

Fishing recruitment and exploitation onto a *Donax trunculus* stock off Tuscany Coast

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RESUME

La population de Filons, en mer Tyrrhénienne Septentrionale, est intensément exploitée. Les analyses des distributions de longueur et des zones d'abondance montrent que la pêche agit surtout sur les individus de petite taille. Même si, en 1966, a été adoptée une taille égale, un usage optimal de la ressource demanderait une réduction ultérieure de l'effort de pêche.

The truncate donax represents the main natural-growing clam species of the Northern Tyrrhenian Sea; it is professionally exploited by 15 dredges, but a sensitive yield is also due to unlicensed hobby-fishing. Because of supposed over-exploitation and catches reduction, one-year research program started in 1985: this was pointed to investigate the resource status and availability in the Marine Department of Livorno and eventually set either license number or other appropriate fishing limitation.

Four main fishing surveys were carried out in September, December, February and May in the 25 km area along the coast. Every time an average of 35 boat-operated-tows were used to evaluate the clam spatial distribution, abundance, and population characteristics.

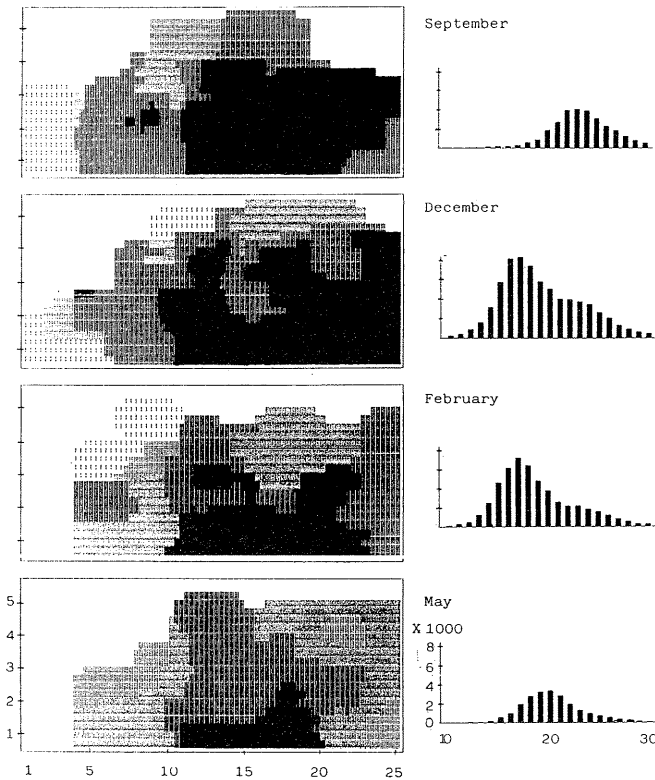


FIG. 1 left: Abundance of donax along the coast-line in km (abscissa) and depth in m (ordinate). Mean catch per tow = 1; 4-20 grams, 20-100 g, 100-500 g, 500-2000 g, 2000-9000 g. right: Length frequency of caught population individuals in cm.

Figure 1 shows the density estimate along the coast at various depth between 0.75 and 5.5 m; on the right side, bar charts represent the total length distribution of the donax population in the same period. The main fishing ground, between the Arno and the Serchio rivers (km 12-22), is heavily exploited during the spring months as soon as the clams are recruited. Average length of 24 mm in September falls to 16 mm in December with the newly recruited individuals and slowly rises to 17 mm in February and to 20 mm in May. In the meanwhile the economically fishable area (more than 2 Kg/tow) reduces to one fifth of the original one. These aspects altogether show a strong over-exploitation trend: even if a stock-recruitment relationship is unlikely, the fishing mainly acts upon the lowest age class at unprofitable size (local market prices of large size donax are 30-40% higher than small size ones).

A first management action was to set a minimum legal size equal to 20 mm and a closed fishing season in April and May, only for hydraulic dredges (D.M.M. 16/7/86). Hopefully the closed season will be extended to every kind of donax fishing for an efficient effort reduction: the size increase of commercial specimen will elevate both total yield and product quality with a sensitive gain for both the fishermen and the stock.

Commercial catches and stock assessment of *Squilla mantis*

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Resumé. La squille ocellée dans la mer Tyrrhénienne Septentrionale représente un exemple typique où les CPUE dérivée des campagnes expérimentales de pêche ne réfléchissent pas les captures commerciales pendant le cours de l'année. La raison principale de ce fait réside dans la particulière stratégie de pêche employée par la flotte commerciale.

It is usual to consider abundance estimates from fishing surveys as a good index of population abundance and availability: case occurs when this is not completely true, but others factors will also determine the amount of commercial landings.

Commercial catches of *Squilla mantis* are reported by the National Statistical Institute (ISTAT) and more accurate landing estimates are available from direct recording in the Livorno whole-sale market. These data have been set in relation to a groundfish survey carried out in 1985-87: in the northern Tyrrhenian Sea, 150 one-hour tows were performed in spring and summer seasons with a traditional Italian trawl (80 TSL, 400 HP). Significant abundance of *S. mantis* is limited to 10 miles around the Viareggio harbour (fig. 1), elsewhere the shrimp gives only rare and occasional catches.

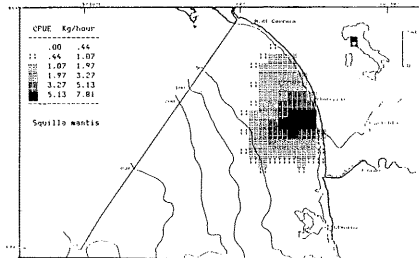


Fig. 1 Yearly mean CPUE of *S. mantis*.

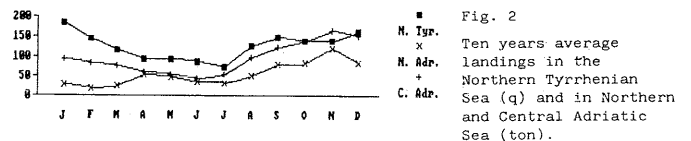


Fig. 2 Ten years average landings in the Northern Tyrrhenian Sea (q) and in Northern and Central Adriatic Sea (ton).

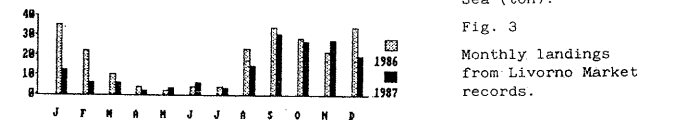


Fig. 3 Monthly landings from Livorno Market records.

Monthly trend of commercial landings in the Northern Tyrrhenian Sea well agree with the Adriatic ones (see fig. 2): catches are decreasing in spring and then increasing in autumn; maximum monthly yield is always in the November-January period. The ISTAT data are confirmed by the direct recordings of whole-sale fish market in Livorno (fig.3), but they are quite different from the CPUE derived from the trawl survey. The survey suggest a sensitive higher presence of *S. mantis* in summer: August CPUE are more than 10 times than those in April. Table 1 shows the comparison between commercial catches and abundance index and the observed ratios in the two seasons. The difference is mainly due to the fishing strategy of the commercial

	SPRING (April)	SUMMER (August)	ratio
Survey CPUE (gr/hour)	110	1330	1 / 12.1
North Tyrrhenian landings (ton)	91	124	1 / 1.4
Livorno market records (Kg)	295	1896	1 / 6.4

Tab. 1 Abundance and catches: their ratio between spring and summer.

fleet, which exert the fishing in the *S. mantis* area especially after the rough sea when the species is more available to the fishing gear and therefore fishermen more attracted. While the commercial catches reflect the species availability - obviously higher around winter time - the survey catches rates show the mean species abundance, which is growing soon after the spring recruitment.

Summing up this short note, when trawl survey data are analysed, it is always necessary to keep in mind that these results are average abundance estimates and not maximal fishing availability. Fishermen concentrate the effort in the right moment and place where highest gain is likely: this effort changes and moves along the year, then, sometime, the yield just a little has to do with the real population abundance.