scaffolds

Update on Pest Management and Crop Development

FRUIT JOURNAL

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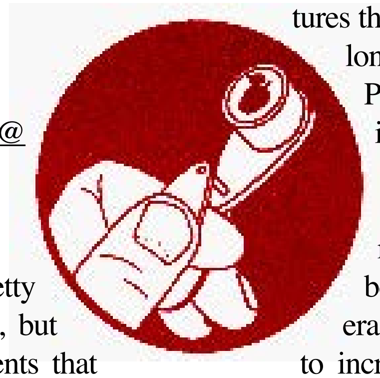
INSECTS

IT'LL BE A COLD DAY

SNOW JOB

(Art Agnello, Entomology, Geneva; ama4@cornell.edu)



❖❖ By now everyone is pretty tired of fretting over the weather, but one of the more frequent sentiments that gets expressed after a winter like this one is the the conjecture that at least maybe all those cold temperatures will help us out with insect control by killing off the overwintering stages. Although I have complete sympathy with the intent, the cold hard facts don't always square with our hopes that the bugs will get a frigid reception (sorry, I'll stop doing that now). First, we most frequently get questions about the winter weather pattern's effect on ERM eggs, in terms of their ability to either tolerate exceptionally cold temperatures, or to take advantage of unusually mild weather. The fact is that there is always some winter mortality of ERM eggs, that it can be quite variable (ranging from perhaps 15% to nearly 60% in severe cases), and that it is dependent on many different factors, such as orchard micro-habitat and air drainage, the amount of snow cover (which we have had pretty regularly this winter), and genetic characteristics of local populations, in addition to simple raw temperature readings. One study conducted in NY after the extremely cold winter of 1956–-57 showed that ERM hatch was cut drastically (to 1–20% of normal) in western NY after a 3–5-day period in the -23 to -28°F range, but that hatch reduction was not uniformly so severe in the Lake Champlain growing region following the same temperature pattern. These results suggest that the eggs in that district may have been conditioned to withstand lower winter temperatures than in warmer parts of the state. The long-term average winter minimum in Peru is approximately -22°F, whereas in the Geneva area it ranges from -10 to -15°F. [Also, for what it's worth, this winter wasn't actually as cold as most people have perceived it to be, because the long-term increase in average winter temperatures – due in part to increased greenhouse gas emissions – have distorted our sense of what constitutes a truly frigid winter. You can check out the details in the following story: http://mashable.com/2014/03/14/winter-cold-2014-perspective/.]

In general, a severely cold winter can reduce the viability of the eggs that are present in the spring, but favorable developmental weather early in the season can easily compensate for a small founding egg population, whereas a cold, wet and extended April and May can serve as effectively to retard mite development as would a good early season spray program.

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Similarly, regardless of the cold winter, which generally only predicts higher overwintering mortality of things like mite eggs and small OBLR larvae, the fate of the season's insect populations probably depends more on what kind of early spring weather we end up having. Observations over the years support the conclusion that the growth of most prebloom arthropod populations is pretty much determined for the first half of the season by spring weather patterns.

European red mite, rosy apple aphid, spotted tentiform leafminer, tarnished plant bug, San Jose scale, and mullein bugs are only the most obvious of the species that suffer from a cold, wet, rainy and windy (in other words, typical) spring. They may be slowed considerably until the summer generations, or they might fail to show up at all in some cases. Conversely, a warm, dry, quick spring can result in nearly spontaneous generation of most of these pests. After the petal fall period, the rate of heat unit (Degree Days) accumulation is a primary factor in the duration of plum curculio oviposition (hotter = shorter period) and the speed of summer mite population growth. This latter case is especially crucial, as the first summer ERM eggs are generally hatching in June so the population is already primed to expand; additionally, the trees are particularly susceptible to foliar feeding stress, so a failure to act against a threshold-level infestation early will result in a long, hard battle for the rest of the summer. As usual, we'll be publishing accumulated DD values for various spots around the state, together with advisories relating to timely control interventions where appropriate. ❖❖

NOT AGAIN?!

REDUCING THE IMPACT FROM 17-YEAR CICADA IN TREE FRUIT

(Peter Jentsch, Entomology, Highland; pjj5@cornell.edu)

❖❖ While pruning our high-density slender spindle block this weekend, I was surprised at the number of young fruiting shoots with ovipositional sites from last year's periodical cicada (*Magicicada* spp.) populations. Inasmuch as we managed the pest with timely applications, as did most of the mid-Hudson Valley tree fruit growers in the Brood II emergence zone, orchards invariably experienced significant damage from the insect. The first appearance of adults on the 27th of May led to 5 weeks of egg-laying by the female beginning the first week of June. The insertion of the egg into the 1st- and 2nd-year branches weakened the branch, causing dramatic limb breakage and loss of fruit as the season progressed. As we move into another season, some consideration should be made to address both damaged fruiting wood and the surviving nymphs, which will feed on roots of the tree for the next 16 years.

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Many of the weakened limbs caused by cicada oviposition will be unable to support the crop through to harvest this season. These branches supporting fruit should be pruned this spring to reduce breakage from crop load, so as to retain the fruiting structure for next season.

The second issue of prolonged cicada nymph presence is likely to be more problematic. The unnoticed nymph emergence occurred weeks after the last application was made to control the adults. Little or no insecticide residue would have remained on the tree to control the nymph as it crawled from the egg, dropped onto the orchard floor and burrowed into the root zone. Nymphs are now firmly attached to developing roots to continue the 17-year feeding cycle on fruit trees.

The cicada nymph populations are estimated to be as high as 1.5 million per acre. Their feeding will slowly take their toll on tree health. Prolonged feeding by nymphs on a tree's root system may reduce plant growth and fruit production. Predictable thinning based on anticipated weather and carbohydrate reserve availability will likely be skewed in blocks where cicada feeding occurs.

The translaminar and systemic insecticides have been shown quite effective at managing insects that feed on the sap of tree foliage and branches, such as leafhoppers, aphids, scale, phylloxera, and mealybugs. Underground sap feeding insects can be addressed by the use of systemic insecticides, which translocate into the root zone. There has been little in the way of agricultural research conducted on underground nymph populations of the 17-year cicada on pome fruit. A study conducted on Kiwi in New Zealand suggested that the use of the systemic insecticide Movento (spirotetramat), applied experimentally to potted kiwi trees at the end of the growing season, demonstrated a 40% decrease in subterranean cicada nymph populations (http://maxa.maf.govt.nz/sff/about-projects/search/09-129/09-129-final-report.pdf). Although Movento is not registered or recommended for use against the 17-year cicada nymphs, its use against the late season San Jose scale and Comstock mealybug may provide some control of the underground cicada nymph population.

Spirotetramat requires the use of a penetrant such as oil or LI700 at the penetrating rate to effectively move into the foliage. The use of this material within labeled guidelines, employing post-petal fall timing, is required to access enough foliage to provide sufficient amount of active ingredient to effectively control scale and Comstock mealybug. ❖❖

Reference

Application timing and adjuvant effects on the uptake and translocation of Movento® sprayed Post harvest to kiwifruit foliage, Gaskin & Horgan, 2011

HORTICULTURE

COLD FEET?

COLD-HARDINESS OF GENEVA® ROOTSTOCKS

(M. Miranda Sazo & Terence Robinson, CCE Lake Ontario Fruit Program, Newark & Horticulture, Geneva; mrm67@cornell.edu & tlr1@cornell.edu)

❖❖ Cold wave events affected our Lake Ontario region this winter and made us wonder about the cold-hardiness of apple rootstocks. As more high density orchards are planted in the U.S. with Geneva® rootstocks in the following years, it will be important to know Geneva's levels of cold-hardiness (Table 1) to determine their suitability for plantings in regions with subfreezing temperatures in the fall and cold winters (with thin or nonexistent snow cover).

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Survival of Geneva stocks in the Champlain Valley has been excellent. In a test planting made in 1991 which experienced -40°F in January 1994, G.41, G.935, G.202 and G.210 showed no damage the next spring, while M.7 showed mild damage. This cold event was with about 6 inches of snow cover.

In a second test planting of Geneva rootstocks with Honeycrisp and McIntosh in the Champlain region in 2001, a winter cold snap in January of 2004 caused considerable tree death of several Malling stocks but not of G.16 and G.30. In this case, there was no snow cover and the damage occurred to the roots and rootstock shank and not to the scion or scion buds. The damage resulted from the combination of warm weather in late December of 2013, which melted all of the snow, followed by a sudden drop in temperature to –25°F by Jan 5. Low temperatures remained at that level each night for several weeks. When tree mortality was recorded in the spring of 2004, G.16 exhibited very good mid-winter hardiness and survived the 2004 winter freeze event in Northern NY that killed many M.9, B.9 and M.26 trees. G.41 has also survived well in Minnesota as part of the NC140 rootstock testing program.

Controlled experiments conducted by Dr. Renae Moran at the University of Maine have shown that G.41, G.11, G.30, and B.9 had root tissue cold-hardiness comparable to M.26. G.935 was the only rootstock to have greater root hardiness than M.26. Cold-hardiness of B.9 and P.2 in relation to hardiness of M.26 was similar to previous reports. She reports that controlled cold-hardiness studies with most of the Geneva rootstocks are lacking, but in field trials, the rootstocks G.16 and G.30 have had greater survival than M.26 or B.9 after a cold event. G.41 has also had good survival after a cold event. She suggests the use of G.935 for apple areas around the world that experience injuriously cold soil temperatures. ❖❖

Table 1. Parentage and cold-hardiness characteristics of some Geneva rootstocks (1)

Geneva® rootstock/cold-hardiness level	Parentage
G.935 (very hardy)	Ottawa 3 (2) X Robusta 5 (3)
G.16 (hardy)	Ottawa 3 X Malus floribunda
G.30 (hardy)	Malling 9 X Robusta 5
G.41 (hardy)	Malling 27 X Robusta 5
G.202 (mixed results, more research needed)	Malling 27 X Robusta 5
G.11 (mixed results, more research needed)	Malling 27 X Robusta 5

(1) Based on controlled studies and tree survival under natural conditions, B.9 and M.26 are considered hardy while M.9 and MM.111 are rated as moderately hardy and M.7 as cold-sensitive.
(2) It is rated as a very cold-hardy rootstock.
(3) It is rated as hardier than M.26 in winter but loses cold-hardiness faster in spring.

ERRATUM

❖❖ Correction to last week's Chem News: The stop-use date for all endosulfan (e.g., Thionex) products in apples is actually July 31, 2015. ❖❖

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–3/31/14):	18	4
(Geneva 1/1–3/31/2013):	36	8
(Geneva "Normal"):	80	25
(Highland 1/1–3/31/14):	41	8

Coming Events:	Ranges (Normal ±StDev):	
Green fruitworm 1st catch	50–152	11–71
Pear psylla adults active	31–99	8–34
Pear psylla 1st oviposition	40–126	11–53

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