

# Ecosystem services and disservices of ants in subsistence farming (Limpopo Province): an experimental approach in mango orchards.

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## ABSTRACT

Subsistence farming increases food security in households by improving human nutrition and cushioning against food price inflation. The mango is a particularly nutritious fruit cultivated and consumed in the Limpopo region, and insect communities may contribute by increasing its quality and productivity by means of pest control and pollination. Ants often dominate invertebrate assemblages in these orchards and the transformation of natural vegetation in and around agricultural production landscapes could lead to the reduction of ecosystem services for subsistence farming.

This study evaluates the ecosystem services and disservices provided by ants in largely transformed vs. mainly natural landscapes. Ten orchards, five in a natural landscape and five in a transformed landscape, were set out in a subtropical region of southern Africa. In each orchard ants were excluded from six trees and six acted as control. Ant abundance was monitored, flower visitors observed and yield quantified. Causal relationships were explored using Generalized Linear Fixed Effects Models and Structural Equation Models. Increased land transformation led to a significant increase in ant abundance and richness, ant diversity had a significant negative impact on other flower visitor abundance and diversity. While other flower visitor diversity had a significant positive effect on yield, mango fruits had significantly more fungal contamination in trees where ants were excluded.

Ants therefore provided both services (pest control) and disservices (decreased flower visitor diversity) which were mediated by levels of transformation in the landscape. This has important implications for crop yield on small holder farms.

**Keywords:** Ants, ecosystem services, pollination, flower visitors, pests, *Mangifera indica*, yield, farms, Thohoyandou.