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## Concluding remarks on the XXXIV Conference of the Italian Society of Biogeography: Marine Biogeography of the Mediterranean Sea

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Biogeography has many homes, as many as the objects and processes it studies, as many as the spatial and temporal windows through which these objects and processes are observed. At the same time, there is a multiplicity of floristic and faunal elements, as well as the communities they compose by means of several dispersal-integration-exclusion mechanisms, the result of which is diversity (the prefix "bio"-, seems to me pleonastic as intraspecific diversity has already a name, *variability*) as we read it today.

In the same manner of its "cousin" Ecology (the frontier between the two is often indistinct when Ecologists study biological patterns in the geographical space, the determinants of which act at a small scale level), the Biogeography is a "compositionist" science, making reference to other disciplines to describe and interpret its objects and processes. In this way, if the Continental Drift was inferred *also* on the basis of palaeogeographical evidence, present faunas and floras are interpreted in the light of geological events.

All this is apparent, although in an uneven manner, from the presentations at the XXXIV Italian Society of Biogeography Congress, during which these few notes were taken. And I would like to extend my non-ritual congratulations to Valerio Sbordoni, the conference Convener, and to those who helped him in the organization of it, for identifying and expressing the variety of themes that are involved in the debate of modern Mediterranean Biogeography.

We can thus try to summarize, in a few broad categories, what we heard in Ischia and derive some conclusive remarks.

First of all, let us consider the faunal aspects (the floristic ones were represented at a smaller extent in the Conference): biogeographical investigations are often the occasion for updating our knowledge on individual taxa, of whatever relevance, that are really fruitful even when they are limited to regional check-lists. With the greatest satisfaction, we could read important reviews on major groups such as Porifera, Hydroids, Polychaetes, Molluscs, Bryozoa and, why not?, Pycnogonids, Gastrotricha Proseriata and Rotifera. However, in view of the rarefaction to which specialists in plant and animal Systematics undergo in our Country, or even when we try to figure out how many students and young biologists are presently learning how to identify marine species, a question arises: what sound assessment of biogeographical patterns is ever possible (see the malicious remark that species number, in a given area, is proportional to the number of taxonomists) in a region where specialists are... missing?. In the same way, what real account can we have on diversity in the lack of specialists? And is not pointless questioning on what kind of decisions, both political and administrative, are possible in the lack of data or, even worst, on the basis of wrong data. This is especially critical when the problem arises of conservation, resources exploitation and anthropic disturbance assessment. Not astonishing, this theme arose several times during the conference.

Evolution and dispersal take place within physical scenarios that, on a larger time scale, are modulated by geological events. From this perspective, Mediterranean history appears quite complicate, with particular reference to the Messinian period. If I can allow myself a personal remark, I remember when the late Dr. Bruno Scotto who died in a shipwreck during a scientific investigation, and I made some data treatment zooplankton samples collected in the Ponza trench at -3500 m. It was then possible to see that deep community resulted from the rarefaction of the bathyal one, while there was no trace of the abyssal community that characterizes corresponding depths in the Atlantic Ocean. I deem that this is a good example of the role the Gibraltar sill and the separating effect it performs since its rise.

The subject of the ancient and modern "immigrants" is somehow correlated. If we consider the ecological history of the Mediterranean, we have the impression that this basin has always acted as a "diversity elaborator" where, starting on the ancient Tethyan basis, a series of elements now of cold now of warm affinity, principally coming from the Atlantic could settle. Such a labour is probably the source of present faunal and floristic originality, as we know it through a great number of endemisms in all Mediterranean taxa. Recently, a Lessepsian migration stratified upon this picture, but its consequences are not fully understood as it has affected for long time the poorly known eastern basins. These seem, however, in some way pre-adapted to receive specie of tropical origin. All these elements became amalgamated to form the communities we

know at present among which sea grass beds are dominant. Among these, *Posidonia oceanica* is surely autochthonous, but its imposing animal and vegetal assemblages undergo local variations where the role of “alien” component is still to be assessed. Man made influence has altered these dynamics by means both of accidental and deliberate transport, this latter concerning several species of commercial interest. Long-term impact of these, sometimes spectacular, phenomena (see *Caulerpa taxifolia*, *C. racemosa*, *Scapharca inaequivalvis* or *Tapes philippinarum*) is still to be evaluated. The effects of the ongoing climatic changes on these dynamics are hardly separable from the above ones: the so-called “tropicalization” of the Mediterranean is, perhaps, an acceleration of the “diversity pump” from several regions, which characterizes this sea since the post-Messinian times.

Also in this case – and such a statement may well represent the concluding remark of the Conference – only a systematic and continued research, performed at the appropriate space and time scales, can offer sensible answers. This demands, at the same time, resources and culture: in a country like Italy, where research is a luxury and the sea comes into existence, for the public opinion, only from April to September, that is to say during the bathing season, invoking attention on something that, at any scale, affects and changes the ecosystems to which we belong, seems almost an utopia!