



Harvest and Postharvest Handling of Dates



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DATE PALM

- ❖ **Citation in The Holy Quran over twenty times**
- ❖ **3rd in ranking (among fruits produced in Pakistan)**

Production Status

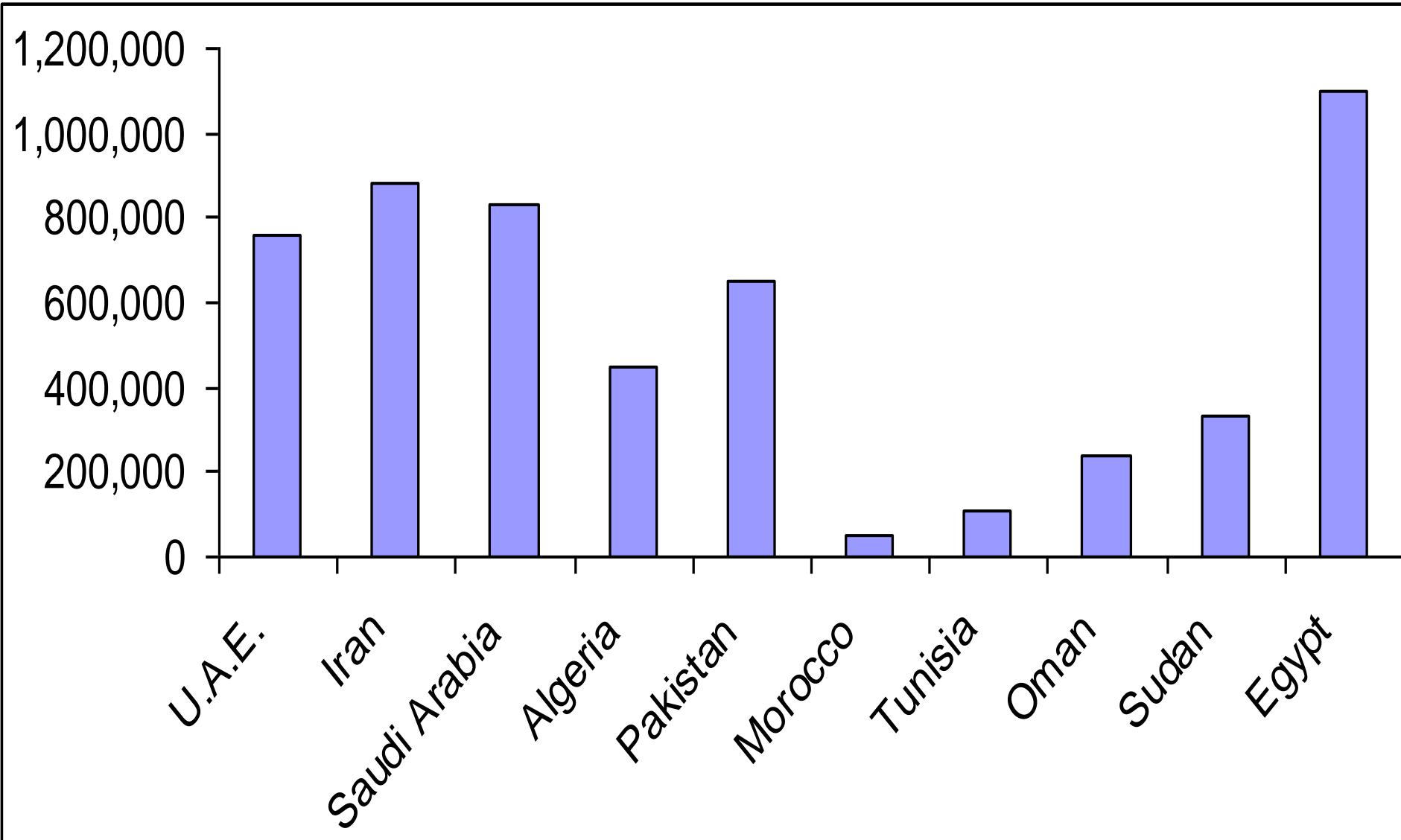
- World Dates Production 7 million tons

Pakistan 2016-2017

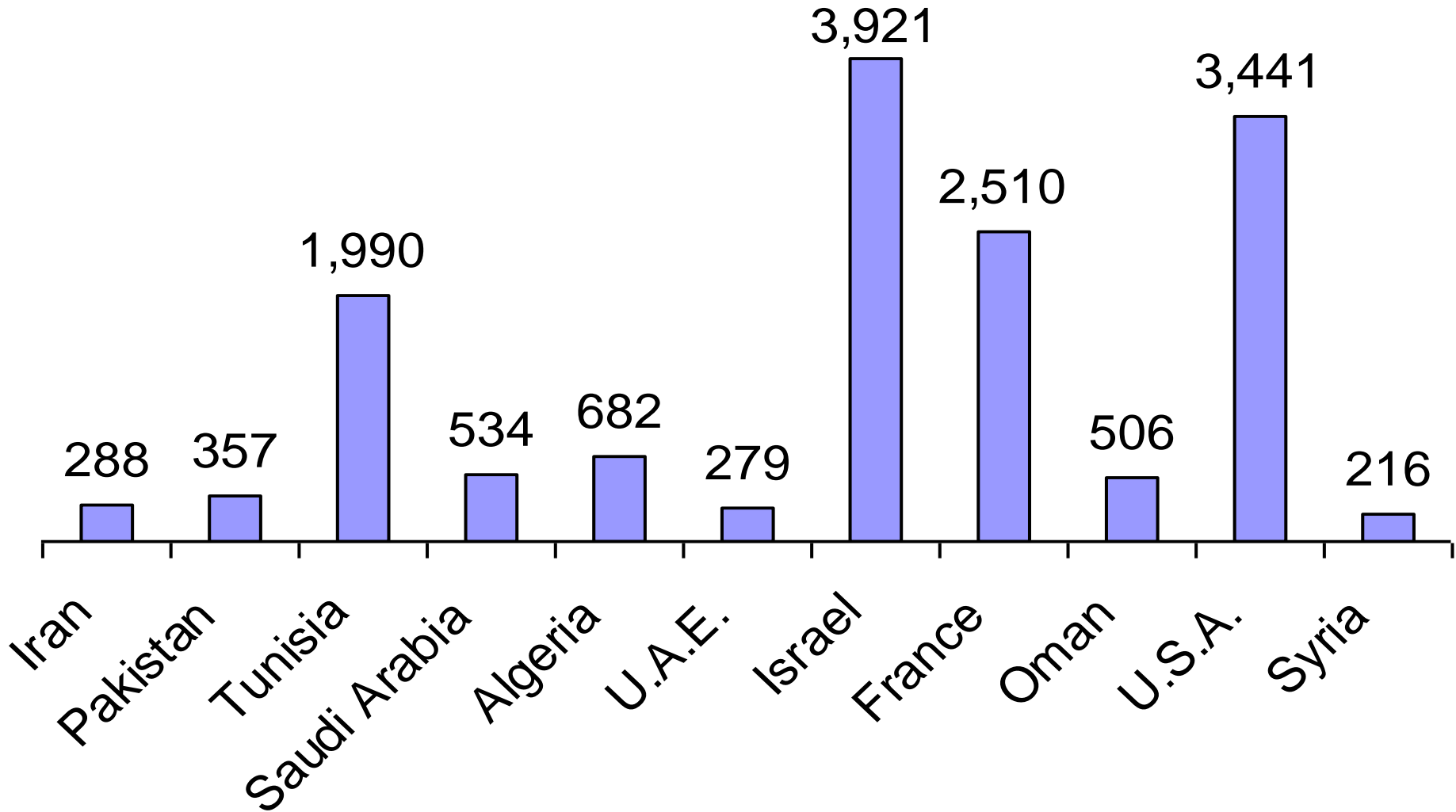
Area 130,000 acres

Production 438,990 tons

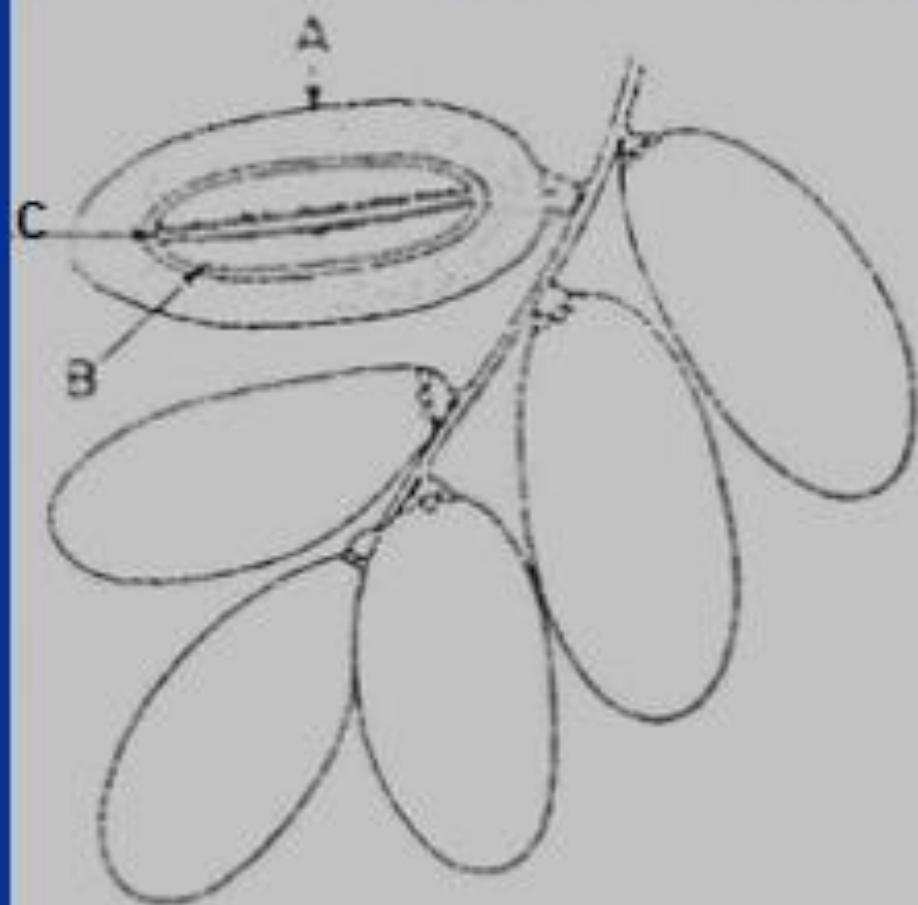
WORLD OUT LOOK- DATE PALM PRODUCTION (Mt) BY COUNTRY



WORLD OUT LOOK- DATE PALM EXPORT EARNINGS (\$ per Mt)



Morphology of dates



137b

137c

137d

137b. Seed, side with the deep furrow

137c. Seed, opposite side marking the embryo by a protuberance

137d. Seed, T. S. passing through the embryo

137. DATE (*Phoenix dactylifera*)
Fruit (x0.5)

137a. One of the dates shown in L. S.

A. Fleshy pericarp

B. Seed of the berry

C. Deep furrow of the seed

Developmental Stages of Dates





Khimri Stage of Development



Khalal Stage of Development



Tamar (Tamr) Stage of Development



Barhi Date Khalal Stage of Development

Ripening of Barhi Dates from Khalal to Rutab



Khalal



Partially-rutab



Rutab



Rutab Stage of Development of Hayany Dates

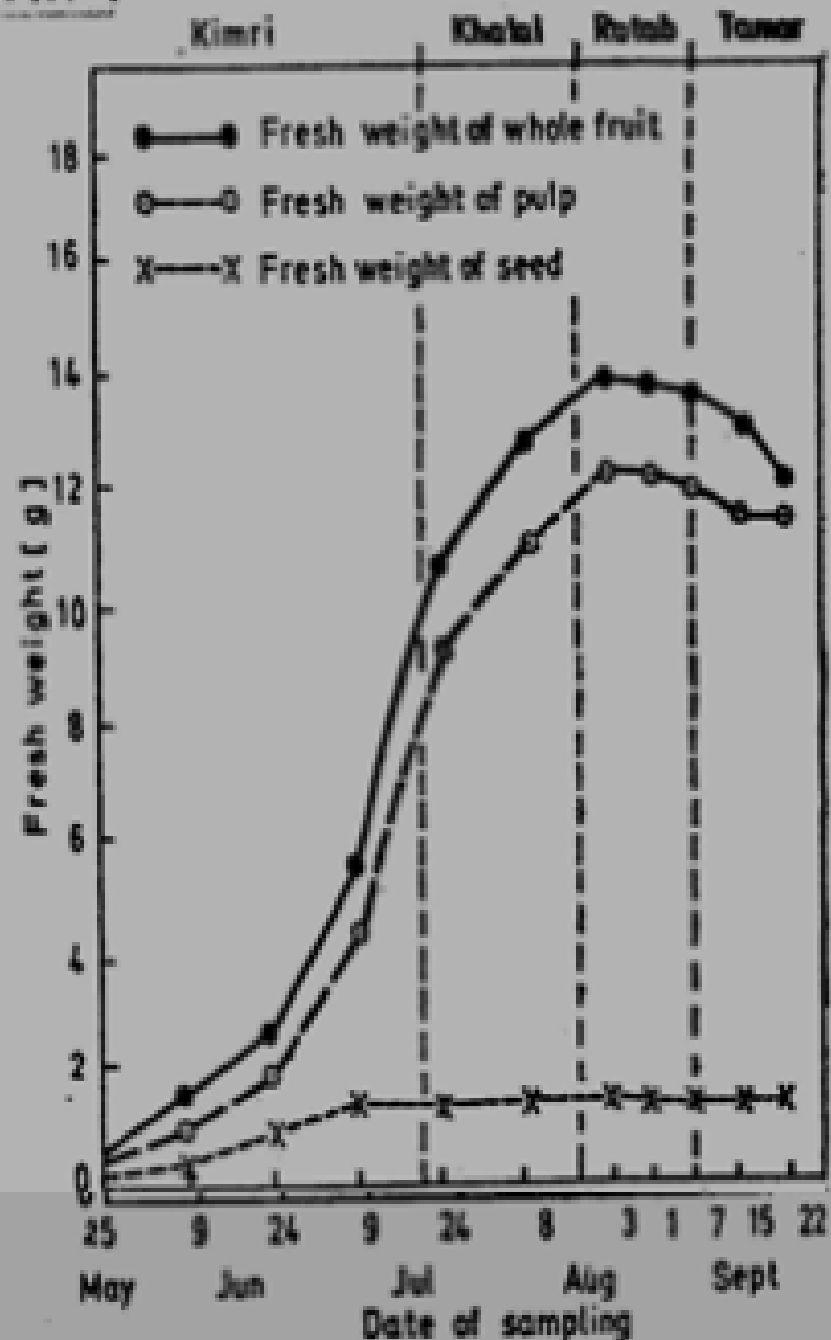


Tamar Stage of Development of Deglet Noor Dates

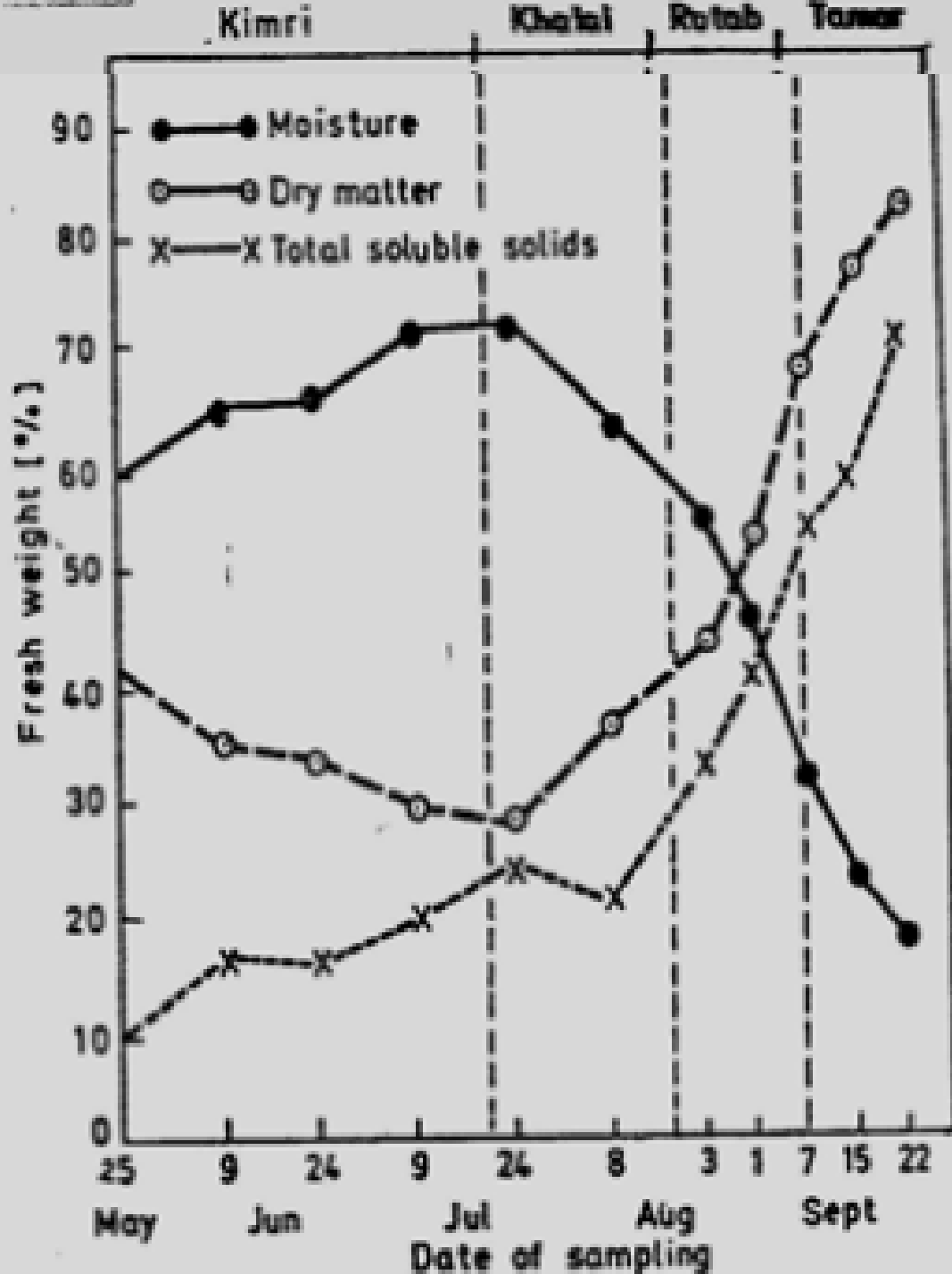
Moisture Contents at Various Stages of Development

- **Khalal** 45-65%
- **Rutab** 30-45
- **Tamar** Less than 30

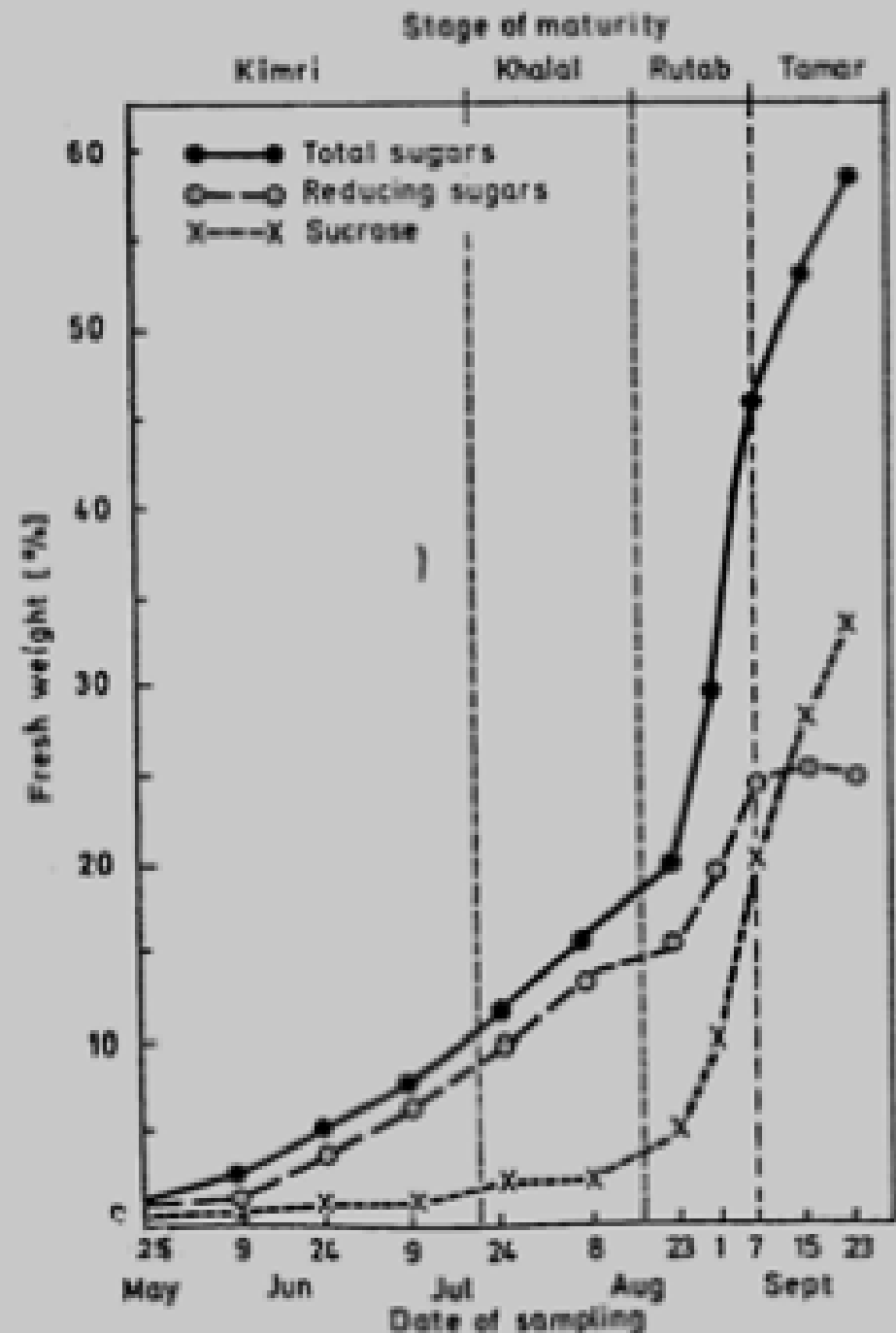
Physical and compositional changes during growth and development of dates-1



Physical and compositional changes during growth and development of dates-2



Physical and compositional changes during growth and development of dates-3



Maturity Indices for Dates

Size and shape

Skin color

Flesh color

Flesh firmness

Soluble solids content

Genotypic differences in color of khalal stage dates



Abada



Barhee



Deglet Noor



Hayany



Honey



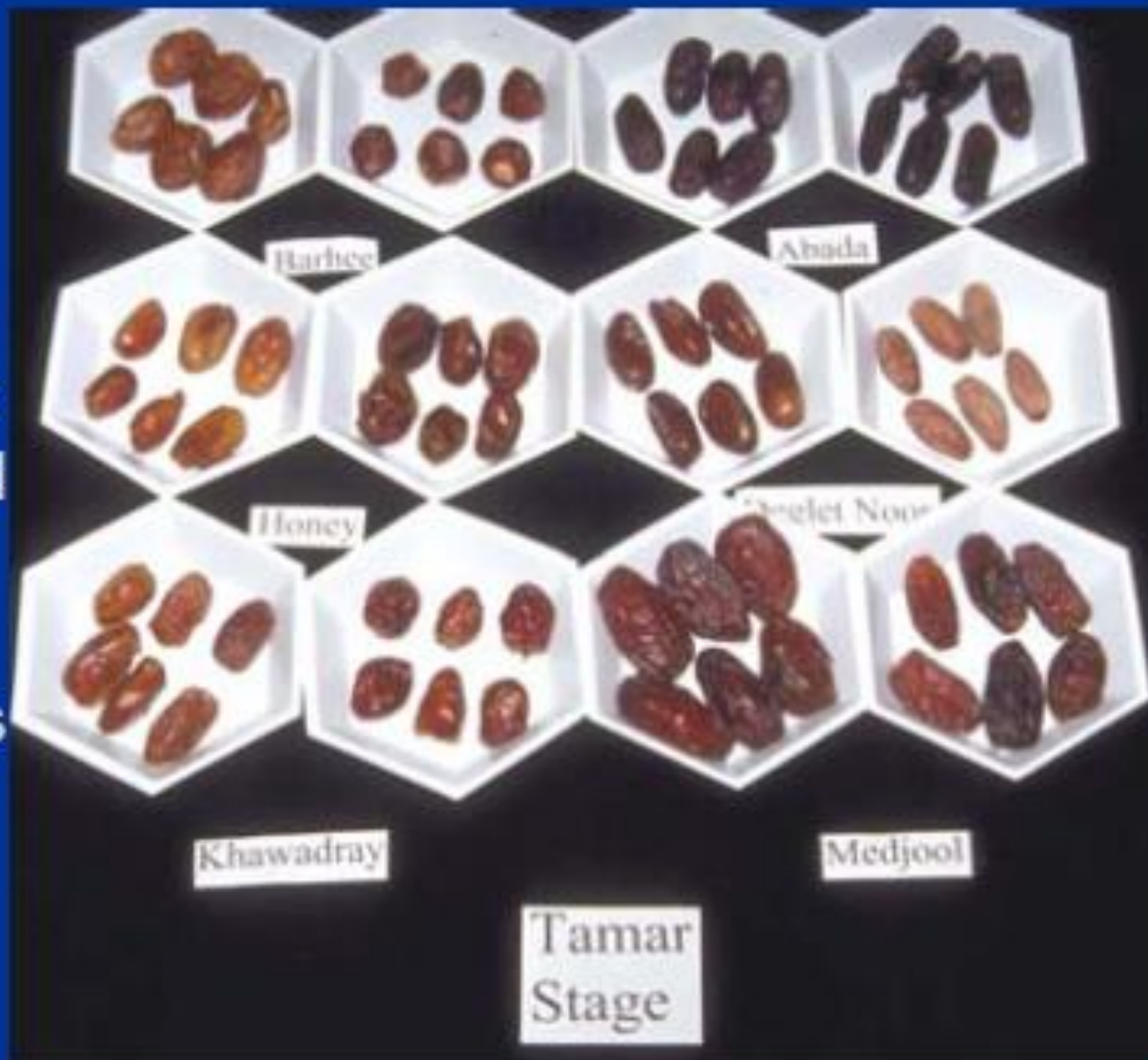
Khadrawy



Medjool

Khalal Stage

Genotypic differences in color and size of tamar stage dates





Date Orchard in Coachella Valley



Date Orchard in Coachella Valley, California

Date Harvesting in California-1

Photos by David Karp



Date Harvesting in California-2



Photos by David Karp

Date Harvesting in California-3

Photos by David Karp



Date Harvesting in California-4



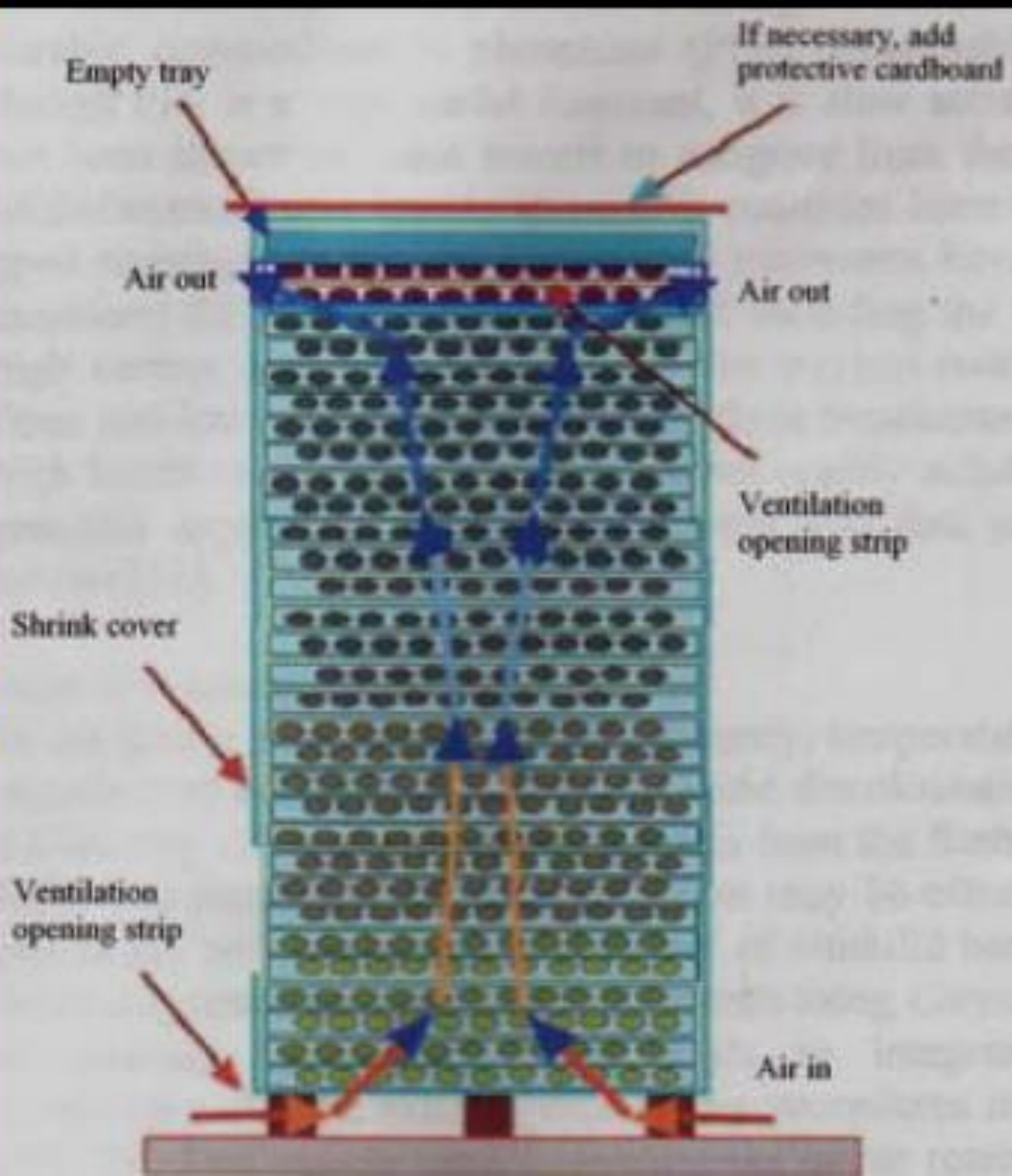
Photo by David Karp

Sun Drying of Dates

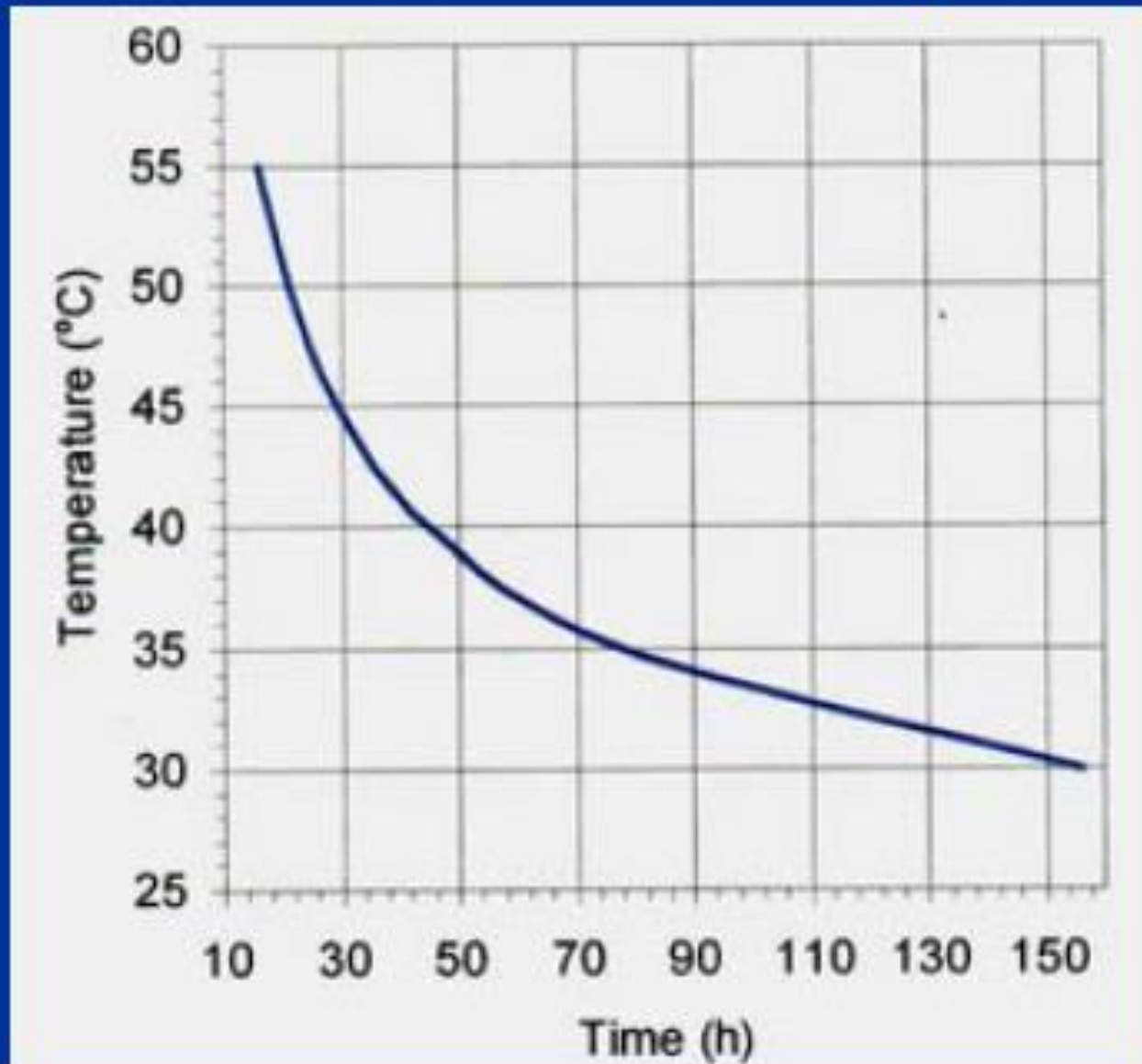
Photos by David Karp



Sun drying of
Majdool dates
in a pallet
wrapped with
shrink wrap
with ventilation
at the top and
bottom



Time necessary for ripening of mature Mejdool dates at various temperatures



Stored Products Insects cause Qualitative and Quantitative Losses

- ***Navel orangeworm***
- ***Indian meal moth***
- ***Dried fruit beetles***
- ***Saw tooth grain beetle***
- ***Merchant grain beetle***
- ***Raisin moth***
- ***Fruit fly***

Insect Control Procedures for Dates

- **Fumigation (methyl bromide or phosphine)**
- **Irradiation at 750 Gy**
- **Freezing at -18 °C for longer than 2 days**
- **Use of heat treatments (50-55 °C)**
- **Exposure to 100% carbon dioxide for longer than 2 days**
- **Storage at temperatures below 5 ° C reduces insect activity**
- **Storage in 0.5% oxygen (balance nitrogen) atmosphere reduces insect activity**



Insect damage in dates



Fumigation chambers for insect control in dates

Preparation of Dates for Market-1

- Initial sorting to remove defective dates and foreign materials.
- Cleaning to remove dust, dirt, and other foreign materials using air pressure and water followed by air drying to remove surface moisture. Damp towels may be used in cleaning the dates.
- Sorting by quality and size into grades.



Dumping dates at the packinghouse



Sorting of dates to remove defects



Sorting dates by quality

CODEX Standard for Dates-3

2.5 Size Classification (Optional)

Dates may be designated as to size names in accordance with the following charts:

(a) Unpitted dates

Size	No. of dates in 500 g
Small	More than 100
Medium	80 to 100
Large	less than 80

(b) Pitted dates

Size	No. of dates in 500 g
Small	More than 110
Medium	90 to 110
Large	less than 90

In the U.S.A., Medjool growers use a Grading standard that differentiates four grades based on fruit size and freedom from defects as follows:

Grade	Dates per kilogram	Description
Jumbo	35-42	No blemishes, skin separation, or dryness
Large	44-51	No blemishes, skin separation, or dryness
Extra Fancy	44-53	Minor blemishes, packed all sizes together
Fancy	44-57	Some dryness and skin separation, packed all sizes together

Quality Grades of Medjool dates

Grade	Dates/pound	Description
Jumbo	16-19	No blemishes, skin separation, or dryness
Large	20-23	No blemishes, skin separation, or dryness
Extra-Fancy	20-24	Minor blemishes, packed all sizes together
Fancy	20-26	Some dryness and skin separation, packed all sizes together

Preparation of Dates for Market-2

Surface coating with wax or other materials to reduce stickiness and improve appearance (gloss).

- In some cases, the dates are pitted and may be stuffed with nuts. Other products include date pieces that are used in cereals and other foods and macerated dates that are used in baked products

Preparation of Dates for Market-3

Packaging to protect the dates from physical damage and moisture absorption if moisture-proof packaging material is used.

Use of insect-proof packaging is highly recommended to prevent Re-infestation of the dates with insects during their subsequent storage and handling step



Packaging of dates



Date packages

Trends in Consumer Packages

- More products are packaged in re-saleable bags or clamshell plastic containers.
- Greater use of packages made from recyclable materials.
- Increased use of modified atmosphere packaging (MAP).
- Consumer packages can help in reducing product contamination during handling, but can slow down cooling rate.



Plastic package for dates

Package of organic, pitted dates

Front



Back



Net Wt 6 oz (170g)

For Nutrition and Ingredient Information, visit www.earthbound.com

Nutrition Facts

Serving Size 1/2 cup (100g)
Amount Per Serving

Total Fat 10g	20%
Total Sugar 10g	20%
Total Carbohydrate 21g	42%
Fiber 1g	2%
Protein 1g	2%

% Daily Values are based on a diet of whole, organic, locally sourced ingredients.

Ingredients: Organic Dried Dates
 Contains 1% or less of: Organic Sunflower Oil, Organic Citric Acid, Organic Natural Flavors, Organic Sea Salt, Organic Vanilla Extract, Organic Stevia Leaf Extract, Organic Lemon Juice Concentrate, Organic Lemon Oil, Organic Lemon Peel, Organic Lemon Zest, Organic Lemon Pulp, Organic Lemon Seed, Organic Lemon Peel, Organic Lemon Zest, Organic Lemon Pulp, Organic Lemon Seed.



Food to live by®

When it comes to dates, Earthbound Farm is the only one that's 100% organic, pitted, and ready to eat. So why not? Dates are naturally full of antioxidants and fiber, and they're a wonderful addition to recipes at work, at home, and on the go. And since we started farming in 1979, we've been growing over 20 kinds of dates. Earthbound Farm has grown to become a company trusted by millions of people every week. We're committed about sharing the benefits of organic food with as many people as possible. We wish you health and happiness with each Earthbound date. www.earthbound.com

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Food to Live By: The Earthbound Farm Mission of Quality, with food that's 100% organic, pitted, and ready to eat. www.earthbound.com



OUR FINEST MEDJOOI GIFT PACKS

(4-1/2 lbs. pictured)

Known for their exceptional flavor and size, Our world famous Medjool Dates are unequalled in quality. Only the best are selected for these popular beautifully packaged gifts.

04-05A ... 1-1/2 lbs. net wt. ... \$17.50

04-05B ... 3 lbs. net wt. ... \$32.00

04-05C ... 4-1/2 lbs. net wt. ... \$45.25



PORTRAIT OF BEAUTY

Our finest Medjool Dates—the gift of royalty—hand packed in a beautiful Tiffany-style container. Great for gift giving year-round.

02-01A ... 1-1/4 lbs. net wt. ... \$18.50

02-01B ... 2 lbs. net wt. ... \$29.75

02-01C ... 3 lbs. net wt. ... \$44.25

Check TINA's Fax
800-827-8017
www.tinaspices.com

Examples of gift packages available by mail, telephone, or web-based order

Examples
of gift
packages
available
by mail,
telephone,
or web-
based
order



MINI COMBO
The tempting assortment
of Milkmaid Ovals, Dark
Caramel Balls, Walnut
Stuffed Milkmaids and Dark
Confections make this an
excellent choice for home
entertainment or office
entertaining.

71025 ... 2 lbs. net wt. ... \$29.99



DATE BOLITAS
Delicious bite sized
dates made with the creamiest
and permeated with an almond
flavor.

87-709 ... 2 lbs. net wt. ... \$11.99
87-710 ... 3 lbs. net wt. ... \$11.99



MILKMAID GIFT BASKET
The most popular Date with
a crunch, macaroon,
walnut stuffed variety's
favorite mix... Walnut!

84-408
... 1-1/2 lbs. net wt.
... \$21.99

WALNUT STUFFED MILKMAID
Premium Milkmaid Ovals, stuffed with
walnuts and rolled in powdered sugar.
An elegant delicacy as a treat for yourself
or to share with friends.

84-742 ... 1 lb. net wt. ... \$14.99
84-782 ... 2 lbs. net wt. ... \$14.99
84-783 ... 3 lbs. net wt. ... \$14.99



WHAT A MIX
Apricots, Dark Chocolate
Pecans, English Nuts
and Milkmaids on a
beautiful wood tray.

87-706 ... 1-1/2 lbs. net wt.
... \$20.99



Special Price \$9.99
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Examples
of gift
packages
available
by mail,
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based
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TOWER OF GIFTS

For your favorite friend, family or client, a beautifully decorated box set of our most popular gifts. The tower's base is our California Caramel box, above is a gift box of our Triple Malted, and topping the Tower are Large Malted items stuffed with walnuts and dipped in chocolate topped Assorted Candy Apples.

84-408 ... 6-1/2 lbs. net wt.
... \$72.99



HOLIDAY CONFECTIONS

A delicious tray of Malted Delays stuffed with Caramel Fruit and Walnuts, Dark Fudge, Dark Caramel and Dark Assorted nuts.

80-086
1-1/2 lbs. net wt. ... \$30.75

80-085A
1 lb. net wt. ... \$22.75

LUXE EXECUTIVE GIFT

A total gift for business. It includes gourmet gift baskets, gift certificates, gift announcements, thank you cards, and more. Gift items available.



TRIPLE DELIGHT

Tempt your palate with Chocolate, Caramels, and Mint. Small items covered with delicious flavors.

80-098 ... 1-1/2 lbs. net wt. ... \$23.75



Thank You! Visit
800-827-8017
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Shipping Containers for Produce



Fiberboard

Styrofoam

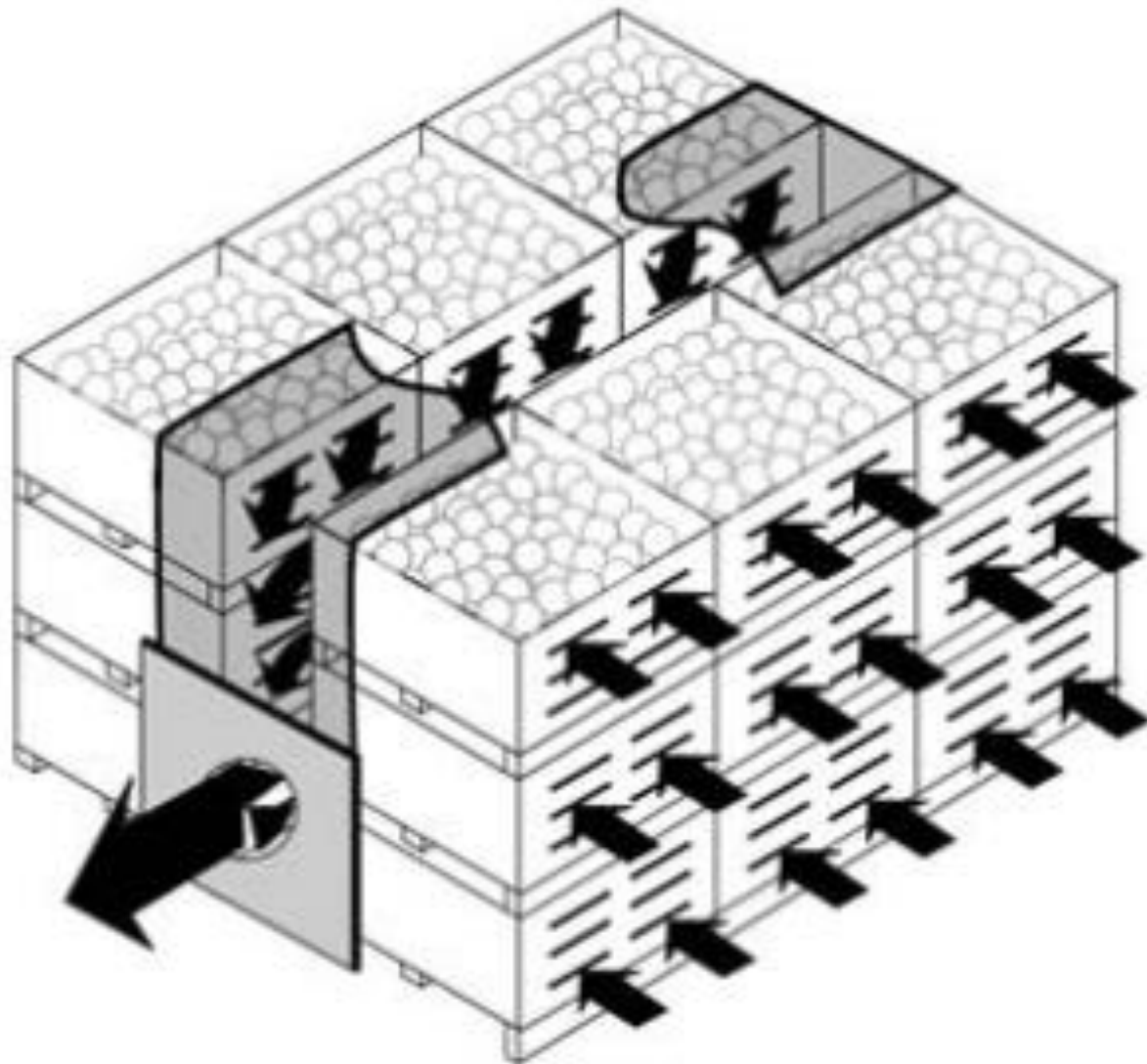
Plastic

Preparation of Dates for Market-4

Forced-air cooling to below 10C (preferably to °C) before transportation or storage under the same temperatures and 65-75% relative humidity.



Diagrammatic view of a forced-air cooling tunnel. Either bins or palletized containers can be placed to form a tunnel from which air is exhausted. The negative pressure then causes cold air from the room to pass through ventilation slots to directly contact the warm product.



Cold Storage Facilities



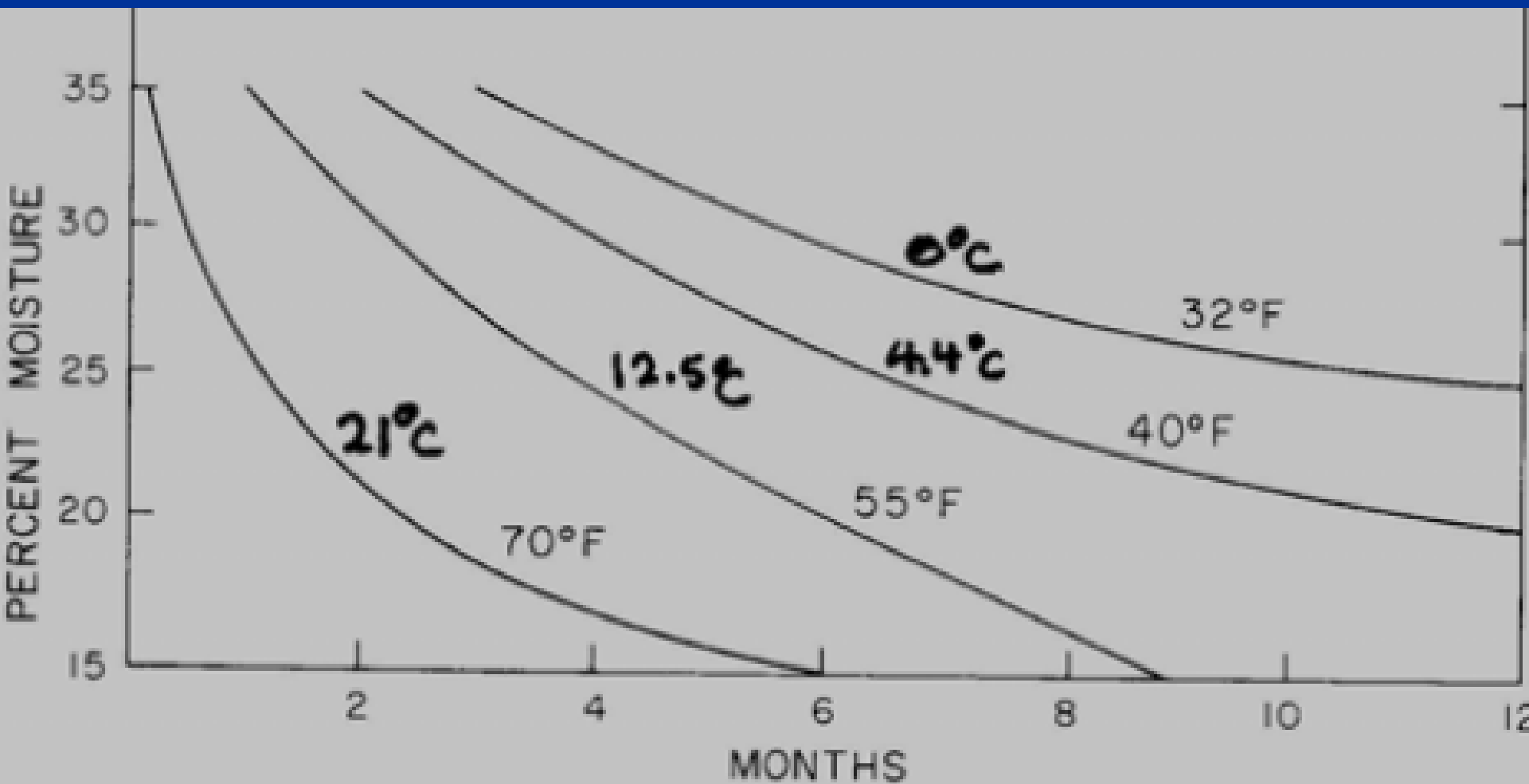


Loading dates into refrigerated trucks for transport to market

Storage Factors

- **Moisture content of the dates**
- **Relative humidity of storage**
- **Storage temperature**
- **Oxygen concentration**
- **Effective insect control**

Effects of temperature and moisture content on storage life of Deglet Noor dates



Physical and Physiological Disorders-1

- **Darkening. Both enzymatic and nonenzymatic**

browning occur in dates and increase with higher moisture content and higher temperatures. Enzymatic browning can be inhibited at low oxygen concentrations.

- **Souring. Yeasty fermentation results in souring of dates with moisture content above 25%.**

Physical and Physiological Disorders-2

Sugar Spotting (sugaring): Crystallization of sugars below the skin and in the flesh of soft date cultivars. Although it does not influence taste it alters fruit texture and appearance. Incidence and severity of sugar spotting increases with storage temperature and time. Storage at recommended temperatures minimizes this disorder, which occurs mainly in cultivars in which glucose and fructose are the main sugars. Sugaring may be reduced by gentle heating of the affected dates.

Date Sugaring (sugar spots) Symptoms



Pathological Disorders

Microbial spoilage can be caused by yeasts (most important), molds and bacteria. Yeast *species of Zygosaccharomyces are more* tolerant of high sugar content than others found in dates. Yeast-infected dates develop an alcoholic odor (become fermented). Acetobacter bacteria may convert the alcohol into acetic acid (vinegar). Fungi (Aspergillus, Alternaria, and Penicillium spp) may grow on high-moisture dates, especially when harvested following rain or high humidity period.

Disease Control Strategies

- Dry the dates to 20% moisture or lower to greatly reduce incidence of molds and yeasts.
- Maintain recommended temperature and relative humidity ranges throughout the handling system.
- Avoid temperature fluctuations to prevent moisture condensation on dates, which may encourage growth of decay - causing microorganisms.
- Use adequate sanitation procedures

Date Storage Conditions

Semi-Soft Dates (Deglet Noor, Halawy and Zahidi)					
Temperature	70°F (21°C)	60°F (15°C)	40°F (4°C)	32°F (0°C)	0°F (-18°C)
Storage Period	1 month	3 months	8 months	1 year	over 1 year
Relative Humidity	75% or less				

Soft Dates (Medjool, Barhee, Khadrawy, Maktoom, Sayer, and Dayri)		
Temperature	32°F (0°C)	0°C (-18°C)
Storage Period	6 months	More than 6 months
Relative Humidity	75% or less	

Thank You

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