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MANAGEMENT OF INFLORESCENCES AÇAÍ PALM (*EUTERPE OLERACEA* MART.) IN THE AMAZON RIVER ESTUARY

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ABSTRACT – An experiment of açaí palm management was established in the Combu Island, Acará country, Pará State, Brazil, with the objective of verifying the influence of inflorescence removal on fruit production. The management stimulates the emergence of new inflorescences, but not influencied in increase the fruit production.

KEY WORDS: *Euterpe oleracea*, Management, Inflorescence.

*RESUMO – Implantou-se na Ilha do Combu, município de Acará (PA) um experimento sobre manejo do açaizeiro (*Euterpe oleracea *Mart.) com remoção de inflorescências no período de julho de 1990 a maio de 1992, procurando verificar sua influência na produção de frutos por estipe. Constatou-se que este manejo estimulou o aparecimento de novas inflorescências, porém não influenciou no aumento da produção de frutos.*

PALAVRAS-CHAVE: *Euterpe oleracea*, Manejo, Inflorescência.

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INTRODUCTION

Fruits of the açaí palm (*Euterpe oleracea* Mart.) are an important food in the floodplain of the Amazon River estuary. In Belém, Pará, the region's major city, more than 100,000 liters of a beverage made from açaí fruits are consumed daily during the açaí season.

For rural residents of the estuarine floodplain (ribeirinhos), açaí is both their economic mainstay and their most valued food source. A study on Combu Island near Belém showed that an average family earned more than 80% of its annual income from the commercialization of açaí fruits (Anderson 1989; Anderson & Ioris 1991). This income is not well distributed, as the bulk of the açaí harvest occurs during the dry season, between the months of July and October. During the rainy season, ripe açaí fruits are scarce enough that many riverine households cannot find sufficient quantities to meet their subsistence needs. In the cities, the rainy season açaí price is two to three times greater than the price during the dry season.

Therefore, for both economic and subsistence reasons, floodplain producers are keenly interested in finding ways to manipulate the fruiting cycle of the açaí palm. Ribeirinho lore is replete with hypotheses and observations on açaí natural history. From this wealth of knowledge we borrowed the idea of altering the palm's fruiting pattern by pruning its inflorescences. Oral accounts of this technique related that açaí can be "trained" to fruit in the rainy season by removing its inflorescences until the cessation of winter rains in June.

MATERIALS AND METHODS

This study was conducted in the Combu Island, 1,5 km South of Belém, Pará, Brazil. Combu receives an average of 2.500 mm of

rainfall each year. Temperatures average 32° C and the relative humidity rarely falls below 90%. Combu is a low-lying island perched a few meters above sea level. During the rainy season, the island is covered with tidally-driven freshwater floods. The açaí palm is both ecologically and economically the most important plant species on the island (Jardim 1991).

The açaí stand in which the study was carried out regenerated after being harvested for palm heart in 1976. Twenty açaí clumps in the stand were randomly assigned to either the control or inflorescence removal treatment groups. For the treated palms, all inflorescences were pruned starting in mid-February and continuing until June. A total of 28 inflorescences were removed in 1990, 35 in 1991, and 39 in 1992. Palms included in the experiment were observed bi-weekly from February 1990, until August 1992. Ripe fruit bunches were pruned by hand, weighed, stripped and then weighed again to determine their net fruit yield.

RESULTS AND DISCUSSIONS

Four principal effects of inflorescence removal were observed. Palms which had inflorescences removed developed more inflorescences during the period August-October than palms in the control group (Figure 1). In 1990-1991, the treated palms produced a total of 21 inflorescences during August-October, or 26% of the inflorescences which emerged during the flowering season. For 1990-1991, no inflorescences were developed during August-October by untreated palms. For 1991-1992, untreated palms produced 7 inflorescences from August-October, or 12% of the inflorescences developed that season.

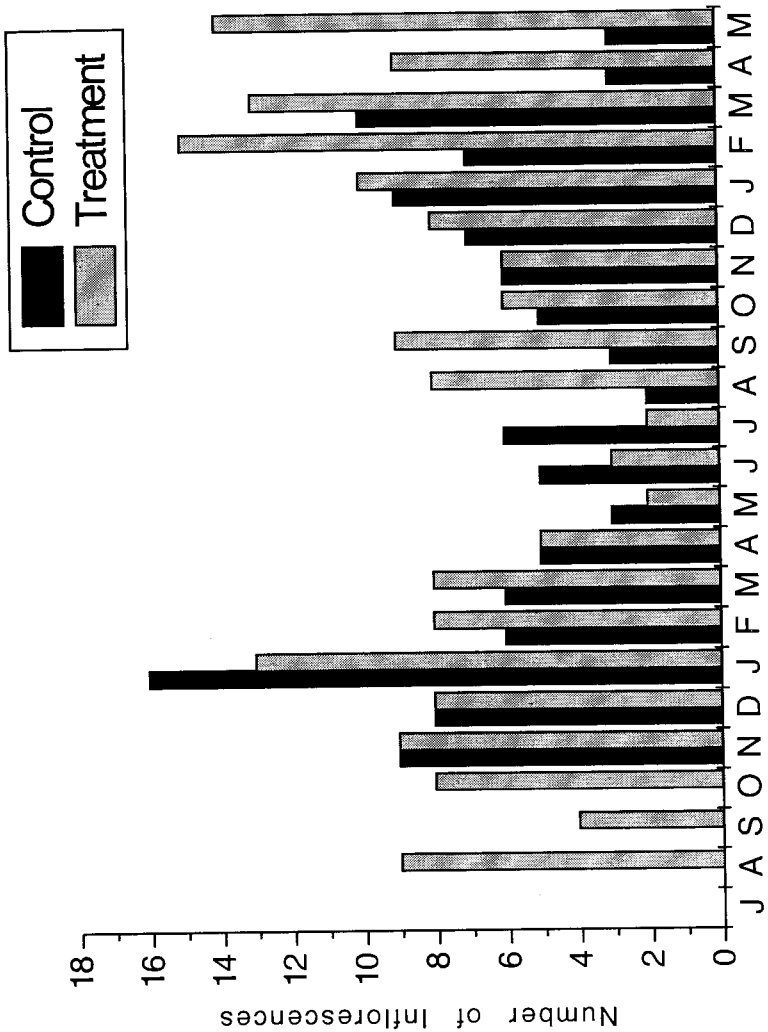

Figura 1 - Number of inflorescences produced monthly between July/1990 and May/1992 as a result of experimental management of açaí palm (*Euterpe oleracea* Mart.) on Combu Island, Acará Country, Pará State, Brazil.

The second effect of treatment was to increase the total number of inflorescences produced. During the 1990-1991 flowering season, treated palms developed 81 inflorescences versus flowering season, treated palms produced 95 inflorescences, while untreated palms in the same period produced 57 inflorescences.

The third effect of treatment was to shift the timing of fruit production (Figure 2). In 1991, 40% of the fruits yielded by the treated palms, or 21,1 kg, were harvested before the start of the main açaí season in July. In 1992, the treated palms produced 67% (42.4 Kg) of their fruits May. For the control group, corresponding values for early fruit production were 5% (3,3 Kg) and 25% (29,9 Kg) in 1991 and 1992, respectively.

The final effect of treatment was to reduce the total by treated palms. In 1991, the treated palms produced 55.2 Kg of fruit, while the untreated group yielded 68.7 Kg, while in 1992 the treated palms produced 62.9 Kg of fruits versus 117.9 Kg for the untreated palms.

The results reported here confirm accounts from informants that the fruiting cycle of the açaí palm can be partially controlled by removing inflorescences. However, according to informant's reports, inflorescence pruning shifts the flowering and fruiting cycles several months earlier than normal. Our findings indicate that the flowering and fruiting cycles are extended, not shifted. The primary effect of inflorescence pruning on flowering is to stimulate the production of extra inflorescences during the period August-October. From November until the cessation of flowering in April, the amount and timing of flower production by the two treatment groups was essentially the same.

The dissection of the açaí crown reveals a primordial flower bud in every leaf axil (Jardim & Anderson 1987) and palms in unmanaged

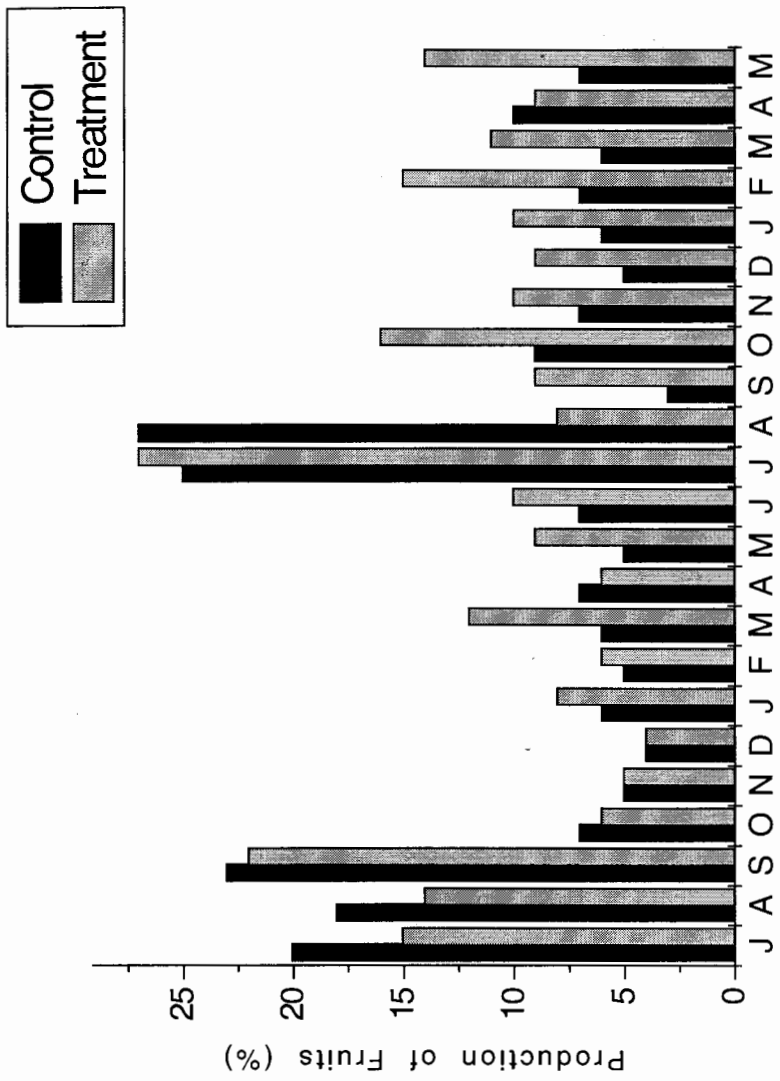

Figura 2 - Monthly production between July/1990 and May/1992 as a result of experimental management of açaí palm (*Euterpe oleracea* Mart.) on Combu Island, Acará Country, Pará State, Brazil.

forests on the Onças Island near Belém dehisced an average of 10.8 leaves per year, yet less than half of the interaxiliary buds developed into inflorescences. They hypothesized that the diversion of metabolites and temperature elevation to developing fruits bunches promoted the abortion of primordial inflorescences (Fisher & Moore 1977; Schroeder 1978). Results from this experiment provide support for their hypothesis since, when inflorescences are removed, resources that would otherwise be diverted to fruit production remain available for the development of extra flowers.

The production of early flowers does not guarantee the production of early fruits. Many inflorescences abort soon after flowering. This is especially true for inflorescences developed during the dry season. Long-time floodplain residents generally agree that açaí inflorescence abortion is commom when the dry season is severe. In this study, early fruit production by the treated palms in 1992 probably would have been greater if fewer inflorescences had aborted during the unusually intense 1991 dry season. Other factors may influence inflorescence abortion, including flooding, extended periods of cloud cover, and the efficacy of pollinators (Fisher & Moore 1977; Sist 1989).

Hamp (1991) found a strong correlation between açaí stem diameter and productivity. Informants report that thick-trunked açaí palms yield more and larger fruit bunches than slender palms, and are more likely to produce fruits out of season. Jardim & Rombold (1994) related to thinning appeared to enable the palms treated plots to set one more infrutescences than palms in untreated stands. Extra fruit production is most useful, and more valuable, when it occurs before the big dry season peak.

In practice, it is difficult to justify the labor investment required to climb each palm to remove inflorescences, and then forego production

during the later part of the fruiting season if the treated palms are stimulated to develop inflorescences which merely abort during the dry season. This technique could prove more consistent and productive by combining it with other treatments to maximize the physiological condition of each treated palm. Thinning has been shown to increase açaí fruit production (Pedersen & Balslev 1993); fertilization also may prove effective, although to date most fertilizer trails with açaí have been disappointing (Hamp 1991). A study where these treatments are tested separately and in combination may yield promising results. Additionally, palms selected for inflorescence pruning should be vigorous and growing on good quality sites. On Combu Island, the most productive açaí sites are located on the gentle levies (restingas) which border the many waterways. In the lower, semi-perennial swamps (igapos), lengthy periods of immersion delay flowering, fruiting and reduce total fruit production (Jardim 1991).

Even if optimal management practices are used, the removal of inflorescences will reduce total fruit yields. Nonetheless, this technique is still an attractive option for floodplain residents because rainy season is a time of scarcity and hardship in the estuary. Markets for cacau and rubber, two of the principal rainy season revenue sources, have degenerated. Floodplain residents consistently identify the need for more alternatives for wet season income and subsistence as one of their greatest priorities (Anderson & Ioris 1991; Jardim & Rombold 1994; Jardim 1996). Techniques which increase the availability of açaí for rainy season subsistence use will enhance the welfare of the rural estuarine residents. For income, açaí fruits can be commercialized during the rainy season if at least 15 kg can be collected per harvest. Results from this study indicate that forty treated palms could yield 1-3 harvests per month during the period from March-May. Even if more income could be made by not removing the palm's inflorescence and

allowing them to bear fruits normally, the marginal utility of each unit of income earned during the rainy season is high. It may be a prudent economic strategy for riverine households to alter the fruiting cycle of some of their palms to better distribute income.

CONCLUSIONS

The removal of açaí palm inflorescences from mid-February until June stimulated early açaí flower and fruit production on Combu Island. The treated palms produced more inflorescences than untreated palms, yet fewer fruits overall. The mechanism of the response of açaí to inflorescence removal has not been determined. However, it appears that removing inflorescences retains carbohydrate reserves that can be used for additional flowering. This technique is potentially attractive to floodplain residents for three reasons. First, it could provide additional food when resources are scarce. Second, açaí prices are higher during the rainy season than during the main harvest. Third, the usefulness of income earned during the rainy season exceeds its nominal value.

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CATASETUM CUCULLATUM, UMA NOVA ESPÉCIE DE ORCHIDACEAE PARA O ESTADO DO AMAZONAS, BRASIL[1]

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RESUMO – Uma nova espécie do gênero Catasetum *L.C. Rich. ex Kunth. (Orchidaceae - Catasetinae), subgênero* Orthocatasetum, *seção Anisoceras, coletada no Estado do Amazonas é descrita e ilustrada. A espécie é denominada* Catasetum cucullatum *e está relacionada com* Catasetum saccatum.

PALAVRAS-CHAVE: *Catasetum, Catasetinae,* Orchidaceae, Taxonomia Vegetal.

ABSTRACT – In this work a new species of Catasetum *(Orchidaceae, Catasetinae), from the Brazilian Amazonia, is described and illustrated. The species, named* Catasetum cucullatum, *belongs to subgenus* Orthocatasetum, *section Anisoceras, and is related to* Catasetum saccatum.

KEY WORDS: *Catasetum, Catasetinae,* Orchidaceae, Plant Taxonomy

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