



The Invasive Aliens

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What kills biodiversity of any given landscape? As you may rightly know, the first cause is the destruction of habitats. Many of the pristine landscapes have been encroached, converted,

mined upon, dumped with urban and industrial waste and thus displacing the native species. This phenomenon, happening in all continents is very much in the public gaze and governance systems have long strived to do something about displacement of species.

The second most important reason for biodiversity loss is the encroachment by invasive alien species. Who are they? They

are plant and animal species which travel away from their natural distribution area, reach new locations and establish and reproduce so prolifically that they displace local species.

A good case is of a fresh water fish named Nile Perch (*Lates niloticus*), which had its natural distribution in the river basins of Congo, Nile, Senegal, Niger, Lake Chad and a few other lakes and which was introduced into the Lake Victoria. Prior to the introduction of the Nile Perch, the Lake Victoria had a diversity of small fish species and there was a local community who depended upon this resource. The Nile Perch preyed upon the resident fishes, leading to the extinction or near extinction of several hundred native species. A new fishing

industry sprang up to take advantage of this big fish. Unlike the earlier small fishes which could be dried in the sun, the Nile Perch with high fat content needed to be smoked and fire wood in large quantities was needed for fires. As the big Nile Perch fishing industry developed and bloomed, the traditional communities with fishing gears only suited to capture small fishes perished. Along with it receded the forest line, due to the felling of large number of trees for firewood to smoke the Nile Perch. Biodiversity fell to an all-time low, the local community became displaced owing to the influx of big fishing industry and Lake Victoria lost the trees which enriched its catchment area. The cascade of impacts of introducing the Nile Perch, extended not just to displacement of other fishes but to socio-economic issues.

Not all invasive alien species are introduced knowingly by humans, as in the case of Nile Perch. Even though I had read about the impact of invasive alien species, I had the feeling that it did not concern me, who study tropical forests. Not just me, my colleagues too had a feeling that the natural forest is a climax ecosystem which do allow the entry of alien species. We were quite complacent when invasive species were creating havoc in agricultural systems. Everything changed the moment we discovered a species of plant, which from the fringes of the forest, climbs to the canopy spreading everywhere, depriving the vegetation below of any speck of light for the forest trees to produce their food. This species is rightfully called the Mile-a-Minute weed (*Persicaria perfoliata*). It grows amazingly fast to cover the vegetation beneath and kills them.

Aliens are there in all groups of organisms we have named. Post globalization, merchandize being transported across the globe has tremendously increased, carrying with them seeds, propagules, live plants and animals, to places outside their normal distribution range. This presents them with opportunity to expand beyond their home range. When they cross over to new territories, at times they reach locales which lack their natural predators or enemies. It is here that they exhibit maximum growth and reproduction, undeterred by natural enemies which limited their success in their original areas of natural distribution.

European colonialism helped the spread of invasive plants and animals. When the countries in the temperate zones established their colonies in the tropics, they brought over many plant species to be planted around their establishments which gave a feel of at home. In the tropics, many of these introduced species became invasive, devouring the local biodiversity.

Lantana camera, is the best example. From the Kew Botanical Gardens in the United Kingdom, it was introduced to many botanical gardens in the tropics where the British ruled. The birds in the new locations loved to eat the berries of the plant and helped the plant spread out of the Botanical gardens. Today, thousands of hectares of forests in the tropics are under this species, superseding the indigenous species.

There are other ways to spreading of invasive species. When ships unload, they need to be filled with water to equalize the weight of the unloaded cargo. Technically we call this as the ballast water. When the ballast water is pumped into the ship, many

aquatic marine organisms go in along with it, which will eventually be released at a port in a different continent- a perfect scenario for escape from natural enemies. These and other ticket-less travel across the globe has triggered immense invasive species issues which include complete covering of aquatic habitats, drop in species diversity, triggering habitat transformation etc. With nearly 70,000 vessels criss-crossing the oceans and seas, the problem of marine invasion is getting intense.

Water Moss (*Fontinalis antipyretica*) and Water Hyacinth (*Eichhornia crassipes*) are natives of the Amazon basin which have spread to most of the tropical countries, infesting fresh and brackish waters. They have covered the entire water surface in many tropical wetlands and rivers, making it difficult for boats to move and impacting aquatic life.

The Mallard Duck (*Anas platyrhynchos*), a very attractive waterfowl, originally from Siberia which has eliminated diversity in a totally different fashion. The male birds have a metallic green head and neck, yellow bill, and purplish-brown chest. The females are uniformly brown-streaked. They breed with indigenous ducks in new locations and have led to the elimination of many local duck varieties. The American Black Duck (*Anas rubripes*) numbers have drastically declined and the Mexican duck (*Anas diazi*) is now extinct because of hybridization with Mallard ducks.

A snake which belongs to the group of the "cat eyed" snakes named Brown Tree Snake (*Boiga irregularis*) is a nocturnal, arboreal species that uses visual and chemical cues to hunt in the tropical rainforest canopy

and/or on the ground. Shortly after World War II, it was accidentally transported from its native range in the South Pacific to Guam, probably as a stowaway in a ship's cargo or by crawling into the landing gear of Guam-bound aircraft. As a result of abundant prey on Guam and the absence of predators, the brown tree snake populations reached unprecedented numbers. They wiped out most of the native forest vertebrate species; thousands of power outages affecting private, commercial and military activities; widespread loss of domestic birds and pets; considerable emotional trauma to residents and visitors alike, when snakes invaded human habitats with the potential for envenomation of small children.

Most invasive aliens are very beautiful and are transported as ornamental captives. At times, when the owner loses the fascination and they are thrown out into the open, they get the opportunity to unleash a massive process of invasion. The Giant African Snail (*Achatina fulica*) was one such organism, curiously taken to new landscapes where it became invasive and devouring nearly 500 species of plants while also spreading a parasite which causes meningitis in humans.

There are many a stories to narrate. But what exactly is the impact of the invasive alien species in the context of losing our biodiversity? Here are the latest facts as reported by Miguel Clavero and Emili Garcí'a-Berthou from the University of Girona in Spain: Of the 680 extinct animal species, causes could be compiled for 170 (25%), of which 91 (54%) included the effects of invasive species. For 34 cases (20%), invasive species were the only cited cause of

extinction. Habitat destruction and harvesting (hunting and/or gathering) were cited for 82 and 77 species respectively. Several reviews of particular taxa by expert groups have concluded that invasive species are the leading cause of extinction of birds (65 out of 129 species) and the second cause of the extinction of North American fish (27 out of 40 species, world fish (11 out of 23 species and mammals (12 out of 25 species).

So, this is the sad state of affairs regarding biodiversity. As the old age saying goes, all that shines is not gold. The immense impact of invasive species is mounting up additional pressure on species which are already impacted by climate change. The biological characteristics of the aliens and the fact that they are outside the zone on population control by natural enemies, help them to outcompete the local species. Whatever way they invade, the result is a monoculture of a species where the diversity is wiped out and a single species dominates.

So, the next time, when you venture into the wild, look out for the aggressive species displacing the weaker local species. The first step in managing invasive species is to know them.

Reference

M Clavero, Garcí'a-Berthou (2005). Invasive species are a leading cause of animal extinctions

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