

The veined whelk *Rapana venosa* has reached the North Sea

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Abstract

An invasive gastropod, the veined whelk *Rapana venosa*, was first recorded in July 2005 in the Dutch part of the North Sea, and in September 2005 in the central southern North Sea (the wider Thames estuary). Both shipping activities and natural dispersion from the nearest population in France (Quiberon, Brittany) are possible modes of introduction of *R. venosa* to these sites. The possible effects of *R. venosa* in the North Sea remain uncertain, but if established, this invasive species could become a severe competitor for the native whelk *Buccinum undatum*. As *R. venosa* is known as predator on bivalves, an impact on local aquaculture activities (on e.g. blue mussels and oysters) is also possible.

Key words: *Rapana venosa*, veined whelk, first record, North Sea

The veined whelk *Rapana venosa* (Valenciennes, 1846) has reached the North Sea. The September 2005 issue of *Straatgras*, the magazine of the Natural History Museum Rotterdam (NMR), reported the first finding of this predatory gastropod in the Dutch part of the North Sea (Vink and Post 2005). A full-grown *Rapana* shell, still containing remains of the animal was found on July 23rd 2005 on the deck of a trawler in the harbour of Stellendam. The trawler, an Eurokotter, had been fishing on flatfish in an area off Scheveningen, northeast of the Eurogeul, the channel leading to the Harbour of Rotterdam (Figure 1). According to the crew members, more specimens were fished but they all ended up on the fish market in a basket together with native whelks *Buccinum undatum* (Vink and Post 2005).

After reports in the Dutch press and a request to report other finds to the NMR, a second finding became known: a live specimen trawled by a Dutch Eurokotter during the first week of September 2005 in the central southern North Sea (the wider Thames estuary). The area known to the Dutch fishermen as “Rug van Michiel -

Michael's ridge” (Figure 1, Annex) is located in British waters but very close to French and Belgian waters. This *Rapana* was transported to the harbour of Breskens (province of Zeeland, the Netherlands) alive and was donated to the local Fishery Museum where it is kept alive and on display in an aquarium (Vink et al. 2005). Figure 2 depicts both specimens from the North Sea. Having a length of 123 mm, the Scheveningen specimen (NMR 20210) is clearly full grown, whereas the Breskens specimen (length 70 mm) is immature.

R. venosa is a member of the Muricidae, a family of predatory marine snails. It has a large and heavy shell with a short spire. A very distinctive feature is the deep orange colour of the inside of the shell. The outer colour is variable from dull grey to red brown, with more or less conspicuous dark brown dashes on the spiral ribs, which tend to make an interrupted pattern - veins - throughout the shell.

R. venosa is native to the Sea of Japan. The species has history of accidentally being introduced into other regions (ICES, 2004). In the 1950s, it was discovered in the Black Sea and

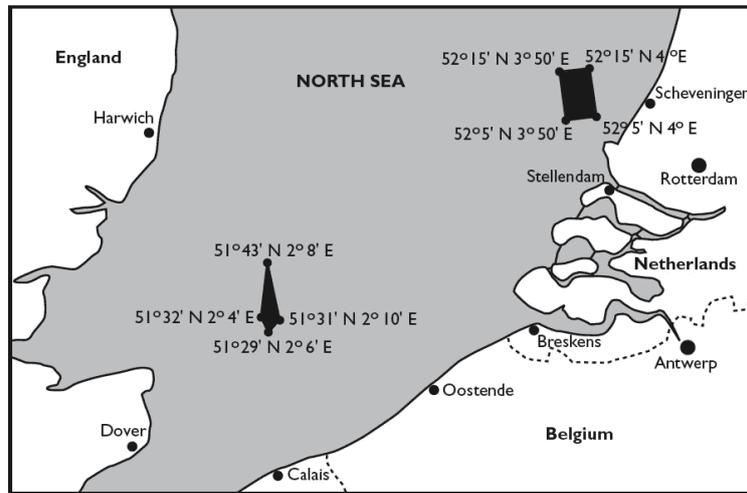


Figure 1. Localities in the southern North Sea where *Rapana venosa* was found. (map: Jaap van Leeuwen, NMR)

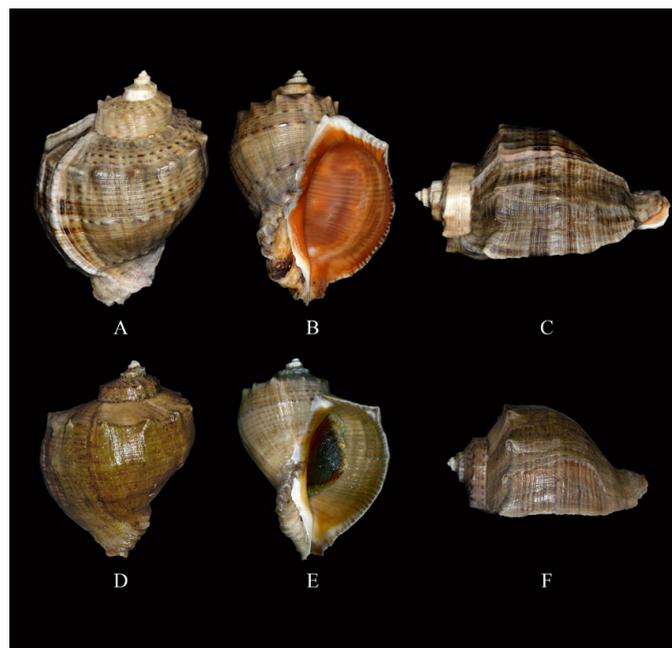


Figure 2. The preserved North Sea specimens of *Rapana venosa*. A, B, C: the Scheveningen specimen (NMR 20120). D, E, F: the Breskens specimen (Visserijmuseum Breskens). (Photo: Robert Vink, NMR)

later it spread to the Aegean and Adriatic seas. Nowadays, populations are also present in Uruguay and the Chesapeake Bay area (eastern USA). In NW Europe, several specimens have been discovered by the end of the 1990s in the Bay of Quiberon (Brittany, France), where the population appears to be small but stable (Gouilletquer pers. comm.).

The species has all many characters of a successful invader. It is fast growing, has a high fertility and a high tolerance to lower salinities, water pollution and oxygen deficiency. *Rapana* favours sandy bottoms where the snails can burrow, thus, the seafloor of the southern North Sea is a very suitable habitat. However, the species colonises hard substrates also. The

snails prey upon a variety of molluscs, mostly other bivalves such as oysters, clams and mussels. They are very voracious predators, and *Rapana* is blamed in the Black Sea for the decline of the native, edible, bivalve fauna. Like native *Buccinum* and *Nucella* they reproduce by forming egg cases, which occur in large clusters. The eggs hatch into pelagic larvae that have a long planktonic phase which may last to a maximum of 80 days. This allows accidental transfer throughout the oceans in ships' ballast water, but accidental introductions of egg cases in hull fouling or with aquaculture products is also very plausible.

The North Sea specimens have been found in the vicinity of areas with heavy shipping. Apart from the modes of introduction mentioned above, an accidental or intentional discharge of live specimens from a passing ship might also be possible while natural dispersion from the nearest population in France (Quiberon, Brittany) remains another possibility.

Due to its predatory impact *R. venosa* is considered as one of the most unwelcome invaders worldwide. Hence, the discovery of this predatory gastropod in the North Sea is of great concern. The invasion history of this species elsewhere shows that it can disturb a whole ecosystem. The possible effects of *Rapana* in the North Sea remain uncertain, but if established,

Rapana could become a severe competitor for the native whelk *Buccinum undatum*, a species already suffering from organotin water pollution and heavy fishing pressure. The industry on edible bivalves such as mussels *Mytilus edulis*, Pacific oysters *Crassostrea gigas* and cockles *Cerastoderma edule* in the region may also be at risk. But, on the other hand, *R. venosa* may find a copious meal in the dense population of the earlier introduced American jack knife clam *Ensis directus*. As a result one invader may turn out to control an other.

Acknowledgement

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References

- Vink RJ and Post JNJ (2005) *Rapana venosa*: een nieuwe exoot voor Nederland. *Straatgras* 17(3): 49
- Vink RJ, Nieweg DC and Post JNJ (2005) *Rapana venosa* (Valenciennes, 1846) (Gastropoda: Muricidae: Rapaninae) een nieuwe invasieve soort voor Nederland (en Engeland?). *Spirula* 345: 152-155
- ICES (2004) Alien Species Alert: *Rapana venosa* (veined whelk). Edited by Roger Mann, Anna Occhipinti, and Juliana M. Harding. ICES Cooperative Research Report No. 264. 14 pp

Annex

Records of *Rapana venosa* in the North Sea in 2005*

Location	Geographic coordinates		Record date	Species abundance	Reference
	Latitude, N	Longitude, E			
Off Scheveningen (Dutch waters)	52°10'	3°55'	23.07.2005	1 (probably more)	Kerckhof et al. 2006
Central southern North Sea (area known to Dutch fishermen as "Rug van Michiel = Michael's ridge) (British waters)	51°39'	2°07'	first week of September, 2005	1	Kerckhof et al. 2006

* Full reference to the data: Kerckhof F, Vink R, Nieweg DC, Post JNJ (2006) The veined whelk *Rapana venosa* has reached the North Sea. *Aquatic Invasions* 1(1): 35-37