SC’s 2019 Southern Pine Beetle (SPB) Pheromone Trapping

Executive Summary
Southern pine beetle (SPB) is one of the most destructive insects to southern yellow pine. The South Carolina Forestry Commission has conducted annual spring pheromone trapping since 1986 to monitor SPB populations and predict the damage they may cause in the upcoming season. Traps were deployed in 32 counties in 2019. Based on the data from these traps we predict moderate SPB activity in Edgefield and McCormick Counties, with potential for SPB activity in Anderson, Oconee and Pickens Counties. The remainder of the state is predicted to have little noteworthy SPB activity, but we expect activity to increase in coming years.

Introduction and Methodology
A total of 32 SC counties were trapped for SPB in 2019 using a revised protocol devised by Billings, et al, 2017. The previous protocol called for two attractants per trap: frontalin and alpha pinene (Sirex lure), and the revised protocol called for an additional third attractant, endo-brevicomin, to be placed 10-12’ away. In prior studies, the addition of the third attractant has been found on average to be 6.54X more attractive to SPB and .97X less attractive to clerid (SPB’s main insect predator) when compared to frontalin and Sirex lures alone. The SPB Prediction Chart was revised to account for the increased attractiveness to SPB. The protocol includes monitoring three pheromone traps in each county for a 28-day period during early spring. Insects captured in each trap are returned to the laboratory for analysis. The total number of trap days and SPB and clerid beetles caught are summed for each trap. The number of SPB caught per trap per day and percent SPB are used to predict the population trend for each county and region and for the whole state. In the past, such surveys have had a success rate of over 80% in predicting the degree of SPB infestation for the following summer.

Results
Based on these results, we predict Edgefield and McCormick Counties to have moderate SPB activity, rating in the “static or moderate” category on the prediction chart. Although the remaining counties are predicted to have insignificant beetle activity based on the prediction model, we are closely monitoring conditions in Anderson, Oconee and Pickens Counties as traps in these counties indicate some activity. No counties within the coastal plain are predicted to experience significant SPB activity. The statewide and regional average predictions remain “declining or low”. The statewide SPB caught per trap per day was 1.61 and made up 53% of the total catch. Last year the statewide SPB caught per trap per day was 3.03 and made up 47% of the total catch. These results are for entire counties, and there is always the possibility of sporadic and localized beetle activity in counties with overall predictions of low population levels.

Review of 2018
SPB activity in Oconee County declined from 2016 and 2017, largely thanks to the US Forest Service identifying infestations that were likely to move on to adjoining private land and salvaging wood to interrupt infestations. Activity in Edgefield is steady compared to 2018, remaining static or moderate according to the prediction model.

SC’s 2019 Bark Beetle Prediction
Predicting SC bark beetle activity for the summer of 2019 is based on current and predicted weather, current drought status per region, activity in preceding years, and SC’s 2019 pheromone trapping data. The National Weather Service is predicting above average temperatures and average rainfall for the southeastern US in the summer of 2019. Most beetle activity throughout the state is likely to be due to *Ips* and black turpentine beetles (BTB) in susceptible pine stands that are overstocked, over-mature or stagnant, have poor or excessive drainage, or have littleleaf, *Heterobasidion* or other root diseases causing stress. *Ips* thrive in stressed trees and high temperatures, completing their life cycle in as little as 21 days. Often, by the time you realize you have an *Ips* spot, they have completed their life cycle and dispersed. Control tactics employed for SPB, such as “cut and leave” and “salvaging,” do not work for *Ips* and BTB since both readily breed in cut pine tops, boles and stumps. During a summer thinning, we recommend all pine tops to be chipped and removed from the site or at least kept at the logging deck. For more information on either beetle, please follow this link: [http://www.state.sc.us/forest/idbeetles.pdf](http://www.state.sc.us/forest/idbeetles.pdf)

**SC’s SPB Population Trend**

SPB activity has picked up regionally, with increased SPB spots in Mississippi, Alabama, Georgia and Florida. Although the vast majority of these spots are on unmanaged land with overstocked and stressed stands, we expect SC’s SPB populations to increase in coming years as the “wall of wood” (SC pine stands originating from 1985-1995) matures. In 2015 we recorded the lowest number of SPB trapped and in 2016 we recorded the lowest number of clerid beetles trapped (although clerid populations were almost as low in 2019). Since then, SPB populations have been slowly increasing. Also worrying is the number of traps in Georgia that had some SPB activity; at least 90% of SPB traps in Georgia showed some activity. The low numbers of beetles in these traps suggest SPB is dispersing and there is potential for the progeny of these beetles to move into marginal stands in South Carolina (Fig. 1).
Recommendations for Landowners and Foresters
Although current SPB populations are comparatively low, we encourage foresters and forest landowners to manage for regulated forests by evenly distributing their pine acreage among age classes, thin on a timely basis, and consider harvesting at-risk stands sooner. When regenerating pine stands, it is important to plant the correct species and density for the site, control natural pine regeneration or have a plan in place to address it; and consider available wood markets or lack thereof. The SPB Cost Share Program has funds available for regenerating pine stands at lower densities and pre-commercial thinning young, over-dense pine stands. This program is more suitable for areas outside of healthy pulpwood markets which is where we have suffered the most loss to SPB. If interested in applying, please contact your county’s SCFC Project Forester.

Summary
We predict no counties within the coastal plain will experience any SPB activity, but Edgefield and McCormick Counties within the Piedmont are predicted to experience moderate SPB activity. The statewide and regional average SPB predictions are considered “declining–low”. If drought and mild temperatures occur in the northwestern piedmont, then SPB activity may increase over the summer, but high summer temperatures should restrict SPB dispersal. Most beetle activity within SC will be Ips and BTB. Average rainfall may overcome high summer temperatures and reduce Ips and BTB activity within the remaining Piedmont counties. With a low clerid population, the coastal plain may have increased Ips and BTB activity if drought and high summer temperatures occur. If you suspect bark beetle activity, please contact the SCFC for identification and the best course of action. Employing the “cut and leave” and “salvaging” techniques could lead to more pine loss if SPB is not the culprit.

It is difficult to predict the degree of loss to SPB and other bark beetles, but our best guess for SC in 2019 is for a loss of less than one hundred thousand dollars.

Please contact us if you have any questions or if we can provide additional information. We hope this report is helpful; we welcome feedback.

Tyler Greiner  David Jenkins  Kevin Douglas
SPB Program Coordinator  Entomologist/Forest Health Specialist  Forestry Technician

Attachments: Pheromone results: tabular and graphical; long-term pheromone results; and SPB Trap Locations.
2019 SOUTHERN PINE BEETLE PHEROMONE TRAPPING RESULTS
South Carolina Forestry Commission
May 21, 2019

**Severe Outbreak Prediction Trend (1)**

<table>
<thead>
<tr>
<th>County</th>
<th>Trapping Days</th>
<th>#SPB</th>
<th>#Clerids</th>
<th>% SPB</th>
<th>SPB/Day</th>
</tr>
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No counties in South Carolina are predicted to have a severe outbreak in 2019.

**Increasing - High Prediction Trend (2)**

<table>
<thead>
<tr>
<th>County</th>
<th>Trapping Days</th>
<th>#SPB</th>
<th>#Clerids</th>
<th>% SPB</th>
<th>SPB/Day</th>
</tr>
</thead>
<tbody>
<tr>
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No counties in South Carolina are predicted to have an increasing-high outbreak in 2019.

**Static - Moderate Prediction Trend (3)**

<table>
<thead>
<tr>
<th>County</th>
<th>Trapping Days</th>
<th>#SPB</th>
<th>#Clerids</th>
<th>% SPB</th>
<th>SPB/Day</th>
</tr>
</thead>
</table>

- Edgefield 84 days: 2376 SPB, 1069 Clerids, 68.97% SPB, 28.29 SPB/Day
- McCormick 87 days: 786 SPB, 172 Clerids, 82.05% SPB, 9.03 SPB/Day

**Declining - Low Prediction Trend (4)**

<table>
<thead>
<tr>
<th>County</th>
<th>Trapping Days</th>
<th>#SPB</th>
<th>#Clerids</th>
<th>% SPB</th>
<th>SPB/Day</th>
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<tbody>
<tr>
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</tbody>
</table>

- Abbeville 84 days: 12 SPB, 72 Clerids, 14.29% SPB, 0.14 SPB/Day
- Anderson 87 days: 538 SPB, 129 Clerids, 80.66% SPB, 6.18 SPB/Day
- Beaufort 84 days: 0 SPB, 5 Clerids, 0.00% SPB, 0.00 SPB/Day
- Berkeley 81 days: 79 SPB, 20 Clerids, 79.80% SPB, 0.98 SPB/Day
- Charleston 81 days: 26 SPB, 26 Clerids, 100.00% SPB, 0.32 SPB/Day
- Cherokee 126 days: 0 SPB, 67 Clerids, 0.00% SPB, 0.00 SPB/Day
- Chester 90 days: 0 SPB, 75 Clerids, 0.00% SPB, 0.00 SPB/Day
- Colleton 83 days: 0 SPB, 35 Clerids, 0.00% SPB, 0.00 SPB/Day
- Dorchester 81 days: 0 SPB, 56 Clerids, 0.00% SPB, 0.00 SPB/Day
- Fairfield 81 days: 0 SPB, 160 Clerids, 0.00% SPB, 0.00 SPB/Day
- Florence 91 days: 0 SPB, 74 Clerids, 0.00% SPB, 0.00 SPB/Day
- Georgetown 64 days: 0 SPB, 99 Clerids, 0.00% SPB, 0.00 SPB/Day
- Greenville 84 days: 0 SPB, 23 Clerids, 0.00% SPB, 0.00 SPB/Day
- Greenwood 84 days: 0 SPB, 48 Clerids, 0.00% SPB, 0.00 SPB/Day
- Hampton 84 days: 0 SPB, 32 Clerids, 0.00% SPB, 0.00 SPB/Day
- Horry 81 days: 0 SPB, 22 Clerids, 0.00% SPB, 0.00 SPB/Day
- Jasper 81 days: 0 SPB, 23 Clerids, 0.00% SPB, 0.00 SPB/Day
- Kershaw 87 days: 0 SPB, 69 Clerids, 0.00% SPB, 0.00 SPB/Day
## 2019 SOUTHERN PINE BEETLE PHEROMONE TRAPPING RESULTS

South Carolina Forestry Commission  
May 21, 2019

### Declining - Low Prediction Trend (4) (continued)

<table>
<thead>
<tr>
<th>County</th>
<th>Trapping Days</th>
<th>#SPB</th>
<th>#Clerids</th>
<th>% SPB</th>
<th>SPB/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lancaster</td>
<td>87</td>
<td>0</td>
<td>216</td>
<td>0.00%</td>
<td>0.00</td>
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<tr>
<td>Laurens</td>
<td>84</td>
<td>0</td>
<td>124</td>
<td>0.00%</td>
<td>0.00</td>
</tr>
<tr>
<td>Lexington</td>
<td>87</td>
<td>7</td>
<td>172</td>
<td>3.91%</td>
<td>0.08</td>
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<tr>
<td>Newberry</td>
<td>84</td>
<td>2</td>
<td>184</td>
<td>1.08%</td>
<td>0.02</td>
</tr>
<tr>
<td>Oconee</td>
<td>87</td>
<td>358</td>
<td>195</td>
<td>65%</td>
<td>4.11</td>
</tr>
<tr>
<td>Pickens</td>
<td>84</td>
<td>135</td>
<td>135</td>
<td>50%</td>
<td>1.61</td>
</tr>
<tr>
<td>Richland</td>
<td>87</td>
<td>0</td>
<td>109</td>
<td>0.00%</td>
<td>0.00</td>
</tr>
<tr>
<td>Saluda</td>
<td>84</td>
<td>79</td>
<td>154</td>
<td>33.91%</td>
<td>0.94</td>
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<tr>
<td>Spartanburg</td>
<td>84</td>
<td>0</td>
<td>141</td>
<td>0.00%</td>
<td>0.00</td>
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<tr>
<td>Union</td>
<td>84</td>
<td>0</td>
<td>78</td>
<td>0.00%</td>
<td>0.00</td>
</tr>
<tr>
<td>Williamsburg</td>
<td>88</td>
<td>0</td>
<td>20</td>
<td>0.00%</td>
<td>0.00</td>
</tr>
<tr>
<td>York</td>
<td>83</td>
<td>0</td>
<td>102</td>
<td>0.00%</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**State Totals**  
2,728 4,398 3,906 53% 1.61

**Coastal Totals**  
899 105 412 20% 0.12

**Piedmont Totals**  
1,829 4,293 3,494 55% 2.35

Severe Outbreak: High probability for major losses  
Increasing - High: Greater than 100% increase from previous year  
Static - Moderate: Less than a 50% decline to less than 100% increase from previous year  
Declining - Low: Greater than a 50% decline from previous year
South Carolina Forestry Commission’s
Southern Pine Beetle Pheromone Trapping Survey - May 2019

SPB Prediction Chart: Frontalin + Sirex Lure + endo-Brevicomin

Declining or Low

Static or Moderate

Increasing or High

Severe Outbreak

% SPB = (#SPB ÷ (#SPB + #Clerids)) X 100

# of SPB/Trap/Day

Abbeville  Coastal Plain Avg  Saluda  Charleston  Pickens  Statewide Avg  Piedmont Avg  Oconee  Berkeley  Anderson  McCormick
* Beginning in 2017, endo-Brevicomin was added to the previous used attractants of Frontalin and Sirex. A study found this new attractant combination on average was 6.54X more attractive to SPB and .97X less attractive to Clerid. To better compare 2017 to previous years, the number of SPB Trapped/Trap/Day was divided by 6.54, but the number of Clerid was left the same.