2018

UMaine Cooperative Extension Maine Tree Fruit Newsletter 2018-08-16

University of Maine Cooperative Extension

1865 THE UNIVERSITY OF MAINE
Cooperative Extension
Pest Management Office

Maine Tree Fruit Newsletter

Thursday, August 16, 2018 Vol 25:12

Apple maggot

Over the past 10 days, apple maggot activity as indicated by trap captures in orchards monitored by Extension – Pomological Society scouting co-op has increased markedly in some locations, but certainly not all, locations. This may be due to recent rains stimulating adult emergence from previously dry soils. Mid-August is typically the time of peak apple maggot activity anyway. The rain timing may have intensified the timing of peak apple maggot egglaying this year.

See table included with previous newsletter for listing of apple maggot insecticide options. Monitoring and protection where apple maggot activity exceeds threshold, or where you do not know because you do not have properly positioned and maintained traps, should continue at least until August 31. For later

Correction to previous newsletter: The apple maggot insecticide table incorrectly stated that residual control tests were conducted against apple maggot. The efficacy tests after rain wash-off were conducted against codling moth. I used those results in conjunction with other information from Michigan State University and Cornell University to derive the rain depletion guidelines for apple maggot insecticides).

Flyspeck and Sooty blotch

If you prevent flyspeck, you prevent sooty blotch, so management guidelines are based on flyspeck. This is not one or two fungi, dark fungal growth within the cuticle wax of apple fruit can be caused any of dozens of fungi. There is a lot left to learn about this sprawling group, but there is enough known to provide reliable management guidelines.

The heavy rain forecast for Saturday August 18 creates a clean break for timing of final fungicide application to prevent visible flyspeck before harvest. If the final application is made before August 18, then protection will end too soon to prevent the possibility of fungal growth becoming visible on fruit until after Columbus Day. Details later.

Codling Moth

Codling moth trap captures have been above the nominal threshold of 5 moths per trap per week in some of the monitored blocks. The pheromone trap thresholds for codling moth and obliquebanded leafroller are less specific than apple maggot trap captures. Codling moth traps that attract only male moths are more useful to identify generation flight timing than for accurately assessing population level of egglaying female moths. That said, they have some value for estimating the need for insecticide protection against infestation of fruit by young codling moth larvae.

It used to be that growers who managed plum curculio in early season, then apple maggot in late summer, with organophosphate insecticides did not have to specifically manage codling moth because control would be achieved incidentally by applications made against those other pests. That still may be the case, but there is some concern that with changing spray programs, codling moth may require targeted control.

The 5-per-week threshold may be unrealistically low, but if traps are catching upwards of 20 moths per week, one begins to wonder if the traps are indicating a significant pest threat. Second generation codling moth flight is underway in Maine orchards. It is a reasonable and prudent assumption that codling moth are present in every orchard at some level. While they rarely cause noticeable damage in orchards receiving insecticide sprays for other pests, codling moth damage regularly occurs in unsprayed orchards.

The combination of recent heavy rains removing insecticide coverage, and seemingly significant trap captures in some monitored locations, is food for thought. Hopefully, the situation is not one of food for codling moth larvae. Like many pests, codling moth usually does not cause economic damage unless you ignore the potential for damage. If insecticide protection with materials effective against codling moth has been in place, then there probably is little risk of damage. However, if late or low apple maggot captures, punctuated recently by heavy rains, has created a situation of minimal coverage of insecticide effective against codling moth, then this pest deserves some consideration. This particularly true for final spray of the year decisions.

There are many spray options, with different modes of action and spray timings. The table below is an attempt to sort through a large amount of information and reduce it to a less daunting list of options.

Codling moth treatment interval guidelines.

Introduction:

Each insecticide option for a pest has different characteristics that affect the duration of effective control after a full-dose, good-coverage application. Some of the key factors are inherent toxicity of the insecticide to the pest; persistence of the chemical vs. time and sunlight; ability of the chemical to penetrate into plant tissues, thus increasing resistance to wash-off by rain.

The following table leaves out many of the details that were considered in devising summary estimates for the limits on the number of days and amount of rain since the application that allows an insecticide application to remain effective at providing protection against the pest, in this case codling moth. The summary guideline for an insecticide may not

seem to fit with the other values shown for that material. In those cases, inherent toxicity to the pest or other factors influenced the guideline for expected residual duration.

This attempt to combine multiple characteristics for each material into a summary weather-based guideline is intended to help growers make decisions about insecticide selection and respray intervals, and to update the codling moth respray interval tables in Ag-Radar. Keep in mind these are only estimates. Only single active ingredient products are listed. Presumably, insecticides with two active ingredients would follow the performance of the individual component ingredients, **but only if the amount of active ingredient in a dose of the combination product is the same as in the single active ingredient product** rated below.

The guidelines assume a moderate/typical level of pest pressure. More stringent respray guidelines may apply where pest pressure is abnormally high. Insecticides are grouped by efficacy rating. Within a group, materials are listed in order of optimum application timing, and by alphabetical order for products with the same efficacy rating and same optimum timing.

PHI = Preharvest Interval for apples. ALWAYS check the label of the product you are using. The PHI value shown in the table may not apply to every product based on the active ingredient rated.

IRAC = Insecticide Resistance Action Committee.

DD50F = degree days base 50F after start of 1st or 2nd generation moth flight.

Rain resistance = Summary of ratings for leaf and fruit tissue exposed to 0.5, 1.0, and 2.0 inches of simulated rain.
High = > 70% residue remained.
Moderate = 50 − 70% residue remained.
Low = 30 − 50% residue remained.

Plant penetration:
Surface = Active ingredient remains on surface of leaves.

Cuticle penetration = Substantial portion of active ingredient moves into cuticle wax covering leaves, thus increasing resistance to wash-off by rain.

Translaminar = Moves from top to bottom surface of leaves, confers greater resistance to wash-off.

Acropetal = Moves to growing tips of leaves, confers greater resistance to wash-off.

The primary sources for the guidelines derived below are:

Rainfast characteristics of insecticides on fruit by John Wise, http://msue.anr.msu.edu/news/rainfast_characteristics_of_insecticides_on_fruit

NY 2018 Cornell Pest Management Guidelines for Commercial Tree Fruit Production

2015 Spray Bulletin for Commercial Tree Fruit Growers Virginia, West Virginia, and University of Maryland Extension.

Guide to Fruit Production 2016–2017, Ontario Ministry of Agriculture, Food, and Rural affairs.

Codling moth **Insecticide**	**Efficacy rating**	**Days residual efficacy**	**Plant pene-tration**	**Rain resistance**	**Tentative guideline for duration of protection against codling moth.**
Rimon Class: Chitin inhibitor IRAC 15 PHI: 14 days	Good to Excellent	10-14	Trans-laminar	Moderate	Days 1-14, up to 1.0" rain. 14 days maximum even if no rain. Notes: Insect growth regulator. Optimum timing is at 100 DD50, i.e. at beginning of egglaying so that Rimon is underneath eggs. Effective against eggs and larvae. Only material with strong ovicidal effect. Limited to one application per season.
Assail Class: Neonicotinoid IRAC 4A PHI: 7 days	Good to Excellent	10-14	Trans-laminar & Acro-petal	Moderate	Days 1-14, up to 1.0" rain. 14 days maximum even if no rain. Notes: Optimum timing is 200-250 DD50F after start of 1st or 2nd flight. Effective against eggs and larvae. Customer concerns about neonic impacts on honeybees. But Assail is in a different chemical subgroup than other neonics and has lower acute toxicity to honeybees.
Exirel, Altacor Class: Diamide IRAC 28 PHI: Exirel 3 days, Altacor 5 days.	Good to Excellent	10-14	Trans-laminar	Moderate to High	Days 1-7, up to 2" rain. Days 8-14, up to 1.5" rain. 14 days maximum even if no rain. Notes: Excellent control of 1st and 2nd generation codling moth. Optimum timing is 200-250 DD50F after start of 1st or 2nd flight. Effective against eggs and larvae. Rain rating based on Altacor not Exirel.
Phytotoxicity concerns with Exirel: Do not tank-mix with strobilurins, copper or captan fungicides. Application within 7-days of these materials, other EC pesticides, or spreader/penetrant adjuvants may increase risk of crop injury. These cautions are not listed for Altacor.					
Delegate Class: Spinosyn IRAC 5 PHI: 7 days	Good to Excellent	7-14	Trans-laminar	Moderate to High	Days 1-7, up to 2" rain. Day 8-14, up to 1.5" rain 14 day maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against larvae.

Codling moth Insecticide	Efficacy rating	Days residual efficacy	Plant pene-tration	Rain resistance	Tentative guideline for duration of protection against codling moth.
Imidan Class: Organophosphate IRAC 1B PHI: 4 or 7 days. 14 days for Pick Your Own.	Good to Excellent	10-14	Surface	Low	Days 1-7, up to 1.5" rain. Days 8-14, up to 0.5" rain 14 days maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against eggs, larvae and adults. Customer concerns about OPs. Late season application can leave visible residue.
Isomate No IRAC classification. PHI 0 days	Good	90 days for twist ties	Surface	Low	TT twin tubes at 200+ per acre, or 1-2 Mister units per acre. Begin application before flight starts for each generation. Requires 5+ acres & rectangular block shape to minimize edge exposure. May require spray buffer near orchard perimeter.
Esteem Class: Juvenile hormone mimic IRAC 7C PHI: 45 days	Good	14-21	Trans-laminar	?	Notes: Optimum timing is 100 DD50F after start of 1st generation flight. Effective against eggs and larvae. Maximum 2 applications per season.
Belt Class: Diamide IRAC 28 PHI 14 days	Good	7-12?	Trans-laminar	Moderate to High	Notes: Presumably same optimum timing as other Diamide products (Altacor, Exirel), i.e. 200-250 DD50F after start of 1st or 2nd flight. Effective against eggs and larvae. Maximum 3 applications.
Intrepid Class: Ecdysone Agonist IRAC 18 PHI: 14 days	Fair to Good	10-14	Trans-laminar	Moderate	Days 1-6, up to 1" rain. Days 7-14, up to 0.5" rain 14 days maximum even if no rain. Notes: Optimum timing is 150-200 DD50F after start of 1st or 2nd flight, to apply over eggs. But can delayed if preceded by ovicide. Insect growth regulator. Effective against eggs and larvae, sub-lethal effect on adults. Intrepid is more active successor to the similar insect growth regulator Confirm.

Codling moth Insecticide	Efficacy rating	Days residual efficacy	Plant pene-tration	Rain resistance	Tentative guideline for duration of protection against codling moth.
Confirm Class: Ecdysone Agonist IRAC 18 PHI: 14 days	Fair to Good	10-14* (presumed based on label directions)			Optimum timing is presumably same as Intrepid, i.e. 150-200 DD50F after start of 1st or 2nd flight, to apply over eggs. But can delayed if preceded by ovicide. Insect growth regulator. Cornell guide says that Intrepid is a more effective successor to Confirm. Ontario guide gives Confirm same efficacy rating as Intrepid.
Proclaim Class: Avermectin IRAC 6 PHI: 14 days	Fair to Good	10-12	Trans-laminar	Moderate	Days 1-6, up to 1.5" rain. Days 7-12, up to 0.5" rain 12 days maximum even if no rain. Notes: Optimum timing is 200-250 DD50F after start of 1st or 2nd flight. Effective against larvae.
Pyrethroids Class: Pyrethroid IRAC 3A PHI: **Baythroid** 7 **Danitol** 14, **Mustang Maxx** 14 **Warrior** 21 **Asana** 21	1st gen. – Fair to Good 2nd gen. – Fair.	7-14	Cuticle pene-tration	Moderate to High	Days 1-6, up to 1" rain. Days 7-14, up to 0.5" rain 14 days maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st generation flight. Effective against eggs, larvae, and adults. Pyrethroids appear to be less effective against 2nd generation codling moth. Repeated use of pyrethroids may flare populations of mites, woolly apple aphid, San Jose scale or other pests normally kept in check by biocontrol.
Checkmate (spray formulation) No IRAC classification. PHI 0 days	Fair	14-21 days for spray	Surface ?	?	Spray formulation or 1-2 Puffer units per acre. Begin application before flight starts for each generation. Requires 5+ acres & rectangular block shape to minimize edge exposure. May require supplementary control with perimeter insecticide spray.

Codling moth Insecticide	**Efficacy rating**	**Days residual efficacy**	**Plant pene-tration**	**Rain resistance**	**Tentative guideline for duration of protection against codling moth.**
Granulovirus (Carpovirusine, Cyd-X, Madex) No IRAC classification. PHI: 0 days	Fair	7	Surface	Low	Effective against larvae. Best effect is when virus is on top of eggs before they hatch. Thus if used alone, start at 100 DD50F. Degrades in the environment even without rain wash-off. Residual protection likely depleted within 7 days. Can be combined in a program with Rimon (both gen.) or Esteem (1st gen. only) for combined impact against eggs and young larvae. Most efficient use of granulovirus is during peak larval emergence at 350 DD50F after flight start.
Belay Class: Neonicotinoid IRAC 4A PHI: 7 days	Fair	7-10	Trans-laminar	Moderate	Suppression only. Optimum timing presumably at 200-250 DD50F after start of 1st or 2nd flight. May be good against 1st generation, but less effective against 2nd gen.
Avaunt Class: Oxadiazine IRAC 22 PHI: 14 days	Fair	10-12	Cuticle pene-tration	Moderate	Days 1-6, up to 1.5" rain. Days 7-12, up to 0.5" rain 12 days maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against larvae.
Aza-Direct, Neemix, etc. Class: UN PHI 0 days	Fair	7-10	?	?	Notes: Optimum timing is presumably 250 DD50F after start of 1st or 2nd flight.
Entrust Class: Spinosyn IRAC 5 PHI: 7 days	Fair	7-10	Trans-laminar	Moderate to High	Days 1-6, up to 1" rain. Days 7-10, up to 0.5" rain 10 days maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against larvae. Much less lethal to CM than Delegate.

Codling moth Insecticide	**Efficacy rating**	**Days residual efficacy**	**Plant pene-tration**	**Rain resistance**	**Tentative guideline for duration of protection against codling moth.**
Sevin (carbaryl) Class: Carbamate IRAC 1A PHI: 3 days	Fair	7-10	Cuticle pene-tration	Moderate	Days 1-6, up to 1" rain. Day 7-10, up to 0.5" rain 10 day maximum even if no rain. Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against larvae. Carbaryl acts as a thinner during the fruit set period, but not when used in July or August.
Grandevo No IRAC classification. PHI: 0 days	Fair	7-14	Surface	Low?	Optimum timing is at 300 DD50F after start of 1st and 2nd generation flight. Effective against larvae.
Surround No IRAC classification. PHI: 0 days	Poor to Fair	Varies with rain	Surface	Low	Through coverage needs to be present through egg hatch period last from 100 to 800 DD50F after start of each generation flight. Applications after mid-July likely to result in visible residue at harvest. Residue in calyx and stem end cups is difficult to remove.
Bt Class: Microbial midgut disruptors IRAC 11A PHI 0 days	Poor to Fair	7-10?	Surface	Low?	Notes: Optimum timing is 250 DD50F after start of 1st or 2nd flight. Effective against larvae.
Oil No IRAC class, physical action. PHI 0 days	Poor	8-14?	Surface	Not relevant for mode of action	Presumably optimum timing would be to smother eggs and just hatched larvae, thus begin coverage at 100 DD50F after start of flight and maintain until egg hatch is declining at ca. 800 DD50F after start of 1st or 2nd generation flight. Maximum spray interval presumably tied to 8-14 days required for development and hatching of eggs.

Gotta hit the road. Will send update with these tables filled out…

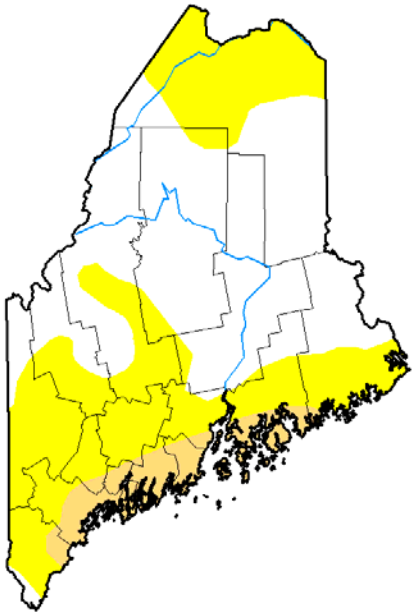
Location	**100 DD50F after 1st gen. flight: Early sprays before egglaying.**	**200-250 DD50F after 1st gen. flight: Beginning of egg hatch.**	**500-650 after 1st gen. flight: Peak egg hatch**	**800 DD50F after 1st gen. flight: 95% egg hatch.**
Sanford				
Monmouth				
Newport				
Presque Isle				

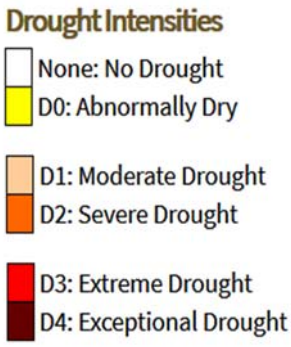
Location	**100 DD50F after 2nd gen. flight: Early sprays before egglaying.**	**200-250 DD50F after 2nd gen. flight: Beginning of egg hatch.**	**500-650 after 2nd gen. flight: Peak egg hatch**	**800 DD50F after 2nd gen. flight: 95% egg hatch.**
Sanford				
Monmouth				
Newport				
Presque Isle				

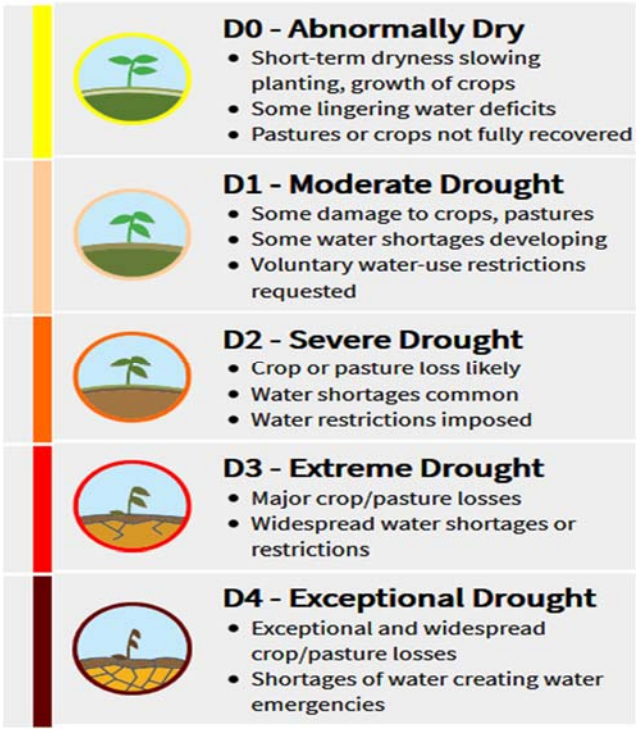
Drought status update

With substantial rain over the past two weeks, and rain in the last two days not represented on the maps, the USDA Drought monitor update for Tuesday August 14 (issued August 16) shows some improvement over two weeks ago. But the improvement is not as much as you might expect, and most commercial Maine apple growing areas are still in the "Abnormally Dry" category. At this time of year with long days and warm temperatures, evaporation losses from soil surface and transpiration withdrawals by plants causes soil moisture loss to regularly exceed additions when there is normal or even above normal rain. Had it not been for those rains, the drought condition would have become measurably more severe. As it is, soil moisture is holding steady. Apple trees may still need, or at least benefit, from supplemental irrigation.

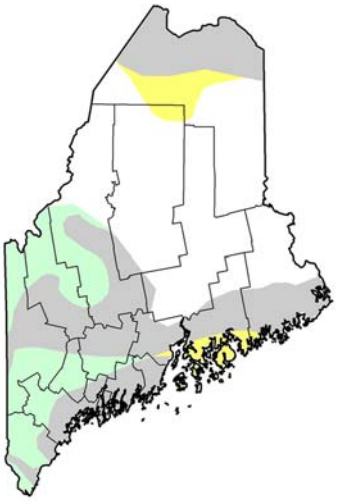
Drought status as of Tuesday, August 14, 2018.

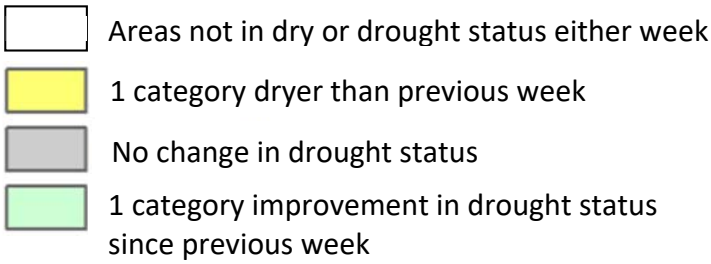






Change in drought status from July 31 to August 14, 2018. (All of the change was in the first week, there was no change in drought status from August 7 to August 14.)





Maps from United States Drought Monitor, http://droughtmonitor.unl.edu. Next update will be posted online Thursday, August 23.

Correction: Agricultural Policy Platform

The **Agricultural Policy Platform** described in the August 8 newsletter was mistakenly identified as a project of the Agricultural Council of Maine (AgCOM). The platform is actually an initiative created by a number of other organizations including Maine Farmland Trust, Maine Organic Farmers and Gardeners Association, and Coastal Enterprises Inc., among others. The policy document will be discussed at AgCOM's monthly meeting on August 28 to see what involvement, if any, AgCOM will have in this effort.

The 4-page policy document is online at https://tinyurl.com/MEAgPolicy. If you have comments, please send them to Scott Miller, Maine State Pomological Society representative to AgCOM, and he will bring them to the AgCOM discussion. Scott's email is theappledoc@yahoo.com

Governor Candidate Forum August 28

AGCOM
AGRICULTURAL
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Come Meet Maine's Next Governor

Hear each of the gubernatorial candidates speak about the issues impacting Maine's agricultural sector, and engage in a question & answer session about some of the challenges facing Maine farmers and the potential solutions that would be proposed by the next governor.

- Each Candidate has their own dedicated time to talk 1-on-1 with a room of farmers and those working in Maine agriculture. A moderator will do brief candidate introductions, keep track of time, and facilitate questions from the audience.
- Candidates are allotted 10 minutes of opening remarks and 5 minutes of closing remarks. Candidates will also be provided several general questions about agricultural policy in advance of the Forum, which can be addressed as part of their opening remarks.
- The 4 candidates running to be Maine's next governor will appear in the following order:

12 pm (noon) - 1 pm	**Shawn Moody (R)**
1 pm—2 pm	**Terry Hayes (I)**
2 pm—3 pm	**Alan Caron (I)**
3 pm—4 pm	**Janet Mills (D)**

- Light refreshments provided.

When: Tuesday, August 28, 2018
12 noon—4 pm

Where: Sportsman's Alliance of Maine L.L. Bean Conference Room
205 Church Hill Road, Augusta, ME

Closing Words

"When the last tree is cut, the last fish is caught, and the last river is polluted; when to breathe the air is sickening, you will realize that wealth is not in bank accounts, and that you can't eat money."

~Alanis Obomsawin, Abenaki Nation

"We don't inherit the earth from our fathers, we borrow it from our children."

~ Chief Seattle, Suquamish Tribe

"If the truth is presented as just another opinion, it's easier to ignore it."

~ Ray Suarez

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