

Cerithiidae (Gastropoda: Mesogastropoda) from Korean Waters

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한국산 짜부라고둥 과 (복족 강 : 중복족 목)

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적 요

1965년 8월부터 1991년 10월까지 한국 해안 12개 지점에서 채집된 짜부라고둥류의 표본들을 동정, 분류한 결과 모두 6속 7종 이었으며 이들중 *Bittium variegatum*, *B. craticulatum*, *Ataxocerithium abnormale* 등 3종은 한국 미기록종으로 밝혀져 이들에 대하여 재기재를 하였다.

Key words: Systematics, Cerithiidae, Mesogastropoda, Gastropoda, Mollusca, Korea.

INTRODUCTION

Regarding the systematic study of Korean Cerithiidae, four species in four genera have been recorded by previous workers (Lee, 1956; Lee, 1958; Higo, 1973) since Adams and Reeve (1848) reported for the first time *Rhinoclavis (Longicerithium) longicaudata* as a Korean species.

Despite the results of these systematic studies, most species of them are not appropriate in their scientific name, and their descriptions are not enough for identifying the specimens. For these reasons, it is necessary to review overall those previous works. Therefore, the object of this study is to classify and describe cerithiids which were collected from South Korean waters.

MATERIALS AND METHODS

The materials examined in this study were collected at 12 localities in South Korean waters during the period from August 1965 to October 1991 (Fig. 1). Most of the materials were preserved in 95% ethanol directly and some of them were narcotized with 2-phenoxyethanol before fixing with ethanol.

The specimens were observed for their taxonomical characteristics using a stereoscopic dissecting microscope. In "Material examined" in the description of each species, ind(s). represents individual(s).

RESULTS

Systematic list of cerithiid species (*: New to the fauna of Korea)

Phylum Mollusca Linné, 1758 연체동물 문
 Class Gastropoda Cuvier, 1797 복족강
 Subclass Prosobranchia Milne-Edwards, 1848 전세아강
 Order Mesogastropoda Thiele, 1925 중복족목
 Superfamily Cerithiacea Fleming, 1822 짜부라코등상과
 Family Cerithiidae Fleming, 1822 짜부라코등과
 Genus *Bittium* Leach, 1847

*1. *Bittium variegatum* Kuroda and Habe, 1971 갈줄고등

*2. *Bittium craticulatum* Gould, 1860 눈줄고등

Genus *Ataxocerithium* Tate, 1893

*3. *Ataxocerithium abnormale* (Sowerby, 1903) 치마고등

Genus *Clypeomorus* Jousseaume, 1888

4. *Clypeomorus humilis* (Dunker, 1861) 오디짜부라코등

Genus *Cerithium* Bruguière, 1789

5. *Cerithium kobelti* Dunker, 1877 감장짜부라코등

Genus *Ochetoclava* Woodring, 1928

6. *Ochetoclava kochi* (Philippi, 1848) 짜부라코등

Genus *Rhinoclavis* Swainson, 1840

Subgenus *Longicerithium* Houbrick, 1978

7. *Rhinoclavis (Longicerithium) longicaudata* (A. Adams and Reeve, 1848) 송곳짜부라코등

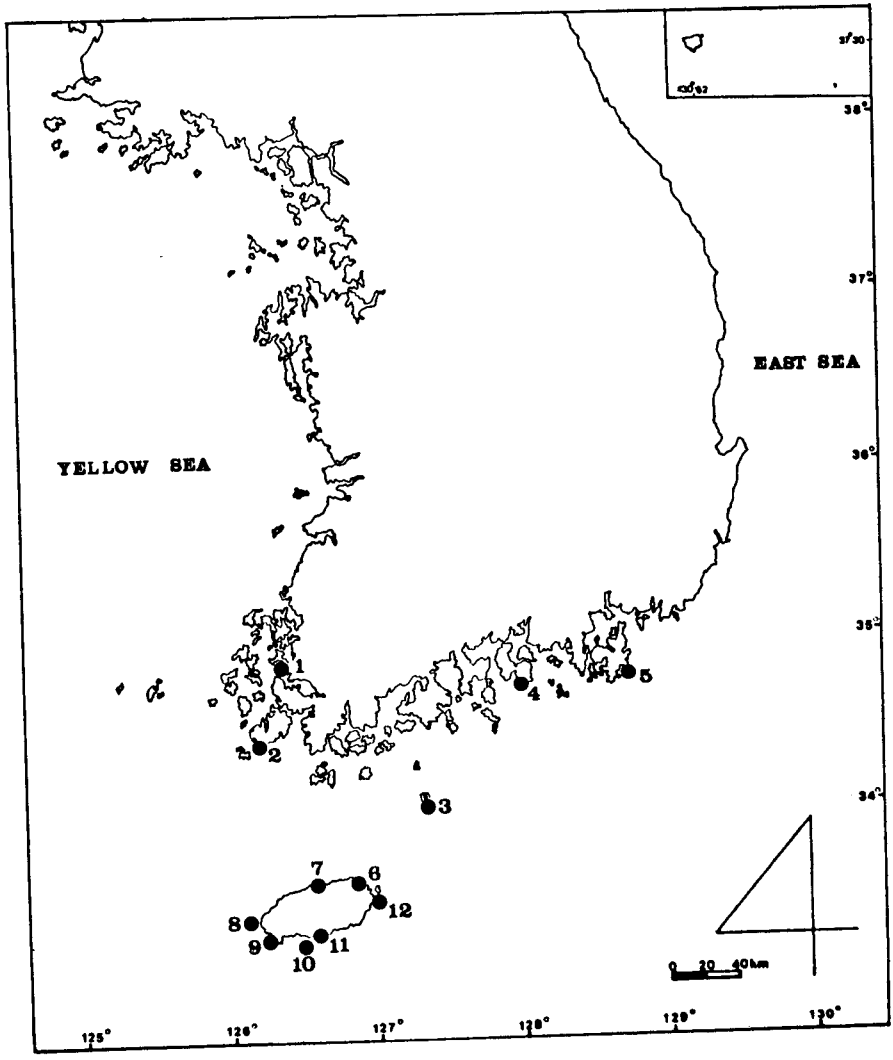


Fig. 1. Map showing the collecting localities from South Korean waters
 1, Namül-ri (Mokp'o); 2, Chindo; 3, Kõmundo; 4, Sangju (Namhaedo); 5, Kujora (Changsũngo'o); 6, Sehwa;
 7, Cheju Harbour; 8, Ch'agwido; 9, Mosũlp'o; 10, Põmsõm; 11, Sõgwip'o; 12, Sõngsanp'o

Key to the species of Korean Cerithiidae

- 1 A stout axial rib present on leftside of body whorl 2
- A stout axial rib absent on leftside of body whorl 4
- 2(1) Spire high turret-shaped and sharply tapering *Ochetoclava kochi*
- Spire roundly cone-shaped and obtusely tapering 3
- 3(2) Light or dark brown in shell color *Certhium kobelti*
- Black in shell color *Clypeomorus humilis*
- 4(1) Aperture with undeveloped siphonal canal 5

- Aperture with developed siphonal canal 6
- 5(4) Spiral ribs forming beadlike granule lines and dark brown in ground color of each whorl
 *Bittium craticulatum*
- Spiral ribs not forming beadlike granule lines and with dark brown band in lower part of each whorl
 *Bittium variegatum*
- 6(4) Siphonal canal very short and toward straightly *Ataxocerithium abnormale*
- Siphonal canal very long and bending toward leftside of aperture
 *Rhynoclavis (Longicerithium) longicaudata*

Description of species

Family Cerithiidae

Genus *Bittium* Leach, 1847

***1. *Bittium variegatum* Kuroda and Habe, 1971** 갈줄고둥 (신칭) (Fig. 2A; Pl. 1, fig. 1)

Bittium variegatum Kuroda and Habe, 1971 (p.108, 71, pl. 107, fig. 17) ; Higo, 1973 (p. 62); Inaba, 1982 (p. 88); Okutani and Habe, 1983 (pp. 68, 275).

Bittium aleutaceum Habe, 1964 {p. 40, pl. 12, fig. 12. (non Gould, 1861)} .

Type locality. Sagami Bay (Japan).

Materials examined. 71 inds., Sögwip'o, Aug. 21, 1982 (B.L. Choe); 3 inds., Sögwip'o, Aug. 22, 1982 (B.L. Choe); 1 ind. Sögwip'o, Feb. 13, 1989 (J.R. Lee); 6 inds., Sögwip'o, Feb. 13, 1989 (J.R. Lee); 2 inds., Pömsöm, Oct. 22, 1991 (B.L. Choe); 1 ind., Söngsanp'o, Oct. 24, 1991 (B.L. Choe).

Description. Shell small, elongated conical shape. Whorls 9 in number and distinctly distinguished by well impressed suture. Each whorl surface with 12-13 axial ribs and 4-5 spiral cords granulated owing to intersecting between them. Body whorl with a stout axial rib on the dorsal side of aperture occupying 2/5 of shell in height, slightly slender and bearing 13-14 axial and 13 spiral ribs. Among spiral ribs in body whorl, 8 prominent ribs in base becoming weak toward lower part of aperture in thickness. Aperture subquadrately ovate with trace of dark brown band in inner part. Outer lip rather thickened and arch shape. Callus without umbilicus. Grayish brown color with dark brown striations in the lower part of each whorl. Height of shell 5.8mm, breadth 2.2mm.

Distribution. Korea (Sögwip'o, Pömsöm, Söngsanp'o), Japan [Honshu (Boso Peninsula as northern limit), Shikoku, Kyushu, Sagami Bay].

Habitat. On gravelly bottom between tide mark down to 20m deep.

2. *Bittium craticulatum* Gould, 1860 눈줄고둥 (신칭) (Fig. 2B; pl. 1, fig. 2)

Bittium craticulatum Gould, 1860 (p. 387); Habe, 1961 (p. 28, pl. 12, fig. 14); Habe, 1964 (p. 40, pl. 12, fig. 14); Okada, 1967 (p. 62); Higo, 1973 (p. 62); Inaba, 1982 (p. 88).

Bittium glareosum Gould, 1860 (p. 387); Okutani *et al.*, 1986 (pp. 82-83).

Type locality. Hong Kong.

Material examined. 1 ind., Songsanp'o, Jan. 18, 1985 (B.L. Choe).

Description. Shell minute, turret form and dark brown in color. Whorls 8 in number and suture distinctly impressed. Shell surface with many axial ribs forming 3 granule lines spirally at intersection. Granules more light than ground surface in color. Among 3 granule lines on each whorl, uppermost more weak than others in strength. Body whorl with smooth base occupied 1/3 of shell in height. Aperture subquadrately ovate with short and narrow canal, outer margin curved roundly. Height of shell 2.7mm, breadth 1.2mm.

Distribution. Korea (Songsanp'o), Japan (Boso Peninsula, Honshu, Ryukyu), China.

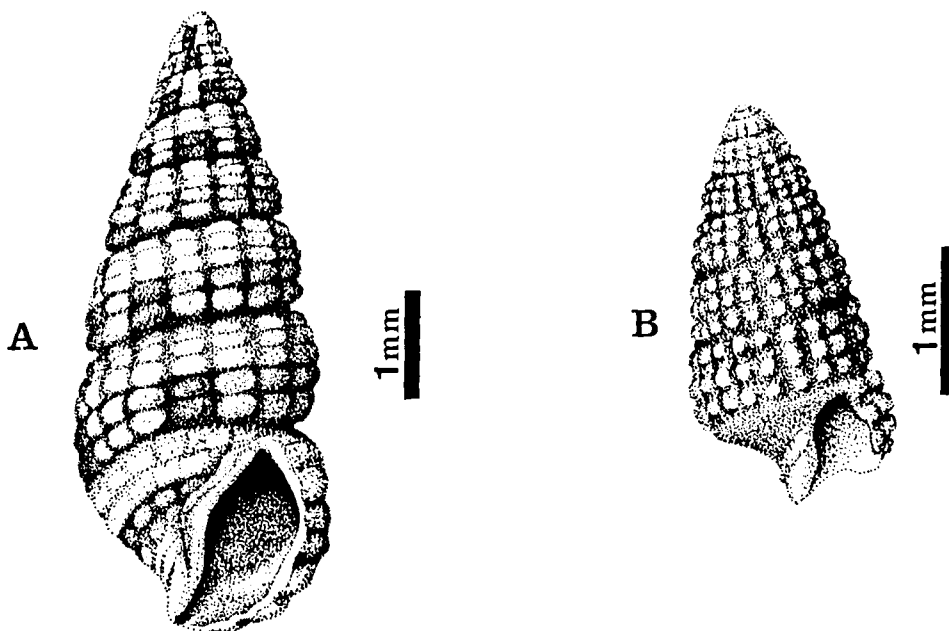


Fig. 2. A, *Bittium variegatum* Kuroda and Habe, 1971; B, *Bittium craticulatum* Gould, 1860

Genus *Ataxocerithium* Tate, 1893

3. *Ataxocerithium abnormale* (Sowerby, 1903) 치마고둥 (신칭) (Fig. 3; pl. 1, fig. 5)

Triforts abnormalis Sowerby, 1903, (p. 179; cited from Kuroda *et al.*, 1971).

Colina (Ataxocerithium) abnormalis: Kanamaru, 1932 (p. 279, textfig. 31).

Ataxocerithium abnormale: Yokoyama, 1931 (p. 29); Habe, 1961 (p. 28, pl. 12, fig. 17); Habe, 1964 (p. 40, pl. 12, fig. 17); Okada, 1967 (p. 62); Kuroda *et al.*, 1971 (p. 109, p. 72, pl. 16, figs. 20-21); Higo, 1973 (p. 63); Inaba, 1982 (p. 90); Okutani and Habe, 1983 (pp. 68, 187); Okutani *et al.*, 1986 (p. 83).

Type locality. Schizum (=Nishizu in correct), Wakasa Bay along the Japan Sea coast of Honshu.

Material examined. 1 ind., Cheju Harbour, Aug. 21, 1982 (B.L. Choe).

Description. Shell small, high turret form and whitish brown in color. Whorls with impressed sutures, 11 in number, sharply attenuating toward top. Commonly 2 slender spiral ribs in the subsutural part of each whorl, which obliquely joining with next. Ornamentation of surface

forming net sculpture in each whorl consisted of many longitudinal and 3 spiral ribs. Body whorl with round periphery, short in height and bearing 4 prominent spiral ribs. Base with 6-7 spiral lines, which becoming faint toward lower part of aperture. Aperture circular and outer lip rather thin. Shortened siphonal canal slightly curved to the leftward of shell. Callus without umbilicus. Height of shell 11.2mm, breadth 4.4mm.

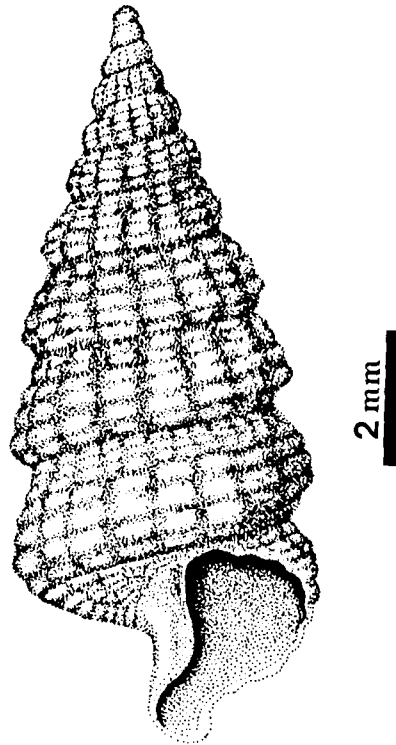


Fig. 3. *Ataxocerithium abnormale* (Sowerby, 1903)

Distribution. Korea (Cheju Harbour), Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Sagami Bay].

Habitat. Sandy bottom from low tide mark down to 30m deep.

Genus *Clypeomorus* Jousseaume, 1888

4. *Clypeomorus humilis* (Dunker, 1861) 오디짜부락고둥 (pl. 1, fig. 3)

Certhium humile Dunker, 1861 (p. 9, pl. 2, fig. 17); Lischke, 1869 (p. 72); Lischke, 1874 (p. 50, pl. 3, figs. 18-20); Dunker, 1882 (p. 106).

Clypeomorus humilis: Kira, 1954 (p. 28, pl. 12, fig. 15); Lee, 1958 (p. 17, pl. 13, fig. 4); Kira, 1962 (p. 26, pl. 13, fig. 15); Okada, 1967 (p. 63); Kang *et al.*, 1971 (p. 58); Kuroda *et al.*, 1971 (p. 112, p. 74, pl. 16, figs. 10-11); Higo, 1973 (p. 64); Yoo, 1976 (p. 62, pl. 9, figs. 12-13); Inaba, 1982 (p. 90); Okutani and Habe, 1983 (pp. 68, 190); Okutani *et al.*, 1986 (p. 84).

Type locality. Decima (=Dejima), Nagasaki City (Japan).

Materials examined. 1 ind., Kōmundo, Aug. 9, 1965; 1 ind., Sōgwip'o, Aug. 20, 1982 (B.L. Choe); 1 ind., Sōgwip'o, Aug. 21, 1982 (B.L. Choe); 41 inds., Sōgwip'o, Aug. 22, 1982 (B.L. Choe); 3 inds., Sōngsanp'o, Aug. 7, 1983 (B.L. Choe); 28 inds., Sōngsanp'o, Oct. 24, 1991 (B. L. Choe).

Distribution. Korea (Cheju Is.), Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Okinawa, Sagami Bay], Taiwan.

Habitat. On rocks and among gravels between tide mark down to 20m deep.

Genus *Cerithium* Bruguière, 1789

5. ***Cerithium kobelti* Dunker, 1877** 감장짜부락고둥 (pl. 1, fig. 4)

Cerithium kobelti Dunker, 1877 (p. 67); Dunker, 1882 (p. 106, pl. 4, figs. 8-9); Yokoyama, 1920 [Foss. Miura (etc.), pp. 66-67, pl. 4, figs. 10a-b; cited from Oyama, 1973]; Kira, 1954 (p. 28, pl. 12, fig. 16); Kira, 1962 (p. 26, pl. 13, fig. 16); Okada, 1967 (p. 64); Kuroda *et al.*, 1971 [p. 113 (in Japanese), p. 75 (in English), pl. 16, figs. 7-9]; Higo, 1973 (p. 64); Inaba, 1982 (p. 90); Okutani and Habe, 1983 (pp. 68, 206); Okutani *et al.*, 1986 (pp. 84-85).

Cerithium (Aluco) kobelti: Yokoyama, 1931 (p. 29).

Gourmya (Contumax) kobelti: Kanamaru, 1932 (p. 279).

Therictum kobelti: Oyama, 1973 (p. 26, pl. 5, fig. 22).

Type locality. Japan, Nagasaki City (selected as type locality by Kuroda *et al.*, 1971).

Materials examined. 1 ind., Sogwip'o, Aug. 20, 1982 (B.L. Choe); 1 ind., Mosulp'o, Aug. 22, 1982 (B.L. Choe); 3 inds., Sehwa, Aug. 5, 1983 (B.L. Choe); 1 ind., Songsanp'o, Aug. 7, 1983 (B.L. Choe); 3 inds., Ch'agwido, Oct. 23, 1991 (B.L. Choe); 1 ind., Songsanp'o, Oct. 24, 1991 (B.L. Choe).

Distribution. Korea, Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Okinawa, Sagami Bay], Taiwan.

Habitat. On rocks and among gravels between tide marks down to 20m deep.

Genus *Ochetoclava* Woodring, 1928

6. ***Ochetoclava kochi* (Philippi, 1848)** 짜부락고둥 (pl. 1, fig. 6)

Cerithium kochi Philippi, 1848 (Zeitschr. f. Malak., 5, pl. 21; cited from Kuroda *et al.*, 1971); Philippi, 1849 (Abbild. Beschr. Conchyl., 3, p. 14, pl. 1, fig. 3; cited from Kuroda *et al.*, 1971); Lischke, 1869 (p. 72); Lischke, 1874 (p. 49); Kanamaru, 1932 (p. 279); Lee, 1956 (p. 71); Kang *et al.*, 1971 (p. 58).

Vertagus kochi: Sowerby, 1866 (*Vertagus*, pl. 5, sp. 26).

Cerithium (Vertagus) kochi: E. A. Smith, 1875 (p. 105); E. A. Smith, 1891 (p. 416).

Vertagus kochi: Dunker, 1882 (p. 108).

Cerithiopsis pontilis Yokoyama, 1927 [Moll. Westn. Shimosa (etc.), p. 450, pl. 51, fig. 7; cited from Oyama, 1973].

Clava kochi: Yokoyama, 1931 (p. 28).

Rhinoclavus (Proclava) kochi: Kira, 1954 (p. 29, pl. 12, fig. 18); Houbriek, 1978 (pp. 73-79, pls.

42-47).

Rhinoclavis (*Ochetoclava*?) *Kochi*: Kira, 1962 (p. 26, pl. 13, fig. 18); Higo, 1973 (p. 65).

Proclava kochii: Okada, 1967 (p. 63); Okutani and Habe, 1983 (pp. 69, 188).

Ochetoclava kochii: Kuroda *et al.*, 1971 [p. 113 (in Japanese), p. 73 (in English), pl. 16, figs. 22-23]; Inaba, 1982 (p. 90).

Rhinoclavis (*Ochetoclava*) *kochi*: Oyama, 1973 (p. 26, pl. 5, figs. 26-27).

Proclava kochii: Okutani *et al.*, 1986 (pp. 84-85).

Type locality. East coast of Africa.

Materials examined. 1 ind., Chindō, Jul. 30, 1979 (B.L. Choe); 1 ind., Kujora (Changsungp'o), Jul. 20, 1985 (B.L. Choe); 1 ind., Namul-ri (Mokp'o), Aug. 25, 1986 (B.L. Choe); 1 ind., Sangju (Namhaedo, May, 13, 1991 (S.H. Yoön).

Distribution. Korea (T'ong-yong, Yosu, Wollae, Cheju Is.), Japan (Honshu, Shikoku, Kyushu, Sagami Bay). Red sea, Indian Ocean, Widely ranging in the Indo-Pacific Region.

Habitat. Fine sandy bottom between tide mark down to 200m deep.

Genus *Rhinoclavis* Swainson, 1840

Subgenus *Longicerithium* Houbriek, 1978

7. *Rhinoclavis* (*Longicerithium*) *longicaudata* (A. Adams and Reeve, 1848) 송곳짜 부락고둥

Cerithium longicaudatum Adams and Reeve, 1848 (p. 43, pl. 10, fig. 15).

Cerithium attenuatus Philippi, 1849 [Zeitschr. f. Malak., 5(21), pl. 1, fig. 2; cited from Houbriek, 1978].

Vertagus attenuatus: Reeve, 1865 (15, *Vertagus*, pl. 3, fig. 12); Dunker, 1882 (p. 107).

Cerithium (*Vertagus*) *attenuatum*: Tryon, 1887 (9, p. 148, pl. 28, fig. 57).

Rhinoclavis (*Longicerithium*) *longicaudata*: Houbriek, 1978 (pp. 85-88, pls. 58-61).

Type locality. Korea (*C. longicaudatum*).

Distribution. Korea, Philippines, Solomon Islands, Fiji Island.

DISCUSSION

Since A. Adams (1860) had reported *Styliferina gontochila* from Mino-Sima, Shiba (1934), Lee (1956) and Kang *et al* (1971) have cited it as a Korean species until now in their own lists without any other additional collecting records and considerations. Therefore, we excluded this species from Korean malacofauna in our study since Mino-Sima is out of Korean sea area actually. On the other hand, we could not confirm whether *Clypeomorus chemnitzianus*, listed by Kim *et al.* (1957), is a Korean species or not because his list was not organized taxonomically and involved possibilities of misidentification. For *Cerithium citrtrum* and *Collna macrostoma* which appeared in Je (1989), we could not ascertain his specimens since no further descriptions and collecting records were accompanied.

ABSTRACT

Cerithiid specimens collected in South Korean waters (12 localities) during the period from August 1965 to October 1991 were identified and classified. In the present study, seven species in six genera were identified as Korean Cerithiidae. Among them, three species, *Bittium variegatum* Kuroda and Habe, 1971, *Bittium craticulatum* Gould, 1860 and *Ataxocerithium abnormale* (Sowerby, 1903), are new to Korean malacofauna and fully redescribed with illustrations.

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PLATE 1

