

# FIELD CAGE EVALUATIONS OF THE LADY BEETLE *SCYMNUS SINUANODULUS* FOR BIOLOGICAL CONTROL OF THE HEMLOCK WOOLLY ADELGID

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## ABSTRACT

Biological control has been a major focus of efforts to reduce the impact of hemlock woolly adelgid (HWA) on hemlocks in the eastern United States. The lady beetle *Scymnus sinuanodulus* Yu et Yao, one of the most abundant predators of HWA in China, was first imported in 1996. Subsequently its biology and host range were evaluated in quarantine and limited numbers are now available for field release.

In 2005, cage field trials were conducted at Coweeta Hydrological Laboratory, Otto, NC, and at Saugatuck Reservoir, Easton, CT, to evaluate reproduction of the lady beetles under field conditions. Fabric bags, each containing three females and two males, were placed over approximately 0.5 m of the terminal end of hemlock branches on March 18, 2005 (North Carolina) and April 22, 2005 (Connecticut). The female lady beetles were laying eggs in the laboratory prior to placement in the field. The bagged hemlock terminals, with the HWA and beetles in them, were removed June 8, 2005 (North Carolina) and June 13 (Connecticut).

The lady beetle reproduced in each of the 20 bags at North Carolina, with a range of 9 to 82 progeny in each bag. Initially, each bag contained more than 100 HWA adult sistentes; at the end of the trial, 0 to 177 progredientes remained in each bag. The number of beetle progeny in the bags was positively correlated with the number of HWA present in the bag at the end of the trial. Most of the progeny recovered were adults.

Similar results were observed in Connecticut, except that initial HWA populations were lower. Only one bag had adelgid ovisacs at the end of the test and this bag had the highest number of progeny (68). All progeny recovered in Connecticut were in the larval stage, except for three prepupae.

The trials in both states indicate that *S. sinuanodulus* reproduces well in the field when prey is not limiting and can dramatically reduce HWA populations.