BIOLOGY

04/2014 - Exotic Plant Frees itself from Hervibores after Colonizing Novel Habitats in Catalonia

An exotic species becomes an invasive one when it forms stable populations that expand on the new territory. One hypothesis attempting to explain this process predicts that exotic plants lose the herbivores associated with their area of origin. A biogeographical study covering the entire known distributional area of the shrub *Senecio pterophorus* shows for the first time consistent evidence of the decline of herbivores after the invasion of this species.

References

Castells, E.; Morante, M.; Blanco-Moreno, J. M.; Sans, F. X.; Vilatersana, R.; Blasco-Moreno, A. Reduced seed predation after invasion supports enemy release in a broad biogeographical survey. Oecologia 173: 1397-1409. 2013.

Biological invasions are one of the major threats affecting biodiversity worldwide. Exotic plants can strongly affect the composition, structure and functioning of the invaded ecosystems. Not all species introduced into new habitats, however, finally form stable populations and become successful invaders.

To improve management of future introductions, scientists are trying to understand what ecological traits are related to successful invasions. The most frequently invoked hypothesis explaining the success of invasive plants is the "Enemy release hypothesis". This hypothesis predicts that exotic plants, during the invasion process, will lose the consumers associated in their area of origin, experiencing immediate benefits in leaf biomass, reproduction and survival which may facilitate invasion.

The Chemical Ecology and Toxicology laboratory at Universitat Autònoma de Barcelona studies the role of plant herbivores as determinants for invasion success in the exotic shrub *Senecio pterophorus*, an alien first found in Catalonia in 1982 near the Ripoll River (Sabadell, Barcelona). *S. pterophorus* is native to eastern South Africa and an invader in western parts of South Africa, Australia and Europe. In Australia, *S. pterophorus* is highly invasive and is considered a noxious weed subject to eradication. Additionally, it has been recently incorporated as an invasive species into the list of exotic species in Catalonia EXOCAT (2012).

In the present study we determined whether the exotic populations of *S. pterophorus* experienced lower levels of herbivory compared with plants from the native area, as predicted by the Enemy Release hypothesis. We traveled to South Africa, Australia and Europe, covering the entire known worldwide distribution of *S. pterophorus*, to evaluate the amount of insects feeding *in situ* on this species.

We found that plants from the native area in South Africa had one-quarter of the flower heads damaged by several insect species of Coleoptera, Lepidoptera and Diptera. Plants growing in the introduced areas experienced a complete release from their native fauna, but they later established new interactions with local herbivores present in the area of introduction. Despite these novel associations, plants from Australia and Europe globally experienced a lower seed predation compared with plants from the native area, which is in accordance to the Enemy release hypothesis.

This study is the first to provide strong evidences of reduced herbivory after plant invasion in a biogeographical survey across the entire distributional area of a species. Exotic populations of *S. pterophorus* freed from insect attack could have an advantage over other native plant species from the invaded ecosystems, thus favoring invasion success.

Eva Castells

PROGRESS

Are Invasive Plants More Toxic than Native Ones?

The Chemical Ecology and Toxicology group at UAB analysed the concentration of certain molecules of the *Senecio pterophorus* shrub, which are toxic to vertebrates and invertebrates, in plants collected in their native environment and in three non-native environments, to determine whether changes in their own chemical composition and toxicity take place.
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PROGRESS

Production of Toxin-Free Bacterial Amyloid

Inclusion bodies or amyloids are nanostructured protein aggregates produced inside a cell, frequent in certain bacteria, and with interesting biomedical applications. A study has developed several toxin-free *E. coli* strains from which amyloids free from potentially hazardous cell contaminants have been produced.
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PROGRESS

How the World's Largest Salamander Feed?

An international team has developed three-dimensional models of the bite of the world's largest living amphibian, the Chinese giant salamander, an endangered animal. Understanding how this species hunts not only broadens the knowledge of its biology but can also help in reconstructing how early tetrapods and extinct amphibians fed.
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PROGRESS

***Cairanoolithus*: a Large Egg for a Small Dinosaur With Wide Hips**

The study of the microstructure of the eggshell of *Cairanoolithus* conducted by Albert G. Sellés and Angel Galobart, both researchers at the ICP, reveals that this egg type does not belong to sauropod dinosaurs but to

ankylosaurs, and probably to *Struthiosaurus*, a genus of armored dinosaurs. The finding would represent the first description of thyreophora eggs in the world.
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Department of Pharmacology, Therapeutics and Toxicology
eva.castells@uab.cat

If you have any suggestions: **premsa.ciencia@uab.es**

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