



Cornell University
College of Agriculture and Life Sciences

New York Berry News

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May 13, 2013

FREEZE WARNING* FREEZE WARNING* FREEZE WARNING* FREEZE WARNING* FREEZE WARNING

HAZARDOUS WEATHER OUTLOOK

NATIONAL WEATHER SERVICE BUFFALO NY
1241 PM EDT MON MAY 13 2013

...FREEZE WARNING IN EFFECT FROM MIDNIGHT TONIGHT TO 8 AM EDT
TUESDAY...

THIS HAZARDOUS WEATHER OUTLOOK IS FOR PORTIONS OF WESTERN AND NORTH
CENTRAL NEW YORK including: NIAGARA-ORLEANS-MONROE-WAYNE-NORTHERN CAYUGA-OSWEGO-
NORTHERN ERIE-GENESEEE-LIVINGSTON-ONTARIO-CHAUTAUQUA-SOUTHERN ERIE counties.

URGENT - WEATHER MESSAGE

NATIONAL WEATHER SERVICE BUFFALO NY
1240 PM EDT MON MAY 13 2013

FREEZE WARNING

...FREEZE WARNING REMAINS IN EFFECT FROM MIDNIGHT TONIGHT TO 8 AM
EDT TUESDAY...

* LOCATIONS...MOST OF WESTERN NEW YORK AND AREAS SOUTH OF LAKE ONTARIO EXCLUDING
WYOMING COUNTY AND INTERIOR PORTIONS OF THE WESTERN SOUTHERN TIER including the
following locations: NIAGARA-ORLEANS-MONROE-WAYNE-NORTHERN CAYUGA-NORTHERN ERIE-
GENESEEE-LIVINGSTON-ONTARIO-CHAUTAUQUA-SOUTHERN ERIE counties-INCLUDING THE CITIES OF
NIAGARA FALLS MEDINA ROCHESTER NEWARK FAIRHAVEN BUFFALO BATAVIA GENESEO CANANDAIGUA
JAMESTOWN ORCHARD PARK SPRINGVILLE

* TIMING...MIDNIGHT TONIGHT THROUGH EARLY TUESDAY MORNING.

* TEMPERATURES...IN THE LOWER 30S.

* IMPACTS...SUB-FREEZING TEMPERATURES HAVE THE POTENTIAL TO DAMAGE OR KILL
UNPROTECTED SENSITIVE VEGETATION.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A FREEZE WARNING IS ISSUED WHEN FREEZING TEMPERATURES ARE FORECAST TO THREATEN
OUTDOOR PLANTS. IF YOU ARE IN THE WARNED AREA YOU SHOULD PROTECT TENDER VEGETATION.
ALSO...POTTED PLANTS NORMALLY LEFT OUTDOORS SHOULD BE COVERED OR BROUGHT INSIDE AWAY
FROM THE COLD. STAY TUNED TO WEATHER RADIO OR OTHER RADIO AND TV STATIONS FOR FURTHER
DETAILS OR UPDATES.

Below is a short article by Laura McDermott which summarizes what you need to know to make frost management decisions for strawberries. Need more information? See the [2012 Special Frost Protection Edition](#) of NY Berry News or visit the Cornell Fruit frost protection page: <http://www.fruit.cornell.edu/berry/production/frostprotect.html>.

Frost Protection in Strawberries – Laura McDermott, Eastern New York Commercial Horticulture Program

We are entering a very dicey time for strawberry growers. The month of May is often equated with sleepless nights as growers devote themselves to monitoring temperatures and irrigation systems. Frost occurs when the temperature around the plant drops below 32°F when pure water turns into ice. Plant sap has a lower freezing point than water due to the soluble solids in it. When the critical temperature (Table 1) is reached, ice forms which damages cell membranes.



Table 1. Critical temperatures of strawberries based on stage of development (Perry and Poling, 1985)

Stage of Development	Approximate Critical Temp. (°F)
Tight bud	22
"Popcorn"	26.5
Open blossom	30
Fruit	28

Frost can kill flowers or cause damaged, misshapen berries. Leaf tips and edges can also be injured.

A rate of 0.1 inch/hour is considered adequate to protect to 24°F with no wind. The water frozen on the plant should be clear ice. If the ice is cloudy or milky white, the water application rate is not fast enough to protect the flower. In this case you can increase the water application rate by reducing the sprinkler spacing or changing to higher flow rate nozzles. At high wind speeds or temperatures below 20°F overhead irrigation can cause rapid freezing resulting in more damage than if there was no frost protection – see Table 2.

Table 2. Inches of Water/Acre/Hour to Apply for Protection at Specific Air Temperatures and Wind Speeds (Martsoff and Gerber, Penn State University)

Wind speed at crop height (km/hr)	27°F air temperature at canopy	24°F air temperature at canopy	20°F air temperature at canopy	18°F air temperature at canopy
0 - 2	0.10	0.10	0.16	0.20
3 - 6	0.10	0.16	0.30	0.40
7 - 14	0.10	0.30	0.60	0.70
15 - 19	0.10	0.40	0.80	1.00
20 - 35	0.20	0.80	-	-

When to turn on the water? Growers need to understand dew point in order to get a good idea of how to make this decision. The dew point is the temperature at which humidity in the air condenses to form dew. When the air is humid the dew point occurs at a higher temperature than when the air is dry. Growers can use dew points to estimate how quickly the temperature might drop. Once dew begins to form, the air temperature drops more slowly because heat is released. Frequently, the nighttime temperature drops to the dew point, but not much below it. If the air is dry, then the dew point will be low. If the dew point is below 32°F, frost forms instead of dew. Don't wait for frost to form before starting the irrigation system. See Table 3.

Table 3: Suggested starting temperatures for irrigation, based on dew point.

Dew Point	Suggested starting air temperature
30 °F	32°F
29°F	33°F
27°F	34°F
25°F	35°F
24°F	37°F
22°F	38°F
20°F	39° F
17°F	40°F

Row covers reduce evaporative cooling. Heavy weight covers (1.5-2 oz/yd²) can protect 4-6 degrees, but there is a lot of variability depending upon manufacturer, age of the cover etc. There is no denying that they can buy some time on a cold night.

You will need to know plant temperature under the cover. Start irrigating right over the covers temperatures under the cover drop to 33-34°F. Irrigate right over the cover. Digital thermometers attached to thermocouples, inserted in the flower buds before the frost event, are necessary for successful protection with covers. Two layers of 1 oz cover provide more protection than 1 layer of 2 oz material.

Research is ongoing on low impact sprinklers and waterless frost protection agents. For a very comprehensive fact sheet on frost protection in strawberries, visit: http://www.omafra.gov.on.ca/english/crops/facts/frosprot_straw.htm#crit.

Questions or comments about the New York Berry News?

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