# Aquatic pests invasions and Climatic Change

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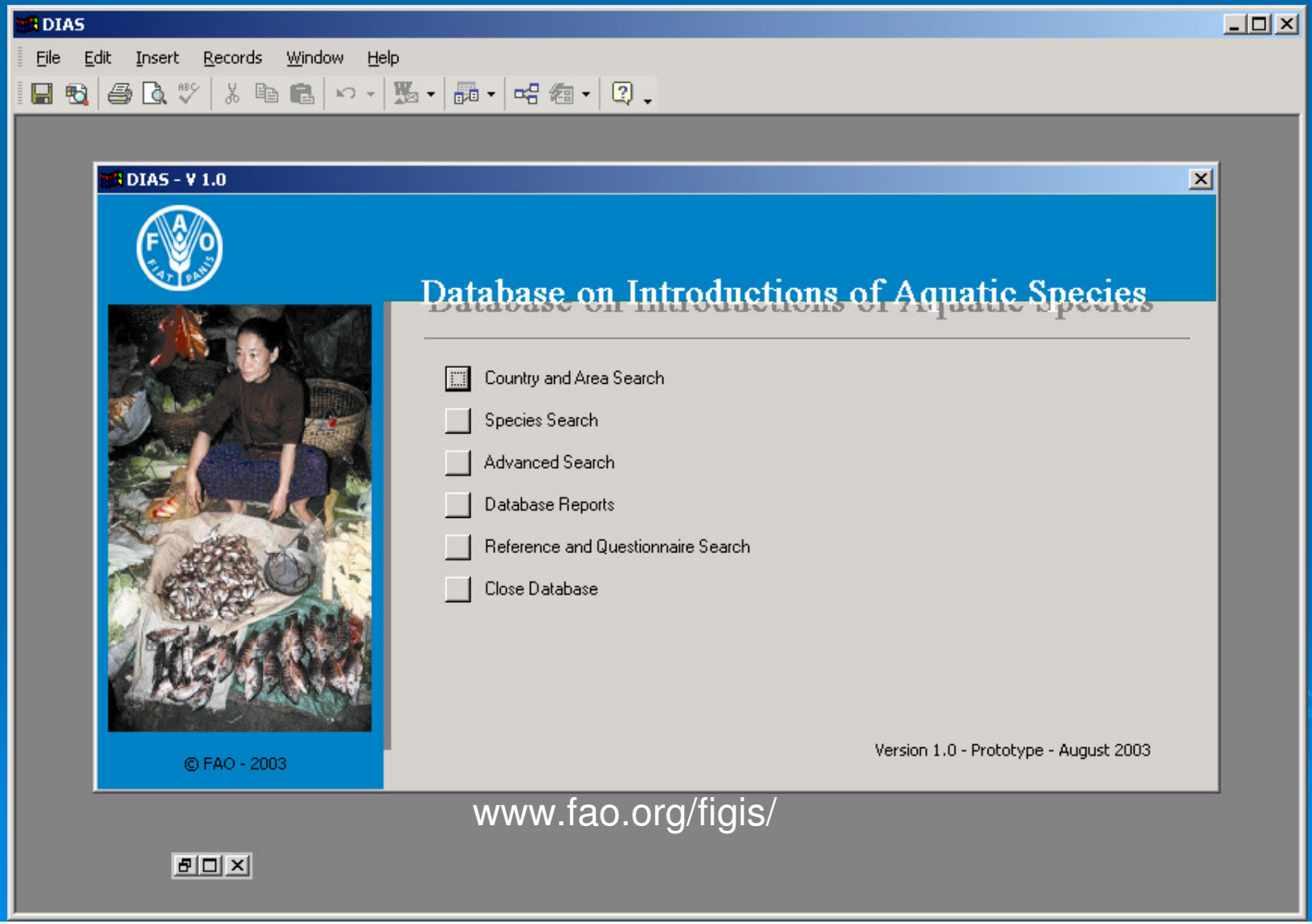
- There is plenty of information and many data bases on alien, invasive, exotic aquatic species
- The reported cases of pest species seem more common in freshwaters
- The most frequently cited/reported cases are in the Northern Hemisphere, particularly North America and Europe
  - Does not mean that pest species do not take place in other regions, but rather that there is less concern, (except when a threat to food security?) and or lower technical ability to report.
- There are few attempts to connect aquatic pest species invasiveness with Climatic Change e.g. in NA Great lakes, which can be used as models

FAO/FIMA keeps  a data base of aquatic species introductions around the world  and provides guidelines for the introduction of new species with aquaculture/fisheries purposes




www.fao.org/figis/

Most commonly cited ; freshwater (estuarine) animal pest species


*Zebra mussel Dreissena polymorpha* (Pallas)


Snake head *Channa argus*


**Chinese Mitten Crab**
***Eriocheir sinensis***

*Golden apple snail*
*Pomacea canaliculata* (Lamarck, 1822)

Most commonly cited ; freshwater (estuarine) pest plant species

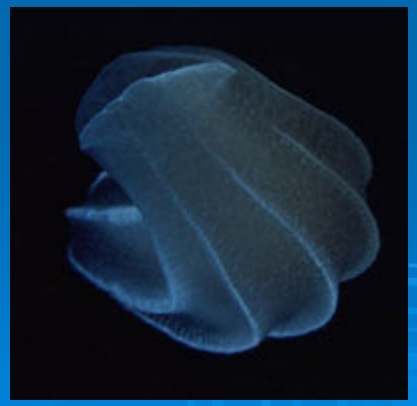
**Eurasian watermilfoil**
**(*Myriophyllum spicatum*)**


**Water Hyacinth**
***Eichhornia crassipes***

Most commonly cited ; marine pest species

Green mussel Perna viridis

Figure 11. The Australian Jellyfish, *Phylloriza punctata* (image courtesy of Dauphin Island Sea Lab)



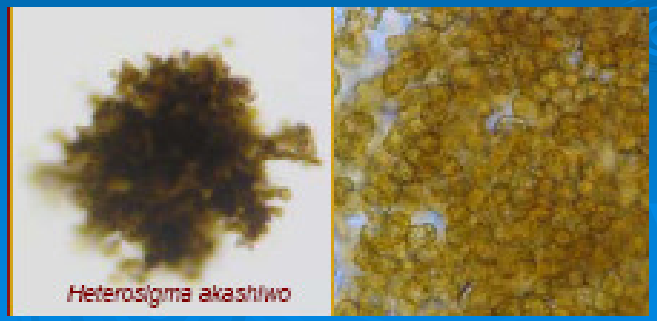
Combed jellyfish (a ctenophore)
*Mnemiopsis leidyi*

*Caulerpa taxifolia*

Native to the Indian Ocean
commonly used as ornamentation in aquarium installations around the world.
A specific strain of this algae was found to thrive in cold aquarium environments
In a  zoo aquarium in Germany where selective breeding under exposure to chemicals was carried out and when it eventually found its way into the Mediterranean,
 it created an invasive species panic because of fears that it threatened to alter the entire ecosystem by crowding out other seaweed while being inedible to animals.

# Microalgae as invasive aquatic pest species

- Algal blooms specially those producing toxins can be a serious threat to human health and to food security
- Red-tides/algal blooms produced by pest species are a major challenge in coastal marine areas
- There are models and scientific propositions linking red-tides to CC
- Red-tide species can be transported worldwide beyond species original range. Ballastwater considered a major vector

- Does the present knowledge in Invasion Ecology Science provide the adequate basis to assess the forcing of Climate Change on aquatic pest species
  - Probably yes
- Can we predict how climate change will affect invasion expansion and invasion patterns?
  - If models are good to predict changes in waterways, temperature and salinity, probably some predictions can be made
- What will be the impact of changes in spread of pest species on the food security and which are the more vulnerable situations
  - Impacts should be variable amongst regions however most vulnerable situations are when pest species affect directly food production (e.g. Golden Apple snail)
- What are necessary future research activities (with emphasis on interdisciplinarity)
  - We should ask weather CC will change human movement of species across borders as we are the main factor

- Aquaculture and specially mariculture will continue to growth particularly in a scenario of Climatic change with shortage of freshwater, therefore is likely that more marine species will be moved around


HELP STOP
Aquatic Hitchhikers
STOP AQUATIC
HITCHHIKERS!