

EUROPEAN
EMBS
MARINE BIOLOGY
SYMPOSIUM
43

2008 | 12 September

UNIVERSITY OF THE AZORES
Marine Biology Section - Biology Department
Ponta Delgada - São Miguel Island



this approach was implemented, it is possible to analyse seasonal and spatial variation in community structure in a consistent and reliable way. Geographically referenced ecological information has provided the Regional Environmental Agency with a set of tools upon which better sustainable decisions can be made. This on-going project is planned to cover the whole archipelago, and could eventually be extended to other Macaronesian islands where coastal communities present similar characteristics.

P3.02

Limpet (*Patella* and *Haliotis*) aquaculture in the Azores

Amaral AF, Pereira NM, Mendes H, Azevedo JMN, Neto A

An intensive pilot culture system is being developed to evaluate the aquaculture potential

of *Haliotis tuberculata* and *Patella* spp. in the Azores. This project is aimed at developing human and technical skills for the implementation of aquaculture in the Azores, targeting species that better respond to the requests of regional authorities and/or third parties interested in implementing cultures on an industrial scale. Ongoing research comprises: i) studies on the species life cycle, involving induction of gametogenesis and monitoring the development of the offspring, growth, reproduction and mortality; ii) evaluation of the biotic and abiotic factors that directly influence the aquaculture of these species in an intensive system; iii) optimization of culture methodologies.

P3.03

Macrobenthic diversity in deep hard bottom assemblages along the southern Tyrrhenian coast of Calabria (Italy)

Angiolillo M, Salvati E, Giusti M, Cardinali A, Fabroni F, Greco S, Canese S

A remotely operated vehicle (ROV), equipped with a digital camera, was used to describe qualitatively and quantitatively the depth distribution (50 - 146m) of major macrobenthic taxa that could be confidently identified from photo analysis. During summer 2007 eleven sites were surveyed and 330 pictures were collected along the depth gradient. Two laser pointers, were used as metric scale in order to compare equal areas (2400cm²). The random point count of major taxa was used for quantitative analysis by means of Coral Point Count (CPCe) software. We have observed a high biodiversity and the presence of rare and uncommon species. Taxa composition varies with depth and location also in sites very close to each other. A boundary was detected at the depth of 75m. The assemblages varied roughly, the erect species dominated above 75m, while under this depth the encrusting species were prevalent. These data provide a baseline on the study of this bathymetric range that is understudied and poorly understood.

Observations on reproduction and behavior of the lessepsian fish *Siganus*

luridus in the SE Ionian Sea

Bardamaskos G, Megalofonou P

From December 2005 to February 2008, a total of 437 specimens of the dusky spinefoot, *Siganus luridus*, was sampled by spear fishing and gillnets in the Messiniakos Gulf (SE Ionian Sea). The study of gonad maturity stages on monthly basis all-year-round revealed that *Siganus luridus* does reproduce in the area, which allows us to consider the species as an established alien in the SE Ionian Sea. The mean gonadosomatic index per month indicated that spawning lasts from May to October. During the spawning season the Sea surface temperature and salinity varied from 22 to 28.6 °C and from 32.1 to 40.9 o/oo respectively. Direct observations in the field while free diving revealed some aspects of the species' behavior considering predator avoidance, deterrence and evasion as well as habitat selection and foraging tactics. It seemed that the species prefers habitats with available cover, such as crevices and holes in the rocky substrate or *Posidonia oceanica* patches, because in that way risk of capture by predators is reduced. Another tactic to avoid being detected by predators is eucrypsis, namely to change its colour pattern to match the background and freeze as close to the substrate as possible. It forms schools of different sizes, from less than 10 to more than 30 fish. Individuals of *Sparisoma cretense* and -less frequently- *Sarpa salpa* were observed to participate in the same school with *Siganus luridus* in the search for food. Two possible explanations for this phenomenon are to deter predators from attacking and to gain access to good foraging areas defended by other herbivores displaying territoriality.

P3.05

Population structure and dynamics of *Chromis chromis* in the southern Mediterranean

Bracciali C, Guzzo G, Giacomina C, Dean JM, Sarà G

The damselfish, *Chromis chromis*, is the only species belonging to Pomacentridae living in the Mediterranean. Most of the time, it forages throughout the water column but it uses the bottom to build nests and to rest at night. Populations of damselfish are the most abundant of any other marine coastal species' in Mediterranean Sea and, therefore, they might affect the global coastal organic matter and energy fluxes. Despite its ecological importance, however, no information is available on growth, age and secondary production rates of this species in addition to sparsely available data from some areas of the Northern Mediterranean. During 2007, we collected data on biometrical and morphological features of damselfish from different sites of the Isola di Marettimo (Egadi Archipelago, western Sicily). We analysed their age and cohort distribution by means otolith analysis. Results of ANOVA highlighted significant differences of damselfish features between sheltered and exposed sites. Damselfish were more abundant, smaller and older in sheltered sites than in exposed sites as also shown by allometric coefficients of length-weight relationships. The pectoral fin ratio evidenced a marked asymmetry: the percentage of specimens with the right fin longer than the left was significantly higher in exposed sites. We concluded that different conditions of food availability and habitat structure and complexity in the two sites may be responsible to select and maintain different swimming behaviours adopted by the two populations to forage at optimal conditions.

Behaviour of *Chromis chromis* under varying hydrodynamics conditions in southern Mediterranean (Sola di Maretino, Egadi archipelago)

Bracciali C, Guzzo G, Sarà G, Giacoma C

Changing environments can have profound impacts on some ecological aspects of behaviour of marine coastal fish. In particular, hydrodynamics can affect rates of food supply for planktivorous small-size fish. Changing current velocity and total discharge of exposed coastal sites are more constant respect to shelter sites and this might influence the availability of suspended food for planktivorous fish. This may have important repercussions on species fitness. Thus, we tested the effect of two different hydrodynamics conditions on feeding behaviour of damselfish (*Chromis chromis*), the most abundant coastal species along the Mediterranean coasts. We selected two sites in the Isola di Marettimo (Egadi Archipelago, Western Sicily) with different hydrodynamics but with similar zooplankton species composition per water volume. The first site was exposed to main water current from Mediterranean off-shore, while the second was sheltered and set aside respect to the main current. We assumed that food quality was similar between two conditions, but the quantity per time unit was higher in exposed than sheltered sites. We video-recorded swimming behaviour of *Chromis* in both sites, and quantified the number of shoals, number of specimens per shoals, shoal shapes, shoal movements, and number of feeding events. Analysed data (ANOVA) showed that damselfish shoals moved more frequently and individuals searched more for food in exposed than in sheltered sites. Shoals spent more time close to bottom and rocky habitats when in sheltered than in exposed sites. We concluded that, at exposed hydrodynamics, the behaviour of *Chromis chromis* was mainly related to water column, whereas it was more affected by habitat morphology and likely by bottom food supply, in sheltered sites.

P3.07

Growth of *Mysis mixta* in the southern Baltic Sea computed numerically

Brzezinska B, Dzierzbicka-Glowacka LA

The paper presents an empirical model describing the growth rate and stage duration of specific size-classes of *Mysis mixta* in the southern Baltic Sea. The quantitative expressions above parameters was obtained as a function of body weight (in mgw.w. - case 1 and in mgC - case 2). The growth rate of *Mysis mixta* was calculated on the basis of experimental data. In the work also obtained the stage duration in different development stages for *M. mixta* by transformation data and the numerical solution of polynomials. Empirical model computed here may be used with good precision in mathematical models of pelagic communities.

Genetic diversity of the carpet shell clam *Ruditapes decussatus* within the Mediterranean region revealed by AFLP fingerprinting.

Cannas R, Manunza A, D'Aiotti V, Mascia D, Demurtas R, Cau A

The carpet shell clam, *Ruditapes decussatus* (Linnaeus, 1758), is distributed on tidal flats in the Mediterranean and Atlantic coasts. The economic importance of this species in aquaculture suggests the need of assessing genetic structure of populations and consequently plan effective management measures. In this study, the genetic diversity of *R. decussatus* within the Mediterranean was assessed using AFLP® markers. A total nine of samples were collected: 7 Sardinian (Santa Gilla, Olbia, Feraxi, Sant'Antioco, Tortoli, Marceddi, Calich) and 2 Adriatic sites (Venezia and Goro). Clean and high molecular weight DNA was isolated from 156 individuals and digested with the two endonucleases EcoRI and TaqI. Selective PCR amplifications were realized using four EcoRI/ TaqI primers combinations and initially tested in a subsample of 40 individuals. The two primers pairs that produced the most polymorphic profiles, E33/T32 (% of polymorphic loci PLP=64.3%) and E44/T32 (PLP=73.3%), were used for the analysis of the whole sample. All the analyses were realized combining the fragments obtained by the two primer pairs. A total of unambiguous 244 informative AFLP fragments, ranging from 70 to 250 bp in size, were generated. Genetic diversity estimates indicated a high level of heterozygosity (HW=0.2033±0.008190) and the fixation index showed a highly significant differentiation among populations (Fst= 0.15351, Pvalue=0.001). Nei's genetic distances and AMOVA analysis indicated that the Adriatic group and the Sardinian group are genetically differentiated (Fct = 0.04709; P-value = 0.05), this last one seems to be further subdivided in two subgroup. AFLP fingerprinting demonstrated to be a valid tool for the assessment of genetic variability in this species. If the genetic distinctiveness of the Sardinian samples will be confirmed by further analyses employing different markers such as microsatellites, the use of allochthonous seed in aquaculture facilities should be carefully monitored.

P3.09

Defense of vegetative vs. reproductive blades of the Pacific kelps *Macrocystis integrifolia* and *Lessonia nigrescens*: A test of species-specific defense strategies

Christian P, Gómez I, Rothäusler E, Veliz K, Thiel M

Chemical defense is assumed to be costly and therefore algae should allocate defense investments in a way to reduce costs and optimize their overall fitness. Thus, lifetime expectation of particular tissues and their contribution to the fitness of the alga may affect defense allocation. Two brown algae common to the SE Pacific coasts, *Lessonia nigrescens* (Bory) and *Macrocystis integrifolia* (Bory), feature important ontogenetic differences in the development of reproductive structures: in *L. nigrescens* blade tissues pass from a vegetative stage to a reproductive stage, while in *M. integrifolia* reproductive and vegetative functions are spatially separated on different blades. We hypothesized that vegetative blades of *L. nigrescens* with important future functions are more (or equally) defended than reproductive blades, whereas in *M. integrifolia* defense should be mainly allocated to reproductive blades (sporophylls), which are considered to make a higher contribution to fitness. Herein, within-plant variation in susceptibility of reproductive and vegetative tissues to herbivory and in allocation of phlorotannins