Fast Facts On

Dates

Phoenix

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1 Plant background

Date palms are members of the Palmaceae family, subfamily Phoenix, which is comprised of 15-20 varieties, mostly found in tropical regions. It is assumed that the origin of the date palm is from the Persian Gulf. Its fruit has been known for at least five thousand years. Date palms grow mainly in the northern hemisphere, but can be found from 38° north to 47° south.

2 Botanical description

The parts of the palm are: the sheath, the spine (midrib), the leaflets (pinnae) and the thorns. The spine is actually the "stem" of the 2-3 meter long leaf. The growing period of the spine continues about 50 days. Along the spine there are 'leaflets', 2-4 cm wide and 50m long. Thorns develop at the base of the spine instead of leaflets.
Within every palm there is generative tissue – an embryo bud, which in a young tree changes to a vegetative state and develops into a scion. At age 4-5 years, this tissue changes into reproductive tissue, creating inflorescence. The number of inflorescences is flexible.
The date palm is hermaphrodite, containing both female and male blossoms. In nature, pollination is effected by the wind, and blossoms that are not pollinated fall off. The accepted practice is to plant a male tree for every 50 female trees, to enable effective pollination.
The fruit berry and berry components are the cortex, flesh and the pit. Fruit develops over several months. Ripening starts when the fruit cortex starts changing color from green to yellow and red. During this period, sugar accumulates. The fruit loses water through cracks in the cortex. This process is called ripening.

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2 Botanical description *(continued)*

The date scion has air roots. These roots can therefore survive in water. Date palms have both deep roots and fine roots that grow upwards and are active in conveying water and nutrients to the plant.

3 Varieties

About 1500 varieties are in existence. In Iraq alone there are about 630 varieties, but the main varieties grown there are Zahdi, comprising about 43% of the total yield, Halawi and Khadrawi. The main variety in North Africa is Deglet, while in California it's Deglet Noor and Zahdi. The Medjoul variety is considered to be of superior quality in both regions and elsewhere. In Israel the main variety is Medjoul.

4 Crop climate conditions

The date palm grows in subtropical and arid regions. The optimal growing temperature is 32°C. Temperatures below 7°C or above 45°C will arrest the tree's growth processes. Fruit set will occur only if the temperature is above 13°C. A commercial yield is possible only if there is a sufficiently long hot period of 32°C. Rains during harvest season are damaging to the yield of most date varieties.

5 Leading dates growing countries (FAO data 2003, except Iraq - 1995)

Country	Total Production (tons)	Planted area (ha)	Yield (ton/ha)
Egypt	1,115,000	29,500	37.8
Iran	875,000	184,000	4.7
Iraq	881,000	88,000	10.0
Saudi Arabia	830,000	140,000	5.9
Emirates	760,000	186,000	4.1
Pakistan	760,000	80,000	8.1
Algeria	420,000	135,000	3.1

Note: The situation in Iraq is unclear. In 1960, Iraq had 30 million date palms. In 1985, there were 22 million trees. There are no new details yet. In the past, Iraq was the leading country in area and yields.

6 Growing season

Date palms grow throughout the year, with accelerated growth during the months April – November. During the winter months there is little palm growth. There are differences amongst varieties. Roots develop mainly during the hot months.

Blossoming begins in early spring – February, continuing to the end of spring – May. Climate conditions and the age of the tree can affect efflorescence.
Fruit development continues 6-8 months, depending on the variety and on climate conditions.

7 Propagation

Saplings can be propagated by seed, but this is not practical. Trees from seed will start producing yields after 6-10 years. In addition, 50% of the trees will be male, which are non-productive. The accepted method is to plant suckers (off-shoots), taken from the base of the mature female. They will always be a genetic copy of the parent tree. A young date palm can produce from 3 suckers a year (Barhee) up to 30 (Medjoul). Suckers are usually planted with roots. No rootstock is necessary. Now it is possible to grow cuttings from tissue cultures, but this still fairly new.

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8 Soil

Dates grow in various types of soil: light, medium and heavy, but require good drainage and air penetration into the soil. Date palms are resistant to alkaline soil. Irrigation with saline water is detrimental to the vegetative growth potential and reduces yield size and quality.

9 Nursery

It is customary to detach scions from the mother plant, and grow them in the nursery until they develop a root system. It is possible to plant saplings year round, though it is customary to plant them in April-May.

10 Tree treatments

Trees are usually pruned once a year. In some growing regions trees are pruned after harvesting, while elsewhere trees are pruned in the spring, before the clusters are covered with sacks.

Fruit is thinned out in May after fruit-set, when it is possible to estimate the quantity of fruit. This is done in order to attain large, high quality, uniform fruit at the ripening stage. A heavy fruit load can result in poor quality, and in addition, can cause alternating yield quantities.

11 Harvest

With the exception of the Medjoul variety, where fruit is harvested individually because of its high quality, normally, the entire cluster is removed at once. In modern plantations, harvesting is done on hydraulic platforms that can be elevated to the height of the treetop clusters.

12 Tree spacing

At present, most varieties are planted at a density of 120 trees per hectare. In plantations with low trees or varieties with small palms, density is ~200 trees per hectare.

13 Irrigation

Date palms require high quantities of water. The shape of the tree leaves also influences the evaporation rate. The date palm does not close its stomata under extreme climate conditions, as long as the hydraulic conductivity of the water in the soil is high. Certain regions irrigate twice daily. In many countries, it is common practice to cover the fruit bunches with paper bags to protect the fruit from the elements (rain, dust) and from rodents. Dates grow in hot climates with high radiation, where the evaporation rate is high. Following are the annual water requirements in several representative countries:

Country	Annual water requirements m^3/ha.	Country	Annual water requirements m^3/ha.
Algeria	15,000 – 35,000	Iraq	15,000 - 20,000
California	27,000 – 36,000	Israel (Jordan Valley)	25,000 - 32,000
Egypt	22,300	Morocco	13,000 - 20,000
India	22,000 – 25,000	South Africa	25,000
Tunis	23,600		

Water consumption per hectare is high during the hot months – July – September. In Tunis this is about 7,200 m^3/ha during the summer, compared to 4,400 m^3/ha during the months December – February.

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13 Irrigation *(Continued)*

Following is a table of irrigation coefficients - Kc values - for two types of dates: moist and dry dates. Data is for the northern hemisphere (and must be adjusted for the southern hemisphere according to seasons):

Seasons	Spring	Summer					Autumn	
Month	April	May	June	July	Aug.	Sept.	Oct.	Nov.
Moist date	0.64	0.68	0.72	0.72	0.72	0.68	0.68	0.66
Dry date	0.78	0.75	0.72	0.85	0.60	0.50	0.75	0.68

Annual water consumption for dates is 25,000 – 32,000 m^3/ha.

14 Critical stages of water stress in the soil and their influence on dates

The critical stage for newly planted date scions is during the first six weeks after planting. For mature trees, the critical stage is during fruit development – from the end of fruit set until the fruit attains its full size.

15 Irrigation deficiency management in dates

Most date plantations are located either in oases or along beaches where table water is high, or in the vicinity of lakes. In such regions, sufficient water is available year round, rendering irrigation deficiency management unnecessary.

16 Recommended irrigation method

Most traditional date palm plantations are still irrigated by flooding or furrow systems.
In modern plantations, drip systems are becoming the systems of choice: high irrigation/fertigation efficiency; easy to operate, suitable for use with automation; irrigates the trees only, preventing weeds, lower system costs.

17 Fertilization application

In California, fertilizer is applied according to the size and age of the tree, in a ratio of 2:1:3:1.
Following are the quantities of nitrogen, applied according to the above ratio: young trees, up to 18 months: 0.3 kg N/tree/annum; small trees: 0.5 – 1.0 kg/tree/annum; medium size trees: 1.5 – 2.0 kg/tree/annum, and large trees: 2.5 – 3.5 kg/tree/annum.
It is necessary to test for microelement deficiencies, and spray the foliage when necessary, with S, Cu, Fe, Mg, Mn.
In Iraq it is customary to apply 20 kg of organic fertilizer per tree per annum.

Annual fertilizer consumption for fruit bearing trees:

N – kg/ha	P_2O_5 – l/ha	K_2O – kg/ha
250-300	60	300-400

18 Yields

During the fourth year, trees bear fruit, but the first commercial yield is attained at age 5-6 years, with 8 – 10 kg/tree. At age 13 the yield will be 60 – 80 kg/tree. In improved varieties and in more populated plantations, it is possible to attain yields of 100 – 150 kg/tree, and a general yield of 11 – 17 tons/ha. The global average, in general, is 5 tons/ha. Date palms continue to produce high yields for 60 – 80 years.

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19 Recommended irrigation equipment for date palms

Netafim produces and markets a very broad range of products, with the aim of providing solutions for every irrigation need. Therefore, for every region, soil type, farmers' demands, etc., we are capable of providing a solution tailored to these needs.

Drip Irrigation

Following are the general recommendations for three types of equipment, which, according to our experience, can provide the most suitable solutions for crop and grower demands. However, these are not the only possible solutions.

UniRam™ or **Ram** compensated drippers, with a self-cleaning mechanism, ensure identical applications of water and fertilizers, regardless of inlet pressure (as long as the pressure is within the recommended limits) and/or topography throughout the irrigation cycle. In addition, this equipment has the following properties: (a) anti-siphon mechanism, and (b) non-leakage (CNL) mechanism that prevents the dripperline from emptying out at the end of the irrigation cycle.

UniRam™ equipment can be used at flow rates of 1.0 to 3.5 l/h. Spacing between drippers is between 0.5 – 0.75 cm. Flow rate and spacing between drippers will be determined according to the soil type and the total hours available for irrigation.

Ram™ compensated drippers, with a self-cleaning mechanism, to ensure that all plants in the field will receive identical applications of water and fertilizers, regardless of inlet pressure (as long as the pressure is within the recommended limits) and/or topography throughout the irrigation cycle.

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Ram™ equipment can be used at flow rates of 1.2 to 3.5 l/h. Spacing between drippers is between 0.5 – 0.75 cm. Flow rate and spacing between drippers will be determined according to the soil type and the total hours available for irrigation.
Dripper lines can be installed parallel to the tree line, or can circle each individual tree, leaving the space between the trees dry.

Micro-sprinkler Irrigation

For Irrigation and Fertigation- Flow compensated sprinklers

- **SuperNet®** – one sprinkler per tree from 20 to 110 L/H with wetted diameter of 1.5m up to 8.0m. It is also available with an upside-down option with insect proof swivels.
- **SuperNet®** – provides full coverage and full overlap of 2X2 up to 6X6 upright or upside-down. Same flow rates and swivels available.

Non-compensated Micro sprinklers

- **GyroNet®** - one sprinkler per tree from 27 to 300 L/H with wetted diameter of 1.5m up to 8.0m. It is also available in an upside-down option with insect proof swivels.
- **GyroNet®** - full coverage and full overlap of 2X2 up to 6X6 upright or upside-down. Same flow rates and swivels available.

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