

Rapana venosa



Taxon	Family / Order / Class / Phylum
<i>Rapana venosa</i> (Valenciennes, 1846)	Muricidae / Stenoglossa / Gastropoda / Mollusca

COMMON NAMES (English only)

Veined rapa whelk
Asian rapa whelk
Rapa welk

SYNONYMS

Rapana thomasiana Crosse 1861
Rapana pontica Nordsieck 1969.

SHORT DESCRIPTION

A large marine and brackish water Asian gastropod with voracious predatory behaviour. Shell lengths of individuals caught in the Adriatic Sea ranged from 67.0 mm to 136.7 mm and the total weight (shell+body wet weight) from 46.0 g to 553.9 g.

BIOLOGY/ECOLOGY

Dispersal mechanisms

Larvae with water currents.

Reproduction

It is a dioecious gastropod with separate sexes. Mating occurs during winter and spring. Masses of egg cases are laid in April to late July. The egg cases are attached to hard substrates and may contain 1,000 developing embryos. One female adult can lay multiple egg cases throughout summer. Upon hatching the larvae are planktotrophic. The variable duration of the planktonic period allows for a variety of dispersal strategies by the species, thereby facilitating its invasions and spread.

Known predators/herbivores

Unknown.

Resistant stages (seeds, spores etc.)

None.

HABITAT

Native (EUNIS codes)

A3: Sublittoral rock and other hard substrata, A4: Sublittoral sediments. Hard and soft bottom habitats.

Habitat occupied in invaded range (EUNIS codes)

A3: Sublittoral rock and other hard substrata, A4: Sublittoral sediments. Hard and soft bottom habitats.

Habitat requirements

In its native Korean range, adult snails show large temperature tolerances (4°C-27°C). Surface freezing in winter is tolerated by migration into deeper waters. In the Black Sea it occurs at salinities of 25 to 32 PSU and at lower salinities in the Sea of Azov. In the Black Sea the species is tolerant to water pollution and low oxygen conditions.

DISTRIBUTION

Native Range

Sea of Japan, Yellow Sea, Bohai Sea, and the East China Sea to Taiwan.



Known Introduced Range

First European record in Novorossiysky Bay (Black Sea) in the 1940s. Subsequent spread resulted in the colonization of the western and southern Black Sea, Azov, Marmara, Aegean, Adriatic, Tyrrhenian Seas and Brittany. The first North Sea record dates from July 2005.







Trend

Spreading.

MAP (European distribution)



Legend

	Known in country		Known in CGRS square		Known in sea
	Key distribution area		Infrequent		Unestablished

INTRODUCTION PATHWAY

Although ballast water and hull fouling is a possibility, the most likely vector is oyster shipments. They were used to "ballast" clam culture bags of *Tapes philippinarum*, which were transferred from the Adriatic, where the whelk was established, to France.

IMPACT

Ecosystem Impact

The large population in the Northern Adriatic Sea is generally considered to have had no major detrimental effect. However, areas with substantial oyster cultures may be at risk once the gastropod becomes established and occurs in high densities. In the North Sea the whelk may become a competitor of the native whelk *Buccinum undatum*.

Health and Social Impact

Unknown.

Economic Impact

The ecological impacts in the Black Sea have been severe. *R. venosa* predation was identified as the key reason for the decline of the commercially fished *Mytilus galloprovincialis* population in Bulgarian waters, the Kerch Strait and the Caucasian shelf.

MANAGEMENT

Prevention

Avoid transfers and release of living organisms. The species is suspected to be introduced with oyster shipments and therefore oysters should be cleaned properly and inspected before laying.

Mechanical

A substantial fishery for the species exists in the Black Sea, which may contribute to the control of the population in the region. Control or eradication efforts should select the most susceptible life stage(s).

Unfortunately, all possible strategies show weaknesses. Egg cases, although visible and often concentrated, may spread over large areas making them difficult to be manually collected. Free-swimming larvae are too dispersed to be considered tractable. Adults may be collected with dredges or pots/traps. It is recommended to catch as many as possible to minimise the risk of the species to become established. However, these efforts may result in unacceptable levels of damage to native species.

Chemical

Unknown.

Biological

Unknown.

REFERENCES

- Kerckhof F, Vink RJ, Nieweg DC, Post JJN (2006) The veined whelk *Rapana venosa* has reached the North Sea. *Aquatic Invasions* 1:35-37
- Mann R, Occhipinti A, Harding JM (eds) (2004) Alien Species Alert: *Rapana venosa* (veined whelk). ICES Cooperative Research Report No. 264. [available at www.ices.dk]
- Zolotarev V (1996) The Black Sea ecosystem changes related to the introduction of new mollusc species. *P.S.Z.N. I: Marine Ecology* 17(1-3):227-236

OTHER REFERENCES (selected from Mann et al. 2004):

- Alpbaz A, Temelli B (1997) A review of the molluscan fisheries of Turkey. NOAA Technical Report NMFS 129: 227-232
- Bilecik N (1975) La répartition de *Rapana thomasiana thomasiana* Crosse sur le littoral turc de la Mer Noire s'étendant d'Igneada jusqu'à Calti Burnu. *Rapp. Comm. int. Mer Méditerranée* 23(2):169-171
- Bombace G, Fabi G, Fiorentini L, Speranza S (1994) Analysis of the efficacy of artificial reefs located in five different areas of the Adriatic Sea. *Bulletin of Marine Science* 55(2-3):559-580
- Chung EY, Kim SY, Kim YG (1993) Reproductive ecology of the purple shell, *Rapana venosa* (Gastropoda: Muricidae), with special reference to the reproductive cycle, deposition of egg capsules and hatching of larvae. *Korean Journal of Malacology* 9(2):1-15
- Ciuhcin VD (1984) Ecology of the gastropod molluscs of the Black Sea. *Academy of Sciences of the USSR, Kiev Naukova Dumka*, pp 175
- Cucuz M (1983) *Rapana venosa* (Valenciennes, 1846) vivente nel Golfo di Trieste. *Bolletino Malacologico, Milano* 19(9-12):261-262
- De Minn R, Vio E (1997) Molluschi conchiferi del litorale sloveno. *Annales*, 11:241-258
- Ghisotti F (1971) *Rapana thomasiana* Crosse, 1861 (Gastropoda, Muricidae) nel Mar Nero. *Conchiglie, Milano* 7(3-4):55-58
- Ghisotti F (1974) *Rapana venosa* (Valenciennes), nuova ospite Adriatica? *Conchiglie, Milano* 10(5-6):125-126
- Golikov AN (1967) Gastropoda - Animals and Plants of Peter the Great Bay. *Nauka Leningrad*
- Grossu A (1970) Two species recently discovered invading the Black Sea. *Of Sea and Shore* 1:43-44
- ICES, WGITMO 1999. Report of the Working Group on Introductions and Transfers of Marine Organisms. ICES CM 1999/ACME:1, pp 57
- ICES, WGITMO 2002. Report of the Working Group on Introductions and Transfers of Marine Organisms. ICES CM 2002/ACME:06, pp 135
- ICES, WGITMO 2006. Report of the Working Group on Introductions and Transfers of Marine Organisms. ICES CM 2006/ACME:05, pp 330
- Koutsoubas D, Voultsiadou-Koukoura E (1990) The occurrence of *Rapana venosa* (Valenciennes, 1846) (Gastropoda, Thaididae) in the Aegean Sea. *Bolletino Malacologico* 26(10-12):201-204
- Liu, JH (1994) The Ecology of the Hong Kong Limpets *Cellana grata* (Gould 1859) and *Patelloida pygmaea* (Dunker 1860): Reproductive Biology. *Journal of Molluscan Studies* 60:97-111

- Mann R, Harding JM (2000) Invasion of the North American Atlantic coast by a large predatory Asian mollusc. *Biological Invasions* 2:7-22
- Marinov TM (1990) The zoobenthos from the Bulgarian sector of the Black Sea. Bulgarian Academy of Sciences Publication, Sofia, pp 195
- Mel P (1976) Sulla presenza di *Rapana venosa* (Valenciennes) e di *Charonia variegata sequenzae* (AR & BEN.) nell'Alto Adriatico. *Conchiglie*, Milano 12(5-6):129-132
- Paolini P (1987) Nuova segnalazione di *Rapana venosa* (Valenciennes, 1846) (Gastropoda, Muricidae) nell'alto adriatico. *Quad. Mus. Stor. Nat. Livorno* 8:111-112
- Rinaldi E (1985) *Rapana venosa* (Valenciennes) spiaggiata in notevole quantità sulla spiaggia di Rimini (Fo). *Bolletino Malacologico*, Milano 21(10-12): 318
- Rubinshtein IG, Hiznjak VI (1988) Stocks of *Rapana thomasiana* in the Kerch Strait. *Rybnoye Khoz (Moscow)* 1:39-41
- Savini D, Occhipinti-Ambrogi A (2006) Consumption rates and prey preference of the invasive gastropod *Rapana venosa* in the Northern Adriatic Sea. *Helgoland Marine Research* 60(2):153-159
- Terreni G (1980) Molluschi poco conosciuti dell'Arcipelago Toscano: 1 - Gasteropodi. *Bolletino Malacologico*, Milano 16(1-2):9-17
- Zibrowius H (1991) Ongoing modification of the Mediterranean marine fauna and flora by the establishment of exotic species. *Mésogée* 51:83-107

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