

DISTRIBUTION OF THE ALIEN GASTROPOD *RAPANA VENOSA* IN THE NORTHERN ADRIATIC SEA

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Abstract

A systematic survey on the invasive alien gastropod *Rapana venosa* was conducted in spring-summer 2004 along the Italian coast of the Northern Adriatic sea in collaboration with squid fishermen. Results showed a scattered distribution of the species between the localities of Marano and Fano (approximately 400 km). Maximum estimated population densities (>500 ind. km^2) were recorded near the shores of Cesenatico; a comparison with a previous survey demonstrated that the local population of the gastropod has been rapidly increasing thus enhancing risk of invasion and of further spreading.

Keywords : *Gastropods, Species Introduction, Coastal Waters, Mapping, Adriatic Sea.*

Background

Rapana venosa (Valenciennes, 1846) represents a good example of a successful marine alien invasive species. This predatory gastropod has been increasing its biogeographical range moving from the native East Asian seas towards Europe and America thanks to ship ballast water and aquaculture transfer vectors. The whelk is internationally considered a serious menace to bivalve fisheries [1,2], being preferentially acclimated in estuarine/brackish water of coastal regions, where intensive bivalve harvesting usually takes place. The first findings of *R. venosa* in the Northern Adriatic Sea occurred in the 1970s when few specimens were collected by the shores of the town of Ravenna [3]; since then the introduced population has been growing undisturbed, being able to colonize the Northern Adriatic coasts of Italy [4]. In this communication we present the results of a field campaign, supported by the Italian Ministry of the Environment, aiming to assess the distribution of the alien gastropod in the Northern Adriatic.

Methods

In April 2004 an informative campaign was organised in order to obtain fishermen collaboration in five different localities of the Northern Adriatic: Marano (UD), Chioggia (VE), Goro (FE), Cesenatico (FC), Fano (AN). Three squid fishermen, each fishing over an area of about 10 km^2 per site were involved in the survey. Previous investigations in Cesenatico showed how squid-nets act as efficient sampling devices for the mature reproductive subset of the gastropod population [4]. Therefore squid-fishermen were asked to provide data on: nets location, water depth and number of gastropods captured at each control date for a period of four months (April to July). All samples collected were kept frozen (-18°C) for further structural analysis of the population (biometry, sex ratio, genetics).

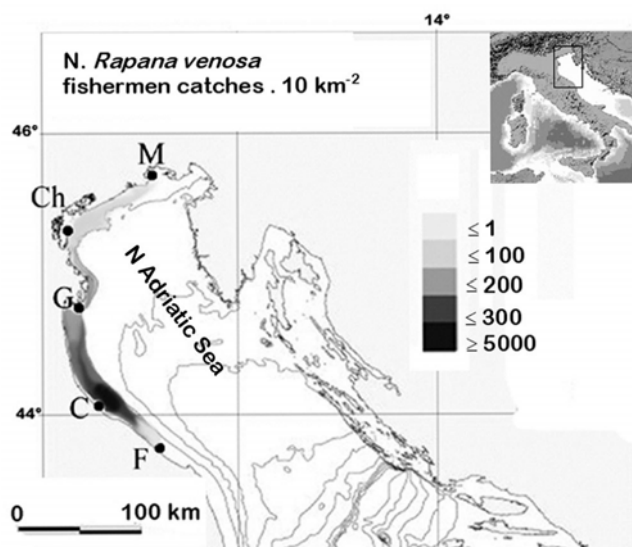


Fig. 1. Northern Adriatic distribution of *Rapana venosa* catches by local fishermen in spring-summer 2004. M = Marano (UD); Ch = Chioggia (VE); G = Goro (FE); C = Cesenatico (FC); F = Fano (AN).

Results and discussion

Data analysis showed a patchy distribution of *Rapana venosa* with maximum catches ($N > 500$ ind. km^{-2}) concentrated nearby the littoral of Cesenatico at 0.5-10 km from the coast and at 2-15 m depth [Fig.1]. No specimens have been caught South of Fano and North of Marano, which so far represent respectively the southern and northern limit of *Rapana* distribution. Samples caught at the distribution limits appeared larger, thus older, than individuals caught in Cesenatico [Fig. 2]. In 2001 a survey conducted using the same methods, but only in Cesenatico [4], reported much lower total catches (302) and significative larger dimensions than specimens collected in 2004 (2001 shell height frequency distribution mode = 100; 2004 mode = 90; KS-test, $D = 0.45$ $P < 0.001$). Both parameters indicate that the local population of the gastropod was experiencing a phase of expansion. In conclusion this survey has claimed for action to manage and control *Rapana* population in this area, an important hot spot of dissemination of this NIS towards other localities of the Mediterranean sea.

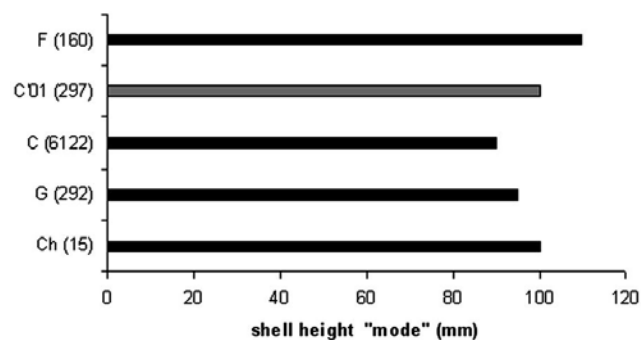


Fig. 2. Modal values of the size frequency distributions (shell height, mm) of *Rapana venosa* specimens collected in: F = Fano, C'01: Cesenatico, year 2001, C: Cesenatico, G: Goro, Ch: Chioggia. Numbers in brackets represent the total sample size.

References

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