

# Study says that changes in butterfly fauna are linked to forestry and to non-native forests

Gabriel Jordani / 5 de junho de 2023 / In English



## Biological | Researchers compared the species of butterflies present in native and exotic forest regions with samples collected in Serra Gaúcha

\*Photo: Gustavo Diehl/UFRGS (Archive - Jan. 2020)  
\*By Gabriel Jordani / September 1st, 2022

A research project conducted at the Graduate Program in Animal Biology (PPGBAN, in Brazilian Portuguese) at UFRGS evaluated the impacts of non-native forests on butterfly preservation. After collecting and analyzing samples of different species of frugivorous butterflies (which feed on fruits) in the National Forest of São Francisco de Paula (RS), scientists observed higher quality of species in the Araucaria forests – native to the state – than in the pine plantations, which are original North American trees. The research results were released in a [master's thesis](#) and in an [article published in August 2022 issue of the Forest Ecology and Management academic magazine](#).

Pines (*Pinus* spp.) form a type of non-native, common and very extensive forest in 500-meters-above-sea-level regions. To understand the impact of this species on fauna, the author Lady Carolina Pinilla analyzed the presence of butterflies in three areas: young pines (with 20-year-old trees), old pines (with plants in their 70s) and native araucarias.

The variety of these insects was similar between the young and old pine areas, but different in the native araucaria regions. Microclimatic conditions and butterflies' responses to these conditions differed between vegetation types. Pine plantations are drier, warmer, and brighter than araucaria forests. When the average temperature increases in native forests, you can see an abundant and rich growth of species of frugivorous butterflies. The opposite occurs in areas of ancient pine: the higher the temperature, the lower the species' richness. Butterflies living in young pine areas are less affected by these variations.

### Why should we analyze butterflies?

The work supervisor, who is a professor at the Helena Romanowski Institute of Biosciences, points out that understanding butterfly assemblages is understanding the functioning of the ecosystem. "Instead of feeding on nectar, frugivorous butterflies, unlike most other species, feed on decaying fruits," mentioned Romanowski. "Their feces became reprocessed vegetable matter that would be incorporated by the soil. Even though it is little, there are thousands of individuals who participate in this process every day, which ends up having a big impact," she adds. Also, she claims that about 60% of animals feed on insects, making clear the importance of butterflies in the food chain.

Initially, the researchers predicted that the richness and abundance of frugivorous butterflies in araucaria forests would as well be observed in areas of old pine plantation, but that such abundance would not be seen in those areas in which pine plantation had occurred more recently. The study, however, showed that both areas of pine – old and young – radically differ from the araucaria forests.

This is due to biotic conditions (the existence of plant species that caterpillars and butterflies can feed on is particularly important) and abiotic conditions (temperature and humidity): pine plantations – of any age – drastically alter these microclimatic conditions. In addition, the replacement of natural areas by forestry makes it impossible for some specialist species to occur and, thus, pine plantation areas present simplified communities, with low species variation.



Photo: Gustavo Diehl/UFRGS (Archive - Jan. 2020)

### Quality vs. Quantity

From November 2016 to March 2017, and from October 2017 to March 2018, researchers inserted 60 traps to attract frugivorous butterflies, from which 3,622 individuals from 40 species were identified.

The greatest recurrence was identified in the old pine sites, with 1,609 individuals (44.42%), distributed in 33 species, three of them unique to this vegetation type. Young pine sites contained 1,306 (36%) individuals, organized into 30 species, three of them exclusive. Finally, native forest sites had the lowest abundance among those studied, with 707 individuals (19.52%) in 20 species, with four exclusive species.

The fact that the ancient pine sites have a greater number of species than native forests, however, does not indicate better environmental health or conservation level, Helena emphasizes.

*"What really tells us something about this environment is the type and which species occur. Are the species associated with specific environments or common and poorly specialized species, which could occur 'anywhere'?"*

— Helena Romanowski

"Most species found in areas of ancient pines are 'opportunistic' and adapt to various types of habitats, even the drastically altered, adaptation which indicates the impact of these forests on fauna," adds the researcher.

### Species extinction

Results of the study demonstrate that, 70 years after the insertion of the non-native pine forest, some species of frugivorous butterflies were unable to remain in these habitats, unlike what was observed in the preserved native forests. Along with this loss, some species of butterflies specialized in pastures were declared extinct 20 years after the start of pine planting.

Helena points out that pine plantation causes two serious problems. The first is that when the leaves of this plant fall, they release a substance called allelochemicals into the soil, inhibiting the growth of other types of vegetation around. And the second problem is the ease of proliferation of this tree, since, because of the pine cone (its germinal medium), the sprouts are spread by the wind, invading the surrounding areas.

With new mosaics of non-native forests replacing previous models, new ecosystems emerge due to these actions. The researchers also argue that carrying out more analyses and collecting different samples from these regions is crucial, since the Atlantic Forest plays a role of great importance in the conservation of biodiversity.

They also recommend that, in addition to an agenda of restoration practices of native fields, more sustainable attitudes are also created for the development of forestry, through native tree species in already degraded forest sites, with the intention of conserving biodiversity.

Translated into English by **Aléxia Souza da Silva**, undergraduate student enrolled in the course "Supervised Translation Training II (English)" of the Undergraduate Program in Language and Literature, under the supervision and translation revision of Professor Elizamari R. Becker (P.h.D.).

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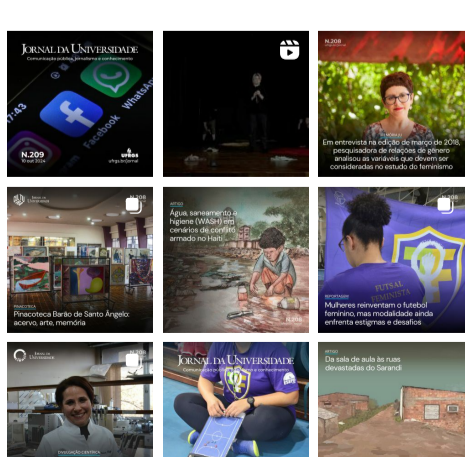
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