

PEARS

Alternaria Rot

Surface dark brown to black. Decayed tissue gray to black, dry in center, gelatinous at edge, easily removable as core from surrounding flesh. Found late in storage season, usually at punctures. *Control:* Prevent skin breaks. Remove from storage on first appearance of trouble.

Blue Mold Rot (*Penicillium*)

See Blue Mold Rot of Apples. Frequently appears in pears as small, flat, circular pin hole spots scattered over surface of fruit. *Control:* Prevent skin breaks. Lower temperature promptly to 31 F.

Brown Core

Anjou and Bartlett pears stored in sealed, polyethylene-lined boxes with inadequate permeability may show various degrees of pithy brown core and desiccated air pockets. Prolonged storage in concentrations of 4 percent or more CO₂ often produces brown core particularly when pears are of advanced maturity when harvested or are cooled slowly after packing. *Control:* Harvest at proper maturity. Cool promptly. Store at 30 to 31 F. Use perforated film liners to maintain CO₂ level at 1 to 3 percent.

Core Breakdown

Often accompanies scald. Soft, brown breakdown in core area having acid, disagreeable odor of acetaldehyde. *Control:* Do not allow pears to become overmature on tree. Cool promptly. Store at 30 to 31 F. Ripen fruit between 65 and 75 F.

Freezing Injury

Bartlett and Anjou pears exposed for 4 to 6 weeks just below their freezing point develop glassy, water-soaked external appearance with tan pithy area around core. Pears frozen sharply may break down completely or show abruptly sunken large pits where slightly bruised while frozen. *Control:* Keep transit and storage temperature above 29 F.

Gray Mold Rot (*Botrytis*)

Extensive, firm, dull, brown, water-soaked decay with bleached border. Dirty white to gray extensive mycelium forming nests of decayed fruit. *Control:* Wrap fruit in copper-impregnated paper. Cool promptly to 31 F.

Scald

Often accompanies core breakdown. Brown to black softening of large areas of skin and tissues immediately beneath. Affected areas slough off readily. Acetaldehyde odor and flavor prominent. *Control:* Pick before overmaturity. Cool promptly. Store only for proper period. Cannot be controlled by oiled paper wraps.

Anjou Scald

Anjou pears are often affected with a surface browning more superficial than common scald and distinct from it, resembling apple scald. Anjou scald is controlled by oiled paper wraps, the same as apple scald.

PINEAPPLES

Bacterial Fruitlet Brown Rot (*Erwinia*)

Little or no external discoloration. On cutting, fruitlets show brown mottling. Decay moderately firm. *Control:* Control measures have not been developed.

Black Rot (*Ceratostomella*)

Affected tissues extensive, soft, leaky, ranging from normal to jet black in color. *Control:* Treat freshly cut stem parts with 2.5 percent solution of benzoic acid in 30 percent alcohol. Prevent bruising. Cool to 50 to 55 F.

Brown Rot (*Penicillium; Fusarium*)

Brown, firm decay starting at eyes or cracks. Common on overripe fruit. *Control:* Provide good growing conditions. Move before fruit is overripe.

PLUMS

See Cherries since the diseases are the same.

STRAWBERRIES

Gray Mold Rot (*Botrytis*)

Brown, fairly firm, fairly dry decay. Dirty-gray mold and grayish-brown velvety spore masses present. Nesting common. *Control:* Handle carefully to prevent skin breaks. Cull out all diseased berries. Cool promptly to 40 F or below.

Leather Rot (*Phytophthora*)

Slightly discolored large tough areas with indefinite purplish margins. Vascular system browned, flavor bitter. *Control:* Mulch plants to keep berries from contact with infested soil. Cool promptly to 40 F or below.

Rhizoctonia Rot

Hard dark brown decay on one side of berry, usually small quantities of soil adhering. Develops but little after harvest. *Control:* Mulch plants to keep berries from contact with infested soil. Cull thoroughly.

Rhizopus Rot

Mushy, leaky collapse of berries associated with coarse black mycelium and sporangia. Extensive red staining of containers from leaking juice. *Control:* Reduce temperature promptly to 40 F or below. Handle carefully to prevent skin breaks.

ARTICHOKE (Globe)

Gray Mold Rot (*Botrytis*)

Most common decay of harvested artichoke. Reddish brown to dark brown firm rot. (See Table 1, Note 2.) *Control:* Practice sanitation in field. Refrigerate promptly. Store in dry place.

ASPARAGUS

Bacterial Soft Rot

Mushy, soft, water-soaked areas on tips and cut ends. (See Table 1, Note 1.) *Control:* Avoid excessive bruising of tips; pre-cool to 40 F.

Fusarium Rot

Water-soaked areas changing through yellow to brown, chiefly on tips. White to pink delicate mold. *Control:* Pre-cool and ship at temperatures of 40 F or lower. Handle promptly. Keep tips dry on market.

Phytophthora Rot

Large, water-soaked or brownish lesions at side of cut stalks. Lesions later extensively shriveled. *Control:* Pre-cool to 40 F. Maintain low transit temperatures. Market promptly.

BEANS

Anthraco-nose (*Colletotrichum*)

Circular or oval, sunken spots; reddish brown around border with tan centers that frequently bear pink spore mounds. *Control:* Use resistant varieties. Plant disease-free seed. Refrigerate harvested beans promptly to 45 F.

Bacterial Blight (*Pseudomonas*)

Small, greasy-appearing, water-soaked spots in pod. Older spots show red at center with water-soaked area surrounding and penetrating to seed. *Control:* Keep field sanitary. Rotate crops. Use disease-free seed. Reduce transit temperature promptly to 45 F.

Bacterial Soft Rot (See Table 1, Note 1.)**Cottony Leak (*Pythium*)**

Pods with large, water-soaked spots accompanied by abundant white cottony mold. *Control:* Sort out diseased pods in packing. Reduce transit temperature promptly to 45 F.

Freezing Injury

Slight freezing results in water-soaked mottling in surface of exposed pods. Severely frozen beans become completely water-soaked, limp, and dry out rapidly. Snap beans freeze at about 30.5 F.

Diseases and Deterioration of Products

Table 1 Notes on Diseases of General Occurrence

Note 1. Bacterial Soft Rot

On various vegetables occurs as dark green, greasy or water-soaked, soft spots and areas in leaves and stems. Soft mushy yellowish spots or soupy areas on stems, roots and tubers of vegetables. Frequently accompanied by repulsive odor from secondary invaders. *Control:* Use sanitation practices during picking and packing to reduce contamination of harvested product. Where possible, reduce excessive atmospheric humidity, avoid bruising and injury. Shade harvested produce in field and reduce temperature promptly to 40 F or lower, for commodities that can withstand low temperatures.

Note 2. Gray Mold Rot (*Botrytis*)

Decayed tissues fairly firm to semi-watery. Water-soaked, grayish-tan to brownish in color. Gray mold and grayish-brown velvety spore masses conspicuous. *Control:* Use sanitation practices during harvesting and packing. Avoid wounds as much as possible. Lower the atmospheric humidity. Use storage and transit temperatures as low as otherwise practicable since decay progresses even at 32 F.

Note 3. Rhizopus Soft Rot

Decayed tissues water-soaked, leaky, softer than those with gray mold rot or watery soft rot but not as soft as those with bacterial soft rot. Coarse mycelium and black spore heads develop under moist conditions. Nesting common. *Control:* Insofar as possible avoid injury and bruising. Reduce temperatures promptly and maintain below 50 F, for commodities that can withstand low temperature.

Note 4. Watery Soft Rot (*Sclerotinia*)

Decayed tissues water-soaked, slightly pinkish or brownish-tan, very soft and watery in later stages, accompanied by development of fine white to dingy cottony mold and large oval black bodies called sclerotia. Nesting common. *Control:* Use sanitary practices in harvesting and packing. Cull out specimens with discolored or dead portions. Maintain as low temperatures as practicable because rot progresses even at 32 F. Better not to store commodities known to have watery soft rot present at harvest.

Russeting

Chestnut-brown or rusty, diffuse surface discoloration on both sides of pods. *Control:* Permit no surface moisture on warm beans. Cool promptly, avoid temperatures lower than 45 F.

Soil Rot (*Rhizoctonia*)

Large, reddish-brown, sunken, decayed spots on pods. Cream-colored or brown mycelium and irregular, chocolate-colored sclerotia may develop. Nesting common. *Control:* Maintain transit temperatures of 45 to 50 F.

Watery Soft Rot

Presence of large black sclerotia in white mold helps separate this from Cottony Leak. (See Table 1, Note 4.)

BEETS

Bacterial Soft Rot (See Table 1, Note 1.)

CABBAGE

Alternaria Leaf Spot

Small to large spots bearing brown to black mold. This spotting opens the way for other decays. *Control:* Avoid injuries. Maintain low humidity and 30 to 34 F in transit and storage. Practice sanitation in storage rooms.

Bacterial Soft Rot

This slimy decay frequently starts in pith of cut stem or in leaf spots caused by other organisms. (See Table 1, Note 1.)

Black Leaf Spot

Small, sharply sunken, brown or black specks occurring anywhere on outer leaves or in leaves throughout the head. Occurs

under refrigeration in transit and storage and in association with decided temperature drops. *Control:* No effective control measures are known.

Freezing injury

Heads frozen slightly may thaw without apparent injury. Freezing injury is found first as brown streaks in stem, then as light brown water-soaking of heart leaves and stem. *Control:* Prevent any extended exposure to temperatures below 31 F.

Watery Soft Rot (See Table 1, Note 4.)

CARROTS

Bacterial Soft Rot (See Table 1, Note 1.)**Black Rot (*Stemphylium*)**

Fairly firm black decay at crown, on side, or at tips of harvested roots. *Control:* Avoid bruising. Store at 32 to 35 F.

Crater Rot (*Rhizoctonia*)

Circular brown craters with white to cream colored mold in the center. Develops under high humidity in cold storage. *Control:* Field sanitation measures. Keep humidity as low as possible in cold storage. Avoid surface moisture on storage roots.

Freezing injury

Roots flabby and upon cutting show radial cracks in flesh of central part and tangential cracks in outer part. *Control:* Prevent exposure to temperatures below 30 F.

Gray Mold Rot (See Table 1, Note 2.)**Rhizopus Soft Rot (See Table 1, Note 3.)****Watery Soft Rot (See Table 1, Note 4.)**

CAULIFLOWER

Bacterial Soft Rot (See Table 1, Note 1.)**Brown Rot (*Alternaria*)**

Brown or black spotting of curd. *Control:* Use seed treatment and field spraying. Keep curds dry. Maintain low transit temperatures. Store at 31 to 32 F.

Freezing injury

Repeated or severe freezing results in water-soaking of stem and parts of curd. Pronounced spoiled cabbage odor develops. Affected tissues are rapidly invaded by soft rot bacteria. *Control:* Protect from repeated or severe freezing.

CELERY

Bacterial Soft Rot (See Table 1, Note 1.)**Black Heart**

Brown or black discoloration of tips or all of heart leaves. Affected celery should not be stored because of rapid development of bacterial soft rot. Good cultural practices with special attention to available calcium. Harvest promptly after mature.

Early Blight (*Cercospora*)

Circular pale yellow spots on leaflets. In advanced stages spots coalesce and become brown to ashen gray. No development of spots in storage, but affected lots lose moisture and fresh appearance. *Control:* Control in field by spraying or dusting.

Freezing injury

Characteristic loosening of epidermis can best be demonstrated by twisting leaf stem. Severe freezing causes celery to become limp and to dry out rapidly. Freezing predisposes celery to watery soft rot and bacterial soft rot. The freezing point of celery is about 31 F.

Late Blight (*Septoria*)

Small (¼ in. or less), yellowish, indefinite spots in leaflet and elongated spots on leaf stalk bearing black fruiting bodies of pin-point size on surface and surrounding green tissue. Development of blight in storage probably negligible but it opens way for