

Fauna of Echinoderms from Jindo Island and Its Adjacent Waters, Korea

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ABSTRACT

The joint faunal survey of Jindo Island, Korea was performed by the Korean Society of Systematic Zoology during June 29–July 1, 2004 in commemoration of the 20th anniversary. In this study, 20 echinoderm species of 13 families, ten orders in four classes such as one crinoid species, seven asteroid species of four families in three orders, five ophiuroid species of three families in two orders, four echinoid species of two families in one order, and three holothuroid species of three families in three orders collected from six localities (Bealpo, Chopyung, Supum, Hoedong, Seomang, and 34° 11'N and 126° 21'E) were identified. Of these, one crinoid (*Antedon serrata*), two asteroids (*Solaster dawsoni* and *Distolasterias nipon*) and one ophiuroid (*Astrodendrum sagaminum*) are newly added to the echinoderm fauna of Jindo Island and one holothuroid (*Pseudocnus* sp.) is newly recorded in Korean waters. The total 31 species are presently listed with some brief remarks and their distribution patterns are discussed based on the composition of geographical distribution forms.

Key words: fauna, Echinodermata, Jindo Island, Korea

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INTRODUCTION

Jindo Island (Is.) is located at the southern part of the Korean Peninsula and at the junction of the South Sea and Yellow Sea which are influenced by the warm current driven from the Kuroshio and the cold current of Yellow Sea waters, respectively. Owing to its location, the marine fauna of the Jindo Is. is very important for the marine zoogeographical study in South Korea.

The echinoderm species are one of the well-known coastal invertebrate groups in Jindo Is. Matsumoto (1917) reported one ophiuroids; Rho and Shin (1980) one asteroids; Shin (1992a) four asteroids; Shin (1992b) three ophiuroids; Shin (1995) six asteroids, nine ophiuroids, four echinoids and three holothuroids which were identified for the result of the 1994 joint faunal survey of Jindo Is. in commemoration of the 10th anniversary of the Korean Society of Systematic Zoology (KSSZ); Won and Rho (1998) one holothuroids, and then Shin and Park (2003a, b) recorded nine asteroids, four ophiuroids, four echinoids and three holothuroids. However, no crinoid species were recorded from Jindo Is. The faunal studies of Jindo Is. and taxonomic studies on many species have been conducted insufficiently. The second joint faunal survey was carried at Jindo Is. in commemoration of the 20th anniversary of the KSSZ. The aim of the present study is to determine the fauna of echinoderms from Jindo Is. and its adjacent waters.

MATERIALS AND METHODS

The present study was based on the materials collected from six localities (Bealpo, Chopyeong, Supum, Hoedong, Seomang, and 34° 11'N and 126° 21'E) in Jindo Is. and its adjacent waters during the period from June 29 to July 1, 2004 (Fig. 1). The echinoderms were collected from several habitats in the intertidal zone such as rocky shore, tide pool and mud flat, etc. with hand and pincette. And the echinoderm specimens were sampled with fishing nets used from 50-60 m in depth of 34° 11'N and 126° 21'E.

All specimens were fixed and preserved in 75% methyl alcohol and deposited in the Department of Life Science, Sahmyook University, Korea. These specimens were identified on the basis of their morphological characteristics and for more detailed observations the microscope and stereomicroscope were used. The species identified in this work and reported previously (Matsumoto, 1917; Rho and Shin, 1980; Shin, 1992a, b, 1995; Won and Rho, 1998; Shin and Park, 2003a, b) were listed.

RESULTS

The echinoderms identified in this faunistic study of Jindo Is. turned out to be 20 species of 18 genus, 13 families, ten orders in four classes including the class Crinoidea which is first reported from Jindo Is. and they are as follows (*): Crinoidea (one species), Asteroidea (seven species), Ophiuroidea (five species), Echinoidea (four species) and Holothuroidea (three species). Of these,

one crinoid (*Antedon serrata*), two asteroids (*Solaster dawsoni* and *Distolasterias nipon*) and one ophiuroid (*Astrodendrum sagaminum*) are newly added to the echinoderm fauna of Jindo Is. (**) and one holothuroid (*Pseudocnus* sp.) is new to Korean fauna (**).

As a result of analyzing the previous reports and the present work, a total of 31 echinoderm species from 19 localities of Jindo Is. and its adjacent waters are listed with some brief remarks. In addition, the zoogeographical aspects of Jindo Is. are also discussed based on the composition of geographical distribution forms of echinoderms (crinoids, asteroids, ophiuroids, echinoids and holothuroids).

Phylum Echinodermata Klein, 1734

Class Crinoidea Müller, 1821

Order Comantulida Clark, 1908

Family Antedonidae Norman, 1865

Genus *Antedon* de Freminville 1811

****1. *Antedon serrata* Clark, 1907**

Material examined. Hoedong, 1 July 2004, 1 ind. (S. Shin and H. S. Kwon).

Remark. This species is newly reported from Jindo Is. and is rarely found at the intertidal zone in Korea.

Distribution. Korea (South Sea, Yellow Sea), Japan, The Formosa Channel, China.

Class Stellerioidea Lamarck, 1816

Subclass Asteroidea de Blainville, 1830

Order Phanerozonia Sladen, 1889

Family Luidiidae Verrill, 1839

Genus *Luidia* Forbes, 1839

2. *Luidia quinaria* von Martens, 1865

Previous record. Shin, 1995 (34° 19'N and 126° 10'E); Shin and Park, 2003a (Seomang).

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, Kwangdung Peninsula, Indo Pacific Ocean.

Order Spinulosa Perrier, 1894

Family Asterinidae Gray, 1840

Genus *Asterina* Nardo, 1834

3. *Asterina minor* Hayashi, 1974

Previous record. Shin, 1995 (Jukrim); Shin and Park, 2003a (Seomang).

Distribution. Korea (Korea Strait, Yellow Sea), Japan.

4. *Asterina batheri* Goto, 1914

Previous record. Shin, 1992b (Heonbokdong); Shin and Park, 2003a (Gahag); Shin and Park, 2003b (Seogochado Is.).

Distribution. Korea (South Sea, Jejudo Is.), Japan.

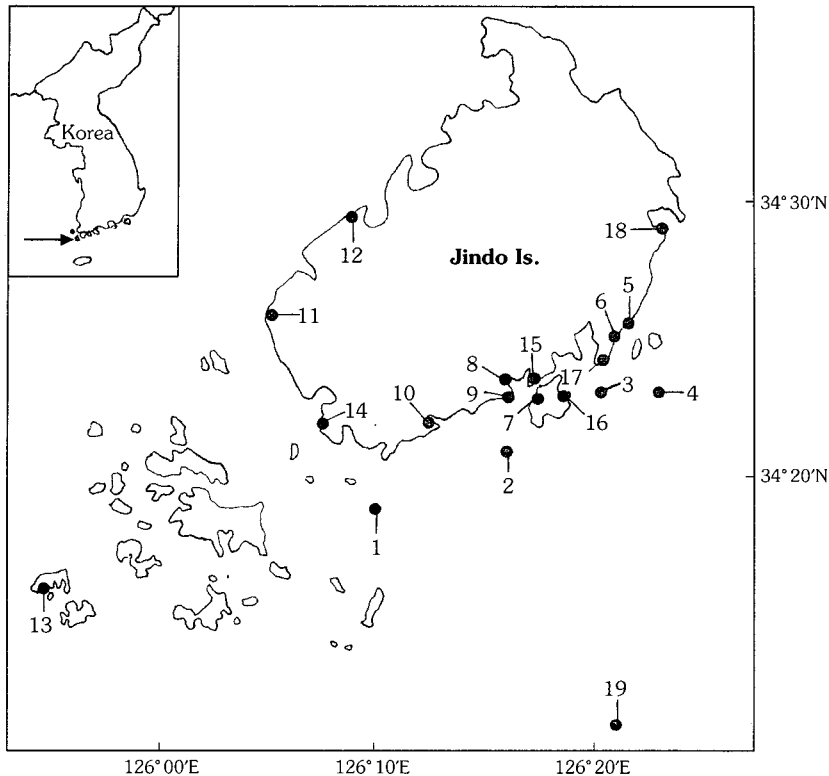


Fig. 1. A map showing the localities where the materials were collected in the previous studies (1-4, 6-13, 15) and the present work (5, 14, 16-19). 1, 34° 19'N, 126° 10'E; 2, 34° 21'N, 126° 16'E; 3, 34° 23'N, 126° 20'E; 4, 34° 23'N, 126° 23'E; 5, Hoedong; 6, Gunpo; 7, Jeopdo; 8, Jukrim; 9, Heonbokdong; 10, Gulpo; 11, Gahak; 12, Galdu; 13, Seogeochoado Is.; 14, Seomang; 15, Geumgap; 16, Supum; 17, Chopyung; 18, Beolpo; 19, 34° 11'N, 126° 21'E.

*5. *Asterina pectinifera* Müller et Troschel, 1842

Previous record. Rho and Shin, 1980 (Jeopdo); Shin, 1992b (Heonbokdong, Jukrim, Gahak, Gulpo); Shin, 1995 (34° 23'N and 126° 20'E, Gunpo); Shin and Park, 2003a (Galdu, Gahag, Seomang); Shin and Park, 2003b (Seogeochoado Is.).

Material examined. Seomang, 30 June 2004, 2 Inds. (S. Shin and H. S. Kwon), with fishing net in 30 m deep; Supum, 30 June 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 20 m deep; Chopyoung, 30 June 2004, 1 Ind. (Y. H. Kim); Beolpo, 1 July 2004, 2 Inds. (Y. H. Kim), with fishing net in 5 m deep; Hoedong, 1 July 2004, 1 ind. (S. Shin and H. S. Kwon).

Remark. This species was previously recorded from 11 localities of Jindo Is. and is the commonest echinoderm species collected from 13 localities of total 19 localities in Jindo Is. Actually this species is the most widely distributed asteroids in the Korean waters.

Distribution. Korea (East Sea, South Sea, Jeju-do Is., Yellow Sea), Japan, Poseta Bay, Vladivostok, Tatar Strait, Sachalin.

Family Echiniasteridae Verrill, 1867

Genus *Henricia* Gray, 1840

***6. *Henricia nipponica* Uchida, 1928**

Previous record. Shin, 1992b (Gulpo, Heonbokdong, Jukrim); Shin, 1995 (Hoedong); Shin and Park, 2003a (Gahag, Seomang); Shin and Park, 2003b (Seogochado Is.).

Material examined. Beolpo, 29 June 2004, 1 ind. (S. Shin and H. S. Kwon); Chopyoung, 30 June 2004, 1 ind. (Y. H. Kim); Hoedong, 1 July 2004, 10 Inds. (S. Shin and H. S. Kwon).

Remark. This species is also common asteroids collected from 9 localities among total 19 localities in Jindo Is.

Distribution. Korea (East Sea, South Sea, Jejuo Is., Yellow Sea), Japan.

Family Solasteridae Forbes, 1839

Genus *Solaster* Forbes, 1839

****7. *Solaster dawsoni* Verrill, 1911**

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 7 Inds. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Remark. This species is newly reported from Jindo Is.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, North Pacific Ocean.

***8. *Solaster uchidai* Hayashi, 1939**

Previous record. Shin and Park, 2003b (Seogochado Is.).

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 4 Inds. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, East China Sea, North Pacific Ocean.

Genus *Crossaster* Müller et Troschel, 1840

***9. *Crossaster papposus* (Linné, 1767)**

Previous record. Shin, 1992b (Heonbokdong); Shin, 1995 (34° 21'N and 126° 16'E); Shin and Park, 2003a (Galdu); Shin and Park, 2003b (Seogochado Is.).

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (East Sea, South Sea), Japan, North Pacific Ocean, Arctic Ocean, North Atlantic Ocean.

Order Forcipulata Perrier, 1884

Family Asteriidae Gray, 1840

Subfamily Coscinasterinae Fisher, 1923

Genus *Coscinasterias* Verrill, 1867

10. *Coscinasterias acutispina* (Stimpson, 1857)

Previous record. Shin and Park, 2003b (Seogochado Is.).

Distribution. Korea (South Sea, Jejuo Is., Yellow Sea), Japan, China, Indo West Pacific Ocean.

Genus *Distolasterias* Perrier, 1896

****11. *Distolasterias nipon* (Döderlein, 1902)**

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Remark. This species is newly reported from Jindo Is.

Distribution. Korea (East Sea, South Sea), Japan, Peter the Great Bay, Hong Kong.

Subfamily Asteriinae Verrill, 1914

Genus *Aphelasterias* Fisher, 1923

***12. *Aphelasterias japonica* (Bell, 1881)**

Previous record. Shin and Park, 2003b (Seogochado Is.).

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, Sachalin, Tatar Strait, Aniba Bay.

Subclass Ophiuroidea Gray, 1840

Order Phrynophiurida Matsumoto, 1915

Suborder Euryalina Lamarck, 1816

Family Gorgonocephalidae Ljungman, 1867

Genus *Astrodendrum* Döderlein, 1911

****13. *Astrodendrum sagaminum* (Döderlein, 1902)**

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 8 Inds. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Remark. This species is newly reported from Jindo Is.

Distribution. Korea (South Sea), Japan (Honsyu, Kyusyu), East China Sea, Indian Ocean.

Genus *Astrocladus* Verrill, 1899

***14. *Astrocladus coniferus coniferus* Döderlein, 1902**

Previous record. Shin, 1995 (Heonbokdong).

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (East Sea, South Sea, Jejudo Is.), Japan (Southern Honsyu, Kyusyu), Peter the Great Bay, East China Sea, Philippines, Indo-Pacific Ocean.

***15. *Astrocladus coniferus dofleini* Döderlein, 1910**

Previous record. Shin, 1995 (34° 21'N and 126° 16'E); Shin and Park, 2003a (Galdu); Shin and Park, 2003b (Seogochado Is.).

Material examined. Seomang, 30 June 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 30 m deep; Supum, 30 June 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 20 m deep; 34° 11'N and 126° 21'E, Jindo Is., 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (South Sea, Jejudo Is., Yellow Sea), Japan, Peter the Great Bay, Vladivostok,

Philippines.

Order Myophiurida Matsumoto, 1915
 Suborder Gnathophiurina Matsumoto, 1915
 Family Ophiactidae Matsumoto, 1915
 Genus *Ophiactis* Lütken, 1856

16. *Ophiactis affinis* Duncan, 1879

Previous record. Shin, 1995 (Heonbokdong).

Distribution. Korea (South Sea, Jejudo Is., Yellow Sea), Japan, China, Indo West Pacific Ocean.

Family Amphiuridae Ljungman, 1867
 Genus *Amphipholis* Verrill, 1899

17. *Amphipholis squamata* (Delle Chiaje, 1828)

Previous record. Shin, 1995 (34° 23'N and 126° 20'E, 34° 23'N and 126° 23'E).

Distribution. Korea (South Sea, Jejudo Is., Yellow Sea), Japan, Artic Sea, Indo pacific ocean, West Africa, Atlantic Ocean, Cosmopolitan.

Genus *Amphiura* Forbes, 1842

18. *Amphiura vadicola* Matsumoto, 1915

Previous record. Matsumoto, 1917 (Jindo Is.); Shin, 1995 (34° 23'N and 126° 20'E).

Distribution. Korea (South Sea, Yellow Sea), Japan, Indo Pacific Ocean.

19. *Aphiura sinicola* (Matsumoto, 1941)

Previous record. Shin, 1992a (Gahak); Shin and Park, 2003a (Seomang).

Distribution. Korea (South Sea, Yellow Sea), Japan.

Family Ophiotrichidae Ljungman, 1867
 Genus *Ophiothrix* Müller et Troschel, 1840

***20. *Ophiothrix exigua* (Lyman, 1874)**

Previous record. Shin, 1992a (Jukrim, Gahak, Gulpo); Shin, 1995 (Heonbokdong, Hoedong, 34° 21'N and 126° 16'E); Shin and Park, 2003a (Galdu, Gahag); Shin and Park, 2003b (Seogechado Is.).

Material examined. Chopyoung, 30 June 2004, 5 Inds. (Y. H. Kim); Hoedong, 1 July 2004, 14 Inds. (S. Shin and H. S. Kwon).

Remark. This species is the commonest species among ophiuroids collected from 9 localities among total 19 localities in Jindo Is. Actually it is the most widely distributed ophiuroids in the Korean waters.

Distribution. Korea (East Sea, South Sea, Jejudo Is., Yellow Sea), Japan, Indo West Pacific Ocean.

Suborder Chilophiurina Matsumoto, 1915
 Family Ophiuridae Lyman, 1865
 Subfamily Opholepidinae Matsumoto, 1915
 Genus *Ophioplocus* Lyman, 1861

***21. *Ophioplocus japonicus* H.L. Clark, 1911**

Previous record. Shin, 1992a (Jukrim); Shin and Park, 2003a (Gahag); Shin and Park, 2003b (Seogochado Is.).

Material examined. Hoedong, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon)

Distribution. Korea (East Sea, South Sea, Jejuo Is., Yellow Sea), Japan, Hong Kong.

Subfamily Ophiurinae Lyman, 1865
 Genus *Stegophiura* Matsumoto, 1915

22. *Stegophiura sladeni* (Duncan, 1879)

Previous record. Shin, 1995 (Heonbokdong).

Distribution. Korea (South Sea), Japan, Indo West Pacific Ocean.

Class Echinoidea Leske, 1778
 Order Echinoidea Claus, 1876
 Suborder Temnopleurina Mortensen, 1942
 Family Temnopleuridae A. Agassiz, 1872
 Genus *Temnopleurus* L. Agassiz, 1841

***23. *Temnopleurus toreumaticus* (Leske, 1778)**

Previous record. Shin, 1995 (Heonbokdong); Shin and Park, 2003a (Seomang); Shin and Park, 2003b (Seogochado Is.).

Material examined. Supum, 30 June 2004, 5 Inds. (S. Shin and H. S. Kwon), with fishing net in 20 m deep.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, Formosa, Indo West Pacific Ocean.

***24. *Temnopleurus hardwicki* (Gray, 1885)**

Previous record. Shin, 1995 (Heonbokdong, 34° 19'N and 126° 10'E, Gunpo, 34° 21'N and 126° 16'E, Hoedong).

Material examined. Beolpo, 30 June 2004, 15 Inds. (Y. H. Kim), with fishing net in 5 m deep; Seomang, 30 June 2004, 1 Ind. (S. Shin and H. S. Kwon), with fishing net in 30 m deep.

Remark. This species is one of the common echinoid species collected 7 localities of total 19 localities in Jindo Is. Actually this species is the most widely distributed echinoids in the mud flat of Korean waters.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan, Kamtchaka, China, Philippines, Arafura Sea.

Suborder Echinina Claus, 1876
 Family Strongylocentrotidae Gregory, 1897
 Genus *Strongylocentrotus* Brandt, 1835

***25. *Strongylocentrotus nudus* (A. Agassiz, 1863)**

Previous record. Shin and Park, 2003b (Seogochado Is.).

Material examined. 34° 11'N and 126° 21'E, 1 July 2004, 12 Inds. (S. Shin and H. S. Kwon), with fishing net in 50-60 m deep.

Distribution. Korea (East Sea, South Sea, Yellow Sea), Japan.

Genus *Hemicentrotus* Mortensen, 1942

***26. *Hemicentrotus pulcherrimus* (A. Agassiz, 1863)**

Previous record. Shin, 1995 (Gulpo, Jukrim); Shin and Park, 2003a (Galdu, Gahag, Seomang); Shin and Park, 2003b (Seogochado Is.).

Material examined. Hoedong, 1 July 2004, 3 Inds. (S. Shin and H. S. Kwon).

Remark. This species is one of the common echinoid species collected 7 localities of total 19 localities in Jindo Is. Actually this is the most widely distributed echinoids in the rocky shore of Korean waters.

Distribution. Korea (East Sea, South Sea, Jeju Is., Yellow Sea), Japan, China.

Family Echinometridae Gray, 1855

Genus *Anthocidaris* Lütken, 1864

27. *Anthocidaris crassispina* (A. Agassiz, 1863)

Previous record. Shin, 1995 (Heonbokdong); Shin and Park, 2003a (Gahag).

Distribution. Korea (East Sea, South Sea, Jeju Is., Yellow Sea), Japan, Formosa, Hong Kong.

Class Holothuroidea de Balinville, 1834

Order Dendrochirotida Grube, 1840

Family Cucumariidae Ludwig, 1894

Genus *Pseudocnus* Panning, 1949

28. *Pseudocnus pawsoni* Won and Rho, 1998

Previous record. Won, 1993 (Jeopdo, Geumgap, Haedong).

Distribution. Korea (South Sea).

*****29. *Pseudocnus* sp.**

Material examined. Hoedong, 1 July 2004, 1 Ind. (S. Shin and H. S. Kwon).

Remark. This species was found inside the dead oyster valve attached on the downside rock. It is first reported in Korean waters and is currently under taxonomic revision.

Distribution. Korea (South Sea).

Order Aspidochirotoidea Grube, 1840

Family Stichopodidae Haeckel, 1896

Genus *Stichopus* Brandt, 1835

***30. *Stichopus japonicus* Selenka, 1867**

Previous record. Shin, 1995 (Heonbokdong); Shin and Park, 2003a (Gahag, Seomang); Shin and Park, 2003b (Seogochado Is.).

Material examined. Beolpo, 29 June 2004, 1 Ind..(Y. H. Kim), with fishing net in 5 m deep.

Remark. This species is the commonest holothuroids collected 4 localities of total 19 localities in Jindo Is. Actually it is the most widely distributed holothuroids in the Korean waters.

Distribution. Korea (East Sea, South Sea, Jejudo Is., Yellow Sea), Japan, HongKong, Sachalin, Vladivostok.

Order Apodida Brandt, 1835

Family Synaptidae Burmeister, 1837

Genus *Protankyra* Ostergren, 1898

***31. *Protankyra bidentata* (Woodward and Barrett, 1858)**

Previous record. Shin, 1995 (Gulpo).

Material examined. Beolpo, 29 June 2004, 4 Inds. (S. Shin and H. S. Kwon).

Distribution. Korea (South Sea), Japan, China, Philippines.

DISCUSSION

A faunistic study of echinoderms was carried out with specimens collected from six localities at the intertidal and subtidal zone of Jindo Is. and its adjacent waters in June 29-July 1, 2004. Twenty echinoderm species belonging to 18 genus, 13 families, ten orders and four classes comprising one crinoid species, seven asteroid species in six genus, four families and three orders, five ophiuroid species in five genus, three families and two orders, four echinoid species in three genus, two families and one order, and three holothuroid species in three genus, three families and three orders were identified and classified. Of these, four species of echinoderms are newly reported from the study area in this survey and they are as follows: one crinoids (*Antedon serrata*), two asteroids (*Solaster dawsoni* and *Distolasterias nipon*) and one ophiuroids (*Astrodendrum sagaminum*). And also among 20 species in 13 families, one holothuroids (*Pseudocnus* sp.) is newly found in Korean waters. The class Crinoidea and the order Focipulata of class Asteroidea are reported for the first time in Jindo Is.

Therefore, with the previous records, a total of 31 echinoderm species (one crinoids, 11 asteroid species in five families, three orders; ten ophiuroids in five families, three orders; five echinoids in three families, one order; four holothuroids in three families, three orders) are known to occur in Jindo Is. and its adjacent waters.

As a result of analyzing the previous reports and the present work, a total of 31 echinoderm species from 19 localities of Jindo Is. and its adjacent waters are listed with some brief remarks. *Asterina pectinifera* was previously recorded from 11 localities of Jindo Is. and is the commonest echinoderm species collected from 13 localities of total 19 localities in Jindo Is. Actually this species is the most widely distributed asteroids in Korean waters. And also *Henricia nipponica* is the common astroids collected from nine localities in Jindo Is. Among ophiuroids, *Ophiothrix exigua* is the commonest species collected from nine localities of Jindo Is. and is actually the most widely distributed ophiuroids in Korean waters so far. *Temnopleurus hardwicki* is one of the common echinoid species collected from seven localities of Jindo Is. and is actually the most widely

distributed echinoids in the mud flat of Korean waters. And also *Hemicentrotus pulcherrimus* is one of the common echinoid species collected from seven localities in Jindo Is. But this is the most widely distributed echinoids in the rocky shore of Korean waters. In particular, the fact that these two echinoid species is common demonstrate that Jindo Is. is located at the southwestern part of

Table 1. Occurrences and the geographical distribution forms of echinoderms in Jindo Island and its adjacent waters.

Species	Locality	Previous record	Present study	Distribution form ⁽¹⁾			
				N	T	S	C
1. <i>Antedon serrata</i>	5		○		○		
2. <i>Luidia quinaria</i>	1,14	○ ^{5,7,8}				○	
3. <i>Asterina minor</i>	8,14	○ ^{5,7}			○		
4. <i>Asterina batheri</i>	9,11,13	○ ^{3,7,8}			○		
5. <i>Asterina pectinifera</i>	3,5,6,7,8,9,11,12, 13,14,16,17,18	○ ^{2,4,5,7,8}	○		○		
6. <i>Henricia nipponica</i>	5,8,9,10,11,13,14,17,18	○ ^{4,5,7,8}	○		○		
7. <i>Solaster dawsoni</i>	19		○	○			
8. <i>Solaster uchidai</i>	13,19	○ ⁸	○		○		
9. <i>Crossaster papposus</i>	2,9,12,13,19	○ ^{4,5,7,8}	○	○			
10. <i>Coscinasterias acutispina</i>	13	○ ⁸			○		
11. <i>Distolasterias nipon</i>	19		○		○		
12. <i>Aphelasterias japonica</i>	13,19	○ ⁸	○		○		
13. <i>Astrodendrum sagaminum</i>	19		○		○		
14. <i>Astrocladus coniferus coniferus</i>	9,19	○ ⁵	○			○	
15. <i>Astrocladus coniferus dofleini</i>	2,12,13,14,16,19	○ ^{5,8}	○		○		
16. <i>Ophiactis affinis</i>	9	○ ⁵				○	
17. <i>Amphipholis squamata</i>	3,4	○ ⁵					○
18. <i>Amphiura vadicola</i>	3	○ ^{1,5}			○		
19. <i>Aphiura sinicola</i>	11,14	○ ^{2,8}			○		
20. <i>Ophiothrix exigua</i>	2,5,8,9,10,11,12,13,17	○ ^{3,5,7,8}	○			○	
21. <i>Ophioplocus japonicus</i>	5,8,11,13	○ ^{3,8}	○		○		
22. <i>Stegophiura sladeni</i>	9	○ ⁵				○	
23. <i>Temnopleurus toreumaticus</i>	9,13,14,16	○ ^{5,7,8}	○			○	
24. <i>Temnopleurus hardwicki</i>	1,2,5,6,9,14,18	○ ⁵	○			○	
25. <i>Strongylocentrotus nudus</i>	13,19	○ ⁸	○		○		
26. <i>Hemicentrotus pulcherrimus</i>	5,8,10,11,12,13,14	○ ^{5,7,8}	○		○		
27. <i>Anthocidaris crassispina</i>	9,11	○ ^{5,7}			○		
28. <i>Pseudocnus pawsoni</i>	5,7,15	○ ⁶			○		
29. <i>Pseudocnus</i> sp.	5		○		○		
30. <i>Stichopus japonicus</i>	9,11,13,14	○ ^{5,7,8}	○		○		
31. <i>Protankyra bidentata</i>	10,18	○ ⁵	○		○		
Total	19	26	20	2	21	7	1

Previous record: ¹Matsumoto (1917); ²Rho and Shin (1980); ³Shin (1992a); ⁴Shin (1992b); ⁵Shin (1995); ⁶Won and Rho (1998); ⁷Shin and Park (2003a); ⁸Shin and Park (2003b). Abbreviations: Distribution forms⁽¹⁾ N: northern form; T: temperate form; S: southern form; C: cosmopolitan species.

Table 2. Numbers of species of crinoids, asteroids, ophiuroids, echinoids, and holothuroids categorized by geographical distribution forms in Jindo Island and its adjacent waters.

Taxon	Geographical distribution form				Total
	Northern	Temperate	Southern	Cosmopolitan	
Crinoids	0	1 (100.0%)	0	0	1
Asteroids	2 (18.2%)	8 (72.7%)	1 (9.1%)	0	11
Ophiuroids	0	5 (50.0%)	4 (40.0%)	1 (10.0%)	10
Echinoids	0	3 (60.0%)	2 (40.0%)	0	5
Holothuroids	0	4 (100%)	0	0	4
Total	2 (6.5%)	21 (67.7%)	7 (22.6%)	1 (3.2%)	31

the Korean Peninsula and at the junction of South Sea and Yellow Sea whose sediments usually consist of mud flat. Among holothuroids, *Stichopus japonicus* is the commonest species collected from four localities of Jindo Is. and also is the most widely distributed holothuroid in the Korean waters.

In addition, the zoogeographical aspects of Jindo Is. are also discussed based on the composition of geographical distribution forms of echinoderms (crinoids, asteroids, ophiuroids, echinoids and holothuroids). Tables 1 and 2 show the species composition of the 31 echinoderm species from Jindo Is. and its adjacent waters according to the distribution forms. In Jindo Is. area, 31 echinoderms comprise two species (6.5%) of northern form, 21 species (67.7%) of temperate form, seven species (22.6%) of southern form and one species (3.2%) of cosmopolitan form. Of these, 11 species of asteroids consist of two species (18.2%) of northern form, eight species (72.7%) of temperate form and one species (9.1%) of southern form. Among ten species of ophiuroids, five species (50.0%) are temperate form, four species (40.0%) are southern form, and one species (10.0%) is cosmopolitan. Of five echinoids, three species (60.0%) are temperate form and two species (40.0%) are southern form. In case of crinoids and holothuroids, one crinoids and four holothuroids are all temperate forms. Considering the geographical distribution form of echinoderm species in Jindo Island and its adjacent waters, the echinoderms of temperate form are predominant in these areas, and the southern form is more dominant than the northern one. These results show that Jindo Is. is quite influenced by the branch of Kuroshio Warm Current.

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진도 해역의 극피동물상

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요 약

2004년 6월 29일부터 7월 1일까지 이루어진 한국동물분류학회 창립 20주년 기념 합동채집회에서 벌포와 초평, 수품, 회동, 서망, 북위 34°11'N과 동경 126°21'E 등, 진도의 6개 지역에서 채집되어 동정된 극피동물은 4강 10목 13과 20종으로서 바다나리가 1목 1과 1종, 불가사리류가 3목 4과 7종, 거미불가사리류가 2목 3과 5종, 성게류가 1목 2과 4종, 해삼류가 3목 3과 3종이었다. 이들 중 바다나리류 1종, 가시에쁜갯고사리 (*Antedon serrata*)와 불가사리류 2종, 도우손햇님불가사리 (*Solaster dawsoni*)와 일본불가사리 (*Distolasterias nipon*), 그리고 거미불가사리류 1종, 나무거미불가사리 (*Astrodendrum sagaminum*)는 진도에서 처음 기록되는 종이며 1종의 한국 미기록 해삼류 (*Pseudocnus* sp.)가 포함된다. 과거기록을 포함하여 총 31종의 종 목록을 작성하였으며, 분포형과 종 출현양상을 근거로 진도 해역의 극피동물상을 논하였다.