EFFECTS OF TIMING OF LARVAL CHILL ON *ANOPLOPHORA GLABRIPENNIS* (COLEOPTERA: CERAMBYCIDAE) SURVIVAL AND PUPATION

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Abstract

Anoplophora glabripennis (Motschulsky) (Coleoptera: Cerambycidae), Asian longhorned beetle, is a recently introduced non-native invasive species in the United States that has the potential to destroy several tree species in urban and forest habitats. The ability to rear *A. glabripennis* in quarantine is critical to rapid progress on techniques for the exclusion, detection, and eradication of this serious pest. Survival and development were compared for larvae from three populations (Ravenswood, Chicago, IL; Bayside, Queens, NY; and Hohhot, Inner Mongolia, China) under four larval treatments (6, 9, 12, or 16 wk at 25 °C followed by 12 wk at 10 °C then returned to 25 °C). Timing of pupation when removed from chill, survival, and successful completion of development were measured for each treatment.

Larvae from the China and Illinois populations were heavier than those from New York. Larvae from the Illinois population began pupation sooner after being removed from the various chill treatments than those from New York or China. Larvae from Illinois also were least affected by the timing of the larval chill period. Pupation success for the China population was highest for individuals with the greatest development time before chill. This result may indicate that larvae from the China population tend to pupate at a later instar, more may require chill to complete development, or some may require more than 1 year to complete development under some conditions. Some larvae from each population did not require a larval chill period to complete pupation. Some larvae from each population that had not reached their critical weight for pupation before the chill period required a second chill period before they initiated pupation. The critical weight for pupation appears to vary both within and between populations, which could indicate a high degree of plasticity or genetic variation for this trait. Overall survival decreased when the developmental time decreased before the chill period. Manipulating the development time before chill appeared to be useful for synchronizing adult emergence and increasing pupation. Further evaluation of the effects of temperature on development is needed to better understand the triggers for pupation and to predict the timing of various life stages for optimal timing of eradication and control treatments. These results indicate that the number of years to complete a generation could be affected by the climate in the location where the beetle is introduced.