Short Communication

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Effect of stored pollen on fruit set, yield and quality of Date palm cv. Halawy under hot arid conditions

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Date palm (*Phoenix dactylifera* L.; family-Arecaceae) is one of the most suitable hardy fruit tree for semi arid and hot arid regions. Pollen plays an important role in fruit production in date palm as it is dioceous plant. The male and female flowers borne on separate plant and the spathes opened according to genetic features and environmental conditions. At present, area of date palm is increasing in the states of Rajasthan,Gujarat, Haryana, Punjab, Tamil Nadu, etc and problem of availability of pollen grains on time is new constraints in date palm cultivation. Flowering occurs 10-15 days early in male than female. But it has been observed that last 3-4 years flowering in male palm is late than female palms due to change in climate and prolong winter season. However, seedling populations are not found in other parts of country except Kachchh region of Gujarat.

Date palm plantations are economically important because it requires minimum care and it has vast potential in arid regions of Rajasthan, Punjab and Haryana as well as coastal belts of Gujarat. Limited work has been conducted on pollen and its effect on fruiting in date palm. The farmers are facing problem of availability of pollens at time of pollination due to scarcity of male palms. The identification of male palm producing high amount of pollen is essential to solve the problem and an elite male palm (CIAH/DP/M-3) has been identified (Singh *et al,* 2018) which has potential to produce 640g pollen grains/tree. The proper storage environment and temperature is necessary to maintain the viability of pollens (Maryam *et al*, 2015). Therefore, major emphasis should be given on pollen production as well proper storage for next season use. Keeping in view, a study on effect of pollen storage temperature on fruit set and yield was undertaken in date palm cv. Halawy in hot arid region.

The experiment was conducted at ICAR-CIAH, Bikaner during 2017-18 to find out the effect of pollen storage environment on fruiting in date palm cv. Halawy under hot arid conditions. The pollens were collected from male germplasm palm tree and stored under refrigerator (4-5 ^{0}C) and at ambient temperature (25-30^{0}C) in room. The pollens collected during 2016 stored under ambient room temperature (T-3) and refrigerator (4-5^0 C) in air tight vials (T-2) and were used for pollination and compared with fresh pollen (T-1). Pollination was done manually after opening of spathes during morning hours and after pollination bunches were covered with muslin cloth bags. Fruit set were counted in second week of April. The experiment was laid out in Completely Randomized Design having 4 replications. The trees were maintained with common cultural practices during the fruiting season. The data were analysed in CRD to determine the effect at 5% level of significance.

After opening of spathes, the pollination was completed during second week of March . Manual pollination was done during morning hours in all treatments. The data pertaining to fruit set in date palm cv. Halawy is presented in Table 1 and a significant difference was observed among the treatments. Spathes opening was not synchronized hence pollination was done as and when spathes were opened and covered by cloths bag.

The data presented in Table 1 showed that a significant variation in fruit set percentage and the maximum fruit set (89.45%) was observed under fresh pollen treatment followed by pollen stored under refrigeration (84.20%). Results showed that different storage conditions had effect on fruit set . The low fruit set (66.6%) was recorded under pollen stored under room temperature. Low fruit set percentage may occur due to decrease in viability of pollen during storage period. Similar findings have reported by Sharma *et al* (2018) in cv. Barhee. The difference in viability of pollens among the cultivars have been also reported by Maryam *et al,* (2015). The pollen stored under cryopreservation gave best result than refrigerated pollen was conventionally stored for long period in date palm (Atteeyeh,2012).

The pea size fruit drop was noticed more under T-3 treatment which may possibly be due to improper pollination and poor fertilization. The maximum number of berry/strand was observed under treatment T-2 (18.25) followed by treatment with fresh pollen (17.35). Moreover, there was no significant difference in number fruits per strand. The size of fruits, length and weight were significantly affected by different type of stored pollens used for pollination. Variation in number of berry per strand and fruit yield has also been reported by Shafique *et al.* (2011) in date palm. The fruit yield in date palm is directly depends upon size of bunch, weight of berry, number of bunches/palm and number of fruits per strands. The fruit yield was affected significantly and higher yield (39.98kg) was recorded under fresh pollen treatment followed by 39.00kg under treatment T 2. The lowest fruit yield ((35.10kg) was recorded under T 3 possibly due to low fruit set and fruit drop. Further, the cause of low fruit yield may due to poor viability of pollens stored under room temperature conditions. It has been reported that pollen stored under room

temperature lost the most of their viability between the 2 or 3 month of storage (Roumani and Salem, 2018). Pollen viability extended over time when pollen was stored under low temperature. However, the fruit size, weight, flesh and seed weight significantly affected by pollen source *i.e*. superior male as reported by Shafique *et al.* (2011) in date palm cv. Dhakki. Fruit quality was also assessed and total soluble solids (TSS) of fruits at *doka* stage were not affected by the treatments. There was no significant difference in weight of stone (Table 1).

It has concluded that fresh pollen is most suitable for pollination to achieve higher percentage of fruit set, yield and quality of fruits in date palm followed by pollen stored under refrigeration (4 ^{0}C). The pollen stored at ambient temperature in room was showed low percentage of fruit set and yield.

Table 1. Effect of stored pollen on fruit set, yield and quality in date palm cv. Halawy

Pollen types	Date of pollination	Fruit set (%)	No. of fruits/ strands	Weight (g)	Fruits Length (cm)	Width cm,	Yield (kg)	Weight of stone (g)	TSS ^{0} Brix
Fresh (T-1)	10.3.2017	89.45	17.25	6.35	2.57	1.80	39.98	0.98	37.80
Stored at 4 ^{0c} in refrigerator (T-2)	19.3.2017	84.20	18.25	4.86	2.35	1.70	39.00	0.86	35.20
Stored at ambient temperature (25-30^0 C) (T-3)	17.3.2017	66.59	16.75	5.93	2.35	1.65	35.10	0.93	36.25
SEm±	--	0.16	0.86	0.06	0.05	0.60	0.76	0.03	1.05
C.D. at 5%	--	0.50	--	0.20	0.17	--	2.69	--	--

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