INVASIVE SPECIES AND THEIR NEGATIVE IMPACTS

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Introduction

Due to globalization and climate change, some species have widened their natural habitat and invaded other ecosystems causing disturbances. This is an issue of global concern as invasive species threaten biodiversity, cause losses worth billions of dollars, and affect human health.

Common characteristics of invasive species

According to Ehrlich (1989), Lodge (1993), and Meffe & Carroll (1994) modified by Mac *et al.* (1998):

- High rate of reproduction; short generation time
- Long-lived
- High dispersal rates
- Single parent reproduction, Vegetative or clonal reproduction
- High genetic variability, Phenotypic plasticity, Tolerant of wide range of conditions
- Broad native range, Abundant in native range, Habitat generalist
- Broad diet (polyphagous)
- Gregarious (liked by humans), Human commensal

Impacts

- **Biodiversity:** the second main agent of species extinction in freshwater ecosystems and the first one in islands (Hill *et al.*, 1997; Harrison & Stianssny, 1999; Baillie *et al.*, 2004)
  - Direct predators and/or competitors
  - Vectors of diseases
  - Alteration of habitat
- **Economy** (Cárdenas *et al.*, 2011; Diagne *et al.*, 2021)
  - Losses in agriculture, silviculture and other production systems
  - Infrastructure deterioration
  - Income reduction in tourism
  - Management and eradication costs: annual mean cost of $162.7 billion and a total of $ 1.288 trillion (2017 US Dollars) from 1970 to 2017
- **Human health** (Mazza *et al.*, 2014)
  - Responsible for illnesses and infections (they are the pathogen, they act as vectors of pathogens, or favor the pathogens and/or their vectors)
  - May hurt humans through bites or stings, allergens, biotoxins and/or poisons
  - Effects through other mechanisms (reduction of natural protection, modify of fire regimes which affects air quality, agriculture, and human safety, etc.)

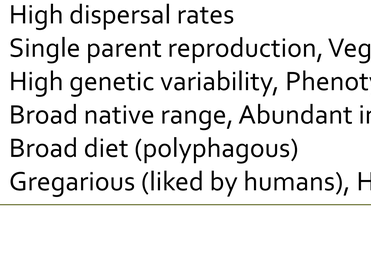

Fig. 1: Water hyacinth in Lake Victoria (Press release, 2019)

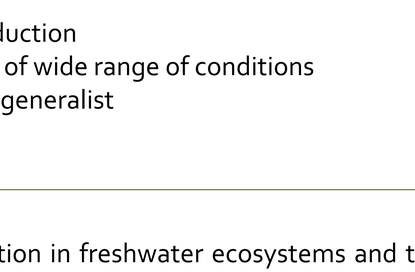

Fig. 2: Asian tiger mosquito (Gathany, 2002)

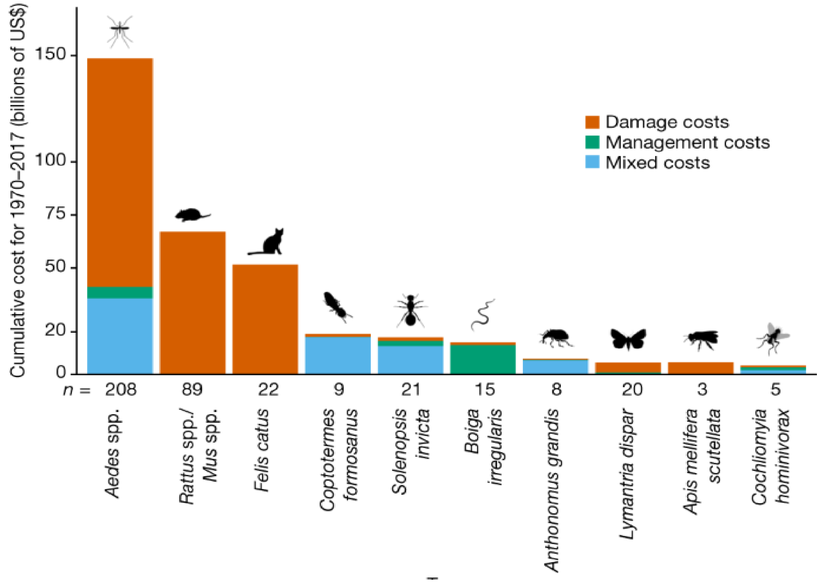

Fig. 3: The 10 costliest species for both cumulative damage and management costs (in billions of 2017 US dollars) between 1970 and 2017 (Diagne *et al.*, 2021)

Future scenario

- Negative impacts will continue rising due to more opportunities of invasion related to more ways of introduction and climate change (Mazza *et al.*, 2014)
- The damage and management costs will increase threefold per decade (Diagne *et al.*, 2021)

How to face the problem?

i) Controlling the commerce and movement of species, and ii) acting with early detection, monitoring, and eradication once the invasive species have arrived (IUCN, n.d.)

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