NSF GK-12 Graduate Fellows Program
Award # DGE-0139171
University of North Carolina at Wilmington

Alien Invaders:
Invasive Species Reading Material

Scientific Articles for Alien Invaders Game

by
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ARTICLE 1

Center, T.D., Davern, T.R., and Jacono, C.C. 2001. The adventive status of *Salvinia minima* and *S. molesta* in the Southern United States and the related distribution of the weevil *Cyrtobagous salviniae*. Castanea 66 (3): 214-226.

This article deals with two invasive plant species and an invasive insect. The two plants are giant salvinia, *Salvinia molesta*, and a plant that is a close relative, *Salvinia minima*. The recent introduction of giant salvinia constitutes a serious threat to aquatic systems in the warm temperate regions of the United States, because it is a very fast growing plant. Giant salvinia can grow at rates that double its biomass every few days. This allows it to crowd out other wetland plants. *Salvinia minima* is the only other member of the Salviniaceae family that is established in North America. It is generally regarded as if it were a native species, even though evidence shows that it was introduced in the late 1920s. This journal article identifies the sites where it was probably introduced and its current range. The article also identifies the range of an insect that consumes salvinia plants. This insect is known as the salvinia weevil. The salvinia weevil was another accidentally introduced species, it was found primarily in Florida. The scientists that conducted this study hypothesized that the presence of the salvinia weevil in Florida may account for the less aggressive growth of *Salvinia minima* in this area, when compared to troublesome growth that occurs in Texas and Louisiana where the weevil is not found. This study shows that it may be possible to use the salvinia weevil as a biocontrol method to control the growth and spread of salvinia species. This article is especially relevant in this area, as Giant Salvinia is one of the most aggressive and potentially harmful invasive species and has been found being sold in New Hanover County in the past.

ARTICLE 2

Blossey, B., Skinner, L.C., and Taylor, J. 2001. Impact and management of purple loosestrife (*Lythrum salicaria*) in North America. Biodiversity and Conservation 10: 1787-1807.

This scientific journal article is about the impact that invasive plants have on an ecosystem. The article considers that invasive species are generally believed to be a threat to the native ecosystem, but there is little evidence for the actual impact they have. Control of an invasive species is usually based on the potential negative impact the species could inflict on the ecosystem. Scientists are asking, "Should lack of scientific certainty about impacts of non-indigenous species result in postponing measures to prevent degradation?" The scientist conducting this study looked at purple loosestrife (*Lythrum salicaria*), an invasive plant that affects North American wetlands. The management of this plant has gotten some criticism because of lack of evidence that it has negative impacts. There has been no evidence that biocontrol works better than conventional control methods. The scientists working on this study state that there was little evidence of the impacts purple loosestrife had when the control program started in 1985. Since then they have found that:

> Recent work has demonstrated that the invasion of purple loosestrife into North American freshwater wetlands alters decomposition rates and nutrient cycling, leads to reductions in wetland plant diversity, reduces pollination and seed output of the native, *Lythrum alatum*, and reduces habitat suitability for specialized wetland bird species such as black terns, least bitterns, pied-billed grebes, and marsh wrens. Conventional methods (physical, mechanical, or chemical), have continuously failed to curb the spread of purple loosestrife or to provide satisfactory control. Although a number of generalist insect and bird species utilize purple loosestrife, wetland habitat specialists (species that use certain types of wetland habitats) are excluded by the encroachment of *L. salicaria*.

They concluded that the negative impacts on the ecosystem of purple loosestrife justify the control of the species and that the detrimental effects of purple loosestrife outweigh the risks associated with the introduction of biocontrol agents. It is also indicated that there are long-term experiments and monitoring programs in place to evaluate the impact of the biocontrol on purple loosestrife on wetland plant succession and other wetland biota.

ARTICLE 3

Ellis, D.R. and Farnsworth, E.J. 2001. Is purple loosestrife (*Lythrum salicaria*) an invasive threat to freshwater wetlands? Conflicting evidence from several ecological metrics. Wetlands 21: 199-209.

This scientific journal article demonstrates that scientists often disagree with each other on different issues. This article deals with the perennial invasive plant species purple loosestrife, Lythrum salicaria. In Article 2, the study says that purple loosestrife definitely has a negative impact on the ecosystem. The scientists involved in this article say that it depends on what data is collected and how it is analyzed. These scientists state that there are many conflicts surrounding the evidence that purple loosestrife negatively affects ecosystems. This study was done in 1999 at five wetland areas in Connecticut. The data that was collected included; above ground biomass, stem density (how many stems/ plants per unit area), and species diversity. The scientists found that several of the measurements they took indicated that there was no impact from the purple loosestrife. They found that species diversity measurements and stem density of native plants were not correlated to purple loosestrife abundance. This means that the number of native species or abundance of native species was not related to the amount of purple loosestrife present. They also found that as the abundance of purple loosestrife increased there were only modest changes in abundance of other species. No other species were consistently associated with or repelled from areas that contained purple loosestrife. Other measurements showed that there was a negative impact due to purple loosestrife. It was shown that the total biomass of native species was negatively correlated with the total biomass of purple loosestrife. This means that as there was more purple loosestrife there were less native plants. Purple loosestrife did maintain a higher above ground biomass at invaded sites than native species at similar sites that had not been invaded. This means that purple loosestrife grew denser than the native plants, thus altering the habitat. This study show that the effects of purple loosestrife can vary depending on which type of ecological metric or measurement is examined. Easy one time studies consisting of one or two data measurements may be cheaper and quicker, but the results may not be accurate. This study suggests that when examining the ecological impact of something a range of data should be collected over a substantial period of time.

ARTICLE 4

Djuricich, P. and Janssen, J. 2001. Impact of Round Goby Predation on Zebra Mussel Size Distribution at Calumet Harbor, Lake Michigan. Journal of Great Lakes Research 27: 312-318.

This article is the abstract taken straight from the scientific journal article. This journal article deals with the interactions between two invasive species, the zebra mussel and the round goby. Both of these species have been accidentally introduce in this country most likely from being expelled in ship ballast water. Since being accidentally introduced round gobies have been acting as a biocontrol for zebra mussels.

Abstract

The size distributions of zebra mussels atop (exposed to predation) and beneath (protected from predation) rocks were compared at a round goby infested site (Calumet Harbor, IL/IN) and round goby-free site (Evanston, IL) in southern Lake Michigan. The largest zebra mussels were atop rocks at both sites and those from Calumet harbor were significantly larger that those from Evanston. The smallest zebra mussels were beneath the rocks at both sites and those from Calumet Harbor were smaller than those from Evanston. Nearly all zebra mussels from Calumet Harbor rock tops were larger than the size range preferred by round gobies in published laboratory experiments. Conversely, most of the zebra mussels from rock tops from Evanston were within the size range preferred by round gobies. In a field experiment, glass sheets colonized with zebra mussels from Evanston rock tops were exposed to round goby predation. Predation was video taped to determine what size zebra mussels were eaten by round gobies. Smaller zebra mussels were consumed more frequently and surviving zebra mussels were either very large or had refuge in the space between larger zebra mussels. The study showed that more effort is required to remove larger zebra mussels than smaller zebra mussels. The results indicate that, while round gobies prefer smaller zebra mussels, the underside of rocks, as well as proximity to larger zebra mussels, can provide refuge for the smaller zebra mussels. Hence round gobies are unlikely to totally remove zebra mussels from a habitat and their impact will likely vary between habitats.