Managing Diseases and Arthropod Pests on Honeycrisp

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Early-season pest control on Honeycrisp is relatively straightforward, but controlling pests during summer and diseases after harvest can be more challenging. Honeycrisp will almost certainly require more care during late summer and harvest than most traditional commercial varieties.

Managing seasonal diseases and arthropod pests on Honeycrisp is somewhat analogous to raising a placid child who becomes rebellious as (s)he matures. Early-season pest control on Honeycrisp is relatively straightforward, but controlling pests during summer and diseases after harvest can be more challenging.

Honeycrisp was included in the 1995 uniform plantings established by participants in the NE-183 project (Rosenberger, 2003). Detailed data on disease susceptibility of cultivars in these plantings were collected in Michigan, Virginia, West Virginia, Connecticut, and New York. When the 23 cultivars in the planting were ranked from most susceptible to least susceptible, Honeycrisp usually appeared near the middle of the rankings (Table 1). Thus, a modest early-season fungicide program should provide adequate control of the common early-season diseases. McIntosh growers who switch to Honeycrisp may be pleasantly surprised by how easily scab can be controlled on this new cultivar. Controlling mildew should be

TABLE 1

Relative susceptibility of 'Honeycrisp' foliage and fruit to various plant pathogens and arthropod pests as determined from comparisons of cultivars in the NE-183 uniform plantings that were established in 1995.

Disease or arthropod pest	Year	Ranking: 1= most susceptible	Incidence on Honeycrisp (HC) compared to a susceptible commonly-grown cultivar	States that supplied data used in rankings	Literature citation
Apple scab (leaf infection)	1997	17th of 23	HC: 10%, Pioneer Mac: 44%	CT, MI, NY, VA, WV	Jones et al., 1998
Venturia inaequalis	1996	10th of 23	HC: 11%, Pioneer Mac 21%	CT, NY, VA, WV	Yoder et al., 1997
Powdery mildew	1997	14th of 23	HC: 27%, Ginger Gold 67%	NY, VA	Kiyomoto et al., 1998
Podosphaera leucotricha	1996	11th of 23	HC: 6%, Ginger Gold 18%	NY, VA, WV	Yoder et al., 1997
Cedar apple rust (leaf infection)	1997	15th of 23	HC: 7%, Golden Delic. 17%	CT, NY, VA, WV	Kiyomoto et al., 1998
*G. juniperi-virginianea**	1996	14th of 23	HC: 8%, Golden Delic. 17%	CT, NY, VA, WV	Yoder et al., 1997
White rot					
Botryosphaeria dothidea	2000-01	20th of 23	similar to Pioneer Mac	WV	Biggs & Miller, 2003
Bitter rot					
Colletotrichum acutatum	1998-99	12th of 14	similar to Ginger Gold	WV	Biggs & Miller, 2001
Codling moth					
Cydia pomonella	2001	20th of 24	similar to Pioneer Mac	NY	Straub, 2003
Plum curculio					
Conotyrachelus nenuphar	2001	18th of 24	similar to Braeburn	NY	Straub, 2003
Phytophagous mites**	1999	14th of 24	similar to Braeburn	NY	Straub, 2003
Obliquebanded leafroller					
Choristoneura resaceana	2001	5th of 24	similar to Ginger Gold	NY	Straub, 2003
Apple maggot					
Rhagoletis pomonella	2001	3rd of 24	similar to Braeburn	NY	Straub, 2003

* *Gymnosporangium juniperi-virginianae*
** European red mite (*Panonychus ulmi*) and two-spotted spider mite (*Tetranychus urtica*)

no more difficult than controlling mildew on Cortland.

Fire blight can be a problem on Honeycrisp. Detailed ratings have not yet been compiled for fire blight infections in the NE-183 plantings, but initial reports suggest that Honeycrisp is quite susceptible to fire blight during the orchard establishment years. However, susceptibility to fire blight may decline rapidly as trees come into full production because Honeycrisp trees with a full crop have only low to moderate vegetative vigor. Fire blight rarely causes extensive damage to mature trees that are not vegetatively vigorous.

Casual observations from Honeycrisp trees at the Hudson Valley Lab suggest that Honeycrisp will prove exceptionally susceptible to black rot and white rot. When susceptibility to white rot was evaluated by inoculating wounded fruit in West Virginia, Honeycrisp was among the more resistant cultivars in the NE-183 trial (Table 1). However, those evaluations were made using wounded and uniformly-inoculated fruit, a method that does not take into account the high levels of inoculum that may be present in Honeycrisp trees. Honeycrisp trees retain thinned fruitlets 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 (Fig. 2). Because Honeycrisp retains thinned fruitlets, Honeycrisp fruit will be exposed to higher doses of inoculum than fruit from cultivars that do not retain thinned fruitlets.

Black rot and white rot occur more frequently in warmer climates such as the Hudson Valley than in colder climates such as the Champlain Valley and New England. Black rot and white rot rarely cause decays in green fruit. Where cool conditions prevail at the time of fruit ripening, large decays are unlikely to develop prior to harvest. However, pinpoint decay lesions and quiescent infections that go unnoticed at harvest may develop into larger decays after harvest. Development of black rot and white rot after harvest may be more problematic if cooling after harvest is delayed so as to reduce susceptibility to chilling injury and soft scald. Long-term storage at 38°F may also allow more development of black rot and white rot than would occur if fruit were held at a colder storage temperature.

Effective fungicides applied after petal fall can reduce *Botryosphaeria* infections in retained fruitlets, and late summer sprays can protect maturing fruit. The benzimidazoles, captan, and the strobilurin fungicides are all reasonably effective for controlling black rot and white rot so long as fungicide coverage is renewed after rains and maintained until harvest.

Figure 1: Honeycrisp fruit at harvest show a fruitlet mummy (arrow) that provided inoculum both for the large decay seen on the left and for the smaller lesion in the center of the apple on the right.

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 contributed to 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. Good sanitation is the only approach for minimizing losses to 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*. Honeycrisp fruit should not be run through a postharvest drench treatment because recycling drench water redistributes spores of *P. expansum* to wounds. Postharvest drenching to control *P. expansum* may become feasible again if new postharvest fungicides are registered in the future.

To summarize, late summer sprays will probably prove more critical for managing Honeycrisp than they are for most other 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. Protection against apple maggot will also be critical during late summer. Although Honeycrisp is generally susceptible to a complex of arthropod pests (Table 1), the fruit appear to be highly attractive to oviposition by apple maggot. Protecting Honeycrisp from this particular pest may be more difficult when the trees are planted along border areas that are sources of pressure from apple maggot.

Careful harvesting and postharvest handling will be required to minimize losses to *P. expansum*. Registration of new postharvest fungicides within the next several years might make it easier to protect stem punctures from *P. expansum*, but Honeycrisp will almost certainly require more care during late summer and harvest than most traditional commercial varieties.

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