

## **Appalachian Transportation Institute (ATI) Research Project Description**

**Project Number:** ATI TRP 99-08

**Project Title:** Abandoned Tire Health Risk Survey/Analysis

### **Primary Investigator Contact Information:**

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**Project Objective:** This project will identify and inventory abandoned tire sites in Nicholas County West Virginia and assess the health risks to the local citizens from mosquitoes that breed at these abandoned tire dumps.

**Abstract:** LaCrosse encephalitis is a disease reported most often in children under the age of 15. West Virginia reports more LaCrosse cases than any other state (R. Nasci, CDC, 1998) with 20 to 40 percent of those cases occurring in Nicholas County in any given year (K. Slemp, WVSDC, 1996). The viral etiologic agent of LaCrosse is maintained in chipmunk populations and vectored to humans through the bite of a mosquito, *Aedes triseriatus*. This mosquito vector is highly predisposed to shaded forest conditions, and readily breeds in abandoned tires, small containers and tree holes. The location and characterization of tire dumps within the county will be performed. This will include an inventory of the tire dumps in the county and the types and prevalence of mosquitoes at each tire dump.

**Task Descriptions:** Jan & Feb-Prepare collection gear and supplies (glass slides, chemicals) for killing, storage and slide preparation of mosquito larvae study samples.

Organize pertinent literature. Establish collection strategy in target area (Nicholas Co.) And schedule meeting(s) with WVDOT personnel to coordinate collection strategies and data compilation/reporting methods.

Mar-Target area fly-over to ascertain potential collection sites; supplement with black & white aerial photographs. Concentrate fly-over in populated areas and along roadways. Do initial test collections (cold weather) to determine if any tire breeding mosquito species have become active this early in the year.

Apr, May, Jun-Begin field collections in earnest. Map (USGS Topo Map grid coordinates) tire dump collection site locations. Characterize (i.e., numbers of tires, shaded or sunlit habitat, elevation) dumpsites. Prepare mosquito larvae collected for species identifications. Identify species and determine

prevalence rates for each mosquito species. Compile data in excel spreadsheet format. (Preparation of larvae and spreadsheets will be the responsibility of student investigator. Identifications of larvae will be undertaken by the PI with training given to student investigator. Both the PI and student investigator will be involved in characterizing tire sites and mosquito collections). Discuss findings with WVDOT personnel along with discussions of tire dump removal timetable. Prepare progress report (for activities in the first 6 months) for 30 Jun submission to Director of ATI.

**Milestones, Dates, Schedule:** Start Date: January 1, 2001, End Date: June 31, 2001

**Budget:** \$67,500

**Student Involvement:** One full-time student research assistant will be assigned to the project. Additional students enrolled in Capstone (i.e., Senior Thesis) or independent study courses will be involved from time to time. Students in medical entomology classes will also be assigned short-term projects related to this research to teach them skills in mosquito collection, preparation and identification, as well as database handling and project report writing. This effort will begin by involving the class enrolled in the spring of 2001.

**Relationship to Other Research Projects:** This research will relate to two ongoing non-ATI research efforts: 1) a study of tree-canopy and ground level dwelling mosquitoes at the Green Bottom Wildlife Management Area undertaken by a student presently funded by a NASA fellowship; and 2) a manuscript being prepared by the Project PI, and co-authored by an epidemiologist employed by the Cabell County Health Department, detailing frequencies of habitat utilization of all mosquito species indigenous to West Virginia.

**Technology Transfer Activities:** Final reports will be available on the ATI website. All, ATI Principal Investigators will present findings through the ATI Transportation Seminar Series to invited guests from WVDOT, USDOT, other ATI Principal Investigators, students and other invited guests. Other opportunities to present the project results will be explored including conferences and peer reviewed journals, etc.

**Potential Benefits of this Project:** This project will provide WVDOT, the agency given a legislative mandate for tire dump clean-up efforts, with additional information on the location, and characterization, of abandoned tire pile accumulations. Mosquito species associated with abandoned tires (i.e., those species utilizing tires as breeding and larval development habitats) will be identified. Some of these species will be known vectors of pathogens (e.g., *Aedes triseriatus*, *Aedes albopictus*), whereas other species

will be identified as unimportant for the dispersal of disease. The prevalence (i.e., level of presence) will be determined for both vector and non-vector mosquito species for the target area (Nicholas County). Information derived from this project may be extrapolated for use in other areas of the state.

**TRB Keywords:** LaCrosse encephalitis, WVDOT, tire dump removal, *Aedes triseriatus*, mosquito vectors of pathogens, WV Division of Surveillance and Disease Control.