

**IUFRO Conference 2023****Strategies employed by Sappi Forests for improved seed production of temperate and sub-tropical pine and eucalypt species, and their hybrids, for long-term sustainability in a changing environment**Jones, W.¹¹ *Sappi Forests, Johannesburg, South Africa*

Received 12 Jul 2023

Accepted 01 Sep 2023

Published 20 Nov 2023

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The annual demand and supply of genetically improved planting stock suitable for sites across varying landscapes, with changing climatic conditions and increasing pest and disease threats are becoming more complex. The agility for effective responses to long-term sustainability of commercial plantations, aimed at different markets, requires a significant investment in genetic resource acquisitions, tree breeding, land management, gene conservation and plant production systems. Tree breeding is one of our most important adaptation strategies in response to climate change and related challenges. These include pests and diseases, drought, frost, and delivery of fit-for-purpose fibre. To supply an annual demand of over sixty million plants, consisting of both pure species seedlings and hybrid cuttings, Sappi requires a well-established pipeline. In addition, this pipeline allows for the sale of between 30 and 40 million viable seeds to both the domestic and international markets. Early acquisition of pine and eucalypt genetic resources suitable for sub-tropical to warm temperate, cool temperate and cold areas has allowed the development of pure species base populations containing genotypes improved for the traits of interest. Through recurrent selection, these populations have been advanced. Key traits include growth, pest and disease tolerance, and wood properties. Various strategies have been adopted to reduce breeding cycles, convert from pure species seedlings to hybrid clonal varieties to sustain productivity. Production of commercial quantities of seed is a key step in translating breeding and development into realised operational gains. A range of orchard types such as breeding seedling seed orchards (BSO), seedling seed orchards (SSO) and clonal seed orchards (CSO) have been developed to produce not only open pollinated seed but also to allow production of control pollinated hybrid seed. Each orchard type and combination of elite genotypes delivers a specific seed product with varying levels of improvement. In addition, associated technologies to produce control pollinated seed have been developed for the advancement of both clonal eucalypt and pine family cutting programmes.

Keywords: seed production, eucalypts, pines, pure species, hybrids, environment