



# Friends of Peninsula State Park Research Report

Summer

2017  
Issue 6

## Oak Wilt Testing Concludes. What do we know?

U.W. Madison student Stephanie Jagemann has completed her last year of a two year FPSP Research Grant testing for Oak Wilt disease in the Park. Her research in part of a larger state study for this devastating oak tree disease. See attached final report.



Stephanie Jagemann delivering public program at Welkers Point, Peninsula State Park 7/25/17

To During the summer of 2017, Jagemann delivered two educational programs to Park visitors on trees and Oak wilt. These programs are important to continue to educate the public on steps to detect and reduce the occurrence and spread of this invasive disease.



Above: (left) Assistant Park Naturalist. Abby Lewandowski and Stephanie conduct tree identification session.

## Oak Wilt: What we know. What we can do.

**We know** Oak Wilt disease can kill an oak tree in one year.

**We know** the majority of Wisconsin has this disease.

**We know** Oak Wilt infections are largely transported by infected beetles.

**We know** the Park has the species of beetles but not with the (spore) disease.

**We know** we do not have Oak Wilt at Peninsula State Park at this time.

**We can** continue to **NOT** bring fire wood from outside the Park to the Park.

Infected wood with Oak Wilt spores can be transported by the beetles to live trees and our Oak Trees will die.

**We can** continue to support research and monitoring of this, and other, invasive treats to our Park.



Each year, The Friends of Peninsula State Park Research Committee meets to review all applications and set topical priorities. Grant applications are welcomed from a college or university student at any time of the year. Students must have academic sponsorship. Awards are for expenses for one year. Further information at;  
[www.peninsulafriends.org](http://www.peninsulafriends.org)

## Past Research Projects

Sponsored by the Friends of Peninsula State Park

- *Forest Understory Change in Response to Altered Deer Pressure*- Sabo/Frerker, UW-Madison, Forestry, 2011
- *A Compositional Analysis of Ceramic Material from Shanty Bay* (partial) - Birnbaum. UW- Milwaukee, Anthropology, 2012
- *Assessment of Reptiles and Amphibians / Focus Rare or Endangered Species*- Siddons, Rucker, Steckert, UW-Stevens Point, Biology, 2012-14
- *Baseline Survey of Iris Lacustris (Dwarf Lake Iris)*- Perrigoue, UW-Stevens Point, Biology, 2013-14
- *Signage Inventory and Data Base Plan (Sunset Bike Route)* – Parr, UI-Chicago, Urban Planning, 2016
- *Seasonal and Regional Distributions of Major Vectors.. Oak Wilt Fungus in Wisconsin*- Jagemann, UW-Madison, Entomology, 2016-17)

Research is important in understanding nature.

Your *time* and *money* are necessary to continue this research for our treasured Park.

Can you contribute?

visit; [peninsulafriends.org](http://peninsulafriends.org)

See Stephanie Jagemann's attached final report – Oak Wilt



Friends of  
Peninsula State Park  
For Now and the Future

## Final Results Report

8/14/2017

### Seasonal and Regional Distributions, Degree-Day Models, and Phoresy Rates of the Major Vectors of Oak Wilt Fungus, *Ceratocystis fagacearum*, in Wisconsin.

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#### Abstract:

Oak Wilt is a lethal disease caused by the fungus *Ceratocystis fagacearum*, which is thought to be invasive. Short-distance spread occurs via root grafts, whereas long-distance spread is by sap beetle (Nitidulidae) vectors. Attempts to limit the spread and impact of *C. fagacearum* are largely based on limiting cutting to periods of vector inactivity. However, there is limited information on these beetles' activity periods, responses to temperature, and phoretic frequencies. We sampled dispersing populations of two major vector species in Wisconsin, *Colopterus truncatus* and *Carpophilus sayi*, for two years to quantify their seasonal and geographic abundances. Trapping was performed in twelve oak stands throughout Wisconsin, and beetles were assayed for *C. fagacearum*. Total catches (15,980) were 59% *C. truncatus* and 41 % *C. sayi*. More *C. sayi* were caught in southern Wisconsin, whereas *C. truncatus* were evenly distributed across the state. Both beetle species were present at asymptomatic sites, including Peninsula State Park. Most sites yielded beetles with viable fungal propagules, but the frequency of association ranged from 0%-50%. Viable fungi were not isolated from any beetles captured in sites not known to have oak wilt. Temperature models of *C. truncatus* and *C. sayi* were

constructed to improve the generality of these results. Because *C. truncatus* and *C. sayi* span the seasonal activities of oak wilt vectors, these results can be used to help guide oak-harvesting practices.

## Study Objectives:

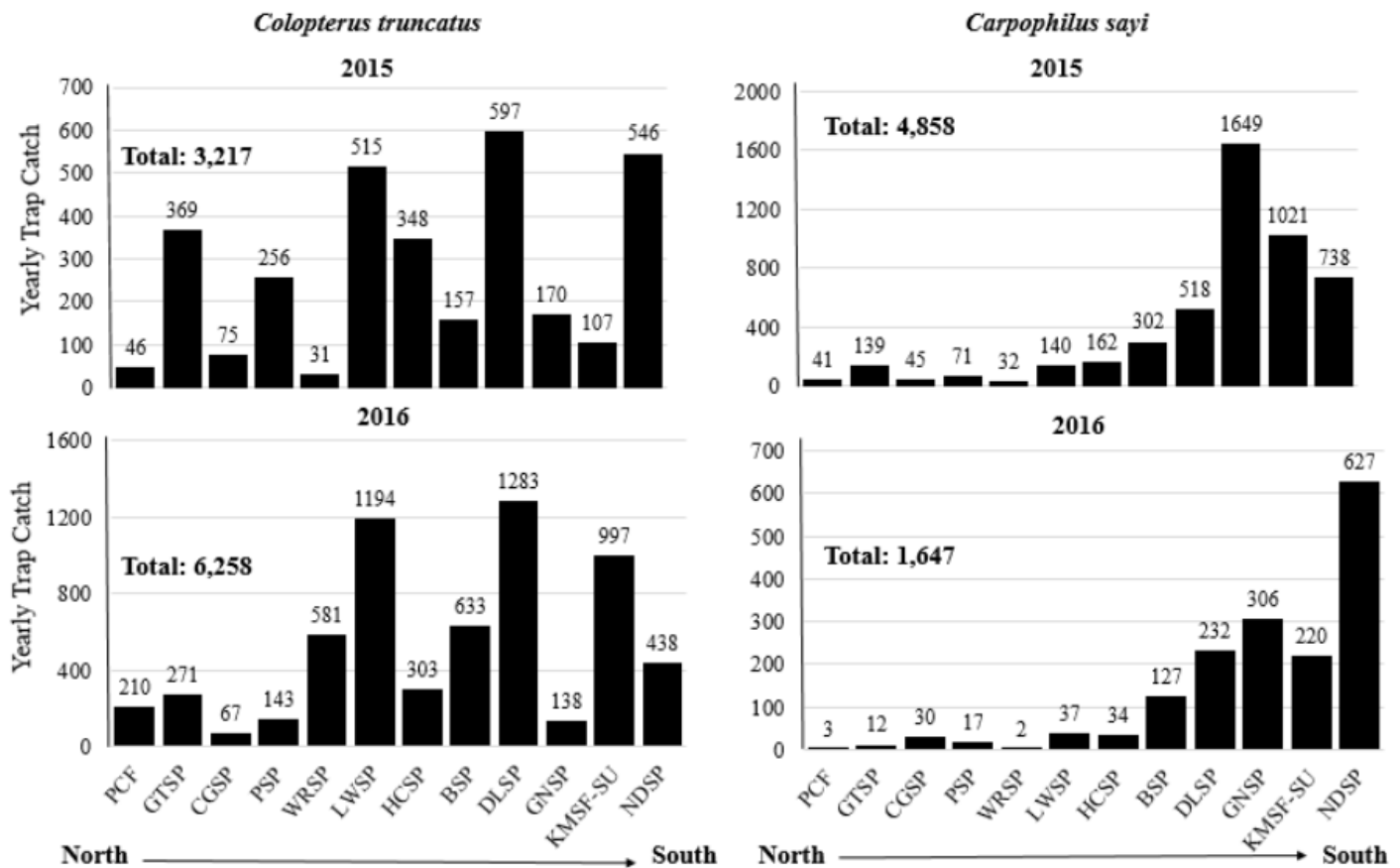
- Characterize the phenology, abundance, and distribution of the two major vectors of Oak Wilt fungus in Wisconsin
- Quantify the association rates of these two vectors with *C. fagacearum*
- Develop degree-day and threshold models of *C. truncatus* and *C. sayi*, to guide decisions about pruning and silvicultural practices



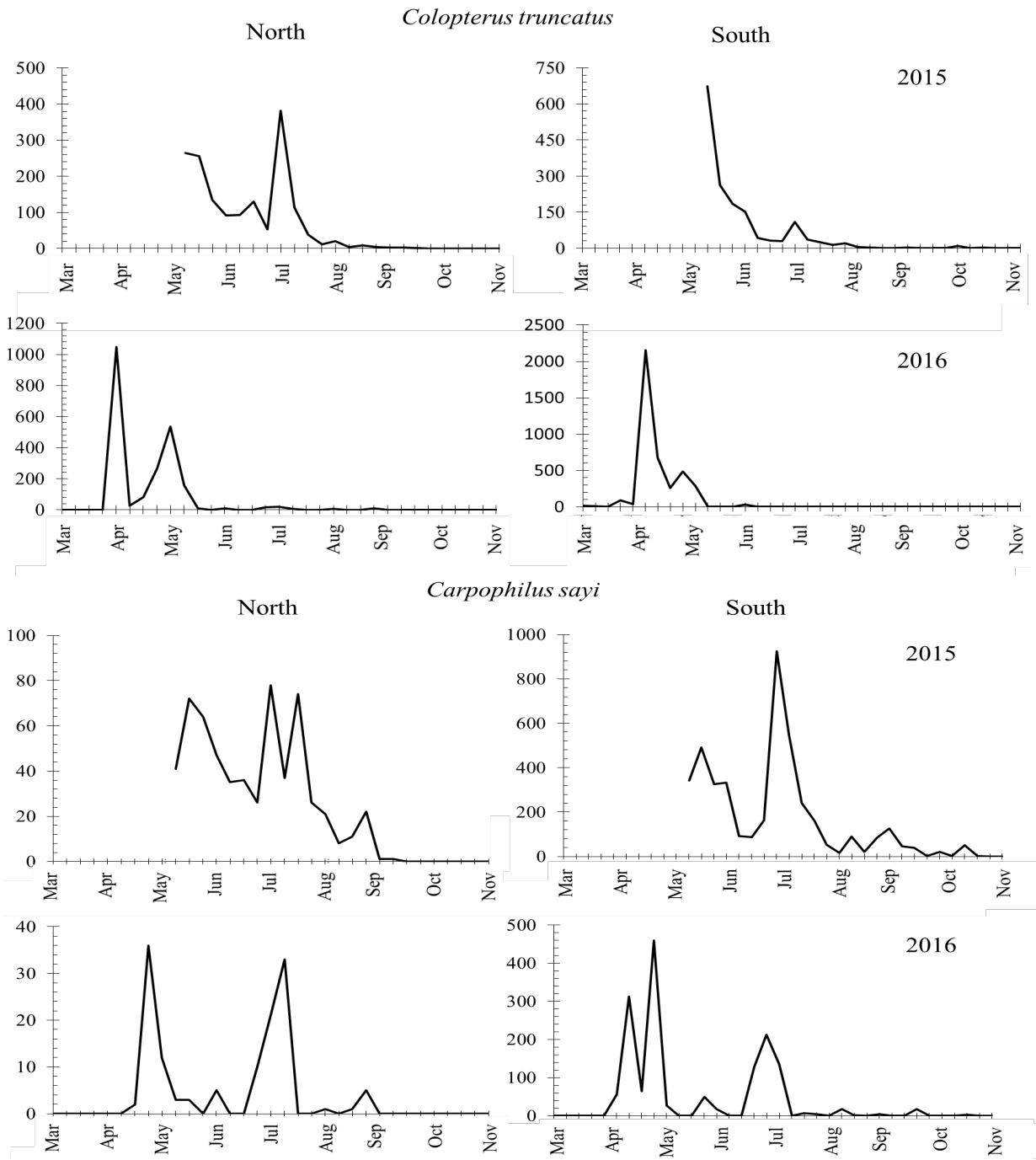
Above: Left: An active *C. fagacearum* fungal mat with asexual pressure pad. Center: *Carpophilus sayi*. Right: *Colopterus truncatus*.

## Results:

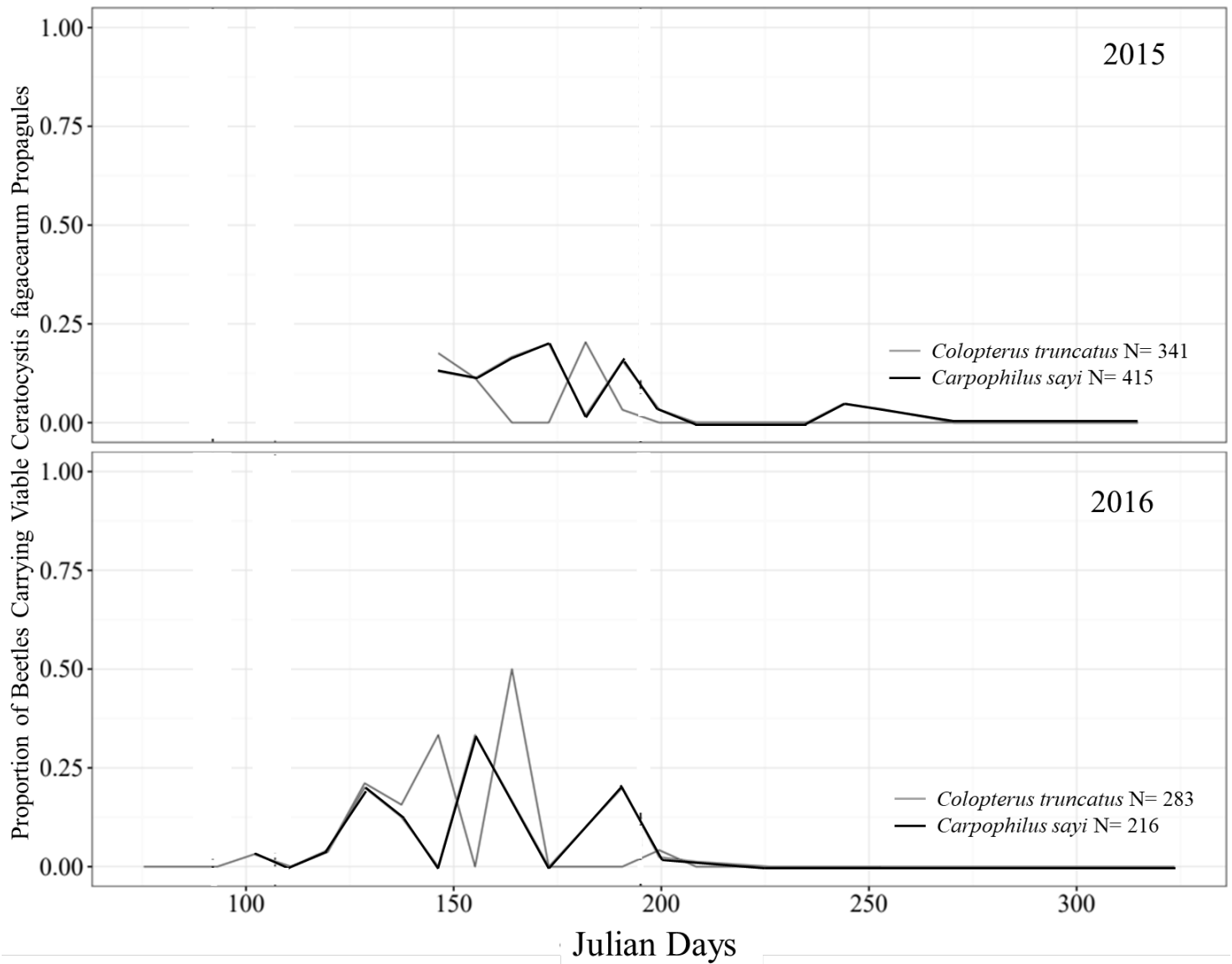
During 2015 and 2016, Peninsula State Park (labeled PSP below) contained both study species. Peninsula State Park is one of only two study sites (of 12) not known to contain oak wilt, yet both beetle species were found in similar numbers to other sites containing active oak wilt pockets. Therefore, these beetles are not dependent on the oak wilt fungus to survive.



The graphs below show the total number of *C. truncatus* and *C. sayi* captured during each week of trapping throughout 2015 and 2016. All sites, including Peninsula State Park have been pooled to simplify presentation. North and South refer to the Tension Zone that runs through Wisconsin. The general trends, of *C. truncatus* peaking in April - May and tapering off throughout the remainder of the field seasons, and *C. sayi* peaking in April and July, apply to Peninsula State Park. It is important to keep in mind that trapping in 2015 started later than in 2016, and so does not include this early part of the flight season. Both years of trapping capture the latest flight of each study species.



In Peninsula State Park, *Colopterus truncatus* was captured as early as 5/26/2015 and 4/18/2016 and as late as 8/18/2015 and 7/26/2016. *Carpophilus sayi* was captured as early as 5/26/15 and 5/9/2016 and as late as 5/9/2015 and 9/6/2016.



None of the study beetles tested at Peninsula State Park tested positive for oak wilt fungus. The above graphs show the total proportion of study beetles from the ten field sites that tested positive for oak wilt fungus throughout the year (shown in Julian Days).

Looking into the future, if Peninsula State Park were to contract or suspect oak wilt fungus, we would recommend the hired help of local arborists in conjunction with the guidelines outlined in the Wisconsin DNR Oak Harvesting Guidelines.

## Conclusions:

- More *Carpophilus sayi* than *Colopterus truncatus* captured overall.
- *Carpophilus sayi* more abundant in southern than northern Wisconsin; *Colopterus truncatus* evenly distributed throughout state. Both sites without known Oak Wilt contained both species, but in fewer numbers than sites with known Oak Wilt. However, the asymptomatic Peninsula State Park contained relatively high numbers of *C. truncatus*.
- *Colopterus truncatus* peaked at the beginning of the season and decreased as the season progressed. *Carpophilus sayi* peaked in the beginning and toward end of field season.
- All of the ten field sites with known Oak Wilt tested positive for *Ceratocystis fagacearum* spores. Incidence of *C. fagacearum* on beetles varied between sites, with the state's highest yielding positive beetles at 5 of 17 weeks. Seven of the 17 weeks tested were within current Oak Harvesting Guidelines.
- Peninsula State Park contained both beetle species, but tested negative for *C. fagacearum* presence.

## Future Work:

Stephanie Jagemann, Kenneth Raffa, Patrick Tobin, and Jennifer Juzwik are currently collaborating on publishing this work. A copy of the publication will be sent to Peninsula State Park.

## Funding:

Primary funding was by the Wisconsin Department of Natural Resources. Additional funding came from the University of Wisconsin-Madison College of Agricultural and Life Sciences, and the Friends of Peninsula State Park.

