Spatial micro-distribution of shoots in *Posidonia oceanica* (L.) Delile meadows

Bacci Tiziano[1], Rende Sante Francesco[1], Rocca Domenico[2], Scardi Michele[3]

[1] ISPRA - Institute for Environmental Protection and Research, Rome, Italy

[2] Marine Protected Area "Capo Rizzuto", Crotone, Italy

[3] University of Rome "Tor Vergata", Department of Biology, Rome, Italy

* tiziano.bacci@isprambiente.it

Posidonia oceanica meadows contain huge numbers of shoots and their dynamics are strictly related to spatial distribution patterns of those shoots. In order to investigate the structure of *P. oceanica* meadows at very small spatial scale (i.e. in the 1 cm^2-1 m^2 range), patterns in shoot distribution were analyzed. Spatial distribution of shoots was recorded by cutting all the leaves and by digitizing shoot location from images of 10 square frames (1 m^2), sampled in seemingly uniformly dense meadows at two sites in Southern Italy. Spatial point patterns have been explored testing the sensitivity and robustness through different spatial indices, based on i) nearest neighbour analysis, ii) quadrat counts analysis, iii) fractal dimension. Clark & Evans nearest neighbour distance index has been proved to be the most suitable for aim of the work and it has been selected for the further analysis. Data analysis of the 10 square frames (1 m^2) highlighted regular spatial point patterns ($R>1$; $p<0.0001$) in most cases (8 frames), while aggregated ($R<1$; $p<0.01$) and random ($R=1$) spatial point patterns were rare. In addition, mean value of nearest neighbour distance of shoots in each square frame analyzed has been shown to be always close to 2 cm (min: 1.73 cm; max: 2.21 cm). The potential implications of this type of data set were highlighted. Both nearest neighbour distance of shoots and spatial point pattern typology (aggregated, random or regular) could provide useful and integrative information for the study of *P. oceanica* macrostructure (e.g. implementation of shoot growth models, development of new descriptors). The raw data, provided by the authors as supplementary material, are currently the first and the only information available about shoot spatial micro-distribution. In this regard, although our data set cannot represent the whole spectrum of variability in *P. oceanica* meadows, it certainly shed some light on the small scale patterns of *P. oceanica* meadows and it prompts us many questions, some of which are still unanswered.