

SHORT COMMUNICATION

## Performance of new introduction of date palm under hot arid conditions

R. S. Singh\*, R. Bhargava and B. D. Sharma

Central Institute for Arid Horticulture, Bikaner-334 006 (Rajasthan)

Date palm (*Phoenix dactylifera* L.) is a nutritious fruit and provides high calories of energy. It is rich source of carbohydrates, minerals, vitamin A, B, and B<sub>2</sub>. Date palm is mostly suitable for cultivation in arid regions of the country where irrigation facilities are available. It is drought hardy plant and tolerates salinity and aridity. It requires rainless period during fruiting season particularly at the time of ripening. In order to exploit the potential of the north-western dry regions of India for date palm cultivation, a number of varieties have been introduced from Middle East countries, USA, which is performing better in different parts of country (Chandra *et al.* 1990). Introduction of new varieties having better traits is a continuous process to enrich genetic resource and productivity of crops. In India, date palm is mainly cultivated in western parts of Rajasthan, Kachchh region of Gujarat, Punjab and Haryana. The districts of Rajasthan such as Jaisalmer, Barmer, Bikaner, Jodhpur are extremely dry and suitable for date palm cultivation. In addition to this, parts of Sri Ganganagar, Churu, Nagour, Hanumangarh, Sirsa, Sikar are also suitable for date production (Mertia and Vashishtha, 1985). In Kachchh region of Gujarat, date palm is growing in about 12,493 ha area with production of 85,352 tonne doka stage fruits. At present, India imports about 253,341 MT dates from Gulf countries every year of worth 7.2 million \$ in the form of pind (soft dates) and dry dates (Chuhara). In our country, date production is very less due to lack of early maturing varieties, rain tolerant genotypes and sufficient planting materials as well as improved production technology for different agro-climatic conditions. By introducing new cultivars and increasing in area of production will certainly help to save foreign exchange and provide nutritious fruit to rural inhabitants (Singh *et al.*, 2003). Looking to its vast potential in arid and semi arid regions, three date palm cultivars were introduced

from Iraq to India. In this paper, the performance of new introductions of date palm under hot arid conditions of Bikaner has been discussed.

The Central Institute for Arid Horticulture, Bikaner is located in the north western part of the country. The soil of arid region is sandy, very poor in fertility and water holding capacity, having pH 8.3 to 8.5, ECe 0.1 to 0.15 dSm<sup>-1</sup> and 0.08 to 0.09 per cent organic carbon. The recurrent drought and extreme aridity is common. The average rainfall is about 240 mm/ annum, May-June is the hottest (mean max. temp. 42.9 °C and mean min. temp. 29.6 °C) and December-January (mean max. temp. 23.7 °C and mean min. temp. 8.9 °C) are coldest months of the year. Being sandy desertic, the soil gets heated up and cools soon when exposed to high or low temperatures. Accordingly, occasional frost during December and January is also experienced in this region. The ground water source is deep and saline in quality. The source of irrigation is open well and canal in the region.

Three date palm cultivars namely Shakkar (EC 402388), Braim (EC 402389) and Chip chap (EC 402390) were introduced from Iraq to India through NBPGR, New Delhi during the year 1997 (Anonymous, 1998). One sucker of each cultivar was procured in April, 1997. The sucker of cultivar Shakkar was small in size and rootless while other two were appropriate in size/weight and 3-4 roots were present. The imported plant material was kept under nursery conditions for six months for hardening and rooting before planting in the field. At planting, suckers were treated with Carbendazim (0.1%) and IBA 1000 ppm. The pits of 1x1x1 m size were prepared and filled with soil mixtures of sand + clay + FYM (1:1:1 ratio) and Methyl parathion dust (50g/ pit). The offshoots were transplanted in field during the month of October. Plants were monitored regularly till establishment and irrigation was given as and when required.

Observations on height of palm, size of leaves, pinnae, emergence of spathe, opening of spathe, fruiting, maturity of berry and quality of berry were recorded.

\*Corresponding author email:  
rssingh@yahoo.co.in



The performance of date palm varieties with respect to survival, growth, suckering, spathe emergence, opening of spathe, fruiting, yield (kg/palm) number of bunch/ palm, size of bunch and berry characters have been presented in Table -1.

and Chip chap offshoots survived and sprouted under field conditions of Bikaner, Rajasthan. However, the offshoot of Shakkar could not survive in the field and dried after two months of transplanting, which may possibly be due to small size and under weight of sucker and lack of roots.

**Table 1.** Performance of exotic date palm germplasm under Indian arid conditions.

Characters	Braim (EC 402389)	Chip chap (EC 402390)
Palm height (cm)	300	250
Number of suckers/plant	08	06
Spread (cm)		
N-S	250	240
E-W	270	250
Length of leaf cm.	210	170
Pinnae size , Length x width (cm)	26.3x2.57	31.5x2.70
Spathe Emergence	2March	7March
Opening	19March	21March
Fruiting		
Fruit set (%)	70	80
Doka stage maturity	20July	14July
Colour of berry	Yellow	Wellow
Size of berry cm. (Length x width)	3.34x2.10	3.56x2.26
Weight of berry g	7.74	8.32
Pulp:stone ratio	7.00	6.60
No. of bunch/plant	4.0	1.0
Length of bunch	48	35
Bunch weight kg	1.5	1.0
No of strand per bunch	21	16
Length of strand cm.	29	21
No. of berries /strand	14	14
Yield kg/palm ( 5th year)	6.000	1.000
Stone weight ( g.)	1.08	1.25
Stone length x width cm.	2.00x0.80	2.52x0.85
Taste of doka fruit	Sweet and juicy	sweet
Acidity (%)	0.17	0.22
Ascorbic acid (mg/100g pulp)	200	170
Sugars (mg. /100g fresh pulp )	620	630

### Survival of plant

One offshoot of three cultivar was introduced from Iraq through a delegation which visited to India. The plants were brought without any packaging. The plant material was transported from NBPGR, New Delhi to C.I.A.H., Bikaner by train. The offshoots were initially planted in perforated gunny bags, which were filled with garden soils. The plants were maintained under normal cultural practices. All offshoots were survived under nursery conditions. Sprouting was started in Chip chap and Braim suckers. During the month of October, the suckers were transplanted in the field. Out of these, Braim

Sucker size/weight play an important role in survival and establishment of plant under field conditions (Pareek, 1984). Though, Date palm is a hardy but rooting in offshoot is very difficult which is the main cause of mortality of suckers besides attack of diseases especially crown rot and environmental conditions of the growing sites.

### Plant growth

The vigorous plant growth was observed in cultivars Chip chap in comparison to Braim plant in respect of palm height, spread, leaf size, pinnae, and suckering also (Table 1). Plant growth pattern in both the cultivars

were at par to other germplasm planted in the same year at same site. It seems that the growth performance of both the cultivars is satisfactory under hot arid environment. However, plant growth depends upon genetic character of the genotype besides environmental conditions of growing sites. Similar view has been expressed by Zaid (1999) while working on production technology of date palm.

### Spathe emergence and flowering

In general, emergence of spathe in date palm starts after 3-4 years of planting. However, it depends on the age and size of suckers in addition to cultural practices employed. Spathe emergence period also depends both on climatic conditions and genotypes. Variation in emergence of spathe has also been reported by Zaid (1999). Under Indian conditions, emergence of spathe has been reported during February to March (Chandra *et al.*, 1990). In both the introductions, spathe emergence was recorded in the first week of March during 2003. It is also similar to earlier introductions and shows medium to late maturing type. Besides, spathe opening pattern was also similar in both the cultivar.

### Yield and berry characters

In the first year of fruiting, 6.000 kg/plant berry (doka) was harvested from Braim plant after five years of planting. However, Chip chap cultivar started flowering and fruiting in the year 2002 after four years of planting but the yield was very less. Only one bunch of 500g weight was produced in the year 2002. During the year 2003, fruit yield (1.000 kg) was obtained from the plant of Chip chap which increase subsequently with the age of plant. In both the cultivar, berry colour was yellow and sweet in taste (table 1) with average berry weight 7.74g and 8.32g for

Braim and Chip chap, respectively. Bigger berry size was recorded in Chip chap than that of Braim cultivar, which possibly be due to genetic feature of the genotype in addition to environmental conditions. Doka stage was early in Chip chap cultivar. Bunch size was also bigger in Braim in respect of number of strands per bunch, number of berries per strands. Fruit set also depends on the time of spathe opening, pollination, viability of pollens and receptivity of stigma besides climatic features. However, better percentage of fruit set (70-80 %) was also recorded in both the cultivars under arid conditions. The percent acidity was 0.17 and 0.22 in Braim and Chip chap, respectively. There was no much more difference in both the cultivars with respect to acidity (%), ascorbic acid and sugars content. The stone size and pulp stone ratio was higher in case of Chip chap which might be due to genetic features of the variety.

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