Cause and Consequences of Natural and Anthropogene Mangrove Forest Variability

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Under natural conditions, the feed-back between currents, vegetation density, erosion and siltation pattern maintains an optimum mangrove ecosystem. In disturbed areas, for instance from land reclamation, siltation of the swamp increases, reducing the tidal asymmetry. This in turn causes the swamp to dry up at low tide, often followed by death of mangrove vegetation. In northern Brazil most important anthropogene alteration of mangrove ecosystems consists in linking urban centers with fishermen villages. For the construction of the PA 458 road linking the city of Bragança with the fishermen village Ajuruteua, a dam was built across the mangrove peninsula, inhibiting tidal inundation at large scale. As dead tree trunks indicate, this disturbance has caused the degradation of more than 200 ha of highly structured Avicennia germinans forest with a former stand density of about 910 trees per 0.1 ha. Today stand density is of only 15 young A. germinans and Laguncularia racemosa plants per 0.1 ha, increasing siltation and elevated soil salinity (maximum value of 137) hindering the mangrove recruitment.

Pest and Disease Incidence in Agroforestry Systems of the Brazilian Central Amazon

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Agroforestry systems are considered a sustainable alternative production system for small farmers. There is much speculation about the beneficial effects of this technique with respect to the reduction of crop diseases and pests, but few detailed studies have been carried out to substantiate these claims. It is believed that the mixture of different plant species in agroforestry systems could reduce the incidence of pests and diseases because non-host plants can serve as barriers to their dissemination and can create favorable conditions to attract natural enemies of pests. This hypothesis is valid in tropical forests where a very high plant diversity entrains very small densities of plant individuals per species.

However, the species choice in agroforestry systems is determined by economic considerations and the number of species is much smaller. In central Amazonia, a high incidence of air-born pest and pathogen species is observed, independently of the number of plant species or of their position within agroforestry systems. These include the pests Hypsipyla grandella (the shoot borer of *Swietenia macrophylla, Carapa guianensis* and *Cedrela odorata*) and *Toxoptera citricidus* (attacking the leaves of orange trees) as well as the pathogens *Crinipellis perniciosa* (withches' broom of cocoa and cupuaçu trees), *Corticium salmonicolor* (pink disease of orange and cupuaçu trees), *Thanatephorus cucumeris* (target leaf spot of rubber, orange and mahogany trees), *Sclerotium coffeicola* and *Pellicularia koleroga* (affecting tens of plant species). In central Amazonia there are no examples of pests or diseases whose incidence is reduced in agroforestry systems.