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EFFECT OF LONG-TERM POLLEN CRYOSTORAGE ON FRUIT, SEED SET AND GERMINATION IN EGGPLANT (*SOLANUM MELONGENA* L.) cv. 'ARKA KUSUMAKAR'

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Fruit set, seed set and germination with 9 year cryostored, eggplant (*Solanum melongena* L.) cv. 'Arka Kusumakar' pollen showed no decline compared with fresh pollen, when pollinations were carried out on emasculated flowers of 'Arka Kusumakar'. Prolonged cryostorage involving the male gamete component obviously, was capable of performing its normal process of fertilization, resulting in fruit and seed set. The average seed number per fruit set with cryostored pollen was higher than (570) that of fresh pollen (423) and germination of seeds set by cryostored pollen was *ca.* 32 per cent, which was slightly higher than that of fresh pollen (27 per cent) as sample from the seeds obtained. The results clearly indicate the possibility of conserving genes through pollen storage, thereby long-term genetic conservation of characters transmitted through pollen could be successfully accomplished through cryogenic methods.

Key words : Pollen cryostorage, longterm, eggplant

Long-term storage of pollen in cryobanks, is a useful tool of haploid genepool conservation. Pollen occupies less storage space and is presently considered economical for conserving the genepool diversity hitherto wasted to nature. Pollen storage is identified as an integrated component of a crop germplasm conservation programme. Pollen storage strategies are also desirable in vegetable crops to achieve several breeding objectives like heterosis breeding, perpuation of male sterile lines hybrid seed production etc. which has been well documented (Bajaj, 1987; Towill, 1985; Rajasekharan and Ganeshan, 1994). Limited reports are available pertaining to the effects of pollen fertility, seed recovery and viability. In potato, Pallais *et al* (1985) investigated this effect after storage of pollen at –12°C. Pfahler (1985) studied early seedling growth in maize after storing pollen at 2°C. The present report deals with the effect of long-term cryostorage (9 years) on fruit and seed set and seed germination in eggplant (*S. melongena* L.) cv. 'Arka Kusumakar' (AK)

MATERIALS AND METHODS

The protocols for pollen collection, cryostorage, viability and fertility assessment are discussed in detail elsewhere (Alexander and Ganeshan, 1989). The fertility of long-term cryostored eggplant pollen has been successfully established (Rajasekharan *et al.*, 1993)

Seed production : Seeds were obtained from crosses with 9 year cryostored AK pollen and fresh pollen of the same cultivar on emasculated AK seed parents. A total number of 37 flowers were pollinated with cryostored pollen samples and 46 flowers pollinated with fresh pollen samples. The resulting fruits set were left till maturity and harvested for seed extraction.

Seed germination: Seeds set through 9 year cryostored pollen 'Arka Kusumakar' were germinated (in three replicates) in earthernware seed pans using soilrite as potting mixture. Simultaneously germination of seeds set through fresh 'Arka Kusumakar' pollen (control) were also undertaken for a performance related comparison. Seed germination data were recorded periodically, till transplantation stage.

The seedlings generated through crosses with 9 year cryostored pollen and fresh pollen (Arka Kusumakar) were transplanted to earthernware pots and grown to adult plants, to study flowering behaviour and pollen viability.

The data was analysed statistically using a simple unpaired t-test.

RESULTS AND DISCUSSION

Results on fruit and seed set along with seed germination are presented in table 1a and 1b. It was interesting to note that the 9 year cryostored pollen

Table 1a. Field pollination with 9 year cryostored pollen of 'Arka Kusumakar' (AK)

Parents		No. of flowrs pollinated	No. of fruit set	Average No. of seeds/fruit
Male	Female			
AK	AK(fresh)	46	41	422.93
AK	AK(cryostored)	37	34	569.50

t - calculated 1.245 (NS)

Table 1b. Germination of seeds set through 9 year cryostored and fresh pollen

	No. of seeds sown	Percentage germination
Fresh (AK × AK)	150	26.66
Cryostored (AK × AK) (9Y)	150	32

was able to induce an equipment number (average) of seeds per fruit comparable to fresh pollen (p=0.01). Seeds set through cryostored pollen recorded 32 percent germination (average of 3 replicates) which was slightly higher than the controls (26.6%). The seedlings generated through cryostored pollen were successfully transplanted and grown to adult plants, which started flowering on proximal dates, along with plants generated through fresh pollen. Flowering proceeded normally and no perceivable phenotypic abnormalities were observed. Pollen viability recorded was on par with controls (data not included).

The foregoing results indicate that prolonged cryostorage of eggplant pollen does not affect fruit set, seed set and seed germination. Seedlings when transplanted produced healthy adult plants which flowered and produced pollen having high viability profiles, comparable to controls. Extensive studies have been carried out on viability of seeds in relation to storage, but there are limited number of reports available on effects of pollen storage on seed viability. Since pollen grains and seeds are very similar in many physiological manifestations, it is generally expected that stored pollen could exhibit a reduction in vigour before it loses viability (Shivanna *et al.*, 1991) which perhaps could be applicable for pollen stored at sub-zero temperatures a considerable decline in viability profiles as indexed by *in vitro* germination, ultimately, controlled pollinations have shown that there was no decline in fruit and seed set (Rajasekharan and Ganeshan, 1994).

In the present study, the seeds sired by cryostored pollen could grow into healthy plants without showing any phenotypic changes. To study the genetic changes in such seed populations (set through cryostored pollen) sensitive procedures like RFLP, RAPD etc. could dilineate the alterations in enzyme activity at the seedling stage which could be correlated to lack or malfunctioning of a specific gene sequence coding for a particular enzyme (Alexander AND Ganeshan, 1993).

The results described here have special significance while considering the establishment of 'Pollen cryobanks' for long-term preservation of haploid eggplant germplasm.

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