

Notes on the community of *Porphyra leucosticta* Thuret in the North Adriatic

by

DUŠAN ZAVODNIK and NEVENKA ZAVODNIK

Center for Marine Researches, Institute « R. Bošković », Rovinj (Yougoslavie)

The community of *Porphyra leucosticta* Thuret (*Rhodophyta*, *Bangiaceae*) is one of the least known sea-weed communities in the Mediterranean. It is distributed in all European seas in the littoral zone, but its vegetation period depends on local environmental factors, especially on the temperature. In the North Adriatic, it appears usually in February or in March, reaches its fully development in April and in May, and disappears usually already in June, after the raising of the sea temperature to about 20 — 22 °C.

In the region of Rovinj, on the west coast of Istrian peninsula, the dense settlements of *Porphyra leucosticta* are distributed on rocky bottoms of the mediolittoral zone, especially in the localities with higher content of organic materials in the sea water. Very dense settlements of this eurytopic species develop sometimes in Lim-fjord, in the nearest vicinity of the under-sea springs of fresh water, where the salinity at low tides can be only 2 ‰. In other localities, at least at the times of low tides, the great parts of the settlements remain frequently on the land exposed to sun heat or to the bathing of the rain. According to BERTHOLD [1882], *Porphyra leucosticta* can survive these unfavourable environmental conditions even when they continue for some days or weeks.

Occasionally, the thalli of *Porphyra leucosticta* were found attached on experimental plates of glass exposed for fouling studies, as well as on the fronds of sea-weeds *Cystoseira abrotanifolia*, *C. barbata*, *C. spicata*, and *Halopteris scoparia* [ZAVODNIK 1967]. However, when growing epiphytic, the population of *Porphyra* is never dense and its fronds never reach such impressive dimensions (up to 25 centimeters) if when growing on rocky bottoms at nitrophile localities.

The covering rate of the *Porphyra* settlements near Rovinj is usually 90 - 100 %. At its full vegetation period, the mean biomass of *Porphyra leucosticta* (wet weight) is 466 grams per square meter. The alga contains about 83 % of the water, and 17 % of dry matter, of which 26,15 % are proteins, 2.30 % are fats, and 10.80 % is the ash.

As to its floristic composition, the community of *Porphyra leucosticta* seems to be rather uniform. The most frequent accompanying algae in our samples were *Corallina mediterranea*, *Jania rubens*, *Laurencia obtusa*, *Colpomenia* sp., *Cladophora*, and others. The mean biomass of these sea weeds is about 172 grams per square meter.

In the region of Rovinj, the macrofauna of the community is similar to the fauna of some other littoral sea-weed communities. The rocks and stones on which *Porphyra* settles are usually perforated by endolithic *Clionidae*, *Lithophaga lithophaga*, and *Saxicava arctica*. In the crevices of the substratum or in shallow engravings *Aiptasia* sp. and *Paracentrotus lividus* are locally abundant. In the substrate level, besides various tube-worms and the barnacle *Chthamalus stellatus*, the most abundant animals are various molluscs: *Patella coerulea*, *Pisania maculosa*, *Vermetus triqueter*, *Conus mediterraneus*, and before all the bivalves *Mytilus galloprovincialis* and *Musculus* sp. The vagile fauna is represented by numerous Polychaets and by some *Leander* and *Blennius* species.

With regard to the meio- and microfauna, only three informational samples were analysed completely till now, according to the working methods adopted previously [ZAVODNIK 1965]. As to the numbers of specimens, the nematods and the copepods prevail absolutely reaching 32 % and 57 % of the total numbers of the specimens. The Polychaets participate with about 2.5 %, the Foraminifera and the Amphipods with about 1 %, while the quantities of all other systematic groups are insignificant. It is interesting, that 80 % of the copepods were obtained among the fronds of the *Porphyra*, and only 20 % of the specimens were encountered on substrate level. On the contrary, the nematods live chiefly among the moss-like vegetation and in the detritus on the substratum; only 40 % of the specimens were sampled on the thalli of *Porphyra*. On an average, at the time of the full vegetative period of *Porphyra leucosticta*, about 63.000 animals per one square meter of the community can be found. Among them, 36.000 are the copepods, and more than 20.000 are nematods. The quantity of the polychaets was calculated to about 1570 specimens per square meter, but most of them were juvenile, especially the *Sedentaria*. In our samples great numbers of the shellfishes *Mytilus galloprovincialis* (mostly juvenile one to two months old) and *Musculus costulatus* were encountered. The populations of these bivalves are pretty dense and reach about 2200 specimens per square meter.

The frond of *Porphyra leucosticta* is leaf-like, very soft and flexible. Therefore, under the influences of the water movements, the laminar surfaces of the fronds are moving continually and seem to be very inconvenient for the settling of epifauna and epiflora. In fact, besides of few fronds of *Cladophora* and a lot of Diatoms, only very rarely juvenile *Mytilus galloprovincialis* and *Musculus costulatus* were found attached to lamina of the fronds. Among the substrate vegetation, and on the thalli of *Porphyra leucosticta*, the vagile gastropods *Barleeia rubra* and *Homalogyra fischeriana* crawl frequently.

A very interesting problem is the surviving of the meiofauna during the exposure of the settlement to the sun heat or to other unfavourable atmospheric factors. The very thin fronds of *Porphyra* (« leaves ») can dry in hot days completely and cover the underlying rocks as a callous film. According to the results of our experiments in laboratory conditions, at the air temperature of 18° C, *Porphyra leucosticta* loses 95 % of the water in 24 hours when the air is immovable, while it happens already in 1 ½ hours at the speed of the wind of 0.5 meters per second. The drained fronds of *Porphyra* protect the underlying rocks and the bolsters of small sea-weeds very effectively, together with minute vagile and sessile organisms. Within the dry *Porphyra* films, we have found trapped the representatives of nearly all systematic groups of meiofauna characteristic for the settlement, but always in insignificant quantities. However, about 80 % of the total number of the animals sampled in dry *Porphyra* were nematods.

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