



**Riunioni scientifiche dei Gruppi di Lavoro
e delle Sezioni Regionali della
Società Botanica Italiana onlus**

**Mini lavori della Riunione scientifica del
Gruppo di Lavoro per l'Algologia**

(a cura R. Pistocchi)

15-16 novembre 2019, Bari

Will the restoration of canopy-forming brown algae keep up the pace with climate changes?

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Anthropogenic impacts and rapid environmental changes are causing unpredictable shifts in Mediterranean canopy-forming brown algae, leading to their regression or loss. Thus, there is an urgent need to set standards and guidelines to optimize the restoration, in order to grant the persistence of marine forests in the future. Outplanting represents an innovative technique for restoring Fucales, although its implementation consists of a set of delicate steps (Falace et al. 2018, De La Fuente et al. 2019), which need to be tailored to the specific requirements of the target species.

Here, we report the results gathered both in the Ligurian Sea and the Gulf of Trieste during the first two years of the EU project ROCPopLife. The two sites are subject to different regimes of human impact (being the Ligurian site in a good environmental status, while the Adriatic site in an urbanized context), but both experienced abrupt and extreme climate events.

In the Ligurian Sea, in July 2018 clay tiles with *Cystoseira amentacea* var. *stricta* Montagne germlings (~3 mm) were screwed to the rocky shore. After 2 months in the field, over the 40% of the tiles were covered with juveniles of ca. 8 mm. However, 6 months after the tile deployment, an unprecedented storm surge severely affected the restoration performance, leading to the loss of the 80% of the tiles. The remaining tiles hosted 3 to 6 cm-long juveniles, which reached 6-9 cm in length after 1 year.

In the Gulf of Trieste, a heatwave of 2.65 °C in February 2019 caused a premature reproductive event in *Treptacantha barbata* (Stackhouse) S. Orellana & M. Sansón, so that the species was found fertile almost 3 months earlier than usual (Bevilacqua et al. 2019). This anomalous event was exploited for carrying out a restoration event, and the same procedure was carried out in May. However, the number of released zygotes was 10 times lower and the germling length after 4 weeks of culture was ¼ with respect to the previous anomalous event. Once in the field, half of the tiles from the February event were protected against herbivores; starting from the fourth week, length was significantly lower in unprotected tiles, and, after 3 months, the 36% of the unprotected tiles resulted empty because of grazing effects.

Since both predictable site-specific stressors and anomalous climatic events can severely affect the restoration actions, the challenge is now to optimize the restoration process (from the monitoring of the donor populations to that of outplants) in order to overcome the negative effects of unpredictable impacts.

Letteratura citata

- Bevilacqua S, Savonitto G, Lipizer M, Mancuso P, Ciriaco S, Srijemsi M, Falace A (2019) Climatic anomalies may create a long-lasting ecological phase shift by altering the reproduction of a foundation species. *Ecology* e02838.
- De La Fuente G, Chiantore M, Asnaghi V, Kaleb S, Falace A (2019) First ex situ outplanting of the habitat-forming seaweed *Cystoseira amentacea* var. *stricta* from a restoration perspective. *PeerJ* 7: e7290, doi.org/10.7717/peerj.7290.
- Falace A, Kaleb S, De La Fuente G, Asnaghi V, Chiantore M (2018) Ex situ cultivation protocol for *Cystoseira amentacea* var. *stricta* (Fucales, Phaeophyceae) from a restoration perspective. *PLOS ONE* 13: e0193011, doi.org/10.1371/journal.pone.0193011.

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