

Subfamily Anadarinae (Bivalvia : Arcidae) of the Russian Far East Coast

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=국문요약=

러시아 극동 연안의 꼬막 아과(이매패: Arcidae)

러시아의 극동 연안에서는 꼬막 아과 세 종이 출현하고 있다. 이들 중 *Anadara inaequalis* (Bruguière, 1789)와 *Anadara subcrenata* (Lischke, 1869)는 신생대에 전멸된 개체군으로 알려져 있다. *Anadara* 속의 형태학적 변이, 분류 및 지리적 분포에 대한 자료를 제시하였다.

INTRODUCTION

Only one species of the subfamily Anadarinae Reinhart, 1935 had been reported by Scarlato (1981) from the former USSR Far East seas-*Anadara broughtoni* (Schrenck, 1867). Recently two additional species, namely, *Anadara* (*Scapharca*) *inaequalis* (Bruguière, 1789) and *Anadara* (*Scapharca*) *subcrenata* (Lischke, 1869) were found; *A. inaequalis* was described from Russian coast under name *Anadara* (*Anadara*) *talmiensis* by Kalishevich (1976) but last species is considered earlier as synonym of *A. broughtoni* (Scarlato and Kafanov, 1988).

In this paper presented an illustrated list of species with taxonomic and biogeographical notes.

A List of the Subfamily Anadarinae from Russian Far East Coast

Subfamily Anadarinae Reinhart, 1935

Genus *Anadara* Deshayes, 1830

Type species: *Arca antiquata* Linné, 1758 (original designation)

Subgenus *Scapharca* Gray, 1847

Type species: *Arca inaequalis* Bruguière, 1789 (original designation)

Anadara broughtoni (Schrenck, 1867)

Plate 1, fig. 5

1844 *Arca inflata* Reeve, Conch. Icon., 2, sp. 30 (non Schroter, 1802, et Brocchi, 1814)

1848 *Arca reevean* Nyst, Mem. Acad. Roy. Sci. Lett. Beaux Arts Belgiq., 22, p. 60 (non d'Orbigny, 1846)

1867 *Arca broughtoni* Schrenck, Reis. u. For-

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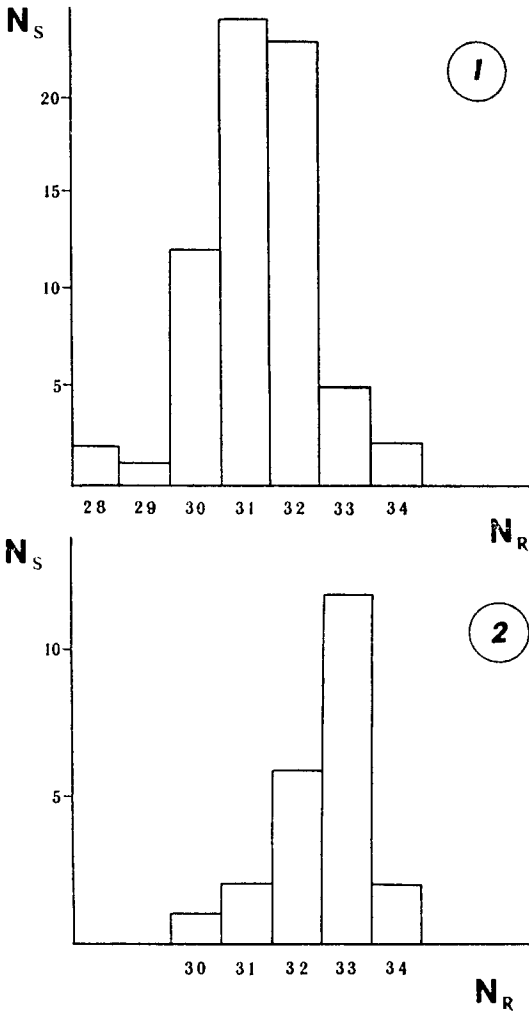


Fig. 1. The number of radial ribs in *Anadara inaequalvis* (1) and *Anadara subcrenata* (2). All specimens were collected from the Holocene deposits and beaches of Peter the Great Bay. Ns-number of specimens (valves), Nr-number of ribs

schung. Amur-Lande., 2, p. 578, pl. 24, figs 1-3

1906 *Arca tenuis* Tokunaga, J. Coll. Sci. Tokyo Imper. Univ., 21(2), p. 58, pl. 4, fig. 1

Distribution: ? South China Sea (Tchang *et al.*, 1960), ? Philippines (Hidalgo, 1904/1905), East China Sea, Yellow Sea (Tchang *et al.*,

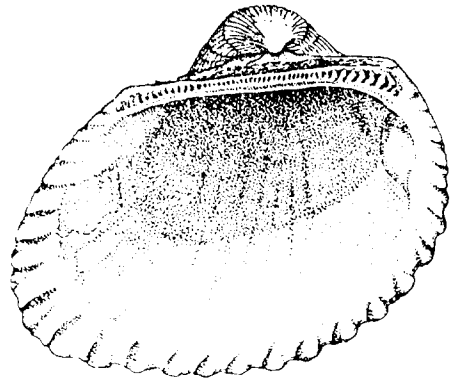


Fig. 2. *Anadara inaequalvis*, interior of left valve: Shkotovo shell bed, Holocene (coast of Ussuri Bay). Length 64 mm, height 51 mm

1955), Korea (Je, 1989), Japan-up to southern Hokkaido (Yamamoto and Habe, 1958). On Russian coast this species is known from Peter the Great Bay (Scarlato, 1981); probably, it has been collected also from Tatarsky Strait (northern Sea of Japan) (Schrenck, 1867).

***Anadara (Scapharca) inaequalvis*
(Bruguère, 1789)**

Plate 1, figs. 3, 4, 6; Figures 1-4

1789 *Arca inaequalvis* Bruguère, Encycl. Meth. Vers, 1, p. 106

1844 *Arca disparilis* Reeve, Conch. Icon., 2, sp. 59

1844 *Arca rufescens* Reeve, Conch. Icon., 2, sp. 53

1966 *Anadara (Hataiarca) masudai* Noda, Sci. Rept. Tohoku Univ., ser. 2(geol.), 38(1), p. 118, pl 5, figs 16, 17; pl. 13, fig. 4 (non fig. 2)

1976 *Anadara (Anadara) talmiensis* Kalishevich, Proc. Inst. Biol. Pedol. (Vladivostok), 42, p. 56, pl. 23, fig. 1

Distribution: India, Burma, Thailand, Malaya, Indonesia, North Australia, Philippines, Japan (Habe, 1965), China (Li, 1983), Mediterranean Sea- as Lessepsian migrant

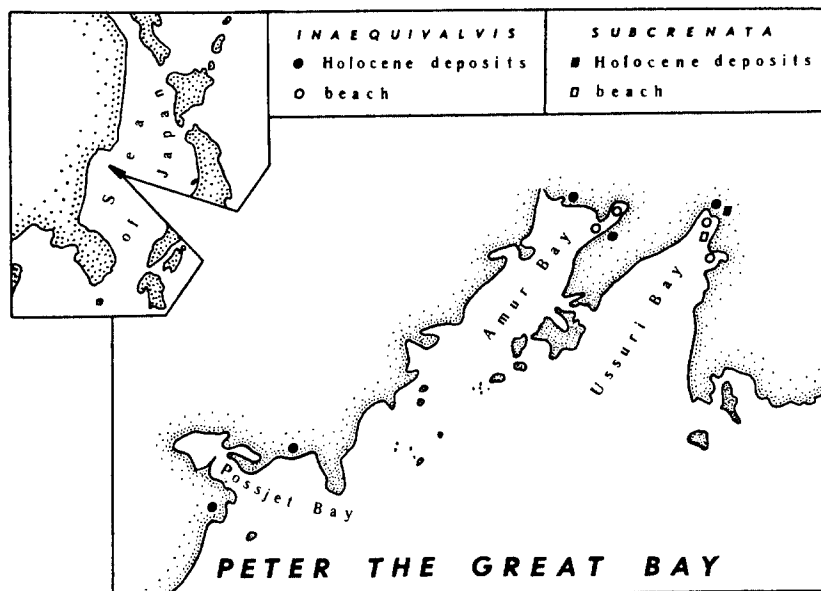


Fig. 3. The distribution of empty shells of *Anadara inaequivalvis* and *Anadara subcrenata* on the coast of Peter the Great Bay.

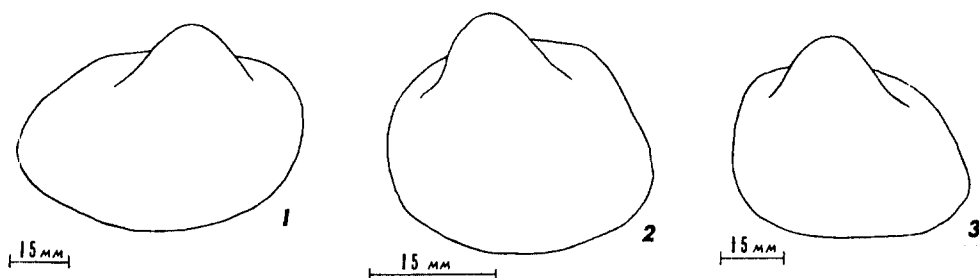


Fig. 4. Variability of shell form in *Anadara inaequivalvis* (specimens were collected from the Holocene deposits of Peter the Great Bay): 1-forma A, elongately ovate; 2-forma B, rounded; 3-forma C, subquadrate

(Barash and Danin, 1986). On Russian coast *A. inaequivalvis* has been found in the Holocene deposits of Peter the Great Bay and beach accumulations of the shell material-ZM FESU¹⁾(Fig. 3).

Remarks: This species is very closed to

Anadara subcrenata(Lischke, 1869) but differs in having the larger shell and variability of shell form. The number of radial ribs both in *A. inaequivalvis* and *A. subcrenata* is similar(Fig. 1). It has been recognized three forms of this species from the Holocene deposits of Peter the Great Bay(Fig. 4). Kalishevich(1976) described *Anadara talmiensis* from the Holo-

¹⁾ Zoological Museum, Far East State University (Vladivostok)

cene deposits of Tal'mi Lagoon(South Primorye), I treated this species as synonym of *A. inaequalvis*.

***Anadara (Scapharca) subcrenata*
(Lischke, 1869)**

Plate 1, figs. 1, 2, 7; Figures 1, 3

1847 *Arca amygdalum* Philippi, Abbild. Beschr. Conchyl., 2, Arca, pl. 2, fig. 2(non Link, 1807)

1869 *Arca subcrenata* Lischke, Malak. Bl., 16, p. 107

1906 *Arca kagoshimensis* Tokunaga, J. Coll. Sci. Tokyo Imper. Univ., 21(2), p. 59, pl. 3, fig. 21

1928? *Arca(Scapharca) peitaihoensis* Grabau et King, Shells Peitaiho, p. 159, pl. 1, fig. 6

Distribution: South China Sea(Tchang *et al.*, 1960; Tsi and Ma, 1980), Yellow Sea, Korea (Yoo, 1976), Japan(up to Mutsu Bay)(Habe, 1965), On Russian coast this species has been found in the Holocene deposits and beach accumulations of the shell material of Peter the Great Bay-ZM FESU(Fig. 3).

Remarks: Demir(1977) have recognized *Arca amygdalum* as new invader to Mediterranean Sea. The Mediterranean species now is known under name *Scapharca demiri* Piani, 1981(nomen novum pro *Arca amygdalum* Philippi, 1847 non Link, 1807) (Piani, 1981). *S. demiri* differs from *A. subcrenata* by having the 29-38 radial ribs (Fig. 1). Part of specimens described by Lutaenko(1988) as *Anadara(Scapharca) subcrenata* referred to *A. inaequalvis*.

SUMMARY

These species of the subfamily Anadarinae Reihart, 1935 occurs on Russian Far East coast. Among them, *Anadara inaequalvis*(Bruguère,

1789) and *Anadara subcrenata*(Lischke, 1869) are considered as extinct Holocene populations. Some data on morphological variability, taxonomy and geographical distribution of *Anadara* species is given.

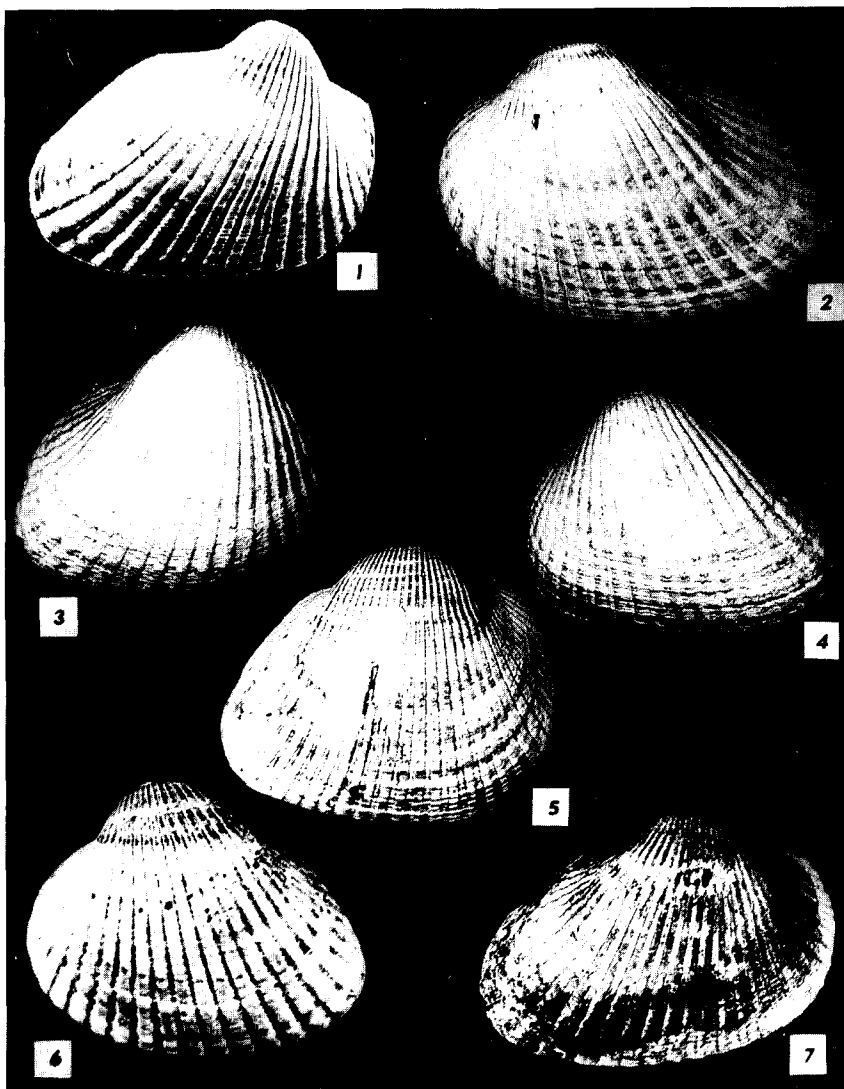
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PLATE 1



- Fig. 1.** *Anadara subcrenata* (Lischke). Shkotovo shell bed (Holocene), coast of Ussuri Bay, Sea of Japan.
Length 56 mm
- Fig. 2.** *Anadara subcrenata* (Lischke). Coast of Ussuri Bay, Sea of Japan; beach drift.
Length 43 mm
- Fig. 3.** *Anadara inaequivalvis* (Bruguière). Coast of Ussuri Bay, Sea of Japan; beach drift.
Length 58 mm
- Fig. 4.** *Anadara inaequivalvis* (Bruguière). Coast of Ussuri Bay, Sea of Japan; beach drift.
Length 53 mm
- Fig. 5.** *Anadara broughtoni* (Schrenck). Shkotovo shell bed (Holocene), coast of Ussuri Bay, Sea of Japan.
Length 77 mm
- Fig. 6.** *Anadara inaequivalvis* (Bruguière). Coast of Ussuri Bay, Sea of Japan; beach drift.
Length 31 mm
- Fig. 7.** *Anadara subcrenata* (Lischke). Shkotovo shell bed (Holocene), coast of Ussuri Bay, Sea of Japan.
Length 69 mm