Citation:
Rosenberger, D.A. 2004. Fruit decay problems in Honeycrisp. Proc. New Engl. Fruit and Veg. Conf., Manchester, NH, 15-16 Dec. 2004.

Fruit Decay Problems in Honeycrisp

David A. Rosenberger
Professor of Plant Pathology
Cornell University's Hudson Valley Lab
Highland, NY 12528

Honeycrisp apples are especially susceptible to both preharvest and postharvest decays. One NY grower has suggested that he sometimes loses up to 5% of stored Honeycrisp to postharvest decays and disorders for every month that the apples are stored after harvest. As we gain a better understanding of the idiosyncracies of Honeycrisp, we will hopefully avoid losses of this magnitude. However, if Honeycrisp will be stored for more than a few days after harvest, both growers and packers will need to apply special measures to prevent losses during storage.

Honeycrisp can suffer from three distinct categories of decay. The first category involves summer fruit decays (black rot, white rot, and bitter rot) that are initiated in the orchard and then cause storage decays when incipient infections develop into visible decays after harvest. The second category covers the usual postharvest pathogens *Penicillium expansum* and *Botrytis cinerea* that invade wounds created during harvest. In the third category are decays that develop after fruit are compromised by bitter pit, soft scald, or apple maggot injury.

Postharvest decays caused by black rot, white rot, and bitter rot:

Observations from Honeycrisp trees at the Hudson Valley Lab suggest that Honeycrisp is exceptionally susceptible to black rot and white rot. Honeycrisp trees retain fruitlets killed by thinning sprays just as Cortland trees do. On Cortland, these retained fruitlets often become infected with *Botryosphaeria* species, the fungi that cause black rot and white rot. The fruitlet mummies provide inoculum for infecting fruit as they mature in autumn. Because Honeycrisp retains thinned fruitlets, Honeycrisp fruit will be exposed to higher doses of inoculum than are fruit from cultivars that do not retain thinned fruitlets.

Black rot and white rot usually appear as small black specks around lenticels. The black lenticel lesions develop a red or brown halo on some cultivars, but on Honeycrisp the lesions often remain brown and rather non-descript. Lenticel infections expand into full-blown decays only as fruit ripen, with decays becoming apparent either in the field before harvest (Figure 1) or during postharvest storage. Where cool conditions prevail at the time of fruit ripening, large decays are unlikely to develop prior to harvest.

Black rot and white rot occur more frequently in warmer climates such as the Hudson Valley and southwestern Michigan than in colder climates such as the Champlain Valley, New England, or northern regions of Michigan. However, the blackened lenticel symptoms are not uncommon in northern climates. Black rot and white rot may develop quickly if cooling is delayed after harvest so as to reduce susceptibility to chilling injury and soft scald.

Effective fungicides applied after petal fall may reduce *Botryosphaeria* infections in retained fruitlets, and late summer sprays can protect maturing fruit. Topsin M, captan, and the strobilurin fungicides (Sovran, Flint, Pristine) are all reasonably effective for controlling black rot and white rot so long as fungicide coverage is renewed after rains and maintained until harvest. The label for Sovran does not allow applications within 30 days of harvest, but Flint applied at 28 and 14

days before harvest should control all of the summer fruit decays during the preharvest interval. Pristine can be applied just prior to harvest and may help to protect fruit against quiescent infections that would otherwise initiate decays after harvest.

Bitter rot develops primarily during periods of extended hot, wet weather during August. Growing regions that are well-suited for production of Honeycrisp generally will not encounter much bitter rot. However, during the wet summer of 2003, we noted extensive bitter rot infection on Honeycrisp apples at the Hudson Valley Lab. Bitter rot usually appears on the side of the apple facing the sun. Lesions are light tan, slightly sunken, and often develop diagnostic masses of pink spores during damp weather. During dry weather, the lesion surfaces appear rough with dark fruiting structures (Figure 2). Applications of captan or Flint during late July and August are effective for controlling bitter rot. Topsin M is not effective for bitter rot control.

Postharvest decays that develop in wounds created during harvest:

Growers producing and storing Honeycrisp have reported that this variety is especially susceptible to postharvest blue mold decay caused by *Penicillium expansum*. The tender skin and stiff stems of Honeycrisp fruit can result in a high incidence of stem punctures. When fruit with stem punctures are exposed to water-borne or air-borne spores of *P. expansum*, those fruit are likely to develop blue mold decay. The problem can be especially severe because no effective postharvest fungicides are currently available for controlling blue mold. Several new fungicides that control postharvest decays may become available within the next several years, but until then special care should be taken to keep Honeycrisp fruit away from bins and storage areas that are contaminated with *P. expansum*.

Given the current high value of Honeycrisp apples, growers should consider stem clipping at harvest as is currently practiced with Fuji produced on the west coast. Clipping stems to shorten them should result in less fruit with stem punctures and less infection sites for postharvest decays.

Apart from stem clipping to reduce fruit injuries, the only other approach for minimizing losses to blue mold are sanitation measures that prevent inoculum from reaching the fruit. Fruit should be picked into the newest and cleanest containers available, and they should be stored only in storage rooms that have been cleaned with quaternary ammonium sanitizers to eliminate inoculum that persists from year to year in storage rooms. Until alternatives for captan and Mertect (thiabendazole) are registered for postharvest use, Honeycrisp fruit should not be run through a postharvest drench treatment because recycling drench water redistributes fungicide-resistant spores of *P. expansum* to wounds.

Postharvest decays that develop in tissue damaged by bitter pit, soft scald, or apple maggot:

Various pathogens can invade fruit tissue that has been damaged or killed by physiological disorders such as bitter pit, soft scald, or apple maggot. No fungicide treatment will be effective for preventing fungal invasion of apple tissue that has been damaged by other physiological disorders.

Summary: Late summer sprays are more critical for managing Honeycrisp than they are for most other apple cultivars. Effective fungicide protection will be needed throughout July and August to protect fruit from infection by pathogens that cause summer fruit decays. Calcium sprays will be needed to control bitter pit. Sanitation of storage bins, cold rooms, and packing areas is essential for preventing losses from *P. expansum*.