

SPATIAL DYNAMICS OF THE ASIAN LONGHORNED BEETLE: CARTERET, NJ, TO STATEN ISLAND, NY, IN NINE YEARS?

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ABSTRACT

The exotic Asian longhorned beetle (ALB) (*Anoplophora glabripennis* [Motschulsky] [Coleoptera: Cerambycidae]), was first discovered on this continent in Brooklyn, NY, in 1996. Other infestations were later found in Chicago (1998), Toronto (2003), and Carteret, NJ (2004). DNA evidence suggests that these represent independent introductions from China. Between August 2004 and March 2007, several sites in Middlesex and Union Counties, NJ, and Richmond County, NY (Prall's Island and Staten Island) were found to be infested with the ALB. We conducted field studies and population analyses that now allow us to reconstruct the history of these infestations and draw conclusions about the relationships among them and about the population biology of this invasive species. Our work provides evidence that the oldest infestation, established in Carteret in 1997, was unrelated to those occurring later in Linden (east of the New Jersey Turnpike) and on Prall's and Staten Islands. East Linden appears to have experienced a separate colonization event in 2000. The infestation on Prall's Island, located in the Arthur Kill (river) between New Jersey and New York, most likely originated in east Linden in 2002 and then served as the source of beetles invading Staten Island in 2006. We believe the open landscape in this area, offering few impediments

to dispersal (or reasons to remain in place) facilitated population spread across open marshes, fields, and industrial wasteland to distant and widely scattered host trees. If the infested sites are related as described, then the Carteret population dispersed (considering only natural, not human-assisted, movement) 1.4 mi (2.25 km) in 7 years, the east Linden population spread the same distance in 5 years, and the population established on Prall's Island spread 1.0 mi (1.6 km) to Staten Island in 4 years. We anticipate that DNA analyses, still pending, will shed additional light on this. Our studies also highlight the fact that when suitable host trees are abundant (as in Carteret), a population of ALB can remain highly localized for years, reproducing on relatively few trees in a limited area (a few hundred meters in radius). We hypothesize that eventually, and rather suddenly, declining food resources or negative interactions among adults lead beetles to disperse more widely. One additional finding is that a severe infestation, with hundreds of exit holes on trees plainly visible from the ground, can go unnoticed—or at least unreported—by the general public for years. The infestation in Carteret, in a busy commercial and residential district, apparently went undiscovered for 7 years.