

# New Records of Three Sergestid Shrimps (Crustacea: Decapoda: Penaeidea) from the Korean Waters of the Yellow Sea

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## Abstract

Three species of pelagic sergestid shrimps, *Deosergestes seminudus* (Hansen, 1919), *Sergia lucens* (Hansen, 1922) and *S. talismani* (Barnard, 1947), were identified based on collections by the National Fisheries Research and Development Institute from the Korean coast of the Yellow Sea between 2003 and 2011. They are herein reported for the first time from the Yellow Sea. Morphological descriptions and illustrations with color photographs of all species are also given. With the addition of these species, the family Sergestidae in the Korean waters now comprises five species belonging to three genera. Finally, a key to the Korean genus and species of the family Sergestidae is presented.

**Key words:** *Deosergestes seminudus*, *Sergia lucens*, *Sergia talismani*, Sergestidae, Decapoda, Korea, New record, Yellow Sea

## Introduction

The family Sergestidae, which is mostly of the pelagic form, comprises 98 species and two subspecies belonging to 11 genera worldwide (De Grave and Fransen, 2011). Their great abundance in the water column plays an important role in the food chain of the oceans, and they are a very commercially important organism in Asian and East African waters (Holthuis, 1980; Hayashi, 1992). However, only two species of Korean sergestid shrimps have been known: *Acetes japonicus* Kishinouye, 1905 and *A. chinensis* Hansen, 1919 (see Kim and Kim, 1997).

During a series of research cruises in Korean waters, three species belonging to the family Sergestidae, namely *Deosergestes seminudus* (Hansen, 1919), *Sergia lucens* (Hansen, 1922), and *S. talismani* (Barnard, 1947), were collected from the Korean waters of the Yellow Sea. This report provides the first record of these species in Korean waters and in the Yellow Sea. These three species are herein described and illustrated with color photographs. An identification key of the Korean

genera and species of the family Sergestidae is also provided.

## Materials and Methods

Shrimp specimens were collected during a series of expeditions to investigate fisheries resources in the Korean Exclusive Economic Zone (EEZ in 2003-2011) using the R/V Tamgu 1 and Tamgu 20 of the National Fisheries Research and Development Institute (NFRDI). Bottom otter trawls (mesh size at the cod end 0.98 × 0.98 mm) were used to collect shrimp specimens. Trawls with otter boards were towed for 30 to 60 min at approximately 3.4 knots. All samples were frozen on board shortly after capture and maintained at -80°C until laboratory identification. Before species identification, the specimens were photographed and then preserved with 70-90% ethanol. The specimens were deposited in the Fisheries Resource Management Division, NFRDI.

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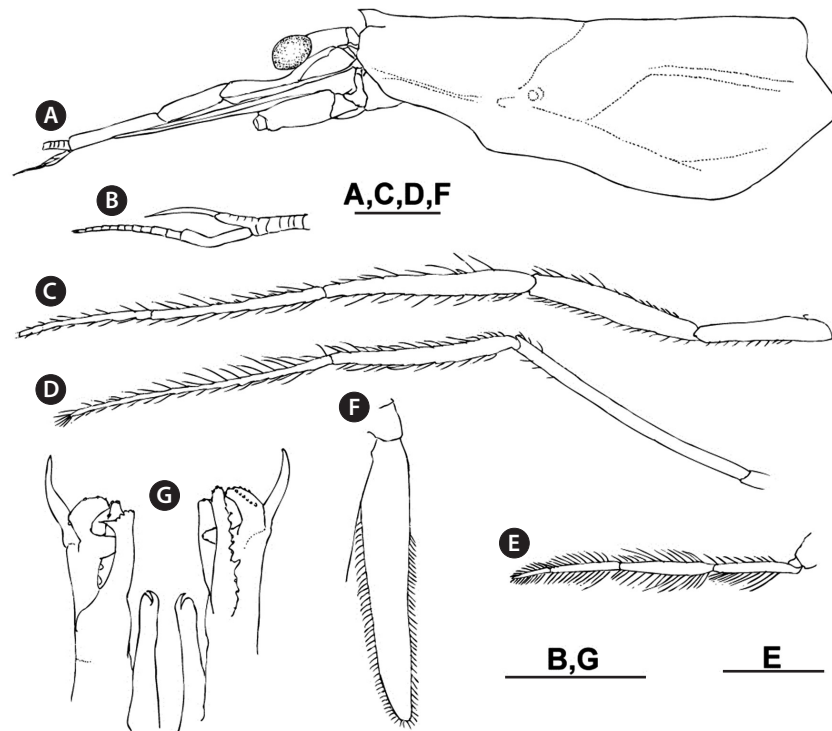
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**Fig. 1.** *Deosergestes seminudus* (Hansen, 1919), male (carapace length 10.6 mm) from southern part of West Sea. (A) Carapace and cephalic appendages, lateral. (B) Left ventral antennular flagellum, ventral. (C) Left third maxilliped, lateral. (D) Left third pereopod, lateral. (E) Left fifth pereopod, lateral. (F) Right uropodal exopod, lateral. (G) Left petasma, ventral (left) and dorsal (right). Scale bars: A, C-F = 2 mm, B, G = 1 mm.

The carapace length (CL), measured from the postorbital margin to the posterior mid-dorsal margin of the carapace, was used to indicate the size of the specimens. The terminology used in this study primarily follows that of Vereshchaka (2000). Genera and species are arranged in alphabetical order.

## Results and Discussion

Family Sergestidae

Genus *Deosergestes* Judkins and Kensley, 2008  
(new Korean name: *Byeol-jeot-sae-u-sok*)

### *Deosergestes seminudus* (Hansen, 1919)

(new Korean name: *Byeol-jeot-sae-u*) (Figs. 1, 4A)

*Sergestes seminudus* Hansen, 1919: 18, pl. 1, fig. 7a-c, pl. 2, fig. 1a-f (type locality: Indonesian waters); Hanamura, 1979: 167; Sakai and Nakano, 1985: 18, figs. 1-5; Hayashi, 1992: 241, figs. 124e, 125g, 126f, n, 127e, l; Lee et al., 2003: 8, figs. 2F, 3F, 4G, 5F, 6F, 7F, 8F, 10G, pls. 2A-D, 3A, B; Vereshchaka, 2009: 54, figs. 2, 4.

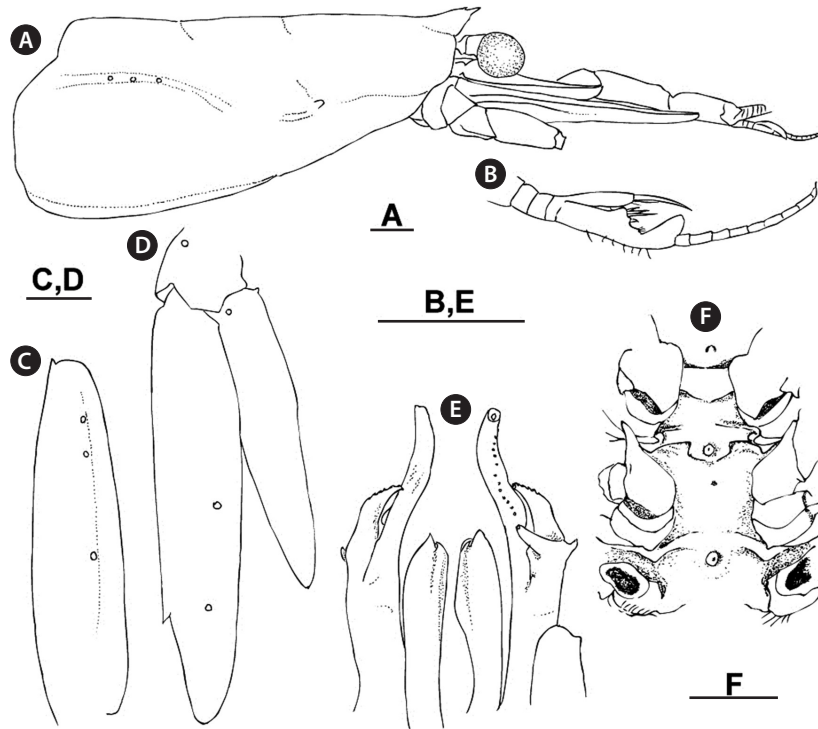
*Deosergestes seminudus* - Judkins and Kensley, 2008: 75 (list); Kensley and Judkins, 2008: 157; De Grave and Franssen, 2011: 242 (list).

### Material examined

Southern part of the Yellow Sea: Western water of Hong Island, 34°40.4'N, 123°20.2'E, 77 m, otter trawl, R/V Tamgu 1, Mar 21, 2003, one male (CL 10.6 mm).

### Description

Body slender, compressed. Rostrum (Fig. 1A) small, somewhat produced forward, with pointed apex. Carapace (Fig. 1A) with hepatic spine, small but distinct; cervical groove deep; rounded branchiocardiac carina well marked, rounded hepatic-antennal carina present. Abdomen smooth. Telson tapering to subacute apex, lacking spines. Eyes (Fig. 1A) slender, elongate cornea slightly broader than eyestalk. Antennular peduncle (Fig. 1A) slender and long; third segment longer than second; in male, ventral flagellum (Fig. 1B) bifurcated, like clasping organ. Antennal scale (Fig. 1A) reaching middle of third antennular segment; distolateral tooth very small. Third maxilliped (Fig. 1C) over-reaching distal margin of antennal scale by distal two segments: distal segment subdivided into eight articles. Third pereopod (Fig. 1D) over-reaching distal margin of antennal scale by distal two segments. Fifth pereopod (Fig. 1E) with two distal segments setose on both ventral and dorsal margins. Exopod of uropod (Fig. 1F) setose on distal 0.6 of its lateral margin, without lateral tooth. Petasma (Fig. 1G) with processus uncifer somewhat slender, hooked at tip; processus ventralis distally expanded to form broad ter-



**Fig. 2.** *Sergia lucens* (Hansen, 1922). (A-E) Male (carapace length 9.3 mm) from Southwest of Jeju Island. (F) Female (carapace length 11.1 mm) from Southeast of Gageo Island. (A) Carapace and cephalic appendages, lateral. (B) Right ventral antennular flagellum, ventral. (C) Right antennal scale, ventral. (D) Right uropods, ventral. (E) Left petasma, ventral (left) and dorsal (right). (F) Thelycum, ventral. Scale bars = 1 mm.

minimal edge furnished with row of many acute papillae; lobus armatus straightly elongated, reaching distal margin of processus ventralis: distal margin armed with row of several hooks, with large anterior hook laterally; lobus connectens somewhat small, oblong triangular, directed outward with about eight hooks on distal half; lobus terminalis moderately short, with obliquely rounded tip, curving outward, distal surface scattered with many small hooks; lobus inermis considerably longer than lobus terminalis, directed forward and somewhat inward, tapering to narrow subacute tip without hooks.

**Coloration**

Body generally semitransparent, with many red spots of stellate chromatophores on dorsoanterior part (Fig. 4A).

**Distribution**

Indo-West Pacific: Korea, Japan, Taiwan, Indonesia, India; meso- and bathypelagic. In Korea, only southern water of western coast in this study.

**Remarks**

Judkins and Kensley (2008) separated five new genera from *Sergestes* s.l. The genus *Deosergestes* is characterized by the third maxilliped being subequal to the third pereopod in length, the distal two segments of the fifth pereopod being setose on both margins, and the lateral margin of the uropodal

exopod being setose for its distal 0.6 and lacking a tooth. The present species is the only member of the genus *Deosergestes* in Korea.

Genus *Sergia* Stimpson, 1860  
(new Korean name: Kkoch-jeot-sae-u-sok)

***Sergia lucens* (Hansen, 1922)**  
(new Korean name: Kkoch-jeot-sae-u) (Figs. 2, 4B)

*Sergestes lucens* Hansen, 1922: 38, 121 (type locality: Suruga Bay, Japan); Gordon, 1935: 310, figs. 1, 3, 5; Omori, 1969: 9, figs. 3-22.

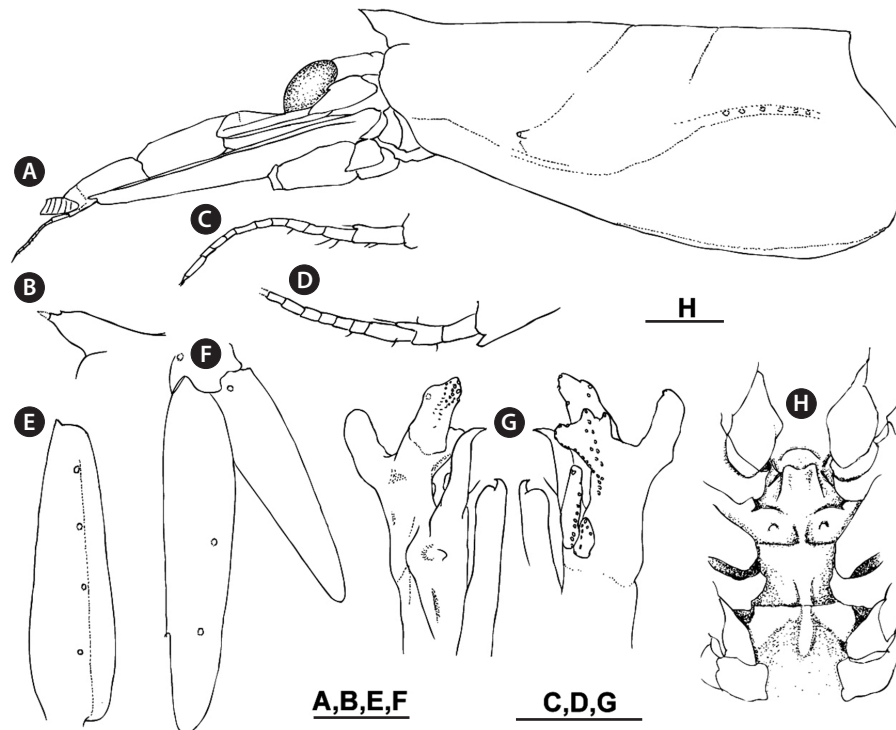
*Sergestes prehensilis* - Yokoya, 1933: 12 [not *Sergestes prehensilis* Bate, 1881].

*Sergestes (Sergia) lucens* - Yaldwyn, 1957: 9.

*Sergia lucens* - Hanamura, 1979: 169; Miyake, 1982: 17, pl. 6, fig. 4; Hayashi, 1992: 254, figs. 132a, g, 133a, g, 134a, f; Lee et al., 1996: 3, figs. 2A, 'A, 3A, 4A, 'A, 5A, 6A, pl. 1A, B; Vereshchaka, 2000: 199, figs. 87-89, pl. 4E; Kensley and Judkins, 2008: 157.

**Material examined**

Southern part of the Yellow Sea: Western water of Jeju Island, 33°00.0'N, 124°38.7'E, 72 m, otter trawl, R/V Tamgu 1, Mar 26, 2003, two males (CL 7.1, 10.3 mm); Southwestern



**Fig. 3.** *Sergia talismani* (Barnard, 1947). (A, C, E, F) Male (carapace length 10.1 mm) from Southwest of Jeju Island. (B, D, G) Male (carapace length 11.9 mm) from South of Socheong Island. (H) Female (carapace length 11.7 mm) from same locality. (A) Carapace and cephalic appendages, lateral. (B) Rostrum, lateral. (C, D) Left ventral antennular flagellum, ventral. (E) Right antennal scale, ventral. (F) Right uropod, ventral. (G) Left petasma, ventral (left) and dorsal (right). (H) Thelycum, ventral. Scale bars: A, B, E, F = 2 mm, C, D, G, H = 1 mm.

water of Jeju Island, 32°41.8'N, 125°15.9'E, 72 m, otter trawl, R/V Tamgu 1, Oct 28, 2004, two males (CL 9.3, 9.5 mm); Southern water of Gageo Island, 33°45.5'N, 125°14.6'E, 94 m, otter trawl, R/V Tamgu 1, Apr 19, 2008, one female (CL 11.0 mm); Southeastern water of Gageo Island, 33°39.9'N, 125°44.8'E, 100 m, otter trawl, R/V Tamgu 1, Apr 19, 2008, one female (CL 11.1 mm).

### Description

Rostrum (Fig. 2A) short, sharply pointed distally; dorsal margin obliquely forward, minutely dentate near apex; lower margin convex. Carapace (Fig. 2A) with hepatic spine blunt; supraorbital crest indistinct; branchiocardiac carina low, with three photophores; cervical groove indistinct, postcervical groove rather distinct. Abdomen smooth and slender, sixth abdominal somite with small dorsomedial spine on posterior margin. Telson triangular in shape. Antennular peduncle (Fig. 2A and 2B) with third segment nearly same length as second; in males, third segment of ventral flagellum with well developed tubercle overlapping fourth segment, fourth segment with five or six bristles on dorsal surface. Antennal scale (Fig. 2C) about four times as long as broad, with series of three photophores; distolateral tooth slightly overreaching lamella. Fourth and fifth pereopods composing of six segments,

fifth pereopod shorter than fourth. Exopod of uropod (Fig. 2D) with two photophores. Petasma (Fig. 2E) with processus ventralis extremely developed, over-reaching other lobes and processes, armed with many hooks; lobus terminalis directed distolaterally, reaching beyond lobus connectens; lobus connectens directed laterally with one apical hook. Thelycum (Fig. 2F) with posterior margin of sixth thoracic sternite produced tongue-like medially, with median tubercle; eight thoracic sternite with median tubercle anteriorly.

### Coloration

Body generally semitransparent, scattered with red chromatophores, concentrated at lower parts of carapace, abdomen and tail fan (Fig. 4B).

### Distribution

Western Pacific only: Korea, Japan, Taiwan, Philippines, New Guinea; mesopelagic. In Korea, western water of Jeju Island and southern part of western coast.

### Remarks

Vereshchaka (2000) divided the species of *Sergia* into nine groups and some isolated species primarily based on photophore patterns and the petasma. The present species is

included in the *Sergia lucens* species group, which is characterized by the carapace having a single lateral row of two or three photophores, the antennal scale with two or three photophores, the uropodal exopod with one or two photophores, the presence of a posterodorsal tooth on the sixth abdominal somite, an extremely elongated processus ventralis of the petasma, and the absence or rudimentary lobus inermis and lobus armatus of the petasma. *Sergia lucens* is the only species of this species group in Korean waters.

### *Sergia talismani* (Barnard, 1947)

(new Korean name: *Nam-bang-kkoch-jeot-sae-u*) (Figs. 3 and 4C)

*Sergestes splendens* Hansen, 1920: 480; 1922: 121, pl. 7, fig. 2 [not *Sergestes splendens* Sund, 1920].

*Sergestes talismani* Barnard, 1947: 384 (type locality: Eastern North Atlantic, Cape Verde Islands, 16°52'N, 27°30'–27°31'W, 550–760 m).

*Sergestes* (*Sergia*) *talismani* - Yaldwyn, 1957: 9; Crosnier and Forest, 1973: 325, figs. 111, 112.

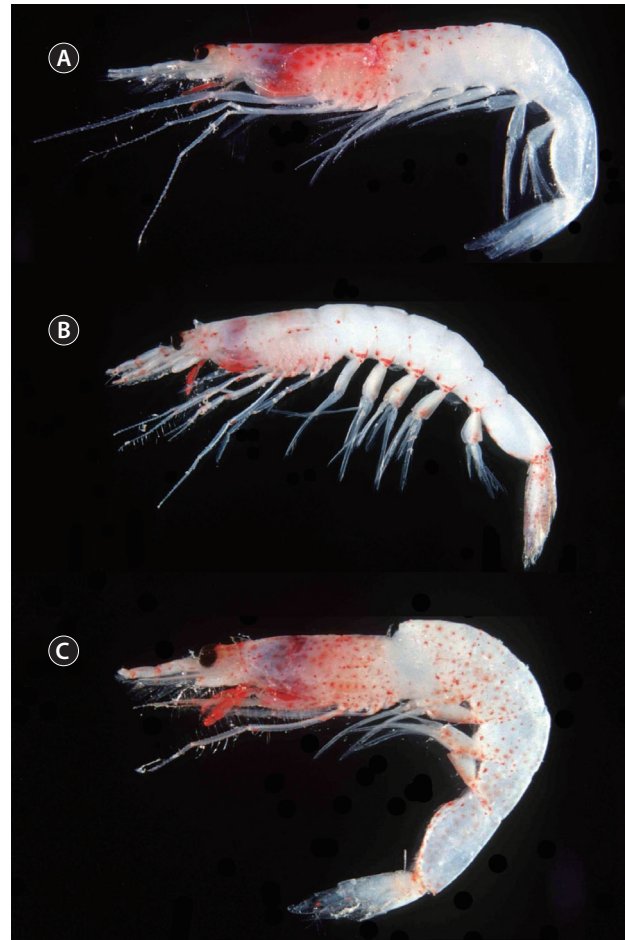
*Sergia talismani* - Hanamura, 1979: 170; Hayashi, 1986: 85, 253, fig. 45; 1992: 258, figs. 128, 132e, j, 133e, j, 134e, i; Lee et al., 1996: 9, figs. 2C, 'C, 3C, 4C, 'C, 5D, 6C, pl. 1C, D; Vereshchaka, 2000: 188, figs. 80–82, pls. 2B, 5C; Komai and Komatsu, 2009: 512.

### Material examined

Southern part of Yellow Sea: Western water of Jeju Island, 33°00.0'N, 124°38.7'E, 72 m, otter trawl, R/V Tamgu 1, 26 Mar 2003, one male (CL 8.8 mm); Southwestern water of Jeju Island, 32°48.5'N, 125°44.1'E, 94 m, otter trawl, R/V Tamgu 20, 22 Nov 2011, one male (CL 10.1 mm). Northern part of Yellow Sea: Southern water of Socheong Island, 37°01.5'N, 124°53.9'E, 67 m, otter trawl, R/V Tamgu 20, 19 October 2010, one male (CL 11.9 mm), one female (CL 11.7 mm).

### Description

Rostrum (Fig. 3A and 3B) short, with apex sharply pointed; lower margin convex, in large specimens with minute dorsal tooth. Carapace (Fig. 3A) with hepatic spine small but distinct; supraorbital crest present; branchiocardiac carina low, with five or six photophores; cervical and postcervical grooves rather indistinct. Abdomen generally smooth, sixth abdominal somite with median spine on posterior margin. Telson short, tapering and slightly grooved mid-dorsally. Antennular peduncle (Fig. 3A, 3C, and 3D) with third segment subequal to second in length, males with small distoventral process but indistinct in small males; basal ventral flagellum of males with finger-like protrusion. Antennal scale (Fig. 3E) about 3.5 times as long as broad, with a series of four photophores; dislateral tooth over-reaching lamella. Fourth and fifth pereopods compressed and short. Exopod of uropod (Fig. 3F) with two photophores. Petasma (Fig. 3G) with processus ventralis slender, with apex curved mesially; lobus armatus straight and



**Fig. 4.** (A) *Deosergestes seminudus* (Hansen, 1919), male (carapace length 10.6 mm) from West of Hong Island. (B) *Sergia lucens* (Hansen, 1922), female (carapace length 11.1 mm) from South of Gageo Island. (C) *Sergia talismani* (Barnard, 1947), male (carapace length 8.8 mm) from West of Jeju Island.

small, with small lobus accesorius at its base; lobus terminalis broadened distally with inner end obtusely pointed and produced as knob-like process proximally. Thelycum (Fig. 3H) with pair of longitudinal ridges on sixth thoracic sternite, its posterior part with pair of tubercles; seventh thoracic sternite with median longitudinal ridge.

### Coloration

Body generally transparent, scattered with red chromatophores, concentrated on lateral and lower parts of carapace and abdomen, and base of tail fan (Fig. 4C).

### Distribution

Tropical to warm temperate waters of the Atlantic and Indo-West Pacific; meso- and bathypelagic. Western water of Jeju Island and off northwestern coast of Korea.

**Remarks**

This species was included in the *Sergia challengerii* species group by Vereshchaka (2000). The species group is characterized by the antennal scale with four to six photophores, the uropodal exopod with two or three photophores, the carapace having a single lateral row of four to six photophores, the presence of a posterodorsal tooth on the sixth abdominal somite, and usually with a bilobed lobus terminalis and a rudimentary lobus armatus of the petasma. In Korea *S. talismani* is the only species of the *Sergia challengerii* species group.

**Key to Korean genera and species of Sergestidae**

- 1. Fourth and fifth pereopods absent ..... *Acetes* 2
- Fourth and fifth pereopods present ..... 3
- 2. Emargination of posterior margin of third thoracic sternite deep; endopod of uropod with four to eight red spots .....  
..... *A. chinensis*
- Emargination of posterior margin of third thoracic sternite shallow; endopod of uropod with one red spot .....  
..... *A. japonicus*
- 3. Dermal photophores absent, organ of Pesta present; ischium of first and second pereopods with well-developed subterminal spine ..... *Deosergestes seminudus*
- Dermal photophores present, organ of Pesta absent; ischium of first and second pereopods lacking subterminal spine..... *Sergia* 4
- 4. Rostrum with minute tooth on dorsodistal margin; antennular peduncle without tooth; antennal scale usually with three photophores; processus ventralis of petasma more elongate than other processes ..... *S. lucens*
- Rostrum usually without dorsal tooth; antennular peduncle with distoventral process or tooth; antennal scale with usually four photophores; processus ventralis of petasma curved distally, not more elongate than other processes .....  
..... *S. talismani*

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