Comparison of landscape attributes to level of tree damage determined by a rapid estimation procedure for red oak borer, *Enaphalodes rufulus* (Haldeman) (Coleoptera: Cerambycidae)

Leah Lucio, Fred Stephen and Fred Limp

Department of Entomology, Center for Advanced Spatial Technologies, University of Arkansas, Fayetteville, Arkansas, 72701

**Objective:** To assess red oak borer distribution and relate red oak borer occurrence to landscape features across the Ozark National Forest using a nondestructive rapid estimation procedure developed by the Forest Entomology Lab at the University of Arkansas. This procedure is used to determine the infestation history of northern red oaks in a stand. Twenty-six variables were analyzed of which three were significant and were used to create a model to predict rapid estimation indices for stands containing northern red oak. These three significant variables were percent oak, basal area of northern red oak and sine of aspect (north vs. south). This model is a first step in generating a more precise and detailed model for determining susceptibility of forest stands to red oak borer outbreaks.

**Methods continued**

From June through August of 2003, 328 prism plots containing northern red oak were established. Seventy of these were recorded at 0.5-mile intervals using off-highway vehicle trails in several regions of the Ozark National Forest. Fifteen plots were located along the Ozark Highlands Trail, which is accessible only to hikers. These 15 plots were separated by ten to fifteen minutes of walking, which was estimated to be approximately 0.5 miles. Forest Service employees established 467 prism plots randomly generated in ArcView GIS 3.2 between May and August 2003 to assess borer activity across the Ozark National Forest. Of these plots, 328 contained northern red oak and were used to create the model.

Global positioning systems, (GPS) were used to navigate to previously determined coordinates and to record newly collected coordinates as plots were being used. Prisms used by each group had basal area factors of 10 ft²/acre. Sites were classified as high, medium or low potential for damage in this current epidemic. The distributions of red oak borer populations will be included in a map series to provide advanced warning of red oak borer infestations to the Forest Service, state agencies as well as private land owners. It will be available through the CAST website, www.cast.uark.edu/cast by the end of 2004.

**Acknowledgements:** USDA Forest Service, Forest Health Protection Challenge Cost-Share agreement with the University of Arkansas, Forest Entomology Lab and the Center for Advanced Spatial Technology (CAST)