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TIPS FOR SUCCESSFUL CROSSES IN THE MIRACLE PLANT

Synsepalum dulcificum (Schumach & Thonn.) Daniell

Background

The miracle plant *Synsepalum dulcificum* (Schumach & Thonn.) Daniell, also known as *Richardella dulcifica* (Schumach & Thonn.) Baehni is a West African native fruit species. It belongs to the Sapotaceae, a family with roughly forty genera and 800 species. *Synsepalum dulcificum* is the most famous species of its genus owing to its fruits “the miracle berry” known as the unique natural source of miraculin, a taste modifying glycoprotein. The sweetening property of the miracle berry placed the species as one of the most valuable and promising species in the Sapotaceae family. The species is a good source of antioxidants and has numerous applications in food and beverages, and pharmaceutical industries.



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Overview on the flower development

Various flower and fruit developmental stages can be simultaneously observed on a plant of *S. dulcificum* (Fig 1). With the indeterminate growth of the species, floral buds are produced continuously when conditions are optimal.

There are three main stages in the phenological evolution towards fruiting in the species: budding, flowering and fruiting.

Fig 1. Plant of *Synsepalum dulcificum* in full flowering and fructification



• Budding and flowering

The budding and the flowering are each split into three different secondary stages (Fig 2).

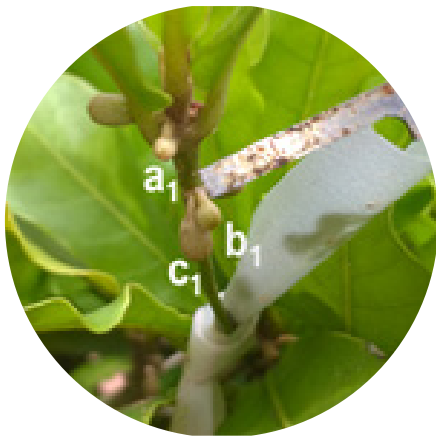


Fig 2. *From budding to flowering:* (a₁) calyx formation; (b₁) peduncle elongation and flower bud enlargement; (c₁) calyx color change from yellow-green to brown; (a₂) : elongation of petals, style and stamens; (b₂) flower blooming ; (c₂) senescence

• Fruiting

The fruiting is initiated just after the full senescence of the flower, following the fertilization and ended by the full ripening.

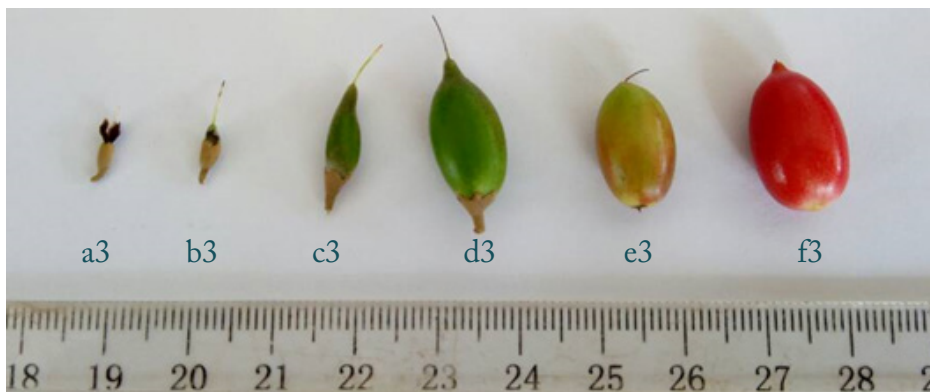


Fig 3. (a₃) Style color shift from white to black; (b₃) Developing and enlarging ovary; (c₃) Ovary elongation, filling and visible shaped fruit with a multicoloured style; (d₃) Developed fruit with black unicolored style; (e₃) Ripening onset; (f₃) Full ripening.

Step1. "Flower selection"

The emasculation is done at stage a_2 and consists in removing stamens or anthers (Fig 4).



Fig 4. Emasculation

Step2. "Pollen harvest"

The pollen is harvested at stage b_2 . The flower is cautiously shaken and the dust pollen is collected in a tube (Fig 5). The operation can be facilitated using an electric brush to make the flower vibrate for the pollen collecting.

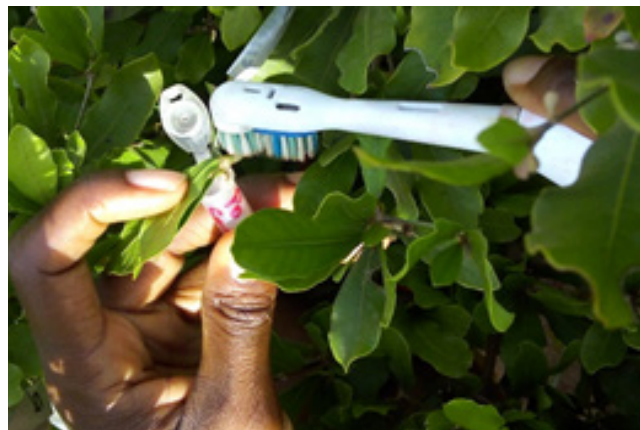


Fig 5. Pollen harvest using electric brush

Step4. "Flower protection"

The pollinated flowers has to be protected automatically after the pollination operation using a small sized covering bag. This should prevent eventual arrival of other unwanted pollen of even the removal of deposited pollen by wind (Fig 7). Three to seven days after the pollination, remove the covering bag to allow aeration and fully development of the ovary.



Fig 7. Flower protection

Step3. "Pollination"

The pollination consists in spraying/depositing the pollen on the style of the emasculated flower.



Fig 6. Pollination



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