Harvest and Postharvest Handling of Dates

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Pakistan

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

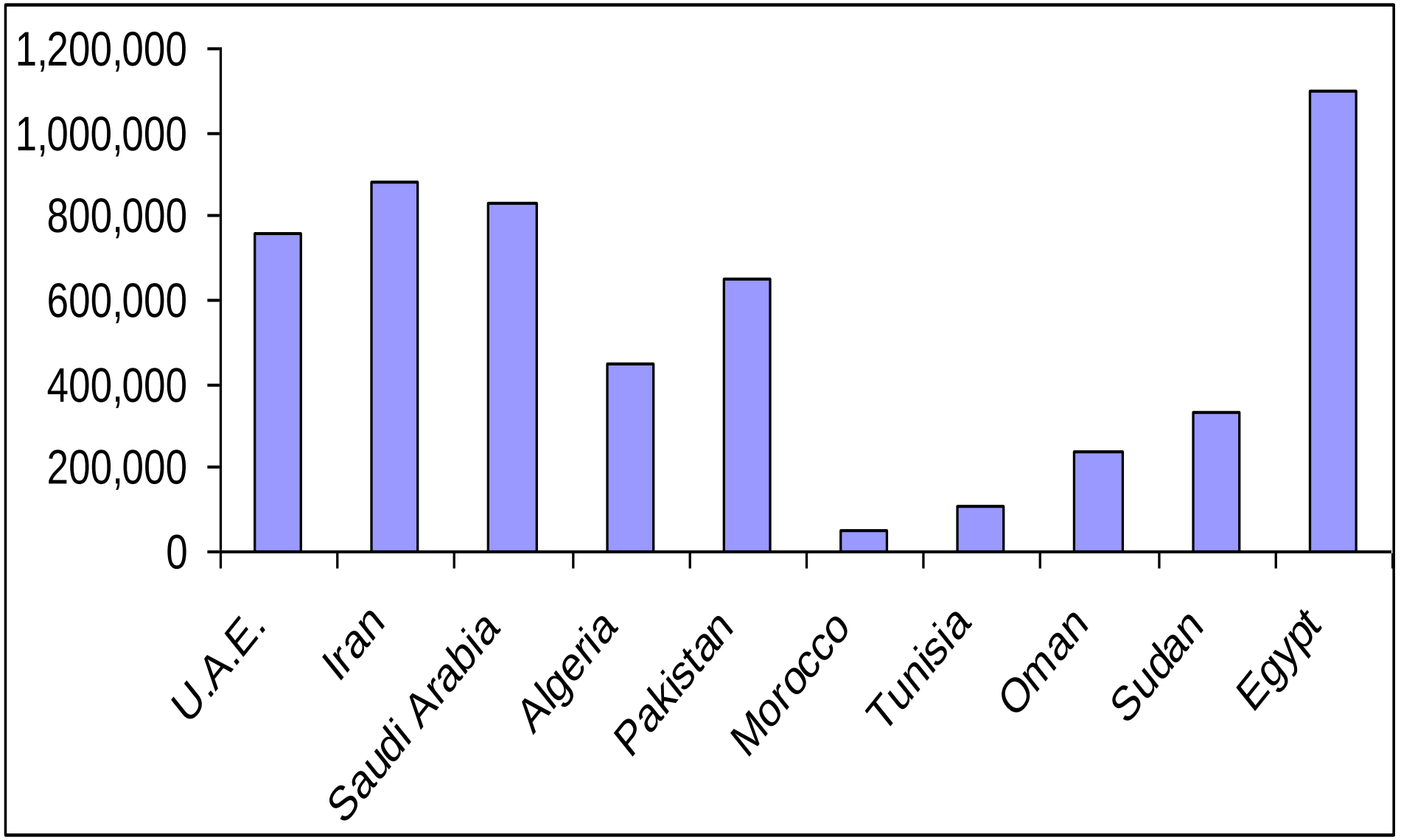
Pakistan 2016-2017

Area 130,000 acres

Production 438,990 tons

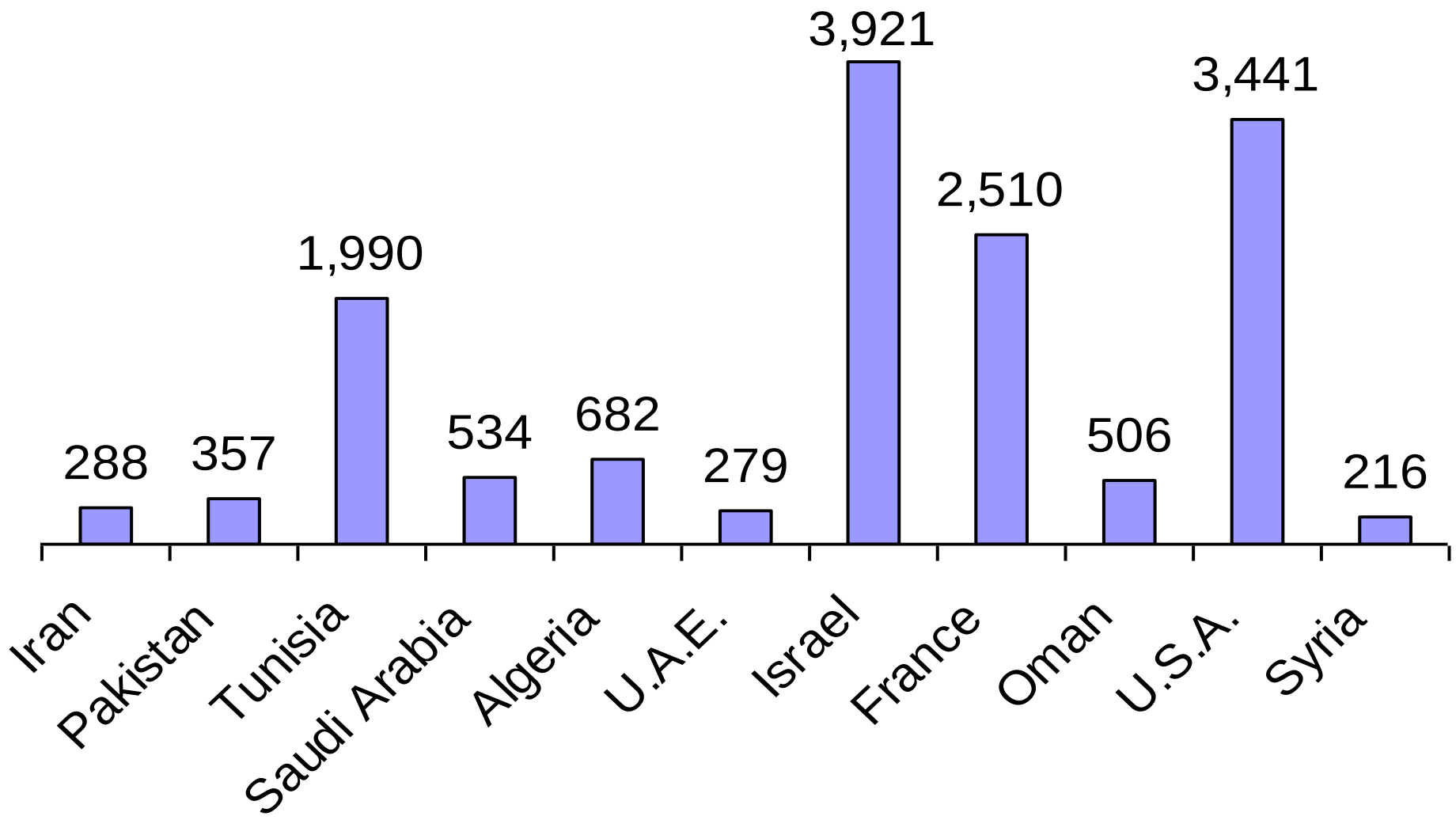
WORLD OUT LOOK- DATE PALM

PRODUCTION (Mt) BY COUNTRY

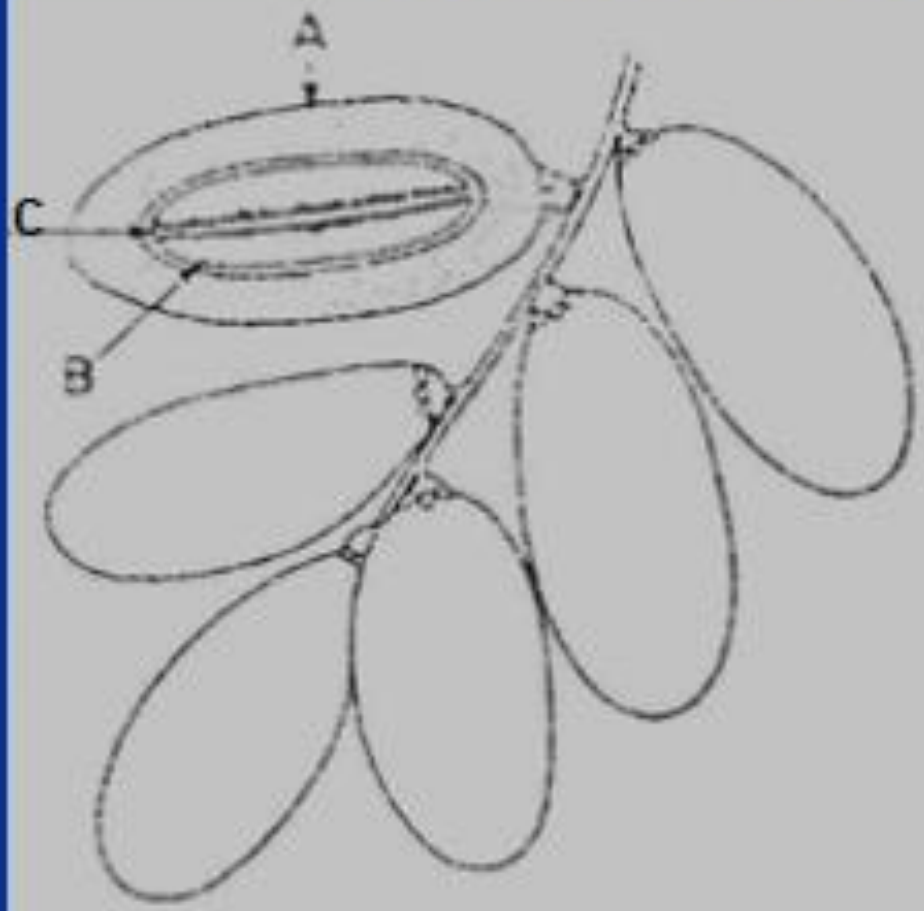


WORLD OUT LOOK- DATE PALM

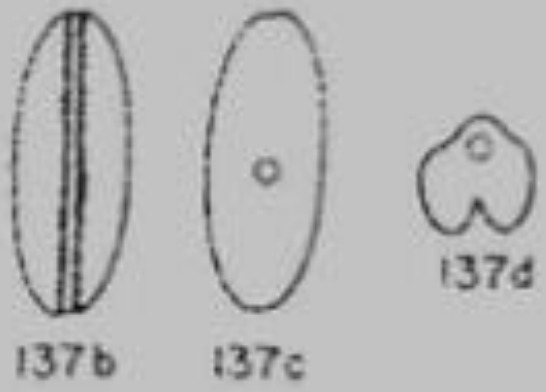
EXPORT EARNINGS ($ per Mt)



Morphology of dates



137c One of the dates shown in L. S.
A. Fleshy pericarp
B. Seed of the berry
C. Deep furrow of the seed



137 b Seed, side with the deep furrow
137 c Seed, opposite side marking the embryo by a protuberance
137 d Seed, T. S. passing through the embryo

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

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

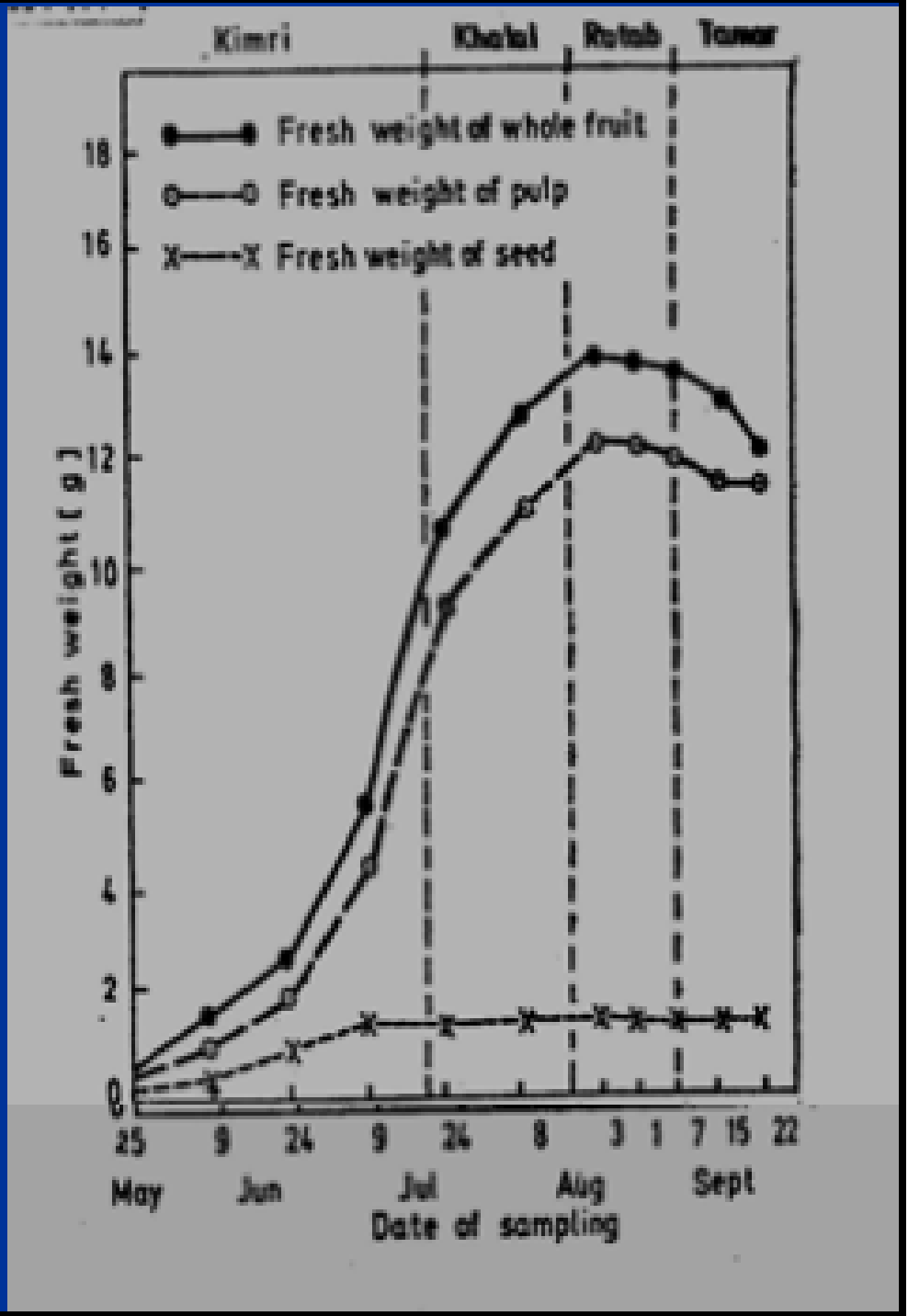
Rutab Stage of Development of Hayany Dates

Tamar Stage of Development of Deglet Noor Dates

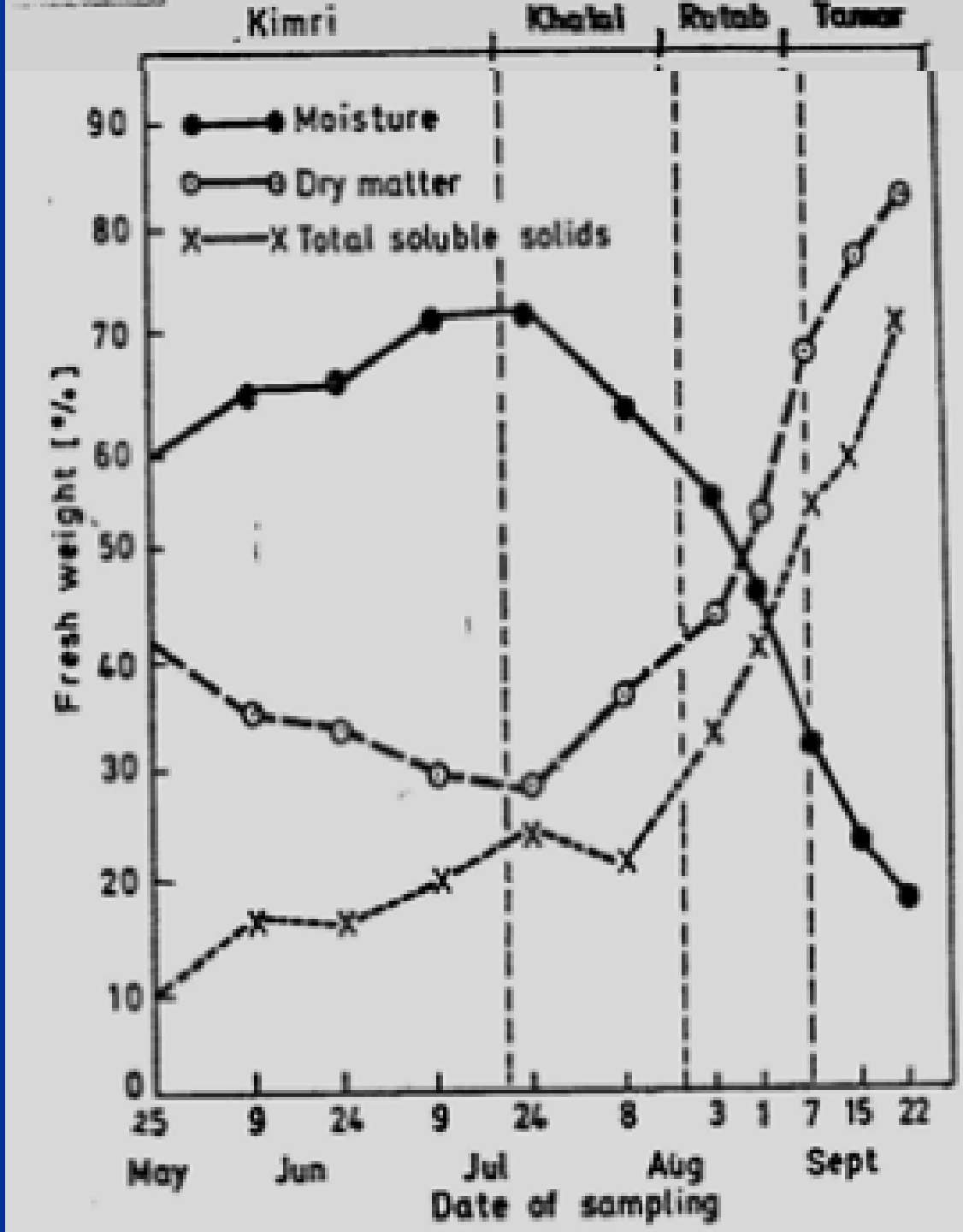
Moisture Contents at Various Stages of Development

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

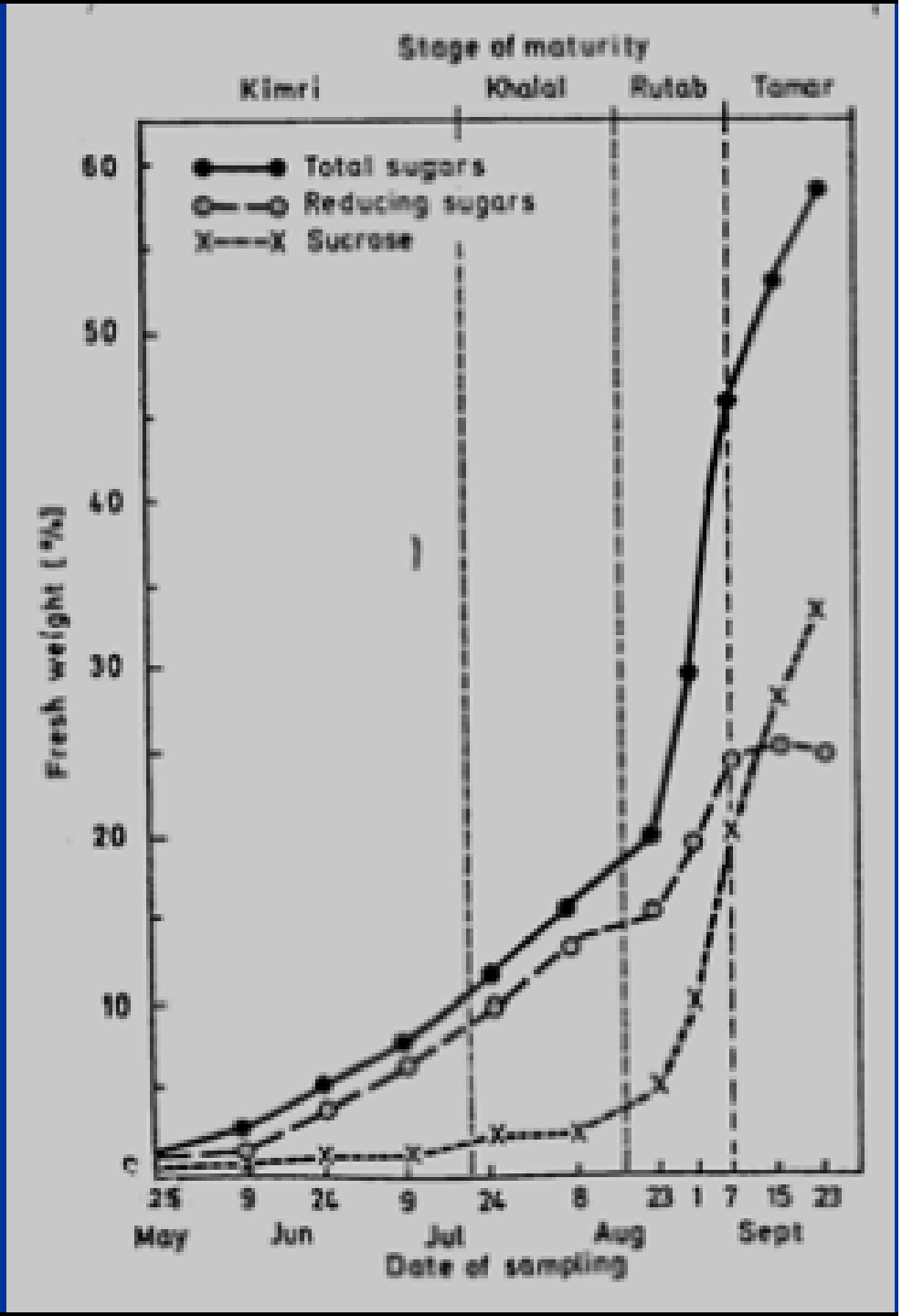
Physical and compositional changes during growth and development of dates-1



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



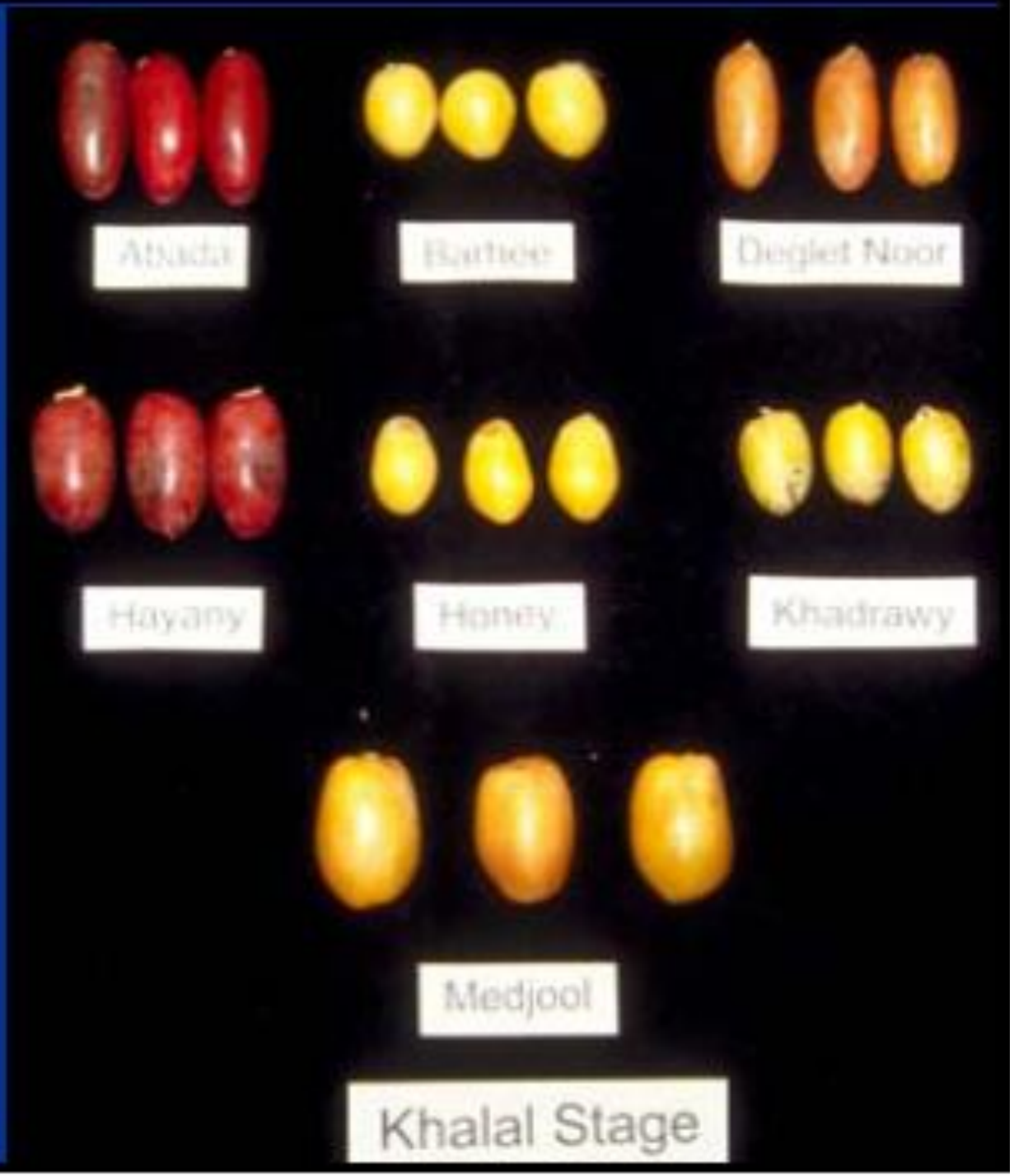
Physical and compositional changes during growth and development of dates-3



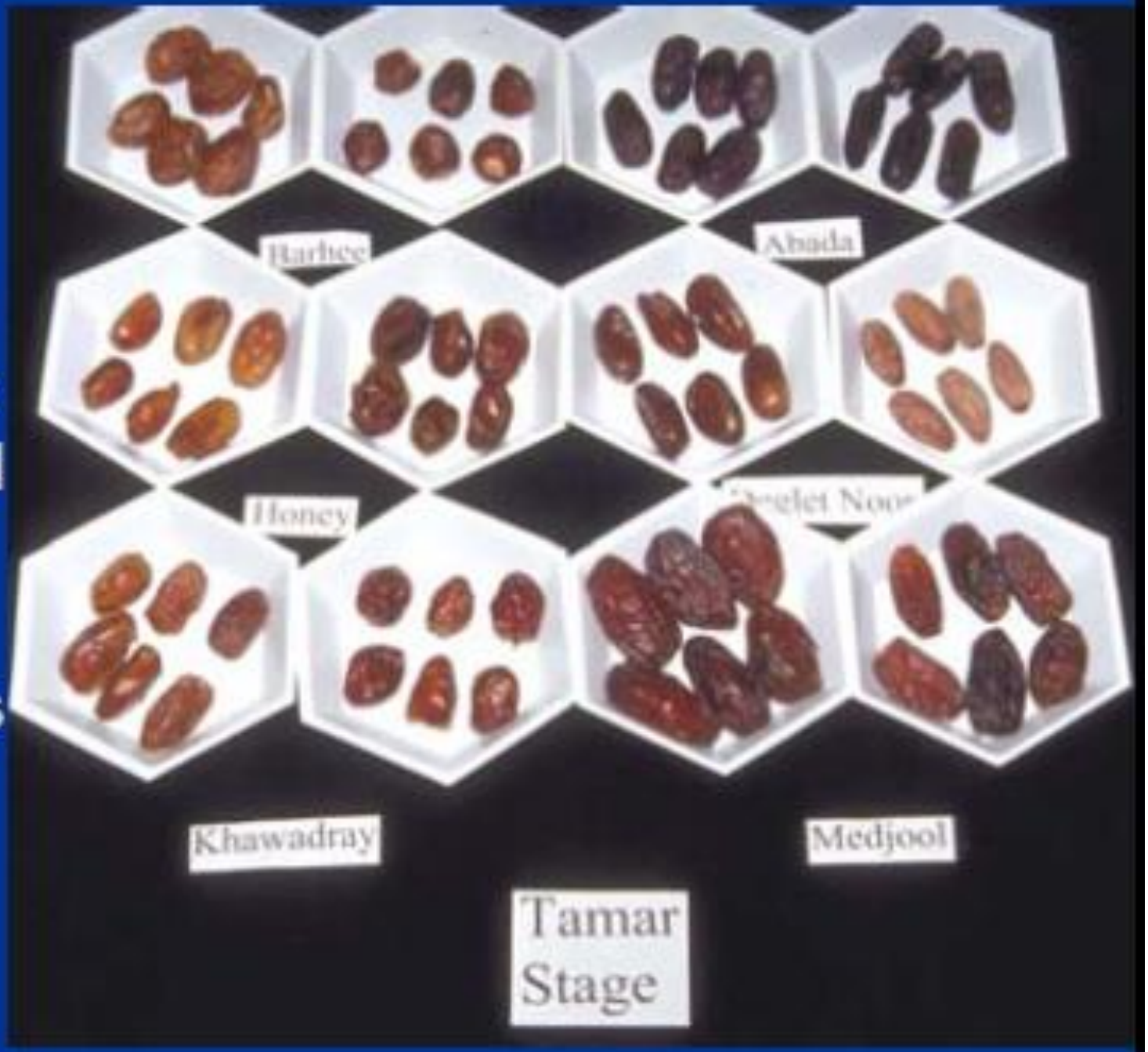
Maturity Indices for Dates

Size and shape
Skin color
Flesh color
Flesh firmness
Soluble solids content

Genotypic differences in color of khalal stage dates



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

Date Harvesting in California-2

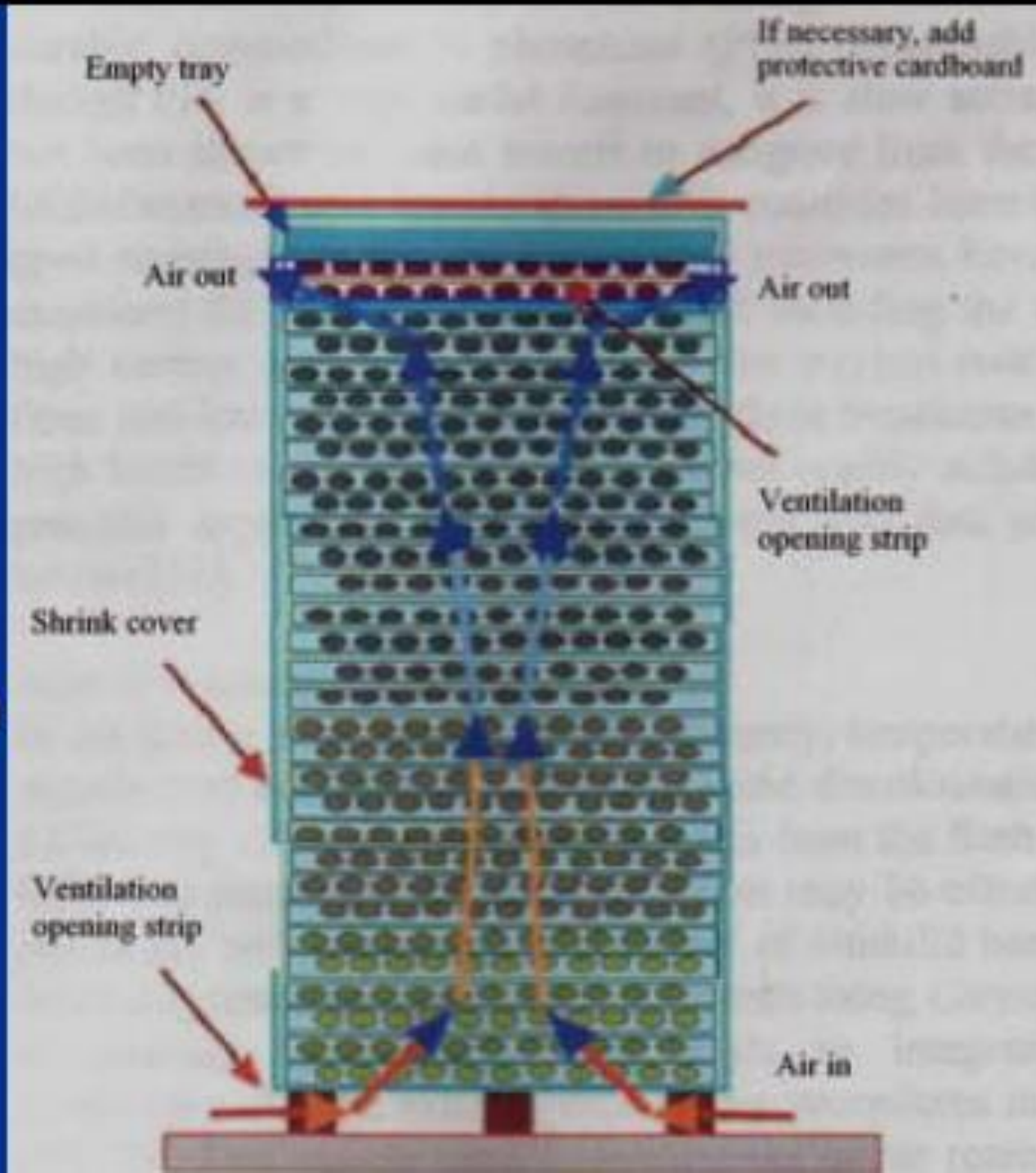
Date Harvesting in California-3

Date Harvesting in California-4

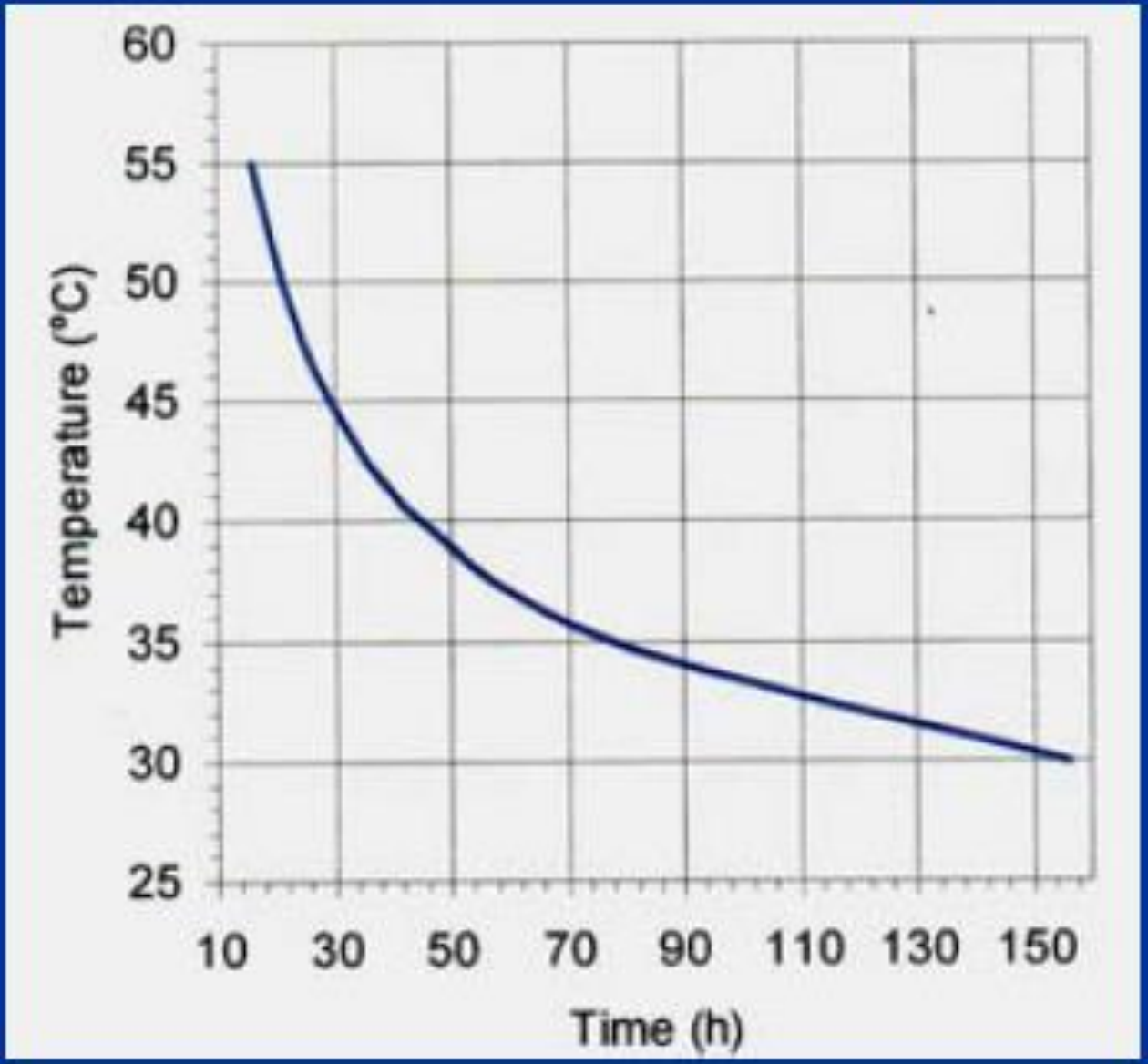
Sun Drying of Dates

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 ºC 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 backed 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

OUR FINEST MEDJOOL GIFT PACKS

(4-1/2 lbs. pictured)

Known for their exceptional flavor and size. Our world famous Medjool Dates are unequaled 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 canister. 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

Order Toll Free
800-827-8017

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

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

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

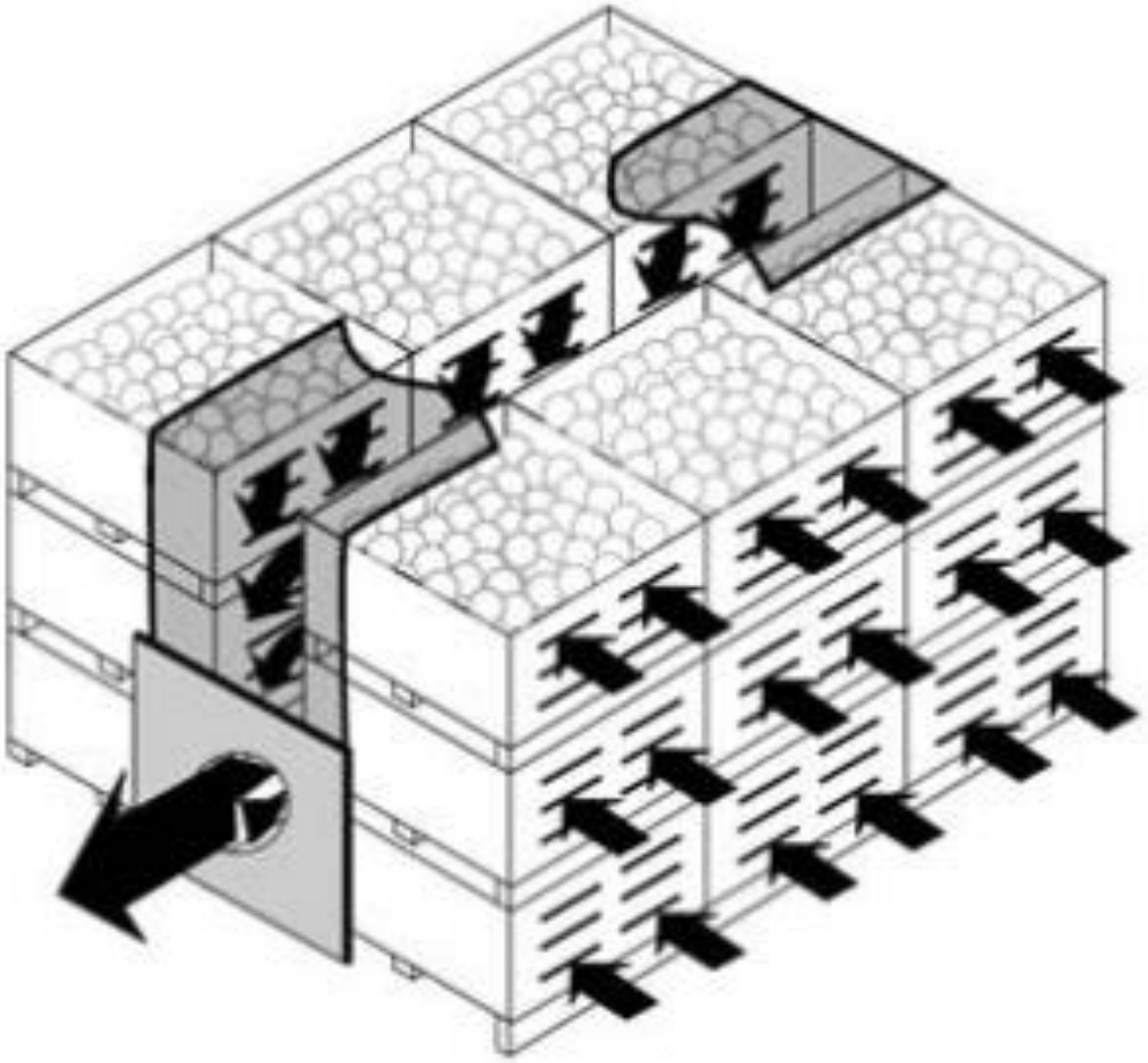
Shipping Containers for Produce

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.



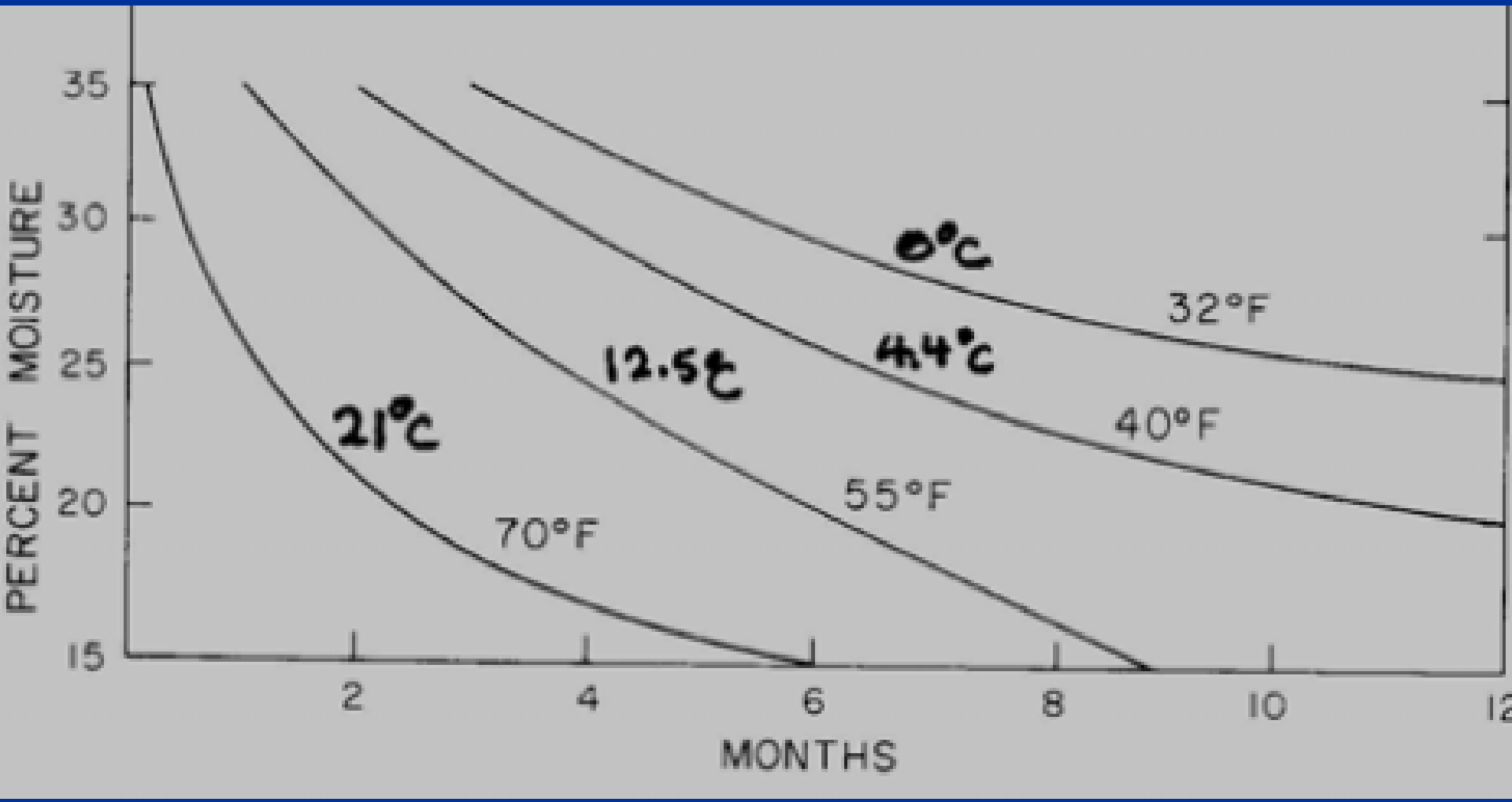
Cold Storage Facilities

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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