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Post-harvest behaviour and short- to medium-term storage of recalcitrant seeds and encapsulated embryonic axes of selected amaryllid species

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Summary

This study determined the appropriate conditions for the short- to medium-term storage of the seed germplasm of selected Amaryllidaceae species. Seeds were stored 'open' (in loosely folded brown paper bags which were enclosed in open plastic packets), and 'hydrated' at 6, 16 and 25°C. The seeds of all species were shed at high axis water contents (2.60 ± 0.16 to 6.94 ± 0.93 g g^{-1}, dmb) and were not amenable to open- or hydrated-storage at 16 and 25°C (since they germinated in storage within 30 days), suggesting non-orthodox seed behaviour. Hydrated-storage at 6°C extended storage longevity but seed viability declined progressively with storage time. The distribution of fungal contaminants across different seed tissues in freshly harvested and stored (hydrated for 90 days) seeds were assessed using fluorescence microscopy. The excision of the embryonic axes from the endosperm (the source of fungal inoculum) and subsequent encapsulation in calcium alginate beads (synseeds), with and without abscisic acid incorporated, was more effective in limiting fungal proliferation and increasing hydrated-storage longevity (at 6°C) than storage of fungicide-treated seeds. Species within the same family can exhibit commonalities in terms of the conditions that extend the short- to medium-term storage life-span of their seeds or seed-derived germplasm.

Introduction

The family Amaryllidaceae is made up of 59 genera and about 850 species world-wide, 210 of which are endemic to southern Africa (Snijman, 2000). Amaryllids are geophytes that are part of an apparently restricted group of monocots producing non-orthodox seeds (Berjak and Pammenter, 2004). Apart from the ephemeral nature of amaryllid propagules possibly limiting seedling recruitment, many species are non-sustainably harvested for traditional medicinal preparations (Snijman, 2000). This, together with predation by the amaryllis caterpillar and habitat loss, has led to the endangered status of 59 species in South Africa while a further 58 are threatened (Snijman, 2000). Systematic study of the storage longevity of amaryllid seeds is presently limited to one species (*Scadoxus membranaceus* [Farrant *et al.*, 1989]) while the amenability of other forms of the germplasm to short-, medium- and long-term storage has never been investigated.

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