

# 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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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/>

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## FIELD AND FORAGE CROPS

From: Dominic Reising, Extension Entomologist

### Soybean Aphid in North Carolina?

For the second year in a row (that we have noticed), soybean aphid has been present in North Carolina. Soybean aphid is the most important insect pest of Midwest soybeans, but is not very prevalent in North Carolina. Soybean aphid is better adapted to northern climates and it is overwintering host, buckthorn, is not commonly known in the state.



**Soybean aphids.**

Last year's cool and cloudy summer must have created good conditions for soybean aphid since it could be found throughout the state. This year, a North Carolina State University Entomology graduate student, Brad Fritz, noticed soybean aphid in the Sandhills. Last year, a few fields were at treatable levels (250 aphids per plant) a bit west in the Piedmont. Pure speculation here, but maybe buckhorn is more prevalent here than other areas. Certainly the climate must have something to do with their presence and, perhaps, spread from areas where they are more common. At the most, soybean aphid has seemed to remain more of a curiosity in the State since fields at or near threshold are rare.

From: Hannah Burrack, Extension Entomologist

### Aphids in (Mostly Organic) Tobacco

Several questions have been received during the past week about aphids on tobacco. In most cases, these questions were related to management in organic tobacco, where aphids are the most difficult to control pest, or were in tobacco that had not been treated with soil insecticide applications at transplant.

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**Red morphs of the green peach aphid on tobacco flower. Photo: Hannah Burrack.**

In most cases, [green peach aphids](#) (the species present in North Carolina tobacco), are not pests after topping because as leaves mature, [they become poorer hosts](#). If aphid populations develop post topping, they are most often present on suckers.

Therefore, good post topping sucker control is good aphid management. However, organic tobacco is a somewhat different scenario. Aphid populations that develop pre topping may potentially stick around post topping and may be more difficult to control. There are also far fewer organic aphid management options, few of which are effective. Information on organic and conventional foliar options for aphids is listed in the [North Carolina Agricultural Chemicals Manual](#).

If post topping aphid populations are large, sucker control is not the problem. And if growers plan to use insecticides for control, a few key practices will increase their likelihood of success:

1. Apply materials using equipment that will cover the entire plant, including the underside of leaves, meaning using drop nozzles.
2. Apply materials in a sufficient volume to achieve good coverage. We use 50 gallons of water per acre in research trials.
3. Make sure that you carefully read the label of your chosen material. Some materials, especially those that are organically acceptable, must be at a specific pH in order to be effective.
4. Organically acceptable materials may not function in the same way as conventional materials. A single treatment of recommended conventional insecticides may be sufficient to suppress populations, while organically materials may need to be reapplied frequently, perhaps weekly.

One final note, it is unlikely that aphid populations present in fields are exhibiting resistance to soil insecticide treatments applied at transplant given that these materials are likely no longer present in insecticidal concentrations at this point in the season.

(Originally posted at: <http://entomology.ces.ncsu.edu/2014/08/aphids-in-mostly-organic-tobacco/>)

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

### Tobacco Insect Scouting Report – August 4, 2014

It is week fourteen of our weekly scouting program and numbers remain low. Flea beetle numbers have increased somewhat, but are still low enough to not cause any substantial damage. We have observed a few tobacco budworm larvae, mostly on suckers. Most sites are now starting to harvest and we expect to see more flea beetles and some hornworm pressure within the next couple of weeks.

#### Scouting Report, Eastern 1 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	0.4 flea beetles/plant – No treatment	2% – No treatment	0 – No treatment	0 – No treatment	0.02 stilt bugs/plant None observed

#### Scouting Report, Eastern 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0.6 flea beetles/plant – No treatment	2% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	0.04 stilt bugs/plant 0.04 stink bugs/plant

#### Scouting Report, Eastern 3 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	2.7 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No treatment	0.03 stink bugs/plant

#### Scouting Report, Eastern 4 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	3 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	None observed

#### Scouting Report Piedmont 1 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 aphid infested plants – No treatment	0.58 flea beetles/plant – No treatment	5% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No treatment	0.05 parasitized budworms/plant

Scouting Report, Piedmont 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0.72 flea beetles/plant – No treatment	2% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	0.04 stink bugs/plant 0.02 stilt bugs/plant 0.02 grass-hoppers/plant

Here are the scouting reports from the control plots for our experiments at the [Upper Coastal Plain Research Station](#) near Rocky Mount, NC, and the [Lower Coastal Plain Research Station](#) near Kinston, NC. 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 per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	0% budworm infested plants – No treatment	0 – No treatment	0 – No Treatment	None Observed

On Station, Kinston – Control plants treated with imidacloprid

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	0% budworm infested plants – No treatment	0.01 hornworms/plant – No treatment	0 – No Treatment	None Observed

On Station, Rocky Mount – **No data taken due to topping\*\***

(Originally posted at: <http://tobacco.ces.ncsu.edu/2014/08/tobacco-insect-scouting-report-august-4-2014/>)

### Tobacco Insect Scouting Report – August 8, 2014

It is now the fifteenth week of scouting! The budworm pressure has dropped significantly over the past couple of weeks as plants at all sites have been topped and are under good sucker control, but hornworm pressure is increasing at our research station sites. Flea beetle numbers are still well below threshold and are not substantially impacting plants at any sites.

#### Scouting Report, Eastern 1 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	1.04 flea beetles/plant – No treatment	2% budworm infested plants – No treatment	0 – No treatment	0 – No treatment	0.06 stilt bugs/plant 0.04 stink bugs/plant

#### Scouting Report, Eastern 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	1.4 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	0.06 stilt bugs/plant

#### Scouting Report, Eastern 3 – Grower Standard Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No treatment	2.1 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No treatment	0.13 stilt bugs/plant 0.03 stink bugs/plant

#### Scouting Report, Eastern 4 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	2.5 flea beetles/plant – No treatment	0 tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	0.05 stink bugs/plant

#### Scouting Report Piedmont 1 – Grower Standard Field



Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 aphid infested plants – No treatment	1.25 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No treatment	0.1 stilt bugs/plant

Scouting Report, Piedmont 2 – IPM Field

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infested plants	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	1.9 flea beetles/plant – No treatment	0% tobacco budworm infested plants – <b>No treatment</b>	0 – No treatment	0 – No Treatment	0.02 stilt bugs/plant

Here are the scouting reports from the control plots for our experiments at the [Upper Coastal Plain Research Station](#) near Rocky Mount, NC, and the [Lower Coastal Plain Research Station](#) near Kinston, NC. 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 per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0% aphid infested plants – No Treatment	0 flea beetles/plant – No treatment	0% tobacco budworm infested plants – No treatment**	0.05 hornworms/plant – No treatment	0 – No Treatment	None Observed

On Station, Kinston – Control plants treated with imidacloprid

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	0% budworm infested plants – No treatment**	0.09 hornworms/plant – No treatment	0 – No Treatment	0.01 parasitized hornworms/plant

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

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 beetles/plant – No treatment	0% budworm infested plants – No treatment	0.18 hornworms/plant – No treatment	0 – No Treatment	0.13 parasitized hornworms/plant

On Station, Rocky Mount – Control plants treated with imidacloprid



Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	0% budworm infested plants – No treatment	0.07 hornworms/plant – No treatment	0 – No Treatment	0.10 parasitized hornworms/plant

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

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

On Station, Rocky Mount – Control plants treated with imidacloprid

Insect observation	No. aphid infested plants	Flea beetles per plant	Percent tobacco budworm infestation	Hornworms per plant	Percent cutworm damaged plants	Other insects
Treatment needed?	0 – No Treatment	0 – No treatment	4% budworm infested plants – No treatment	0– No treatment	0 – No Treatment	1% plants infested with TSWV

(Originally posted at: <http://tobacco.ces.ncsu.edu/2014/08/tobacco-insect-scouting-report-august-8-2014/>)

From: Steve Koenning, Extension Plant Pathologist, and Jim Dunphy, Extension Soybean Specialist, Crop Science

**Soybean Disease Update: Frogeye Leaf Spot, Target Spot, and Stem Canker**

So far this year target spot of soybean and frogeye leaf spot have both been identified in North Carolina. Many cultivars are resistant to these diseases so there is no cause for alarm at this time. If the disease is detected, it warrants a fungicide application. If target spot is identified, it warrants an application of a strobilurin fungicide. If frogeye is identified, then a combination fungicide (Stratego YLD, Fortix, Quadris Top, or Affiance) may be warranted since resistance to strobilurin fungicides was identified last year in Beaufort County. Soybean stem canker has been found in the Piedmont and in Martin County. Soybean stem canker must be controlled with varietal resistance and fungicides rarely impact this disease especially at this point in the season.

**Current Status of Soybean Rust in the U.S.**

Soybean rust has been identified in a soybean sentinel plant in Alabama. This is in Prattville, Alabama, which is just northwest of Montgomery. Soybeans at R5 and 100% canopy closure. Aside from the Alabama find, soybean rust appears to be restricted to Mexico, the Gulf Coast and North Central Florida at this time. Soybean rust has not been found in Georgia as of this writing.





Abbreviations: CEW = corn earworms; GSB = green stink bugs

From: Mike Carroll, Agricultural Extension Agent, Craven County

**Light Trap Data from Craven County**

```

*****
                Number of Adult Insects
                *****
Date           BW*  GSB   BSB    AW    HW
*****
July 16        ----- Date Initiated -----
July 18         13    0     0     0     1
July 21         28    0     0     0     2
July 23         30    1     0     0     1
July 25         18    1     0     0     1
July 28        105    1     0     0     2
July 30         76    1     0     0     1
August 1        136    1     0     2     1
August 4        259    1     0     2     2
August 6         80    2     0     0     0
August 8         49    0     0     0     1
*****
    
```

Abbreviations: BW\* = bollworms; GSB = green stink bugs;  
 BSB = brown stink bugs; AW = true armyworms;  
 HW = tobacco hornworms

\*Bollworms reflect corn earworm and tobacco budworm counts

Cooperator: Cove City Fertilizer

From: Arthur R. Bradley, Jr., County Extension Director, Edgecombe County

**Light Trap Data from Edgecombe County**

```

*****
                Number of Adult Insects
                *****
                West Edgecombe           Coakley           Lawrence
                *****           *****           *****
Date           CEW  BSB  GSB    CEW  BSB  GSB    CEW  BSB  GSB
*****
July 11         -   -   -      0   3   6      -   -   -
July 14         0   1   0      1   0   1      -   -   -
July 16         0   0   0      0   0   3      -   -   -
July 18         0   0   0      -   -   -      -   -   -
July 21         0   1   0      -   -   -      -   -   -
July 23         1   0   0      5   0   1      -   -   -
July 25         1   0   1      8   2   6      -   -   -
July 28        14   1   1     15   0   1      -   -   -
July 30         5   0   0      -   -   -      -   -   -
August 1        12   0   0     43   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
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
June 28	0	2	0	1	1	0	0	0
June 29	0	0	0	0	2	0	0	0
June 30	0	0	0	0	1	0	0	1

\*\*\*\*\*

July

\*\*\*\*\*

Number of Adult Insects

\*\*\*\*\*

Date	HW	CEW	ECB	AW	AWC	GSB	BSB	TBW
July 1	0	2	0	0	1	0	0	0
July 2	0	1	0	0	0	0	0	0
July 3	0	1	0	0	1	0	0	1
July 4	0	2	0	0	0	0	0	0
July 5	0	1	0	1	0	0	0	0
July 6	0	1	0	0	0	0	0	1
July 7	0	0	0	0	0	0	0	0
July 8	0	0	0	0	0	0	0	0
July 9	0	0	0	0	0	1	0	0
July 10	0	0	0	0	0	1	0	0
July 11	0	2	0	0	0	2	0	0
July 12	0	1	0	1	0	1	0	0
July 13	0	0	0	0	0	0	0	0
July 14	0	0	0	0	0	0	0	0
July 15	0	1	0	0	0	0	1	1
July 16	0	1	1	0	0	0	0	0
July 17	0	4	0	0	0	1	0	0
July 18	0	1	0	0	2	1	0	0
July 19	1	1	0	0	0	1	0	0
July 20	0	2	0	0	1	2	0	0
July 21	0	7	1	0	1	6	0	0
July 22	1	8	0	0	2	3	0	0
July 23	0	9	1	0	0	3	1	1
July 24	0	11	0	0	0	3	3	0
July 25	0	8	0	0	4	2	1	0
July 26	0	26	0	0	0	5	0	0
July 27	0	18	0	0	2	7	2	0
July 28	0	20	0	1	3	8	7	0
July 29	0	26	0	1	1	2	0	0
July 30	0	36	0	0	1	0	0	0
July 31	0	52	0	1	1	6	0	0

\*\*\*\*\*

August

```

*****
                        Number of Adult Insects
*****
Date      HW      CEW      ECB      AW      AWC      GSB      BSB      TBW
*****
August 1  0       36       0       2       0       7       0       1
August 2  0       30       0       1       0       3       1       2
August 3  0       43       0       1       1       3       0       1
August 4  0       46       0       0       0       4       0       1
August 5  0       63       0       1       0       6       0       1
August 6  0       26       0       0       0       5       0       0
August 7  0       33       0       1       0       6       0       2
August 8  0       21       0       0       0       2       1       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

From: Craig Ellison, Agricultural Extension Agent, Northampton County

**Light Trap Data from Northampton County**

```

*****
                        Number of Adult Insects
*****
                        Galatia      Seaboard      Woodland
*****
Date      CEW GSB BSB  HW  CEW GSB BSB  CEW GSB BSB
*****
July 26   -  45  2   2   -  -  -   -  -  -
July 29   7  15  1   -   4  6  0   -  -  -
July 30   0  0  0   -   -  -  -   -  -  -
July 31   0  0  0   -   2  1  0   -  -  -
August 1  0  -  -   -   -  -  -   1  0  0
August 4  49 89  0   -  12  4  0   1 18  0
August 5  23  3  0   -   -  -  -   -  -  -
August 6  10  1  0   -   7  1  0   2  1  0
August 8   -  -  -   -  12  3  0   -  -  -
*****
    
```

Abbreviations: CEW = corn earworms;  
 GSB = green stink bugs; BSB = brown stink bugs

From: Robeson County

**Light Trap Data from Robeson County**

```

*****
                          Number of Adult Insects
*****
Date      CEW      ECB      AWC      AW      GSB      BSB
*****
July 29   43       -        1       -        3        0
July 30   24       2        0       1        0        0
August 1  41       0        0       -        1        0
August 7  21       1        0       2        1        2
*****
    
```

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

From: Scotland County Extension Center

**Light Trap Data from Scotland County**

```

*****
                          Number of Adult Insects
*****
          Gibson                John's                Laurinburg
*****
Date      CEW  ECB  GSB  TBW  BSB  CEW  ECB  GSB  TBW  BSB  CEW  ECB  GSB  TBW  BSB
*****
July 23   -    -    -    -    -    -    -    -    -    -    -    -    -    -    -
July 25    5    2    -    -    -    -    -    -    -    -    -    -    -    -    -
July 28    4    4    -  288  -    5    0    -  559  -    2    1    -    55  -
July 30   60    -    0    -    0  273  -    1    -    0    -    -    -    -    -
August 1  74    -    1    -    0   98  -    0    -    0   24  -    0    -    0
August 4  108   -    2    -    0  268  -    1    -    0    -    -    -    -    -
August 5    -    -    -    -    -    -    -    -    -    -    56  -    0    -    0
August 6   34    -    5    -    0   84  -    2    -    1    -    -    -    -    -
August 8    -    -    -    -    -    -    -    -    -    -    22  -    0    -    2
*****
    
```

Abbreviations: CEW = corn earworms; ECB = European corn borers;  
 GSB = green stink bugs; TBW = tobacco budworms; BSB = brown stink bugs

From: Washington County

**Light Trap Data from Washington County**

```

*****
                Number of Adult Insects
                *****
Date                CEW        GSB
*****
July 15                1          1
July 18                4          2
July 25                3          -
*****
    
```

Abbreviations: CEW = corn earworms;  
 GSB = green stink bugs

From: Tyler Whaley, Agricultural Extension Agent, Wayne County

**Light Trap Data from Wayne County**

```

*****
                Number of Adult Insects
                *****
                        Goldsboro
                        *****
Date                CEW    GSB    BSB    HW
*****
July 7                -     2     -     -
July 9                -     1     -     -
July 11               -     1     -     -
July 14               -     2     -     -
July 16                4     6     2     -
July 18                1     2     1     -
July 21                5     5     1     2
*****
    
```

Abbreviations: CEW = corn earworms; GSB = green stink bugs;  
 BSB = brown stink bugs; HW = hornworms

From: Norman E. Harrell, Agricultural Extension Agent, Wilson County

**Light Trap Data from Wilson County**

```

*****
                Number of Adult Insects
                *****
                        Kenly                Fountain                Pender's
                        *****                *****                *****
Date                CEW  ECB  GSB  BSB  HW  CEW  ECB  GSB  BSB  HW  CEW  ECB  GSB  BSB  HW
*****
July 23                1   -   1   0   -   12  0   -   -   1   -   -   -   -   -
    
```

July 25	-	-	-	-	-	20	5	-	-	7	-	-	-	-	-
July 26	3	0	-	-	1	-	-	-	-	-	-	-	-	-	-
July 28	3	0	-	-	3	5	-	29	5	3	-	-	-	-	-
July 30	2	-	0	0	-	-	-	-	-	-	1	-	0	0	-
August 1	3	-	0	0	-	6	-	10	0	-	9	-	0	0	-
August 4	22	-	0	0	-	25	-	16	3	-	31	-	6	2	5
August 6	-	-	-	-	-	18	-	23	6	-	45	-	4	0	1
August 7	11	-	0	0	-	-	-	-	-	-	-	-	-	-	-
August 8	3	-	0	0	-	17	-	19	0	-	18	-	6	0	-

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Abbreviations: CEW = corn earworms; ECB = European corn borers;  
 GSB = green stink bugs; BSB = brown stink bugs; HW = hornworms

*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.*