Sampling Seasons for Exotic Woodboring Insects: How Long is Long Enough?

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Abstract

Introduction. Several injurious exotic woodboring insects (EWBI) have recently been introduced into North America, such as the Asian longhorned beetle, *Anoplophora glabripennis* (Motschuslsky) (Coleoptera: Cerambycidae), the brown spruce longhorned beetle, *Tetropium fuscum* (F.) (Coleoptera: Cerambycidae), and the pine shoot beetle, *Tomicus piniperda* (L.) (Coleoptera: Scolytidae).

The influx of intercontinental and regional EWBI continues unabated. Of the 81 Scolytid species recorded in Oregon since 1997, 29 % are exotic. Recently detected exotic Scolytid species in OR (eight) outnumbered more "historical" ones (seven) detected prior to 1997. The agricultural, ecological, and economic consequences of many of these species are currently unknown. Development of EWBI survey protocols is receiving increased attention.

Since survey resources are limited, an important consideration is: What is the optimum survey season for EWBI? This question was explicitly addressed during the development of protocols for the USDA 2001 Rapid Detection of Exotic Scolytidae Pilot Project (RDESPP). Based upon available data and a short list of target species, a survey period of early March through the end of July was selected. The question we address here is: Could rapid detection of some newly introduced EWBI be impaired by ending sampling in July?

Methods. Three Oregon sites were selected for the RDESPP survey. Following RDESPP protocols, three 12-funnel Lindgren traps, each utilizing a different lure, were placed at each site. Samples were collected bi-weekly. In order to ascertain any benefits of an extended survey period, trapping was continued until the end of the Oregon Dept. of Agriculture's (ODA) standard EWBI survey season, mid-October. Analysis was based upon the proposed RDESPP survey period, the "Season" ending July 31, versus the period thereafter, the "Post Season" ending mid-October. Data from ODA's 1999 and 2000 EWBI surveys in western Oregon, which included five times as many traps and sites as the RDESPP Oregon survey, were also analyzed in this manner. Both native and established exotic species of Cerambycidae, Scolytidae, and wood wasps (Sircidae and Xiphydriidae) were considered.

Analysis. We compared the percentage of species of Cerambycidae, Scolytidae, and wood wasps detected within "Season" and the percentage of additional species detected "Post Season". Percentages of cerambycid species added after July 31 ranged from substantial (25%) to minor (7%). Additional scolytid species were relatively few (2 % to 8%), although it is worth noting that for the RDESPP the increase was almost 10%. In sharp contrast, the bulk of wood wasp species, from 40%-67%, were detected "Post Season".

Several species were only detected "Post Season". These included *Ortholeptura valida* (LeConte) and *Plectura spinicauda* Mannerheim (Cerambycidae), and *Scolytus oregoni* Blackman (Scolytidae). Fully half of the wood wasp species were only detected "Post Season": *Sirex cyaneus* F. and *Urocerus gigas flavicornis* (F.) (Siricidae), and the exotic *Xiphydria prolongata* (Geoffroy) (Xiphydriidae). *Sirex cyaneus* is very similar in appearance to the notorious *S. noctilio* F., which has caused extensive damage to pine plantations in Australia, New Zealand, and South America. Furthermore, individuals of some woodboring insect taxa were predominant only "Post Season". Two-thirds of *Scolytus* individuals and over 90% of wood wasp individuals were collected "Post Season".

Conclusions. Data based largely upon indigenous insects or those of a particular region, as in this case, must be used with care when extrapolating to the behaviors of exotic species. Nonetheless, some useful conclusions can be drawn:

- An EWBI rapid detection survey season of mid-March through July may detect most but not all species of Scolytidae.

- Some species of wood borers were only found after the end of July. Phenologies of some species of EWBI may thus make rapid detection unlikely if surveys are conducted only through July.

- The vast majority of individuals of *Scolytus* and wood wasps were collected after July. These, and

other, important groups of potential EWBI may be virtually overlooked by surveys terminating before August.

- If some species of WBI indigenous to Oregon are introduced into other countries or regions, they may not be readily detected by surveys terminating in the middle of local summers.