Principal Aquatic Invasive Species in Puerto Rico

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The ecosystems of tropical islands usually have higher percentages of endemic species than tropical and temperate mainlands. Therefore, the disappearance of an insular species may cause a worldwide net loss in biodiversity. The major causes of extinctions are habitat loss, the introduction of exotic species and uncontrolled exploitation of resources. In Puerto Rico, several species have been introduced purposefully or accidentally. Some of these after becoming established have impacted negatively the local biota and the ecosystems. This work summarizes the principal invasive species found in Puerto Rican freshwater communities. Although most of them are well known species with widespread distributions (e.g. *Eichhornia crassipes* - Water Hyacinth), others represent less common events (*Cherax quadricarinatus* - Australian Crayfish and *Amphylophus* spp. - Red Devil) providing opportunities for timely and transferable research.

Methods

Reports


Literature review


Field interviews of anglers


Electrofishing

Results

Invertebrates

Australian red claw crayfish
Langostino azul australiano
First Known Registry in Puerto Rico – 1998


Cherax quadricarinatus

Known Distribution in Puerto Rico
Reservoirs: Carite, Cidra and Loiza. Rivers: Loiza, Espíritu Santo and Lajas.
Origin – Australia
Biology – Omnivorous and detritivore, non-aggressive in nature and highly fertile.
Potential Threat – Diseases, parasites, competition and displacement of native freshwater shrimps.

Asian clam / Almeja asiática
First Known Registry in Puerto Rico – 1998


Corbicula fluminea

Known Distribution in Puerto Rico
Reservoirs: Cidra, Dos Bocas, Guajataca, La Plata, Loiza and Patillas. Rivers: Cayey.
Origin – Southeastern Asia
Biology – Feeds on plankton, hermaphroditic and capable of self-fertilization.
Potential Threat – Can cause extinction of endemic and native clams, can clog water pipes, screens and other submerged structures.

Aquatic Plants

Water hyacinth / Jacinto de agua
First Known Registry in Puerto Rico – Before 1952


Eichhornia crassipes

Known Distribution in Puerto Rico
Reservoirs: Cidra, Comerío I y II, Dos Bocas, Guayabal, La Plata, Loiza. Rivers: Arecibo, Cabo Rojo, Añasco, Santa Rosa de Lima, Majagual in Mayagüez, Hondo, Gurabo, Guánica irrigation channel.
Origin – Brazil (Amazon basin)
Biology – Grows in all types of freshwaters. Its growth rate is among the highest of any plant known: hyacinth populations can double in as little as 12 days.
Potential Threat – One of the worst weeds in the world, aquatic or terrestrial. Forms dense colonies that block sunlight, provoking eutrophication and fish mortality, clog water intakes, crowds out native species, interferes with navigation, recreational use and hydroelectric systems.

Aquatic Plants / Cont.

Water lettuce / Lechuga de agua
First Known Registry in Puerto Rico – Unknown


Pistia stratiotis

Known Distribution in Puerto Rico
Reservoirs: Guayabal, La Plata, Loiza. Rivers: Campanero, Gurabo, Cocal, Hondo.
Origin – United States of America
Biology – Reproduces rapidly by vegetative offshoots formed on short, brittle stolons. Can survive for extended periods of time on moist muck, sandbars, and banks.
Potential Threat – Interferes with navigation, recreational use and hydroelectric systems. Provokes eutrophication and fish mortality.

Fish

Armored catfish / Pleco
First Known Registry in Puerto Rico – First became established in 1990

Comment: The taxonomy of this genus in Puerto Rico is confused.There may be up to 3 species *(P. disjucntivus, P. pardalis* and P. *multiradiatus*) or more, and possible intergrades.


Pterygoplichthys spp.

Known Distribution in Puerto Rico
Reservoirs: Caonillas,Cidra, Dos Bocas, Guajataca, Guayabal, La Plata, Loiza, Luchetti, Patillas.
Rivers: Bayamón, Grande de Loiza, Guanajibo, Gurabo, Loco.
Origin – northern South America
Biology – Nocturnal, feeds on algae, but will also feed on worms, insect larvae, and other bottom dwelling aquatic animals. Facultative air breathers.
Potential Threat – Have caused deaths of endangered brown pelicans (Pelecanus occidentalis). Because of its spawning habits, construct nesting burrows that sometimes occur in very close proximity to each other, compromising shoreline stability, increasing erosion and suspended sediments loads.

Jaguar / Guapote tigre
First Known Registry in Puerto Rico – 2001


Parachromis managuensis

Known Distribution in Puerto Rico
Lajas, Sabana Grande
Origin – Central America
Biology – Highly predaceous, feeding mainly on small fishes and macroinvertebrates.
Potential Threat – Highly piscivorus and aggressive, potencial pest.

Red devil / Diablito rojo
First Known Registry in Puerto Rico – 2000

Comment: There are two known species in Puerto Rico (*A. labiatus* and *A. citrinellus*).


Amphilophus spp.

Known Distribution in Puerto Rico
Resevoirs: Dos Bocas, Guajataca, Loiza. Rivers: Cañaboncito, Cañas.
Origin – South America
Biology - Aggressive and territorial, Omnivorous, eating mostly aufwuchs, snails and small fishes. Also feeds on, insect larvae, worms and other bottom-dwelling organisms.
Potential Threat – May compete for resources with sportfish species in reservoirs.

Conclusions

Several exotic species are invasive in reservoirs and streams. Some appear to be associated with the aquarium trade (Armored catfish, Red devil), and others with aquaculture (Redclaw, Asian clam, Jaguar).

Five of these are considered among the 100 worst invasives in the world (IUCN). Among these 5, though, is the largemouth bass (*Micropterus salmoides*), which is managed as the most important sportfish in Puerto Rico reservoirs, and thus not officially considered a invasive species.


Micropterus salmoides from Dos Bocas Reservoir.

Although strict legislation exists, more effective enforcement is needed to prevent importation and release of additional invasive species.

Additional studies are required to assess the impact on native and important sportfish species in Puerto Rico.

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