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species as a suitable host facilitate the establishment of the introduced species. However the EHR does not include the impact of generalist enemies and it has been suggested that generalist enemies would prefer a novel species over the native species that have coevolved with the generalist enemies. If generalist enemies prefer introduced species over native species it could be assumed that only well defended species, populations or individuals would be successfully introduced. *Fucus evanescens* was introduced to Sweden in the 20th century and generalist herbivores in this range prefers co-occurring native furoid species that contain lower levels of phlorotannins, a group of chemicals known to increase the resistance to generalist herbivores. In Iceland where *F. evanescens* is native it is a preferred food choice with low levels of phlorotannins. Here we have tested if the pattern of herbivore preference is due to the novelty of *F. evanescens* in the introduced range, i.e. if the EHR applies, or the high level of defence compounds in the introduced population. This was done by comparing the preference of a generalist herbivore (*Littorina littorea*) for the native and introduced populations of *F. evanescens*. We also compared the herbivore preference for agar pieces containing pulverized algal tissue from the two populations to confirm that chemical traits, rather than morphological traits, are causing an eventual preference. The introduced population of *F. evanescens*, that has the higher concentration of phlorotannins, was grazed to a lesser extent than the native population of *F. evanescens*, both as live algae and incorporated in agar. Our results suggest that generalist herbivores consume novel species and that resistance to herbivory can be important for a successful establishment of introduced algal species. If this pattern is general, marine communities, which commonly are dominated by generalist herbivores, would be resistant to the introduction of algal species, with the exception of those that are well defended against generalist herbivores.

03.19

Is energy supply affecting algal palatability? Temporary low-light stress in coastal habitats and its consequences for grazer-algal interactions

Lenz M, Wahl M

Temporary low-light stress in coastal waters can be due to phytoplankton blooms or sediment particles brought into the water column by terrestrial runoff and storm events. The frequency and intensity of all three causal processes is tied to climate change and will be altered when temperature, precipitation, and storm regimes will shift. As a consequence, benthic primary producers, among which macroalgae are the most important habitat engineers in nearshore waters, will be subjected to longer and more frequent periods of energy limitation. Plant defense hypotheses predict that resource shortage will lead to a reduced capacity of individuals to defend themselves against herbivores, e.g. by the production of active chemical compounds. This, in turn, should change grazer-algal interactions with potentially far-reaching consequences for the distribution of seaweeds. We tested this model in an experimental approach by exposing a total of 17 macroalgal species from 7 different biotic provinces to moderate and severe low-light regimes for a maximum time span of 21 days. Subsequently, we assessed the attractiveness of differently stressed algal individuals for consumers in no-choice feeding assays. Though all seaweed species were impaired in their physiological performance, i.e. oxygen production and growth, by at least the harshest stress levels, we only found a positive relationship between light reduction and algal attractiveness for meso- or macrograzers in three cases. Our results show that marine macroalgae have a surprisingly high potential to adapt to temporary low-light conditions and that energy

limitation for periods between two to three weeks is not consistently affecting algal susceptibility to herbivore attack. We discuss these findings with regard to plant defense theory and suggest different mechanisms that could be responsible for the absence of a relationship between light supply and algal palatability.

03.20

Lepidochronology in *Posidonia oceanica* (L. Delile): A review of the technique and analysis of some rhizome features along a spatio-temporal gradient

Serrano L, Serrano O, Mateo MA

Seagrass has the potential to adapt its form and physiology to its environment. Many studies demonstrated that some *Posidonia oceanica* traits are subject to considerable spatial variability. "Lepidochronology" is a technique that allows retrodating different parts of this species in order to reveal the history of the variability of several functional and structural parameters during recent decades. For the first time geographic, bathymetric and temporal variation was considered on a global scale, by joining literature data from previous lepidochronological studies. The database was also complemented with our sampling missions in the Mediterranean. Some of the results obtained suggest that in the eastern Mediterranean basin, *P. oceanica* produced significantly less leaves and rhizome ( $6.70 \pm 0.07$  leaf  $y^{-1}$ ,  $N=74$  and  $0.86 \pm 0.03$  cm  $y^{-1}$ ,  $N= 51$  respectively) than in the western basin ( $7.71 \pm 0.03$  leaf  $y^{-1}$ ,  $N=1276$  and  $0.83 \pm 0.01$  cm  $y^{-1}$ ,  $N=1542$  respectively). The number of leaves produced per year increased globally ( $R=0.27$ ;  $P<0.0001$ ;  $N=1324$ ), whereas the rhizome vertical growth decreased ( $R = - 0,41$ ,  $P <0,01$ ;  $N = 47$ ). We postulate that water temperature, transparency and conductivity are the three most plausible environmental factors that help understand these observations. Furthermore, temporal variation of heavy metal content in sheaths was also analysed. Considering all the data, it appears that despite the large influence of local environmental factors in the ecology of *Posidonia oceanica*, global temporal trends can be observed. This indicates that global factors may contribute to the variation of some *Posidonia oceanica* descriptor values, that can be observed on a Mediterranean scale.

P3.01

Azorean coastal communities: an on-going study

Álvaro NV, Wallenstein FM, Neto AI, Nogueira EM, Terra MR

Marine protected areas in the Azores archipelago were first defined in 1980 essentially based on empirical knowledge. Scarce scientific information on biotic community structure around these islands was used for this purpose, which lead to over and underestimation of ecologically sensitive areas. To overcome this shortage, an intensive 3 year study was widely implemented on shores around São Miguel Island to assess coastal communities. Abiotic and biotic factors were systematically organized and biotopes defined. Consequently a set of methodologies for easy and systematic identification of biotopes was defined based essentially on algae communities. These methods were implemented throughout other islands of the archipelago - Santa Maria, Graciosa, Pico and Terceira - enhancing comparability of results throughout the archipelago. Since



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 (2400cm<sup>2</sup>). 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.