

Expected and unexpected effects of waterbirds on Mediterranean aquatic plants



The mute swan *Cygnus olor* Gmelin and the greater flamingo *Phoenicopterus roseus* Pallas potentially affect plants, directly through grazing and indirectly through mechanical disturbance during their foraging activities. We studied in a field enclosure experiment, from May 2010 to July 2011, their respective impact on macrophytes in two Mediterranean lagoons (Camargue, South of France) with different plant communities. In one lagoon, greater flamingo negatively affected *Ruppia cirrhosa* Petagna cover from June to July, and dry biomass in July. In the other lagoon, greater flamingo and mute swan had a detrimental effect on *Zostera noltii* Hornemann cover at the beginning of the growing season (April). They also reduced *Chaetomorpha* sp. cover from April to July and dry biomass in July. Combined activities of waterbirds decreased the dominance of *Chaetomorpha* sp. bed, thus favouring later (July) *Z. noltii* cover and partially dry biomass in areas available for greater flamingo and mute swan. However, the impact of waterbirds was not entirely beneficial for *Z. noltii*, as its abundance during July was indeed higher in ungrazed areas with low *Chaetomorpha* sp. abundance in previous months. The combined effect of waterbirds on *Z. noltii* is thus dual, mainly favouring its development by reducing competing macroalgae but conversely mitigating it through direct impact at both ends of the growing season. Depending on the ecological context, waterbirds can thus affect in two opposite ways the growth of plant species such as *Z. noltii* or *R. cirrhosa* which are of importance with regard to conservation. Large waterbird species can be considered as ecosystem engineers in Mediterranean wetlands.

Auteurs du document : GAYET G., CROCE N., GRILLAS P., NOURRY C., DESCHAMPS C., DEFOS DU RAU P.

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