Preliminary evaluation of the effects of *Caulerpa cylindracea* on *Posidonia oceanica* through the analysis of primary production and morphometric characteristics

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**STUDY AREA**

The coastal area of the northern Tyrrhenian sea (Italy) provides different situations due to its natural and anthropic features. The best known and most degraded area in central Italian coast, characterized by severe coastal activities (fishing, *C*. *cylindracea* invasion, as well as all the other coastal activities, is that of the Port of Civitavecchia and the Tarquinia-Nord catchment system (CNS)). The sampling location was the Civitavecchia harbor area, considered one of the most threatened sites in the Tyrrhenian Sea. The *C*. *cylindracea* invasion has been reported in this area in the last years, and it has been involved in a fragmented scenario characterized by the presence of several sandy rocky patches and mixed areas (Katsanevakis et al., 2010).

**RESULTS**

Several studies have evidenced that *C. cylindracea* mostly colonizes fragmented or low-slope density meadows of *P. oceanica* (Crecchietti et al., 2000), Katsanevakis et al., 2010, Baller et al., 2011), while it is generally encountered at the edge or within disturbed meadows (Katsanevakis et al., 2010). To date, very few studies have described the vegetative phase and primary production of *C. cylindracea* in *P. oceanica* areas (Dumay et al., 2002), and our work represents the first study in the coastal sector of Civitavecchia. We observed that the mean adult leaf length and leaf surface area per shoot were significantly higher in the absence area (p < 0.001 and p < 0.001, respectively), confirming the expected trend to increase with decreasing level of competitive interaction (Dumay et al., 2002; Vilelle & Verlaque, 1994, 1995). Our analysis has evidenced a significant difference between the two areas for several parameters which resulted higher in the absence area, such as the adult leaf length during both sampling periods (p < 0.001 and p < 0.05, respectively in July and October 2019), number of adult and total leaves (p < 0.05 and p < 0.001 respectively), and, leaf and thionine biomass (p < 0.01 and p < 0.05 respectively) in July 2019. The parameters observed in the two areas showed only significant differences in summer. Seasonal variations (July-October) are also highlighted by Vilelle & Verlaque (1995), and constitute symptoms of repress. In conclusion, our study showed the presence of a direct interaction between *C. cylindracea* and *P. oceanica*, located in SCI TIT0000005, which could lead to a decrease in the biological and structural qualities of the seagrass meadow. Further studies will be useful to analyze the level of this interaction and to develop a management and conservation plan.