

REPRODUCTIVE BIOLOGY OF CALLIANDRA CALOTHYRSUS

IN RELATION TO SEED PRODUCTION IN SRI LANKA

By

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ABSTRACT

Research on *Calliandra* has received increased attention because of the focus on its wide range of products, and the use of the species in tea and coffee plantations as medium shade. Strategic research into the species' reproductive biology and breeding system has been conducted and is vital to meet the demand for superior germplasm, to avoid planting and spread of genetically inferior seed sources, and to begin effective breeding programmes. Hence the reproductive biology of *Calliandra calothyrsus* Meisn. should be understood.

In this study seven provenances selected on growth performance and morphological characteristics, namely 9/89, 10/91, 9/91, 12/91, 11/91, 18/91 and 20/91 from the Oxford Forestry Institute (OFI) collection, were used. *Calliandra* flowers open in the evening and show receptivity to pollen grains from 5.30 pm to 6.00 am. However, the best time for pollination is from 7.00 pm to 9.00 pm as observed in the fixed samples under the microscope and also by allowing the pollinated flowers to developed as pods. The major pollination vector is the Sri Lankan dog face bat (*Rousettus seminuclus*) belonging to the Megachiroptera. The bats are attracted by the high sugar percentage of about 25% of the nectar and not by the nectar volume which is about 70 ul per floret. The observations done in both wet (Maha, from October to March) and dry (Yala, from May to September) seasons showed that the provenance 10/91 has a high pollination efficiency. In addition the full-sib crosses of *C. calothyrsus* were evaluated for germination, growth characters, and flower production.

The results show *C. calothyrsus* has a mixed mating system. It is mostly outcrossed, since it tolerate selfing upto 2.6 %. It exhibits a self-incompatibility mechanism which can be utilized to promote out crossing through controlled crosses within improvement programmes through the effective design and management of seed orchards. In the evaluation of full-sib crosses, 10/91 X 10/91 was the best overall performer, followed by 9/89 X 10/91, and 10/91 X 9/89. It is suggested that these two provenances be mixed in seed orchards to provide germplasm of *C. calothyrsus* with good growth characteristics and high genetic diversity.