

THE EFFECT OF POLLEN SOURCE ON FRUIT CHARACTERISTICS OF “SEEWY” DATE CULTIVAR.

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ABSTRACT

The effect of pollens introduced from three different zones famous in production of date palms fruits in Egypt were studied on fruit properties of “Seewy” date cultivar grown in El-Fayoum zone. The three zones were El-Sharkia, El-Fayoum and Asswan. The present study showed great variation in “Seewy” date fruit as affected by pollen source. Pollens of Asswan male parent had better effect where gave high quality of “Seewy” date fruits compared to El-Fayoum or El-Sharkia parents. Selection among male parents in Asswan zone as pollinators are important for improving the fruit quality for “Seewy” date cultivar which is one of the leading semi-dry date cultivars in Egypt, especially at El – Fayoum zone.

Additional Index Words: Phoenix dactylifera L., Pollination, Metaxenia, Fruit quality.

INTRODUCTION

Arab Nation is leading in date production in the world. In Egypt, date palm is one of the most important fruits and widely distributed in different zones. There are three main types of dates based on fruit moisture content, i.e., soft, semi- dry and dry cultivars. El-Fayoum zone is considered one of the main zones of semi – dry date production in Egypt. “Seewy” date cultivar is one of the leading semi-dry date cultivars and widely grown in El-Fayoum zone.

Artificial pollination in date palm trees is one of the major practices and necessary for successful fruiting. There is a direct effect of pollen on fruit physical and chemical characteristics. This effect, known as metaxenia, includes fruit size (Swingle, 1928; El-Wakeel & Ibrahim, 1969; El-Hammady et al., 1977; El-Ghayaty, 1982 and Abdelal et al., 1983), colour, time of ripening (Nixon, 1928,1934 & 1951; Al-Delamiy

& Ali, 1970), weight of fruit and seed (El-Wakeel & Ibrahim, 1969; Hussein, 1970; Hussein et al., 1976; El-Hammady et al., 1977; El-Ghayaty, 1982 and Abdelal et al., 1983). Gasim (1993), El-Makhtoun & Abdel-Kader (1993), Desouky et al. (1993) and Ben Salah & Hellali (1998) cleared that the direct effect of male parent on date fruit qualities varies according to the male parent used in female pollination.

There is a great necessity to study the metaxenia phenomenon in "Seewy" dates. The objective of this study was to evaluate the effect of various pollen sources from different zones famous in production of date palm fruits in Egypt on fruit properties of "Seewy" date cultivar grown at El-Fayoum zone. Such study will help in selecting of male parents that can produce better fruit qualities of "Seewy" cultivar.

MATERIALS AND METHODS

This study was conducted during two successive seasons of 1996 and 1997 on "Seewy" date palms (*Phoenix dactylifera*, L.) of about 20 years old grown in loamy sand soil at El-Bassionia Orchard, El-Fayoum zone, Egypt. In both seasons, five female uniform vigorous palm trees were selected according to their bearing of the same number of female spathes. Regular agricultural practices were applied to all investigated palm trees. On each selected palm tree in both seasons, nine female spathes of nearly equal size and the same age were chosen and labelled. Three of the nine female spathes on each palm tree were received pollens from one of the three sources, where male parents were selected from three different zones, i.e., El-Sharkia, El-Fayoum and Asswan. Subsequently, the experiment consisted of 3 treatments, where each treatment was replicated 5 times with 3 female spathes for each palm tree in a complete randomized design. Hand pollination was carried out by placing desired male pollen strands within female spathe. After pollination, all spathes were bagged, each in a big paper bag which was tied at the base of the spathe to prevent contamination from air or other surrounding pollinating treatments. Thereafter, the bags were removed out after two weeks from pollination.

All bunches were harvested all full colour stage during the second week of October in both seasons. Samples of 30 date fruits were taken at random from each bunch for the determination of physical and chemical fruit properties for each treatment. The determination of fruit included weights of fruit, flesh and seed as well as volume, peel thickness and dimensions (length and diameter). The determination included also total soluble solids % (TSS) by a hand refractometer, total sugars as gm.per

100 gm. of the fresh flesh weight (using the method described by Schaffar and Hartman, 1921) and acidity as gm. per 100 gm. fresh weight (according to the method A.O.A.C., 1970). The obtained data were statistically analysed according to Snedecor and Cochran (1980).

RESULTES AND DISCUSSION

Tables 1 and 2 exhibit the effect of different pollen sources on fruit physical and chemical characteristics of "Seewy" dates in 1996 and 1997 seasons.

Data proved that fruit weight was greatly influenced by pollen source in both seasons. Meanwhile, pollens of Asswan zone greatly increased weight of "Seewy" date fruit by 11.3 and 12.8% compared to the male parents of El-Sharkia zone in the first and second seasons, respectively. No significant effect in fruit weight was produced by pollens from El-Fayoum and El-Sharkia zones in the two seasons. These findings agree with those reported by Gasim (1993), El-Makhtoun & Abdel-Kader (1993), Desouky et al. (1993) and Ben Salah & Hellali (1998) on several date cultivars.

The present data clearly indicated that Asswan and El-Fayoum parents produced larger fruit than El-Sharkia parent in both seasons of study. However, no significant difference was found in fruit volume of produced by El-Fayoum and El-Sharkia male parents in 1996 and 1997 seasons. The increase in fruit volume was associated with the increase in fruit weight. On the other hand, the significant effect of Asswan male parent on fruit weight and its volume was due to the great increase in weights of flesh and seed (Tables 1 & 2).

Flesh weight of fruit significantly increased in "Seewy" palm trees when pollinated by Asswan male parent compared to El-Fayoum and El-Sharkia parents. This is clearly shown in both seasons. On the other hand, flesh weight by using Asswan parent represented about 88.2 and 88.5% of fruit weight in 1996 and 1997 seasons, respectively. These results are supported by the findings of Hussein et al. (1976), Abdelal et al. (1983) and El-Makhtoun & Abdel-Kader (1993).

The average seed weight varied from 2.10 to 2.20 gm. for among the experimental treatments in both seasons. Asswan pollens produced heavier seeds than seeds produced by pollens from El-Fayoum and El-Sharkia pollens. The trend was same in both seasons. However, the differences between pollen sources were significant only in the second

season. The results obtained for fruit and seed weights were in agreement with that of Nixon (1951) who found a direct effect of pollen source on the weight of

Table (1): Fruit properties of "Seewy" date produced by pollens of male parents from El-Sharkia, El-Fayoum and Asswan zones during 1996 season.

Pollens zone	Fruit Weight (gm.)	Fruit volume (cc)	Flesh weight (gm.)	Seed weight (gm.)	Peel thickness (cm.)	Fruit dimensions		TSS %	Total sugars %	Total acidity %
						Length (cm.)	Diameter (cm.)			
El-Sharkia	16.42	20.11	14.32	2.10	0.55	3.93	2.36	37.60	31.60	0.27
El-Fayoum	17.11	20.80	15.00	2.11	0.65	4.21	2.58	37.90	31.70	0.24
Asswan	18.28	22.23	16.13	2.15	0.74	4.31	2.71	38.70	32.10	0.23
L.S.D.at 5%	1.20	1.25	1.10	N.S.	0.06	0.12	0.15	N.S.	N.S.	N.S.

Table (2): Fruit properties of "Seewy" date produced by pollens of male parents from El-Sharkia, El-Fayoum and Asswan zones during 1997 season.

Pollens zone	Fruit weight (gm.)	Fruit Volume (cc)	Flesh weight (gm.)	Seed weight (gm.)	Peel thickness (cm.)	Fruit dimensions		TSS %	Total sugars %	Total acidity %
						Length (cm.)	Diameter (cm.)			
El-Sharkia	16.94	21.80	14.79	2.15	0.70	4.08	2.50	38.00	32.20	0.24
El-Fayoum	17.86	22.63	15.76	2.10	0.72	4.25	2.75	38.60	33.10	0.23
Asswan	19.10	24.12	16.90	2.20	0.77	4.35	2.73	40.10	34.60	0.20
L.S.D.at 5%	1.10	1.42	1.12	0.04	0.04	0.15	0.16	1.20	1.30	0.02

fruit and seed. Similar results have been reported by Hussein (1970), El-Sabroun (1979) and El-Ghayaty (1982).

As shown in the attached tables, it is obvious that dates produced by Asswan pollens had thicker peel than other parents in the two studied seasons.

In both seasons, fruit dimensions (length and diameter) increased by pollens of Asswan and El-Fayoum than by El-Sharkia parents. The increases in fruit length and diameter were statistically significant in the two seasons. These increases in fruit length and diameter supports the findings of Nixon (1928), El-Hammady et al. (1977), Abdelal et al. (1983), El-Makhtoun & Abdel-Kader (1993) and Ben Salah & Hellali (1998).

Concerning the effect of pollen source on fruit chemical properties, results indicated that the percentage of total soluble solids (TSS) was generally higher when pollens used from Asswan zone as compared with two other zones in the first and second seasons. However, this effect was significant in the second season only. The results agree with those reported by El-Wakeel and Ibrahim (1969), Hussein (1970), El-Hammady et al. (1977), El-Ghayaty (1982) and Abdelal et al. (1983).

Values of total sugars percentage followed trend similar to that of TSS% in both seasons. Statistically, the differences between pollen sources were significant in 1997 season only.

In the first season, data proved that there were no significant differences in the acidity of fruit produced by either of the male parents. In the second season, pollens of Asswan caused relative lower acidity in fruits compared to the pollens of El-Fayoum and El-Sharkia and the difference was significant.

CONCLUSION

From the foregoing results, physical and chemical characteristics of "Seewy" date fruit were greatly influenced by pollen source and this effect varies according to the male parent used in pollination of female trees. Fruits produced from date palm trees which pollinated by pollen obtained from male parents grown in Asswan zone had the best qualities in all of fruit properties than that obtained by pollens from El-Fayoum and El-Sharkia zones. These differences in fruit quality may be due to the genotype effect of the pollen of male parents. On the other hand, there is

a high similarity in genetic structure of male parents produced from El-Fayoum and El-Sharkia zones. Consequently, pollen from Asswan zone is considered a good pollinator for "Seewy" date palms grown at El-Fayoum zone.

Author recommend the selection among male parents in Asswan zone. Such selection is of great importance and will enable date palms growers of "Seewy" cultivar to obtain higher fruit qualities and yield.

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