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Pollination and Floral Biology in Five Species of the Family Annonaceae in French Guiana

By

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Five *Annonaceae* species, two species of *Anaxagorea* and two of *Duquetia* and the species *Unonopsis stipitata*, were observed in an undisturbed primary lowland forest in French Guiana. Four species show cantharophily, the common pollination syndrome in the family *Annonaceae* (GOTTSBERGER 1999); *U. stipitata* is pollinated by bees (see also CARVALHO & WEBBER 2000). All species are small trees with a height from 4.5 to 7.5 meters. The flower size varies from small (e.g. *U. stipitata*, flower length 0.7 cm and 3 cm in diameter) to large (e.g. *D. eximia* 4 cm flower length to 3 cm in diameter). Number of flowers during their flowering period differs in a wide range, one tree of *A. prinoides* produces 140 flowers, whereas *A. dolichocarpa* produces only 7 flowers per anthesis. Four of the 5 species bear their flowers on branches or on the main trunk, exceptionally, *D. cadaverica* presents their flowers on long flagelliform twigs along the ground. These twigs are mostly inserted on the base of the stem and grow in various directions up to 2.5 m far from the stem. Flowers of all species have a diurnal protogynous anthesis. The five species have more or less the same flower anatomy; in the centre a high number of carpels, surrounded by numerous stamens, both in helicoidal position. Duration of anthesis was from a few hours up to two days, whereas all species finished anthesis by dropping of the petals. During anthesis the cantharophilous *Anaxagorea* and *Duquetia* species build a so called pollination chamber by closing the petals over their reproductive organs. The flowers of *U. stipitata* do not form a pollination chamber, they remain open during their whole anthesis.

The flowers of both *Anaxagorea* species emit a fruity odor, dominated by fatty acid derivates and can be described as pineapple like (*A. dolicho-*

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carpa) and banana like (*A. prinoides*). The odor of *D. eximia* is fruity, in contrast, *D. cadaverica* which has an unpleasant odor, rich in alcohol and sulphur-containing volatiles. The species with flowers having a fruity or unpleasant scent attract small beetles of the family Nitidulidae, which act as pollinators. Up to 25 beetles can be found in one flower. The beetles spend the whole anthesis inside the pollination chamber. When the flower changes from pistillate to the staminate stage the anthers shed pollen, the petals detach, and the beetles, covered with pollen, fall to the ground or may fly to other flowers in pistillate stage.

In the population of *A. prinoides*, anthesis did not occur synchronously. While one part of the individuals was in the staminate stage, the others were in the pistillate stage. The flowers of each phenotype started with their pistillate stage half an hour before the others released the beetles. Thus the inbreeding is limited to a minimum. This so called heterodichogamy is known from several other plant taxa (see also RENNER 2001).

Unonopsis stipitata differs considerably from the other species. The flowers do not form a pollination chamber, they remain open during their whole anthesis and are visited by males of two different euglossine bee species. The pistillate- and staminate-staged flowers attract the bees by a mint-like scent, which is produced by osmophores in the petals. The main compounds of the scent are monoterpenes which are well known as being attractive to male euglossine bees.

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