



Maine Tree Fruit Newsletter

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Apple maggot

As in previous years, apple maggot (AM) trap captures run the gamut from none caught so far all season to traps that catch 5X the "1 AM fly per trap" threshold each week. If you do not have multiple, properly hung and maintained traps in the orchard, the prudent assumption is that continuous protection is needed against apple maggot egg-laying from now until the end of August.

Given the value of Honeycrisp apples and the preference of AM for this cultivar, it might make sense to extend protection into early September for Honeycrisp, though I do not have data to verify that. I am told that Sweet 16 is another cultivar subject to high level of AM damage.

If you do have traps, make sure they are still effective. After 3 weeks in the field, the accumulation of insects and debris on the traps causes traps to capture about 25% fewer AM than a fresh trap. It is easier to hang a new trap than to deal with in-field maintenance of cleaning off traps that have been in the field for several weeks.

Each insecticide option for AM control has different characteristics that affect the duration of control after a full-dose, good-coverage application. Some of the key factors are inherent toxicity of the insecticide to the pest; persistence of residual protection in the absence of rain; ability of residual protection to resist rain washoff; ability of the chemical to penetrate into plant tissues for curative activity against eggs.

In a June 2018 Michigan State University Extension article, (http://msue.anr.msu.edu/news/rainfast_characteristics_of_insecticides_on_fruit), Dr. John Wise reported results from tests with a rain tower to simulate different amounts of rain at one and seven days after application, followed by tests of the residual coverage against apple maggot flies. The following summary table leaves out many of the details that were considered in devising rules for number of days and cumulative rain since the application. For example, the "Rain resistance" rating summarizes six different ratings for three different rain amounts times two types of plant tissue (foliage and fruit). Because of those omissions, the tentative rule may not seem to fit with the other values shown for that material. In those cases, other factors such as inherent toxicity to the pest not shown in the table influenced the duration guideline.

This attempt to represent the information on each material as weather-based rules is intended to help growers make decisions about insecticide selection and respray intervals, and to update the apple maggot respray interval tables in Ag-Radar. Keep in mind these are just best guesses at summary extensive data into simple rules. Only single active ingredient products are listed. PHI = preharvest interval for apples.

The guidelines shown below assume a moderate level of apple maggot pressure. Once an insecticide application has been depleted by number of days or rain, clear AM traps and begin counting from zero towards the threshold to see if/when retreatment is needed. More stringent respray guidelines may apply where pest pressure is abnormally high.

Insecticide	Efficacy rating	Days residual	Plant penetration	Rain resistance	Tentative guideline for duration of protection relative to cumulative number of days and rainfall. Rain resistance ratings based on tests against codling moth, not apple maggot. But days residual based on efficacy against apple maggot.
Imidan Class: Organophosphate IRAC 1B PHI: 7 days	Good to Excellent	14+	Surface	Low	Days 1-6, up to 1.5" rain. Days 7-14, up to 1" rain 15 days maximum even if no rain. Notes: Long history of effective AM control. Poor rain resistance compensated by high efficacy against pest. Long residual in absence of rain. Customer concerns about OPs.
Assail Class: Neonicotinoid IRAC 4A PHI: 7 days	Good to Excellent	14	Trans-laminar & Acropetal (moves through shoots.)	Moderate	Days 1-14, up to 1" rain. 14 days maximum even if no rain. Notes: Proven effective AM control. Lower inherent toxicity to AM than Imidan compensated by rain resistance, and repellence and curative activity against eggs. Customer concerns about neonic impacts on honeybees more relevant to neonics in the nitro group. Assail is not in that subgroup, and has lower acute toxicity to honeybees, but customers concerned about neonics may not be aware of such details.
Pyrethroids except Asana. Class: Pyrethroid IRAC 3A PHI: Baythroid 7 Danitol 14, Mustang Maxx 14 Warrior 21	Good	7-10	Cuticle penetration	Moderate	Days 1-10, up to 1" rain. 10 days maximum even if no rain. Notes: Repeated use of pyrethroids may flare populations of mites, woolly apple aphid, San Jose scale or other pests normally kept in check by biocontrol.

Asana Class: Pyrethroid IRAC 3A PHI: 21 days	Fair to Good.	7-10	Cuticle penetration	Moderate	Days 1-6, up to 1" rain. Days 7-10, up to 0.5" rain 10 days maximum even if no rain. Asana may be less effective above 80F. Notes: I do not have data to justify separating Asana out from other pyrethroids, but have done so based on concern that it may be more heat-sensitive than 2 nd -generation pyrethroids.
Exirel, Altacor Class: Diamide IRAC 28 PHI: Exirel 3 days, Altacor 5 days.	Fair	10	Trans-laminar	Moderate-High	Days 1-6, up to 1" rain. Days 7-10, up to 0.5" rain. 10 days maximum even if no rain. Notes: Rating based on Altacor not Exirel, but they share same rating in Cornell Tree Pest Management Guidelines. MI lists interval as 10-14, but with Fair rating and for suppression only. Apparently, it lasts well, but has less inherent toxicity against apple maggot than higher ranked alternatives.
Avaunt Class: Oxadiazine IRAC 22 PHI: 14 days	Fair	7-10	Cuticle penetration	Moderate	Days 1-6, up to 1" rain. Days 7-10, up to 0.5" rain 10 days maximum even if no rain. Notes: MI Extension gave Avaunt a Poor rating against AM.
Delegate (spinetoram), Entrust (spinosad). Class: Spinosyn IRAC 5 PHI: 7 days	Fair	7-9	Trans-laminar	Moderate-High	Days 1-7, up to 2" rain. Day 8-9, up to 0.5" rain 9 day maximum even if no rain. Notes: MI Extension rates Delegate and Entrust as for suppression only against AM, suggesting that these materials are not reliable against high AM pressure.
Sevin (carbaryl) Class: Carbamate IRAC 1A PHI: 3 days	Fair	7-9	Cuticle penetration	Moderate	Days 1-7, up to 2" rain. Day 8-9, up to 0.5" rain 9 day maximum even if no rain. Notes: While carbaryl acts as a thinner during the fruit set period, it will not have a thinning effect when used in July-August.

Fire blight

After quieting down in early July, there has been an upswing in calls and samples about suspected, and in some cases confirmed, fire blight infections in apple and pear trees. Shoot blight usually spreads from blossom infections, but can also spread from unseen canker infections from the previous year.

Some of the limb dieback cases seen in recent weeks do not fit the wilted shoot tips and typical foliar appearance of fire blight. Our best guess at some of those cases is late manifestation of winterkill. Foliage on trees with winterkilled cambium (vascular system) typically collapses rapidly during the fruit set period after Petal Fall. Presumably, this is because prior to that point, the tree relies on stored energy to produce a new set of leaves. After that point, energy reserves have been exhausted and the tree relies on photosynthesis by those new leaves to replenish energy stores. But if the vascular system is not functioning to allow sugars to be transported from leaves to the rest of the tree, the tree runs out of energy.

Another hypothesis for the limb dieback cases that do not look quite like fire blight is that trees were weakened but not killed outright by a combination of inadequate hardening off during the prolonged warm fall of 2017 that resulted in apple trees retaining their leaves into the winter, and extremely low winter temperatures in early January. Those weakened trees could have been more susceptible to infection by white rot or other wood rot fungus infection.

Now that apple trees have reached terminal bud set, pruning out fire blight strikes is no longer recommended. Pruning this late in the season could prolong growth of tender young shoots and thus provide new sites for fire blight infection. At this point, it would be best to mark affected branches with paint or flagging for removal during winter pruning.

Mite Status

Keep an eye out for late season mite outbreak. Hot dry weather favors mite population increase.

European red mites are fully into their fourth generation, which is often the peak population density of the year. Fourth generation females are now laying eggs for the next generation. Some of those eggs will hatch over the coming weeks for a fifth generation this summer, but some will be overwintering eggs that will not hatch until next spring. The portion of overwintering eggs increases as days start to get shorter.

Twospotted spider mites can become the predominant mite species in late August. The same threshold is used for both species. The establish treatment threshold at this time of year is an average of 7.5 mites per leaf, or living hatched mites present on 85% of leaves. For trees in dry soil, especially for high-density dwarf trees with small root systems, a lower threshold of an average of 5 mites per leaf, or living hatched mites present on 75% of leaves would be prudent.

Apple and Thorn Skeletonizer

The Apple and Thorn Skeletonizer (ATS) is moth species whose caterpillars feed on the foliage of apple, crabapple, birch, cherry, hawthorn, willow and mountain ash. The distinctive leaf damage from larval feeding appears on low-spray apple trees each year in early August. There are three generations a year.

The best time to spray to control them is right before or at egg hatch to expose the young larvae. Best timings are late bloom, 7 weeks after bloom, and 14 weeks after bloom. Apple bloom date varies every year of course, but at Highmoor Farm in Monmouth, that puts the optimum control dates at about May 25, July 15 and September 1. But if first generation is controlled, there is less chance of a second generation being a problem. If both 1st and 2nd generations are controlled, there is presumably almost no chance of a problem with the 3rd generation.



Photo: Michigan State University

Adult moths overwinter in crevices in the tree. They lay eggs in small bunches on the undersides of leaves. The larvae emerge and feed on the underside of the leaves. They then move to the top surface and feed there, often tying the sides together creating a "rolled" effect. There is often more than one caterpillar in the roll, and the leaf ends up skeletonized. After 3 to 4 weeks, the larvae pupate in the rolled leaf. Adults emerge after about 2 weeks to start a new generation.

It is highly unlikely to find this insect as pest levels in commercial orchards where insecticide applications were made against plum curculio, codling moth, and/or apple maggot. For low-spray plantings, one of the home fruit tree spray products containing insecticide should be effective.

For organic control, there are two effective options. One is a product containing the insecticide active ingredient spinosad. The commercial agriculture spinosad product is called Entrust, but its package size is much larger than is practical. There are homeowner versions of spinosad is such as Monterey Garden Insect Spray, Bonide Captain Jack's Dead Bug Brew, and many others. (No endorsement or discrimination implied for list names). Another organic option is one of the many Bt (*Bacillus thuringiensis*) insecticide products. It is important to apply Bt when larvae are small, as Bt is less effective against larger larvae. As always, be sure to read and follow the label instructions.

While the foliar damage looks bad, apple trees will likely recover from ATS feeding unless defoliation is severe, repeated, or other stressors are present. Watering during dry conditions is helpful with or without caterpillar damage.

Pesticide labeling

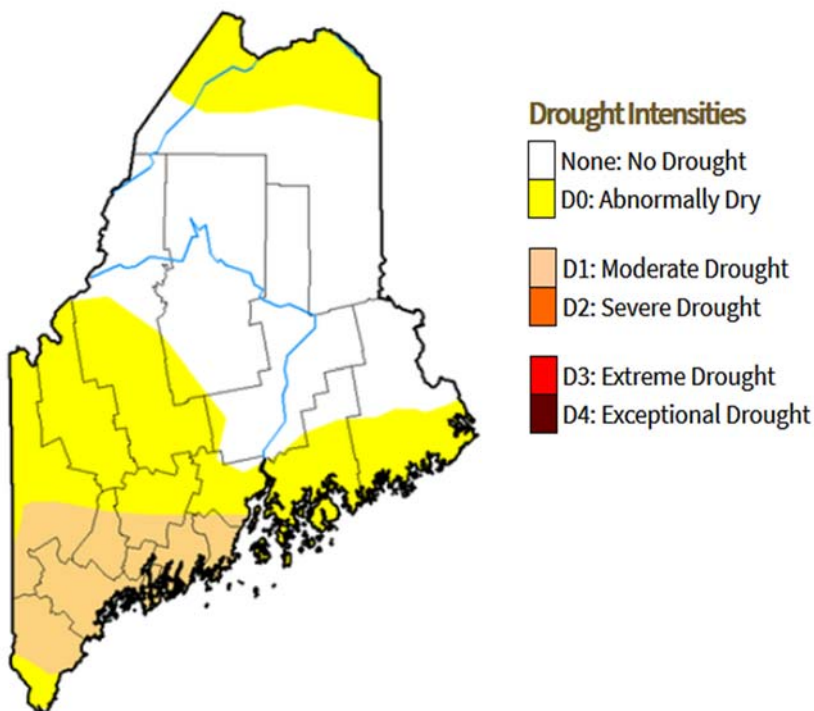
In order to register a pesticide with EPA, manufacturers need to provide extensive data on human and environmental/ecological safety. A product can only be used on crops that appear on the label.






Relatively uncommon pests such as apple and thorn skeletonizer may not be listed on pesticide (in this case, insecticide) labels. The particular pest species you are seeking protection against does not have to be listed on the label. But if the crop – pest combination is not listed, that is reason to do some investigation to see if the product is effective for that pest. The amount used cannot exceed the maximum dose per acre listed for that crop plant.

If the pest is listed on the label that is not a guarantee of effective control. Manufacturers do not have to prove efficacy against a pest in order to list it on the label.

Drought status and request for observations

1) The most recent USDA Drought monitor map, issued July 31, shows most commercial Maine apple growing areas in the “Abnormally Dry” and “Moderate Drought” categories.



	D0 - Abnormally Dry <ul style="list-style-type: none">• Short-term dryness slowing planting, growth of crops• Some lingering water deficits• Pastures or crops not fully recovered
	D1 - Moderate Drought <ul style="list-style-type: none">• Some damage to crops, pastures• Some water shortages developing• Voluntary water-use restrictions requested
	D2 - Severe Drought <ul style="list-style-type: none">• Crop or pasture loss likely• Water shortages common• Water restrictions imposed
	D3 - Extreme Drought <ul style="list-style-type: none">• Major crop/pasture losses• Widespread water shortages or restrictions
	D4 - Exceptional Drought <ul style="list-style-type: none">• Exceptional and widespread crop/pasture losses• Shortages of water creating water emergencies

The monthly drought Outlook, also issued July 31, estimates that Maine areas currently in the drought category will remain in drought for the month of August. However, the seasonal drought outlook, issued July 19 and applicable to July 19-October 31, estimates that Maine areas currently in the drought will receive enough rain to be removed from the drought category by the end of the period.

The rains since July 26 have brought some relief to the dry conditions in early July. Note that temperatures at this time of year mean that soil moisture loss through evapotranspiration routinely exceeds recharge through precipitation. Looking ahead, the 6-10 day outlook for August 13-17 shows a slightly above chance of rain. The 8-14 day outlook for August 15-21 shows normal chance of rain. The 6-10 day and 8-14 day temperature outlooks for August 13-21 show high probability for above average temperatures. So the heat wave may not be over, and even with normal amount of rain, soil moisture level could decline.

The **current drought status** report is based on data through Tuesday of each week, with the updated report posted each Thursday, thus an update will be available Thursday, August 9.

The **monthly drought outlook** is issued once per month, and will be updated at 3pm August 31, at

http://www.cpc.ncep.noaa.gov/products/expert_assessment/month_drought.png

The **seasonal drought outlook** will be updated 8:30m August 16 at

http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

2) The Maine Department of Agriculture, Conservation & Forestry (MDACF) is **seeking input regarding drought conditions, including data or anecdotal observations** on agricultural problems with irrigation, water supply, or livestock heat stress. The Department reports that while drought conditions are not as severe as last year, there is still potential for persistent and increasing problems through autumn.

If you send your observations to me, I will relay them to Tom Gordon, at the MDACF Soil & Water Conservation Program. That way I get to see them too. But if you would like to communicate directly with Tom, you can reach him at 207-287-4986, Tom.Gordon@maine.gov.

Agricultural Council of Maine

The text below is slightly edited versions of messages from Jeff O'Donal, President of the Agricultural Council of Maine, <http://maineagcom.org/>, and John Rebar, Director of UMaine Cooperative Extension.

1) The Agricultural Council of Maine **Agricultural Policy Platform** is online at <https://tinyurl.com/AgComPlan>
(full address: <http://files.constantcontact.com/87cb6814501/9137c8f4-90f0-436b-a451-cc1b4875209d.pdf>)

The next AgCOM meeting is **Tuesday, August 28, 9:00am to ca. 11:30am** at the Maine Farm Bureau Association, 4 Gabriel Drive, Suite 1, Augusta, Maine. The August meeting will focus on what farmers feel is either missing, existing but unnecessary or existing but could/should be stated differently in the policy document. Any member of the larger agricultural community is welcome to attend.

The group dearly wants this platform to reflect what farmers in Maine experience as well as what they need from policy-makers to, in the words of AGCOM's Strategic Plan:

- Create profitability in farming
- Support the next generation
- Connect local food with healthy eating
- Protect Maine's farm resources

Our strength comes when we collectively push/pull in the same direction. We want to hear the opinion of Maine's farmers. If anyone is unable to attend this meeting and has comments to offer, please feel free to send them by email to Jeff O'Donal at onorser1@maine.rr.com.

2) The Agricultural Council of Maine is sponsoring a gubernatorial candidate forum on **Tuesday, August 28 starting at 12pm** at the Sportsman's Alliance of Maine headquarters. 205 Church Hill Road in Augusta (9 minutes away from site of the AgCOM meeting in the morning). The focus will be on the candidate's vision for the future of Maine agriculture. The event is open to everyone. More details coming soon.

Closing Words

Carl Sagan quotes:

"If you wish to make an apple pie from scratch, you must first invent the universe."

"We find that we live on an insignificant planet of a humdrum star lost in a galaxy tucked away in some forgotten corner of a universe in which there are far more galaxies than people."

"For small creatures such as we, the vastness is bearable only through love."

"You're an interesting species. An interesting mix. You're capable of such beautiful dreams, and such horrible nightmares. You feel so lost, so cut off, so alone, only you're not. See, in all our searching, the only thing we've found that makes the emptiness bearable, is each other."

"Every one of us is, in the cosmic perspective, precious. If a human disagrees with you, let him live. In a hundred billion galaxies, you will not find another."

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