scaffolds

Update on Pest Management and Crop Development

F R U I T J O U R N A L

August 25, 2014 VOLUME 23, No. 23 Geneva,

INSECTS

RAIN FOR US

SOGGY WINGS (Dave Kain & Art Agnello, Entomology, Geneva)

❖❖ Needless to say, once it finally got here, the summer was rather wet and humid, with some heat but not as much as we would have liked. Most summer pest populations fell into the "typical" category, with healthy populations of the internal leps, and an apple maggot flight that could eventually break some records. The invasive pest species seemed to have had slimmer numbers this season, although BMSB does look to be gaining in presence in the Hudson Valley.

Following are summarized comparative listings of some of the pest events (for the "usual" species) that occurred this season (in Geneva) with calendar and degree-day normals. The values and dates are given +/- one standard deviation; i.e., events should occur within the stated range approximately 7 years out of 10.❖❖

	DATE		DEGREE DAYS (BASE 43 °F)	
EVENT	Normal (+/-days)	2014	Normal (+/-DD)	2014
APPLE MAGGOT				
1st catch	2-Jul(+/-10)	30-Jun	1459(+/-210)	1369
Peak	5-Aug(+/-11)	4-Aug	2385(+/-270)	2266
AMERICAN PLUM BORER				
1st catch	16-May(+/-7)	30-May	451(+/-63)	630
1st flight peak	3-Jun(+/-9)	5-Jun	780(+/-186)	762
1st flight subsides	29-Jun(+/-7)	10-Jul	1344(+/-144)	1652
2nd flight start	15-Jul(+/-9)	21-Jul	1823(+/-266)	1926
CODLING MOTH				
1st catch	18-May(+/-8)	22-May	485(+/-86)	473
1st flight peak	3-Jun(+/-12)	27-May	769(+/-214)	580
1st flight subsides	6-Jul(+/-13)	10-Jul	1550(+/-288)	1652
2nd flight start	20-Jul(+/-14)	31-Jul	1907(+/-344)	2164
2nd flight peak	7-Aug)+/-14)	11-Aug	2339)+/-383)	2435

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EVENT	DATE Normal (+/-days)	2014	DEGREE DAYS (BASE 43 °F) Normal (+/-DD)	2014
DOGWOOD BORER				
1st catch	15-Jun(+/-9)	9-Jun	1041(+/-237)	846
Peak	10-Jul(+/-11)	10-Jul	1686(+/-209)	1652
GREEN FRUITWORM				
1st catch	6-Apr(+/-7)	14-Apr	101(+/-50)	89
Peak	17-Apr(+/-8)	21-Apr	154(+/-57)	127
Flight subsides	8-May(+/-10)	19-May	359(+/-100)	424
LESSER APPLEWORM				
1st catch	12-May(+/-12)	27-May	419(+/-150)	580
1st flight peak	22-May(+/-14)	9-Jun	570(+/-211)	846
1st flight subsides	25-Jun(+/-11)	16-Jul	1260(+/-268)	1808
LESSER PEACHTREE BORER				
1st catch	24-May(+/-9)	27-May	580(+/-98)	580
OBLIQUEBANDED LEAFROLLER				
1st catch	9-Jun(+/-6)	9-Jun	897(+/-86)	846
1st flight peak	16-Jun(+/-7)	30-Jun	1030(+/-196)	1369
1st flight subsides	16-Jul(+/-7)	21-Jul	1825(+/-215)	1926
2nd flight begins	8-Aug(+/-9)	4-Aug	2444(+/-196)	2266

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EVENT	DATE Normal (+/-days)	2014	DEGREE DAYS (BASE 43 °F) Normal (+/-DD)	2014
ORIENTAL FRUIT MOTH				
1st catch	2-May(+/-9)	8-May	276(+/-51)	236
1st flight peak	14-May(+/-11)	12-May	436(+/-104)	321
1st flight subsides	12-Jun(+/-8)	16-Jun	977(+/-138)	1001
2nd flight begins	29-Jun(+/-5)	26-Jun	1386(+/-117)	1249
2nd flight peak	11-Jul(+/-9)	30-Jun	1710(+/-259)	1369
2nd flight subsides	1-Aug(+/-7)	4-Aug	2307(+/-241)	2266
3rd flight begins	11-Aug(+/-9)	18-Aug	2566(+/-278)	2587
PANDEMIS LEAFROLLER				
1st catch	5-Jun(+/-6)	5-Jun	833(+/-65)	762
Peak	14-Jun(+/-9)	26-Jun	1036(+/-153)	1249
Flight subsides	5-Jul(+/-6)	16-Jul	1559(+/-131)	1808
PEACHTREE BORER				
1st catch	17-Jun(+/-11)	23-Jun	1072(+/-268)	1162
REDBANDED LEAFROLLER				
1st catch	16-Apr(+/-9)	24-Apr	145(+/-33)	153
1st flight peak	3-May(+/-10)	22-May	303(+/-75)	473
1st flight subsides	1-Jun(+/-8)	5-Jun	746(+/-150)	762
2nd flight begins	30-Jun(=/-6)	26-Jun	1400)+/-172)	1249
2nd flight peak	14-Jul)+/-7)	10-Jul	1773(+/-220)	1652
2nd flight subsides	8-Aug(+/-11)	4-Aug	2454(+/-277)	2266
SAN JOSE SCALE - adult males				
1st catch	20-May(+/-8)	27-May	525(+/-90)	580
1st flight peak	29-My(+/-8)	30-May	647(+/-92)	630
1st flight subsides	16-Jun(+/-9)	26-Jun	1051(+/-187)	1249
2nd flight begins	15-Jul(+/-8)	14-Jul	1804(+/-175)	1755
2nd flight peak	3-Aug(+/-9)	4-Aug	2315(+/-178)	2266
SPOTTED TENTIFORM LEAFMINER				
1st catch	19-Apr(+/-9)	8-May	166(+/-50)	236
1st flight peak	7-May(+/-8)	22-May	338(+/-71)	473
1st flight subsides	5-Jun(+/-9)	9-Jun	810(+/-139)	846
2nd flight begins	16-Jun(+/-7)	19-Jun	1080(+/-86)	1087
2nd flight peak	7-Jul(+/-9)	3-Jul	1588(+/-206)	1475

CROP	DATE		DEGREE DAYS(BASE 43 °F)	
PHENOLOGY	Normal (+/-days)	2014	Normal (+/-DD)	2014
APPLE (MCINTOSH)				
Silver tip	8-Apr(+/-6)	14-Apr	85(+/-24)	89
Green tip	13-Apr(+/-8)	21-Apr	121(+/-24)	127
Half-inch green	20-Apr(+/-8)	28-Apr	175(+/-23)	169
Tight cluster	27-Apr(+/-8)	5-May	233(+/-26)	215
Pink	3-May(+/-7)	9-May	294(+/-23)	254
Bloom	10-May(+/-6)	14-May	381(+/-36)	358
Petal fall	18-May(+/-6)	25-May	486(+/-38)	524
Fruit set	22-May(+/-6)	27-May	554(+/-44)	580
APPLE (RED DELICIOUS)				
Silver tip	10-Apr(+/-5)	14-Apr	96(+/-18)	89
Green tip	13-Apr(+/-9)	24-Apr	134(+/-26)	153
Half-inch green	20-Apr(+/-10)	1-May	192(+/-24)	184
Tight cluster	26-Apr(+/-11)	8-May	248(+/-28)	236
Pink	5-May(+/-8)	12-May	331(+/-37)	321
Bloom	13-May(+/-7)	19-May	424(+/-46)	424
Petal fall	21-May(+/-8)	22-May	536(+/-64)	473
Fruit set	23-May(+/-6)	27-May	578(+/-47)	580
APPLE (EMPIRE)				
Silver tip	9-Apr(+/-6)	14-Apr	91(+/-11)	89
Green tip	16-Apr(+/-2)	18-Apr	108(+/-9)	110
Half-inch green	18-Apr(+/-11)	28-Apr	169(+/-26)	169
Tight cluster	24-Apr(+/-12)	5-May	224(+/-30)	215
Pink	30-Apr(+/-10)	12-May	290(+/-26)	321
Bloom	9-May(+/-6)	14-May	382(+/-33)	358
Petal fall	18-May(+/-7)	22-May	491(+/-36)	473
Fruit set	22-May(+/-7)	27-May	545(+/-38)	580

DISEASES

STREP STORY

STREPTOMYCIN RESISTANT FIRE BLIGHT SURVEY UPDATE

(Kerik Cox, Plant Pathology, Geneva; kdc33@cornell.edu)

❖❖ The streptomycin resistance survey is proceeding with astonishing efficiency. Thus far we have processed 537 samples to completion with only a total of 741 samples to finish. All samples submitted before the beginning of august have been completed and are all streptomycin sensitive. Currently, it takes about 2–3 weeks to see a sample to final completion with entry in the data sheet. Delivery of survey results to those submitting samples will proceed like that in clinical science in that if you do not receive a phone call or email, your trees do not have streptomycin resistant fire blight. If you want a personal assurance or want to check on status, just email me (kdc33@cornell.edu) with your orchard and cultivar surveyed. We have also looked at some black stem borer (BSB) samples. All of the fungi associated with BSB are *Nectria haematococca* (an. *Fusarium solani*). *Fusarium solani* can contribute to tree decline. ❖❖

Figure 1. Apple shoot infected with *Nectria*. Shown is the junction of first and second year growth covered with coral colored stromata of *N. cinnabarina*.

THAT OTHER BLIGHTER

BLIGHT BLUES: *NECTRIA* AND LATE SUMMER TREE DECLINE

(Kerik Cox; kdc33@cornell.edu and Juliet Carroll, IPM, Geneva; jec3@cornell.edu)

❖❖ It seems to be the summer of tree decline and shoot blight, and in this case I'm not necessarily referring to shoot blight caused by fire blight. The symptom of a flagged crooked brown or black shoot with wilted dead leaves isn't exclusive to fire blight infections. Such a symptom is physiological response to rapid wilting and death of tissue, which is why other fungal canker diseases and "tractor blight" (when farm equipment snaps a shoot) can look like fire blight. The fire blight bacterium *Erwinia amylovora* can actually cause necrosis of tissue, which often causes the wilted shoots to look darker than the brown color associated with a slow fungal decay or a cracked shoot.

Throughout eastern and western NY, I've seen and been sent numerous samples of *Nectria* canker on apples, which is easily diagnosed by the presence of orange, salmon, or black fruiting bodies usually near the section of decay at the base of the shoot where the infection likely took place. *Nectria* is indeed fairly widespread this year. I have seen *Nectria* canker in all of my research orchards from young current season plantings to older 15 year old blocks. With the exception of my newly planted orchard, *Nectria* was only found on shoots that have been compromised by either physical or chemical damage, or fire blight. In fact, nearly every broken branch or pruning left in my orchard is now covered with *Nectria* fruiting bodies. In the case of my orchards with fire blight, *Nectria* likely arrived after they were compromised by fire blight. In NY, a lot of the *Nectria* I've seen is *Nectria cinnabarina* and a few other species that are weakly pathogenic and emerge on infected shoots from mid-summer to early fall.

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Figure 2. Blighted shoot tissue from an apple shoot infected with *Nectria*. The shoots have the wilted crooked appearance of fire blight, but are light tan and much paler than fire blight infections.

Although *N. cinnabarina* is weakly pathogenic, shoots compromised by fire blight, black stem borer, isolated hailstorms, herbicide application, and heavy thunderstorms would be enough to make orchards susceptible to infection by *Nectria* and other minor canker pathogens. With all of the aforementioned problems plaguing orchards this summer it is not surprising to see *Nectria* canker. The question now becomes how to identify and manage infections by *Nectria* and other canker fungi.

Symptoms and signs

Apple shoots infected by *Nectria* and other canker fungi will wilt, decline, and turn brown with a crooked tip. However, the color of the leaves and wilted shoot tip is more bronze (not black) and will look nearly identical to a shoot that was broken at the base. Sections of the infected bark may appear light tan with a slight orange tint. In these pale sections and at the attachment point of shoots or fruit spurs one may often find the presence of hard orange, coral, or black pustules (stromata) which are 1mm (about the size of the head of a pin). Such pustules are filled with spores than can cause infections of leaf scars, pruning wounds and dead fruit spurs or peduncles remaining after thinning. *Nectria* can occur on shoots with fire blight or vice versa, which can confuse the diagnosis of both diseases.

Epidemiology and management of *Nectria* diseases

Little is known about the pathogenicity of the majority of *Nectria* species other than they are opportunists that can attack compromised woody perennials from currants to apples, and produce stromata with infective spores in mid-summer to early fall. By comparison, a good bit is known about *N. galligena*, the causal agent of European canker. European canker is a fairly important disease of apple in Europe and South America, and is known to be present on apples in California. Although *N. galligena* is more aggressive than many of the *Nectria* species observed this summer, the life history of all Nectria species should be somewhat similar. *N. galligena* can survive in cankers and old bark, and can be present in nursery stock. It's not hard to imagine other *Nectria* species surviving in a similar manner on summer prunings that may be present on the orchard floor or still hanging in larger trees. Unless every spur or shoot with stromata (pustules) is removed from affected trees, it should be assumed that *Nectria* is present, able to sporulate, and cause infection of compromised tissues.

In the case of European canker, infections occur in the fall by wind-dispersed spores invading leaf scars formed during leaf drop at senescence. Following infection, the *Nectria* may spread through the woody tissues and kill the entire shoot as the summer progresses. Local infections may also occur during spring and summer on pruning cuts by spores produced on the cankers that formed from infections taking place in the fall. In the case of the *Nectria* infections observed this season, infections may have occurred during rainy weather last fall and following summer pruning. In addition to pruning wounds, the black stem borer, local hailstorms, fire blight, and even winter injury would have been enough to exacerbate spring and summer infection by *Nectria*.

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Managing canker fungi is difficult as the fungi are protected deep inside woody tissues from fungicide residues used to manage apple scab and powdery mildew. While there are a few fairly systemic fungicides, the most effective fungicides are only locally systemic and would never penetrate deeply into woody tissues. Management of *Nectria* canker begins in the fall by protecting leaf scars resulting from leaf fall. *N. galligena* infections are initiated by spores produced in stromata (pustules) emerging in late summer. Similarly, the stromata containing spores from *N. cinnabarina*, *Botryosphaeria*, and other canker fungi are readily observed on apple wood and would be able to cause infections. It is typically recommended to apply copper fungicides at 20% and 80% leaf fall. Leaf fall application timings can be adjusted to better match local fall rains. Such recommendations may sound familiar, as it is nearly the same recommendation for protecting cherries against bacterial canker in the fall. Don't forget that such applications only protect against new infections, and are not able to arrest established infections in the woody tissue. Fortunately, many excellent copper products including Kocide 3000 and Badge SC are labeled for European canker (*Nectria*) in NY, and these could be used to protect against fall infections for the 2015 season.

Infections by *N. galligena* first occur in the early summer or late spring, and at this time it is important to prune out infected shoots before the fungus spreads throughout the scaffold to the main trunk. Moreover, such infections will serve as a source of inoculum for infections at leaf drop. Infections from *N. cinnabarina* and other canker fungi should be pruned out to minimize the amount of inoculum present in the fall and curtail new infections. Pruning out shoots infected with *Nectria* should occur on a cool day following a 24-hr period of dry weather with two days of dry weather forecasted following pruning. If *Nectria* infection has reached the leader or trunk, it is probably worthwhile to remove the tree and replant rather than to remove the leader, retrain the tree, and risk potential development of more inoculum in the orchard in the fall. When pruning is completed, it is imperative to remove cuttings from the orchards and burn them or take them offsite to reduce inoculum pressure in the orchard and infection risk to trees during leaf fall. All of the cuttings in my research orchard are covered with *Nectria* stromata and will be releasing spores to initiate new infections this fall unless I remove them.

In summary, *Nectria* species other than *N. galligena* are fairly weak pathogens and usually only infect and invade shoots compromised by winter injury, the black stem borer, fire blight, hail, and herbicide applications. Copper fungicides are the only means to protect against infection during leaf drop in the fall. Pruning is probably the most important means of managing the *Nectria* infections as it reduces inoculum potential and restricts the spread of the fungus into the major scaffolds, leaders, and trunk. Infected prunings should be pushed out of the orchard and burned to reduce *Nectria* inoculum. Finally, while infections by *Nectria* and other canker fungi seem overly prevalent this season, we may not see them in growing seasons with warmer winters, less rainfall, and fewer cases of fire blight. ❖❖

GOING OFF SCREEN

ORCHARD RADAR DIGEST

[H = Highland; G = Geneva]:

Codling Moth
Codling moth development as of August 25: 2nd generation adult emergence at 99% [H] / 87% [G] and 2nd generation egg hatch at 86% [H] / 56% [G].

❖❖

FRUIT TOUR

EVENT ANNOUNCEMENTS

CORNELL FRUIT PEST CONTROL FIELD DAYS

❖❖ The Geneva Fruit Pest Control Field Day will take place during Labor Day week on Sept. 3 this year. Activities will commence with registration, coffee, etc., in the lobby of Barton Lab at 8:30 am. The tour will proceed to the orchards to view plots and preliminary data from field trials involving new fungicides, bactericides, miticides, and insecticides on tree fruits and grapes. It is anticipated that the tour of field plots will be completed by noon. Because of the recent retirements and personnel changes at the Hudson Valley Lab, there will be no corresponding Highland component this year. However, cooperators desiring one-on-one tours of their individual research plots can contact Peter Jentsch to make arrangements. No pre-registration is required for the Geneva tour.
❖❖

GENERAL INFO

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	8/18	8/21	8/25
Redbanded leafroller	0.3*	0.2	2.0
Spotted tentiform leafminer	8.6	7.0	11.4
Oriental fruit moth	3.0	2.0	1.1
Codling moth	0.6	1.5	2.1
Lesser appleworm	0.1	0.3	0.6
San Jose scale	33.8	39.2	41.9
American plum borer	0.0	0.0	0.0
Lesser peachtree borer	0.1	0.8	0.3
Obliquebanded leafroller	1.1	0.3	0.3
Dogwood borer	0.0	0.0	0.5
Peachtree borer	0.4	0.5	0.0
Apple maggot	5.3	4.8	5.9

* first catch

Highland, NY

	8/18	8/25
Redbanded leafroller	0.7	2.7
Spotted tentiform leafminer	39.2	41.9
Oriental fruit moth	2.1	1.1
Codling moth	2.4	0.7
Lesser appleworm	2.4	4.4
Variegated leafroller	0.6	1.1
Tufted apple budmoth	0.8	1.1
Sparganothis fruitworm	0.0	0.1
Obliquebanded leafroller	0.6	0.1
Apple maggot	0.1	0.0

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–8/25/14):	2752	1875
(Geneva 1/1–8/25/2013):	2849	1974
(Geneva "Normal"):	2969	1987
(Geneva 1/1–9/2/14, predicted):	2968	2035
(Highland 1/1–8/25/14):	3148	2192

Coming Events:	Ranges (Normal ±StDev):	
American plum borer 2nd flight peak	2005–2575	1351–1777
Comstock mealybug 2nd gen. crawlers subside	2735–2771	1794–1958
Codling moth 2nd flight peak	1943–2727	1288–1888
Spotted tentiform leafminer 3rd flight peak	2568–3022	1748–2110
Apple maggot flight subsides	2772–3258	1907–2283
Obliquebanded leafroller 2nd flight peak	2593–3011	1758–2098
Redbanded leafroller 3rd flight peak	2717–3207	1881–2225
Lesser appleworm 2nd flight peak	2131–3105	1422–2156
Oriental fruit moth 3rd flight peak	2643–3221	1818–2232
Peachtree borer flight subsides	2478–3126	1672–2180
San Jose scale 2nd gen. crawlers emerging	2746–2852	1916–2104

NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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