

A Systematic Study on the Ophiuroidea in Korea II. Cheju Island

Sook Shin

Department of Biology, College of Natural Science, Mokpo National University, Ch'önnam 534-729, Korea

The ophiuroids collected from 13 localities in the vicinity of Cheju Island during the period from July, 1965 to October, 1991 were observed for the systematic study on the basis of external features. As a result 26 species belonging to 11 families and 2 orders were identified, of which 5 species are newly reported in Korean fauna and they are as follows: *Ophiomyxa australis*, *Ophiacantha levispina*, *Ophiactis dyscrita*, *Ophiocentrus verticillatus*, *Ophiarachnella infernalis*. The ophiuroids distributed so far in Cheju Island turned out to be 30 species.

KEY WORDS: Systematics, Ophiuroidea, Cheju Island, Korea

The present study is a continuous work for the ophiuroid fauna in Korea. With regard to ophiuroids distributed in Cheju Island and its adjacent water, only nineteen species so far were recorded (Rho and Kim, 1966; Rho, 1979; Rho and Shin, 1983, 1987; Shin and Rho, 1986).

Still further researches are needed for the survey of ophiuroid fauna, particularly on the ophiuroids distributed in Cheju Island. Cheju Island is noticeably abundant in ophiuroid species of its own, namely, ten of nineteen recorded species have been found only in Cheju Island. Thus the systematic study on Ophiuroidea collected from Cheju Island in Korea has been performed in detail.

Materials and Methods

The materials used were collected from 13 localities (Cheju-hang, Söngsanp'o, Udo, Chigwido, Sögwip'o, Mundo, Pöbhwan, Pömdo, Marado, Ch'agwido, Piyangdo, Hanrim, Ch'ujado) in the

vicinity of Cheju Island during the period from July, 1965 to October, 1991 (Fig. 1). The speci-

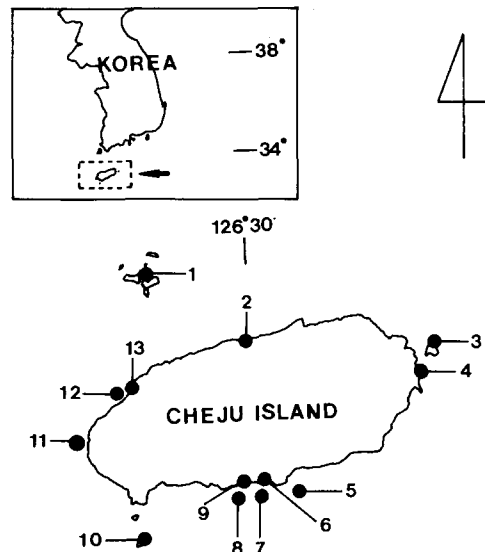


Fig. 1. A map showing the localities where the materials were collected.

1. Ch'ujado (추자도)
2. Cheju-hang (제주항)
3. Udo (우도)
4. Söngsanp'o (성산포)
5. Chigwido (지귀도)
6. Sögwip'o (서귀포)
7. Mundo (문도)
8. Pöbhwan (법환)
9. Pömdo (법도)
10. Marado (마라도)
11. Ch'agwido (차귀도)
12. Piyangdo (비양도)
13. Hanrim (한림)

This work was supported by 1990-1991 year grant from Korean Science and Engineering Foundation.

mens were collected by the author and others using pincette and shovel in the intertidal zone and by SCUBA diver and fishing net in subtidal zone. They were fixed, preserved in about 75% methyl alcohol and identified on the basis of their morphological characteristics. For those species newly reported in the Korean fauna, a brief description and the plates are introduced.

Systematic Account

The ophiuroids identified turned out to be 26 species belonging to 11 families and 2 orders. Of which 5 species (asterisk *): *Ophiomyxa australis*, *Ophiacantha levispina*, *Ophiactis dyscrita*, *Ophiocentrus verticillatus*, *Ophiarachnella infernalis* are newly reported in Korean ophiuroid fauna.

Phylum Echinodermata Klein, 1734 극피동물 문

Class Stelleroidea Lamarck, 1816 성형강

Subclass Ophiuroidea Gray, 1840 사미아강

Order Phrynophiurida Matsumoto, 1915 혁사미목

Suborder Ophiomyxina Müller et Troschel, 1842 점사미아목

Family Ophiomyxidae Ljungman, 1866 피부거미불가사리과(신칭)

Genus *Ophiomyxa* Müller et Troschel, 1842 피부거미불가사리속(신칭)

***1. *Ophiomyxa australis* Lütken, 1869** 피부거미불가사리(신칭) (pl. 1, figs. 1-6)

Ophiomyxa australis Lütken, 1869 (p. 45); Lyman, 1882 (p. 246); 1883 (p. 247); Brock, 1888 (p. 532); Koehler, 1898 (p. 123); H. L. Clark, 1909 (p. 547); 1911 (p. 271); 1915 (p. 168, pl. I, figs. 1 & 2); 1939 (p. 36); 1946 (p. 170); Matsumoto, 1917 (p. 19, fig. 3, pl. I, Figs. 4-7); Mortensen, 1924 (p. 111, figs. 4 & 5); Murakami, 1944 (p. 237); Irimura, 1969 (p. 38); A. M. Clark & Rowe, 1971 (p. 78, fig. 22a, pl. XIII, figs. 3 & 4); Devaney, 1974 (p. 115); Cherbonnier & Guille, 1978 (p. 18); Irimura, 1982 (p. 2, text-fig. 1, pl. I, figs. 1, 2); 1990 (p. 69).

Ophiomyxa brevispina Martens, 1870 (p. 249); Brock, 1888 (p. 530); Döderlein, 1896 (p. 298, pl. XVII, figs. 27 & 27a); H. L. Clark, 1915 (p. 1709). *Ophiomyxa brevispina* var. *irregularis* Koehler, 1898 (p. 111).

Ophiomyxa irregularis; Koehler, 1922 (p. 17, pl. II, fig. 18, pl. V, figs. 1 & 2, pl. VI, fig. 4, pl. ICII, fig. 2).

Ophiomyxa robillardi Loriol, 1893 (p. 53, pl. XXV, figs. 5 & 5d).

Material examined: Piyangdo, June 20, 1985, 1 specimen.

Description: r = 24 mm, R = 112 mm. Whole body covered with skin providing soft touch. Disk covered with skin thick and pentagonal shape. Radial shield also covered with skin but lower portion of radial shield where arm attached rather elevated and appear to be a long rod shape. Interbrachial area also covered with a thick skin. Genital slit large, wide and open to two third of disk margin. Since oral shield and adoral plate covered with skin, shape not clear but they consist of three oral papillae. Arm a narrow and long whip shape and its length about more than four and a half times larger than a half of disc diameter. Arm covered with skin so dorsal arm plate and ventral arm plate can not be seen but arm spine short, seven in number at proximal part of arm and its length equal to length of an arm joint. One arm spine on dorsal side separated from the other and slightly long, its end blunt and the rest attached to lateral arm plate. Arm spines covered with skin and connected with each other somewhat like a web. Tentacle pore present but no tentacle scale. Color brown in alcohol.

Distribution: Korea (Cheju Island), Japan (South of Tugaru Strait), Indo-West Pacific Ocean.

Suborder Euryalina Müller et Troschel, 1840 만사미아목

Family Gorgonocephalidae Ljungman, 1867 삼천발이과

Genus *Gorgonocephalus* Lyman, 1865 삼천발이속

2. *Gorgonocephalus dolichodactylus* Döderlein, 1911 긴자루삼천발이

Material examined: Cheju-hang 80 m, Feb. 6, 1986, 1 specimen.

Distribution: Korea (Cheju Island), Japan (Sagami Bay).

Genus *Astrodendrum* Döderlein, 1911 나무거미불가사리속

3. *Astrocladus coniferus dofleini* Döderlein, 1910 도플라인혹가지거미불가사리

Material examined: Cheju-hang 80 m, Feb. 6, 1986, 1 specimen; Ch'ujado 100 m, Feb. 6, 1986, 2 specimens.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu), Peter the Great Bay, Vladivostok, Philippines.

4. *Astrocladus ludwigi* (Döderlein, 1896) 루디웁가지거미불가사리

Material examined: Söwip'o, Jan. 19, 1985, 1 specimen.

Distribution: Korea (Cheju Island), Indonesia, Australia.

Family Euryalidae Gray, 1840 넓적거미불가사리과

Genus *Astroceras* Lyman, 1869 별불가사리속

5. *Astroceras annulatum* Mortensen, 1933 고리별거미불가사리

Material examined: Sögwip'o, Jan. 19, 1985, 4 specimens; Oct. 24, 1991, 2 specimens.

Remark: This species undergoes self-fission and always are clinging to the gorgonaceans, Anthozoa.

Distribution: Korea (Cheju Island), Japan (Honsyu, Kyusyu).

Order Myophiurida Matsumoto, 1915 폐사미목

Suborder Laemophiurina Matsumoto, 1915 후사미아목

Family Ophiacanthidae (Perrier, 1891) 침거미불가사리과

Genus *Ophiacantha* Müller et Troschel, 1842 침거미불가사리속

*** 6. *Ophiacantha levispina* Lyman, 1878** 미끈침거리불가사리(신칭) (pl. 2, figs. 1-5)

Ophiacantha levispina Lyman, 1878 (p. 147, pl. 10, fig. 277); 1882 (p. 196, pl. XXV, figs. 1-3); H. L. Clark, 1911 (p. 198); 1915 (p. 200); Matsumoto, 1917 (p. 115); D'yakonov, 1954 (p. 30); Irimura, 1968 (p. 33); 1981 (p. 20); 1982 (p. 26, Text-fig. 16, pl. VI, figs. 1, 2); 1991 (p. 125).

Material examined: Sögwip'o, Dec. 24, 1971, 1 specimen.

Description: r = 3.5 mm, R = 20 mm. Disk and interbrachial area covered with small spine whose end split into two or three. Radial shield long, narrow and covered with spine. Genital slit long. Oral shield small diamond shape and its width longer than its length. Adoral plate long, two fold larger than oral shield and widely contact with each other in oral side. Number of oral papillae three or four and outer one largest. Dorsal arm plate fan shape and separated from each other. Lateral arm plate well developed and its central portion narrow inwards and its dorsal and ventral side adjacent. Ventral arm plate pentagonal shape which largest at proximal portion of arm becomes smaller and separated from each other toward end of arm. Arm spine seven in number, long, narrow and spines on dorsal side larger than that on ventral side. A very small and pointed tentacle scale present in a tentacle pore. Color brownish gray in alcohol.

Distribution: Korea (Cheju Island), Japan (Sea of Japan, Honsyu, Kyusyu), East China Sea, Celebes, Madagascar, Andaman Archipelago, Cape Bluff.

Suborder Gnathophiurina Matsumoto, 1915 악사미아목

Family Ophiactidae Matsumoto, 1915 뱀이거미불가사리과

Genus *Ophiactis* Lütken, 1856 뱀이거미불가사리속

7. *Ophiactis profundus* Lütken et Mortensen 1899 깊은뱀이거미불가사리

Material examined: Sögwip'o, Dec. 1, 1978, 1 specimen; Ch'ujado, Feb. 6, 1986, 1 specimen; Söngsanp'o, Oct. 24, 1991, 1 specimen.

Remark: They usually have six arms but sometimes have seven arms. Some specimens were found in being self-fission.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Sea of Japan, Honsyu, Kyusyu), Malaysian Water, Gulf of Panama, Malpelo Island.

*** 8. *Ophiactis dyscrita* H. L. Clark, 1911** 작은뱀이불가사리(신칭) (p. 2, figs. 6-10)

Ophiactis dyscrita H. L. Clark, 1911 (p. 137, fig. 52a-c); 1915 (p. 266); Matsumoto, 1917 (p. 154); Downey, 1969 (p. 85); Irimura, 1969 (p. 40).

Material examined: Sögwip'o, July 11, 1965, 1 specimen; Jan. 19, 1985, 4 specimen.

Description: $r = 2.2$ mm, $R = 9.2$ mm. Disk covered with folded large scale and centrodorsal plate not clear. Radial shield long, narrow and separated by one large scale except outer one. Interbrachial area covered with scales smaller than that of disk. Genital slit large and clear. Oral shield round triangle and its length a little bit larger than its width. Adoral plate pentagonal and its width wider than its length. Dorsal arm plate pentagonal, its length almost same as its width and connected to middle part of arm. Arm spine three in number, its middle one largest and as long as an arm joint. A large and round tentacle scale present in a tentacle pore. Color light brown in alcohol.

Distribution: Korea (Cheju Island), Japan (Honsyu, Kyusyu), Hawaii.

9. *Ophiactis affinis* Duncan, 1879 유사뱀이거미불가사리

Material examined: Söngsanp'o, Oct. 8, 1987, 13 specimens; Pömdo, Oct. 22, 1991, 2 specimens.

Distribution: Korea (Korea Strait, Cheju Island, Yellow Sea), Japan (Kyusyu), China, Philippines, Malaysian Water, Banda Sea, Indo-Pacific Ocean.

10. *Ophiactis savignyi* (Müller and Troschel, 1842) 뱀이거미불가사리

Material examined: Söngsanp'o, July 9, 1985, 20 specimens; Sögwip'o, Jan. 19, 1985, 15 specimens; Pömdo, Oct. 22, 1991, 2 specimens; Ch'agwido, Oct. 23, 1991, 4 specimens; Chigwido, Oct. 23, 1991, 2 specimens; Söngsanp'o, Oct. 24, 1991, 16 specimens; Marado, Oct. 23, 1991, 4 specimens.

Remark: This species undergoes self-fission and several specimens were found in clinching to sponges and anthozoans.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu), China, Philippines, Singapore, North Australia, Zanzibar, South Pacific Ocean, Indo-West Pacific Ocean, Red Sea, Madagascar, West Africa.

Genus *Ophiopholis* Müller et Troschel, 1842 뿔거미불가사리 속

11. *Ophiopholis mirabilis* (Duncan, 1879) 뿔거미불가사리

Material examined: Ch'ujado, Feb. 6, 1986, 13 specimens; Cheju-hang, Feb. 6, 1986, 2 specimens.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island, Yellow Sea), Japan (Kyusyu, Hokkaido), Okhotsk Sea.

12. *Ophiopholis brachyactis* H. L. Clark, 1991 완뿔거미불가사리

Material examined: Ch'ujado 100 m, Feb. 6, 1986, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Sea of Japan, Honsyu, Kyusyu), East China Sea.

Genus *Amphipholis* Ljungman, 1866 양비늘거미불가사리 속

13. *Amphipholis squamata* Delle Chiaje, 1828 양비늘거미불가사리

Material examined: Söngsanp'o, Oct. 5, 1991, 1 specimen.

Distribution: Korea (Korea Strait, cheju Island), Japan, Arctic Sea, Indo-West Pacific Ocean, West Africa, Atlantic Ocean, Cosmopolitan.

14. *Amphipholis pugetana* Lyman, 1868 후개타나양비늘거미불가사리

Material examined: Udo, Oct. 7, 1985, 1 specimen.

Distribution: Korea (Cheju Island), Japan (Sea of Japan, Hokkaido), California.

Genus *Amphiura* Forbes, 1842 턱뱀거미불가사리 속

15. *Amphiura koreae* Duncan, 1879 턱뱀거미불가사리

Material examined: Ch'ujado 100 m, Feb. 6, 1986, 6 specimens.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Honsyu, Kyusyu), China, Philippines, Indo-West Pacific Ocean, Madagascar, California, Central America.

Genus *Ophiocentrus* Ljungman, 1867 송이거미불가사리 속(신칭)

*16. *Ophiocentrus verticillatus* (Döderlein, 1896) 밤송이거미불가사리(신칭) (pl. 1, figs. 7-13)

Ophiocnida verticillata Döderlein, 1896 (p. 287, pl. XIV, figs. 2a & b, pl. XV, figs. 7 & 7a); Koehler, 1905 (p. 29, pl. II, fig. 4).

Ophiocentrus verticillatus Matsumoto, 1917 (p. 214, fig. 59); Irimura, 1988 (p. 321).

Material examined: Pömdo, Oct. 22, 1991, 1 specimen.

Description: r = 13 mm, R = 140 mm. Arm all broken and not possible to measure its length accurately but seems to be long. Disk pentagonal shape whose interbrachial area convex, portion of that which in contact with arm constricted and elevated over arm. Disk covered with soft skin on which a small, short and pointed spines scattered. Short spines rarely seen near interbrachial area and absent around mouth. Radial shields long, narrow rod shape and in contact with each other on proximal portion of arm. Oral shield heart shape, adoral plate bent and not in contact with each other inwards. Oral papillae two in number, one on mouth large, thick while the other located right above the former thin, long and attached to inner side of adoral plate. Genital slit open towards margin of disk. Arm thin and long. Dorsal arm plate small, its width and length almost the same at proximal portion but after that it becomes longer and its width twice longer than its length. Ventral arm plate almost rectangular shape whose outer side concave and length of plate at proximal part of arm much longer but its width becoming broader. Lateral arm plate narrow, arm spine on dorsal arm plate blunt, flat but arm spine on ventral arm plate slender and long. Tentacle pore present but tentacle scale absent. Color light brown in alcohol.

Distribution: Korea (Cheju Island), Japan (Honsyu).

Family Ophiotrichidae Ljungman, 1867 가시거미불가사리 과

Genus *Ophiothrix* Müller and Troschel, 1840 가시거미불가사리 속

17. *Ophiothrix koreana* Duncan, 1879 고려가시거미불가사리

Material examined: Söngsanp'o, Oct. 5, 1991, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Sea of Japan, Honsyu, Kyusyu), East China Sea, Philippines, Amboina, Banda Sea, Indo-West Pacific Ocean.

18. *Ophiothrix exigua* (Lyman, 1874) 짧은가시거미불가사리

Material examined: Ch'ujado, Feb. 6, 1986, 2 specimens; Cheju-hang, Feb. 6, 1986, 2 specimens; Sögwip'o, Oct. 9, 1986, 3 specimens; Söngsanp'o, Oct. 8, 1987, 8 specimens; Ch'agwido, Oct. 23, 1991, 1 specimen; Söngsanp'o, Oct. 24, 1991, 2 specimens.

Description: Young specimens are often clinging to adult specimen and sponges.

Distribution: Korea (Sea of Japan, Korea Strait, Cheju Island, yellow Sea), Japan (Sea of Japan, Honsyu, Kyusyu), China, Hongkong, Philippines, Amboina, Indo-West Pacific Ocean, North Australia, Madagascar, Africa.

Genus *Ophiogymma* Ljungman, 1866 뱀가시거미불가사리 속

19. *Ophiogymma fulgens* (Koehler, 1905) 큰뱀가시거미불가사리

Material examined: Sögwip'o, Oct. 6, 1991, 1 specimen.

Distribution: Korea (Korea Strait, Cheju Island), Japan (Honsyu), China, East China Sea, Philippines, Indonesia.

Genus *Ophiothela* Verrill, 1867 꼭지거미불가사리 속

20. *Ophiothela danae* Verrill, 1869 비단꼭지거미불가사리

Material examined: Pömdo, Oct. 22, 1991, 5 specimens.

Remark: This species are always found on the gorgonaceans, Anthozoa.

Distribution: Korea (Cheju Island), Japan (Kyusyu), Philippines, Indo-West Pacific Ocean, Australia.

Suborder Chilophiurina Matsumoto, 1915 순사미
아목

Family Ophiodermatidae Ljungman, 1867 가죽거
미불가사리 과

Genus *Pectinura* Forbes, 1843 빗거미불가사리
속

21. *Pectinura anchista* H. L. Clark, 1911 빗거미
불가사리

Material examined: Pöbhwon, July 12, 1985, 1
specimen.

Distribution: Korea (Cheju Island), Japan, East
China Sea, Indo-West Pacific Ocean, Zanzibar,
New Zealand.

Genus *Ophiarachnella* Ljungman, 1872 뱀거미
불가사리 속

**22. *Ophiarachnella gorgonia* Müller et Troschel,
1842** 뱀거미불가사리

Material examined: Udo, Oct. 7, 1985, 1 speci-
men; Piyangdo, Feb. 5, 1986, 7 specimens; Han-
rim, Oct. 9, 1987, 4 specimens; Ch'ujado, July
21, 1990, 1 specimen; Söngsanp'o, Oct. 24,
1991, 2 specimens.

Distribution: Korea (Sea of Japan, Korea Strait,
Cheju Island), Japan (Sea of Japan, Honsyu,
Kyusyu, Shikoku), Philippines, Torres Strait, In-
do-West Pacific Ocean, Zanzibar.

***23. *Ophiarachnella infernalis* (Müller et Tros-
chel, 1842) 고사리뱀거미불가사리(신칭)
(pl. 3, figs. 1-6)**

Ophiarachna infernalis Müller et Troschel, 1842
(p. 105).

Pectinura infernalis Lütken, 1869 (p. 33); Koehler,
1905 (pl. 1, figs. 1-3).

Ophiarachnella infernalis H. L. Clark, 1909 (p.
124); 1915 (p. 305); 1946 (p. 262); Matsumoto,
1917 (p. 324, fig. 90); A. M. Clark & Rowe, 1971
(p. 125).

Material examined: Ch'agwido, Oct. 23, 1991, 1
specimen.

Description: r = 10 mm, R = 31 mm. Disk pen-
tagonal shape, covered with granules and even
margin of radial shield covered with granules ex-
cept its central part. Portion between both radial
shields, namely proximal part of arm, not covered

with granules forming a triangle as three parts and
exposed. Round portion of interradius center,
near margin of disk, not covered with granules.
Disk contains dark and light color forming round
stripes. Color at every sixth position of arm joints
becomes lighter forming band stripe. Interbrachial
area covered with smaller granules than those of
disk. Genital slit slender and open to two third
portion of disk margin. Oral shield exposed but
oral plate and adoral plate all covered with small
granules. Oral papillae small, seven to eight in
number and inner one of them pointed but outer
one slightly stumpy. Dorsal arm plate hexagon,
overlap each other and its margin covered with
small granules. Arm spine short, ten in number at
proximal part of arm and equivalent to less than
one half of length of an arm joint. Ventral arm
plate forms a hexagon but not covered with gra-
nules. Two tentacle scale present in a tentacle
pore and inner one much larger.

Distribution: Korea (Cheju Island), Japan, Califor-
nia, Monterey Bay, Indo-West Pacific Ocean.

Family Ophionereididae Lütken, 1859 딱지거미
불가사리 과

Genus *Ophionereis* Lütken, 1859 딱지거미불가
사리 속

24. *Ophionereis dubia* Müller et Troschel, 1842
줄딱지거미불가사리

Material examined: Ch'agwido, Oct. 23, 1991, 1
specimen.

Distribution: Korea (Korea Strait, Cheju Island),
Hongkong, Indo-West Pacific Ocean.

Family Ophiuridae Lyman, 1865 빗살거미불가사
리 과

Subfamily Ophiolepidinae Matsumoto, 1915 비늘
거미불가사리 아과

Genus *Ophioplocus* Lyman, 1861 곱슬거미불가
사리 속

25. *Ophioplocus japonicus* H. L. Clark, 1911 왜
곱슬거미불가사리

Material examined: Piyangdo, June 19, 1985, 1
specimen; Feb. 6, 1986, 12 specimens; Söngsan-
p'o, Oct. 24, 1991, 1 specimen.

Distribution: Korea (Sea of Japan, Korea Strait,
Cheju Island), Japan (Sea of Japan, Honsyu,

Kyusyu).

Family Ophiocomidae Ljungman, 1869 뱀털거미
불가사리 과

Genus Ophiomastix Müller & Troschel, 1842 채
찍거미불가사리 속

26. Ophiomastix mixta Lütken, 1869 빨간등거
미불가사리

Material examined: Sögwip'o, July, 12, 1985, 1
specimen; Mundo, July 13, 1985, 2 specimens;
Söngsanp'o, Oct. 24, 1991, 1 specimen.

Distribution: Korea (Cheju Island), Japan (Hon-
syu, Kyusyu), PHilliphines, Amboina, South Paci-
fic Ocean, Indo-Pacific Ocean.

Acknowledgements

The author would like to express her deep
appreciation to Dr. Boon Jo Rho and Dr. Jum-Im
Song, Department of Biology, Ewha Womans
University and Dr. Chung-Ja Sim, Department of
Biology, Hannam University for providing a part
of specimens for this work.

References

- Brock, J., 1888. Die Ophiuriden faunades Indischen
Archipels. *Zeit. f. Wiss. Zool.* **48**: 465-539.
- Cherbonnier, G. and A. Guille, 1978. Faune de Madag-
ascar 48, Echinodermes: Ophiurides. Editions du C.
N. R. S., Paris, 253pp., 77 figs., 17pls.
- Clark, A. M. and F. W. E. Rowe, 1971. Monograph of
Shallow-Water Indo-West Pacific Echinoderms. Trus-
tees Brit. Mus. (Nat. Hist.) London, vii + 238pp., 100
figs., 31pls.
- Clark, H. L., 1909. Echinodermata Scientific Results of
the Trawling Expedition of H. M. C. S. "Thesis" off the
Coast New South Wales in February and March,
1898. *Aust. Mus. Sydney Mem.* **4**: 519-564, pls.
47-58.
- Clark, H. L., 1911. North Pacific Ophiurans in the Col-
lection of the United States National Museum. *Smith.
Inst. Unit. Stat. Nat. Mus., Bull.* **75**: 1-302.
- Clark, H. L., 1915. Catalogue of Recent Ophiurans:
Based on the Collection of the Muscum of Compara-
tive Zoology. *Mum. Mus. Com. Zoll. Harv. Coll.* **25**:
1-374, 20pls.
- Clark, H. L., 1939. Ophiuroidea. *Scient. Rep. John Mur-
ray Exped.* **4**: 29-136, 62 Text-figs.
- Clark, H. L., 1946. The Echinoderm fauna of Australia
Its Composition and Its Origin. Carnegie Inst. Wash.,
567pp.
- Devaney, D. M., 1974. Shallow-Water Asterozoans of
Southeastern Polynesia II. Ophiuroidea. *Micronesica*
10: 105-204.
- Döderlein, L., 1896. Bericht über die van semon bei
Amboina und Thursday Islands gesammelten Ophiur-
oidea, in Semon's Forschungereisen. 5, Jena (cited
from Koehler, R., 1922).
- Downey, M. E., 1969. Catalog of Recent Ophiuroid
Type Specimens in Major Collections in the United
States. *U.S. Nat. Mus. Bull.* **293**: 1-239.
- D'yakonov, A. M., 1954. Ophiuroids of the USSR Seas.
Acad. Sci. USSR. **55**: 1-136, 47 figs.
- Irimura, S., 1968. Ophiurans from Tanabe Bay and its
vicinity (prediction). *Nankiseibutu* **10**: 30-38 (trans-
lated from Japanese).
- Irimura, S., 1969. Supplemental report of Dr. Muraka-
mi's paper on the ophiurans of Amakusa, Kyushu.
Pub. Amakusa Mar. Biol. Lab., Kyushu Univ. **2**:
37-48, 4pls.
- Irimura, S., 1981. Ophiurans from Tanabe Bay and its
vicinity with the description of a new species of
Ophiocentrus. *Pub. Seto Mar. Biol. Lab.* **26**: 15-48, 9
figs., 1pl.
- Irimura, S., 1982. The Brittle-stars of Sagami Bay. *Biol.
Lab. Imp. House., Japan.* pp. 1-95, 15pls.
- Irimura, S., 1988. Ossicles of the stomach wall of
Ophiuroidea and their taxonomic significance. *In*:
Echinoderm Biology, Burke et al. (eds.), A. A. Balke-
ma, Rotterdam, Brookfield. pp. 315-322.
- Irimura, S., 1990. Ophiuroidea, *In*: Echinoderms from
Continental Shelf and Slope around Japan Vol. 1.
Japan Fish. Resource Cons. Ass., pp. 67-100.
- Irimura, S., 1991. Ophiuroidea, *In*: Echinoderms from
Continental Shelf and Slope around Japan Vol. 2.
Japan Fish. Resource Cons. Ass., pp. 112-152.
- Koehler, R., 1898. Echinodermes recueillis par "l'Inves-
tigator" dans l'océan Indien. II. Les Ophiures littorales.
Bull. Sci. **31**: 51-124, pls. 2-5.
- Koehler, R., 1905. Ophiures littorales. *Siboga Exped.,
Mon.* **45b**: 1-422, 18pls.
- Koehler, R., 1922. Ophiurans of the Philippine Seas and
Adjacent Waters. *Smith. Inst. Unit. Stat. Nat. Mus.,
Bull.* **100**: VIII + 486pp., 103pls.
- Loriolle, P. De, 1893. Catalogue raisonné des Echi-
nodermes recueillis par M. V. de Robillard á l'île
Maurice. III. Ophiurides et Astrophytides. *Mem. Soc.
Phy. Hist. nat. Genève* **32**: 1-63, pl. 23-25 (cited
from Cherbonnier, G. and A. Guille, 1978).

- Lyman, T., 1878. No. 7- Ophiuridae and Astrophytidae of the Exploring voyage of H. M. S. "Challenger," under Prof. Sir Wyville Thomson, F. R. S. U.S. Coast Survey. *Bull. Mus. Comp. Zool. Harv.*, pp. 65-168, 10pls.
- Lyman, T., 1882. Report on the Ophiuroidea dredged by H. M. S. Challenger during the years 1873-76. *Bull. Mus. Comp. Zool. Harv.*, 386pp., 48pls.
- Lyman, T., 1883. Report on the Results of Dredging under the Supervision of Alexander Agassiz, in the Caribbean Sea in 1878-79, and along the Atlantic Coast Survey Steamer "Blake" Commander J. R. Bartlett, U. S. M., Commanding. XX. Report on the Ophiuroidea. *Bull. Mus. Comp. Zool. Harv.* **10**: 227-287, 8pls.
- Lütken, C., 1869. Additamenta ad historiam Ophiuridarum. 3. Beskrivende og Kritik Bidrag til kundskab om Slangestjernerne. *K. danske Vidensk. Selsk.* **5**: 24-109, 3 figs (cited from Cherbonnier, G. and A. Guille, 1978).
- Martens, E. Von, 1870. Die Ophiuriden des Indischen Ocean **36**: 224-262.
- Matsumoto, H., 1917. A monograph of Japanese Ophiuroidea, arranged according to a new classification. *Jour. Coll. Sci. Imp. Univ. Tokyo* **38**: 1-408, 52pls.
- Mortensen, T., 1924. Papers from Cr. Th. Mortensen's pacific expedition 1914-16. XX. Echinoderms of New Zealand and the Auckland-Campbell Islands. II. Ophiuroidea. *Vidensk. Medd. Fra Dansk Naturh. Foren* **77**: 91-177, pls. 3-4.
- Müller, J. et F.-H. Troschel, 1842. System der Asteriden Brunschweig pp. 1-134, 12pls.
- Murakami, S., 1944. Report on the Ophiurans from off Ogasawara Islands and from off the Yaeyama group, Nippon. *Dept. Agric. Kyusyu Imp. Univ.* **7**: 235-257, 1pl.
- Rho, B. J., 1979. A Study on the Classification and the Distribution of the Echinoderms in Korea. *Jour. Kor. Res. Inst. Bet. Liv.* **23**: 33-50.
- Rho, B. J. and H. S. Kim, 1966. Studies on the Echinodermata (Echinoidea, Asteroidea and Ophiuroidea) from Korea. *Collect. Thes. Writ. Commen. Dr. Emma Kim's Forty Years Teac.* Ewha Womans Univ., Seoul, Korea pp. 273-283, 9pls.
- Rho, B. J. and S. Shin, 1983. A Systematic Study on the Ophiuroidea in Korea 2. Phrynophiurida. *Jour. Kor. Res. Inst. Bet. Liv.* **31**: 57-64. 4pls.
- Rho, B. J. and S. Shin, 1987. Systematic Study on the Ophiuroidea from Cheju Island, Korea. *Korean. J. Syst. Zool.* **3**: 208-224, 2pls.
- Shin, S. and B. J. Rho, 1986. *Ophiacantha linea* a New Brittlestar Species from Cheju Island, Korea (Echinodermata, Ophiuroidea). *Korean. J. Syst. Zool.* **2**: 59-66.

(Accepted May 30, 1992)

한국산 사미류의 계통분류학적 연구

II. 제주도

신 숙(목포대학교 자연과학대학 생물학과)

한국산 사미류의 분류학적 연구를 하기 위하여 1965년 7월부터 1991년 10월까지 제주도 해역의 13개 지역(제주항, 성산포, 우도, 지귀도, 서귀포, 문도, 법환, 범도, 마라도, 차귀도, 비양도, 한림, 추자도)에서 채집하여 보관중이던 표본을 동정·분류하였다. 그 결과 2목 11과 26종의 사미류가 밝혀졌고 이들 중 *Ophiomyxa australis*, *Ophiacantha levispina*, *Ophiactis dyscrita*, *Ophiocentrus verticillatus*, *Ophiarachnella infernalis* 5종은 한국미기록종이다. 현재까지 제주도에 분포하는 것으로 밝혀진 사미류는 30종이다.

Explanation of Plates**Plate 1**

Figs. 1-6. *Ophiomastix australis* Lütken

1, dorsal view; 2, ventral view; 3, radial shield and arm spine; 4, oral plate and oral papillae; 5, 6, lateral arm plate and arm spine. Scale size: 1-2, 1 cm; 3-6, 50 μ m.

Figs. 7-13. *Ophiocentrus verticillatus* (Döderlein)

7, 9, dorsal view; 8, 10, ventral view; 11, arm spine; 12, dorsal arm plate and arm spine; 13, ventral arm plate and arm spine. Scale size: 7-10, 1 cm; 11-13, 50 μ m.

Plate 2

Figs. 1-5. *Ophiacantha levispina* Lyman

1, 5, dorsal view; 2, 3, ventral view; 4, dorsal arm plate and arm spine. Scale size: 1 mm.

Figs. 6-10. *Ophiactis dyscrita* H. L. Clark

6, dorsal view; 7, 10, ventral view; 8, dorsal arm plate and arm spine; 9, lateral arm plate and arm spine. Scale size: 1 mm.

Plate 3

Figs. 1-6. *Ophiarachnella infernalis* Müller et Troschel

1, 3, dorsal view; 2, 4, ventral view; 5, dorsal arm plate and arm spine; 6, lateral arm plate and arm spine. Scale size: 1-4, 1 cm; 5-6, 50 μ m.

PLATE 1

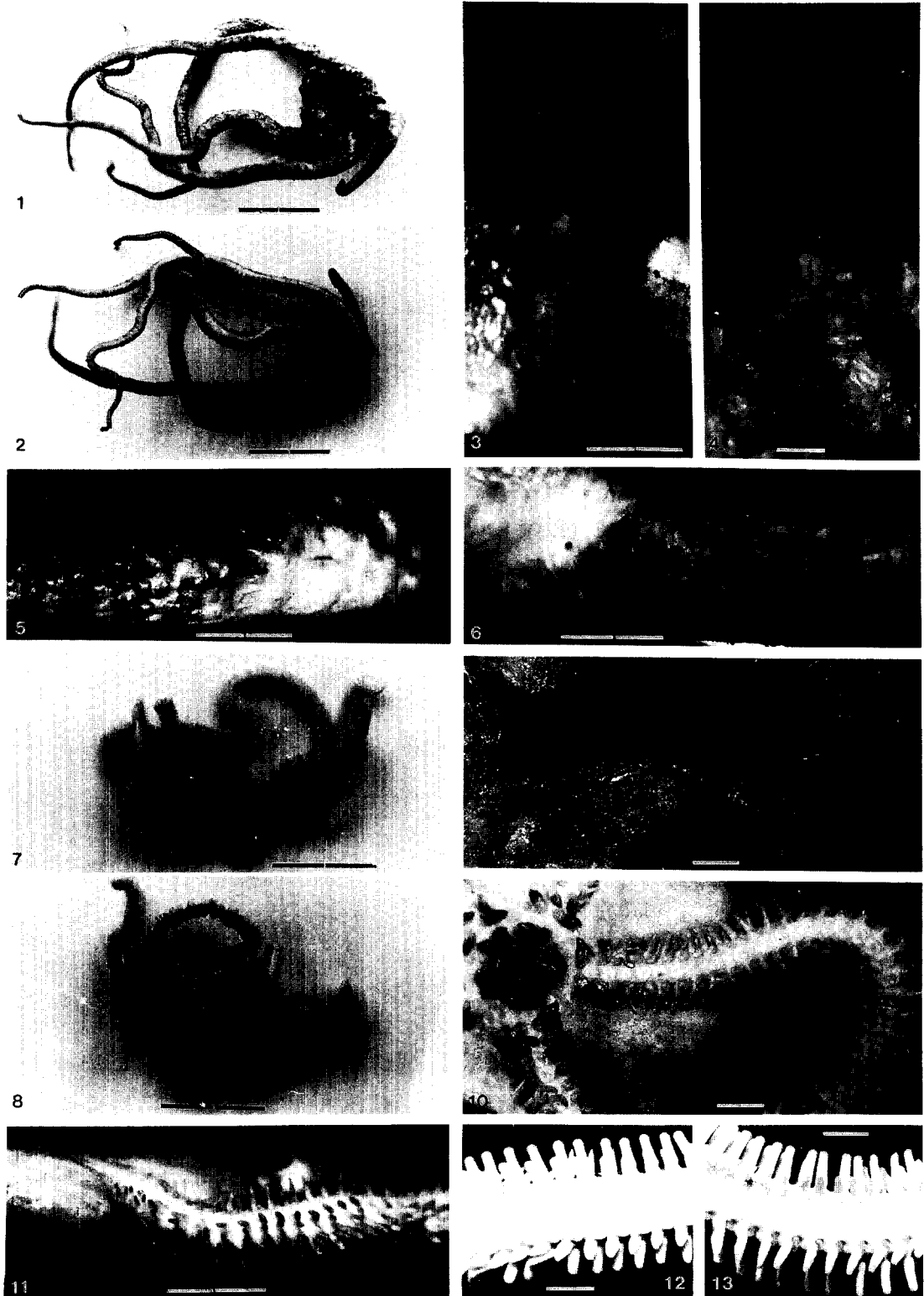


PLATE 2

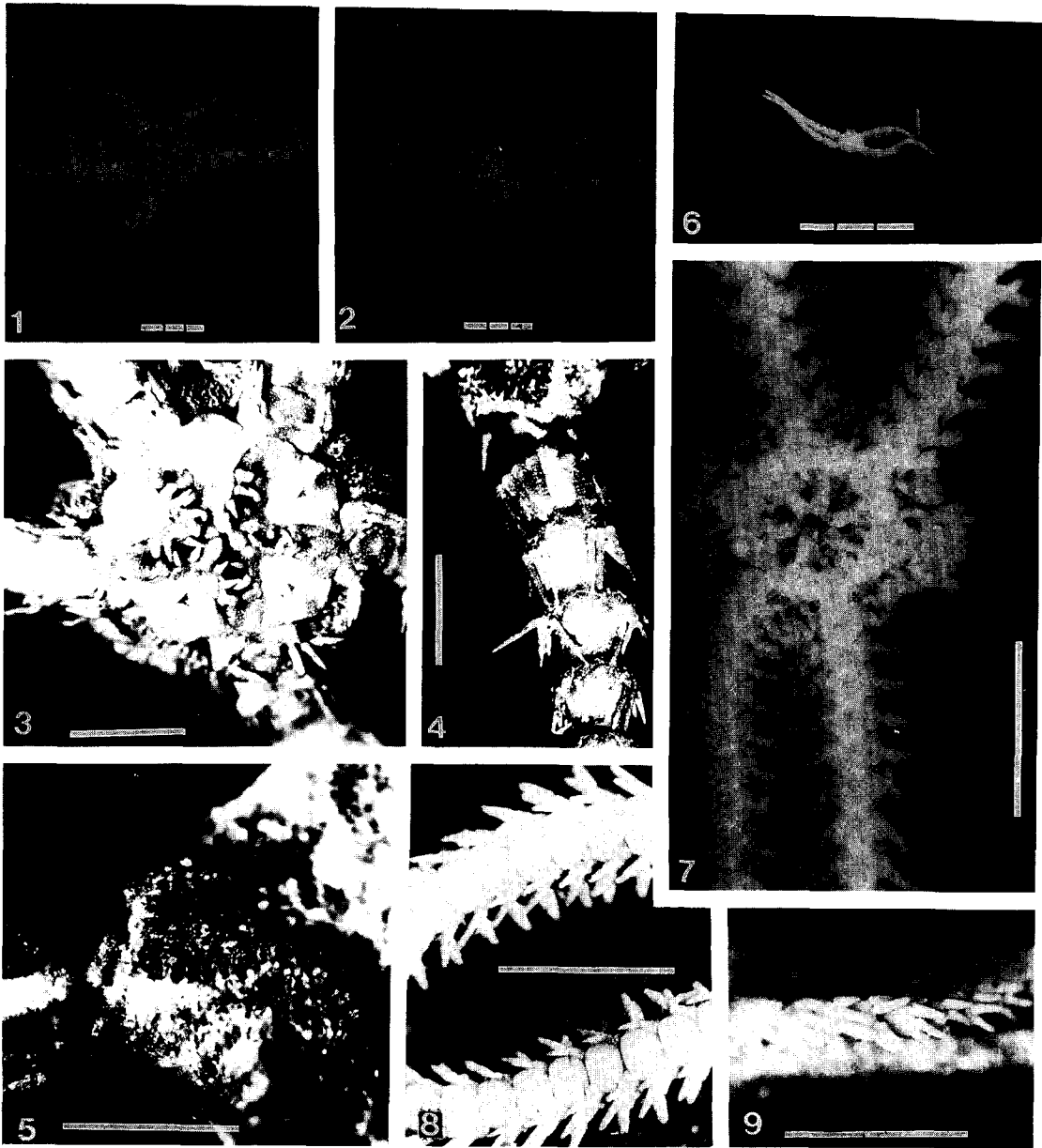


PLATE 3

