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When is the Best Time to Apply Fungicides for Foliar Diseases?

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1. No or light wind (3 - 5 MPH) to achieve best coverage and minimize potential for drift. Light wind is best when there is a temperature inversion* to avoid the possibility of fine spray droplets being trapped in the inversion layer, then rising and drifting away. *(colder air near the ground and warmer air above; more likely to occur under high pressure conditions; characterized by stagnant air). Mid-day is the best time to spray when there is an inversion as it tends to be less pronounced then. For more about inversions and impact on applications of pesticides, especially herbicides, see http://www.ipm.msu.edu/uploads/files/CT_Workshop_Presentations/Thostenson-Inversions-NCR-GrandRapids2012_PDF.pdf
2. Leaves dry (very light dew okay, especially when gallonage is not high). Dew can enable runoff.
3. Leaves expected to stay dry (no rain or heavy dew) through the rainfast period. Most products need at least 4 hours. Time is often specified on the label.
4. With products that move into leaves, apply when conditions will promote slow drying to maximize uptake, such as calm, cloudy days and late afternoon to dusk. Also, under these conditions stomates are more likely to be open, which should enhance uptake.
5. Right before, rather than after, conditions are forecast to be favorable for disease development. Most fungal and bacterial pathogens need leaves to be wet for several hours to be able to infect, some fungi can infect when humidity is high (at least 90% RH). Powdery mildew fungi are an exception being able to infect under dry conditions; rain is actually unfavorable for these pathogens.
6. Bees not active. While most fungicides are not toxic to bees (neem oil is an exception), minimizing direct exposure and disturbance is desirable.

Additionally to maximize achievable control:

1. Make sure sprayer is providing good spray coverage. In spring check

calibration and replace worn nozzles (all should deliver same amount with less than 10% variation). Consider new nozzle types that might improve coverage (such as twin-jets). Use a gallonage that covers leaves well without runoff. Use adequate pressure (at least 60 psi) to obtain small droplets as they provide better coverage than larger ones, but avoid too high pressure as tiny droplets are prone to drift. Use water-sensitive paper to check coverage in crop. Obtaining spray deposition on the underside of leaves is especially important with a disease like powdery mildew that develops best there and is especially difficult with large leaves like those of pumpkin.

2. Start applications before or when symptoms are first seen, and at low severity. Fungicides have no to limited curative activity. And curative use can promote resistance development.

3. Select fungicides labeled for the targeted disease and demonstrated to be effective. Obtain current information on efficacy and resistance. Most selective (single site mode of action) fungicides are at risk for resistance development; consequently, a product may no longer be as highly effective as it once was.

4. Check calculations to ensure the intended rate will be applied.

5. Include an adjuvant when indicated on label. There are many factors to consider when choosing an adjuvant, including whether the fungicide needs to stick on the leaf (contact products like copper), penetrate into the leaf (systemic and translaminar products), or be able to volatilize to spread to other areas (especially the underside of leaves).

6. Check spray pH. Use buffers if it is not between 6 and 7. Most pesticides are formulated to work best at a pH near 7; many formulations include buffers.

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