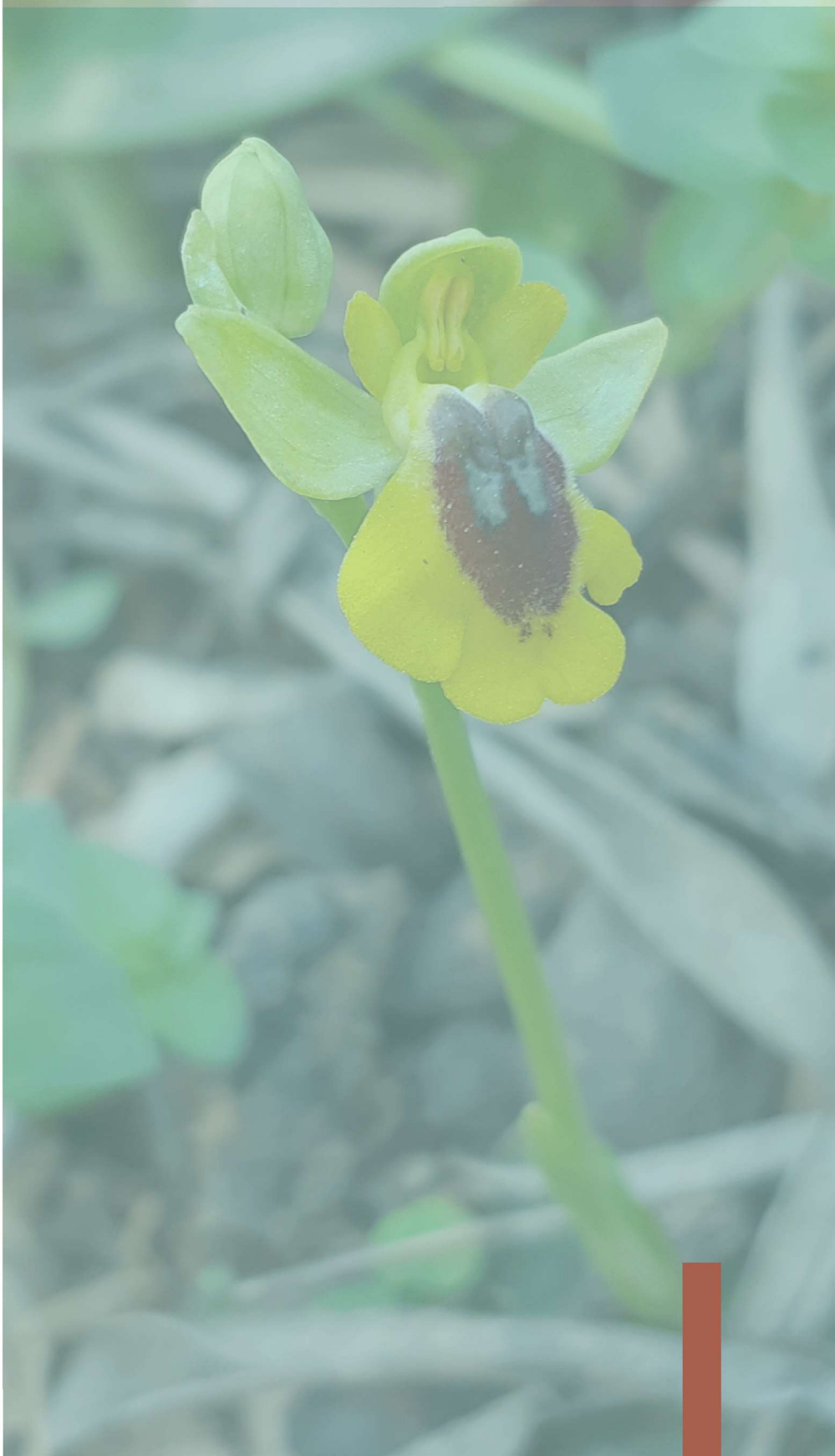


BOOK OF ABSTRACTS



VALENCIA (SPAIN) | 23-27 OCTOBER | 2023
*Plant Conservation and Ecosystem Restoration
in the Mediterranean*



**4th Mediterranean Plant
Conservation Week**

VALENCIA | 23-27 OCTOBER | 2023

Title: 4th Mediterranean Plant Conservation Week “Plant Conservation and Ecosystem Restoration in the Mediterranean” Valencia, Valencian Community, Spain 23-27 October 2023

Editors: E. Laguna, D. Arizpe, A. Cebrián, M. Seguí, A. Rubio

Organisers: Centre for Forestry Research and Experimentation (CIEF, Generalitat Valenciana), Botanical Garden of the University of Valencia (BGUV), IUCN, GENMEDA

Published by: Centre for Forestry Research and Experimentation (CIEF, Generalitat Valenciana)

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Citation: Mediterranean Plant Conservation Week (4th: 2023: Valencia, Spain) E. Laguna, D. Arizpe, A. Cebrián, M. Seguí, A. Rubio, editors. 4th Mediterranean Plant Conservation Week “Plant Conservation and Ecosystem Restoration in the Mediterranean” Valencia, Valencian Community, Spain 23-27 October 2023: book of abstracts. Valencia: CIEF, 2023

Layout: Guillem Gadea Pacheco

Download at: bit.ly/3QmALbL

ISBN: 978-84-09-54884-2



The use of native succulent *Chenopodiaceae* (*Amaranthaceae* sensu APG) to treat marine aquaculture wastewater in the Mediterranean area

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The sector of aquaculture contributes almost 60% of the global production of aquatic organisms and this percentage is estimated to increase to more than 70% by 2030 due to the growing demand [1]. The variable and/or uncontrolled release of nutrients into the environment, such as nitrogen and phosphorus, in open systems facilities, could represent a risk for environmental effects such as eutrophication. For these reasons, in accordance with the Water Framework Directive of the European community (2000/60/CE), land-based aquaculture farms are increasing, suggesting more efficient methods for the treatment of nutrient-rich saline wastewater.

The treatments of eutrophic waters include physical, chemical and biological methods: physical and chemical methods could be expensive and produce secondary pollution. On the contrary, traditional biological methods are cheaper and have less impact on the environment, but they require large surfaces.

Ecological Floating Beds (EFBs) are a relatively new technology that is receiving increasing interest in the last decade, presenting the advantage of low installation and maintenance costs and do not require additional soil consumption as they can be installed on existing bodies of water [2]. These consist of artificial floating rafts on which emerging rooted macrophytes are grown.

The roots develop on the substrate of the raft and on the underlying water, providing a large surface area for the development of the microbial biofilm, responsible for most of the purification process.

EFBs have very rarely been used for the treatment of saline (or hypersaline) waters, and there are no case studies in the Mediterranean basin. Halophilic plants combined with EFBs technologies can play an important role in the purification of these waters and investigating this possibility is the aim of this project.

The study area is represented by a small settling basin linked to the sea, receiving wastewater from a land-based marine fish farm (flow-through) located in Petrosino (Trapani province), in the western part of Sicily, bordering the Natura 2000 site "Paludi di Capo Feto e Margi Spanò" (ITA010006).

The proximity to this site, the characteristics of the water and the surrounding environment determined the choice of plant species to be used, and these were propagated starting from material coming from the farm site.

The first step of the study aimed to evaluate, for the first time, the growing capacity of three halophilic Mediterranean plants of the genera *Salicornia*, *Sarcocornia* and *Salsola* in EFBs in highly nutrient-rich sea water-like saline water. To verify this, rooted plants were placed in April 2023 on floating rafts. Morphometric measurements were periodically carried out on these and weight increases were recorded.

Salsola seems to be disadvantaged when grown under these conditions in comparison with individuals growing in open ground. *Sarcocornia* and especially *Salicornia* instead have shown a good growth response and so a second step will evaluate the removal of nutrients due to the accumulation in the plant tissues of these species and the efficiency of the whole system in reducing water eutrophication.

As already described in South America [3], *Sarcocornia* and *Salicornia* therefore seem to be useful, in constructed wetlands or floating beds for treatment of effluents of land based marine fish farms. However, considering their life cycle characterized by a winter rest period, tests with other species are desirable in order to obtain good performances also during the cold period.

Keywords: Constructed wetlands, Ecological Floating Beds, halophytes, *Salicornia*, *Sarcocornia*

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