Primary Observation of Precocious Flowering in *Balanites aegyptiaca* (L.) Del

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SUMMARY

The flowering cycle of *Balanites aegyptiaca* in the wild normally commences at 5–7 years. Under greenhouse conditions, 1-year-old cloned material, and ca. 2–3-year-old seed-derived stock plants were observed to flower. Precocious flowering is an important development in the breeding and improvement of this species.

RÉSUMÉ

A l'état de nature *Balanites aegyptica* commence normalement à fleurir dès l'âge de 5 à 7 ans. En serre, on a vu fleurir de la matière clonale âgée d'un an et des plantes normales dérivées de graines âgées de 2 à 3 ans. La floraison précoce constitue un développement important en ce qui concerne la reproduction et l'amélioration de cette essence.

RESUMEN

La floración de *Balanites aegyptiaca* en la naturaleza comienza, generalmente, a los 5–7 años. Se ha observado floración en clones de un año y plantas de 2–3 años derivadas de semillas, en condiciones de invernadero. La floración precoz constituye un importante desarrollo en la reproducción y la mejora de esta especie.

INTRODUCTION

Balanites aegyptiaca (L.) Del. (Balanitaceae) is an important multipurpose hardwood tree of the arid and semi-arid lands of Africa. The architectural model is that of Champagnat (Hallé *et al*., 1978), with homogenous axes. Phyllotaxy is spiral. Each axis is initially orthotropic but the distal section becomes secondarily pendulous under its own weight and renewal axes arise on the upper surface of the bend. The species has been heralded as a 'seed of hope in the desert' (IAD, 1987) and has been fully described in a recent monograph (Hall and Walker, 1990). It is used for food (leaves, fruit, gum and nut); forage; timber; fuelwood, and as a source of important chemical extracts such as precursors of steroid drugs, molluscicides (relevant in the control of schistosomiasis) and fish poisons. The tree is found in the Sahel and the northernmost Sudan savanna zone of West Africa and Sudan – White's (1983) 'Sahel regional transition zone'. It grows on a wide variety of soils including difficult clay soils (vertisols) where in the short rainy season, periods of inundation are experienced, and there is severe cracking in the dry season.

The genetic resources of *B. aegyptiaca* are in danger of depletion due to destruction of habitat and over-exploitation of the species within its existing range. It is imperative, therefore, to conserve, develop and utilize existing germplasm.

Like many tropical perennial crop plants *B. aegyptiaca* does not come into flower until between 5 and 7 years of age in the wild (Maydell, 1986). Reducing the generation time may be a means of increasing the rate of genetic gain. The incidence of precocious flowering is, therefore, an important development in the genetic improvement programme of the species.

MATERIALS AND OBSERVATIONS

In May 1989, semi-hardwood stem cuttings were successfully rooted using 14 to 23 month old stock plants of *B. aegyptiaca* from the Kitui region of Kenya (Mbah, 1989). Rooted cutting material was potted up into 7.5cm pots containing the loam based compost, John Innes no. 1. The clonal material grew architecturally in a manner comparable with seedling material.

At one year of age in May 1950, approximately 10% of the cloned material developed flower buds (Figure 1). The inflorescences arose in place of the supra-axillary thorns (essentially modified shoots), and occurred on both the orthotropic (proximal) and pendulous sections of the axes.

Two months after this, flowering was also observed on

FIGURE 1. *Inflorescences on 1-year-old rooted cutting material of* Balanites aegyptiaca. *Open flowers are approximately 8mm–10mm across.*

3 out of the 21 seed-derived stock plants (now 2 years 4 months and 3 years 1 month old). These stock plants had been grown almost continuously (i.e. no induced dormant period) at temperatures of approximately 20°C at night and 30°C during the day with 16 hours supplementary lighting per day. Copious watering and a regular supply of nutrients by liquid feeding ensured good growth (2m–3m high at 3 years) despite the plants being in a relatively small amount of soil in 7.5l and 10l pots. Root restriction may have been the factor responsible for flower induction.

B. aegyptiaca has demonstrated an ability to produce flowers under greenhouse conditions after a relatively short time from seed germination and rooting of cuttings. To utilize this observation in breeding programmes it is essential to devise standard methods for greater and more predictable flower induction. The use of various growth regulating chemicals is being explored.

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