Postharvest Decay of Pome and Stone Fruits and Management Strategies

Wayne M. Jurick II, Ph.D.

USDA-ARS, Food Quality Laboratory
Special Graduate Faculty Member
Department of Plant Sciences and Landscape Architecture
University of Maryland – College Park
Beltsville, Maryland 20705
Outline

I. Pome and stone fruit

II. Fungi that cause decay

III. Management strategies
Pome fruit

Pome fruit – fruit with seed chambers and an outer fleshy portion.

1) Apple

2) Pear (European and Asian)

3) Quince
Asian Pear
Stone Fruit

Stone fruit – fruit with a single hard stone that encloses the seed

1) Peaches
2) Plums
3) Nectarines
4) Cherries
5) Dates
6) Apricots
Postharvest decay

- Occurs after the fruit are picked or harvested.

- A significant problem for growers and packers that store their fruit.

- Most often caused by fungi.

- Sometimes the fungi that cause disease in the field don’t trigger symptom development until after the fruit are picked.
Postharvest Diseases

- Blue Mold – *Penicillium expansum*
- Gray Mold – *Botrytis cinerea*
- Bitter Rot – *Colletotrichum acutatum*
- Brown Rot – *Monilinia fructicola*
Blue-colored growth on fruit surface
Clearly defined edge

Soft and scoopable
Blue Mold – Quick ID Tips

1) Defined lesion margin

2) Blue/greenish growth

3) Scoopable decay that is soft and watery
Sclerotia may be present – hardened, black “rat droppings”

Gray Mold

Gray to whitish colored “fuzzy” growth
Uneven margin, can be dark colored

Feels “leathery” and does not separate cleanly from healthy tissue
Gray Mold – Quick ID Tips

1) Uneven lesion margin, leathery

2) Gray to whitish fluffy growth

3) Sclerotia may be present
Circular lesion

“scabby, pimple-like” lesion

“bulls-eye” lesion

Bitter Rot
Bitter Rot – Quick ID Tips

1) Circular, brown to tan colored
2) Typically no fluffy growth
3) Concentric rings
Brown Rot

Fluffy, brown colored growth
Brown Rot – Quick ID Tips

1) Brown, fluffy growth on stone fruits

2) Soft, watery lesion

3) Mummies present in field
Management Strategies

1) Chemicals – some applied preharvest, most postharvest fungicides are applied as drenches or incorporated into waxes.

2) Non-chemical – cultural practices

3) Resistant varieties – no resistance to postharvest decay causing fungi
Management Tools

• Industry relies on chemical based methods of controlling postharvest decay

• 4 fungicides (Scholar®, Penbotec®, Mertec®, and Captan®) are labeled for apple and pears to control blue mold decay

• Resistance to various chemicals has been observed.
Fungicides

• Resistance or reduced efficacy can develop with prolonged use.

• Rotate use of fungicides to ensure highest level of control.

• Example – Mertec® (TBZ) – introduced in the 1960’s – used very little now by packers as resistance has developed
99 Blue mold isolates from 1 location in Pennsylvania

TBZ – Labeled application rate is 600ppm

37/99 = 37.3% able to grow at or above recommended rate
99 Blue mold isolates from 1 location in Pennsylvania

Penbotec – Labeled application rate is 500 ppm

Product newly introduced to the market in 2004.
Cultural Practices

1) Bin sanitation

2) Remove leaves and infected fruit

3) Keep fruit surface dry

4) Avoid wounding and bruising of fruit

5) Maintain proper storage temperature
Keep bins clean

Cull leaves

Remove infected materials

Peach “mummy” in orchard

Maintain proper storage temperature

0 5 10 20°C

Peach “mummy” in orchard
Fruit Resistance

• Wild apple germplasm from Kazakhstan

• Considered the ancestral home of the apple

• Broad genetic diversity as shown by wide variety of fruit colors, forms, and tastes

• This collection has not been previously examined for resistance to postharvest plant pathogens
Inoculations

Resistant

Susceptible
Summary

• Blue mold exclusively occurs in storage on apple fruit.

• Gray mold and bitter rot on pome and brown rot on stone fruits can occur both in the field and in storage.

• Fungicides can be used to manage decay, but rotate applications to ensure optimal performance.

• Cultural practices are also effective i.e. maintaining cold temperature, bin sanitation, removing leaves and decayed fruit.
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