



# Ecosystem Insights

Advice and Opinions for Organic, Biodynamic, & Holistic Orchardists

## *Cold Damage Assessment*

14 February 2016

This is a brief report that I just put together listing yesterday's minimum cold temperatures at some primary apple production sites around the region. The first column is data taken directly from the [NEWA](#) site. The second column is taken from [WeatherUnderground](#) site. Each set of data is from a different station, so there are obviously some geographic and tech differences due to station placement and type. The NEWA data is from known RainWise apple grower stations. If any growers have any direct or different measurements that could add to or improve these data, please send them on to me. It is difficult sometime to know what to believe and what not, especially when there is wide variation.

In summary, it was COLD yesterday and last night. And it was windy. The embedded chart is a basic critical temperature chart for apples and stone fruit. Since most fruit buds were still dormant, this means we hit the critical dormant temperatures for apricots and peaches in only a few locations and just barely, if at all. However, the mild winter so far and the wind could have resulted in higher than normal (last winter being normal) critical temperatures. The buds had likely deacclimated somewhat and the wind+cold may have desiccated them slightly further increasing the chances for a higher degree of damage potential. I am not as concerned about how quickly it got this cold, because the plunge started a few days ago and didn't reach its climax until early this morning, and it didn't last incredibly long. Likewise, the climb out of the deep freeze will occur over a few days, as opposed to radical warmup that could increase the chances of damage by not allowing the trees to appropriately recover.

Please note the differences between dormant critical temperatures, and the temperatures required for 10% and 90% bud kill. As buds deacclimate, they become much more sensitive to cold temperatures. Most fruit buds – regardless of fruit type – were likely not fully dormant, but also hadn't reached silver tip or first swell. So reality lies somewhere in between – sublethal damage will remain the unknown from here on out.

There are two links at the bottom of the attachment. One leads to a talk that Mike Fargione (former Eastern Fruit Extension agent) put together during the winter of 2011/12, the other is an ongoing assessment of grape bud cold hardiness conducted by Cornell. Judging from the data, the most recent LT10 data (taken Feb 1) for winegrape buds was in the -5 to -10 range, so similar to stone fruit, there was probably a hit, but it was minimal. The winegrape site is relevant because it gives some degree of confidence that, in general, fruit buds were still reasonably dormant and so not as susceptible to the radically deep cold temperatures they just experienced. We won't be able to tell for a few days exactly what damage, if any, was incurred. I feel stone fruit growers probably took a hit on the order of 10-20%, but apple growers are generally safe. Time will tell.

The forecast for the coming week is for much warmer temperatures with only one day (Thursday) with a lows in the mid-teens. The rollercoaster ride continues, hang on!!

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### Minimum Temperatures (°F) around New York state.

February 14 2016

City	Location	NEWA	WU
Roxbury	Catskills	-21.0	-20.7
Geneva	Finger Lakes	-4.0	-13.5
Ithaca	Finger Lakes	-10.0	-13.9
Accord	Hudson Valley	-17.4	-5.5
Fishkill	Hudson Valley	-10.1	-7.6
Marlboro	Hudson Valley	-12.9	-9.8
New Paltz	Hudson Valley	-8.9	-7.1
Red Hook	Hudson Valley	-13.4	-13.6
Williamson	Lake Ontario	-5.7	-8.0
Southington, CT	SW Connecticut	-13.0	-10.3
<b>Average</b>		<b>-11.6</b>	<b>-11.0</b>

WU=WeatherUnderground

[Understanding Frost & Freeze Events](#)

[Grape Bud Hardiness Data](#)

Fruit Crop	Stage of Growth	Critical Temp (°F)	Stage of Growth	90% kill (°F)	10% kill (°F)
Apples	Dormant	< -25	Silver Tip	2	15
Apricots	Dormant	< -5	1st Swell	-	15
Sweet Cherries	Dormant	< -20	1st Swell	5	17
Peaches	Dormant	< -10	1st Swell	1	18
Plums	Dormant	< -20	1st Swell	0	14

- Critical Temperatures (col 3) are temps where growers can expect to begin to see bud damage occur. When reading the Critical Temp column it is important to bear in mind that trees are "always" hardier at sustained cold temperatures than they are during periods of fluctuating temperatures when severe cold is experienced.
- 90% and 10% kill (cols 5 and 6, respectively) are the amount of bud damage growers can expect at those temps for the specified stage of growth. Fruit buds always become more susceptible to cold damage as they begin to grow.

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### UPCOMING KNOW YOUR ROOTS WORKSHOPS

I am in the process of planning a series of intriguing (I hope) workshops through the season. Given the recent cold temperatures, I think it is appropriate to announce that on May 7, I will be conducting a day-long workshop that will examine cold damage and frost prevention in addition to crop load management in apples. All of the workshops are still in the planning process (mostly for a location), but go ahead and mark your calendars now and look for more information in the next week or so.

#### **Cold Damage & Crop Load Management**

May 7 2016

This is a full-day, two-part workshop where we should be at a point where we can discuss winter cold damage, frost protection, and crop load management for perennial tree crops in one fell swoop.

– **Cold Damage (Part I – morning).** The winter of 2014/15 was about as nice a winter as we've seen in a while. Once it got cold, it stayed cold – miserable for humans, great for apple trees. However, this winter is presenting as a bit more of a quandary. The mild December and January, coupled with the lack of snow, deacclimated fruit buds, recent cold snaps (as of this writing), and increased the potential for damaging mid-winter cold temperatures. We know that any damage – whether it is lethal or sub-lethal – should have an effect on how we plan for this year's crop. And we all want apples, right? In this workshop, we discuss how to identify floral and leaf tissue, dormancy and cold hardiness, factors that affect potential for cold damage, and what you can do to improve your chances for a successful crop. We'll examine fruit buds under microscopes to evaluate extent of cold damage (if any) as a way to ensure a crop of apples.

– **Crop load management (Part II – afternoon).** Crop load management is more than just thinning. It's about managing the fruit on your trees for optimal yield, quality, and nutritional value. How you manage crop load also has a direct effect on return bloom for next year's crop. In this workshop, we'll discuss the basics of floral bud induction and development, flowering and early fruit development, return bloom, and crop load management tactics (yes, including thinning). Trees should be at or close to bloom so we can study the flowers in situ and discuss the direct impact your management will have not only on this year's crop, but next year's as well.

Please contact Mike for more information: [mike@knowyourroots.com](mailto:mike@knowyourroots.com)

You can also check out all Know Your Roots events at our online events calendar: [HERE](#).

**REMINDER:** All newsletters are archived [HERE](#) at the [Know Your Roots](#) web site.

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