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Dramatic Fruit Fall of Peach Palm in Subsistence Agriculture in Colombia: Epidemiology, Cause and Control

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Abstract

The fruits of *Bactris gasipaes* (B.g.) are the main cash-crop of the South Pacific mangrove coast of Colombia, which encompasses a 250 km long and 60 km wide region with the rivers Cajambre, Yurumanguí, Naya, Micay, Saija and Bubuey, with a yearly rainfall of 5,262 mm in the estuaries increasing to 18,784 mm at river heads. Rainfall and tides cause inundation of the river banks and low luminosity, limiting crops to taro *Colocasia esculenta*, B.g., plantain, low-sugar sugarcane, borojó (*Borojoa patinoi*) and coconut. The 20,000 inhabitants subsist on 5 ha agro-forestry sites at river banks. Transport in the region is only by boat taking up to 3 days to Buenaventura with access to inland markets.

The stems of up to 20 m high B.g. have 4-5 cm long hard spines and produce twice yearly 1-2 fruit bunches each with up to 70 highly valued fruits enduring storage and transport to Buenaventura. Fruit abscission started in mid 1980s in the central coast and invaded the south region in 1990s with 100 % abscission reducing cash income from US\$ 400/year to less than US\$ 100. Investigation of fruit fall was difficult because assessing fruits on palms was impossible until a climbing device was developed. Fruit abscission follows pollination of the inflorescence involving approximately 11 insect species. No pathogens were detected on B.g. palms and fruits, but small apodous larvae were present on fruits fallen to the ground. Larvae in attached fruits were from 2 tiny weevil species of the subfamily Baridinae (1) *Parisochoenus* sp. with 2 mm length and (2) a weevil of 2.5 - 3.6 mm length identified as a new species *Palmelampus heinrichi* sp. nov. O’Brien. Assays on B.g. fruit abscission with 11 variants and 30 repetitions were performed in the lower, middle, and high part of the rivers and included nutrient supply, contact-insecticides, stem injected systemic-insecticides, fruit-protection with 0.5 mm mesh bags and insecticide impregnated polyethylene bags. The 2 last methods significantly reduced fruit abscission. A further trial included bagging of inflorescence at different times after aperture, application of insecticides prior to bagging and also trials on the effect of different net bag designs and shaking of inflorescence instead of killing weevils with insecticides prior to bagging.

Keywords: Agroforestry, *Bactris gasipaes*, Colombia, fruit fall, IPM, peach palm, weevils