

POLLEN CHARACTERIZATION AND BREEDING STUDIES OF SELECTED CAJANUS CAJAN (L.) Millsp. ACCESSIONS

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Cajanus cajan (*S. Rata Thora*) is an important crop in South Asia for its protein value and nitrogen fixation capability. Three accessions of *Cajanus cajan* (7068, 7096, 7065) were obtained from Plant Genetic Resources Center (PGRC) at Gannoruwa, Sri Lanka in view of choosing male and female parents for breeding based on characterization of pollen and to perform hybridization for early maturity character of pods. A live collection of plants was maintained in the Department garden.

Pollen characterization was done from the pooled pollen samples from each accession. Quantitative and Qualitative tests were carried out in 3 replicates to characterize pollen in each accession. Quantitative test *in vitro* germination of pollen grains was tested using sitting drop culture method using Brew baker and Kwacks medium (Daffni, 1992). As Qualitative tests, histochemical analyses were done to ascertain the presence of starch, using Idoine/ Pottassium Iodide solution (I_2/KI) and lipids, using Sudan IV solution. The pollen diameter was measured using the eye piece graticule. A breeding programme was carried out in order to produce hybrids with early maturity of pods.

The best sucrose solution for germination of pollen was 60 % concentration. Pollen studies showed that 44.3 % of the pollen grains are able to produce healthy pollen tubes. Accession number 7096 showed highest pollen germination percentage (90.72 %) *in vitro* in the Brewbaker and Kwacks medium. It also showed that the lipid content was higher than the starch content in all accessions. Accession number 7096 showed highest starch content in reference to the colour scale. According to the ANOVA (CRD) test there was no significant difference between pollen grain diameters of *Cajanus cajan* ($P= 0.0001$) accessions.

In the breeding programme, accession number 7096 was selected as the male parent since it had the highest pollen germination percentage and it took 4 months for pod maturity. Accession number 7068 was selected as the female parent which has less time duration for pod maturity (3 months). Flowers were bagged at the bud stage and after cross pollination in order to discourage selfing and contaminations from foreign pollen. Reciprocal crosses were performed.

Intra-specific hybridization was highly successful, because F_1 hybrids were fertile and able to set pods after selfing. The F_1 hybrids showed the expected character of early maturity of pod (3.5 months) compared to the male parent only. Interestingly, in addition to this character, variability among individuals of F_1 , such as early flowering, dwarf plants and insect resistance could be observed. The studies are being continued.

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