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Pollination Biology

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Floral biology and pollination of an agroforestry palm, *Mauritia flexuosa*: why field observations are not enough!

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The palm family (Arecaceae) plays a pivotal role in tropical ecology and economies. Although palms were originally thought to be wind-pollinated, recent research has shifted this paradigm to entomophily. Understanding the pollination ecology of palms has implications for agroforestry and conservation. Harvesters must know the timing of flowering and pollination system to harvest fruits sustainably. Likewise, conservation programs should understand the reproductive patterns of native plants to manage native habitats effectively.
Alexander von Humboldt appropriately referred to the dioecious palm, *Mauritia flexuosa* L.f. as the *tree of life* because of its profound role in the economy and culture of the Amazon. Today, Amazonian communities continue to harvest *M. flexuosa* (*buriti* in Brazil) fruits for local consumption. Given its unmatched beta-carotene levels, *buriti* is now used by international cosmetic and pharmaceutical corporations, and its oil is the topic of research for biodiesel. Despite its importance as a non-timber forest product, little is known about its reproductive ecology. This study investigates the floral biology, phenology, and pollination system of *M. flexuosa* in the state of Roraima, northern Brazilian Amazonia. From 2009-2011 we conducted phenological observations, diurnal and nocturnal visitor watches, visitor-exclusion and anemophily experiments in three habitats: 1) native savanna; 2) native forest;and 3) native savanna converted to large-scale plantations of the exotic tree, *Acacia mangium*.
Staminate inflorescences bear up to 200,000 flowers, while pistillate inflorescences typically bear fewer than 3,000 flowers. Male flowers are smaller than female flowers and produce copious amounts of dry pollen. Female flowers have a dry stigma, and produce neither nectar, nor any other reward. Both staminate and pistillate flowers produce a sweet fragrance, much stronger in the former. Contrary to previous assumptions of cantharophily, our results suggest that this palm is anemophilous. Twelve morphotypes of Coleoptera and Heteroptera were found in pistillate flowers. However, no conspecific pollen was found on their bodies (or alcohol vials in which they were stored). Moreover, a significant number of Vaseline-covered slides hung from female inflorescences contained conspecific pollen. We make the following conclusions: 1) the wind transports pollen from male individuals to female individuals; 2) floral visitors collect pollen from male flowers, but do not effectively pollinate female flowers; and 3) pollination studies in the future should combine field observations and experiments with laboratory analyses to distinguish floral visitors from pollinators.

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