattered spines on ventral surface *Stenopus goyi*
3. Gills simple, lacking lamellae or filaments *Globospongiicola spinulatus*
- Gills trichobranchiate with series of filamentous branches arranged around central axis. 4
4. Carapace armed with cincture of spines along posterior margin of cervical groove. *Odontozona spiridonovi*
- Carapace without cincture of spines along posterior margin of cervical groove 5
5. Dactyli of fourth and fifth pereopods uniunguiculate; exopod of third maxilliped well developed. . . . *Engystenopus palmipes*
- Dactyli of fourth and fifth pereopods biunguiculate, occasionally with additional small tooth at basal ventral unguis; exopod of third maxilliped usually rudimentary or absent 6
6. Third pereopod with propodus twice or more as long as wide; chela usually with dorsal and ventral margins entire; exopods of second and third maxillipeds absent. *Spongicoloides iheyaensis*
- Third pereopod with propodus almost as long as wide; chela with dorsal and ventral margins serrated; exopods present on second maxilliped, rudimentary on third maxilliped 7
7. Carapace unarmed on lateral surface *Spongicola levigatus*
- Carapace armed with spines on lateral surface. 8
8. Merus of third pereopod lacking prominent spine on lateral surface *Spongicola goyi*
- Merus of third pereopod armed with prominent spines on lateral surface *Spongicola andamanicus*

Acknowledgements

This work was supported by grants from the Ministry of Science and Technology, Taiwan, ROC, and the Center of Excellence for the Oceans (National Taiwan Ocean University), which The Featured Areas Research Center Program financially supports within the framework of the Higher Education Sprout Project by the Ministry of Education in Taiwan, ROC.

References

- Alcock, A. (1901) *A descriptive catalogue of the Indian deep-sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum. Being a revised account of the deep-sea species collected by the Royal Indian Marine Survey Ship Investigator.* The Trustees of the Indian Museum, Calcutta, 286 pp.
<https://doi.org/10.5962/bhl.title.16083>
- Alcock, A. & Anderson, A.R. (1894) An account of a recent collection of deep-sea Crustacea from the Bay of Bengal and Laccadive Sea. Natural history notes from H.M. Indian Marine Survey Steamer “Investigator”, commander C.F. Oldham, R.N., commanding. Series II, No. 14. *Journal of the Asiatic Society of Bengal*, 63, 141–185.
- Balss, H. (1914) Beiträge zur Naturgeschichte Ostasiens. Herausgegeben von Dr. F. Dolflein. Ostasiatische Decapoden II. Die Natantia und Reptantia. *Abhandlungen der Mathematisch-Physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften*, 10 (Supplement 2), 1–101.
- Bochini, G.L., Cunha, A.M., Terossi, M. & Almeida, A.O. (2020) A new genus and species from Brazil of the resurrected family Macromaxillocarididae Alvarez, Iliffe & Villalobos, 2006 and a worldwide list of *Stenopodidea* (Decapoda). *Journal of Crustacean Biology*, 40 (6), 704–714.
<https://doi.org/10.1093/jcabi/ruaa064>
- Chan, T.-Y. & Yu, H.-P. (2002) Decapod Crustacean Fauna Study in Taiwan. *Journal of the Fisheries Society of Taiwan*, 29 (3), 163–171.
- Chen, C.-L. & Chan, T.-Y. (2021) A new stenopodid shrimp of the genus *Odontozona* Holthuis, 1946 (Crustacea: Decapoda:

- Stenopodidea) from Taiwan. *Arthropoda Selecta*, 30 (3), 299–308.
<https://doi.org/10.15298/arthsel.30.3.04>
- Chen, C.-L., Goy, J.W., Bracken-Grissom, H.D., Felder, D.L., Tsang, L.M. & Chan, T.-Y. (2016) Phylogeny of Stenopodidea (Crustacea: Decapoda) shrimps inferred from nuclear and mitochondrial genes reveals non-monophyly of the families Spongicolidae and Stenopodidae and most of their composite genera. *Invertebrate Systematics*, 30 (5), 479–490.
<https://doi.org/10.1071/IS16024>
- Criales, M.M. & Lemaitre, R. (2017) A new species of *Odontozona* Holthuis, 1946 (Crustacea: Decapoda: Stenopodidea: Stenopodidae) from the Caribbean Sea. *Zootaxa*, 4276 (3), 405–415.
<https://doi.org/10.11646/zootaxa.4276.3.5>
- de Azevedo Ferreira, L.A., Leray, M. & Anker, A. (2020) New findings of the stenopodidean shrimp *Microprosthemina loensis* Goy & Felder, 1988 (Decapoda: Stenopodidea: Spongicolidae). *Zootaxa*, 4729 (3), 445–450.
<https://doi.org/10.11646/zootaxa.4729.3.11>
- De Grave, S. & Fransen, C.H.J.M. (2011) Carideorum catalogus: the recent species of the dendrobranchiate, stenopodidean, procarididean and caridean shrimps (Crustacea: Decapoda). *Zoologische Mededelingen*, 85 (9), 195–589.
- De Grave, S., Pentcheff, N.D., Ah Yong, S.T., Chan, T.-Y., Crandall, K.A., Dworschak, P.C., Felder, D.L., Feldmann, R.M., Fransen, C.H.J.M., Goulding, L.Y.D., Lemaitre, R., Low, M.E.Y., Martin, J.W., Ng, P.K.L., Schweitzer, C.E., Tan, S.H., Tshudy, D. & Wetzer, R. (2009) A classification of living and fossil genera of decapod crustaceans. *Raffles Bulletin of Zoology*, Supplement 21, 1–109.
- Goy, J.W. (2010a) Infraorder Stenopodidea Claus, 1872. In: Schram, F.R., von Vaupel Klein, J.C., Forest, J. & Charmantier-Daures, M. (Eds.), *Treatise on Zoology – Anatomy, Taxonomy, Biology – The Crustacea, Decapoda, Volume 9 Part A Eucarida: Euphausiacea, Amphionidacea, and Decapoda (partim)*. Brill, Leiden, pp. 215–265.
https://doi.org/10.1163/9789004187801_009
- Goy, J.W. (2010b) A review of the genus *Engystenopus* (Crustacea: Decapoda: Stenopodidea) *Juxtastenopus*, gen. nov., a new combination for *E. spinulatus* Holthuis, 1946, and transfer of *E. palmipes* Alcock & Anderson, 1894 to the family Spongicolidae Schram, 1986. *Zootaxa*, 2372 (1), 263–277.
<https://doi.org/10.11646/zootaxa.2372.1.21>
- Goy, J.W. (2015) Stenopodidean shrimps (Crustacea: Decapoda) from New Caledonian waters. *Zootaxa*, 4044 (3), 301–344.
<https://doi.org/10.11646/zootaxa.4044.3.1>
- Hayashi, K.I. & Ogawa, Y. (1987) *Spongicola levigata* sp. nov., a new Shrimp Associated with a Hexactinellid Sponge from the East China Sea (Decapoda, Stenopodidae). *Zoological Science*, 4, 367–373.
- Holthuis, L.B. (1946) Biological results of the Snellius Expedition. XIV. The Decapoda Macrura of the Snellius Expedition. I. The Stenopodidae, Nephropsidae, Scyllaridae and Palinuridae. *Temminckia*, 7, 1–178.
- Holthuis, L.B. (1955) The recent genera of the caridean and stenopodidean shrimps (class Crustacea, order Decapoda, supersection Natantia) with keys for their determination. *Zoologische Verhandelingen, Leiden*, 26, 1–157.
- Holthuis, L.B. (1993) *The recent genera of the caridean and stenopodidean shrimps (Crustacea, Decapoda): with an appendix on the order Amphionidacea*. Nationaal Natuurhistorisch Museum, Leiden, 328 pp.
<https://doi.org/10.5962/bhl.title.152891>
- Komai, T. (2015) A new species of the stenopodidean shrimp genus *Spongicola* (Crustacea: Decapoda: Spongicolidae) from French Polynesia, South Pacific. *Species Diversity*, 20 (1), 29–36.
<https://doi.org/10.12782/sd.20.1.029>
- Komai, T., De Grave, S. & Saito, T. (2016) Two new species of the stenopodidean shrimp genus *Spongiocaris* Bruce & Baba, 1973 (Crustacea: Decapoda: Spongicolidae) from the Indo-West Pacific. *Zootaxa*, 4111 (4), 421–447.
<https://doi.org/10.11646/zootaxa.4111.4.5>
- Milne-Edwards, A. & Bouvier, E.-L. (1909) Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877–78), in the Caribbean Sea (1878–79), and along the Atlantic coast of the United States (1880), by the U. S. Coast Survey steamer “Blake,” Lieut.-Com. C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding. XLIV: Les Pénéides et Sténopides. *Memoirs of the Museum of Comparative Zoology at Harvard College*, 27 (3), 179–274.
- Rathbun, M.J. (1906) The Brachyura and Macrura of the Hawaiian islands. *Bulletin of the United States Fish Commission*, 23 (3), 827–930.
- Rodríguez Quintal, B. & Goy, J.W. (2019) A new species of the Stenopodidean shrimp Genus *Spongicola* (Crustacea: Decapoda: Spongicolidae) representing the first record of the genus from the Atlantic Ocean. *Zootaxa*, 4648 (2), 393–400.
<https://doi.org/10.11646/zootaxa.4648.2.12>
- Saint Laurent, M.d. & Cléva, R. (1981) Crustacés Décapodes: Stenopodidea. In: *Résultats des Campagnes MUSORSTOM. I—Philippines (18–28 Mars 1976)*. Éditions de l’Office de la Recherche Scientifique et Technique d’Outre-Mer, Paris, pp. 151–188.
- Saito, T. & Fujita, Y. (2018) A new species of the stenopodidean shrimp genus *Odontozona* Holthuis, 1946 (Crustacea: Decapoda: Stenopodidea: Stenopodidae) from the Ryukyu Islands, Indo-West Pacific. *Zootaxa*, 4450 (4), 458–472.
<https://doi.org/10.11646/zootaxa.4450.4.4>
- Saito, T. & Komai, T. (2008) A review of species of the genera *Spongicola* de Haan, 1844 and *Paraspongicola* de Saint Laurent & Cléva, 1981 (Crustacea, Decapoda, Stenopodidea, Spongicolidae). *Zoosystema*, 30 (1), 87–147.

- Saito, T., Okuno, J. & Anker, A. (2017) Two new species of the stenopodidean shrimp genus *Odontozona* Holthuis, 1946 (Decapoda: Stenopodidae) from the Indo-West Pacific. *Crustacean Research*, 46, 25–55.
https://doi.org/10.18353/crustacea.46.0_25
- Saito, T., Okuno, J. & Chan, T.-Y. (2009) A new species of *Stenopus* (Crustacea: Decapoda: Stenopodidae) from the Indo-West Pacific, with a redefinition of the genus. *Raffles Bulletin of Zoology*, 20, 109–120.
- Saito, T. & Takeda, M. (2003) Phylogeny of the family Spongicolidae (Crustacea : Stenopodidea): evolutionary trend from shallow-water free-living to deep-water sponge-associated habitat. *Journal of the Marine Biological Association of the United Kingdom*, 83, 119–131.
<https://doi.org/10.1017/S002531540300688Xh>
- Saito, T., Tsuchida, S. & Yamamoto, T. (2006) *Spongicoloides iheyaensis*, a new species of deep-sea sponge-associated shrimp from the Iheya Ridge, Ryukyu Islands, Southern Japan (Decapoda: Stenopodidea: Spongicolidae). *Journal of Crustacean Biology*, 26 (2), 224–233.
<https://doi.org/10.1651/C-2650.1>
- Schnabel, K.E., Kou, Q. & Xu, P. (2021) Integrative Taxonomy of New Zealand Stenopodidea (Crustacea: Decapoda) with new species and records for the region. *Diversity*, 13 (8), 343.
<https://doi.org/10.3390/d13080343>
- Schram, F.R. (1986) *Crustacea*. Oxford University Press, New York, 606 pp.
- Wang, T.W., Komai, T., Chen, C.L. & Chan, T.Y. (2016) *Globospongicola jiaolongi* Jiang, Kou & Li, 2015, a junior subjective synonym of *G. spinulatus* Komai & Saito, 2006 (Crustacea: Decapoda: Stenopodidea: Spongicolidae). *Zootaxa*, 4072 (5), 579–584.
<https://doi.org/10.11646/zootaxa.4072.5.5>
- Xu, P., Zhou, Y. & Wang, C. (2017) A new species of deep-sea sponge-associated shrimp from the North-West Pacific (Decapoda, Stenopodidea, Spongicolidae). *ZooKeys*, 685, 1–14.
<https://doi.org/10.3897/zookeys.685.11341>
- Zhao, Y., Xu, T., Yang, W. & Qiu, J. (2021) A new species of the deep-sea shrimp genus *Spongicoloides* (Decapoda: Spongicolidae) from the South China Sea. *Zootaxa*, 5005 (3), 276–290.
<https://doi.org/10.11646/zootaxa.5005.3.3>