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North Carolina Pest News

Departments of Entomology and Plant Pathology

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CAUTION !

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

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In This Week's Issue . . .

See current and archived issues of the *North Carolina Pest News* on the Internet at: http://ipm.ces.ncsu.edu/2014-north-carolina-pest-news-archive/

FIELD AND FORAGE CROPS

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

Tobacco Insect Scouting Report – June 20, 2014

In our eighth week of scouting, we exceeded threshold for one of the key tobacco pests for the first time! Our Eastern 1 (Grower Standard) and Eastern 2 (IPM) fields were both over threshold for tobacco budworms. The grower standard field (Eastern 1) was treated with an application of Besiege (containing chlorantraniliprole and lambda-cyhalothrin) about a month ago when no budworm larvae were present. Budworm counts in both

fields were exactly the same, suggesting that this preventative treatment had no measurable effect on tobacco budworm infestation, which we would expect since the plants have grown considerably in one month.

Tobacco plants in Greene County. Photo: Hannah Burrack.

Tobacco budworm pressure was also high at our research station locations and several of our plots were treated either for threshold comparison or to assess the efficacy of registered and unregistered insecticides.

While we only saw one stink bug in our scouting locations this week, we observed several brown stink bugs on tobacco in a field in Greene County. Stink bugs cause characteristic leaf wilting when they feed on the mid rib of tobacco leaves. Normally leaves can bounce back from this injury unless the weather is hot and dry (sound familiar?). In the case of hot dry weather, leaves may experience some sun scald, but the damage is generally not significant enough to justify treatment. We do not have thresholds for stink bug treatment in tobacco for this reason.

Interestingly, no tomato spotted wilt virus was observed in any of the grower fields this week despite the high numbers of thrips that we observed this early summer. This supports our assumption that while thrips numbers may have been high this year, they may have been uninfected and not transmitting large amounts of virus or the plants may have been large enough to withstand a systemic infection.

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	12% tobacco budworm infested plants – **Treatment recommended**	0 – No treatment	0 – No treatment	None observed

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	12% tobacco budworm infested plants – **Treatment recommended**	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	0% tobacco budworm infested plants – No treatment	0 – No treatment	0 – No treatment	6.1 thrips per plant, 0.025 stink bugs per plant

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	2.5% tobacco budworm infested plants – No treatment	0 hornworms/plant – No treatment	0 – No Treatment	3 thrips/plant

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	0.05 beetles/plant – No treatment	2.5% tobacco budworm infested plants – No treatment	0 – No treatment	0 – No treatment	1.03 thrips/plant, 0.025 Japanese beetles/plant

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	0.08 beetles/plant – No treatment	4% tobacco budworm infested plants – No treatment	0.02 hornworms/plant – No treatment	0 – No Treatment	0.6 thrips/ plant

We will post our research station counts later this week.

More information

Stink bugs – Tobacco Growers Information

See last week's scouting report here.

(Originally posted at: http://tobacco.ces.ncsu.edu/2014/06/tobacco-insect-scouting-report-june-16-2014/)

FRUIT AND VEGETABLES

From: Jim Walgenbach, Extension Entomologist

Section 18 Approved for Dinotefuran for Control of Brown Marmorated Stink Bug in North Carolina

The U.S. Environment Protection Agency has renewed an emergency exemption use permit (Section 18) for the neonicotinoid dinotefuran for control of the brown marmorated stink bug on apples, peaches and nectarines. This was submitted as a regional request and applies to the mid Atlantic states of Delaware, Maryland, North Carolina, New York, New Jersey, Pennsylvania, Virginia and West Virginia.

Dinotefuran is a neonicotinoid sold under the trade names of Scorpion 35SL (Gowan) and Venom 70SG (Valent USA). Regardless of the product used, a maximum of 0.604 lbs of active ingredient per acre per season will be allowed, which is equivalent to 24 fl oz of Scorpion or 13.5 oz of Venom. The preharvest interval for both products is 3 days. Scorpion is labeled at 8 to 12 fl oz per acre (0.203 to 0.304 lbs of active ingredient per acre), and Venom is labeled at 4 to 6.75 oz per acre (0.179 to 0.302 lbs of active ingredient per acre). Regardless of the rate used, a maximum of two applications per season is allowed, along with a 12-hour re-entry interval and a 3-day preharvest interval. When applying either of these materials for BMSB control on apples, growers must have possession of the Section 18 label.

A Section 18 renewal request for the pyrethroid bifenthrin was submitted at the same time as the dinotefuran request, but the bifenthrin request has not yet been approved.

From: Hannah Burrack, Extension Entomologist

Flowers Impact Bee Foraging in Blueberries

Just in time for Pollinator Week, I wanted to share another update on our work on pollinators in blueberries. While graduate student Shelley Rogers and technician Kevin Littlejohn were collecting data on which bees are the "best" blueberry pollinators and whether bee diversity influences pollination, they observed some interesting differences in foraging patterns between some varieties of rabbiteye blueberries.

Rabbiteye blueberries represent about 20% of North Carolina acreage and flower and fruit later in the growing season than southern highbush, which are the majority of blueberries grown in North Carolina.

A popular rabbiteye variety, Premier, can have abnormally shaped flowers with shorten corollas as compared to other rabbiteye varieties.

Typical rabbiteye blueberry flowers (left) and malformed Premier flowers (right). Photos: Shelley Rogers.

Interestingly, it appeared that more honey bees were present at Premier flowers than at other rabbiteye varieties. Shelley Rogers and Kevin Littlejohn then conducted time observations of individual plants of Premier and non Premier varieties over two years to determine if this observation was correct.

They found that, on average, 19 honey bees visited Premier plants in 15 minutes, while only 5 honey bees visited other varieties in the same time period. In addition, only 1 wild bee visited Premier plants in 15 minutes, but 10 wild bees visited other varieties.

We suspect that the malformation of Premier flowers may act similarly to carpenter bee slits on intact flowers, and that honey bees are taking advantage of easier access to nectaries.

It is unclear if these differences in foraging activity are problematic. Rabbiteye blueberries do benefit from cross pollination between varieties, so it is possible that if honey bees only forage on Premier flowers, cross pollination may be reduced. However, it is also possible that honey bees are able and willing to visit more Premier flowers, perhaps making them better single-visit pollinators.

We will be sharing the results of this project as a poster at the North American Blueberry Research and Extension Workers Conference in Atlantic City, June 23 to June 26, 2014.

More information

View a copy of our poster.

Blueberry pollination posts – Entomology Portal

(Originally posted at: http://entomology.ces.ncsu.edu/2014/06/flowers-impact-bee-foraging-in-blueberries/)

From: Lina Quesada-Ocampo, Extension Plant Pathologist

Control Options for Cucurbit Downy Mildew in North Carolina

Cucurbit downy mildew, caused by the oomycete *Pseudoperonospora cubensis*, is a yearly concern for North Carolina cucurbit growers. Having the most effective fungicide products at hand to control this disease is key since no resistant cultivars are available for disease control. In addition, the reproductive nature of this pathogen allows it to quickly overcome fungicides when such products are applied without the proper active ingredient rotations, thus, having the latest results on fungicide efficacy is an invaluable tool for growers. To address this need, the Vegetable Pathology Lab at North Carolina State University conducted several fungicide efficacy trials last year that provided the needed information to manage cucurbit downy mildew this year in North Carolina.

One trial was conducted at the Cunningham Research Station in Kinston, North Carolina, using Vlaspik cucumbers, which are susceptible to downy mildew. Fungicide treatments were applied on a 7-day interval from September 9 to October 14 and included the following products:

Product	Active Ingredient	Fungicide Group	Pre Harvest Interval
Previcur Flex 6F	Propamocarb	28	2
Ranman 400SC	Cyazofamid	21	0
Gavel 75WP	Mancozeb + Zoxamide	M + 22	5
Zampro 525SC	Ametoctradin + Dimethomorph	45 + 40	0
Presidio 4SC	Fluopicolide	43	2
Tanos 50WP	Famoxadone + cymoxanil	11 + 27	3
Bravo Weather Stick 6SC	Chlorothalonil	M	0
Manzate Pro-Stick 75DG	Mancozeb	M	5

To assess individual efficacy of each product, fungicides were applied as single-treatments at high and low rates following label guidelines (Figure 1). Details of rates used for each product and how applications were made can be found here. Please note that this was done for research purposes only to provide our stakeholders with the efficacy information they need; however, growers are strongly recommended to rotate fungicides in a spray program to avoid generating fungicide-resistant isolates. The trial was initiated late in the growing season to ensure availability of inoculum and to quickly destroy the trial once completed to eliminate it as a source of inoculum. The pathogen requires a host to live; it cannot persist in the soil and thus, it cannot survive winter temperatures in the field.

Disease severity and marketable fruit yield were recorded at the end of the trial on October 17 for each treatment and are shown in Figure 1. Treatments labeled with the same letter are not statistically different. For example, all treatments not labeled with the letter “a”, which corresponds to the non-treated control, presented significantly less cucurbit downy mildew disease.

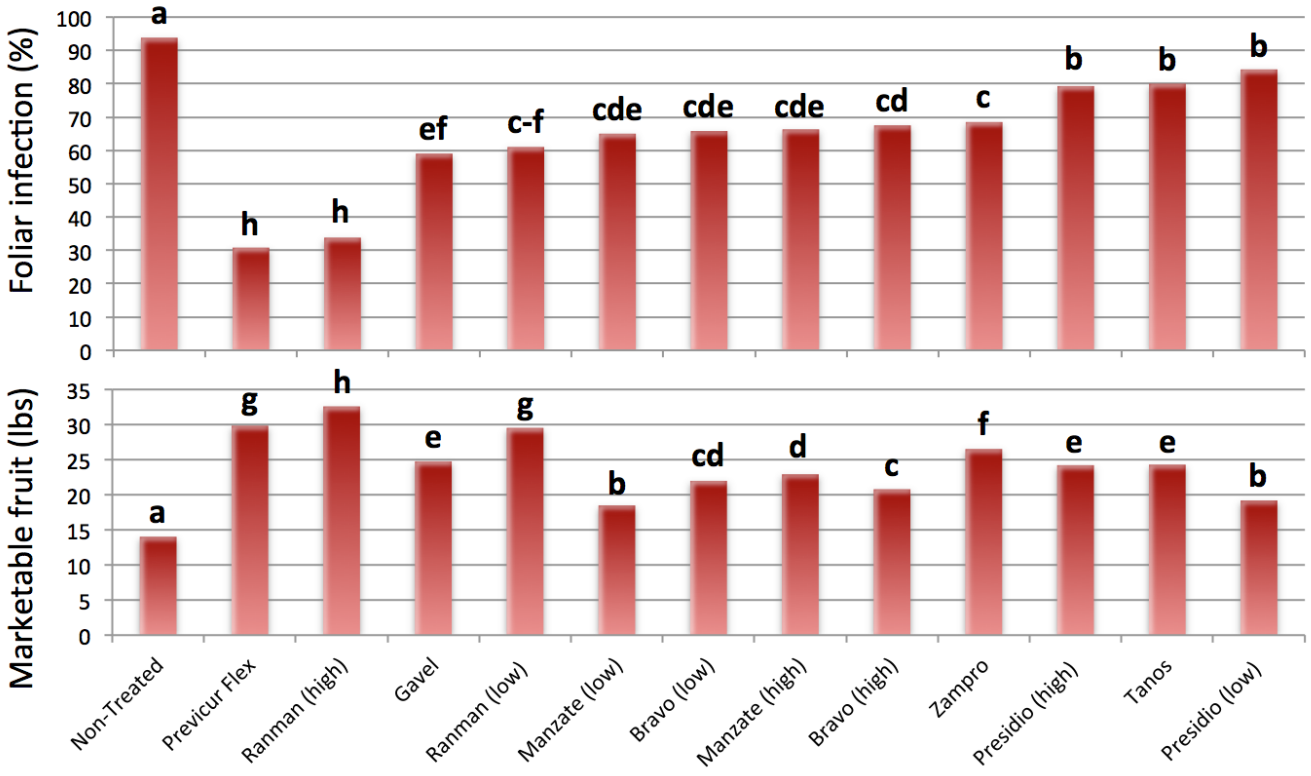

Figure 1. Fungicide efficacy trial for cucurbit downy mildew control using single products at high and low rates.

Disease pressure for the trial was significant (>90%), which allowed for identification of effective treatments. Previcur Flex (1.2 pt) and Ranman (2.75 fl oz) applied at high rates provided the highest disease control of all treatments and presented approximately 30% disease at the end of the trial. Other treatments also provided good to moderate control of cucurbit downy mildew and presented approximately 60 to 70% disease.

A second set of treatments were included in the trial and corresponded to the same products shown in Figure 1, but applied in a rotation program to determine which fungicide rotations are most effective in controlling cucurbit downy mildew (Figure 2). All products, with the exception of Gavel since it contains mancozeb, were tank-mixed with Bravo Weather Stick and alternated following recommendations to prevent appearance of fungicide-resistant isolates. Details of rates used for each product and how applications were made can be found here. Disease severity and marketable fruit yield were recorded as described above, and as in Figure 1, treatments in Figure 2 labeled with the same letter are not statistically different.

Treatments alternating Presidio, Previcur Flex, Zampro, and Ranman, provided the highest level of disease control and presented approximately 30% disease at the end of the trial. Other programs also provided good control of cucurbit downy mildew and presented approximately 50 to 60% disease. It is interesting to note that in this trial Presidio, used as a single product, provided little control; however, in the same trial when Presidio was used as an initial spray in a spray program that alternated other products with good to moderate performance, disease control was achieved.

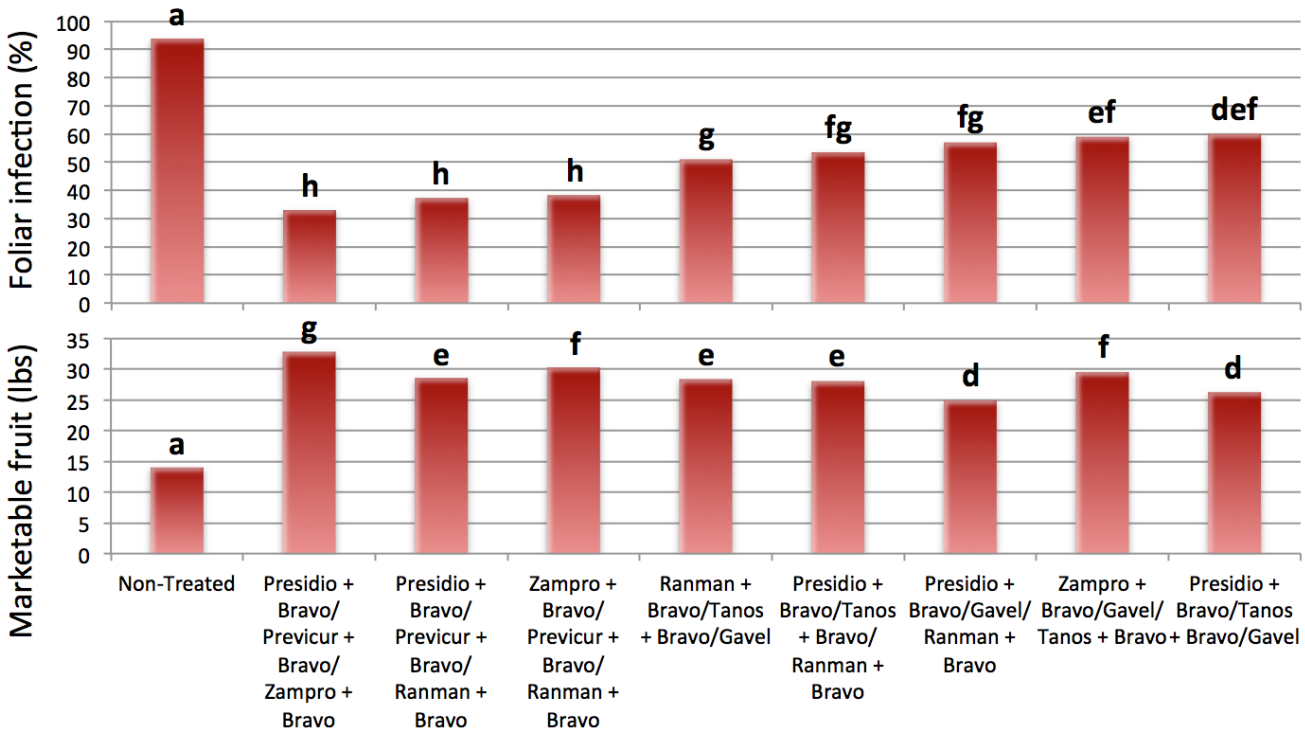

Figure 2. Fungicide efficacy trial for cucurbit downy mildew control using products in a rotation program.

It is important to remember that *Pseudoperonospora cubensis*, the causal agent of cucurbit downy mildew, can generate fungicide resistance very quickly. Presidio has provided excellent control of the disease in past years and it is only recently that we have observed loss of sensitivity to this product in pathogen populations. It is critical that growers alternate products in their fungicide programs to protect the few chemistries we have that are still highly effective in controlling downy mildew. Because the pathogen can travel long distances and it reproduces profusely during the growing season, if fungicide-resistant isolates are generated due to misuse of fungicides, they could spread quickly to other regions. Using fungicides appropriately to avoid generating fungicide-resistant isolates will ensure the long term profitability of our cucurbit industry.

When planning your spray program, make sure you alternate fungicide groups of products to avoid generating fungicide-resistant isolates. You can find some example products on our Cucurbit Downy Mildew fact sheet. Growers are encouraged to read the Southeastern U.S. Vegetable Crop Handbook for the latest fungicide 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 for confirmation and reporting to the Cucurbit Downy Mildew ipmPIPE.

Follow us on Twitter and Facebook for more vegetable disease alerts.

Potato Late Blight Outbreak in Eastern North Carolina

Potato late blight, caused by the oomycete *Phytophthora infestans*, was reported June 19, 2014, in a potato sample from Carteret County, North Carolina, and confirmed by the Plant Disease and Insect Clinic and the Quesada Lab at North Carolina State University. Symptoms appeared to be recent and limited pathogen sporulation was observed.

Potato late blight.

Potato and tomato are susceptible to this disease, and can be significantly defoliated within days if environmental conditions favor the pathogen. Active scouting and immediate action to protect potato and tomato crops in North Carolina from late blight is recommended, since we have been experiencing wet and cool weather that is conducive to disease. For more information about potato late blight and how to control it, see our potato and tomato late blight fact sheets, which list effective products against late blight. Control recommendations are also available in the USAblight website, where you can register to receive text and/or e-mail alerts when new disease outbreaks are reported.

If you think you have late blight in your tomatoes and/or potatoes please contact your local Extension agent and send photos and/or physical samples to the Plant Disease and Insect Clinic. If late blight is

confirmed in your samples by an expert, please send a report at the USAblight website to alert other growers. The USAblight website also contains information about disease identification and control.

Follow us on Twitter and Facebook for more vegetable disease alerts.

ORNAMENTALS AND TURF

From: Steve Frank, Extension Entomologist

Flea Beetles

Redheaded flea beetles, *Systena frontalis,* have become a serious pest of nursery stock over the past several years. They are an especially damaging pest because they feed on roots and leaves. They overwinter as eggs in the soil. Larvae hatch in spring and begin feeding on roots. The larvae are elongate and creamy-white. Heavy infestations may reduce root mass or girdle plants. Adult redheaded flea beetles are small, shiny black, beetles with reddish to dark colored head and long antennae. They are about 1/16 of an inch long and, as the name suggests, jump when they are approached. There are at least two generations in Delaware and may be more in North Carolina.

Redheaded flea beetle on a rose leaf.

Adults and adult feeding damage are present now. The favored hosts are Itea, hydrangea, forsythia, and knockout roses and many perennials like joe-pye weed. Adult management has been frustrating for growers who find that even frequent insecticide applications do not reduce adult abundance and damage to acceptable levels. Part of this has to do with not controlling larvae since even if you kill all the adults present in a crop (which you won't) more adults are emerging from the soil every day. Research thus far in Delaware and grower reports indicate that Talstar, Sarfari, and Flagship provide good efficacy as foliar applications, but do not have long residual activity.

Columbine Leafminer

The first round of flowering is about over for my native columbine, *Aquilegia canadensis*. Columbine is a great early spring flower that flowers profusely and spread easily by seed. Spring bees and humming birds visit columbine flowers particularly in early spring when it is one of the only flowers present.

The columbine leafminer, *Phytomyza aquilegivora*, overwinters as pupae. Adults emerge in early spring and oviposit in new columbine leaves. Small white maggots mine the leaves creating white or grey serpentine pathways. Often entire leaves are discolored. Larvae pupate after about 10 days on the underside of leaves. Columbine leafminer has at least 4 overlapping generations per year in North Carolina. There are at least 13 species of parasitoids that become more abundant as the summer progresses.

Braman et al. (2005) reported that the native species, *A. canadensis*, is more resistant to leafminers than many other species of cultivars. Removing and destroying infested leaves before adults emerge may help reduce damage to subsequent leaves. Leafminer control is often best to left the parasitoids become established and just accept some damage. If you are a grower, there are several insecticides available to help reduce leafminer damage.

New industry articles on spider mite and thrips management for greenhouses.

Periodically I publish articles in industry magazines such as *Greenhouse Grower*, *GrowerTalks*, and *American Nurseryman*. The two most recent articles discuss spider mite and thrips management. You can find these and all industry articles at:
http://ecoipm.com/extension/extension-resources/industry-publications/.

INSECT TRAP DATA

From: Alan A. Harper, Lenoir County

Light Trap Data from Lenoir County

June

Date	Number of Adult Insects							
	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

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.