Abstract

Seagrasses are the only group of submerged plants that are permanently growing in marine environment. They play an important role in the sea bottom ecosystem. Seagrasses are primary producers capable of accumulation and deposition of carbon. They influence water flow at the sea bottom and form symbioses with variety of organisms. Our knowledge of symbiotic interactions of seagrasses is still limited even though several studies of the topic have been carried out in recent years.

Unlike most of terrestrial plants, seagrasses are generally considered as plants that do not form any specific associations with mycorrhizal or endophytic fungi. Surprisingly, we have discovered a novel fungal endophytic association in roots of Mediterranean endemic seagrass species *Posidonia oceanica* (L.) Delile. Morphology of this symbiotic fungi strongly resembles common symbiotic fungi of terrestrial plants, dark septate endophytes (DSE). We sampled roots of *P. oceanica* in large area of the Mediterranean from southeastern Spain to Albania and described range and taxonomical classification of the endophyte using microscopy, in vitro cultivation and molecular determination.

Roots of *P. oceanica* in whole area of study are colonized by mere two endophytic fungal species. Over 90 % of the fungal symbionts belong to a single so far undocumented species from family Aigialaceae, order Pleosporales. This fungal symbiont was present in vast majority of root samples from almost all sites. It formed distinctive structures such as superficial mantle-forming hyphae, intraradical intercellular hyphae and intracellular microsclerotia.

Unlike in established plants, fungal symbionts were completely absent in roots of early plantlets. However, juvenile Posidonias frequently formed root hairs – structures that were considered very rare or absent on most of the seagrass roots. It seems that the plant gradually loses root hair cover during ontogenesis. On the other hand, fungal colonization rate increases. Fungal symbiotic colonization of the roots is most likely influenced by other factors as well. Colonization rate of roots sampled at uncommon silty substrate was lower. On the contrary, fungal colonization increases with increasing depth.

Unlike Posidonia oceanica, roots of second most common seagrass species from the Mediterranean, Cymodocea nodosa, did not associate with the fungal symbiont even though sometimes both seagrasses co-occurred at the same site. Specificity of the pleosporalean

endophyte along with the fact that Posidonias almost do not associate with other fungal species may point at unique status of the newly discovered symbiosis.

Key words:

seagrasses, Posidonia oceanica, endophytes, DSE, symbiotic fungi