

SHORT COMMUNICATIONS

Performance of Date Palm Introductions under Hot Arid Environment

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Date palm (*Phoenix dactylifera* L.) is an important fruit tree of arid and semi-arid regions. Fruits are either eaten fresh or in the processed form. In order to exploit the potential of the northwestern dry areas of India for date palm cultivation, a number of varieties have been introduced from Middle East countries, USA, Saudi Arab, Egypt, which are performing better in different parts of country (Chandra *et al.* 1990). Introduction of new varieties having better traits is a continuous process to increase productivity of crops. In India, date palm is mainly cultivated in western parts of Rajasthan, Kachchh region of Gujarat, parts of Punjab and Haryana state (Pareek and Muthana, 1978, Singh *et al.*, 2003). For commercial cultivation of date palm in this region, there is a need to have cultivars, which are early to medium maturing, rain tolerant, capable of tolerating high temperature and salinity. Accordingly, date palm cultivars in the form of offshoot as well seeds were introduced from Iraq to India and their performance in this region was evaluated and findings have been summarized in the present paper.

In India, maximum date varieties have been introduced from USA, Egypt, Iraq, Saudi Arabia, Oman etc (Anon., 1975). The seed/planting material i.e. offshoots were introduced through NBPGR, New Delhi to CIAH, Bikaner under germplasm exchange programme. The plants were raised under hot arid environment of India to evaluate the suitability of the exotic materials. One offshoot of each variety namely Shakkar (EC 402388), Braim (EC 402389) and Chip chap (EC 402390) were introduced from Iraq in 1997. Out of these, Braim and Chip chap are growing well and started flowering and fruiting after four years of establishment while, offshoot of variety Shakkar could not survive. The investigation was conducted at Central Institute for Arid Horticulture, Bikaner that is located in the northwestern part of the country. The soil of the areas is sandy, desertic, poor in nutrients and water holding capacity. The summer is very hot and annual average rainfall is also low (240 mm) and erratic. The ground water source is limited, deep and saline in quality.

The sucker of date palm cultivars viz. Braim (EC 402388), Chip chap (EC 402389) and Shakkar (EC 402390) was introduced from Iraq to India through NBPGR, New Delhi during the year 1997 (Anonymous, 1997-98). 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. Seeds of seven date palm varieties from Iraq and one genotype from Tehran, Iran were introduced to India and seedling growth performance were evaluated. Observations on height of palm, size of leaves, pinnae, emergence of spathe, opening of spathe, fruiting, maturity of fruits and quality of fruit was assessed.

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. 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 also been expressed by Zaid (1999) while working on production technology of date palm.

In the first year of fruiting, 6.000 kg doka fruits/plant 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 obtained in the year 2002. During the year 2003, fruit yield (1.000 kg/plant) was obtained from

Chip chap plant. In both the cultivar, fruit colour was yellow and sweet in taste 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 (Khalal) stage was early in Chip chap cultivar. Bunch size was also bigger in Braim in respect of number of strands per bunch, number of fruits per strands. Fruit set also depends on the time of spathe opening, pollination, viability of pollens and receptivity of stigma besides climatic conditions. However, good 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 contents. The seed size and pulp stone ratio was higher in case of Chip chap which might be due to genetic features of the variety.

The seeds of seven varieties viz., Khastavi, Sayer, Braim, Chip chap, Barhee, Khadrawy and Zahidi (EC 454540- 46) were procured from Iraq in the month of May, 2000. For evaluation, seeds were sown in polythene bags (30 x 12 cm.) filled with soil mixture in the nursery. The seed germination varied from 76 -100 per cent and seedlings growth was ranged from 57-95 cm after one year of sowing. There was no much more difference in number of leaves per plant (5.5-7.0) and collar diameter at ground level (5.5-7.0 cm) which seems that the initial growth performance of all varieties are similar. However, plant height (57.5- 95.5 cm) and length of primary leaves (52.0-94.5 cm) differed which may be due to genetic feature under similar growing conditions. As far as survival of plant is concerned, except Barhee and Chip chap, all varieties showed better establishment under field conditions. The growth of seedlings reveals that plants of Sayer, Braim and Chip chap are of slow growing type and rest are vigorous.

The seed of date palm (*Phoenix dactylifera*) EC 517310 was introduced from Tehran, Iran during June, 2003. The seed were sown in polythene bags (30x12 cm) filled with soil mixture of clay+sand+FYM (1:1:1 ratio) in the third week of June, 2003. The plants were raised in the nursery under agro-shade net condition. Observations on germination, time taken for germination and survival of seedlings was recorded and data is presented in Table 1. The germination of seed was cent per cent after 32 days of sowing. To control diseases,

Table 1. Performance of date palm (*Phoenix dactylifera* L.) seed introduced from Tehran, Iran

| S.No. | Characters | Performance |
|-------|---|--------------|
| 1. | Germination (%) | 100 |
| 2. | Days taken for germination | 32 |
| 3. | Plant height (cm) 360 days after sowing | 58.66 |
| 4. | Survival of plants under nursery (%) | 100 |
| 5. | Average number of leaves/plant | 9.66 |
| 6. | Length of leaves (cm) | 45.77 |
| 7. | Collar diameter (cm) | 5.66 |
| 8. | Date of transplanting of seedlings | August, 2004 |
| 9. | Survival (%) under field condition | 66.66 |

spray of Carbendazim @ 0.1% was done at fortnightly intervals. Data presented in Table 1 shows that the initial performance of introduced seed material was satisfactory under nursery conditions. After a year, the plants were transplanted in the field for evaluation. The survival of plant was recorded 66.6 per cent after three months of planting under hot arid environment.

The study indicates that date palm offshoots can be introduced successfully from warm arid and semi-arid parts of the World. Both the introduced cultivars viz. Braim and Chip chap are found suitable to complete the flowering and fruiting (upto doka stage) before 20th July, hence they are able to avoid the rainy season in Western Rajasthan. The present study reveals that both the date palm introduction are suitable for cultivation under hot arid environment.

The seed material introduced from Iraq and Iran were evaluated under nursery. The survival and seedlings growth performance was good under arid environment. However, introduction of seed in case of date palm should be restricted because of dioecious plant.

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