

RESEARCH NEWS

POLLINATION STUDIES IN TOMATO (*Lycopersicon esculentum* Miller) HYBRID SEED PRODUCTION

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At present, the farmers are keen in growing hybrid vegetable varieties with the intention of obtaining good quality products and high yields from their cultivation. The Department of Agriculture has recently released two hybrids of tomato (*Lycopersicon esculentum* Miller) varieties namely, *Maheshi* and *Bathiya* and two hybrids of brinjals namely, *Amanda* and *Anjalee*. Unlike in the open pollinated varieties, the farmers are unable to produce seeds of hybrid varieties, but have to purchase the seeds every season.

The hybrid seed production is a tedious process as special attention should be paid in the production process. Shortage of pollen under unfavourable environmental conditions creates inefficiency in hybrid seed production. Therefore, for supplementary pollination, pollen grains have to be stored in viable conditions until use, to ensure the availability of pollen for pollination. The knowledge on pollen viability and stigma receptivity is important in hybrid seed production, particularly in tomato where manual emasculation, pollen collection and pollination are involved. Therefore, a study was initiated with the objective of finding out the storage period of pollen for effective seed production, and the effective time period for efficient fruit set after emasculation in tomato.

The pollens of the male parent of the hybrid (var. *Maheshi*) were stored for 1 to 7 days under room temperature (25°C to 27°C), refrigerated (9°C to 10°C) and frozen (-4°C to -5°C) conditions. Pollination was carried out using these pollens stored under different conditions during *maha* 2007/2008 and 2008 *yala*, in the research fields at Gannoruwa, Peradeniya. The experiment was conducted in a Randomized Complete Block Design with three replicates. Observations on the percentage fruit set, seed number per fruit, seed weight per fruit, and seed to fruit ratio (S/F) were recorded, and statistically analyzed.

In the study on stigma receptivity, the two parental materials of *Maheshi* hybrid were grown in the field and pollination was carried out from 1 to 7 days after emasculation. The experiment was carried out in a Randomized Complete Block Design with three replicates. Each treatment consisted of 15 female flowers. Data on stigma receptivity based on fruit set percentage, fruit weight, seeds per fruit and S/F were recorded.

The highest fruit set (96 %), seed number per fruit (78), seed weight per fruit (0.4 g) and S/F ratio (0.006) were observed in the pollen stored for one day in room temperature (25°C to 27°C). The pollen stored in the refrigerated condition (9°C to 10°C) remained viable until five days without showing significant difference in percentage fruit set, seed number per fruit, and seed weight per fruit. But after five days, a significant drop in the percentage fruit set and seed weight per fruit was observed. However, in the frozen condition (-4°C to -5°C), a significant difference ($p < 0.05$) in the highest fruit set (80 %), seed number per fruit (70), seed weight per fruit (0.3 g) was observed only in the first day of storage. Increase in the storage period under frozen conditions resulted in pollen desiccation. The stigma receptivity in the female parent of the hybrid showed increasing trend from the day of emasculation till the 4th day (93 % fruit set), and declined thereafter. The fruits obtained from pollination on these days also showed higher values for fruit weight, seed per fruit and S/F ratio.