

Apple

Disorders

Bitter Pit :

This is a physiological disorder, which reduces the fresh market quality of fruit. Young trees that are just coming into bearing are the most susceptible. Immature fruit are more susceptible to bitter pit than fruits harvested at the proper maturity stage.



Small brown lesions of 2-10 mm in diameter (depending on the cultivar) develop in the flesh of the fruit. The tissue below the skin becomes dark and corky. At harvest or after a period in storage the skin develops depressed spots on the surface.

These spots appear as water soaked spots on the skin near the calyx. The spots generally turn darker, become more sunken than the surrounding skin and get fully developed after one or two months in storage.

Control : Calcium sprays prior to harvest and calcium dips before storage control the incidence of bitter pit. The plants should be sprayed 45 days prior to harvest followed by a repeat spray after 15 days. The post-harvest dip for 1-2 minutes should be given before storage.

Brown Heart :

This physiological disorder is associated with large and overmature fruits. It can also occur when the CO₂ concentration in storage increases above 1%. The symptoms appear as brown discoloration in the flesh, usually originating in or near the core. Brown areas have well defined margins and may include dry cavities developed due to desiccation. Symptoms range from a small spot of brown flesh to entire browning of flesh with a margin of healthy white flesh remaining just below the skin. Symptoms develop early in storage and may increase in severity with extended storage time.

Control : Harvesting of overmature fruits should be avoided. In case of storage in controlled atmosphere (CA) the fruits should be harvested at optimum maturity. The CO₂ concentrations in CA should be below 1% to reduce the development of brown heart incidence.

Cork Spot :

The initial symptoms of this physiological disorder appear as small blushed area on the skin of the fruit above the affected brown spot. The affected tissue is usually much harder than the healthy tissue. Boron and calcium deficiencies are occasionally found responsible for development of cork spot.

Control : Proper nutrient management especially boron and calcium helps in preventing this disorder.

Scald :

This physiological disorder is a serious concern for apple growers. Susceptibility to this storage disorder varies with the variety of apple, environment and cultural practices. Incidence and severity



of scald is favoured by hot, dry weather before harvest, immature fruit at harvest, high nitrogen and low calcium concentrations in the fruit. Inadequate ventilation in storage rooms or in packaging boxes also promotes this disorder.

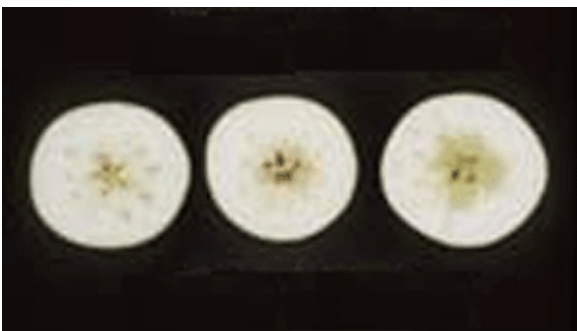
Irregular brown patches of dead skin develop within 3 to 7 days due to warming of the fruit after removal from the cold storage. The warm temperatures do not cause the scald but allow symptoms to develop from previous injury, which occurred during cold storage. Symptoms may be visible in cold storage when injury is severe.

Control : Harvesting at proper maturity and ventilation in cold storage help to reduce the scald incidence.

The most common method used to control scald is application of an antioxidant immediately after harvest. Diphenylamine (DPA) is commonly used. Ethoxyquin is also effective for some varieties, but can cause damage to other apple varieties. Antioxidants should be applied within one week of harvest for maximum control.

Water Core :

This physiological disorder is promoted by high leaf to fruit ratio, high levels of nitrogen and boron in the fruits, low levels of fruit calcium, excessive thinning, and exposure of fruits to high temperatures. Large



size fruits are mostly susceptible to this type of disorder. Disorder at pre-harvest stage results in the development of water soaked regions in the flesh. These regions are hard, glassy in appearance and only visible externally when infection is very severe. Severely affected fruits may smell and have a fermented taste. Water soaked areas are found near the core or on the entire apple. If symptoms are mild to moderate, they may disappear completely in storage.

Control : The most effective way to reduce the incidence is to avoid delayed harvests. As fruits approach maturity stage, samples of fruit should be examined for water core development. Fruit should be harvested before water core develops extensively. Fruits lots with moderate to severe water core symptoms should not be placed in controlled atmosphere (CA) storage but should be marketed quickly.

Sun Burn :



This physiological disorder occurs due to intense heat of the sun. Fruit on the southwest side of the tree are generally affected. Water stress can also increase the incidence of sunburn.

Initial symptoms are white, tan or yellow patches on the fruits exposed to the sun. With severe skin damage, injured areas of the fruit can turn dark brown before harvest. These areas may become spongy and sunken. Fruit exposed to the sun after harvest can develop severe sunburn.

Control : The best method of control is to avoid sudden exposure of fruit to intense heat and solar radiation. Proper tree training and pruning are critical. Summer pruning must be carefully done to avoid excessive sunburn. Pruned orchards should be regularly irrigated to reduce heat stress. Careful sorting to remove affected fruit upon packing is the only solution once the injury has occurred.

Russeting :

Russeting of apples in a humid environment is a major concern of the fruit growers. Russeting occurs shortly after petal fall. The apple cultivars, which have thin cuticle, are more susceptible to russeting. It is commonly noticed on exposed fruits than on fruits remaining in shade. Frost during the blossom or at the early fruit formation stage may also cause russeting. Russeting leads to rupture of the fruit skin and development of cracks.

Control : Selection of less susceptible clones and adequate irrigation, manuring and effective pest management can reduce russeting.

Fruit Drop :

Most of the commercial varieties of apple exhibit 3 cycles of fruit drop viz., early drop, June drop and pre-harvest drop. The early drop is considered natural and is due to lack of pollination and fruit competition. Moisture stress and environmental conditions cause the June drop. These two drops neither cause substantial economical losses nor are controlled effectively by artificial means. The pre-harvest drop causes serious economic loss as the full grown marketable fruits abscise before the harvest due to the reduction in the levels of auxins.

Control : The pre-harvest drop can be controlled by application with NAA (15 ppm) sprayed 20 days before the expected fruit drop or 20-25 days before the harvest.