

Insect communities and ecosystem processes in fragmented Chaco Forests: summarizing 20 years of studies in Central Argentina

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INTRODUCTION

- Habitat loss and fragmentation are landscape transformations with profound impacts on insect biodiversity and ecosystem services.
- In the Neotropics, the Chaco forest is one of the largest phytogeographic regions and has suffered critical deforestation rates in recent decades (Fig. 1).
- For 20 years, we studied the impact of habitat loss and edge effects on insect communities in Córdoba, Argentina, and the interaction between forests and adjacent crops.

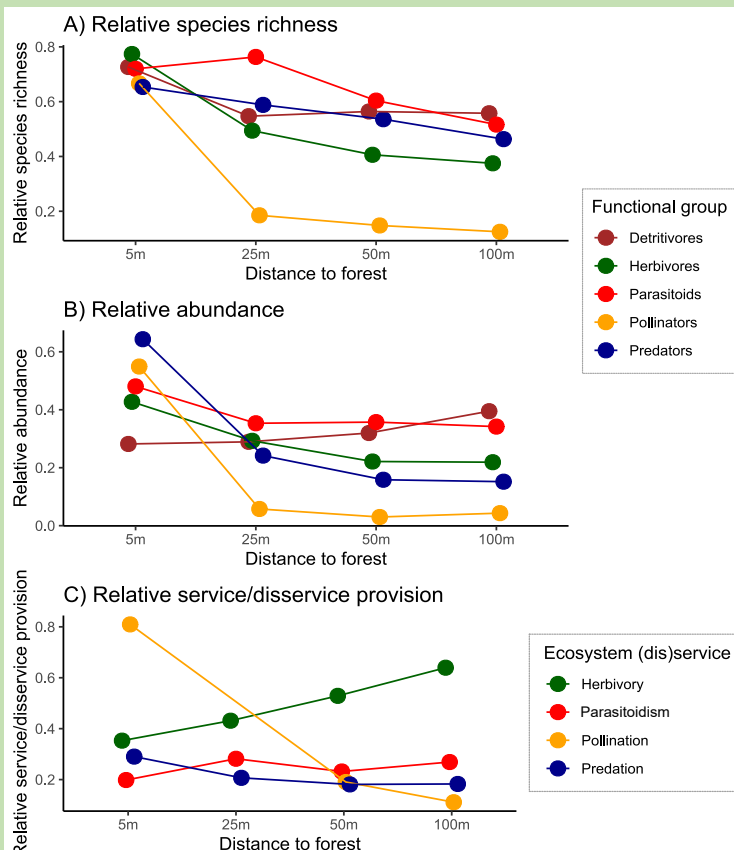


METHODS

- Here, we review 25 studies on the influence of fragment area, forest cover, and edge habitats on different insect functional groups and ecological processes in fragmented Chaco.
- We used several types of traps and active samplings to collect herbivores, predators, parasitoids, pollinators and ground-dwelling insects.
- Ecosystem processes were quantified using decomposition bags, herbivory measurements, artificial prey and sentinel eggs (Fig. 2).
- Movement at the forest edge was measured with flight interception traps and insects and ecosystem processes were sampled within crop fields (soybean and maize) at several distances from the edge.

RESULTS

- Small fragments and landscapes with low proportions of forest cover were generally linked to impoverished insect communities across most functional groups (Fig. 3).
- Fragment area reductions negatively affected above-ground processes such as herbivory and parasitoidism, whereas leaf litter decomposition was not affected.
- Edge effects were variable, favouring some insect groups (i.e., ground-dwelling arthropods and parasitoids) and parasitoidism rates.
- More than 5000 individuals from up to 250 species moved in a 0.6 m² window throughout one week between forests and crops.
- Both insects and ecosystem service provision increased near the forest (Fig. 4).



	Fragment area	Forest cover	Edge effects
Detritivores / Ground-dwelling 			+ =
Herbivores 			= - +
Parasitoids 			+
Predators 			+ =
Pollinators 			= +

CONCLUSIONS

- Fragmentation of Chaco forests has clear implications for insect conservation and ecosystem service provision.
- Maintaining forest remnants and promoting native forest plantations should be prioritized to guarantee insect biodiversity.

