RELEASE AND MONITORING OF *LARICOBIUS NIGRINUS* (COLEOPTERA: DERODONTIDAE) FOR CLASSICAL BIOLOGICAL CONTROL OF THE HEMLOCK WOOLLY ADELGID IN THE EASTERN U.S.

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ABSTRACT

Studies are being conducted to determine optimal release procedures for establishment and sampling methodology of *Laricobius nigrinus* Fender (Coleoptera: Derodontidae), a predator of the hemlock woolly adelgid, *Adelges tsugae* Annand (Hemiptera: Adelgidae) on eastern hemlock, *Tsuga canadensis* (L.) Carriere, trees. Three factors examined are: (1) the number of beetles released; (2) location; and (3) time of release. CLIMEX software produced a climate match index of 0.58-0.65 between the original *L. nigrinus* collection area (Victoria, B.C.) and eastern areas infested with HWA indicating adequate climate matching. Laboratry-reared beetles were released at 22 sites from Massachusetts to Georgia and sampling methods for adult and immature stages (i.e. beatsheets and branch clipping) were compared within eastern and King County, WA sites. There were 10 open releases in the 2003-2004 season consisting of the replicated treatments: 300 adults in fall 2003, 300 in spring 2004, or 300 in fall 2003 plus spring 2004 (sum = 600). There were 12 releases in the 2004-2005 season including the new release sizes: 75, 150, or 1,200 adults in fall-spring. In fall 2004, beatsheet sampling recovered four *L. nigrinus* F_1 adults at two of the first 10 release sites. In spring 2005, branch clipping recovered 285 F_2 *Laricobius* larvae from 8 of these 10 sites, however some of these recoveries were *L. rubidus* LeConte. *L. nigrinus* presence was confirmed at 5 of the 10 sites through rearing of larvae to the adult stage. In fall 2005, beatsheet sampling recovered 13 F_2 and 33 F_1 *L. nigrinus* adults at the 2003-2004 and 2004-2005 sites, respectively (4 of 22 sites). To date, *L. nigrinus* has been recovered from Tennessee to Pennsylvania at 8 of 22 sites. The optimal release method is not clear at this early stage of colonization. Branch clipping was significantly better in recovery of *L. nigrinus* and determined presence more frequently than beatsheets in native and introduced habitats.