

Production of Barnacles in a brackish lagoon in the Po delta

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On a évalué la production secondaire d'un peuplement à Balanes (*Balanus improvisus*, *B. eburneus*, *B. amphitrite*) dans une lagune saumâtre du delta du Po. La valeur de 51 g/dm²/an confirme l'importance de ce groupe d'animal dans la composition des communautés de la lagune.

Barnacles, represented by *Balanus improvisus* Darwin, *B. eburneus* Gould and *B. amphitrite* Darwin, form one of the most substantial parts of the macrobenthos of the hard substrate in the Po delta area and in particular of the "Sacca del Canarin" (RELINI *et al.* 1978-1985).

The Barnacles in the Po delta area have been studied since 1977 and among the published we would like to draw attention to: RELINI 1981; RELINI and FASCIANA 1982-1985-1989.

In order to estimate the secondary production of a population of three species of Barnacles in the Sacca a station was chosen at the centre of the lagoon, at a depth of 80 cm, which is greatly influenced by the marine inflow. For one year, from 1st June 1990 to 31st May 1991, cement-asbestos panels were immersed for periods varying from 2 weeks to 12 months.

Subsequently the central dm² of both sides of the panels was examined in order to evaluate the density, the size, the maturity of the individuals, the developmental stage of any possible embryos. The weight values of the whole of the fouling and of the share of Barnacles were expressed in terms of wet weight, dry weight and weight of ashes.

All three species show a summer-autumn recruitment. From June to October and beyond, only 2 week after being fixed on the substrate the Barnacle population already starts to contribute to the total biomass expressed in dry weight, and to the production of inorganic substances with percentages which are very often over 50%. During the study period the maximum value of the biomass was registered after 9 months of immersion, 68g/dm², with a density of 278 ind./dm². On the annual panel a biomass of 55g/dm² and a density of 282 ind./dm² was registered.

In order to measure the secondary production we applied two approaches suggested by CRISP (1971) for benthonic populations which do not present recruitment or applicable to any recruitment of species whose density and weight can be measured with continuity. The two formulas used are:

$$P_1 = \sum_0^t N \Delta \bar{w}$$

N = average number of individuals in the time interval.

$\Delta \bar{w}$ = increase in average individual weight in the time interval.

$$P_2 = N_t \bar{w}_t + \sum_0^t \bar{w} \Delta N$$

$N_t \bar{w}_t$ = biomass present at time t.

\bar{w} = individual average weight.

ΔN = variation in density in the time interval.

The results were: $P_1 = 54 \text{ g/dm}^2/\text{year}$ and $P_2 = 50 \text{ g/dm}^2/\text{year}$.

In a Barnacle population the death does not correspond to the disappearance of shell of the Cirriped which remains stuck to the substrate.

In the theoretical population considered by Crisp, on the other hand, the density corresponded to the number of living individuals and mortality could be calculated theoretically as the difference in density between the two time intervals.

Thus, using real data of the number of living and dead individuals and giving a realistic estimate of the weight of a single living individual, a calculation was made, with the first formula, of a third production value $P_3 = 51 \text{ g/dm}^2/\text{year}$ which falls into the previously estimated interval.

This value demonstrates the important role played by Barnacles in the ambit of the biocoenosis of this lagoon and confirms the high productivity of the northern zone of the Adriatic Sea.

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