Vegetative Transformation of Inflorescences in *Socratea salazarii*

JEAN-CHRISTOPHE PINTAUD
IRD
Whimper 442 y Coruña
Ap. 17.12.857
Quito, Ecuador

AND

BETTY MILLAN
Herbario USM,
Museo de Historia Natural
Av. Arenales 1256
Lima 14, Perú

1. A young, sterile inflorescence of *Socratea salazarii* showing reduced, brown, scale-like prophyll and first peduncular bract.

An unusual transformation of inflorescences in *Socratea salazarii*, in which the inflorescence tips develop into stolons, is described for the first time.

Vegetative transformations of inflorescences occur relatively commonly in Monocotyledons. A well-known example is the production of bulbils on inflorescences of *Agave*, *Furcraea* or *Chlorophytum*; the production of bulbils represents an efficient mechanism of vegetative dispersal. Within palms, specialized inflorescences with vegetative functions occur in subfamily Calamoideae. The flagellum is a modified, sterile inflorescence acting as a climbing whip in some species of *Calamus*. A few species such as *Calamus pygmaeus* and a form of *Calamus nematospadix* from Sarawak (Dransfield 1992) produce vegetative shoots at the tip of long, flagelliform, fertile inflorescences, and if these reach the ground they can root and develop into new vegetative shoots. This sometimes also occurs in the massive acaulescent *Daemonorops ingens* (Dransfield 1997). In *Salacca flabellata* (Furtado 1949), the staminate inflorescences are very long and grow over the surface of the soil and then root at their tips and produce vegetative shoots. Elsewhere in the palm family, vegetative modifications of inflorescences are rare and abnormal. Oil palms (*Elaeis guineensis*) producing multiple heads originating from modified inflorescences occur sporadically in plantations. Moreover, vegetative development of inflorescence

2 (top) & 3 (below). Stolons developing from inflorescences.

tissues can be induced in vitro by growth hormones (Y. Duval, pers. comm.), a phenomenon suggesting that modified inflorescences can develop due to metabolic alterations. This may explain why such abnormal expression of characters is often limited to isolated individuals. While teaching a field course on palms for students of San Marcos University in the region of Iquitos and the lower Ucayali river, Peru, we serendipitously found a very peculiar, stoloniferous plant of *Socratea salazarii*, a species that is normally solitary.

We observed *Socratea salazarii* in Jenaro Herrera (Loreto, Peru), where it is abundant, with a density of more than 200 individuals (juveniles and adults) per hectare in forest on *tierra firme* (Kahn & Mejia 1991). It also occurs on hydromorphic soils in the area. Although *Socratea salazarii* is reported to be occasionally caespitose (Henderson 1990), we have seen only solitary individuals in Jenaro Herrera. A single plant showed, however, a very unusual morphology, producing stolons from inflorescences. The young inflorescences are externally similar to normal inflorescences (with peduncle, prophyll and peduncular bracts) although the bracts are reduced (Fig. 1), but the rachis is transformed into a vegetative shoot that promptly grows as a thin, flexuous stem with elongated internodes and reduced leaves (Fig. 2 & 3). When the stolon reaches the ground, it produces adventitious roots and then grows vertically, establishing a new stem (Fig. 4). Although this process seems very abnormal and exceptional in this species, it looks like a highly evolved adaptation, not very different from the flagelliform rooting inflorescences found in the Calamoid palms mentioned above, and very efficient in establishing a clonal individual (Fig. 5).

This behavior may be related to the inherent vegetative plasticity of species belonging to the Iriarteeae tribe, in relation to the generalized ability of producing stilt roots on any part of the trunk (Bodley & Benson 1980 and Fig. 6). The tribe does include stoloniferous species (*Iriartella* spp., *Wettinia drudei*), but this process derives from the common caespitose habit and is unrelated to the production of inflorescences. The atypical specimen of *Socratea salazarii* encountered is still juvenile and so far has just established its first stolon in the ground. The production of these unusual inflorescences occurs at only 1 or 2 m above ground, a height at which this species does not normally produce inflorescences. It would be interesting to see if this plant produces functional

4. An inflorescence stolon established in the ground.

5 (above). A trunk of *Socratea salazarii* showing a double cone of stilt roots, indicating the ability of the plant to produce roots on various parts of the trunk. 6 (right). View of the stoloniferous *Socratea salazarii*.

fertile inflorescences when it reaches the adult size.

Acknowledgments

We are grateful to IIAP (Instituto de Investigación de la Amazonia Peruana) for providing working facilities at Jenaro Herrera Research Station and especially to Kember Mejia for sharing with us his knowledge on Peruvian palms. We also thank Dr. José Gomez of San Marcos University for his continuous support for the palm field course at the Post-graduate Unit. We are indebted to Yves Duval (IRD) and to John Dransfield (RBG Kew) for their information on the physiology of palm organogenesis and on Calamoid morphology, respectively.

LITERATURE CITED

BODLEY, J.H. AND F.C. BENSON. 1980. Stilt-root walking by an Iriarteoid palm in the Peruvian Amazon. Biotropica 12(1): 67 –71.

DRANSFIELD, J. 1992. The rattans of Sarawak. RBG Kew, UK and Sarawak Forest Dept., Malaysia.

DRANSFIELD, J. 1997: The Rattans of Brunei Darussalam. Forestry Department, Brunei Darussalam

FURTADO, C.X. 1949. Palmae Malesicae X. The Malayan species of *Salacca*. Gard. Bull. Singapore 12: 378–403.

HENDERSON, A.J. 1990. Arecaceae. Part I. Introduction and the Iriarteinae. Flora Neotropica Monograph 53. The New York Botanical Garden, NY, USA.

KAHN, F. AND K. MEJIA. 1991. The palm communities of two “Terra Firme” forests in Peruvian Amazonia. Principes 35: 22–26.