

**TITLE:** Thousand Cankers Disease in Tennessee: For how long?

**LOCATION:** Tennessee, primarily. Also North Carolina, Kentucky, and Virginia

**DATE:** September 24, 2010

**DURATION:** Year 1 of 1-year project      **FUNDING SOURCE:** Base

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### **PROJECT OBJECTIVES:**

The objectives of the proposed project are to (1) analyze black walnut crown conditions from the past 5-10 years as measured by the U.S. Forest Service Forest Inventory and Analysis (FIA) Program to determine if symptoms of Thousand Cankers Disease (TCD) were present, (2) locate areas that have black walnut trees with poor crown conditions that might suggest the presence of TCD, and (3) evaluate the effectiveness of the FIA plot network for detecting localized forest health problems.

### **JUSTIFICATION:**

#### **a. Linkage to FHM Detection Monitoring**

The presence of TCD was not discovered from data collected via detection monitoring. Instead, the Tennessee Division of Forestry was alerted to the problem by local landowners inquiring about the decline of their black walnut trees. This raises a question regarding the effectiveness of the FIA detection monitoring plot network for early detection of a forest health threat. It is likely that the crown symptoms of TCD have not yet reached the size threshold required for observation on the FIA P3 plot network (Bechtold and others 2009). However, it is possible that the symptoms of TCD were present in the FIA data but not recognized as indicating a potential threat. This project will attempt to determine if symptoms of TCD were apparent in the data and if so, explore how the symptoms may have been missed in order to set forward a course of data analysis so that future such events are not overlooked.

#### **b. Significance in terms of the geographic scale**

Black walnut is distributed throughout the eastern United States with high concentrations in Missouri and the Ohio River basin. The first known incidence of TCD east of the Mississippi River occurred in Knox County, TN which is located at the intersection of two interstate highways: I-40, an east-west route, and I-75, a north-south route. Since the initial discovery, TCD has been found in three neighboring counties (Simmons 2010). The most likely pathway for expansion of TCD is through movement of raw wood, thus the threat of TCD spreading to surrounding states is high.

#### **c. Biological impact and/or political importance of the issue**

Black walnut volume is estimated at approximately 200 million cubic feet in Tennessee (Oswalt and others 2009), 214 million cubic feet in Kentucky (Turner and others 2008), 133 million cubic feet in Virginia (Rose 2009), and 90 million cubic feet in North Carolina (FIDO 2010). In Tennessee, the timberland component of black walnut is worth as much as \$1.5 billion, and an urban component is worth almost \$1.4 billion (The Forestry Source 2010). Black walnut is an extremely desirable tree for wildlife forage and timber production on forestlands and shade, aesthetics, and wildlife forage in

urban areas. TCD has the potential to inflict substantial damage to not only the wildland and urban forest landscapes, but also to the economy of the hardwood forest industry.

**d. Scientific Basis/Feasibility**

The proposed project relies on crown condition data from the U.S. Forest Service Forest Inventory and Analysis (FIA) Program. The project leader and cooperators are experienced analysts who are familiar with, and have open access, to FIA data.

**e. Priority Issues**

The proposed project addresses two of the priority issues addressed in the request for proposals: poor crown conditions and tree mortality.

**DESCRIPTION:**

**a. Background**

In August 2010, the Tennessee Department of Agriculture announced the discovery of TCD in Knox County. TCD is a disease that causes mortality among species in the *Juglans* genus though not all species exhibit the same susceptibility. TCD is caused by a fungus, *Geosmithia morbida*, which is spread by the walnut twig beetle (*Pityophthorus juglandis*). Early symptoms of TCD include yellowing leaves and thinning foliage in the upper part of the crown. As the disease progresses, crown dieback continues, killing larger branches and eventually the entire tree. Black walnut (*Juglans nigra*), an extremely desirable tree for wildlife forage and timber production, is highly susceptible to TCD and often succumbs within three years of visible symptoms. Prior to this discovery, TCD was known to exist only in eight Western states (AZ, CA, CO, ID, NM, OR, UT, WA). Based on the condition of black walnut trees observed in Knox County, it is possible that TCD has been in the area for 5-10 years.

**b. Methods:**

The FIA Program collects a suite of crown condition variables on its forest health monitoring (phase 3) plots and a single hardwood crown dieback variable on its regular forest inventory (phase 2) plots. These data, collected by FIA since 2000, will be compiled and summarized for Tennessee, primarily, and Virginia, North Carolina, and Kentucky secondarily. In addition to these forest data, crown condition data from the Tennessee Urban FIA pilot-study (2005-2010) will be incorporated into the analysis. Crown conditions on these plots located in urban areas are measured in much the same way as crowns on the Phase 3 plots. Point-in-time estimates of black walnut crown condition, as well as change in condition over time, will be examined at both the individual tree and plot levels. The rate of black walnut mortality over the last decade will be examined also.

**c. Products:**

1. Poster presentation at an FHM Working Group Meeting
2. Oral or poster presentation at a state or regional scientific meeting
3. Peer-reviewed journal article

**d. Schedule of Activities:**

1. Fall 2010-Spring 2011 – Analyze data and summarize results
2. Spring-Summer 2011 – Complete peer-reviewed journal article
3. 2011 – Oral or poster presentation, pending identification of an appropriate meeting

**COSTS:**

	Item	Requested FHM EM Funding	Other-Source Funding	Source
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<b>YEAR 1 (FY11)</b>				
<b>Administration</b>	Salary	\$7,200	\$7,200	U.S. Forest Service, SRS-FIA
	Overhead		\$3,000	
	Travel	\$2,000		
<b>Procurements</b>	Contracting			
	Equipment			
	Supplies			
<b>Total</b>		\$9,200	\$10,200	

### References

The Forestry Source. 2010. Thousand cankers disease found in Tennessee. One-two punch: emerald ash borer discovered in State in July. Vol. 15 (September). No. 9. P. 1 (col. 2), 3 (col. 1). Bethesda, MD: Society of American Foresters.

Bechtold, W.; Randolph, K.; Zarnoch, S. 2009. The power of FIA phase 3 crown-indicator variables to detect change. In: McWilliams, W.; Moisen, G.; Czaplowski, R., comps. Forest Inventory and Analysis (FIA) Symposium 2008; October 21-23, 2008; Park City, UT. Proc. RMRS-P-56CD. Fort Collins, CO: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station. 21 p.

FIDO. 2010. Forest Inventory Data Online, 2.0. <http://fiatools.fs.fed.us/fido/index.html>. [Date accessed: September 23, 2010]. U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis Program.

Oswalt, C.M.; Oswalt, S.N.; Johnson, T.G. [and others]. Tennessee's forests, 2004. Res. Bull. SRS-144. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 96 p.

Rose, A.K. 2009. Virginia's forests, 2007. Resour. Bull. SRS-159. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 77 p.

Simmons, M. 2010. Four counties restrict black walnut. News Sentinel. Sept. 22: A11 (col. 3). Knoxville, TN.

Turner, J.A.; Oswalt, C.M.; Chamberlain, J.L. [and others]. 2008. Kentucky's Forests, 2004. Resour. Bull. SRS-129. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 101 p.