

Invasive Alien Species on Islands : A Quick Look

Rauf Ali*

Foundation for Ecological Research,
Advocacy & Learning (FERAL), Pondicherry

*Email : raufie@gmail.com

Introduction

Invasive alien species first attracted attention about 56 years ago in 1958, with the publication of Charles Elton's book "*The Ecology of Invasions by Animals and Plants*". Since then invasion biology has become a major focus for research worldwide, though it is sadly neglected in India.

An organism is considered introduced when it is transported by human means to an area where it is not normally found. It is considered invasive or IAS (Invasive Alien Species) when it establishes and causes economic or environmental damage.

In this paper, I give a very brief introduction to the various components of invasion biology. I then look at the specific case of the Andaman Islands, where I will focus on the impacts that selected invasives have. Finally I will touch upon the policy initiatives that need to be taken to reduce the harm done by invasives.

TEASI

The components of invasion biology can be summed up by the acronym TEASI: Transport, Establishment, Abundance, Spread, and Impacts.

Transport: The main transport vectors to islands are by sea. Ballast water is known to transport up to 10,000 species from one area to another daily. These include jellyfish, mussels, and pathogens. Crows and rats came to the Andamans as 'stowaways' on ships. Common Mynah, House Sparrow and Chital were deliberately introduced. Many weeds came as seedstock contaminants, several domesticated animals such as dogs, cats and goats have gone feral and are in effect invasives in terms of the damage they do. Species such as *Lantana* and *Water Hyacinth* were also originally introduced as ornamentals.

Establishment and abundance: This is dependent on a



Barren Island- undergrowth destroyed by feral goats.



Forest cover where chital are absent



Inter-island canoes transported potential invasives for a long time



Coastal vegetation in Middle Andaman



All regeneration mainly with exotics

number of factors, the most important of which appears to be a change in disturbance regime. Absence of competitors, predators and parasites also allow invasives to establish themselves. An organism from a similar latitude has a greater chance of establishing itself. Abundance in original range, small seed mass, broad diet, and rapid dispersal have also been suggested as reasons for invasive establishment and spread.

Spread : The main barrier to the spread in invasives is the presence of water in between the islands. Chital have not been able to spread to Little Andaman yet. Palm squirrels are not found yet in the northern parts of the islands, since they appear to disperse only through cultivated lands and human settlements. Shipping links make it easy for marine organisms wherever these links exist.

Impacts: IAS are considered second only to habitat destruction as a threat to endangered species in the US. In 49% of endangered species there, invasives are a

threat factor. They are a greater threat to biological diversity than pollution, poaching and disease combined. We do not have any comparable figures for India because these studies have never been done. However, a 2001 estimate (Pimental *et al.* 2001) of economic damage due to IAS for India assesses US\$9.1 billion (Rs. 5,460 crores) on economic damage and US\$2.5 billion (Rs. 1,500 crores) annually due to environmental damage. This estimate relies very heavily on secondary sources and needs to be validated.

Impacts include major damage to shipping due to hull fouling, disease, new insect pests that damage agriculture and forestry and competition for nesting sites and food with endemic species.

Impacts specific to the Andamans

Among vertebrate invaders, there are at least three species of birds (House Crow, House Sparrow, and Common Mynah) and ten species of mammals.



Common Mynah

The greatest threat to biodiversity in the Andamans is the Chital. It was introduced for sport by the British in the 1930s. In the absence of predators and in the presence of the Wildlife Act, it has spread to all the major Islands of the Andaman group with the exception of Little Andaman. A comparison of forests between Little Andaman and the other areas show that basal areas have decreased considerably (Ali, 2004), and the amount of vegetation is decreasing rapidly enough to show up on satellite imagery (Ali and Pelkey 2013). The problem is that the chital browse every tree species seedling but two: *Lagerstromia hypoleuca*, and *Pongamia pinnata*. Recent regeneration consists mostly of these two species and inland evergreen forests are now becoming deciduous.

It is worth mentioning that this is probably the only place in the world where elephants can be considered invasive. A group of elephants was abandoned on Interview Island in 1962, when the timber company employing them went bankrupt. They multiplied to about 70 in 1991 and again declined to 31 in 2001. Bamboo, cane and *Pandanus* have been wiped out and a

significant proportion of trees on the island have died due to bark-stripping by elephants. Regeneration is very sparse because of browsing by chital and the centre of the island, which was logged, is now an almost pure stand of *Lagerstromia*.

Among birds, the Common Mynah competes with endemic hole-nesters such as the Glossy Starling and the Andaman Black Woodpecker. There is not enough data at the moment to establish how much of a threat it is to these species.

Also of interest is the House Crow. Seven birds were seen flying off a ship in 2003. In spite of representations to the A & N Administration no action was taken and now these birds number has reached several thousand. They constitute an agricultural pest and a possible disease vector.

Among domesticated animals, feral dogs have been observed hunting sea turtles that come ashore to nest. They have also been observed digging up turtle eggs and eating them. Feral cats have seriously reduced the populations of endemic reptiles and birds. The process of documenting has just begun.

Ironically the effort to control insect pests, many of whom are IAS, is actually worsening the problem. Biocontrol agents brought in from outside themselves may be potentially invasive. The ladybird beetle, which the Agriculture Department is testing, is one such potential invader, having caused tremendous damage wherever it is found. Tests need to be carried out as to what non-target species it will affect. These do not appear to have been done.

Next steps

From all this, it is clear that some control measures are necessary. While many in the Andamans have come round to this point of view, permissions are not being granted by the Centre. A proper control of invasives will require amendments to the Wild Life Protection Act, 1972. A unified policy for invasives is highly desirable for all of India at this stage.

References

- Pimentel, D et al (2001) Economic and environmental threats of Alien Invasions. Agriculture, Ecosystems & Environment, 84: 1-20
- Ali R (2004). The effects of introduced herbivores on vegetation in the Andaman Islands, India. Current Science, 68(8): 1103-1112.
- Ali, R & NW Pelkey (2013) Satellite imagery shows vegetation degradation due to Invasive herbivores in the Andaman Islands. Current Science, 105: 209-214
- Ali, R (2005) An update on the elephants of Interview Island. JBNHS, 102: 221-223