

Oomycete Pathogens the Hidden Risk in Seagrass Restoration

Oomycetes are fungus-like microorganisms that can cause seagrass disease. They can quietly undermine restoration, even if plants initially survive.

Why care?

- Oomycetes can cause leaf lesions, tissue necrosis and root/rhizome rot
- Multiple species infect *Zostera marina*, *Zostera noltii* and *Cymodocea nodosa*
- Over 100 marine oomycetes detected; most undescribed
- Disease risk increases when plants are stressed: after transplanting, during heatwaves, in degraded sites, or when susceptible material is repeatedly planted

Field warning signs



- Dark, spreading leaf lesions
- Soft or collapsing tissue
- Thinning canopies despite good survival
- Black decaying roots/ rhizomes (especially in *Zostera*)

Practical guidance

Assume pathogens are present

- Avoid using material from declining and sick meadows

Strengthen biosecurity

- Use local, traceable sources
- Clean tools, ropes, containers
- Don't use unscreened donor material

Match plants to conditions

- Populations vary in resistance
- Survivors in diseased areas may be more tolerant

Protect the microbiome

- Healthy microbiomes may help suppress disease
- Restoration can disrupt this protection

Monitor beyond survival

- Track disease symptoms, not just growth
- Long-term monitoring ($\geq 5-10$ years) is critical



READ MORE

- Maia, Cristiana, et al. "Eight new *Halophytophthora* species from marine and brackish-water ecosystems in Portugal and an updated phylogeny for the genus." *Persoonia-Molecular Phylogeny and Evolution of Fungi* 48.1 (2022): 54-90.
- Man in't Veld, Willem A., et al. "Multiple *Halophytophthora* spp. and *Phytophthora* spp. including *P. gemini*, *P. inundata* and *P. chesapeakeensis* sp. nov. isolated from the seagrass *Zostera marina* in the Northern hemisphere." *European Journal of Plant Pathology* 153.2 (2019): 341-357.