

Sponge population of the Apulian coralligenous formations*

by

M. SARÀ

Istituto di zoologia, Università, Genova (Italia)

The coralligenous bank, discovered [SARÀ 1968 *a, b*] along the Apulian coast between the isobaths of 9 and 35 meters (in average 10-30 m), covering an area of some 250 km², is a well-defined formation, having peculiar characteristics among the various types of coralligenous formations known as yet in the Mediterranean. The study of its population has therefore a twofold interest : a general one regarding our knowledge of the biocoenoses of the coralligenous banks, hitherto only partially studied by LAUBIER [1966] for the formations at Albères, off Banyuls; a specific one regarding the type of formation found in Apulia. The latter one is in fact for the most part separated from the littoral rock by sand- and Posidonia-bottoms and borders with the muddy bottoms of deeper water, while being found at a lesser depth than any other known coralligenous bank.

Data on the sponge fauna [LABATE 1967] are here reported which, however, cannot be compared with those of a similar formation, as no observations on the sponges of Albères are available.

The Porifera, together with the Bryozoa, are one of the most important groups of the animal population of the coralligenous formations. They live both on the surface and inside the microcavities of the substrate and belong therefore both to the epifauna and to the endofauna. In spite of their great biomass, owing to the incoherent structure of their skeleton, they contribute for a little part to the growth of the formation, but have no doubt a remarkable role in its dynamics, for the presence of both the destructive action of some species, as the Clionids, and the agglomerating one of the same Clionids and of some other species, *Fasciospongia cavernosa* in the first place. It must also be observed that, considering the density of the sponge population both at the surface and inside the substrate, the Porifera condition the biotic environment of the formations, giving shelter and nourishment to a number of other forms of the sessile and motile benthos.

The number of the species hitherto found is about a hundred, and the list is not yet complete. This number is particularly high and significant, as the Apulian coralligenous formations appear as a uniform biotope in their entire extension and, moreover, the identified species come from a limited area, that between Giovinazzo and Monopoli. A quantitative survey having the purpose of ascertaining whether there are significant differences in the sponge population of different areas (both from a bathymetric standpoint : 10, 20 and 30 m and a geographic one : Bari, Giovinazzo etc.) indicates that these either do not subsist or are not relevant, neither considering the population as a whole nor the frequency of the single species. Only in regard to a few massive species of the epifauna, *Chondrilla nucula*, *Acanthella acuta*, *Agelas oroides* and *Petrosia ficiformis*, their quantity (volume) having been compared at different depths and stations, significant results of heterogeneous distribution have been obtained. The high specific diversity is therefore to be essentially ascribed to the complexity of the population and is accompanied by the small dimensions of the specimens of the majority of the species. This is in agreement with the observations obtained from other biotopes having a dense sponge population, as the rocky walls of Cala dell'Olivetta [SARÀ

* With contribution of C.N.R. and O.N.R.

1966] and the floor of superficial caves near Leuca [SARÀ, 1968 *b*]. In the Cala dell'Olivetta the rate of diversity increases with the density of the sponge population [SARÀ, 1970], proving that the effects of cooperation are more important than those of competition. This depends on the favourable environmental conditioning and on the greater complexity of recesses which, in turn, is related to the higher density of the population. On the other hand, the specific diversity depends on the different parts which the species may play within the community. As in the case of the calcareous floor of the superficial cave at Leuca, also in the coralligenous formations a vertical stratification of the sponge community may be observed. An important difference is related to the different kinds of the substrate, which is almost compact in the cave at Leuca and perforated by a number of irregular microcavities in the coralligenous formations. A larger vertical development of the sponge stratification in the coralligenous formations results.

It is possible to distinguish also in regard to the coralligenous formations the strata (to be understood ecologically rather than topographically) already described for the cave at Leuca (SARÀ 1968 *b*):

1. Basal species. The more frequent among these are *Agelas oroides*, *Petrosia ficiformis*, *Spirastrella cunctatrix*, *Chondrilla nucula* and, locally, *Raspaciona aculeata*.
2. Boring species. Only two species are present, *Cliona viridis* and *Cliona schmidtii*, while *Cliona copiosa* is doubtfully present. This is a peculiar observation, worth of analysis, if we consider that in the cave at Leuca eight species of Clionids were found on a surface of 40 square meters. The reduction in number of the Clionids may depend on many factors, one being possibly the nature of the substrate which consists mainly of calcareous algae. Anyway, in spite of the scarce number of species, the boring action has its importance.
3. Hypobiotic species. At Leuca these grow underneath the basal species and inside the galleries left by Clionids, but in the coralligenous formations they find adequate ecological niches in the innumerable microcavities and interstices of the substrate. To this fact is due the extraordinary development of some species, particularly *Jaspis johstoni*, probably the most frequent one in these formations, of *Fasciospongia cavernosa* and, locally, of *Dercitus plicatus*.
4. Epibiotic species. These species, living on the basal ones, have a scarce development, particularly in regard to the phytal. Their presence is quite exceptional.

Characteristic is the different exological role played by *Cliona viridis* in its developmental stages. During its α and β stages it excavates the substrate emerging only with its papillae, while in its γ stage it develops on the surface, taking the massive aspect of a species of the basal stratum. In the same time it occupies the spaces created by its own disgregating action and contributes in consolidating the substrate.

A problem of considerable interest, concerning not only the Apulian formations but also the analogous ones of the Mediterranean, is whether their population has or has not a biocoenotic individuality. According to LAUBIER [1966] the coralligenous formations should be understood as a cross-point of different biocenoses. In regard to sponges, this point appears to be confirmed by the fact that the species of the coralligenous formations are found for the most part also on other biotopes. Three species new for science have been found (*Histodermella apuliae*, *Crella fusifera* and *Desmacidon adriaticum*) (SARÀ, 1969), but the discovery of new species normally occurs when the sponge fauna of any area not yet investigated of the Italian littoral is studied in details. However, the spongofauna of the coralligenous formations has its own typical aspect due both to the abundance of some endobiotic species as *Fasciospongia cavernosa* and *Jaspis johstoni* and to the relation of the species between each other. This appears to be determined by the particular edaphic conditions of the coralligenous formations in which the building organisms, calcareous algae in the first place, assume a significance of environment for all the other groups of population, which they condition by the irregular morphology of their formations. In this sense, the population of a coralligenous bank, as the Apulian one, forms a community which is complex and heterogeneous from an ecological standpoint, but well defined.

References

- LABATE (M.), 1967. — Poriferi del coralligeno adriatico pugliese. *Boll. Zool.*, **34**, p. 127.
- LAUBIER (L.), 1966. — Le coralligène des Albères. Monographie biocénotique. *Ann. Inst. océanogr. Monaco.*, **43**, 2, pp. 137-316.

- SARÀ (M.), 1966. — Studio quantitativo della distribuzione dei Poriferi in ambienti superficiali della Riviera Ligure di Levante. *Arch. Oceanogr. Limnol.* **14**, pp. 365-386.
- SARÀ (M.), 1968 *a.* — Un coralligeno di piattaforma (coralligène de plateau) lungo il litorale pugliese. *Arch. Oceanogr. Limnol.*, **15**, (suppl.), pp. 139-150.
- SARÀ (M.), 1968 *b.* — Research on benthic fauna of Southern Adriatic. Italian Coast, *Final Scient. Report, O.N.R.*, pp. 1-53.
- SARÀ (M.), 1968*c.* — Stratification des peuplements d'Eponges à recouvrement total dans certaines grottes du niveau superficiel. *Rapp. Comm. int. Mer Médit.*, **19**, 2, pp. 83-85.
- SARÀ (M.), 1969. — Specie nuove di Demospongie provenienti dal coralligeno pugliese. *Boll. Mus. Ist. Biol. Univ., Genova*, **37**, pp. 89-96.
- SARÀ (M.), 1970. — Competition and cooperation in sponge populations. *Symp. zool. Soc. Lond.*, **25**, pp. 273-284.

