

Orth Illuminates Role of Seed Predators in Seagrass Beds

Anyone who has watched a squirrel bury or eat an acorn appreciates that animals help determine the abundance and distribution of plants on land. Recent work by VIMS researcher Dr. Robert Orth suggests that animals may be doing the same thing to help shape plant communities underwater.

Orth, a Professor of Marine Science in VIMS Department of Biological Sciences, is studying how seagrasses are affected by the marine creatures that might eat their seeds. The work is part of his larger effort to restore eelgrass to Chesapeake Bay by sowing seeds rather than planting young shoots, which is the typical practice. Eelgrass is the most common underwater grass in Chesapeake Bay, but it no longer grows in many areas that once supported lush beds. To help restore Bay grasses, Orth and his staff collect and broadcast millions of eelgrass seeds each year, with support from the Virginia Saltwater Recreational Fishing License Fund.

One intriguing question in Orth's research is how seed predators might be affecting seagrasses. To help address this question, Orth traveled half way around the world to Australia.

Drs. David Tunbridge of Western Australia's Murdoch University and Ken Heck Jr. of Alabama's Dauphin Island Sea Lab collaborated in the study.

Results from the Australian study, recently published in *Marine Ecology Progress Series*, shed light on seagrass restoration in Chesapeake Bay. They suggest that restoration of eelgrass with seeds may be more successful in unvegetated sand, where the survival rate of seeds is higher, than in areas near eelgrass beds.

"Our results came just at the right time," says Orth, "as we are expanding our restoration efforts using seeds."

Ironically, one of Orth's reasons for working down under was to escape the turbid waters that threaten the Chesapeake's seagrasses. The Western Australian sites provide the clear water that seagrasses need to thrive, and that Orth needs for his experi-



VIMS researcher Robert Orth tethers seagrass seeds to study their animal predators.

ments, in which SCUBA divers visually monitor the fate of individual seagrass seeds tethered to a monofilament line. This tethering technique had previously been used only in animal studies.

Studies of animals in seagrass beds show that prey items—small fish and invertebrates—are more likely to be eaten if they wander from the cover of a seagrass bed into a nearby sand patch, where there are fewer places to hide.

But when it comes to seeds, the situation is reversed—Orth's experiments show that seeds within a seagrass bed are more likely to be

chewed or swallowed than those in bare sand. The reason? Orth thinks the pattern may reflect the type of animals—small crabs—that likely feed on seeds. Small crabs generally hide within the cover of seagrass blades to avoid predation in open areas of bare sand. Though crabs may have more difficulty finding seeds within a seagrass bed, those seeds are safer for the crabs to eat because the crabs don't have to worry about being eaten themselves.

In addition to aiding seagrass restoration efforts, Orth's finding may help explain the dynamics of seagrass meadows, at least those dominated by the species studied. Because seeds dispersed into an existing patch are more likely to be eaten, it appears seed dispersal plays a relatively minor role in a bed's on-going development. Instead, seeds may be more important in helping a patch colonize sandy areas and expand. Given the prevalence of storms and strong currents along the western Australia coast, relatively higher survival in sand may be needed for patches to re-establish themselves in denuded areas following large-scale disturbances.