

North Carolina Pest News

Departments of Entomology and Plant Pathology



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In This Week's Issue . . .

CAUTION !

The information and recommendations in this newsletter are applicable to North Carolina and may not apply in other areas.

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FIELD AND FORAGE CROPS

From: Dominic Reisig, Extension Entomologist

Scouting for Plant Bugs

Although it looks like plant bugs may be an issue this year, we don't need to panic. What I mean by don't panic is that we shouldn't spray if it's not needed. Growers in the Midsouth contend with plant bugs at much greater densities and frequencies than we do. Managing plant bugs is as easy as any

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of our other pests if you have a scouting plan and stick to it. I cannot urge how important it is to both monitor square retention and to check for plant bugs. Plant bugs aren't the only cause of square loss – other stresses in the environment can cause this. So you don't want to spray a field where bugs aren't the problem. Also, plant bugs are extremely mobile and can rapidly move in and out of fields. Sometimes they may be present (especially adults), but not causing square loss.

Weekly checks of upper square retention is the most efficient way to assess if plant bugs can either be ruled out as an economic concern at that time or if sweeping for the adults and nymphs is needed. An upper square retention rate of 80% or more usually indicates that plant bugs are not present at damaging levels. If upper square retention is less than 80%, you should sweep six to eight or 10 locations in the field away from the edge, looking for live adult and immature plant bugs. In most years in North Carolina, square retention is very high – often in the mid-90s. A threshold of eight plant bugs per 100 sweeps usually indicates that a spray is needed at that time. Remember that when cotton is approximately one week into blooming, a five-foot black beat cloth is a more accurate sampling devise than the sweep net for plant bugs, especially immatures. I'll blog about this sampling option in the coming weeks.

Insecticides for Plant Bugs

With cotton squaring and flowering weeks away, it is a good idea to think about treatment options for plant bugs. In fact, some growers have already confirmed square loss from plant bugs and densities of plant bugs above threshold in our state. Some fields have already been sprayed, as a result, and it is a good idea to be prepared. Although I think plant bugs are going to be an issue this year, I also think that we can easily manage them if we scout our fields correctly. What I hope we can avoid is spraying when we don't need to, which can lead to resistance or flare other pests later in the season. For example, no insecticide will control adults that remigrate into a field after a spray or stop squares that are being shed from droughty conditions with no plant bugs present.

Generally the neonicotinoid-class insecticides perform well early in the season before flowering and often at lower rates. These include products such as Admire Pro, Belay, Centric, Intruder, Trimax Pro, etc. The advantage to using these products is that they generally do not flare secondary pests, such as spider mites, and may preserve some, but not all, beneficial insects. In general, a product that is killing a plant bug will likely kill related beneficial insects such as minute pirate bug and insidious flower bug, damsel bugs, assassin bugs, and big-eyed bugs. However, these products are still much less harsh on the system than pyrethroid and organophosphate-class insecticides.

Later on in the season, neonicotinoid insecticides generally do not work as well. However, Belay performed well in 2010 and 2013 trials that I had well into the growing season (Figures 1 and 2). That being said, I am recommending that you do not spray a pure neonicotinoid product **more than once a season** (common examples of Admire Pro, Belay, Centric, Intruder, Trimax Pro are listed above) or a mixed product more than twice a season (common examples include Brigadier, Endigo, and Leverage 360). Aphid resistance to neonicotinoids is on the rise and was confirmed in eastern North Carolina in 2012. All cotton seed treatments targeting thrips are neonicotinoids and pre-mixed product use in cotton is widespread. Hence, the increase in neonicotinoids in cotton is increasing aphid resistance to these products. Therefore, to counteract this resistance I am recommending that you rotate insecticides.

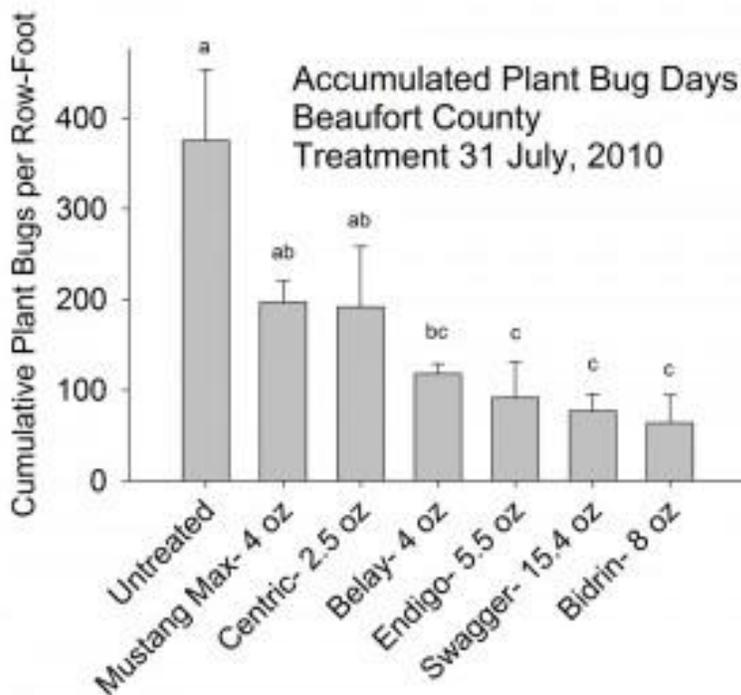


Figure 1. Cumulative plant bugs per row foot 14 days after treatment, 2010.

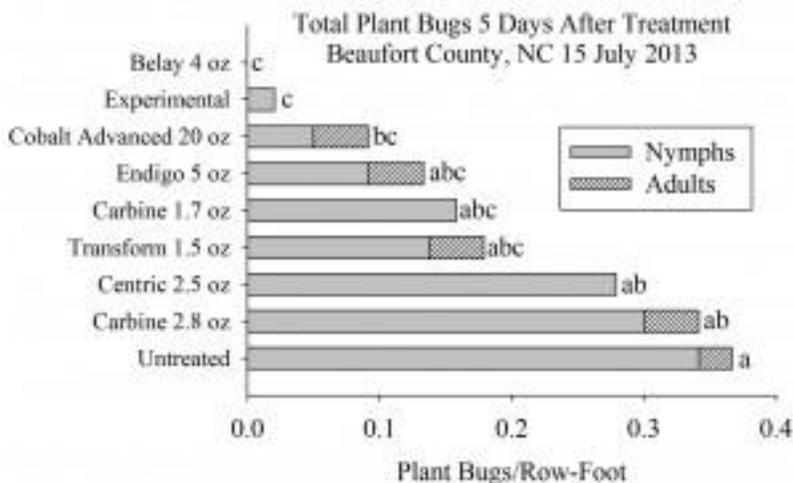


Figure 2. Total plant bugs five days after treatment, 2013.

Also keep in mind that there are label restrictions to how much insecticide can be used throughout the season. One example is thiamethoxam. The maximum amount of this chemical that can be sprayed in the season is equal to a 5 oz rate of Centric (0.125 lb active ingredient per acre). That total amount includes premixed products that contain thiamethoxam, such as Endigo. Check the label before you spray to see what the active ingredients are and how much can be applied to the crop.

Here is an example of a spray plan. For the first plant bug spray pre-bloom, at squaring or first flower, consider using a stand-alone neonicotinoid product (common examples include Admire Pro, Belay,

Centric, Intruder, Trimax Pro). If plant bugs are still a concern later on, or require a second spray, first check to see that aphids are not common in the field. If they are, you should not use a neonicotinoid again. Switch to a product like Carbine, Transform, or one of the more effective pyrethroids. Remember that aphids first occur in field “hot-spots”. So you might not see a population and resistance developing until it is full-blown. Be sure to scout these fields intensively. If aphids are not a concern, you should still not use a stand-alone neonicotinoid product for a second spray, but should switch to one of the pre-mixed products (like Endigo, Swagger, etc.) or an organophosphate/carbamate-only product (Bidrin, Orthene, Vydate, etc.). Many of these products are also effective against stink bugs; eliminating stink bugs can be beneficial during the period of boll formation. The downside to these products is that they kill beneficial insects and put you at risk for bollworm and spider mites.

From: Hannah Burrack, Extension Entomologist

What’s Up with All These Budworms?

We exceed [tobacco budworm](#) thresholds at several of our scouting locations [last week](#), which was also the case for a number of growers. This week, however, scouting at some of these same locations has revealed that budworm may still exceed threshold. This was the case at one of our research station experiments at the [Lower Coastal Plain Research Station](#) in Kinston, North Carolina. Because we had untreated control plots in this experiment, we were able to tease out what likely happened at this and other locations. The larvae in our control plots were mostly large, and had likely been present last week when our treatments were applied. The larvae in the plots which were treated last week were small (first and second instars), which suggests that they were the result of eggs laid after we treated last week. This suggests that we are in the middle of a prolonged tobacco budworm flight, resulting in potential re-infestations, in the east-central part of the state.



**Tobacco budworm larvae of varying sizes.
Photo: Hannah Burrack.**

Questions about residual activity

So why aren't we seeing activity on these new larvae from the treatments made last week? None of the insecticides applied as foliar treatments for tobacco budworms are systemic, meaning they do not move throughout plants. Some materials may be persistent in plants, meaning they may be present in toxic doses for insects on the treated leaves for longer periods of time than others. However, that last point is key! Any persistence or residual activity of an insecticide for budworms applies only to the **treated leaves**. The bud is the most dynamic, fastest growing part of the plant, and it is likely with our warm weather and recent thunderstorms, the leaves which were treated last week are longer the same as those that recently hatched budworm larvae are feeding on!

The fact that we can only expect residual activity of an insecticide on the leaves it was applied to underscores the important of only treating when budworms reach threshold. We cannot expect a foliar treatment applied weeks ago to be effective on bud tissue that has only grown out recently. Waiting to treat until tobacco budworms reach threshold maximizes the impact of those treatments and reduces the likelihood that a reapplication will be necessary. Although, as we are now seeing, sometimes insect pressure trumps timing. We retreated several of our plots at the research station. A final point on retreatment: if you are making more than one application of an insecticide against the same target pest, always be sure to rotate to a new mode of action (MOA). The [North Carolina Agricultural Chemicals Manual](#) and [Tobacco Information](#) both include information on MOAs for recommended insecticides.

Other pests present in fields

In addition to tobacco budworm, some locations are also seeing a few [hornworms](#) present. So far, hornworm numbers have been below threshold (less than 5%) at our scouting locations. (View weekly scouting reports.) While hornworms are a much more significant pest than budworms, the larvae at our scouting locations have ranged from large and close to mature to very small with very few eggs observed.



Tobacco and tomato hornworm eggs are round, blueish green and typically laid on the upper surface of leaves. We are not seeing large numbers of eggs in fields at this time. Photo: Hannah Burrack.

With this age structure, I suspect that hornworm populations may stay below threshold for the time being, perhaps even through topping. However, if we start to spot more eggs or more small, recently hatched larvae, that prediction may change.

In addition to hornworms, growers are also observing some stink bug movement in tobacco. Stink bug feeding on tobacco leaf mid ribs can lead to wilted leaves, typically no more than one per plant.



**Tobacco leaf wilted due to stink bug feeding.
Photo: Hannah Burrack.**

While it is important to be able to diagnose this injury, stink bugs rarely, if ever, impact yield and therefore, should not be the focus of additional insecticide applications. Further, the materials effective against stink bugs available for use in tobacco come with significant risk in the form of pesticide residue concerns and are unlikely to be effective against this highly mobile pest.

(Originally posted at: <http://entomology.ces.ncsu.edu/2014/06/whats-up-with-all-these-budworms/>)

From: Hannah Burrack, Extension Entomologist, and Cameron McLamb, Student Working

Tobacco Insect Scouting Report – June 26, 2014

It is our ninth week of scouting, and we are starting to see higher numbers of [tobacco budworms](#) at all locations. We have observed a few other insects, such as Japanese beetles and stink bugs, but not at levels that cause concern. [Thrips](#) have also decreased quite substantially throughout all sites, and tomato spotted wilt virus incidence is well below 10%, the point at which we become concerned about this disease.



Larger plants present this week. Photo: Cameron McLamb.

Scouting Report, Eastern 1 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	0 beetles/plant – No treatment	6% tobacco budworm infested plants – No treatment	0 – No treatment	0 – No treatment	0.04 Japanese beetles/plant

Scouting Report, Eastern 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	8% tobacco budworm infested plants – No treatment	0 hornworms/plant – No treatment	0 – No Treatment	None Observed

Scouting Report, Eastern 3 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	0 beetles/plant – No treatment	8% tobacco budworm infested plants – No treatment	0 – No treatment	0 – No treatment	0.025 stink bugs per plant 1 minute pirate bug (beneficial) observed

Scouting Report, Eastern 4 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	23% tobacco budworm infested plants – Treatment Recommended	0 hornworms/plant – No treatment	0 – No Treatment	None observed

Scouting Report, Piedmont 1 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	0 – No treatment	40% tobacco budworm infested plants – Treatment Recommended	0.075 hornworms/plant – No treatment	0 – No treatment	None observed

Scouting Report, Piedmont 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infested plants	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	34% tobacco budworm infested plants – Treatment Recommended	0.06 hornworms/plant – No treatment	0 – No Treatment	None observed

Here are the scouting reports from the control plots for our experiments at the [Upper Coastal Plain Research Station](#) near Rocky Mount, North Carolina, and the [Lower Coastal Plain Research Station](#) near Kinston, North Carolina. For some of these experiments, the control plots receive no insecticide treatments for the entire season. For some of the experiments, we are interested in only caterpillar pests so all plants in the experiment, including the control plots, are treated in the greenhouse with imidacloprid to prevent other early season pests.

On Station, Kinston – Control plants with no insecticide treatment

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infestation	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0% aphid infested plants – No Treatment	0 beetles/plant – No treatment	75% budworm infested plants – No treatment**	0 – No treatment	0 – No Treatment	5% of plants infected with tomato spotted wilt virus

On Station, Kinston – Control plants treated with imidacloprid



Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infestation	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	82% budworm infested plants – No treatment**	0 – No treatment	0 – No Treatment	5% of plants infected with TSWV

On Station, Rocky Mount – Control plants with no insecticide treatment

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infestation	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	5% budworm infested plants – No treatment	0% Hornworm infested plants – No treatment	0 – No Treatment	2% of plants infected with TSWV

On Station, Rocky Mount – Control plants treated with imidacloprid

Insect observation	No. aphid infested plants	Flea beetles/plant	Percent tobacco budworm infestation	Hornworms/plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	6% budworm infested plants – No treatment	0 – No treatment	0 – No Treatment	1% of plants infected with TSWV

**** Plots were not treated due to the experiment, but experimental plots with similar amounts of budworm infestation, were treated.**

More Information

You can find last week’s scouting report [here](#). To learn more about the Integrated Pest Management project, refer to our first scouting report [here](#).

(Originally posted at: <http://tobacco.ces.ncsu.edu/2014/06/tobacco-insect-scouting-report-june-26-2014/>)

FRUIT AND VEGETABLES

From: Lina Quesada-Ocampo, Extension Plant Pathologist

Cucurbit Downy Mildew Found in Franklin County, North Carolina

Cucurbit downy mildew was confirmed on a cucumber sample from a commercial field in Franklin County submitted to the [Plant Disease and Insect Clinic](#) on June 23, 2014. Leaves presented approximately 20% disease, but only 1% of the field was affected (Figure 1 and Figure 2).



Figure 1. Adaxial side of a cucumber leaf showing downy mildew symptoms (Charles Mitchell, North Carolina Cooperative Extension).



Figure 2. Abaxial side of a cucumber leaf showing downy mildew sporulation (Charles Mitchell, North Carolina Cooperative Extension).

This is the second report of cucurbit downy mildew in North Carolina for 2014, and several outbreaks are being reported in neighboring states. Active scouting and immediate action to protect cucurbit crops is recommended. Please refer to our [previous alert](#) for control recommendations.

If you think you have cucurbit downy mildew in your cucurbits please contact your [local Extension agent](#) and send photos and/or physical samples to the [Plant Disease and Insect Clinic](#). If cucurbit downy

mildew is confirmed in your samples by an expert, please make sure a report is sent to the [Cucurbit downy mildew IPM pipe website](#).

Follow us on [Twitter](#) and [Facebook](#) for more vegetable disease alerts.

ORNAMENTALS AND TURF

From: Steve Frank, Extension Entomologist

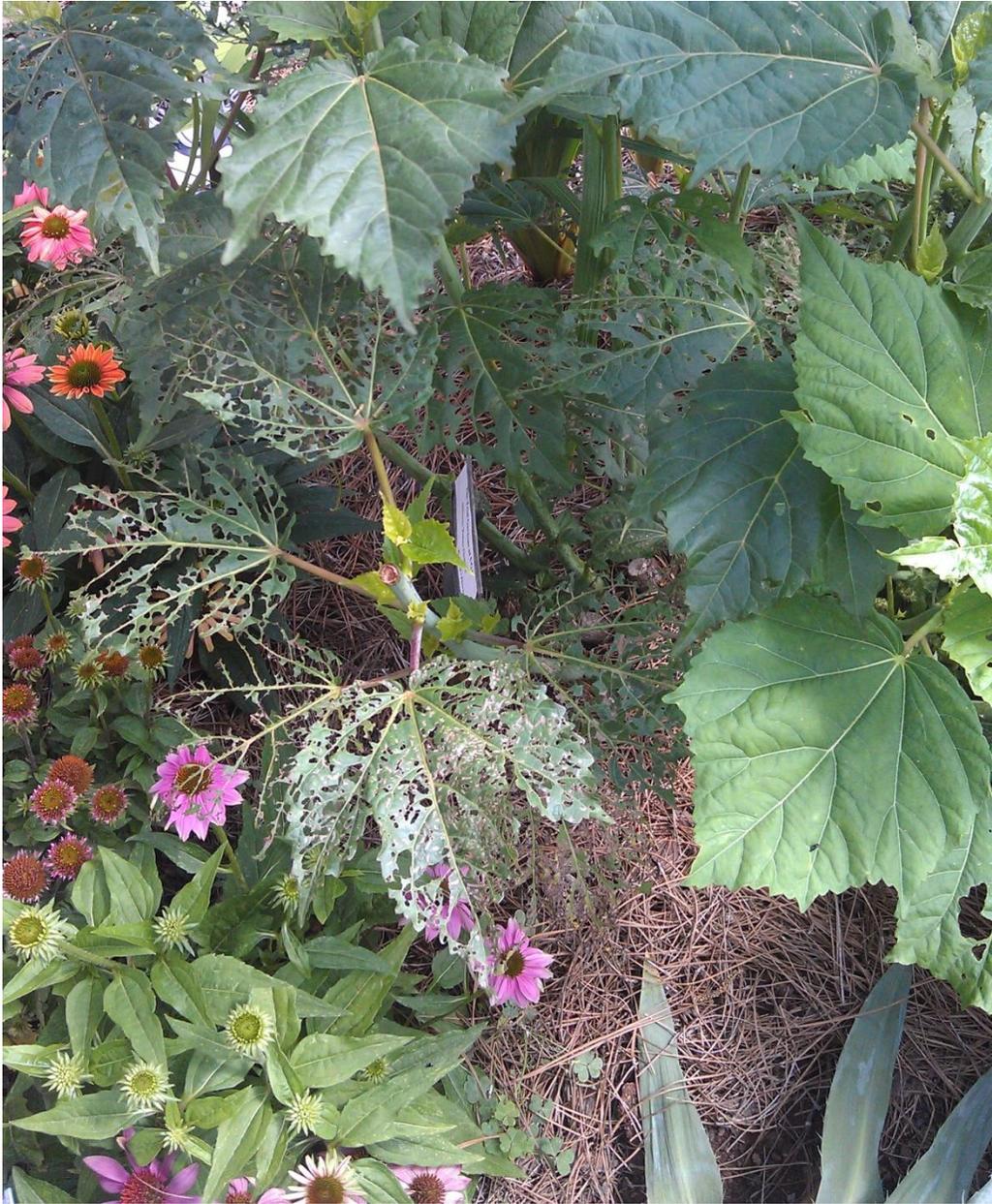
Hibiscus Sawfly Damage

This week I found severe damage by hibiscus sawfly. Larvae and adults were present on the plants I surveyed. The adults are active throughout the summer. The larvae feed on hibiscus and related plants. The larvae skeletonize leaves when they are young, but quickly defoliate plants as they grow. Insecticides for management include, bifenthrin, spinosad, acetamiprid, azadirachtin and others listed here: <http://www.ces.ncsu.edu/depts/ent/notes/O&T/shrubs/note07/note07.html>

They are not caterpillars so be sure to look for sawflies specifically on the label of the product you select.



Adult hibiscus sawfly. Photo: S. D. Frank.



Damage caused by hibiscus sawfly larvae. Photo: S. D. Frank.

Japanese Beetles Trickle Out

It is late June and Japanese beetles are out, but not very many on campus. I have a couple reports from around North Carolina and I saw a few at the JC Raulston Arboretum. So I guess they are trickling out, but populations seem to have gotten lower and lower in the past several years. For three years in a row we have had severe droughts during the time Japanese beetles are ovipositing. They need moist soil so their eggs do not dehydrate and so tiny young larvae can borrow into the soil. Droughts have restricted successful reproduction to only well irrigated areas.

Of course, the drought scenario only applies to areas without irrigation. Golf courses and neighborhoods with irrigation in every yard will have a lot more beetles and larvae. Ironic that irrigation and HOA standards to maintain uniformity and aesthetic standards actually increase pest abundance and damage to lawns and trees.

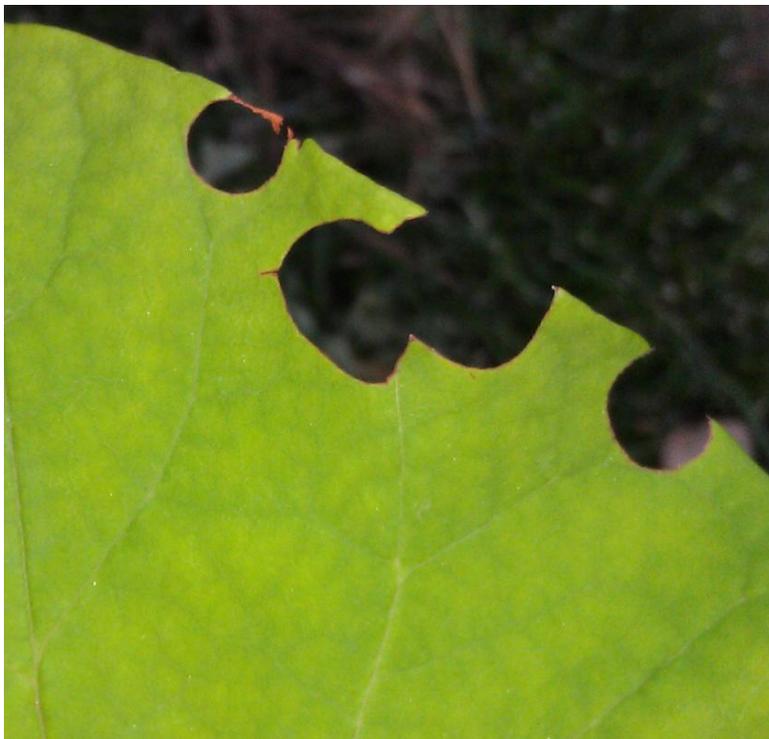
So keep an eye out and remember a few key things. Japanese beetle traps do not offer any protection to landscape plants and may actually attract more beetles on to your property so hang them in your neighbor's yard. Likewise, treating a lawn for Japanese beetle grubs will not reduce defoliation of plants on that property since beetles fly in from great distances. Long-term protection for landscape and nursery plants can be achieved a neonicotinoid insecticide such as imidacloprid (e.g., Merit, Marathon II) or acetamiprid (Tri-Star). A new product with extremely low vertebrate toxicity, but good efficacy for a number of pests including Japanese beetles, is Acelepryn (chlorantraniliprole). For more information on the biology and management of adult Japanese beetles in nurseries and landscapes consult the insect note at <http://www.ces.ncsu.edu/depts/ent/notes/O&T/flowers/note147/note147.html>.



Japanese beetle on roses. Photo: S. D. Frank.

Notching on Redbuds by Bees

Leaf cutter bees in the family Megachilidae are actively notching out small pieces of leaves from redbuds and other trees. They also attract attention for tunneling into soft rotten wood and hollow or soft, pithy plants stems like roses. They make their nests in these hollow tubes and line them with leaf fragments. Leaf cutter bees are much more of a benefit than a pest; try to convince clients of this fact. Also most insecticides are either not labeled for bees or ineffective since the bees do not eat the leaves. Many people are more concerned about the bees tunneling in their roses which can be prevented by sealing the ends of branches after pruning. Overall, bees are an important native pollinator that should be protected and even encouraged. More pictures here: <http://ecoipm.com/>. Information sheet: <http://www.ext.colostate.edu/pubs/insect/05576.html/>.



Notched leaf margins from leaf cutter bees. Photo: S. D. Frank.

RESIDENCES, STRUCTURES AND COMMUNITIES

From: Mike Waldvogel, Extension Entomologist

Mosquitoes and Diseases

With July coming upon us soon and while most people are thinking about barbecuing and fireworks, rainfall over recent weeks is a good reminder to think about mosquitoes and protecting not only ourselves, but also pets. In 2013, we had 13 veterinary cases of Eastern Equine Encephalitis (EEE) in a cluster of six southeastern counties. Eight of those cases occurred from July through early August. Brunswick County recorded the first case (confirmed in mid-July), but Cumberland County led the way with six cases and Pender County had three. In 2012, Cumberland and Brunswick County recorded the only cases, but they were recorded closer to September. What this tells us is that we can't predict where and when the disease might occur.

Horse owners may want to check their inoculation records to make sure that their horses' inoculations are still effective (which they should be if the horses were inoculated in the spring), but remember that a booster inoculation is important about 6 months later.

Despite the name, the disease affects not just horses but people as well. Unlike some other disease-causing viruses of medical importance, you can't get EEE from contact with an infected person or horse. Mosquitoes become infected when they bite an infected bird and those mosquito species then feed on other birds, which increases the reservoir of virus in the bird population during the course of the summer. Other mosquito species acquire the virus when they bite infected birds and then act as

"bridges" by passing the virus to horses or people on whom they subsequently feed and which then become infected.

Children and the elderly are the biggest concern and so we need to urge our clients to take appropriate protective measures and use insect repellents (see <http://insects.ncsu.edu/Urban/repellents.htm>). We still recommend the usual measures of emptying rain-filled containers and other objects as well as unclogging gutters, drainage ditches, etc. However, mosquitoes that can transmit EEE will also breed in floodwaters and salt marshes and for that reason personal protection is critical. Many of these mosquitoes are active at dawn and dusk and so altering are activity times can help (but are not a guarantee against mosquito bites). Again, we also urge horse owners to consult with the veterinarian about vaccinating their animals against these mosquito-borne diseases.

I would also add that people with dogs that spend a great deal of time outdoors need to make sure they are keeping up their pet's monthly medications since some of the same mosquito species that are increasing in numbers can also transmit dog heartworm.

INSECT TRAP DATA

From: Alan A. Harper, Lenoir County

Light Trap Data from Lenoir County

June

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*****
                        Number of Adult Insects
*****
Date      HW      CEW      ECB      AW      AWC      GSB      BSB      TBW
*****
June 3      ----- Put up light trap -----
June 4      0      0      0      0      0      2      1      0
June 5      0      0      0      0      0      0      0      0
June 6      0      0      0      0      0      2      0      0
June 7      0      0      0      0      0      0      0      0
June 8      0      0      0      0      0      0      0      0
June 9      0      0      0      0      0      0      0      0
June 10     0      0      0      0      0      3      0      0
June 11     0      0      0      0      0      1      0      0
June 12     0      0      0      0      0      1      1      0
June 13     0      1      0      0      1      0      0      0
June 14     0      0      0      0      0      0      0      0
June 15     0      1      0      0      1      0      0      0
June 16     0      0      0      0      0      0      0      0
June 17     0      1      0      0      1      0      0      1
June 18     0      0      0      0      0      0      0      0
June 19     0      0      0      0      0      0      0      1
June 20     0      2      0      0      0      0      0      0
June 21     0      2      0      0      1      0      0      0
June 22     0      1      0      0      0      1      0      0
June 23     0      0      0      1      1      0      0      0
June 24     0      1      0      0      0      0      0      1
    
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June 25	0	3	0	2	1	1	0	0
June 26	0	1	0	1	0	1	0	0
June 27	0	1	0	0	0	0	0	0

Abbreviations: HW = hornworms; CEW = corn earworms; ECB = European corn borers; AW = true armyworms; AWC = armyworm complex; GSB = green stink bugs; BSB = brown stink bugs; TBW = tobacco budworms

Recommendations for the use of chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services in this publication does not imply endorsement by North Carolina State University, North Carolina A&T State University or North Carolina Cooperative Extension nor discrimination against similar products or services not mentioned. Individuals who use chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical. For assistance, contact an agent of North Carolina Cooperative Extension.