What are the impacts of climate change on invasive species?

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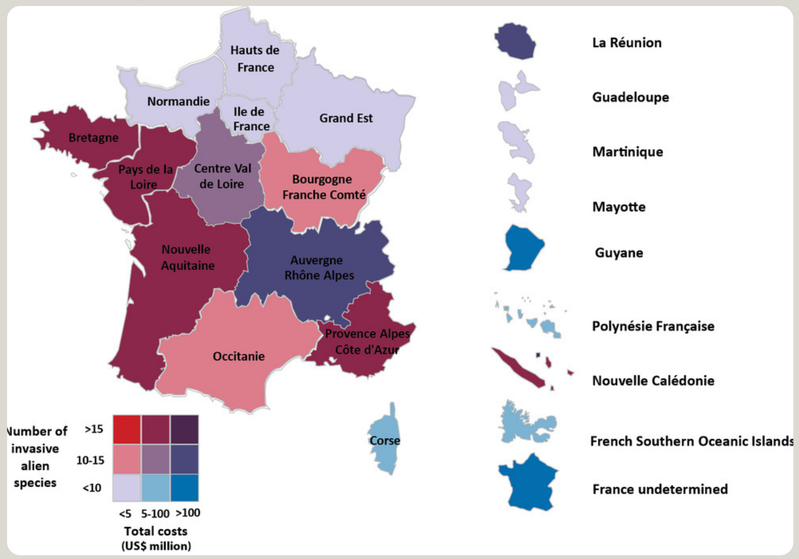
- ***Invasive species*** is a species introduced by man voluntarily or involuntarily into a territory outside its natural range, which threatens ecosystems, natural habitats or local species. (src: Ministère de la Transition écologique)

- 6000 plants species
- 5300 native species
- 700 alien species
- 100 invasives species



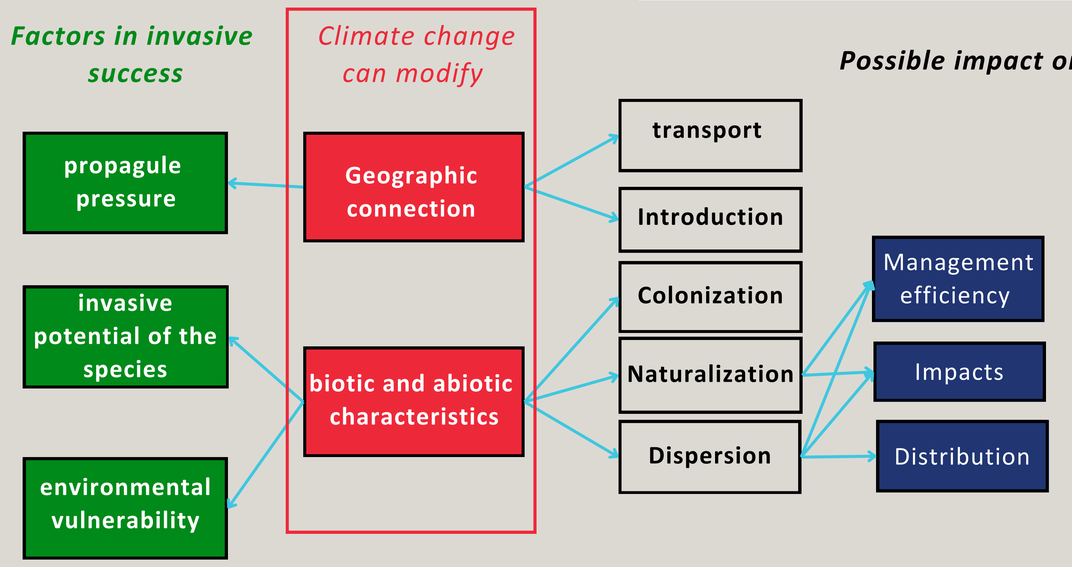


Figure : Consequences of climate change on biological invasions through its influence on invasive success factors and the invasion process. (From Morgane G. 2017)

The effect of climate change on exotic species concerns both the factors influencing their invasive success and the various stages in the invasion process (Fig.). Climate change will have an impact on the transport of exotic species, both directly and indirectly. For example, since hurricanes cause individuals to be transported over long distances, their increased frequency means that natural introductions of potentially invasive species into new habitats are likely to increase. In addition, climate change will lead to changes in the use of certain environments by man, for recreational and commercial activities, which could lead to connections between geographical zones that were previously non-existent.

Ludwigia Grandiflora

Primerose-willows orJussie à grandes fleures

History : Creeper Water Primrose, originally from South America, was introduced to different continents for ornamental purposes. In France, it accidentally arrived in the Lez River in Montpellier around 1820-1830, becoming naturalized in the Gard and Hérault regions. It then spread to Brittany, southern France, and extended north and eastward.

Why is it an invasive plant? It has a high density subaquatic, so it became hard to move in it and it take all of the light. It erases most of the native plant and some animal species too.

Climate change and development : Increased range of invasion as the plant's germination can withstand higher temperatures than native aquatic plants.

Egeria densa

Brazilian Waterweed or Egérie Dense

History : In Europe, particulary in France it proliferates excessively due to the pollution of agricultural fertilizer. In the USA, in the Delta of Sacramento-San Joaquin it has a bad effect on the local species and the ecosystem. Imported in the 19th.

Why is it an invasive plant? Due to the ability of the plants to regenerate itself, when you try to destroy it in a mechanical way the plant will regenerate itself and create other plant with every pieces. Moreover it likes warm water.

Climate change and development : With the temperature's increasing the temperatue of the water increase too. And the plant have more facilities to propagate itself.

How it impact agriculture? It impacts the production of aquatic plants and fish farm, deteriorating water quality and creating a competion between them and the cultivated plant.

Tamarix

Tamarisk or Tamaris

History : In the 19th century, they were imported in the USA for their beauty and their ability to stabilize banks and shores. They have become invasive plants, colonizing the southwestern USA at the expense of native willows and poplars.

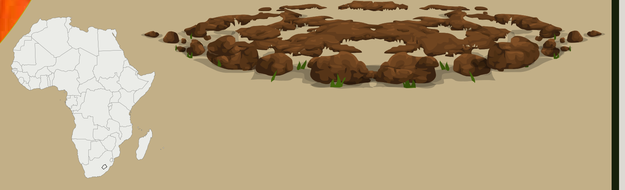
Why is it an invasive plant? By concentrating salt in their roots and leaves, Tamarisks alter the mineral content of the soil, leading to the elimination of native species. Over 4,000 km have been conquered in this way, posing an expose risk of fire due to the flammability of the Tamarisks.

How to limit the development? Introduce a pest that is called Diorhabda is really efficient to reduce the development of the Tamarisks.

Climate change and development : The high temperature is better for Tamarisks because their roots can go deeper than other native species to take all the water and promote themselves.

Spathodea

Gabonese tulip tree or Tulipier du Gabon



History : Imported for the beauty of the plant in the 20th, it became an invasive plants cause of the propagation in agricultural field and due to the difficulty to destroy it.

Why is it an invasive plant? It's an invasive plant because it can produce seed during few month. And it have a suckering root system. Moreover it can produce a new plant with a piece of root.

Climate change and development : The hight temperature is better for Gabonese Tulip Tree because the seed can germinate in higher altitude.

How it impact agriculture? Due to the capacity to proliferate, it enters the field and create a competition with the crop. Moreover, it is difficult to eradicate, posing a significant problem for agriculture in La Réunion.

Conclusion

Climate conditions and geographical barriers delineate the distribution of species, influencing their establishment, recruitment, growth, and survival. Climate change amplifies the risks associated with biological invasions, affecting the distribution of invasive species and the damage they cause. However, studies indicate that in certain regions, climate change may reduce the probability of invasion, thereby creating opportunities for ecosystem restoration. Furthermore, the impact of climate change varies depending on the species, habitats, and regions, and preserving native plant communities can serve as a strategy to counter invasion. Responses to climate changes will depend on various factors, such as the species involved, habitat type, and socio-economic elements, highlighting the complexity of the relationship between climate change and biological invasions.

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