

Forest management that factors in stream distance would help protect arthropods

February 21 2020



The experts studied the population of arthropods in forest areas in the northeastern area of the peninsula, in O Incio (Lugo, Galicia). Credit: University of Barcelona

The structure of vegetation and stream distance are important factors to consider in order to protect the biodiversity of forest arthropods, as stated in an article now published in the journal *Forest Ecology and Management*. The study concludes that farther from a river course, the conditions are better for the communities of arthropods in the forests, since they need a cool and wet microclimate.

The new study is led by experts from the Faculty of Biology, the Biodiversity Research Institute (IRBio) and the Animal Biodiversity Resource Center of the UB (CRBA), and it counts on the participation of experts from CREAM, the Museum of Natural Sciences of Barcelona, and the universities of Canberra and Melbourne (Australia).

Forest arthropods and rivers: a connection to be discovered yet

The contribution of river proximity in the biodiversity of non-riparian [forest](#) arthropods is a little understood ecological relationship. Researchers have now studied the population of arthropods in forest areas in the northeastern area of the peninsula, in O Incio (Lugo, Galicia).

The great biodiversity of arthropods analyzed in the study, 21 orders and 60 families, expands the reference coordinates in previous studies that were mostly focused on specific groups such as butterflies. "It is known that rivers are vertebral axes of terrestrial ecosystems, regulating the microclimate and conferring many ecosystemic values. However, the

relationship with forest arthropods beyond gallery forest ones was not quantified," notes the first author of the article, researcher Sergio Albacete from the Department of Evolutionary Biology, Ecology and Environmental Sciences of the UB.

The new study emphasizes the value of discovering the biology of relatively understudied groups, "such as flies, dipteran insects with more than 100 families in the Iberian Peninsula, and which are important for the processes of pollination, decomposition and plague control," notes the researcher.



A member of the genus *Lithobius*. Credit: Antoni Serra, UB-CRBA

Chestnut woodlands: ecology, economy and landscape

The [forest areas](#) in the study are chestnut woodlands, "habitats with a great ecological economic and landscape value," says researcher Alberto Maceda (UB-IRBio). "From a biological perspective, we find centenary trees and a great biological diversity that has been preserved over the years thanks to traditional management, an activity which is being lost due to rural abandonment. These trees have economic value, as well, since they provide fruit and wood, subsistence resources for the rural world in the past. As landscape, *soutos*—the local name for the chestnut trees—are protected by the Directorate habitat, and are the dominant landscape of many valleys."

According to the conclusions, the distance between the trees and the rivers affects the richness, abundance and trophic guilds of the arthropods "after considering other factors (level of coverage of the understory, diversity and height of plants, density and diameter of the trunks, etc.) that affect the availability of food and shelter for these invertebrates," says Sergio Albacete. "Therefore, we have to consider the effects of such distance to establish ecological relationships between the arthropods and the rivers."

Social wasps are the group most apparently affected by stream distance. "Without setting potential cause-effect relationships, the statistical analysis of individual effects in several studied variables would suggest social wasps do not like to live far from rivers," says Alberto Maceda. "We are now studying this relationship in detail, since we have been getting samples of the Asian wasp (*Vespa velutina*) since 2017. This invasive species is generating social alarm, and can affect the conservation of the native biodiversity."



Myriapod of the genus *Polydesmus*. Credit: Antoni Serra, UB-CRBA

Traditional management for the richness of understories

In order to protect the forest diversity of the arthropods, some of which control many agricultural and forest plagues in a natural way, we would need to preserve the traditional management of forests, favour the richness of understories and maintain the chestnut tree as the predominant tree in the area. Another important factor would be to avoid clearance of paths, which eases chestnut gathering, before the end of the plant period of the understory.

"The traditional management, regarded as a medium-intensity perturbation, prevents the understory from being monopolized by plants with an extensive growth (blackberries, ivy, fern, etc.). Moreover, this

management model prevents souts from densifying due to the growth of the chestnut trees and the germination of other trees in the forest," notes Maceda.

In this habitat, the presence of oaks near the [chestnut trees](#) "is essential to control the chestnut gall wasp (*Dryocosmus kuriphilus*), since we can find deformations of plant organs where native parasites reproduce and control the plague of the chestnut tree which also provokes them," says lecturer Juli Pujadé Villar from the Department of Evolutionary Biology, Ecology and Environmental Sciences of the UB.



In order to protect the forest diversity of the arthropods, we would need to preserve the traditional management of forests. Credit: University of Barcelona

Discovering the structural complexity of the forest

Arthropods are the animal taxon with the largest diversity worldwide. However, it is necessary to conduct studies on different groups in several habitats to complete the general view of the conservation state of these invertebrates. At the moment, habitat loss, alterations in the phenology of plants due to [climate change](#), and the use of pesticides are threatening the conservation of many groups of arthropods worldwide.

"It is important to improve the management of the understories in a moment when society thinks a forest is dirty if it has understory, and fire prevention policies lead to random clearances to clean it. We need more pedagogy at school, since studying biodiversity is undervalued, so that society understands that a forest has a structural complexity a garden does not have, and we need to preserve it. In the context of climate change, this is getting increasingly important," conclude the authors.

More information: Sergio Albacete et al. Stream distance and vegetation structure are among the major factors affecting various groups of arthropods in non-riparian chestnut forests, *Forest Ecology and Management* (2020). [DOI: 10.1016/j.foreco.2019.117860](https://doi.org/10.1016/j.foreco.2019.117860)

Provided by University of Barcelona

Citation: Forest management that factors in stream distance would help protect arthropods (2020, February 21) retrieved 16 August 2024 from <https://phys.org/news/2020-02-forest-factors-stream-distance-arthropods.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.