



SIGNIFICANCE OF HORTICULTURE



Hort. Industry

- Provides

- Essential components of our daily diet
- Meet individual aesthetic needs
- Occupation for workers in prod. Phases
- Business for merchants
- Exercise & small income for amateurs

Enhances

physical and mental health and
economic prosperity of individuals and nations



1. Dietary Importance

- Complete food
 - CH_2O
 - Proteins
 - Fats
 - Vitamins
 - Minerals
 - Roughages and fiber

Hort. Foods are excellent source of all essential components of human diet

Max. value of diff. components in edible portion of fruits

Food Components	Richest fruit source	Amount available (%)
Water content	strawberry	90
Proteins	almonds	21
Fats	Pecan nuts	70.5
Ash	Almond	2
Fiber	guava	4.8
Sugar	date	72
Acid		
Citric acid	Lime	5.9
Malic acid	strawberries	1.6
Feul value/lb (cal)	pecans	3330

Source: USDA Cir. 50



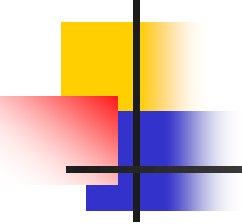
Max. Nutritive values of 1 lb. of veg. foods

Food Components	Richest veg. source	Amount available
Refuse %	Cauliflower and peas green	55
Proteins (g)	Peas green	13.7
P (mg)	Peas green	249
Food energy (Cal)	Sweet potatoes	488
Fats (g)	Sweet potatoes	2.7
CH ₂ O (g)	Sweet potatoes	108.8
Ca (mg)	Turnip greens	987
Fe (mg)	chard	15.6



Max. Nutritive values of 1 lb. of veg. foods

Food Components	Richest veg. source	Amount available
Vit A (Int. Units)	Carrot	48000
Riboflavin (mg)	Turnip greens	2.15
Ascorbic Acid (mg)	Turnip greens	518
Niacin (mg)	Summer squashes	5.0
Thiamin (mg)	Peas green	0.72

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- Hort. Sector 30% of consumed food
 - Banana, potato and sweet potato are potential energy producing crops
 - On per acre basis
 - Potato & banana >calories than wheat
 - Potatoes 4th most imp. food crop in the world
 - ^ prod. >>>>> v decrease pressure on grain yield
 - Peacan, peaches and beans are high in proteins
 - Avocado, olive and nuts are high in fats
 - Spices and beverages high in pleasure
 - Fruit and veg. provide vit. And minerals lacking in staple food

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Vit. Deficiency symptoms and food source

Vit. A:

Skin diseases

Night blindness

Kidney stone

Source: Orange and dark green color fruit and vegetable, respectively.

■ Vit. C:

Hemorrhage

Swollen gums

Decrease body resistance against infection

Source: Guava, citrus, tomato and melons

■ Vit. E:

Sterility

Increase risk of heart diseases

Lung cancer

Source: Onion, lettuce, oranges, banana, avocado.

Dr Muhammad Rashid Shaheen



Vit. Deficiency symptoms and food source

- **VIT B:**

Berry berry

Loss of sensation

Heart enlargement

Source: Many fruits and vegetables

- **VIT D:**

Ricketts and softening of bones in children

Source: Green leafy vegetable

- **VIT F:**

blood clotting

Source: spinach and other leafy vegetables



Minerals

Important role in development of human body regulate metabolic activities.

- Important minerals are Ca, Na, P, Co, Cu, Mg, Fe and I.

a) Calcium:

Deficiency effects

Contractibility of muscles

Blood coagulation

Heart beat and bones.



Minerals

P:

Constituent of Nucleic acid.
Helps in energy transformation.

Fe:




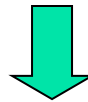


Oxygen carrier
Deficiency cause anemia

I:

Required for normal functioning of thyroid gland
Sources: fruit juices, seed pods, leafy vegetables ,apple,
apricot and dates.



Variability in nutrition values

- Cultural condition
- Stage of consumption
 - Test in field and after harvest
-  soil N   Ca in vegetables & effects protein comp.
-  soil B   riboflavin & carotene
- Rainfall and sun light received by crop influence Vit. C contents.

Variability in nutrition values

- In Storage

-  temp.  respiration   water & vitamins.

- loss of vitamins due to heat (cooking) and leaching.

- **Best to use fresh/raw fruits and vegetables.**

- Fruit quality deterioration during storage

- Banana brown color development below 56°F
 - citrus store below refrigeration
 - Apple low temp. chilling injury
 - Dry fruits store at 72°F.



2. Economic Position

Prod. Is not too bad but supply often falls short to fulfill requirements.

- ↑ production required to ↑ nutritional status of peoples.
- Higher net returns than Agro crops.

Phases of Investments in Post-harvest Hort.

Handling

Processing

Marketing.

- ↑ flow of capital ↑ economic activity & jobs.
- Fruits and ornamentals are investment for future as
 - timber and fire wood.
- Raw material of industries
 - paper, perfumes, cosmetics, and furniture.



Aesthetic values

- beauty and pleasure are qualitative measures
- differ from person to person
- Elements of plant beauty combined to give max. utility
- Hort therapy

Role in environment

Act as lungs

decrease soil erosion

Hardy plants (guava, ber, date) for waterlogged soils.

Wind breaks improve micro and macro climate



Medicinal plants

- falsa, sweet lime, jaman cooling effects
- grape fruit dieting patients
- bitter gourd and jaman diabetes patients



Classification of Hort. Crops

- Types of classification
 - Horticultural
 - Botanical
- Horticultural Classification
 - Logically conceived systems of description, nomenclature and identification of plants
- Ways
 - Growth habit and physiological characteristics
 - Life span
 - Flowering Habits
 - Temp. relation
 - Uses
 - Morphology
 - Cultural requirements



Horticultural Classification of Hort. Crops

a. Growth habit & physiological characteristics

- Succulents:

- Foliage plants with tender and watery stem & leaves.

- Herbaceous:

- Herb self supporting succulent,
- tender stem either drooping or self supporting
- e.g. most of vegetables.

- Woody:

- self supporting woody plants e.g trees and shrubs.



a. Growth habit & physiological characteristics

- Classification of tree & shrub

Tree

Single central stem

Taller

May vary with environment and training practices.

Shrub

one or more stem

smaller

- Plants with trailing /climbing stems may be woody/non-woody.
- Vine
 - Climbing plant with non woody stem
- Liana
 - A climbing plant with woody stem



A. Growth habit & physiological characteristics

- Evergreen
 - Plants with persistent leaves
 - Tropical in origin
 - Eg. Citrus, mango, date, guava, litchi, coconut, olive, ber, banana, chiku, pineapple, fig, mulberry, and papaya etc.
- Deciduous:
 - Plant shedding their leaves in winter
 - e.g Apple, pear, peach, plum, apricot, almon, cherry, strawberry, grapes, wlanut, pistachio, pomegranate and falsa

B. Classification based on life span

■ Annuals

- complete life cycle in one growing season.
- many vegetables and seasonal flowers.

■ Biennials

- complete life cycle in two growing seasons.
- Ist season
 - vegetative with short internodes and rosettes
- IIInd season
 - bolting (sends up flowering stalk with long internodes bearing flowers and fruits)
- root vegetables (Carrot, beet, radish)
- leafy vegetables (Lettuce and cabbage)
- & onion.

Climate is critical factor in determination of the life cycle

Most of the above vegetables are treated as annuals ?



B. Classification based on life span

■ Perennials

- Grow for years and woody.
- Growth
 - Juvenile (vegetative for several yrs.)
 - Mature (veg. + reproductive)
- all fruit and ornamental trees and shrubs.
- Herbaceous plants like asparagus, potato & bulbs
- Above ground parts are killed in winter while
- Underground storage structures survive
- Brinjal and tomato perennial in tropical climate
 annual in temperate climate
 b/c of winter killing



C. Classification based on flowering habits

Acc. to functionality of parts

- Unisexual/imperfect
 - Having one of the male/female floral parts on the flower
- Bisexual/hermaphrodite/perfect
 - Both male and female parts present on same flower e.g. peas.

Acc. to presence/absence of floral parts

- Complete flower.
 - All four whorls present.
- Incomplete flower.
 - Anyone absent.



C. Classification based on flowering habits

Acc. to availability of male/female parts on the plant

- Monoecious:
 - Male and female parts on the same flower/plant.
 - e.g., mango, citrus, cucurbits and walnuts.
- Dioecious:
only one sex present on one plant.
 - e.g., Date and papaya, spinach, asparagus, beet
- Polygamous
 - having all male, female and hermaphrodite flowers on the same plant
 - Watermelon, fig, mango



D. Classification based on temperature relations

- Temp. requirements for growth and tolerance to low temperature

Acc. To growing season (Vegetables)

- Summer
 - grown year round in entire lower sindh-frost free area
- Winter
 - Grown in plains of Punjab
 - Easily cultivated in summer at high altitudes



D. Classification based on temperature relations

Acc. To growing season (Vegetables)

- Cool season crops
 - Max. 80-85°F
 - Min. 35-40°F
 - Opt. 65°F
- Warm season crops
 - Opt. above 80°F
 - Min. below 50°F (can't grow)
 - Frost sensitive



D. Classification based on temperature relations

Acc. To growing season (Fruits)

- Temperate:
 - Mostly deciduous.
 - Required chilling to flower
 - e.g., apple, pear, plum and peaches.
- Sub tropical:
 - Can tolerate frost
 - e.g., citrus, guava and grapes.
- Tropical:
 - More sensitive to low temp.
 - e.g., banana, papaya and mango.



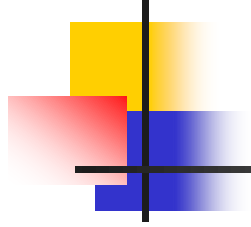
D. Classification based on temperature relations

Acc. To growing season (Fruits)

- Both tropical and sub tropical are
 - native to warmer climate,
 - frost sensitive,
 - needs hardening in late summer.

According to ability to withstand low winter temperature.

- tender not resistant
- hardy resistant



THANKS
ANY QUESTIONS



Next lecture

- Significance of Hort. Contd.