

# CHARACTERIZATION OF MICROSATELLITE LOCI FOR *LARICOBIOUS NIGRINUS* AND *L. RUBIDUS*, PREDATORS OF ADELGIDS IN NORTH AMERICA

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## ABSTRACT

*Laricobius nigrinus* (Coleoptera: Derodontidae) is native to western North America and has been released in eastern North America as a biological control of the hemlock woolly adelgid (HWA). In eastern North America there is a congeneric native species, *L. rubidus*, which feeds on white pine adelgid, *Pineus strobi*, and on HWA but not enough to control the pest. Phylogenetic analysis of the genus *Laricobius* using mitochondrial and nuclear DNA sequence data showed that *L. nigrinus* and *L. rubidus* are sister species and closely related. This has led us to question whether these species have diverged long enough to be reproductively isolated. Hybridization between the introduced *L. nigrinus* and native *L. rubidus* would have unknown consequences for biological control. We also found some evidence of population structure within the native range of *L. nigrinus* associated with geography and/or host association.

As a first step toward obtaining a better understanding of the relationship between *L. nigrinus* and *L. rubidus* and of possible genetic structure associated with host or climate within *L. nigrinus*, we isolated and characterized

microsatellite markers for both species. An initial 14 loci were characterized using samples of *L. nigrinus* from Seattle, WA (n=25) and Portland, OR (n=17), and *L. rubidus* from Hamden, CT (N=28) where no *L. nigrinus* releases have been made. Nine loci were variable and amplified cleanly for both species. The number of alleles per locus varied from 4 to 16 (mean = 8.1) for *L. nigrinus* and 2 to 10 (mean = 4.9) for *L. rubidus*. Two loci displayed significant deviation from Hardy-Weinberg equilibrium in both species after controlling for multiple comparison false discovery rate. The  $F_{st}$  value (a measure of population differentiation) between *L. nigrinus* populations from Washington and Oregon was 0.02 while the  $F_{st}$  between *L. nigrinus* and *L. rubidus* was 0.34 indicating that these markers should provide adequate resolution to distinguish the two species and detect hybrids. We are currently working to add more loci to improve our ability to resolve *L. nigrinus* interspecific variation and are processing additional beetles to track diversity in laboratory colonies of *L. nigrinus* and to monitor the establishment and spread of different genotypes following release.