The Palm Heart as a New Commercial Crop from Tropical America

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A stately species of the genus *Euterpe* is found throughout the once vast rain forests of Costa Rica. This palm, when mature, reaches the upper limits of the forest canopy, some 70 feet or more in the air. Its slender trunk, while only six to eight inches thick, supports a splendid crown of fronds, directly under which are produced clusters of small, single-seeded fruits (Fig. 1). Unfortunately, these palms contain a sweet tender heart, and before they reach a seed-producing size they are often felled to acquire this relatively small amount of edible "heart of palm." In fact, in areas of forest much traveled, as soon as these palms reach one inch in diameter, they become desirable in the eyes of the local inhabi-

1. Two sources of heart of palm, *Euterpe* to the left, *Bactris gasipaes* at the right.

2. *Bactris gasipaes* planted close together for harvesting.
4. The heart removed. More must be peeled to get to the part used for food.

San Vito de Java in the mountains of western Costa Rica, is attempting the experimental cropping of a substitute palm heart, the *pejibaye* or peach palm (*Bactris gasipaes*). Several rows of this species were planted in an attempt to demonstrate that this palm could serve as a domesticated substitute for the *Euterpe*, thereby reducing the traditional damage to the forest ecology. These palms become large enough to cut for their hearts in two and one-half to four years from seed, depending on the climate and location, and they yield up to three pounds of edible heart, substantially more than the *Euterpe* palm (Figs. 2-4). One additional commercial advantage to using the *pejibaye* palm heart is that it will not discolor after being cut, as does the wild product. The quality of the heart is excellent, having a crisp, nutty flavor. The peach palm is well known in Costa Rica as an impor-
Terminal (hapaxanthic) flowering is well known in the lepidocaryoid palms: all species of *Korthalsia*, *Plectocomia*, *Plecopteris*, *Myrialepis*, *Ancistrorrhaphium*, *Oncocalamus*, *Eletiolepis*, and *Eugeissona*, and apparently all species of *Raphia*, have this particular method of flowering in which axes develop through a vegetative phase and then pass into a flowering phase which terminates the growth of those axes. In *Metroxylon* all species but one flower hapaxanthically: *M. amicarum* (H. Wendl.) Becc., the exception, has pleonanthic flowering, the inflorescences being produced in the axes of the leaves until the axis dies of injury or old age. That the two effectively and markedly different methods of flowering can occur in the same genus has stimulated much speculation as to which flowering process is primitive and which advanced. Holtum (1955), Corner (1966), Hallé and Oldeman (1970), and Dransfield (1970) favour the idea that hapaxanthic flowering is basic whereas Moore (1969), at least in *Metroxylon*, and Moore and Uhl (1973), regard it as derived. Tomlinson and Moore (1968) regard the whole argument concerning which is primitive, hapaxanthic or pleonanthic, as being redundant. Like many evolutionary problems there are good arguments difficult to prove in favour of both views. Whatever the real answer may be, the situation is certainly an interesting one and it may be of importance to record the occurrence of hapaxanthy in a genus hitherto thought to be entirely pleonanthic.

Of the 115 species of *Daemonorops*, at least one species appears to have hapaxanthic flowering. This is *Daemonorops calcarpa* (Griff.) Mart., an acauceous forest undergrowth plant highly characteristic of forest border rivulets in nonswampy lowland and dipterocarp forest in the Malay Peninsula; in such a habitat it forms thickets often in association with *Calamus costatus* Griff. It also grows in N Sumatra in a small area of forest in Langkat Nature Reserve which is remarkable for the large number of plants of Malayan distribution apparently found elsewhere in Sumatra (e.g. *Calamus costatus*, *C. insignis* Griff., *Johanniastia mollis*, *Wesselia altifrons* (Reh. f. et Zoll.) H. E. Moore).

*Daemonorops calcarpa* produces pseudodacate suckering axes which derive more than 30 cm. tall and have large leaves often 3.5 m. tall with brown sheaths having conspicuous oblique combs of pale brown spines. The pinnae are regular, fine, and crowded, and sometimes the leaf blade is in a short vestigial cirrus. A clump contains six or more axes of varying age. An axis of *D. calcarpa* in flower has a marvellous appearance; a large kerry of flowers is found almost at ground level among the leaf bases. The flowering axis consists of very crowded internodes with short leaves ending in a vestigial cirrus and undulate, partially developed leaflets. These leaves become smaller and smaller distally. In the higher part of them are the inflorescences which are slightly shorter in size distally; the most distal ones are minute and contain no flowers. In all, about 25 inflorescences are produced from the axis, not apparently reaching any...