



## Maine Tree Fruit Newsletter

Sunday, July 19, 2020 Vol 27:10 **See Updated Summer Meeting info on page 14**

### Apple Maggot

Apple maggot emergence is early this year. About half of the orchards monitored by the Extension Pomological Society Scouting Co-op have exceeded the treatment threshold of an average of 5 AM per baited trap. At Highmoor Farm for example, the average number of AM per trap was 12.8 over the past week, more than 2.5 times the treatment threshold. In 2019, we had not reach threshold in many monitored blocks by August 9.



Photo credit: Wikimedia commons



Apple maggot on sticky trap. G. Koehler

Trade name	Chemical group	Efficacy rating
Imidan	Organophosphate	Good
Minecto	Diamide & Abamectin	Good
Endigo, Leverage	Neonic & Pyrethroid	Good
Baythroid cyfluthrin, deltamethrin, Danitol, Gladiator, Lambda Cy, Pounce, Warrior	Pyrethroid	Good
Assail	Neonicotinoid	Fair-Good
Avaunt	Oxadiazine	Fair-Good
Exirel	Diamide	Fair-Good
Carbaryl	Carbamate	Fair
Besiege, Voliam Xpress	Pyrethroid & Diamide	Fair
Altacor	Diamide	Fair
Delegate, Entrust	Spinosyn	Fair
Surround	Kaolin clay derivative	Fair

\*Asana also has a high rating, it does not hold up over 80F, and has been associated with poor control under high AM under high heat pressure.

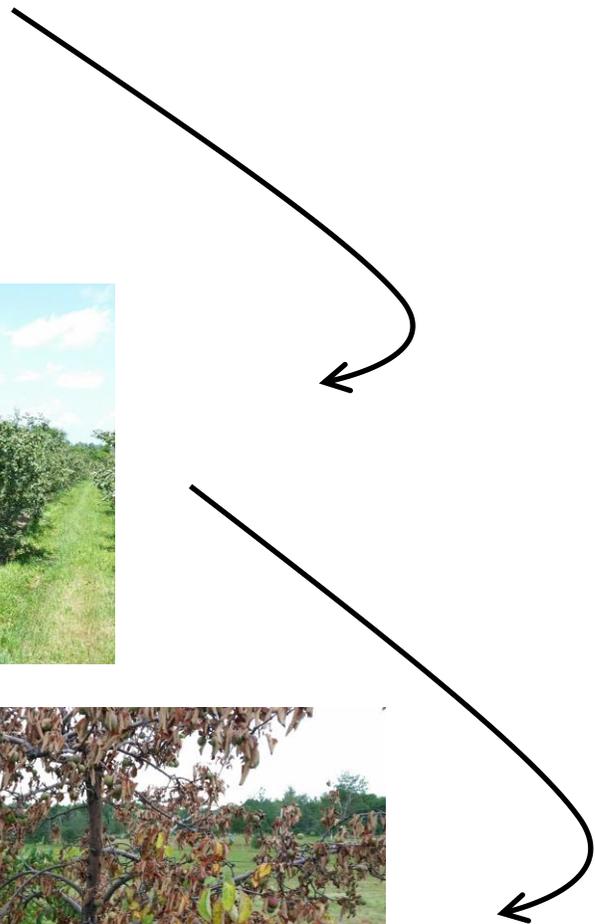
## Fire blight

Cortland and Paulared seem to be the worst hit by new fire blight shoot blight strikes. Blossom blight in some other cultivars does not appear to have resulted in much shoot blight. The appearance of new strikes should diminish as vegetative shoot growth declines and terminal bud set arrives. Continued sanitation pruning is recommended to reduce the in-orchard population of the cankers that harbor bacteria for new infections next year.

The reason for cutting is prevent the sequence shown below. The photos are from Maine orchards, but different trees at different times. They are used to demonstrate how fire blight can progress, and why sanitation is key.



Photos: G. Koehler.



## Bitter rot notes

Bitter rot fungi live in weakened or dead wood, and mummified fruit from last year. Bitter rot causes fruit rot infections, especially with hot (i.e. 80+F) dry weather. With above average temperatures forecast for August 2020, and also for the August-October, bitter rot pressure could be higher than normal this year as fruit ripen.

Symptoms begin as small sunken dark spots that increase in size and soften, often developing concentric rings of spot. In the advanced stage, rot extends toward the core in a V-shaped pattern.



Bitter rot lesions. G. Koehler.

Heat induced sunburn injury to fruit skin on sun-exposed fruit increases susceptibility.

A 2020 study found that there is considerable genetic diversity and multiple species within the fungi identified as causing bitter rot. *Colletotrichum fioriniae* was identified as the dominant species causing bitter rot on apple.

The fungicide active ingredients pyraclostrobin (**Merivon, Pristine**), difenoconazole (**Inspire Super**), benzovindiflupyr (**Aprovia**) thiabendazole (**Mertect 340-F**), and fludioxonil (**Scholar**) were all able to suppress fungal growth at field rates of all the bitter rot fungi species tested.

A 2001 study classified apple cultivars into four relative susceptibility groups:

**Most susceptible:** Ginger Gold, Honeycrisp, Pristine;

**Highly susceptible:** Arlet, Enterprise, Sansa, Yataka;

**Moderately susceptible:** Creston, Golden Delicious, Golden Supreme, GoldRush, PioneerMac, Sunrise;

**Least susceptible:** Fuji.

Note that earlier published rankings have included Fuji and Golden Delicious among the most susceptible cultivars.

Sources: Khodadadi et al. (2020) Nature Research 10:11043

<https://doi.org/10.1038/s41598-020-66761-9>

Biggs, A. R., and Miller, S. S. 2001. Relative susceptibility of selected apple cultivars to *Colletotrichum acutatum*. Plant Dis. 85:657-660.

## Browntail moth

Browntail moth distribution is primarily coastal, but their range has been increasing inland and north toward Penobscot Bay in recent years. Browntail moths began their summer flight early this year. Egg masses are showing up on leaves of apple and other host trees. The hairs on the egg masses are not as irritating as the hairs from the late instar larvae and cocoon in May and June, but can still cause a skin rash. That rash can vary from mild to severe requiring medical attention. The irritation can also affect the respiratory system. Individual sensitivity is highly variable.

The eggs could begin hatching in late July. The hairs from the young larvae feeding in late summer prior to forming overwintering nests are not as irritating as the hairs from the overwintered larvae that resume feeding in late April into late June, but they may also pose some risk of causing dermatitis on people, in addition to feeding on apple foliage.

Insecticide applications in May and June for plum curculio control the overwintered larvae still feeding at time of application. Insecticide application in August control the new larvae that hatch in August and feed until overwintering as larvae. The major risk of browntail moth is in low/no spray home orchard apple and pear trees. Even in commercial orchards, browntail populations could be present on oak, apple, cherry and other host plants around the orchard. The irritating hairs and their toxin can last up to three years.

The main control windows are to remove nests in the winter and spray against newly emerged larvae in the Green Tip to King Bloom period. Removal of egg masses will not affect the total population but may have a local effect for individual trees. If removing egg masses, wear protective gloves that will not absorb the hairs and place egg masses in a container of soapy water to kill them.

The Maine Forest Service has an excellent “Frequently Asked Questions” page:  
[https://www.maine.gov/dacf/mfs/forest\\_health/invasive\\_threats/browntail\\_moth\\_faqs.htm](https://www.maine.gov/dacf/mfs/forest_health/invasive_threats/browntail_moth_faqs.htm)



By Bj.schoenmakers - Own work, CC0,  
<https://commons.wikimedia.org/w/index.php?curid=5073>

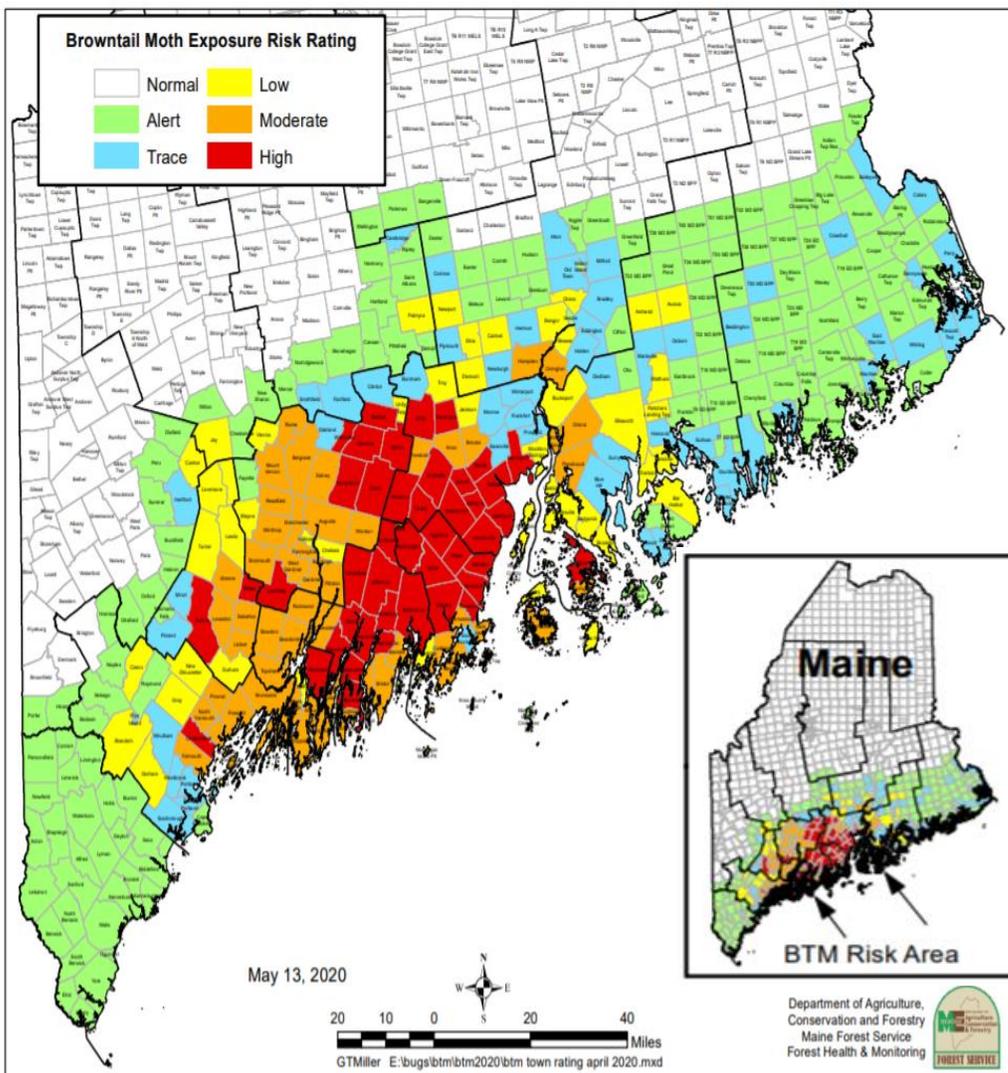


Image from A. Kanoti. Maine Forest Service.  
<https://slideplayer.com/slide/14260920/>

- Caterpillars skeletonize leaves and tie leaves together and to twig with silk



Images from A. Kanoti. Maine Forest Service. <https://slideplayer.com/slide/14260920/>



**Normal:** Moths have been found in light traps in all corners of Maine. Areas rich in host trees, especially apples and other fruit trees and oaks, are more likely to have populations.

**Alert:** Locations near detections but survey has not been conducted or has not revealed established populations.

**Trace:** A small number of webs were found.

**Low:** Webs were frequently encountered, or patches of trees with webs were found

**Moderate:** Continuous stretches of overwintering webs were found.

**High:** Continuous stretches of high populations of winter webs were found.

Map from [https://www.maine.gov/dacf/mfs/forest\\_health/documents/Browntail%20Moth%20Exposure%20Risk%202020.pdf](https://www.maine.gov/dacf/mfs/forest_health/documents/Browntail%20Moth%20Exposure%20Risk%202020.pdf)

The photos below will not be useful until next spring, but since we are discussing browntail moth, here is a comparison of browntail moth caterpillars with other hairy caterpillars often found on apple trees in the spring.

Tent-makers		No Tents	
<b>Browntail Moth</b>	Eastern Tent	Forest Tent	Gypsy Moth
<b>Look for</b> Overall brown color; White tufts along sides; <u>Red-orange dots on tail-end</u>  <b>DANGER!!</b>	<b>Look for</b> <u>White stripe</u> down center of back Blue spots like the "eye" in peacock feather along each side of stripe	<b>Look for</b> White or <u>off-white footprint-shaped marks</u> down the center of the back Blue body coloration in later instars	<b>Look for</b> Prominent knobs with hairs on each side of head capsule. Five pairs of <u>blue- and six pairs of red- spots along back</u> (4 <sup>th</sup> instar and later).
			
<b>Invasive</b> <b>Human &amp; Forest Health Impacts</b>	Native Mostly aesthetic impacts	Native Occasional outbreaks	<b>Invasive</b> Forest Health Impacts Quarantined pest

Image from A. Kanoti. Maine Forest Service. <https://slideplayer.com/slide/14260920/>

## Apple and Thorn Skeletonizer

Apple and thorn skeletonizer is easily controlled by canopy insecticide sprays for other pests, but occasionally occurs in heavy populations on unsprayed trees. The foliar damage weakens trees, but established trees with good growing conditions and water supply will recover. The threat to tree growth and survival is more serious on young trees.



Leaf damage from apple and thorn skeletonizer feeding. G. Koehler.



Close up showing lacy feeding pattern. G. Koehler.



Apple and thorn skeletonizer on apple. G. Koehler.



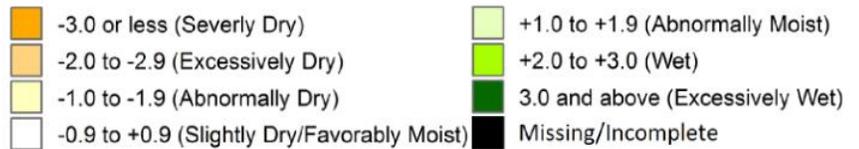
Apple and thorn skeletonizer. Oregon State Univ. Kirian Elliot

# Drought Watch

There are different measures of soil moisture and drought. The most often cited measure is the Palmer Drought Severity Index. Even though it is used by the USDA for drought reports, it really isn't the best indicator of conditions for crop plants. The PDSI is a long-term measure that is appropriate for municipal water supply and forest conditions, but in my humble opinion other measures that focus more on recent conditions are a better indicator for tree fruit and other crops.



Crop Moisture Index by Division  
Weekly Value for Period Ending Jul 11, 2020  
Short Term Need vs. Available Water in a Shallow Soil Profile



## CROP MOISTURE

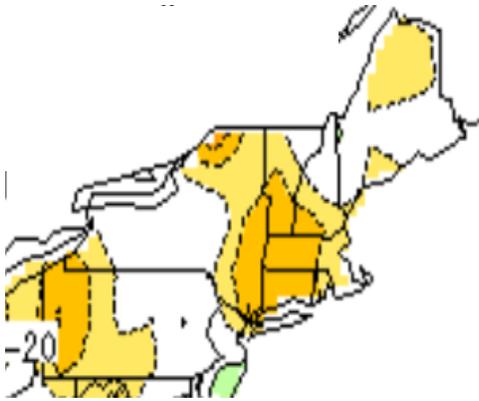
DEPICTS SHORT-TERM (UP TO 4 WEEKS)  
ABNORMAL DRYNESS OR WETNESS AFFECTING AGRICULTURE,  
RESPONDS RAPIDLY, CAN CHANGE CONSIDERABLY WEEK TO WEEK  
AND INDICATES NORMAL CONDITIONS AT THE BEGINNING AND END  
OF THE GROWING SEASON.

USES... APPLICABLE IN MEASURING THE SHORT-TERM, WEEK TO WEEK, STATUS  
OF DRYNESS OR WETNESS AFFECTING WARM SEASON CROPS AND FIELD OPERATIONS

LIMITATIONS... MAY NOT BE APPLICABLE TO GERMINATING AND SHALLOW ROOTED CROPS  
WHICH ARE UNABLE TO EXTRACT THE DEEP OR SUBSOIL MOISTURE FROM A SHALLOW  
SOIL PROFILE, OR FOR COOL SEASON CROPS GROWING WHEN TEMPERATURES ARE AVERAGING  
BELOW ABOUT 55F. IT IS NOT GENERALLY INDICATIVE OF THE LONG-TERM (MONTHS, YEARS)  
DROUGHT OR WET SPELLS WHICH ARE DEPICTED BY THE DROUGHT SEVERITY INDEX.

[https://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/cmi.gif](https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif)

- > +3 Excessively wet.** Some fields flooded.
- +2 to +3. Too wet.** Some standing water.  
Dry weather needed. Field work delayed.
- +1 to +2. Above normal wetness.** Some fields too wet.  
Soil moisture favorable but too wet in spots.
- 0 to +1 Moisture adequate for present crop needs.**  
Soil moisture favorable for normal growth and field work.
- 0 to -1. Abnormally dry. Top soil moisture short.**  
Seed germination slow.
- 1 to -2. Moderate drought.**  
Crop prospects threatened with further drying.
- 2 to -3. Severe drought. Excessively dry.**  
Yield prospects for shallow rooted crops reduced.



**Soil Moisture Anomaly July 18, 2020**

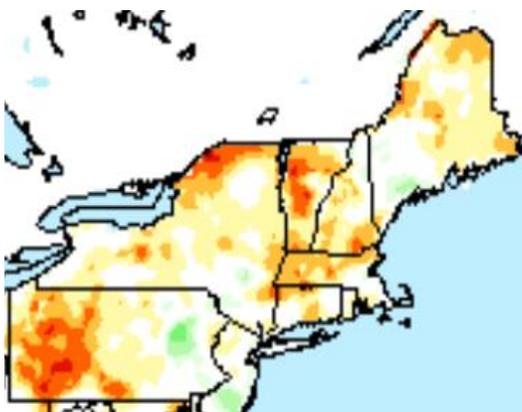


-160 -140 -120 -100 -80 -60 -40 -20 20 40 60 80 100 120 140 160

Millimeters above or below 1916 – 2004 average.

20 mm = 0.8 inch, 40 mm = 1.6 inch etc.

[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml#](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)

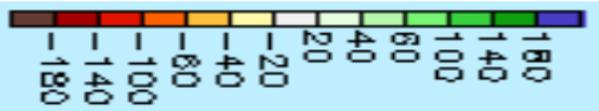


**North American Ensemble total soil moisture anomaly**

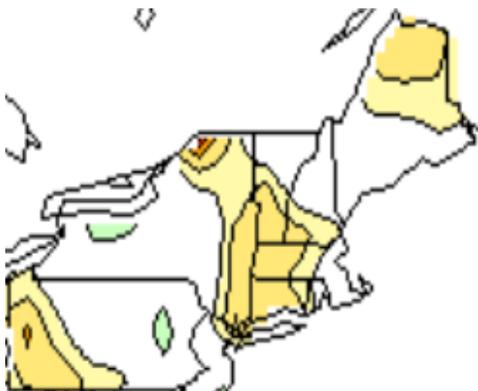
July 8 -July 15, 2020.

Millimeters above or below 1979 – 2010 average.

20 mm = 0.8 inch, 40 mm = 1.6 inch etc.



<https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/weekly-total-SM-anom.shtml>



**Soil moisture percentile July 18, 2020**

compared to 1916-2004.

50% = median year

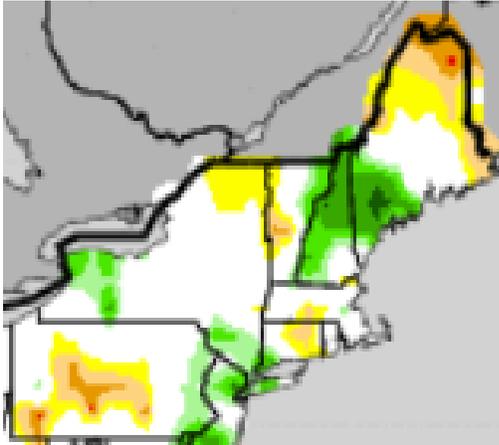
0% -driest year vs. record.

100% = wettest year



1 5 10 20 30 70 80 90 95 99

[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml#](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)



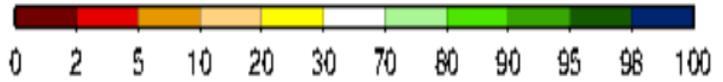
**Experimental Surface water percentile July 18, 2020**

compared to 1916-2004.

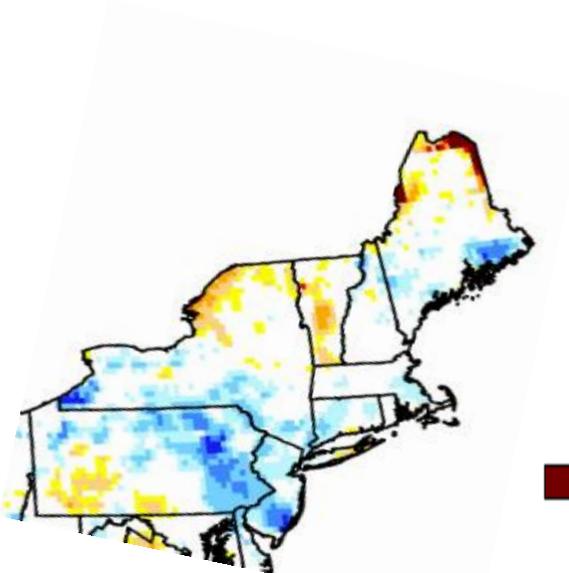
50% = median year

0% -driest year

100% = wettest year



[http://www.hydro.ucla.edu/SurfaceWaterGroup/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_qnt.gif](http://www.hydro.ucla.edu/SurfaceWaterGroup/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif)



**GRACE top meter of soil moisture percentile**

July 13, 2020 compared to 1948-2012.

50% = median year

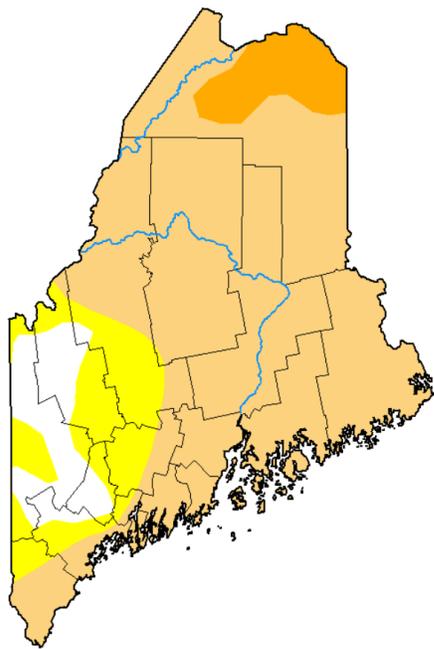
0% = driest year

100% = wettest year



[https://nasagrace.unl.edu/data/20200713/GRACE\\_RTZSM\\_20200713.png](https://nasagrace.unl.edu/data/20200713/GRACE_RTZSM_20200713.png)

While the Palmer Drought Severity Index is not as sensitive to recent conditions, it is still the standard reference. It is useful to compare it to the shorter-range estimates shown above.



**Map released: Thurs. July 16, 2020**

**Data valid: July 14, 2020 at 8 a.m. EDT**

**Intensity:**

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

<https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?ME>

- D0 Abnormally dry.** 21-30<sup>th</sup> percentile Expected frequency on this date is once every 3-5 years. Slowing of plant growth.
- D1 Moderate drought.** 11-20<sup>th</sup> percentile Expected frequency on this date is once every 5-10 years. Possibly crop damage. Lower stream and pond levels. Possible local water use restrictions.
- D2 Severe drought.** 6-10<sup>th</sup> percentile Expected frequency on this date is once every 10-20 years. Significant chance of damage to crops or pastures. Water shortages expected. Water restrictions likely.
- D3 Extreme drought.** 3-5<sup>th</sup> percentile Expected frequency on this date is once in 20-50 years. Major crop and pasture losses imminent. Water shortages and restrictions widespread.
- D4 Exceptional drought.** 0-2<sup>nd</sup> percentile Expected frequency on this date is less than once in 50 years. Water shortages at emergency levels. Low, empty, or depleting streams, ponds, reservoirs and aquifers.

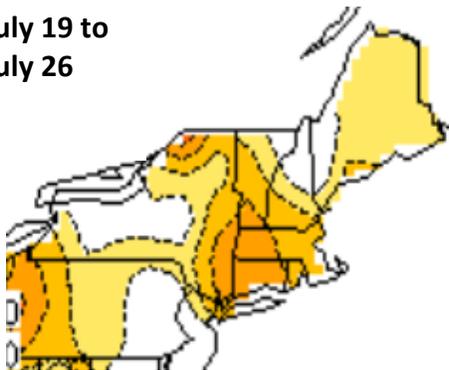
Category	Impact
D0	Crop growth is stunted; planting is delayed
	Fire danger is elevated; spring fire season starts early
	Lawns brown early; gardens begin to wilt
	Surface water levels decline
D1	Irrigation use increases; hay and grain yields are lower than normal
	Honey production declines
	Wildfires and ground fires increase
	Trees and landscaping are stressed; fish are stressed
	Voluntary water conservation is requested; reservoir and lake levels are below normal capacity

D2	Specialty crops are impacted in both yield and fruit size
	Producers begin feeding cattle; hay prices are high
	Warnings are issued on outdoor burns; air quality is poor
	Golf courses conserve water
	Trees are brittle and susceptible to insects
	Fish kills occur; wildlife move to farms for food
	Water quality is poor; groundwater is declining; irrigation ponds are dry; outdoor water restrictions are implemented
D3	Crop loss is widespread; Christmas tree farms are stressed; dairy farmers are struggling financially
	Well drillers and bulk water haulers see increased business
	Water recreation and hunting are modified; wildlife disease outbreak is observed
	Extremely reduced flow to ceased flow of water is observed; river temperatures are warm; wells are running dry; people are digging more and deeper wells
D4	Maine has had little or no experience in D4 so no impacts have been recorded at that level in the Drought Impact Reporter

But that's all the past and water under the bridge as they say. It is equally or more important to consider soil moisture prospects for the near future, to the extent to which they are predictable. Outlooks out to 1 month have predictive skill, beyond that is questionable.

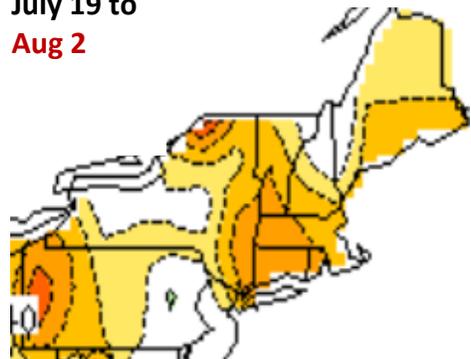
**ONE week  
predicted soil moisture anomaly**

July 19 to  
July 26



**TWO week  
predicted soil moisture anomaly**

July 19 to  
Aug 2

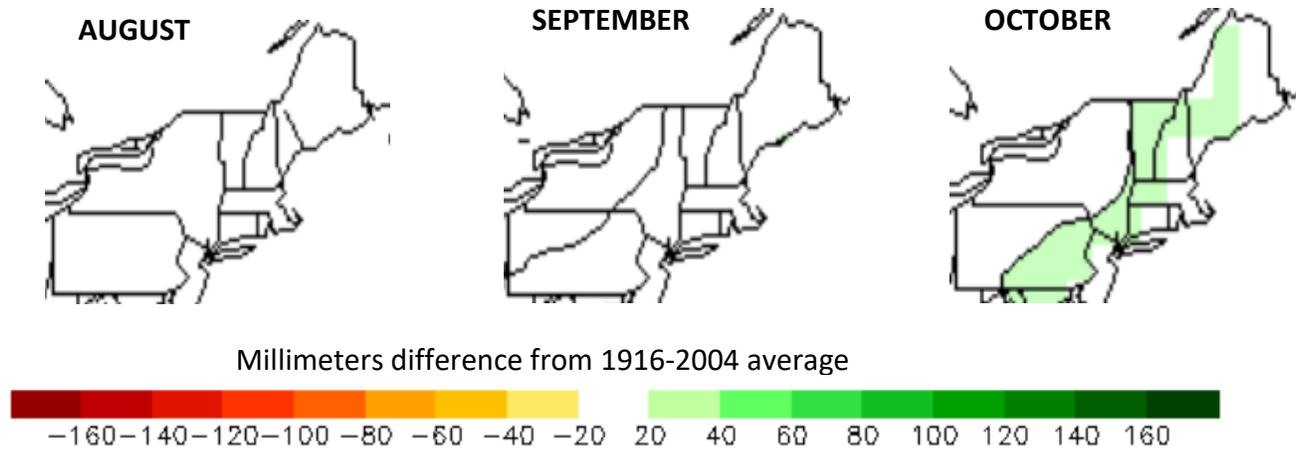


Millimeters difference from 1916-2004 average. 20 mm = 0.8 inch, 40 mm = 1.6 inch etc.



[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Outlook/GFS/SM\\_anom.shtml#](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Outlook/GFS/SM_anom.shtml#)

## Soil Moisture Anomaly Outlooks for end of August, September, October 2020 as of July 18)



[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Outlook/CAS/SM.shtml](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Outlook/CAS/SM.shtml)

Bottom line: At this point the soil moisture prospects for rest of the growing season look pretty good.

## Dirty Dozen List Returns

Every year around this time an unscrupulous activist group uses misleading disinformation about pesticide residues on fresh produce as a fund-raising tool. The way they interpret data violates the most basic premise of toxicology, and is so distorted that the USDA testing results they cite that show fresh produce is safe, becomes turned inside out to imply just the opposite. The fund-raising effort is back at it this year, but apparently media coverage has lessened in the context of current real health concerns, not not falsely inflated fear mongering. Nevertheless, it may be worthwhile to prepare for customer concerns raised by the fund-raising campaign. Two useful resources are

1) Journal of Toxicology: Dietary Exposure to Pesticide Residues from Commodities Alleged to Contain the Highest Contamination Levels

<https://www.safefruitsandveggies.com/studies/journal-of-toxicology-dietary-exposure-to-pesticide-residues-from-commodities-alleged-to-contain-the-highest-contamination-levels/>

2) Survey of Registered Dietitians: Better Understanding Challenges of Increasing Fruit and Vegetable Consumption

<https://www.safefruitsandveggies.com/wp-content/uploads/2019/11/Survey-Report-Page-11-15-19.pdf>

## Update - Maine State Pom. Soc. Summer Tour

The Summer Tour will be held in-person (not a Zoom meeting!) on Wednesday, July 22, at [Treworgy Orchards](#) in Levant ([3876 Union St, Levant, ME](#), between Newport and Bangor).

Registration is \$20, payable at the event. The meeting is designed to prepare tree fruit growers for the fall harvest and marketing during the current pandemic. The morning tour features a grower discussion on methods to attract customers and maintain protections from COVID-19.

We hope you can attend, but we must limit the total attendance to 50 people.

**PREREGISTRATION IS REQUIRED**, so contact Margie Hansel to reserve your space by email [mhansel@maine.rr.com](mailto:mhansel@maine.rr.com) or by calling (207) 829-6136.

Due to Covid-19 restrictions, attendees must wear face masks during the welcome period, while getting lunch, and anytime during close contact with others. Please bring yourself a chair for the afternoon program. This will reduce contact between farm staff and guests.

### Schedule

9:00am through lunch

#### Vendor displays and representatives

OESCO (Orchard Equipment Supply Company)

Greenway Equipment (John Deere Dealership)

Brookdale Fruit Farm (Irrigation supplier)

9:30 – 10:00am      **Welcome and registration**

10:00 – 11:45am.    **Orchard tour and grower discussion.**

***Managing Pick-Your-Own sales during a pandemic***

Moderated by Jason Lilley, UMaine Extension

11:45 – 12:45pm.    **Pizza lunch**

During lunch Alan Perry, agricultural representative on the Governor's Economic Committee, and Hannah Carter, Director of Cooperative Extension, will be available to discuss individual and industry-wide needs in the current unprecedented circumstances.

12:45 – 1:30pm.    ***Health care services for seasonal workers and their families***  
Maine Mobile Health.

1:30 – 2:00pm.    ***Practical Consideration for Apple pest monitoring***  
Glen Koehler, UMaine Extension

2:00 – 2:30pm.    ***Safe use of sanitizers in the workplace***  
Kathy Murray, Maine Dept. of Agriculture, Conservation & Forestry

2:30 – 3:00pm.    ***Controlling noxious orchard weeds***  
Renaë Moran, UMaine Extension

3:00 – 4:00pm.    **Complimentary ice-cream, social (at a distance) hour,  
and optional guided strawberry irrigation tour.**

Attendance qualifies for 2 pesticide applicator recertification credits.

## Closing Words

Albert Palmer tells of a conversation he had with John Muir on the trail. He asked Muir, "someone told me you did not approve of the word 'hike.' Is that so?"

Muir's blue eyes flashed, and with his Scotch accent he replied:

"I don't like either the word or the thing. People ought to saunter in the mountains - not hike!

Do you know the origin of that word 'saunter?' It's a beautiful word. Away back in the Middle Ages people used to go on pilgrimages to the Holy Land, and when people in the villages through which they passed asked where they were going, they would reply, 'A la sainte terre,' 'To the Holy Land.' And so they became known as sainte-terre-ers or saunterers.

Now these mountains are our Holy Land, and we ought to saunter through them reverently, not 'hike' through them."

- John Muir, as quoted by Albert W. Palmer, *The Mountain Trail and its Message*

"This grand show is eternal.

It is always sunrise somewhere; the dew is never all dried at once;  
a shower is forever falling; vapor ever rising.

Eternal sunrise, eternal sunset,  
eternal dawn and gloaming, on seas and continents and islands,  
each in its turn, as the round earth rolls."

- John of the Mountains: The Unpublished Journals of John Muir

"Between every two pine trees there is a door leading to a new way of life."

- John Muir

Source: Quotations from John Muir, Selected by Harold Wood

[https://vault.sierraclub.org/john\\_muir\\_exhibit/writings/favorite\\_quotations.aspx](https://vault.sierraclub.org/john_muir_exhibit/writings/favorite_quotations.aspx)

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Orono, ME 04473-1295

<http://pmo.umext.maine.edu/apple/>



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### [Dr. Renae Moran](#)

Extension Tree Fruit Specialist

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Highmoor Farm Ag. Exp. Station, P.O. Box 179

Monmouth ME 04259-0179

<http://extension.umaine.edu/fruit/>