



HARVEST AND POST HARVEST HANDLING OF APPLES



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Importance

- Highly nutritious fruit
- It has carbohydrates, proteins, vitamins and minerals especially iron.
- Its is used as fresh fruit and juices, jams, jellies, marmalade etc.

Importance

- **Area** **235,400 Acres**
- **Production** **669,910 tons**

Areas

- **Restricted, Hilly tract, Punjab-Murree, Quetta**
- **Region of Balochistan and KPK**

Varieties

- Red Delicious
- Golden Delicious
- Kulu
- Amri

▶ **Red Delicious**

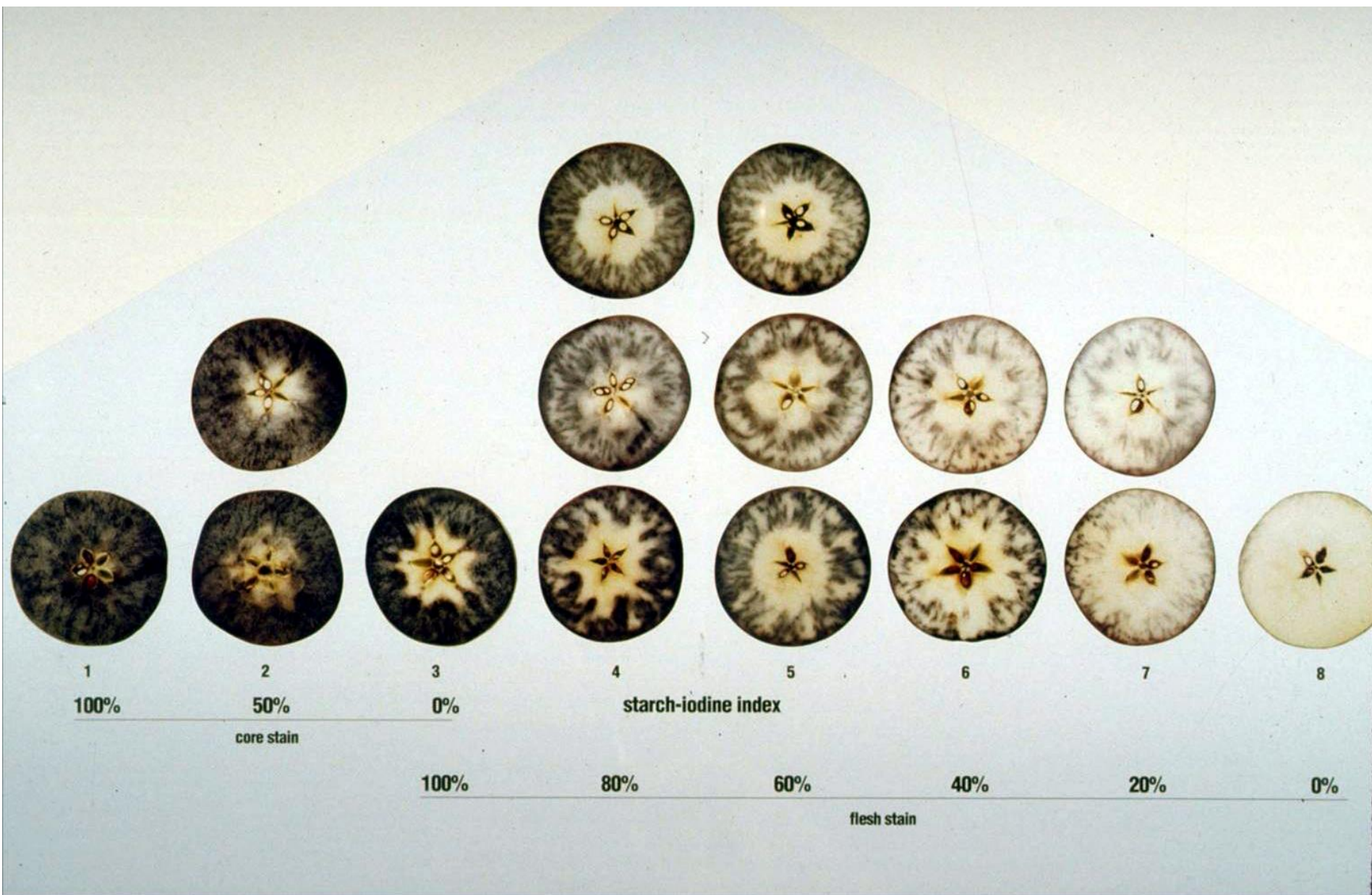


▶ **Golden Delicious**



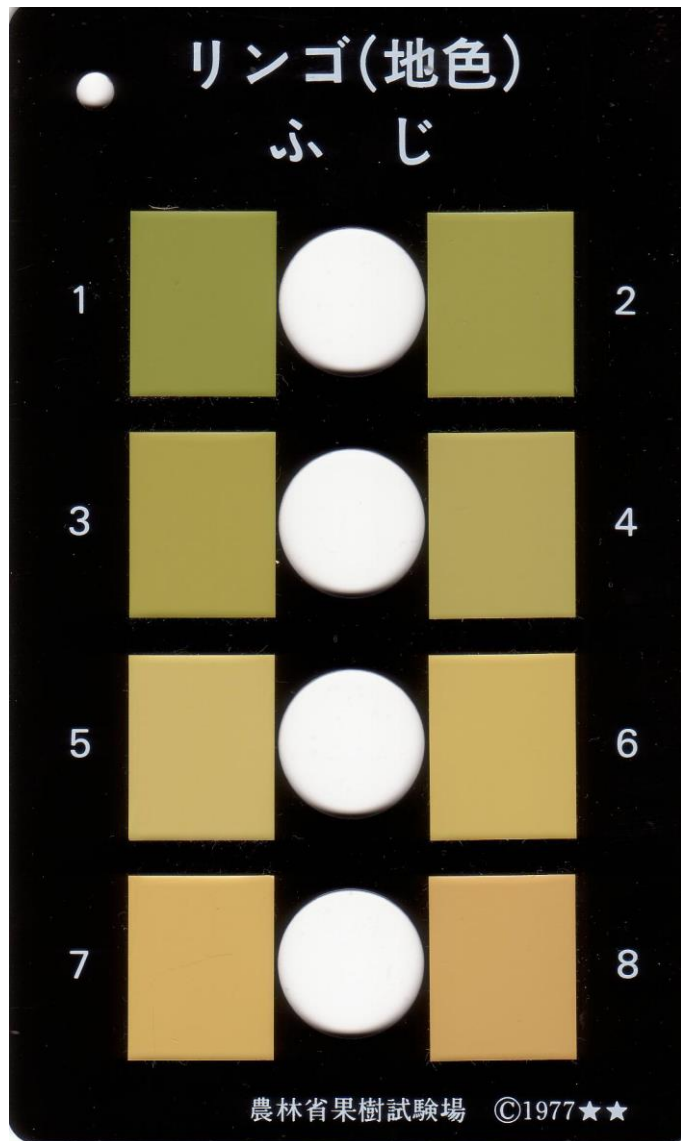
Maturity Indices

- Skin colour
- Seed colour
- Flesh firmness
- Starch contents
- Soluble solid contents
- Acidity
- Respiration rate
- Ethylene production rate
- Flavor

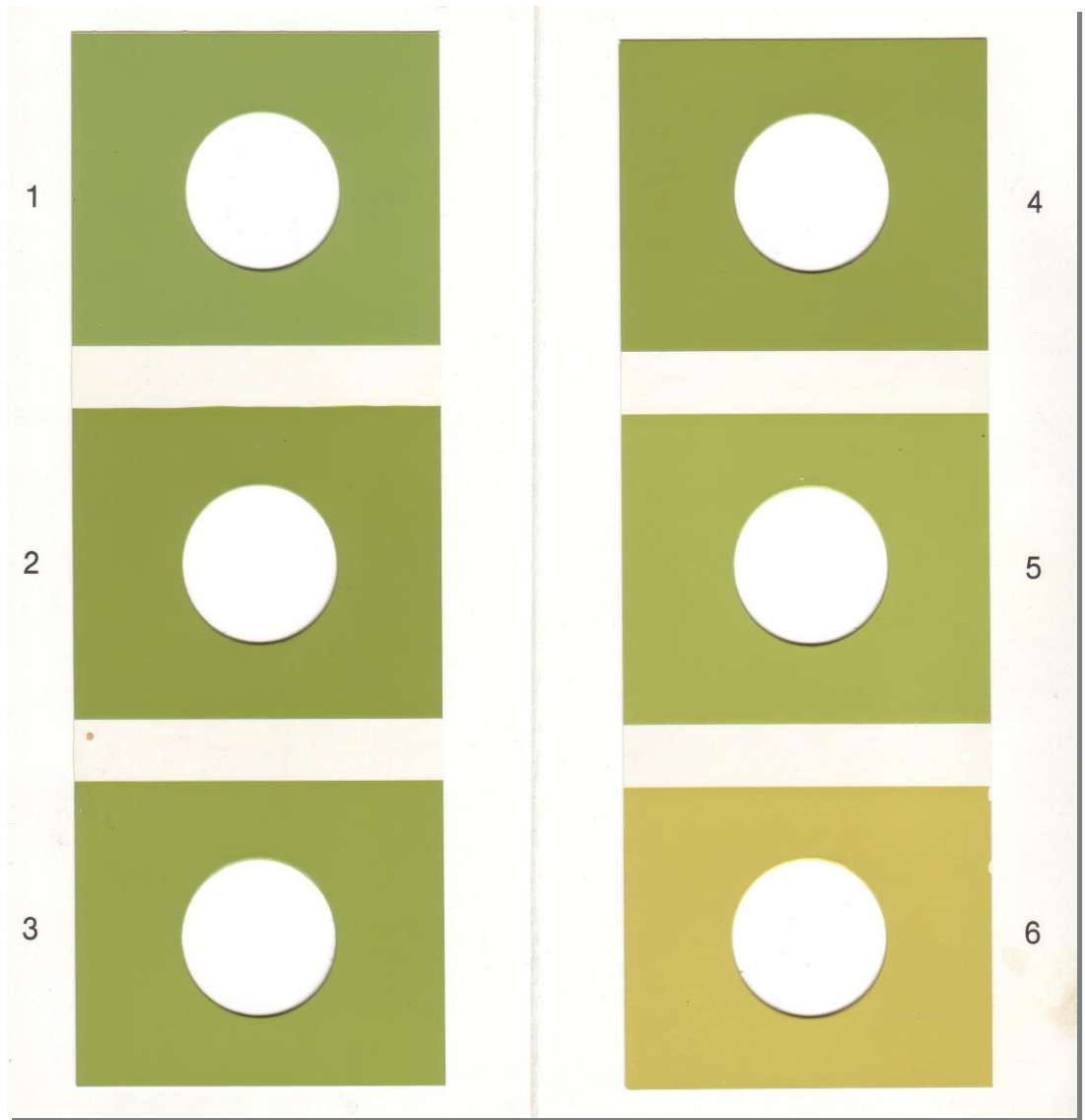


Apple Starch Staining Pattern Chart (Cornell University)

Apple Color Charts



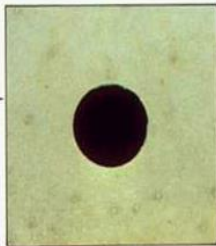
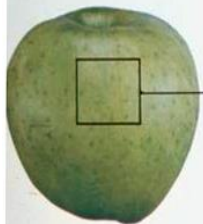
Fuji



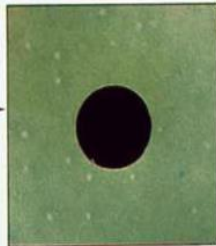
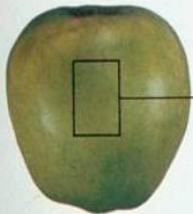
Golden Delicious

Visual Aids For US Standards For Grades Of Apples

GOLDEN DELICIOUS (YELLOW VARIETY)

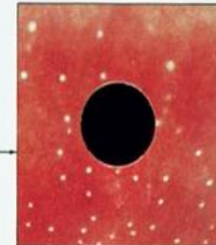
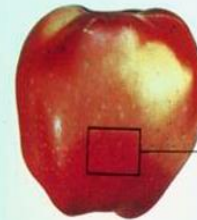
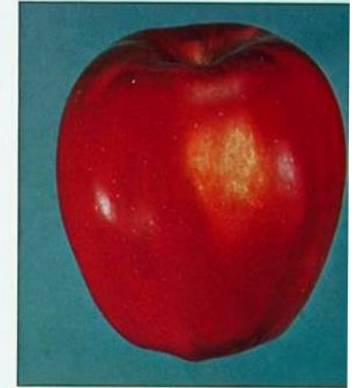


MINIMUM WHITE OR
LIGHT GREEN COLOR.

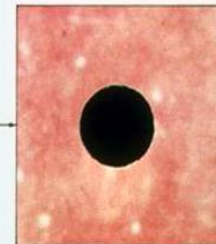
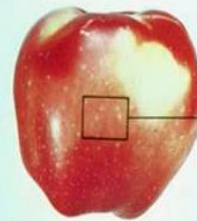


CHARACTERISTIC COLOR.

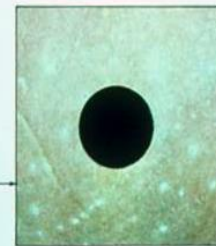
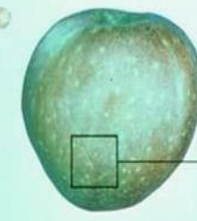
RED DELICIOUS (RED SPORT VARIETIES)



MINIMUM GOOD SHADE
OF SOLID RED COLOR.



"MINIMUM COMPENSATING
COLOR": COLOR LIGHTER
THAN A GOOD SHADE
OF RED.



NOT TO BE CONSIDERED
AS COLOR.

Harvesting

- Manual picking in bags
- Transferred to field bins
- Transported to pack house
- Avoid bruising or injury to fruit

Washing

- At pack house fruit unloaded and washing is done.
- Portable water should be used for washing.

Sorting/Grading

- Sorting and grading is done to remove fruits having defects.
- Electronic colour and size sorter are used in large pack houses.
- Manual sorting can also be done.

Packing

- Packing is done after grading
- Several consumer grades are formed
- Fresh market apples are tray packed
- Bagging is also done to save fruits from injury

Storage

- Apples should be stored at 0 °C
- Relative humidity should be maintained at 90-95%
- Storage time may be up to 9 months
- Modified gaseous concentrations have shown positive results

Apple Disorders

Bitter Pit

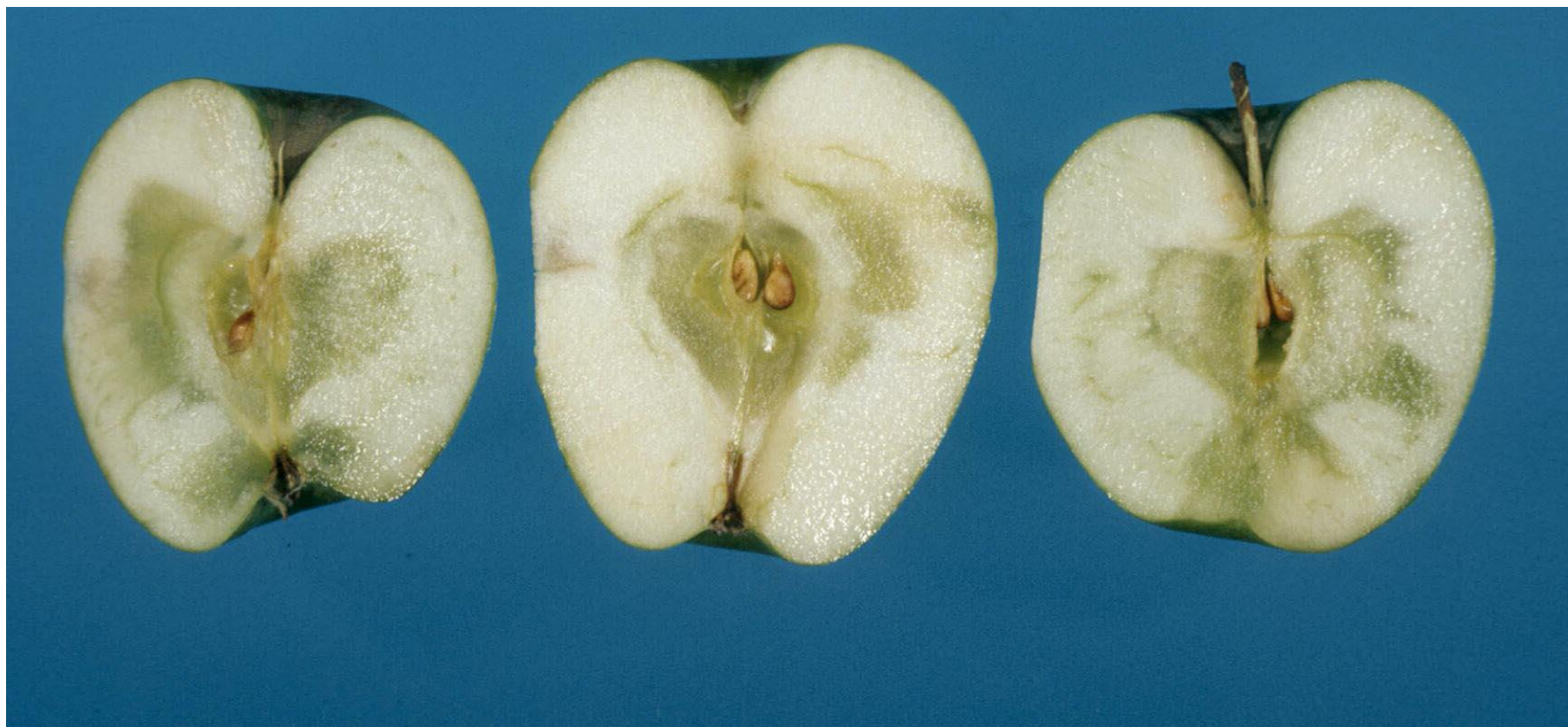
- Development of dark, dry spots near or below the fruit surface especially at calyx end.
- Problem can be controlled by
 - Rapid cooling during storage
 - Calcium sprays before harvest

Bitter Pit



Water Core

- Water soaking symptoms, resulting from flooding of intercellular spaces by fruit solution.
- Its more in calcium deficient fruits and from young plants.
- Fruits should early marketed
- Delay in cooling (1-2 days)



Water core



Compression Bruises

Thank You

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