

PRELIMINARY DATA ON POSIDONIA CONSUMPTION BY
PARACENTROTUS LIVIDUS IN CORSICA (FRANCE)

by H. NEDELEC, M. VERLAQUE and A. DIAPOULIS

*Laboratoire de Biologie végétale marine
Université d'Aix-Marseille II, Marseille, France*

ABSTRACT : The mean transit time is between 30 to 54 hours; the mean feeding rate of Posidonia leaves and epiphytes is 0.51 gdw/day.

INTRODUCTION : Sea urchins are among the more important seagrass feeders (7). Their populations, subject to very important fluctuations : pullulation (2) and mass mortality(11), play a conspicuous role in the evolution of seagrass beds (9). In the Mediterranean, *Paracentrotus* is a regular browser of *Posidonia oceanica* (L) Delile leaves.

MATERIAL AND METHODS : We have studied the feeding behaviour of *P. lividus* in a population settled on a Posidonia bed, 5 metres deep, near Galeria.

During May-June 1980, two consecutive experiments were carried out *in situ* with the help of experimentation cages. We used a technique of biological marking of a set of individuals (test-diameter between 4.9 and 7.3 cm). Cladophora and Enteromorpha, given as food to the urchins, was a good tracer element of their gut contents. These individuals were then replaced at midday in the Posidonia meadow and some of them were then collected at different times over a period of 3 to 4 days.

PERIOD OF FOOD TRANSIT : It is obvious that the time of transit varies according to many factors (individual behaviour, experimental conditions...), however, the simultaneous analysis of the evolution of Posidonia consumption and that of remaining tracer (Fig.1) suggests a mean transit of 30 to 54 hours, values close to that established by Kempf (6) on a rocky shore population (a recycling of the faeces and/or the temporary persistence

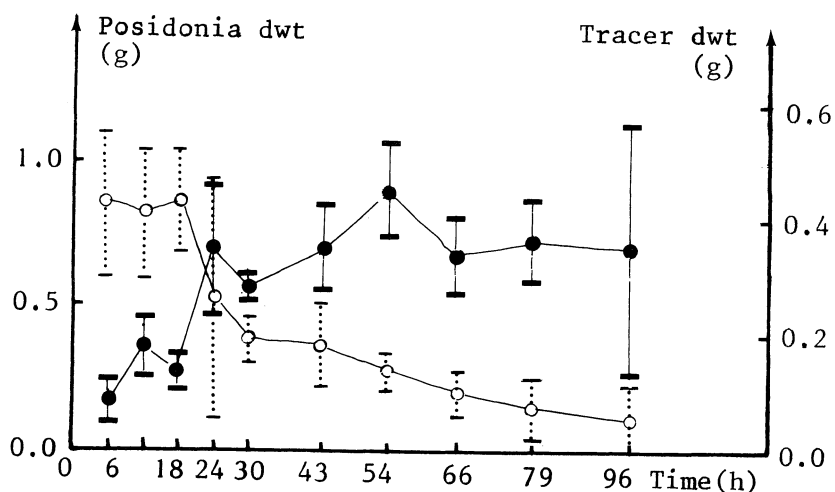


Fig.1 : Evolutions of Posidonia weight (●) and tracer weight (○) with time (mean values).

of a residual fraction of the tracer seems to us to be the cause of the non-negligible quantity of tracer observed beyond this period).

FEEDING RATE AND IMPACT ON THE SETTLEMENT : The mean feeding rate by day has been calculated for different 24 hours periods (0-24h : 0.7063, 6-30h : 0.3928, 18-43h : 0.4335 gdw of *Posidonia* and epiphytes), the global mean value obtained is 0.51 gdw/day. This value is much higher than those obtained by different authors on *P. lividus* and on other species of sea urchins (Table). If we consider, on one hand possible tracer-recycling, and on the other hand the effects of over-crowding (5), we may suppose that this value is not over-estimated. It is obvious that this mean rate, calculated from 3 and 4 days periods, does not take into account rhythms of longer periods (monthly, annual rhythms) such as those displayed by Fuji (3) on *Strongylocentrotus intermedius*.

At the same season, the leaf production of *P. oceanica* has been estimated at 6.00 gdw/m².day (-10m, Corsica (1)) and the global production of the seagrass bed (*P. oceanica* and its epiflora) at 4.04 gdw/m².day (-4m, Ischia (10)). Consequently, the estimation of the mean consumption per sea urchin and by day is about the 1/10 of the primary production of the seagrass bed. Moreover, we must take into account the non-negligible quantity of leaf-parts which are severed by *P. lividus*, drift away and are lost to that bed. In the case of sea urchin pullulations, a regression of the bed is possible; *Lythechinus variegatus* has thus been responsible of mass destructions in *Thalassia testudinum* beds (2).

References	Species	Seagrass	Conditions	Feeding rate (gdwt/day)
Ott and Maurer, 1976	<i>Paracentrotus lividus</i>	<i>Posidonia oceanica</i>	in vitro	0.0030
Traer, 1980	<i>Paracentrotus lividus</i>	<i>Posidonia oceanica</i>	in vitro	0.0029-0.0031
Greenway, 1973	<i>Lythechinus variegatus</i>	<i>Thalassia testudinum</i>	?	0.0286-0.1786
Lowe, 1974	<i>Lythechinus variegatus</i>	<i>T. testudinum</i> <i>Syringodium filiforme</i>	? ?	0.063 0.068
Greenway, 1976	<i>Lythechinus variegatus</i>	<i>T. testudinum</i>	in vitro in situ	0.1100 0.1443
Nédélec et al., 1980	<i>Paracentrotus lividus</i>	<i>Posidonia oceanica</i>	in situ	0.5108

Table : Feeding rates given by some authors on *P. lividus* and other species of sea urchins.

ACKNOWLEDGEMENTS : This study has been carried out as part of the Scandola Project of the "Parc Naturel Régional de Corse".

REFERENCES :

- BAY, D., 1978. *Prog. Rep. Stareso, Univ. Liège*, 16 : 1-251.
- CAMP, D.K., COBB, S.P. and BREEDVELD, J.F., Van, 1973. *Bio Science, U.S.A.*, 23(1):37-38.
- FUJI, A., 1967. *Mem. Fac. Fish., Hokkaido Univ.*, 15(2):83-160.
- GREENWAY, M., 1973. Abstract, 10th Ann. Meeting, Assoc. Island mar. Lab. of the Caribbean.
- GREENWAY, M., 1976. *Aquatic Botany, Netherl.*, 2:117-126.
- KEMPF, M., 1962. *Rec. Trav. Stn mar. Endoume, Bull., Fr.*, 25(39):47-116.
- KIKUCHI, T. and PERES, J.M., 1977. In *Seagrass Ecosystems*, ed. by P. McRoy & C. Helfferich, New York:147-193.
- LOWE, E.F., 1974. Thesis, Univ. Southern Florida, Tampa, 97pp.
- OGDEN, J.C., 1976. *Aquatic Botany, Netherl.*, 2:103-116.
- OTT, J. and MAURER, L., 1976. In *Biology of Benthic Organisms*, ed. by B.F. Keegan, P.O. Ceidigh & P.J.S. Boaden, Pergamon Press, Oxford, New York, Toronto, Sydney, Paris, Frankfurt : 493-502.
- PEARSE, J.S., COSTA, D.P., YELLIN, M.B. and AGEKIAN, C.R., 1977. *Fish. Bull., U.S.A.*, 53(3):645-648.
- TRAER, K., 1980. In *Echinoderms : Present and Past*, Ed. M. JANGOUX, Rotterdam : 241-244.