

APPLE SNAIL Overview

Problem:

Invasive apple snails, including *Pomacea maculata* (Figure 1), are considered among the most damaging invasive species worldwide. Invasive apple snails have become major pests of in rice production systems in Asian, Europe, Central American, and most recently, North America. Once established, high reproductive output coupled with behavioral and physiological adaptations make control and eradication efforts difficult. Rice production systems in Texas have been infested with *P. maculata* for more than 10 years, but impacts have been relatively minimal because of the prevalence of dry planting and crop rotation with dryland crops (soybean) or fallow periods.



Figure 1. Image showing the large size of the invasive apple snail, *Pomacea maculata*.

Impacts on Rice-Crawfish Production

The snails have also been established in Louisiana for more than 10 years but were not detected in the state's rice production regions until 2018. The snails quickly became much more damaging in Louisiana agriculture relative to Texas because of the prevalence of a rice/crawfish rotation which sees fields flooded for 11 months of the year. Impacts to infested crawfish ponds were immediate with some farmers having to drain fields only two months into the crawfish season, suffering a near total loss of revenue on affected acreage. Impacts to crawfish ponds result from the snails competing with the crawfish for forage and blocking entrance holes to crawfish traps. In addition to greatly reduced crawfish capture, all catch from infested ponds must be laboriously sorted through to remove the snails before the crawfish can be marketed.



Figure 2: Invasive apple snail blocking crawfish trap. Photo: Mark Shirley

Economic impacts of apple snails in infested ponds have not yet been quantified, but the producers have suggested that heavily infested ponds cannot be fished at a profit. Bait and labor associated with harvest account for >50% of all crawfish production costs. Apple snails greatly increase the bait and labor requirements while simultaneously reducing yields. Currently, the snails are estimated to impact <5% of Louisiana's 150,000 acres of crawfish production. However, unless effective strategies to manage infestations and prevent expansion into new ponds can be found, the snails will devastate the industry.



Figure 3: Invasive apple snails collected from a single crawfish pond in Louisiana. Photo: Blake Wilson

Impacts on Human Health

Aquatic gastropods including apple snails often serve as intermediate hosts for multiple parasites, some of which can be subsequently transmitted to other vertebrate and invertebrate organisms in the system. These parasite lifecycles often require a mammalian host for completion, which can include humans. In the case of crawfish and catfish production, parasite infections can lead to increased production costs associated with longer production times, economic losses from mortality events, and sell point rejections or price deductions. Additionally, certain parasites such as rat lungworm (*Angiostrongylus catonensis*), which actively infects *P. maculata*, can be transmitted to humans, causing severe disease of the brain. To date, the parasite community present in *P. maculata* of the United States remains unknown.

Integrated Pest Management of Apple Snails

Development of integrated pest management strategies will require in depth needed to identify factors associated with highly damaging infestations. Further, potential for cultural controls which disrupt the apple snail life cycle and overwintering need investigation. Molluscicides are available which may be used to control apple snail infestations, but research into product efficacy, application strategies, and potential non-target effects is needed before chemical controls can be used commercially.



Figure 4. High density of apple snail egg masses in a Louisiana crawfish pond. Photo: Blake Wilson