**INTRODUCTION**

Since its introduction, the *P. elliottii* (*Pe*) *P. caribaea var. hondurensis* (*Ph*) hybrid has played a very important role in the plantation forestry industry due to its displayed improved growth, desirable wood properties (Du Plooy, 1984; Malan, 1970); and high level of tolerance to Furniture infection (Kwe et al., 2000). Currently, there is an unquantifiable demand for this hybrid in South Africa.

Research conducted by the CSIR on pine hybrid improvement indicated that the first generation (*F₁*) *P. elliottii* hybrid is difficult to produce as the crown typically results in high abortion rates of cones and low seed yields. The low seed set obtained from the *P. elliottii* *× P. caribaea* cross makes the seeds of seedlings in commercial quantities difficult and costly (Ske, 1975).

**CREATING THE HYBRID**

In South Africa, the flowering periods of *P. elliottii* (maternal parent) and *P. caribaea* (paternal parent) are typically three months apart. The pollen of *P. elliottii* is collected and stored until receptivity of *P. elliottii* female cones. The species are hybridised via controlled pollinations, with the first visit the young female cones are bagged (to prevent contamination before receptivity) and then pollinated. Several days after pollination the bags are removed and seed cones are collected 20 to 24 months later.

**STUDY 1: POLLEN VIABILITY**

In vitro pollen germination is the most widely used test and was used in this study to determine the quality of pollen.

**METHODS**

In 2007, mature *P. elliottii* catkins from five genotypes were sourced from the Pietermaritzburg research farm in Kwazulu-Natal, *P. elliottii* catkins were obtained from the genotypes located at the CSIR’s Myupi breeding centre in Nelspruit, *P. caribaea* (Pc) catkins were harvested from the breeding archive in Nelspruit. Upon harvesting, paper bags containing the catkins were spread out in the laboratory to facilitate air-drying. After several days of air-drying, the pollen was shed from the catkins and stored. Pollen was dispersed into 50 ml airtight bottles and stored in a desiccator at 4 °C. Prior tests had confirmed that the species were capable of surviving and suspended over moisture independent storage up to hermetically sealed buckets for one hour. Fungal spores, a pollen mix was made up by mixing equal quantities of pollen from each of the five genotypes.

**RESULTS AND DISCUSSION**

Three replicates were conducted. Ten randomly-selected fields of view were captured from each slide. Pollen was stained in germination when the length of pollen tube exceeded the width of the pollen grain and was expressed as percent pollen germinated.

The presence of these fungi suggests the moisture content of the *P. caribaea* pollen and storage conditions promote fungal growth. The presence of the fungus is cause for concern as it reduces the viability of the pollen.

**FURTHER STUDIES**

To determine if fungi have a detrimental effect on pollen germination in vitro (microscopy study), further research is needed to establish if it is necessary to inhibit fungal growth by testing different fungicides and optimizing pollen harvesting during drying procedures and storage conditions.

**CONCLUSION**

*P. caribaea* pollen has poor storability under conditions suitable for *P. elliottii* pollen. In addition, *P. caribaea* pollen used in this study had a high level of fungal contamination. The fungus contamination is a major factor contributing to low seed yields. Based on these results, we suggest that the poor quality of *P. caribaea* pollen is a major factor responsible for cone abortions and poor seed yields in the creation of the *P. elliottii* *× P. caribaea* hybrid.

**REFERENCES**