

Floristic composition and structure of vegetation under isolated trees in neotropical pastures

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Abstract. Large isolated trees are a common feature of the agricultural landscape in humid tropical regions originally covered by rain forest. These isolated trees are primarily used as a source of shade for cattle and people. 13 pastures (totaling ca. 80 ha) currently used as cattle pasture were studied. In them, we registered 265 isolated trees belonging to 57 species. 50 trees of the most frequent species (*Ficus* spp. $n = 30$ and *Nectandra ambigens* $n = 20$) were selected to examine the influence of isolated trees on floristic composition and vegetation structure in the pastures. At each tree, three 4-m² quadrats were sampled: under the canopy, directly under the canopy perimeter, and beyond the canopy in the open pasture. Under-canopy vegetation was structurally and floristically different from the other two sampling sites. Mean species richness per quadrat was significantly higher under the canopy (17.8 ± 4.3 SD) than at the canopy perimeter (11.2 ± 3.4) and in the open pasture (10.6 ± 3.6) sites. Stem density was higher at under-canopy sites, where greater proportions of endozoochorous and rain-forest species were found. Isolated trees function as nursery plants for rain-forest species by facilitating the establishment of zoochorous species whose seeds are deposited under the tree canopies by frugivorous birds or bats. Our results imply that isolated trees may play a major role in seed dispersal and establishment of native species, which is of consequence for the preservation of rain-forest species in these fragmented landscapes.

Keywords: Endozoochory; Fragmentation; Los Tuxtlas; Rain forest; Seedling establishment; Veracruz.

Abbreviations: TRF = Tropical rain forest.

Nomenclature: Ibarra-Manríquez & Sinaca (1987); Gómez-Pompa & Sosa (1991).

Introduction

The extent of the tropical rain forest (TRF) diminishes every year at a very high rate (Grainger 1983). The forest is cut primarily to provide land for agriculture and cattle raising; the latter form of land use has become

very wide-spread in humid tropical regions of Mexico and the neotropics in general (Szekely & Restrepo 1988; Toledo 1989).

TRF clearing has created a complex fragmented landscape. TRF fragments of varying size are surrounded by pastures and fields. These landscape components are found side by side and constitute floristically and structurally distinct vegetation units. Arboreal elements within the pastures can be classified into two major groups: rain forest remnant trees (i.e. those in riparian corridors and scattered isolated trees belonging to the native TRF's upper canopy and purposely left uncut), and planted trees, i.e. those forming living fences (Sauer 1979) and hedgerows. These arboreal elements, which are all part of agricultural and/or cattle ranching practices (Guevara 1986), interrupt the homogeneity of pastures, increasing both their species richness and structural complexity.

This spatial pattern of vegetation resulting from TRF fragmentation, and especially the presence of arboreal elements within the pastures, influences many ecological processes: movement of animals, persistence of organisms and ecosystem processes, e.g. redistribution of nutrients, primary production, decomposition and evapotranspiration (Turner 1989).

The shaded area under the canopy of isolated trees may be a favourable microsite for the establishment of woody species in pastures. Also, isolated trees may operate as sites for a concentrated seed rain. Guevara, Purata & van der Maarel (1986) suggested that these seeds may be deposited primarily by frugivorous birds and bats.

The objectives of this study were to: (1) analyse species composition and vegetation structure in tropical pastures currently used for cattle grazing, while comparing the vegetation under the canopy of isolated trees with that of the open pasture, and (2) to examine possible causes of vegetation differences.