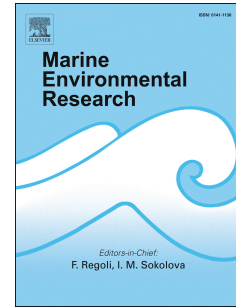


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Seagrass recovery after fish farm relocation in the eastern Mediterranean

Demetris Kletou, Periklis Kleitou, Ioannis Savva, Martin J. Attrill, Charalampos Antoniou, Jason M. Hall-Spencer



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# 1 Seagrass recovery after fish farm relocation in the eastern Mediterranean

2 Demetris Kletou <sup>\*1,2</sup>, Periklis Kleitou<sup>1,2</sup>, Ioannis Savva<sup>1</sup>, Martin J. Attrill<sup>2</sup>, Charalampos  
3 Antoniou<sup>1</sup>, Jason M. Hall-Spencer<sup>2,3</sup>

4 1. Marine & Environmental Research (MER) Lab Ltd., Limassol 4533, Cyprus

5 2. School of Biological & Marine Sciences, University of Plymouth, Plymouth, PL4 8AA, UK

6 3. Shimoda Marine Research Centre, University of Tsukuba, Shizuoka, Japan

7  
8 \* Corresponding author. Email address: [dkletou@merresearch.com](mailto:dkletou@merresearch.com)

## 9 ABSTRACT

10 Finfish aquaculture has damaged seagrass meadows worldwide as wastes from the farms  
11 can kill these habitat-forming plants. In Cyprus, the Mediterranean endemic *Posidonia oceanica* is  
12 at its upper thermal limits yet forms extensive meadows all around the island. Understanding this  
13 under-studied isolated population may be important for the long-term survival of the species given  
14 that the region is warming rapidly. When fish farming began around Cyprus in the 90s, cages  
15 were moored above seagrass beds, but as production expanded they were moved into deeper water  
16 further away from the meadows. Here, we monitored the deepest edge of meadows near fish farms  
17 that had been moved into deeper waters as well as at a decommissioned farm site. Four *P.*  
18 *oceanica* monitoring systems were set up using methods developed by the Posidonia Monitoring  
19 Network. Seagrass % coverage, shoot density, % of plagiotropic rhizomes, shoot exposure, leaf  
20 morphometry, and sediment organic matter content and grain size were monitored at 11 fixed  
21 plots within each system, in 2012-2014 and in 2017. Expansion at the lower depth limit of  
22 seagrass meadows was recorded at all monitoring sites. Most other *P. oceanica* descriptors either  
23 did not change significantly or declined. Declines were most pronounced at a site that was far  
24 from mariculture activities but close to other anthropogenic pressures. The most important  
25 predictor affecting *P. oceanica* was depth. Monitoring using fixed plots allowed direct  
26 comparisons of descriptors over time, removes patchiness and intra-meadow variability increasing  
27 our understanding of seagrass dynamics and ecosystem integrity. It seems that moving fish farms  
28 away from *P. oceanica* has helped ensure meadow recovery at the deepest margins of their  
29 distribution, an important success story given that these meadows are at the upper thermal limits  
30 of the species.

31  
32 **Keywords:** aquaculture; bioindicators; Cyprus; ecological monitoring; ecosystem change; eastern  
33 Mediterranean; seagrass.

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