UPDATE ON SURVEY AND ERADICATION OF THE BROWN SPRUCE LONGHORN BEETLE, AND SUMMARY OF RECENT RESEARCH

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Abstract

In 2000, the Canadian Food Inspection Agency (CFIA) initiated a science-based eradication program to eliminate the brown spruce longhorn beetle (BSLB) in Halifax, Nova Scotia, Canada. The BSLB is an introduced alien invasive species, native to Europe, that could threaten the health of spruce forests and urban trees in impacted areas. The BSLB program focuses on public awareness, surveillance, research, quarantine control measures, certification protocols, and pest mitigation activates. Currently, the only effective detection tool is visual inspection, and the most effective control tool is the removal and destruction of host trees. To date, the CFIA has removed over 6300 spruce trees, with approximately 300 removed during 2004. Program results appear promising, as the number of positive trees detected has decreased dramatically since 2000. Hurricane Juan caused substantial blowdown of trees in Halifax and other parts of Nova Scotia on 28 September 2003. Because the BSLB breeds in windfall and fresh logs, as well as live spruce, there were concerns that populations might build in windfall that was not salvaged before adult emergence in the summer of 2005. Large-diameter, green, windfelled spruce trees that displayed no external signs of BSLB were sampled from nine sites, eight within the BSLB quarantine zone and one outside the quarantine zone, in late fall of 2004; they were milled to determine the percentage infested with the BSLB. Eight of nine sites contained infested windfall, with an overall mean of 14% (0-43%) infestation. The heaviest infestation was on McNabs Island, an area so badly damaged by Hurricane Juan that regular surveys to locate and remove infested trees were not possible until the fall of 2004. The eradication program is being reviewed to determine strategies for mitigating the risk of BSLB population increase and spread posed by the large volume of windfelled spruce.

Highlights of some recent research on the biology, survey, and control of the BSLB were presented. Two North American species of parasitic wasps (one braconid, one ichneumonid) that commonly parasitize the native *Tetropium cinnamopterum* have also been recorded for the first time from *T. fuscum* (see Sweeney et al. poster abstract in these Proceedings). With greater knowledge of the factors affecting parasitoid foraging and survival, it may be possible to enhance their impact on the BSLB in Nova Scotia. *Beauveria bassiana* is being tested as means of suppressing BSLB populations, by applying conidospores directly to spruce bait logs or by wrapping conidia-treated polyester bands around the stems of spruce trees (see Sweeney et al. poster abstract). Results indicate that the BSLB is susceptible to *B. bassiana* under field conditions and that tree bands may be a better strategy to pursue than applications to bait logs. Species-specific molecular markers and real-time PCR assays have been developed that demonstrate great promise in rapidly distinguishing *T. fuscum* from nine other *Tetropium* species, as well as other asemine cerambycid out-groups. Further tests are planned to validate the markers and test their efficacy with environmental samples, such as eggs, frass, and exuviae. A large whole-tree drum chipper was tested for its efficacy as a phytosanitary tool for the treatment of BSLB-infested logs in March 2004. No *Tetropium* spp. adults or similar size insects (e.g., wood wasps, parasitoids, other cerambycids) emerged from chips compared with significant numbers that emerged from logs. Some very small scolytid beetles and flies (1-3

mm) survived to emerge from chips, suggesting that small life stages of BSLB (e.g., eggs, 1st or 2nd instars) might survive but very few chips (≤ 0.25%) had intact bark and sufficient size for successful development of *T. fuscum*. The results indicate that chips had negligible phytosanitary risk and that chipping was a suitable treatment for BSLB infested material. The CFIA has approved phytosanitary wood chipping protocols that will help landowners clear windfall from properties and mitigate the spread of BSLB.