

한국산 개오지불이 과 (복족 강: 흡강 목) 의 분류 및 기재

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Classification and Description of Ovulidae (Gastropoda: Sorbeoconcha) from Korean Water

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ABSTRACT

Ovulid species were collected during the period from 1998 to 2004 years at six localities of Korean coastal area. Ovulidae in Korea was classified as 27 species in 11 genera. Twenty two species among them have never been reported in Korean fauna; *Habuprionovolva hervieri* (Hedley, 1899), *Prionovolva brevis* (Sowerby, 1828), *P. pudica pudica* (A. Adams, 1855), *P. bulla* (Adams & Reeve, 1848), *Dentiovula colobica* (Azuma & Cate, 1971), *Pseudosimnia (Diminovula) punctata* (Duclos, 1831), *Pseudosimnia (Inflatovula) culmen* (Cate, 1973), *Aperiovula allynsmithi* Cate, 1978, *Primovula (Primovula) tigris* Yamamoto, 1971, *Crenovolva (Cuspivolva) cuspis* Cate, 1973, *Phenacovolva (Phenacovolva) lahainaensis* (Cate, 1969), *P. (P.) subreflexa* (Adams & Reeve, 1848), *P. (P.) improcera* (Azuma & Cate, 1971), *P. (P.) weaveri* Cate, 1973, *P. (P.) poppei* Fehse, 2001, *Phenacovolva (Turbovula) brevirostris* (Schumacher, 1817), *P. (T.) fusula* Cate & Azuma, 1973, *P. (T.) dancei* Cate, 1973, *P. (T.) hirasei* (Pilsbry, 1913), *Phenacovolva (Calcarrovula) longirostrata* (Sowerby, 1828), *P. (C.) tokioi* Cate, 1973, and *Volva volva habei* Oyama, 1961.

Keywords: Ovulidae, Korean coastal area, New record, Korean fauna.

서론

개오지불이 과의 패류는 인도-서태평양의 열대수역에 주로 분포하며 세계적으로 16 속 100 여종이 알려져 있다 (Wilson, 1993). 국내에는 Lee (1958) 에 의하여 처음으로 1 종이 보고 되었고, Choe (1992) 는 2 종의 국내 미기록종을 포함하여 모두 3 종을 보고하였다. Kwon *et al.* (1993) 은 미동정 종 1 종을 추가하여 2 종을 기록하였고, 목록으로는 Choe (1997) 가 4 종을 기록 하였다. 한편 Kwon *et al.* (2001) 은 도감을 통하여 미기록종 1 종을 포함한 3 종을 발표하였고, Lee and Min (2002) 은 추가종 없이 4 종을 기록하였다.

저자 등은 1998년부터 2004년까지 국내 연안 및 도서지역에서 채집된 개오지불이류를 동정한 결과 모두 11 속 25 종이 동정되었고, 이중 22 종이 국내 미기록종이었다. 따라서 이들 종에 대한 기재와 이미 발표된 2 종을 포함한 11 속 27 종의 한국산 개오지불이과 패류 분류목록을 작성하였다.

재료 및 방법

1998년 10월부터 2004년 4월까지 충청남도 태안군 채석포, 울산시 당사동, 제주도 남제주군 문섬, 제주도 남제주군 범섬, 제주도 남제주군 숲섬, 제주도 남제주군 외돌개 등 6개

Received October 13, 2004; Accepted December 8, 2004

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1225-3480/20207

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지역의 조간대 및 조하대에서 직접 또는 스쿠버 다이빙을 통하여 채집하였다. 채집된 표본은 95% ethanol로 고정하여 민 패류연구소에 보관하였고 동정된 자료는 Higo *et al.* (1999) 의 체계를 따라 목록을 작성하였다.

분류학적 기재

1. 분류목록(* 한국 미기록종)

- Phylum Mollusca Linnaeus, 1758 연체동물 문
- Class Gastropoda Cuvier, 1797 복족 강
- Superorder Caenogastropoda Cox, 1959
신생복족 상목
- Order Sorbeoconcha Ponder & Lindberg, 1997
흡강 목
- Family Ovulidae Fleming, 1822 개오지불이 과
- * 1. *Habuprionovolv* *hervieri* (Hedley, 1899)
구슬개오지불이 (신칭)
- * 2. *Prionovolv* *brevis* (Sowerby, 1828)
흰띠분홍개오지불이 (신칭)
- * 3. *Prionovolv* *putica putica* (A. Adams, 1855)
연분홍개오지불이 (신칭)
- * 4. *Prionovolv* *bull* (Adams & Reeve, 1848)
등근개오지불이 (신칭)
- * 5. *Dentiovul* *colobica* (Azuma & Cate, 1971)
진한무늬토끼고둥 (신칭)
- * 6. *Pseudosimn* *ia (Diminovul) punctata* (Duclos, 1831)
분홍반점개오지불이 (신칭)
- * 7. *Pseudosimn* *ia (Inflatovul) culmen* (Cate, 1973)
클맨개오지불이 (신칭)
- 8. *Xandarovul* *xanthochila* (Kuroda, 1928)
가는옆줄토끼고둥
- * 9. *Aperiovul* *allynsmithi* Cate, 1978
줄무늬토끼고둥 (신칭)
- * 10. *Primovul* *(Primovul) tigris* Yamamoto, 1971
호랑이무늬토끼고둥 (신칭)
- 11. *Crenovolv* *(Cuspivolv) frumentum* (Sowerby, 1828)
어깨토끼고둥
- * 12. *Crenovolv* *(Cuspivolv) cuspis* Cate, 1973
뽕족토끼고둥 (신칭)
- 13. *Sandalia rhodia* (A. Adams, 1855) 주홍토끼고둥
- 14. *Phenacovolv* *(Phenacovolv) rosea rosea* (A. Adams, 1854)
가시두루마리고둥 (국명변경)
- * 15. *Phenacovolv* *(Phenacovolv) lahainaensis* (Cate, 1969)
구름무늬두루마리고둥 (신칭)

- 16. *Phenacovolv* *(Phenacovolv) birostris* (Linnaeus, 1767)
뽕족두루마리고둥 (국명변경)
- * 17. *Phenacovolv* *(Pellasimn* *ia) subreflexa* (Adams & Reeve, 1848)
고랑두루마리고둥 (신칭)
- * 18. *Phenacovolv* *(Pellasimn* *ia) improcera* (Azuma & Cate, 1971)
잘린두루마리고둥 (신칭)
- * 19. *Phenacovolv* *(Pellasimn* *ia) weaveri* Cate, 1973
우아한두루마리고둥 (신칭)
- * 20. *Phenacovolv* *(Pellasimn* *ia) poppei* Fehse, 2001
보라파도무늬두루마리고둥 (신칭)
- * 21. *Phenacovolv* *(Turbovul) brevirostris* (Schumacher, 1817)
두툼짜배기두루마리고둥 (신칭)
- * 22. *Phenacovolv* *(Turbovul) fusula* Cate & Azuma, 1973
작은구름무늬두루마리고둥 (신칭)
- * 23. *Phenacovolv* *(Turbovul) dancei* Cate, 1973
흰띠작은두루마리고둥 (신칭)
- * 24. *Phenacovolv* *(Turbovul) hirasei* (Pilsbry, 1913)
누렁꼭지두루마리고둥 (신칭)
- * 25. *Phenacovolv* *(Calcarovul) longirostrata* (Sowerby, 1828)
카누두루마리고둥 (신칭)
- * 26. *Phenacovolv* *(Calcarovul) tokioi* Cate, 1973
곰은부리두루마리고둥 (신칭)
- * 27. *Volva volva habe* *i* Oyama, 1961
계란두루마리고둥 (신칭)

2. 종 기재

- Phylum Mollusca Linnaeus, 1758 연체동물 문
- Class Gastropoda Cuvier, 1797 복족 강
- Superorder Caenogastropoda Cox, 1959
신생복족 상목
- Order Sorbeoconcha Ponder & Lindberg, 1997
흡강 목
- Family Ovulidae Fleming, 1822 개오지불이 과

개오지불이 과의 속 검색표

- 1 패각은 등근 난원형이다. 7
- 2 패각은 긴 난원형이다. *Prionovolv*
- 3 패각은 전, 후관구가 좁은 원통형이다. 8
- 4 패각은 전각이 있는 마름모형이다. 9
- 5 패각은 가늘고 전, 후관구가 뽕족하다. ... *Phenacovolv*
- 6 패각은 등면이 부풀고 전, 후관구가 급격히 좁아지며 길다. *Volva*
- 7 각구 폭이 넓고 활층돌기가 발달한다. *Habuprionovolv*

- 각구 폭이 좁고 활층돌기가 약하다. *Pseudosimnia*
 8 외순이 얇다. *Xandarovula*
 외순이 두껍다. *Sandalia*
 9 외순이 두껍다. 10
 외순이 얇고 패각에는 구름무늬가 있다. ... *Dentiovula*
 10 외순의 치상주름이 뚜렷하다. 11
 외순의 치상주름이 뚜렷하지 않다. *Primovula*
 11 전, 후 수관구가 넓다. *Aperiovula*
 전, 후 수관구가 좁다. *Crenovolvula*

Genus *Habuprionovolvula* Azuma, 1970

구슬개오지불이 속 (신칭)

1. *Habuprionovolvula hervieri* (Hedley, 1899)

구슬개오지불이 (신칭) (Pl. 1, Fig. 1a, 1b)

Ovula hervieri Hedley, 1899 (Cited from Higo *et al.*, 1999)

Prionovolvula hervieri: Azuma, 1970, p. 179, Text-fig.1

Habuprionovolvula hervieri: Habe, 1976, p.41, pl. 19, fig. 6; Higo *et al.*, 1999, p. 130.

Prionovolvula (Prionovolvula) aenigma: Azuma & Cate, 1971, p. 261, fig. 1.

Galeravolvula aenigma: Cate, 1978, p. 199; Liltved, 2000, p. 99, fig. 156

Habuprionovolvula aenigma: Higo & Goto, 1993, p. 130; Min *et al.*, 2004, p. 160, figs. 343-1, 2, 3, p. 161. 얼룩구슬개오지불이.

Galeravolvula basilia: Cate, 1978, p. 199, pl. I, fig. 1

Habuprionovolvula basilia: Higo & Goto, 1993, p. 130; Min *et al.*, 2004, p. 160, figs. 344-1, 2, 3, p. 161. 작은구슬개오지불이

Material examined: Two specimens, Munseom Jeju-do, May 12, 2002 (D.B. Koh).

Type locality: Funafuti atoll, Ellice island (Tuvalu, Polynesia).

Distribution: Korea, Japan, South Africa.

Habitat: Subtidal to 50 m, parasitic on *Dendronephthya*.

Genus *Prionovolvula* Iredala, 1930

분홍개오지불이 속 (신칭)

분홍개오지불이 속의 종 검색표

- 1 패각은 둥글고 활층 융기선이 발달한다. *bulla*

- 패각은 긴 난형이다. 2
 2 등면에 두 줄의 백색 띠가 있다. *brevis*
 등면에 백색 띠가 없다. *pudica pudica*

2. *Prionovolvula brevis* (Sowerby, 1828)

흰머분홍개오지불이 (신칭) (Pl. 1, Fig. 2a, 2b)

Ovulum breve Sowerby, 1828 (Cited from Higo *et al.*, 1999)

Prionovolvula brevis: Azuma, 1970, p.179, Text-fig. 2; Habe, 1976, p. 41, pl. 19, fig. 7;

Higo & Goto, 1993, p. 131; Wilson, 1993, p. 206, pl. 24, fig. 20a-b; Higo *et al.*, 1999, p. 130; Okutani *et al.*, 2000, p. 210, pl. 105, fig. 5, p. 211; Min *et al.*, 2004, p. 160, figs. 346-1, 2, 3, p. 161.

Material examined: Five specimens, Munseom Jeju-do, Feb. 9, 2002 (D.B. Koh).

Type locality: None given.

Distribution: Korea, Japan, Philippines, Australia.

Habitat: Depth of 20-50 m., sandy mud bottom, parasitic on *Dendronephthya*.

3. *Prionovolvula pudica pudica* (A. Adams, 1855)

연분홍개오지불이 (신칭) (Pl. 1, Fig. 3a, 3b)

Amphiperas (Ovula) pudica A. Adams, 1855, p. 131 (Cited from Liltved, 2000)

Prionovolvula pudica: Okutani & Habe, 1975, p. 84, p. 219; Wilson, 1993, p. 203, pl. 24, fig. 19a-b.

Prionovolvula pudica pudica: Higo & Goto, 1993, p. 131; Ma, 1997, p. 160, pl.7, fig. 3.

Prionovolvula pudica pudica: Higo *et al.*, 1999, p. 130.

Prionovolvula pudica wilsoniana: Habe, 1976, p. 41, pl. 19, fig. 11; Azuma, 1989, p. 161; Higo & Goto, 1993, p. 131.

Prionovolvula wilsoniana: Min *et al.*, 2004, p. 160, figs. 347-1, 2, 3, p. 161.

Material examined: One specimens, Munseom Jeju-do, Jan. 24, 2002 (D.B. Koh).

Type locality: New Caledonia.

Distribution: Korea, Japan, Borneo, New Caledonia.

Habitat: Depth of 10-30 m., sandy mud bottom, parasitic on *Dendronephthya*.

4. *Prionovolva bulla* (Adams & Reeve, 1848)

둥근원개오지불이 (신칭) (Pl. 1, Fig. 4a, 4b)

Prionovolva bulla: Higo & Goto, 1993, p. 131;
Ma, 1997, p. 163, pl. 7, fig. 14;
Higo *et al.*, 1999, p. 131; Okutani, 2000,
p. 210, pl. 105, fig. 4

Prionovolva (Prionovolva) nebula Azuma & Cate,
1971, p. 262, fig. 2.

Testudovolva nebula: Azuma, 1988, p. 257;
Higo & Goto, 1993, p. 131; Higo *et al.*,
1999, p. 130; Min *et al.*, 2004, p. 160, figs.
345-1, 2, 3, p. 161, 그림무늬구슬개오지불이.

Material examined: Two specimens, Munseom Jeju-do,
Jan. 24, 2002 (D.B. Koh); One specimen, Munseom
Jeju-do, Oct. 3, 2001 (D.B. Koh).

Type locality: China Sea.

Distribution: Korea, Japan, China.

Habitat: Depth of 40-50 m, parasitic on
Dendronephthya.

Genus *Dentiovula* Habe, 1961

무늬토키고둥 속 (신칭)

5. *Dentiovula colobica* (Azuma & Cate, 1971)

진한무늬토키고둥 (신칭) (Pl. 1, Fig. 5a, 5b)

Primovula colobica Azuma & Cate, 1971, p. 263,
fig. 6.

Dentiovula colobica: Azuma, 1974, p. 66, pl. 4, fig. 1;
Higo & Goto, 1993, p. 131; Higo *et al.*,
1999, p. 131; Okutani *et al.*, 2000, p. 210,
pl. 105, fig. 6, p. 211.

Material examined: Four specimens, Munseom
Jeju-do, Nov. 8, 2001 (D.B. Koh).

Type locality: off Cape Kirime, Kii peninsula.

Distribution: Korea, Japan.

Habitat: Depth of 30-100 m, parasitic on
Acalycigorgia.

Remark: Min *et al.* (2004) 의 *Crenovolva (Cuspivolva)*
myrakeenae (Azuma & Cate, 1971)는 본 종의 오기임.

Genus *Pseudosimnia* Schilder, 1927

반점개오지불이 속 (신칭)

반점개오지불이 속의 종 검색표

1 전관구가 좁고 짧은 편이다. *punctata*

전관구가 넓고 긴 편이다. *culmen*

6. *Pseudosimnia (Diminovula) punctata* (Duclos,
1831) 분홍반점개오지불이 (신칭) (Pl. 1, Fig. 6a, 6b)

Ovula punctata Duclos, 1831, pl. 7, figs. 2, 3.
(Cited from Azuma, 1973)

Diminovula punctata: Okada, 1983, p. 79;
Wilson, 1993, p. 200, pl. 24, figs. 22a-b.

Pseudosimnia (Diminovula) punctata: Kira, 1959,
p. 43, pl. 18, fig. 5; Cate, 1973,
Supplement, 29, fig. 57; Okutani & Habe,
1975, p. 84, p. 339; Azuma, 1976, p. 111,
pl. 1, fig. 6; Higo & Goto, 1993, p. 131;
Ma, 1997, p. 173, pl. 7, fig. 2.

Pseudosimnia (Diminovula) whiteworthi Cate, 1973,
Supplement, 30, fig. 58; Azuma, 1976,
p. 112, pl. 1, fig. 7; Higo *et al.*, 1999,
p. 130; Min *et al.*, 2004, p. 163,
figs. 351-1, 2, 3, 4.

Material examined: Three specimens, Munseom
Jeju-do, May 10, 2002 (D.B. Koh).

Type locality: Reunion, Indian Ocean.

Distribution: Korea, Japan, Indo-Pacific, Australia.

Habitat: Intertidal to 50 m, parasitic on *Dendro-*
nephtya.

7. *Pseudosimnia (Inflatovula) culmen* (Cate, 1973)

쿨맨개오지불이 (신칭) (Pl. 2, Fig. 7a, 7b)

Pseudosimnia (Inflatovula) culmen Cate, 1973,
Supplement, 33, fig. 65; Azuma, 1976,
p. 114, pl. 1, fig. 12; Azuma, 1989, p. 163;
Higo & Goto, 1993, p. 133; Higo *et al.*,
1999, p. 133; Min *et al.*, 2004, p. 162,
figs. 352-1, 2, 3, 4. p. 163.

Pseudosimnia (Inflatovula) stigma Cate, 1978, p. 196,
pl. 2, fig.6; Higo & Goto, 1993, p. 133;
Higo *et al.*, 1999, p. 133.

Material examined: Four specimens, Munseom
Jeju-do, May 12, 2002 (D.B. Koh).

Type locality: off Cape Hino, Kii peninsula, central
Honshu.

Distribution: Korea, Japan.

Habitat: Depth of 10-30 m, parasitic on *Dendro-*
nephtya.

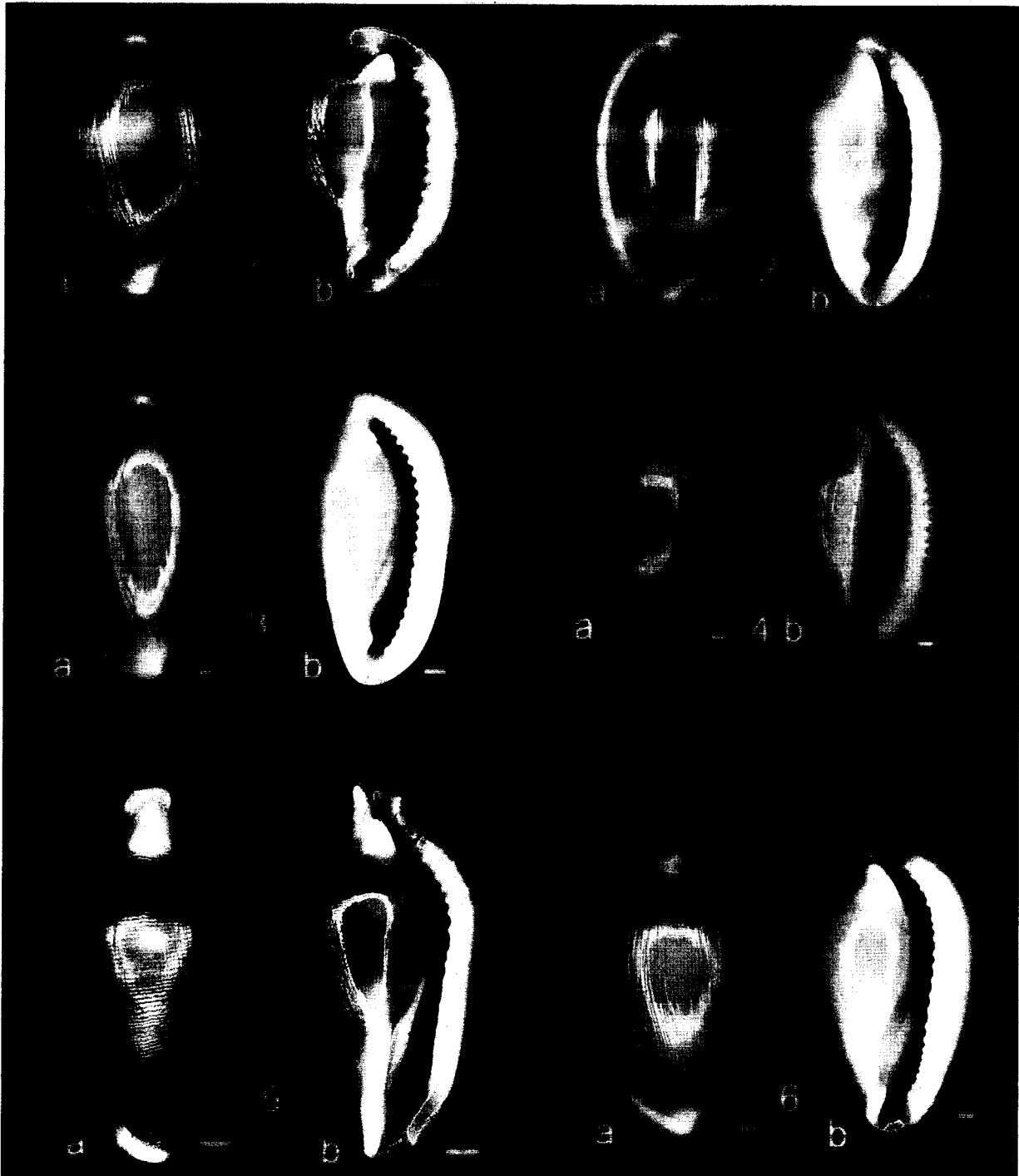


PLATE 1

- Fig. 1a, b.** *Habuprionovolva hervieri* (Hedley, 1899). height: 6.5 mm, width: 4.5 mm.
Fig. 2a, b. *Prionovolva brevis* (Sowerby, 1828). height: 15 mm, width: 9 mm.
Fig. 3a, b. *Prionovolva pudica pudica* (A. Adams, 1855). height: 12 mm, width: 6 mm.
Fig. 4a, b. *Prionovolva bulla* (Adams & Reeve, 1848). height: 12 mm, width: 8mm.
Fig. 5a, b. *Dentiovula colobica* (Azuma & Cate, 1971). height: 12 mm, width: 5.5 mm.
Fig. 6a, b. *Pseudosimnia (Diminovula) punctata* (Duclos, 1831). height: 14 mm, width: 8 mm.
scale bar = 1 mm.

Genus *Xandarovula* Kuroda, 1929

옆줄토끼고둥 속 (신칭)

8. *Xandarovula xanthochila* (Kuroda, 1928)

가는옆줄토끼고둥 (Pl. 2, Fig. 8a, 8b)

Simnia (?) *xanthochila* Kuroda, 1928, pl. 1, fig. 5

(Cited from Azuma, 1976)

Xandarovula xanthochila: Okutani & Habe, p. 84, p. 170; Azuma, 1976, p. 115, pl. 1, fig. 14; Higo & Goto, 1993, p. 134; Ma, 1997, p. 178, pl. 7, fig. 8; Higo *et al.*, 1999, p. 133; Okutani *et al.*, 2000, p. 214, pl. 107, fig. 17, p. 215; Kwon *et al.*, 2001, p. 100, fig. 278-1, 2, p. 101; Lee & Min, 2001, p. 110; Min *et al.*, 2004, p. 162, figs. 353-1, 2, 3, 4, p. 163.

Material examined: One specimen (empty), Chaeseogpo Chungcheongnam-do, April 19, 1999 (D. K. Min); One specimen (empty), Dangsan-dong Chungcheong nam-do, Jan. 10, 1998 (D.K. Min).

Type locality: off southern Shikoku.

Distribution: Korea, Japan.

Habitat: Depth of 50-200 m, parasitic on *Dendronephthya*.

Genus *Aperiovula* Cate, 1973 줄무늬토끼고둥 속 (신칭)

9. *Aperiovula allynsmithi* Cate, 1978

줄무늬토끼고둥 (신칭) (Pl. 2, Fig. 9a, 9b)

Aperiovula allynsmithi Cate, 1978, p. 197, pl. 2, fig. 7; Higo & Goto, 1993, p. 134; Higo *et al.*, 1999, p. 133; Okutani *et al.*, 2000, p. 215.

Cuspivolva allynsmithi: Min *et al.*, 2004, p. 162, figs. 354-1, 2, 3, 4, 5, 6, 7, p. 163.

Material examined: Four specimens, Munseom Jeju-do, April 25, 2004 (D.B. Koh).

Type locality: Kii strait off Wakayama prefecture, central Honshu.

Distribution: Korea, Japan.

Habitat: Depth of 10-20 m, parasitic on *Euplexaura*

Genus *Primovula* Theiele, 1925 토끼고둥 속

10. *Primovula (Primovula) tigris* Yamamoto, 1971

호랑이무늬토끼고둥 (신칭) (Pl. 2, Fig. 10a, 10b)

Primovula (Primovula) tigris Yamamoto, 1971,

p. 191-195, figs. 1a-1c, pl. 8, figs. 1-4;

Yamamoto, 1972, p. 158, pl. 20, figs. 1-4;

Higo *et al.*, 1999, p. 133.

Crenovolva (Cuspivolva) tigris: Higo & Goto, 1993, p. 136.

Crenovolva (Cuspivolva) tigris: Cate, 1973, p. 56, fig. 117; Azuma, 1974, p. 102, pl. 5, fig. 8; Azuma, 1988, p. 260.

Cuspivolva tigris: Okutani & Habe, 1975, p. 84, p. 239; Min *et al.*, 2004, p. 162, figs. 355-1, 2, 3, 4, p. 163.

Primovula (Crenovolva) tigris: Okutani *et al.*, 2000, p. 216, pl. 108, fig. 24, p. 217.

Material examined: Five specimens, Munseom, Beomseom, Oidolgae, Jeju-do, Sep. 4, 2001 (D.B. Koh).

Type locality: off Shirahama, Kii peninsula, central Honshu.

Distribution: Korea, Japan.

Habitat: Intertidal to 20 m., parasitic on *Euplexaura*.

Genus *Crenovolva* Cate, 1973 어깨토끼고둥 속 (신칭)

어깨토끼고둥 속의 종 검색표

1 견각과 활층돌기가 발달한다. *cuspis*
견각이 완만하며 활층돌기의 발달이 약하다.

..... *frumentum*

11. *Crenovolva (Cuspivolva) frumentum* (Sowerby, 1828) 어깨토끼고둥

Ovulum frumentum Sowerby, 1828, Zool. Jour., 4(14), p. 155 (cited from Kuroda *et al.*, 1971)

Primovula frumentum: Habe, 1964, p. 63, fig. 5, pl. 19; Kuroda *et al.*, 1971, pl. 24, figs. 17, 18; Higo, 1973, p. 87; Choe, 1992, p. 336, pl. 76, figs. 125a, b.

Crenovolva frumentum: Habe, 1961a, p. 41, pl. 19, fig. 5

Crenovolva (Crenovolva) frumentum: Cate, 1973, Veliger, 15, Supplement, p. 53, fig. 110 (cited from Azuma, 1974); Azuma, 1974, p. 101, textfig. 8, pl. 5, fig. 4;

Higo *et al.*, 1999, p.135

12. *Crenovolva (Cuspivolva) cuspis* Cate, 1973

뽕족토끼고둥 (신칭) (Pl. 2, Fig. 11a, 11b)

Crenovolva (Cuspivolva) cuspis Cate, 1973, p. 54, fig. 113.

Crenovolva (Cuspivolva) cuspis. Azuma, 1974, p. 102, pl. 5, fig. 6; Higo & Goto, 1993, p. 136; Higo *et al.*, 1999, p. 135 ; Min *et al.*, 2004, p. 162, figs. 356-1, 2, 3, p. 163.

Material examined: One specimens, Munseom Jeju-do, Sep. 4, 2001 (D.B. Koh).

Type locality: Kii strait, off Kii peninsula, central Honshu.

Distribution: Korea, Japan.

Habitat: Intertidal to 20 m, parasitic on *Alcyonium*.

Genus *Sandalia* Cate, 1973 주홍토끼고둥 속 (신칭)

13. *Sandalia rhodia* (A. Adams, 1855)

주홍토끼고둥 (Pl. 2, Figs. 12a, 12b)

Amphiperas rhodia A. Adams, 1855, p. 130, pl. 28, fig. 8.

Sandalia rhodia: Cate, 1973, supplement, 86, figs. 193, 193c (Cited from Azuma, 1976); Higo & Goto, 1993, p. 138; Ma, 1997, p. 204, pl. 7, fig. 10; Higo *et al.*, 1999, p. 136; Azuma, 1976, p. 202, textfig. 11, pl. 2, fig. 25; Kwon *et al.*, 2001, p. 100, fig. 279-1, 2, p. 101; Lee & Min, 2002, p. 110.

Primovula rhodia: Kira, 1954, p. 43, pl. 18, fig. 6;

Kira, 1962, p. 44, pl. 19, fig. 34;

Habe & Kosuge, 1967, p. 50, pl. 19, figs. 17, 18; Choe, 1992, p. 335, pl. 76, fig. 124a, b; Choe & Yoon, 1990, p. 50.

Primovula (Sandalia) rhodia: Kwon *et al.*, 1993, p. 70, fig. 29-1, p. 272.

Aperiovula takae: Min *et al.*, 2004, p. 162, figs. 358-1, 2, 3, 4, 5, 6, 7, p. 163.

Material examined: One specimen (empty), Dangsan-dong Chungcheongnam-do, Jan. 10, 1998 (D.K. Min); One specimen (empty), Chaeseogpo Chungcheongnam-do, April 19, 1999 (D.K. Min); Two specimens, Munseom Jeju-do, Nov. 8, 2001 (D.B.

Koh)

Type locality: Japan.

Distribution: Korea, Japan, China.

Habitat: Subtidal to 30 m, parasitic on *Melithaea*.

Genus *Phenacovolva* Iredale, 1930

두루마리고둥 속 (국명변경)

두루마리고둥 속의 종 검색표

- 1 패각은 가늘고 길며 후관구가 좁고 등면에 좁은 백색 대를 갖는다 *rosea rosea*
 패각 중앙은 두툼하고 진한갈색의 파도 무늬가 있으며 외순 외측에 황색선이 있다 *lahainaensis*
 패각은 적색으로 중앙은 약간 두툼하고 전관구 외순 부분은 사선의 절단상을 이룬다 *birostris*
 패각은 가늘고 길며 황백색이며 외순이 안쪽으로 반곡한다 *subreflexa*
 패각은 가늘고 길며 연분홍색을 띤다. 각구가 좁고 외순의 1/5 정도가 안쪽으로 반곡한다 *improcera*
 전, 후관구가 좁고 외순은 주황색을 띤다. 적갈색 반점이 3개 있다 *weaveri*
 전, 후관구가 좁고 적갈색 반점이 등면을 따라 이어진다. *poppei*
 패각은 자주색 바탕에 담색 띠가 나타나며 외순이 두툼하다 *brevirostris*
 패각 등 면에 구름무늬가 있으며 중앙에 폭 넓은 담색 띠가 있다 *fusula*
 패각에 나상맥이 발달하며 전관구 부분의 외순이 심하게 각을 이룬다 *dancei*
 패각은 방추형이며 후관구와 전관구 끝에 황색 선 무늬가 있다 *hirasei*
 패각의 전, 후관구가 매우 뽕족하며 휘어진다 *longirostrata*
 패각은 적갈색이며 등 면에 뚜렷한 백색 띠가 있고 외순은 심하게 안으로 반곡한다 *tokioi*

14. *Phenacovolva (Phenacovolva) rosea rosea* (A.

Adams, 1854) 가시두루마리고둥 (국명변경) (Pl. 3, Fig. 13a, 13b, 13c, 13d)

Phenacovolva (Phenacovolva) rosea rosea:

Higo & Goto, 1993, p.139; Higo *et al.*, 1999, p. 137; Kwon *et al.*, 2001, p. 100, fig. 280-1, 2, p. 101, 가시토끼고둥; Lee & Min, 2002, p. 110, 가시토끼고둥.

Phenacovolva rosea: Wilson, 1993, p. 203, pl. 24,

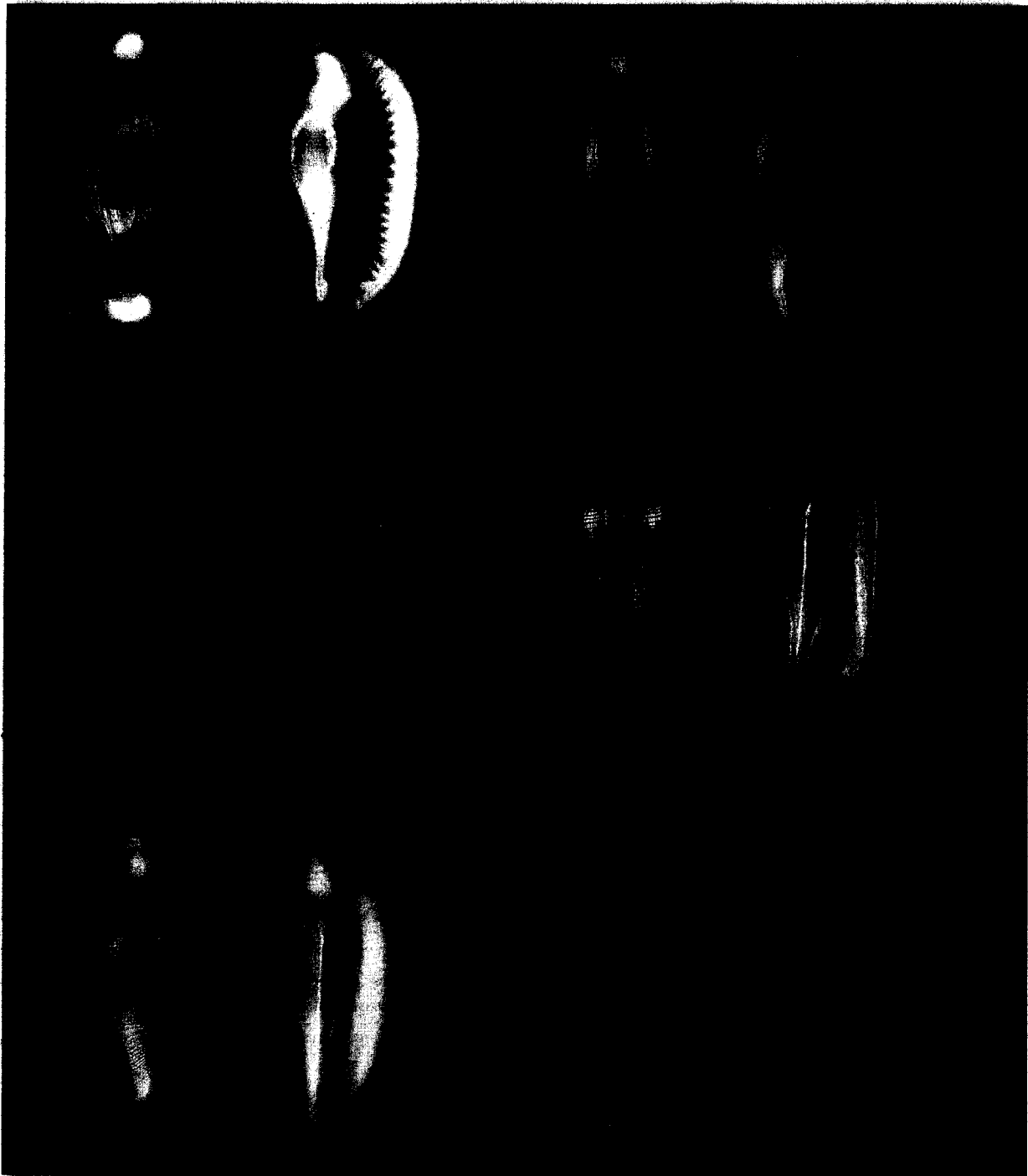


PLATE 2

Fig. 7a, b. *Pseudosimnia (Inflatovula) culmen* (Cate, 1973). height: 11.5 mm, width: 6.5 mm.

Fig. 8a, b. *Xandarovula xanthochila* (Kuroda, 1928). height: 11 mm, width: 5 mm.

Fig. 9a, b. *Aperiovula allynsmithi* Cate, 1978. height: 9.5 mm, width: 4.3 mm.

Fig. 10a, b. *Primovula (Primovula) tigris* Yamamoto, 1971. height: 12.2 mm, width: 5.5 mm.

Fig. 11a, b. *Crenovulva (Cuspidovulva) cuspis* Cate, 1973. height: 12 mm, width: 5.5 mm.

Fig. 12a, b. *Sandalia rhodia* (A. Adams, 1855). height: 11 mm, width: 5 mm.

scale bar = 1 mm.

- fig. 5a-c; Okutani *et al.*, 2000, p. 220, pl. 110, fig. 44, p. 221.
- Phenacovolva (Phenacovolva) rosea*: Ma, 1997, p. 206, pl. 11, fig. 11.
- Volva (Phenacovolva) brevisrostris rosea*: Kira, 1977, p. 44, pl. 18, fig. 10.
- Material examined: Three specimens, Munseom Jeju-do, Nov. 25, 2001 (D.B. Koh).
- Type locality: China.
- Distribution: Korea, Japan, China, Philippines, western Pacific.
- Habitat: Subtidal to 50 m, parasitic on *Lophogorgia*, *Anthoplexaura*, *Acalycigorgia*, *Euplexaura*, *Echinogorgia*, etc.
- Remark: 속명 (*Phenacovolva*) 의 국명 일치를 위하여 본 종의 국명을 가시두루마리고둥으로 개칭한다.
15. *Phenacovolva (Phenacovolva) lahainaensis* (Cate, 1969) 구름부늬두루마리고둥 (신칭)
(Pl. 3, Fig. 14a, 14b)
- Volva (Phenacovolva) lahainaensis* Cate, 1969, pp. 365-366, pl. 56, fig. 2 (Cited from Liltved, 2000)
- Phenacovolva (Phenacovolva) lahainaensis*. Higo & Goto, 1993, p. 139; Higo *et al.*, 1999, p. 137. Liltved, 2000, p. 138, fig. 209; Min *et al.*, 2004, p. 164, figs. 360-1, 2, 3, 4, p. 165.
- Material examined: Three specimens, Munseom Jeju-do, June 13, 2002 (D.B. Koh).
- Type locality: Lahaina roads, Maui, Hawaii.
- Distribution: Korea, Japan, Hawaii.
- Habitat: Depth of 20-60 m, parasitic on *Altipathes*.
16. *Phenacovolva (Phenacovolva) birostris* (Linnaeus, 1767) 뽕족두루마리고둥 (국명변경)
- Bulla birostris* Linné, 1767, Syst. Nat., ed. 12, p. 1182. (cited from Kuroda *et al.*, 1971)
- Volva (Phenacovolva) birostris*: Kira, 1954, p. 44, pl. 18, fig. 11
- Phenacovolva birostris*: Habe, 1964, p. 64, pl. 19, fig. 13; Cernohorsky, 1968, Veliger, 10, p. 363, pl. 50, fig. 10 (cited from Kuroda *et al.*, 1971); Kuroda *et al.*, 1971, pl. 24, figs. 2, 3; Choe, 1999, p. 337, pl. 77, figs. 126a, b, 뽕족개오지불이.
- Phenacovolva (Phenacovolva) birostris*: Higo, 1973, p. 88; Higo *et al.*, 1999, p. 137.
- Remark: 속명 (*Phenacovolva*) 의 국명 일치를 위하여 본 종의 국명을 뽕족두루마리고둥으로 개칭한다.
17. *Phenacovolva (Pellasimnia) subreflexa* (Adams & Reeve, 1848) 고티두루마리고둥 (신칭)
(Pl. 3, Fig. 15a, 15b)
- Ovulum subreflexa* Adams & Reeve, 1848
(Cited from Higo *et al.*, 1999)
- Phenacovolva subreflexa*: Wye, 1991, p. 92.
- Phenacovolva (Pellasimnia) subreflexa*: Higo & Goto, 1993, p. 139; Ma, 1997, p. 209, pl. 12, fig. 11; Higo *et al.*, 1999, p. 138; Okutani *et al.*, 2000, p. 220, pl. 110, fig. 42, p. 221.
- Material examined: Two specimens, Munseom Jeju-do, Feb. 9, 2003 (D.B. Koh).
- Type locality: Bilaton island, off Sumatra.
- Distribution: Korea, Japan, Philippines, Australia, East Africa.
- Habitat: Depth of 10-30 m., parasitic on *Altipathes*.
- Remark: Min *et al.* (2004) 의 *Phenacovolva maccoyi* (Tenison-Woods, J.E., 1878)는 본 종의 오기이다.
18. *Phenacovolva (Pellasimnia) improcera* (Azuma & Cate, 1971) 잘린두루마리고둥 (신칭)
(Pl. 3, Fig. 16a, 16b)
- Phenacovolva improcera* Azuma & Cate, 1971.
(Cited from Higo *et al.*, 1999)
- Phenacovolva (Pellasimnia) improcera*: Higo & Goto, 1993, p. 139; Higo *et al.*, 1999, p. 138; Min *et al.*, 2004, p. 164, figs. 361-1, 2, 3, 4, p. 165.
- Phenacovolva improcera*: Wilson, 1993, p. 203, pl. 24, fig. 10.
- Material examined: One specimen, Munseom Jeju-do, June 13, 2002 (D.B. Koh).
- Type locality: off Cape Kirime, Kii peninsula, central Honshu.
- Distribution: Korea, Japan, western Australia.
- Habitat: Depth of 20-60 m., parasitic on *Altipathes*

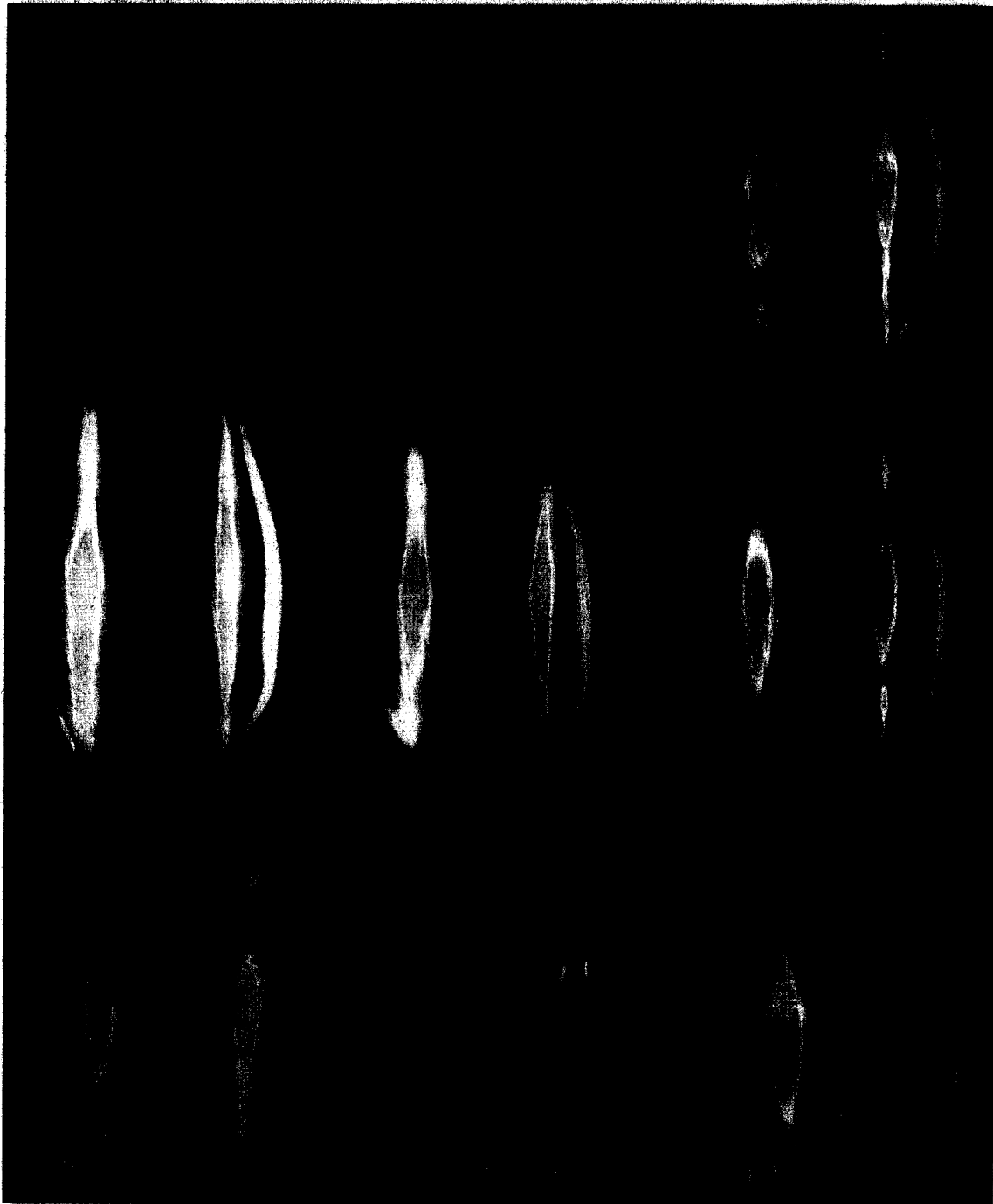


PLATE 3

- Fig. 13a, b, c, d.** *Phenacovolva (Phenacovolva) rosea rosea* (A. Adams, 1854). height: 34 mm, width: 8 mm.
Fig. 14a, b. *Phenacovolva (Phenacovolva) lahainaensis* (Cate, 1969). height: 33 mm, width: 9.5 mm.
Fig. 15a, b. *Phenacovolva (Pellasimnia) subreflexa* (Adams & Reeve, 1848). height: 16 mm, width: 6 mm.
Fig. 16a, b. *Phenacovolva (Pellasimnia) improcera* (Azuma & Cate, 1971). height: 32 mm, width: 6 mm.
Fig. 17a, b. *Phenacovolva (Pellasimnia) weaveri* Cate, 1973. height: 35 mm, width: 9 mm.
Fig. 18a, b. *Phenacovolva (Pellasimnia) poppei* Fehse, 2001. height: 28 mm, width: 7.5 mm.
Fig. 19a, b. *Phenacovolva (Turbovula) brevirostris* (Schumacher, 1817). height: 33 mm, width: 12 mm.
Fig. 20a, b. *Phenacovolva (Turbovula) fusula* Cate & Azuma, 1973. height: 28.5 mm, width: 8.5 mm.
scale bar = 2 mm.

19. *Phenacovolva (Pellasimnia) weaveri* Cate, 1973
우아한두루마리고둥 (신칭) (Pl. 3, Fig. 17a, 17b)

Phenacovolva (Pellasimnia) weaveri weaveri
Cate, 1973, p. 100, fig. 227
(Cited from Liltved, 2000)

Phenacovolva (Pellasimnia) weaveri: Higo *et al.*,
1999, p. 138.

Phenacovolva weaveri: Liltved, 2000, p. 128,
figs. 195-196

Phenacovolva (Pellasimnia) pseudogracilis:
Min *et al.*, 2004, p. 164, figs. 362-1, 2, 3,
4, p. 165.

Phenacovolva (Pellasimnia) weaveri pseudogracilis:
Higo & Goto, 1993, p. 140; Wilson, 1993,
p. 204, pl. 24, fig. 1; Higo *et al.*, 1999,
p. 138; Okutani *et al.*, 2000, p. 222,
pl. 111, fig. 50, p. 223.

Material examined: One specimen, Munseom Jeju-do,
June 9, 2002 (D.B. Koh).

Type locality: Au Au Channel, Maui, Hawaii.

Distribution: Korea, Japan, Philippines, South Africa,
Hawaii.

Habitat: Depth of 30-60 m, parasitic on *Altipathes*.

20. *Phenacovolva (Pellasimnia) poppei* Fehse, 2001
보라파도부늬두루마리고둥 (신칭)
(Pl. 3, Fig. 18a, 18b)

Phenacovolva (Pellasimnia) poppei Fehse, 2001,
p. 39, figs. 1-3

Phenacovolva (Pellasimnia) poppei: Min *et al.*, 2004,
p. 166, figs. 369-1, 2, 3, p. 167.

Material examined: Two specimens, Munseom Jeju-do,
spring, 2001 (D.B. Koh)

Type locality: Somalia, East Africa.

Distribution: Korea, East Africa.

Habitat: Deep water, host unknown.

21. *Phenacovolva (Turbovula) brevirostris*
(Schumacher, 1817) 두릅파베기두루마리고둥 (신칭)
(Pl. 3, Fig. 19, 19b)

Radius brevirostris Schumacher, 1817, p. 259
(Cited from Liltved, 2000)

Phenacovolva brevirostris: Habe, 1976, p. 41, pl. 19,
fig. 13; Wye, 1991, p. 91; Wilson, 1993,

p. 203, pl. 24, fig. 9.

Phenacovolva (Turbovula) brevirostris: Higo & Goto,
1993, p.140; Ma, 1997, p. 210, pl. 8,
fig. 6; Higo *et al.*, 1999, p. 138; Okutani *et al.*,
2000, p. 222, pl. 111, fig. 51, p. 223;
Liltved, 2000, p. 139, figs. 210-213; Min *et al.*,
2004, p. 164, figs. 363-1, 2, 3, 4, p. 165.

Material examined: One specimen, Munseom Jeju-do,
Nov. 11, 2001 (D.B. Koh).

Type locality: None given.

Distribution: Korea, Japan, China, Philippines,
western Pacific.

Habitat: Depth of 10-30 m, parasitic on *Euplexaura*,
Anthoplexaura, *Altipathes*, *etc.*

22. *Phenacovolva (Turbovula) fusula* Cate & Azuma,
1973 작은구름부늬두루마리고둥 (신칭)
(Pl. 3, Fig. 20a, 20b)

Phenacovolva (Turbovula) fusula Cate & Azuma,
1973, 103, fig. 232 (Cited from Liltved,
2000)

Phenacovolva fusula: Liltved, 2000, p.143, figs. 217.

Phenacovolva (Turbovula) fusula: Higo & Goto,
1993, p.140; Higo *et al.*, 1999, p. 138;
Okutani *et al.*, 2000, p. 222, pl. 111, fig.
52, p. 223; Min *et al.*, 2004, p. 164, figs.
363-1, 2, 3, 4, p. 65.

Material examined: 2 specimens, Munseom Jeju-do,
June 9, 2002 (D.B. Koh).

Type locality: off Minabe, Kii peninsula, central
Honsu.

Distribution: Korea, Japan, Philippines, Australia.

Habitat: Depth of 10-30 m, parasitic on *Altipathes*.

23. *Phenacovolva (Turbovula) dancei* Cate, 1973
흰머작은두루마리고둥 (신칭) (Pl. 4, Fig. 21a, 22b)

Phenacovolva dancei: Abbott & Dance, 1982, p. 100;
Wilson, 1993, p. 203, pl. 24, fig. 8

Phenacovolva (Turbovula) dancei: Higo & Goto,
1993, p. 140; Ma, 1997, p. 211, pl. 8, fig. 7;
Higo *et al.*, 1999, p. 138; Min *et al.*, 2004,
p. 164, figs. 365-1, 2, 3, 4, p. 165.

Material examined: Five specimens, Munseom Jeju-do,
June 9, 2002 (D.B. Koh).



PLATE 4

- Fig. 21a, b.** *Phenacovolva (Turbovula) dancei* Cate, 1973. height: 15 mm, width: 5.5 mm.
Fig. 22a, b. *Phenacovolva (Turbovula) hirasei* (Pilsbry, 1913). height: 33 mm, width: 11 mm.
Fig. 23a, b. *Phenacovolva (Calcarrovula) longirostrata* (Sowerby, 1828). height: 50 mm, width: 8 mm.
Fig. 24a, b. *Phenacovolva (Calcarrovula) tokioi* Cate, 1973. height: 35 mm, width: 7 mm.
Fig. 25a, b. *Volva volva habei* Oyama, 1961. height: 75 mm, width: 25 mm.
scale bar = 2 mm.

Type locality: Singapore.

Distribution: Korea, Japan, Australia.

Habitat: Depth of 10-30 m, parasitic on *Altipathes*.

24. *Phenacovolva (Turbovula) hirasei* (Pilsbry, 1913)
누렁꼭지두루마리고둥 (신칭) (Pl. 4, Fig. 22a, 22b)
Ovula (Neosimnia) hirasei Pilsbry, 1913, p. 114,

pl. 7, fig. 4 (Cited from Liltved, 2000)

Phenacovolva hirasei: Liltved, 2000, p. 129, fig. 197.

Phenacovolva (Turbovula) hirasei: Cate, 1973,
p. 104 (Cited from Liltved, 2000);

Higo & Goto, 1993, p. 140; Ma, 1997,
p. 213, pl. 11, fig. 7; Higo *et al.*, 1999,
p. 138; Okutani *et al.*, 2000, p. 222,

pl. 111, fig. 53, p. 223; Min *et al.*, 2004,
p. 164, figs. 366-1, 2, 3, 4, 5, p. 165.

Material examined: Two specimens, Munseom Jeju-do,
Nov. 10, 2001 (D.B. Koh).

Type locality: off Tomida, Kii peninsula, southwestern
Shikoku.

Distribution: Korea, Japan, Philippines, Taiwan, South
Africa.

Habitat: Depth of 20-60 m, parasitic on *Altipathes*.

25. *Phenacovolva (Calcarrovula) longirostrata*

(Sowerby, 1828) 카누두루마리고둥 (신칭)
(Pl. 4, Fig. 23a, 23b)

Ovulum longirostrata Sowerby, 1828a, p. 160
(Cited from Liltved, 2000)

Phenacovolva (Calcarrovula) longirostrata:

Azuma, 1987, p. 227, fig. 7; Higo & Goto,
1993, p.140; Higo *et al.*, 1999, p. 139;
Min *et al.*, 2004, p. 166, figs. 371-1, 2, 3, 4,
p. 167.

Phenacovolva (Calcaria) longirostrata: Ma, 1997,
p. 214, pl. 8, fig. 10.

Phenacovolva (Calcarrovula) longirostris: Okutani *et al.*,
2000, p. 222, pl. 111, fig. 55, p. 223.

Phenacovolva longirostrata: Abbott & Dance, 1982,
p. 110; Wye, 1991, p.92; Liltved, 2000,
p. 135, figs. 203-206.

Material examined: Two specimens, Munseom Jeju-do,
Oct. 4, 2001 (D.B. Koh).

Type locality: None given.

Distribution: Korea, Japan, Thailand, Philippines,
Australia, South Africa.

Habitat: Depth of 10-30 m, parasitic on *Acalycigorgia*.

26. *Phenacovolva (Calcarrovula) tokioi* Cate, 1973

곶은부리두루마리고둥 (신칭) (Pl. 4, Fig. 24a,
24b)

Phenacovolva (Calcarrovula) tokioi: Higo & Goto,
1993, p. 140; Higo *et al.*, 1999, p. 139;
Min *et al.*, 2004, p. 166, figs. 372-1, 2, 3,
4, p. 167.

Phenacovolva tokioi: Okutani, 1975, p. 17, pl. 9,
fig. 12; Abbott & Dance, 1982, p. 101;
Wye, 1991, p. 92; Wilson, 1993, p. 203,

pl. 24, fig. 4.

Material examined: Five specimens, Munseom Jeju-do,
Dec. 14, 2003 (D.B. Koh).

Type locality: Cooktown, Queensland, Australia.

Distribution: Korea, Japan, Philippines, western
Pacific.

Habitat: Depth of 10-30 m, parasitic on gorgonians.

Genus *Volva* Röding, 1798 계란두루마리고둥 속 (신칭)

27. *Volva volva habei* Oyama, 1961

계란두루마리고둥 (신칭) (Pl. 4, Fig. 25a, 25b)

Volva volva habei: Habe & Kosuge, 1967, p. 55,

pl. 21, fig. 2; Okutani & Habe, 1975,

p. 84, p. 252; Higo & Goto, 1993,

p. 141; Kira, 1977, p. 44, pl. 18, fig. 12;

Ma, 1997, p. 217, pl. 5, fig. 9; Higo *et al.*,

1999, p. 139; Okutani *et al.*, 2000,

p. 222, pl. 111, fig. 59, p. 223.

Material examined: One specimen (empty), Kangjeong
Seoguipo Jeju-do, Feb. 14, 2003 (J.S. Kim).

Type locality: Tatsugahama, Kii peninsula.

Distribution: Korea, Japan.

Habitat: Depth of 10-100 m, sandy mud.

Remark: Min *et al.* (2004) 의 *Volva volva volva*
(Linnaeus, 1758) 는 본 종의 오기이다.

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