



## RESPONSE OF DATE PALM CULTIVARS TO VARYING CONCENTRATION OF ETHEPHON ON YIELD AND YIELD ATTRIBUTING CHARACTERS

**Ramkesh Meena, P. K. Yadav and R.S. Singh<sup>1</sup>**

S.K. Rajasthan Agricultural University, Bikaner – 334006

<sup>1</sup>Deptt. of Horticulture, CIAH, Bikaner-334006

### ABSTRACT

**An experiment was carried out at Date Palm Research Station, R.A.U., Bikaner to see the response of ethephon spray on yield and yield attributing characters in date palm (*Phoenix dactylifera* L.) cultivars under hot arid region. The study revealed that the maximum weight of fruit and fruit size (length, breadth and volume) was observed in cultivar Halawy. The number of fruits/strand, number of bunch/per tree and bunch weight was recorded highest under cultivar Zahidi. But, the fruit yield/tree was observed maximum in cultivar Halawy. The fruit length, breadth and volume were found maximum under the treatment of ethephon at 1000 ppm when it was sprayed after colour breaking stage. The application of ethephon was also produced more bunch weight and fruit yield/tree. The less number of days in attaining fruit colour and maturity were counted minimum under the concentration of 1000 ppm than the control and other concentrations employed. Spray of 1000 ppm ethephon at colour breaking stage was found beneficial for uniform maturity, ripening and production of better quality fruits in date palm.**

**Key words :** Date palm, *Phoenix dactylifera*, ethephon, fruit quality, arid region

### INTRODUCTION

Date palm (*Phoenix dactylifera* L.) is an ancient indigenous fruit to countries around Persian Gulf. Its cultivation was practiced in southern Iran as early as 4000 B. C. In India, it is believed to be present in 2000 B.C. (3). At present, India imports date fruits about 2,40,399 MT in the form of soft dates (pind khajoor) and dry dates (Chhuhara) from Gulf countries which involves foreign exchange of about 5.57 million \$. Date palm is cultivated on a very small scale in the states of Rajasthan, Gujarat, Punjab and Haryana in our country (8). However, it is most suitable fruit tree for cultivation in hot and dry regions having sufficient irrigation facilities. The cultivation of date palm on a commercial basis in the Thar desert will help in saving of foreign exchange which is incurred on import of date fruits. Date palm requires sandy to sandy loam soil, dry hot climate and irrigation facilities for quality fruit

production. The ideal mean temperature for flowering and fruit ripening in date palm has been found to be 25 °C and 40 °C, respectively. A total of 3000 degree days of heat summation units are required for full maturity of date palm berries. In western part of Rajasthan, rainfall is very less (240mm) and erratic. Rain causes less damage at early stages of fruit development, but even light rains at later stages of fruit ripening can cause heavy damage. It requires rain-free conditions during the fruiting season, particularly at the time of ripening of fruits. Due to the above reason, its scope is very wide to grow it in hot-arid regions of the country. Ripening is the terminal period of maturation when fruit attains maximum edible quality. Techniques to induce early and uniform ripening of the fruits provide an opportunity to obtain a premium price of the produce in the market. Early ripening

also escapes early rains, which is an important limiting factor in commercial cultivation of date palm in northern India. Ethephon (2 chloro- ethylene phosphonic acid) an ethylene releasing chemical has climacteric effect and inducing early ripening before the commence of rain. It is very much needs to prevent spoilage of the fruits. For early and uniform ripening of berries in date palm, an experiment on the effect of ethephon spray was carried out.

## **MATERIALS AND METHODS**

The study was conducted at Date palm Research Station, RAU, Bikaner in split plot design with three replications during the year 2004-05. The four varieties were taken in main plot and four ethephon concentrations were used in sub-plot. The 20 years old date palm trees of uniform growth were chosen in the orchard of date palm cultivars Halawy, Khadrawy, Zahidi and Shamran. Each selected tree represented for one treatment in each replication. In all 48 full grown date palm trees were selected for this study and maintained with cultural practices during course of investigation. The solution of ethephon was prepared by dissolving its required amount in water as per treatment just before spray. In each spray treatment, teepol (1-2ml) was used as sticking agent. The different concentrations were sprayed at colour breaking stage of fruit. The fruits were harvested at the doka (Khalal) stage from first week of July to 31 July, 2004. Observations on morphological characters of fruits were recorded and subjected to statistical analysis.

## **RESULTS AND DISCUSSION**

### **Varietal response of date palm**

The response of different varieties to each other was found significant in this study. The significantly bigger fruit size (length, breadth and volume) was obtained in variety Halawy as compared to Khadrawy, Zahidi and Shamran. It may possibly be due to genetic features of variety as reported by Baccha and Shaheen (1). The significant higher number of fruits/strand and number of strand per bunch were observed in date palm variety Zahidi.

But the number of bunches per tree was significantly higher in variety Halawy over Khadrawy and Shamran and remain statistically at par to Zahidi (Table- 1). The higher number of fruits per strand might be due to high rate of fruit set and retention of berries fruit in a particular variety. Similar result was observed in date palm by (5). The yield of fruit per tree was found significantly higher in date palm variety Halawy followed by cultivar Zahidi due to genetic makeup of cultivar and due to more number of bunches per plant then the other varieties (Table- 1). The fruit weight was also higher in cultivar Halawy, this might be due to another reason of increased yield of fruit per tree in Halawy cultivar. Similar result was also recorded by (6). The variety Halawy recorded less number of days to attain maturity due to less heat summation units required in Halawy as compared to other cultivars. Similar findings have been reported by (4) in date palm.

### **Effect of ethephon**

Application of varying concentrations of ethephon significantly increased the fruit length, breadth and volume of fruit but maximum values were obtained under 1000 ppm of ethephon (Table 1). The possible reason may be release of ethylene gas by ethephon which might have enhanced physiological activity of cell enlargement. Spraying of ethephon had remarkable influence on weight of individual fruit bunch and yield per tree in variety Halawy as compared to other cultivar might be due to involvement of ethephon in cell enlargement activity leading to increased size of fruit and bunch weight ultimately to yield of fruits per tree. Similar results have been reported (2) in improvement of fruit quality of Guava.

The application of ethephon at 1000 ppm curtailed the number of days taken to colour development and fruit maturity might be due to synthesis of pigment and degradation of chlorophyll in treated plants. The early maturity was also observed due to increase climacteric respiration and loss of malic acid in treated fruits. Similar findings have been reported by (7) while working on ber fruits.

**Table 1: Performance of Date palm varieties and effect of ethephon concentrations on fruit yield attributing characters.**

Treatments	Fruit length (cm)	Fruit breadth (cm)	Volume of fruit (cc)	Number of fruit/strand	Number of strand / bunch	Number of bunches / tree	Number of days taken in maturity	Av. bunch weight (kg)	Yield of fruit/ tree (kg)
<b>(A) Variety</b>									
Halawy	3.67	2.51	8.99	14.08	55.25	6.83	30.67	6.50	44.47
Khadrawy	2.85	2.81	7.55	12.96	47.75	5.17	36.67	4.32	22.42
Zahidi	3.31	2.32	8.52	15.15	57.92	6.25	40.50	6.94	43.29
Shamran	2.93	2.12	7.38	12.90	47.50	5.58	33.92	4.22	23.59
S.Em +	0.03	0.06	0.19	0.18	0.79	0.28	0.661	0.158	1.491
CD at 5%	0.13	0.23	0.68	0.64	2.75	0.97	2.28	0.548	5.161
<b>(B) Ethephon</b>									
0	2.98	2.51	7.09	13.69	52.00	5.67	39.75	4.48	27.90
500 ppm	3.18	2.18	7.95	13.73	51.58	5.92	37.83	5.13	30.93
1000 ppm	3.28	2.32	8.70	13.81	52.42	6.25	32.58	5.87	37.50
1500 ppm	3.31	2.12	8.71	13.85	52.42	6.00	31.58	6.10	37.54
S.Em +	0.02	0.06	0.19	0.16	0.63	0.21	0.380	0.122	1.350
CD at 5%	0.08	0.23	0.57	NS	NS	NS	1.110	0.358	3.940

## REFERENCES

- Baccha M A and A Shaheen (1986) Arab Gulf. J. Science Research. 4: 341-347.
- Biswas B, S K Ghosh, B Gosh and S K Mitra (1988) Effect of growth substances on fruit weight, size and quality of guava cv. L-49. Agriculturist. 32: 245-248.
- Chandra A, A Chandra and I C Gupta (1995) Date palm cultivation in India. Scientific Publisher, Jodhpur. pp 5-22.
- Chandra A, R Swaminathan, N L Chaudhary, M S Manohar and O P Pareek (1990). Performance of date palm cultivars in the Thar Desert. Indian J. Hort. 47: 28-33.
- Chouhan G S, J S Jawanda and J C Bakshi, (1972) Flowering and fruiting behaviour of promising date varieties at Abohar. J. of Research (PAU). 9 (2): 256-61.
- Pareek O P and K D Muthana (1978). Growth and fruiting characteristics of some date cultivars in Thar Desert. Haryana J. Hort. Sci. 12: 39-43.
- Singh R S (2007) Date palm In. Fruit production Technology (ed. by Yadav P K) International Book Distributing Comp., Lucknow. pp 349-367.
- Sandhu S S, S S Thind and J S Bal (1989) Effect of pre-harvest spray of ethephon on size, quality and ripening of ber (Ziziphus mauritiana Lamk.) cv. Umran. Indian J. Hort. 46 (1): 23-27.

Received : June, 2012; Revised : August, 2012; Accepted : November, 2012