Pome & Stone Fruits

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Pome & Stone Fruits

- Pome Fruits:
  - Apples & Pears (European & Asian) & Quince
- Stone Fruits:
  - Peaches:
    - Freestone (melting flesh; fresh market only)
    - Clingstone (mostly non-melting flesh; and mostly processed)
  - Apricot, Nectarine, Plum, Prune, Sour Cherry, Sweet Cherry

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Ripening Pattern

- Climacteric:
  - Apples, European and some Asian Pears
  - Apricot, Nectarine, Peach, Plum, Prune
- Non-climacteric:
  - Cherry
  - Some Asian Pears

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Maturity & Quality Standards

- Internal quality attributes
  - Sugars, acids, ratio, etc.
- Exterior attributes
  - Color, shape, size, freedom from defects, etc.

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Harvest

- No mechanical harvesting of fresh produce
  - Cherries for processing or prunes for drying are commonly harvested mechanically

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Optimum Temp & RH

- Almost all pome and stone fruit should be stored near 32F (0C)
- Chilling sensitive apple cultivars (incl. Yellow Newtown, McIntosh, some Jonathan, and some Grimes Golden) should be stored 34-40F (3-4C)
- Optimum RH for all is 90 to 95%

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Shelf Life

- Apples: 1 to 12 (in CA) months
- Pears: 2 to 7 months
- Apricot: 1 to 3 weeks
- Nectarine & Peach: 2 to 4 weeks
- Plum & fresh Prune: 2 to 5 weeks
- Sweet Cherry: 2 to 4 weeks

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MA or CA

- CA extends storage of apples and pears
  - Optimum conditions vary by variety but are often between 1-2% O_2 & 1-4% CO_2
- CA or MA of 10-15% CO_2 & 3 to 10% O_2 are used for cherries
- Responses to CA or MA of apricots, nectarines, peaches, and plums in not consistent

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Ripening Control Using 1-MCP (SmartFresh™)

- Application to preclimacteric fruit delays onset of ripening significantly
  - Used alone or with CA storage for about half of the U.S. apple crop
- Its use is complicated for other fruits because results depend on:
  - Maturity/ripeness at application
  - Concentration and exposure time
  - Temperature during and following treatment

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Ripening

- Ripening related changes:
  - Increased respiration and ethylene production
  - Softening
  - Increased sweetness
  - Loss of astringency
  - Development of aroma volatiles
  - Color change
- Preclimacteric fruit store better than postclimacteric fruit

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Ripening

- Optimum temperature for ripening are ~ 68 to 72F (20 to 22C) with RH of 90-95%
  - Temperature above 30C inhibits ethylene biosynthesis
- Ethylene treatments of 10 to 100 ppm can be used to accelerate ripening

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Ripening

- Pears tend to become mealy if ripened on the tree
  - Use cold storage (32F or 0C for 2 to 8 weeks) or ethylene treatments
- Pear preconditioning treatments:
  - Bartlett – expose to 100 ppm ethylene at 68-77F (20-25C) for 24 hrs.
  - d'Anjou – expose to 100 ppm ethylene at 68F (20C) for 2 to 3 days

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Physiological Disorders

- Apples:
  - Scald – Diphenylamine commonly used to control. Low O_2 concentrations (1%) can also control scald
  - Freezing injury
  - Chilling injury (some cultivars) – at 32-40F (0-4C)
  - Water core – faulty sugar (sorbitol) metabolism
  - Bitter pit – calcium deficiency
  - Different types of breakdown in different cultivars

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Physiological Disorders

- Pear:
  - Scald – same as apples
  - Senescent scald
  - Cork Spot – similar to bitter pit in apples
  - Core breakdown (internal breakdown or brown core)
  - Freezing injury – core may freeze first because of lower sugar content
  - High CO_2 or low O_2 (<1%) injury

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Physiological Disorders

- Stone fruit (except cherries):
  - –Internal breakdown (CI) – symptoms include browning of the flesh, dry-mealy texture (wooliness, lack of juiciness), development of off flavors
    - Symptoms develop when stored at temperatures between ~36 and 45F (2 to 7C)
  - –Freezing injury
  - –Heat injury (above 95F or 35C) – pit burn; gas pockets in prunes

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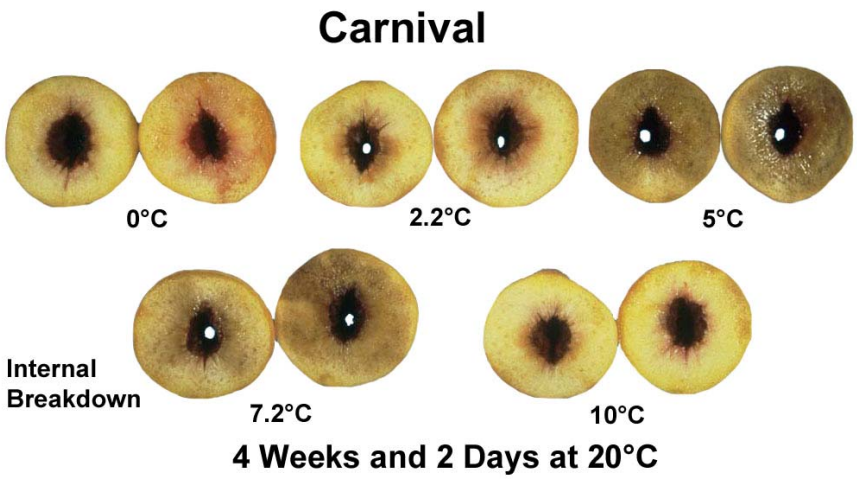
Internal Breakdown and Temperature



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Decay Control

- Stone Fruits:
  - Brown rot (*Monilinia*) – Does not develop during cold storage below 39 to 41F (4 to 5C)
  - *Rhizopus stolonifer* – It is chilling sensitive. Proper cooling and maintenance of the cold chain will reduce its growth significantly

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Decay Control

- Apples & Pears:
  - Gray mold (*Botrytis cinerea*) & Blue mold (*Penicillium expansum*)
    - Best controlled through careful handling and sanitation in the field & packinghouse
    - Fungicides may also help, but resistance is occurring to TBZ-type fungicides

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Decay Control

- Apples & Pears:
  - –Mucor rot (*Murcor* piriformis) problem on Granny Smith & Fuji
    - Lives in the soil
    - Grows slowly even at 32F (OC)
    - Fungicides & even chlorine not particularly effective
    - Best control: sanitation (keep soil out of drench & water solutions)

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Special Note on Pears

- Pears are very easily bruised when ripe so handle ripe fruit very carefully

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Postharvest Handling Selected Points

- Reducing mechanical damage
  - Use air suspension systems on trucks and bubble plastic liners and top pads in filled bins
  - Grade farm roads and restrict speeds on theses roads to reduce vibrations
  - Reduce handling steps
  - Maintain clean packing equipment to reduce abrasive particles (e.g. sand)
  - Immobilize fruit within shipping containers

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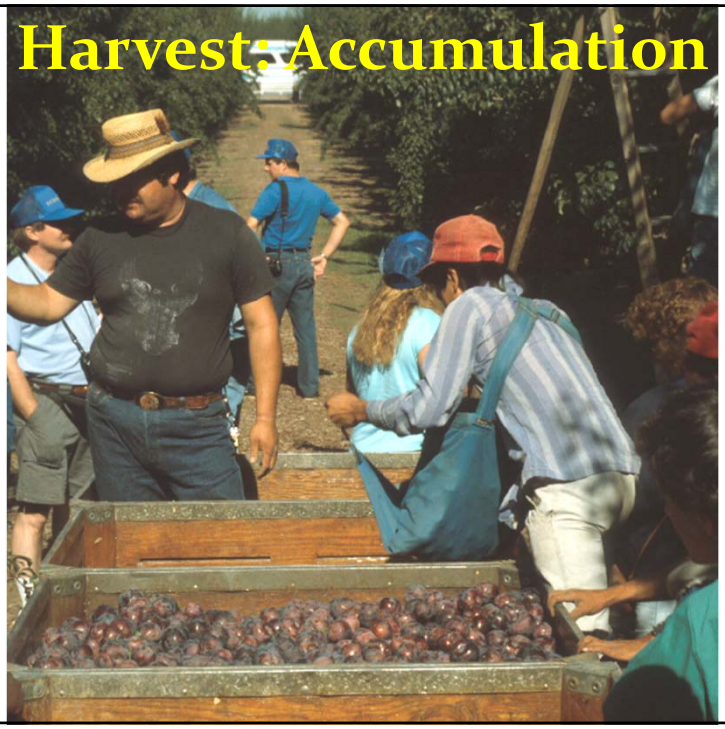
Harvest: Accumulation



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"Ranch-Pack" System for Tree-ripe Peaches

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Cooling Field Bins Prior to Packing

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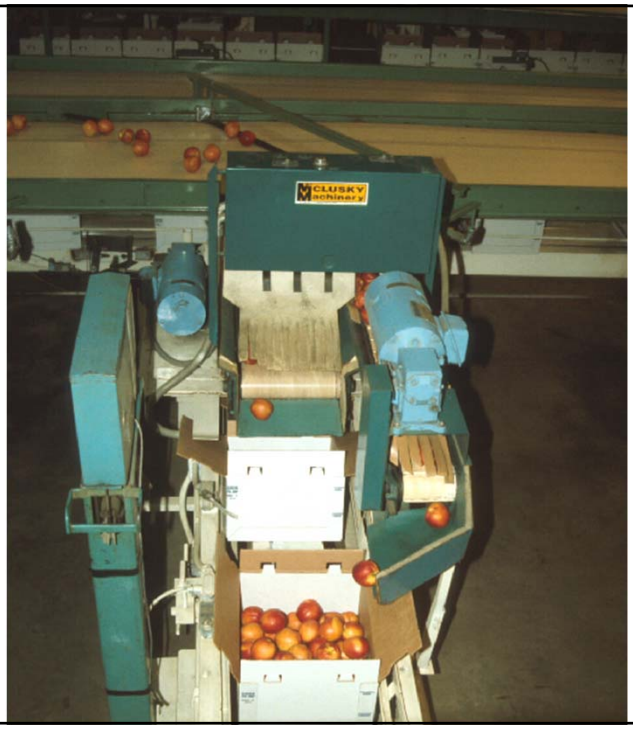
Carton Weight-Fill Machine



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