Abstract

[Project Information]

Project Title : Development of the System for Early Detection and Elimination in Newly Invaded Sites of the Invasive Alien Species *Aromia bungii*

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Principal Investigator : Tamura Shigeaki

(PI ORCID) : ORCID0000-0002-8739-5302

Principal Institution : Forestry and Forest Products Research Institute, Forest Research and Management Organization

Cooperated by : 1 Matsunosato, Tsukuba City, Ibaraki, JAPAN

Keywords : Tel: +81 (0)29 829 8250

[Abstract]

The red-necked longhorn beetle, *Aromia bungii* (Coleoptera: Cerambycidae), is an invasive wood-boring pest that causes severe damage to Rosaceae trees, including cherry, plum, and peach. Rapid containment of its spread through early detection and eradication is an urgent priority. The objectives of this project were to: 1) elucidate the spread dynamics of *A. bungii*, 2) identify high-risk areas of invasion, and 3) develop an insecticidal bait that attracts and kills the adult stage.

To address Objective 1, we conducted population genetic analyses and laboratory behavioral assays to infer dispersal routes; and we also comprehensively analyzed the pest's regional distribution. Mitochondrial DNA analyses revealed that a single population spread widely across four prefectures in the Kansai region. Additionally, we present evidence for five long-distance (>20 km) dispersal events in the Kansai and Kanto regions. Laboratory behavioral assays demonstrated that adult *A. bungii* can cling to vehicle surfaces under wind pressures of 50 km/h and withstand vibrations for over an hour. Nevertheless, distribution analyses in Osaka and Wakayama Prefectures, Kansai region, showed that 97% of new infestations occurred within a 3-km mesh of infestation areas identified in the previous year and based on data compiled from 2015 to 2024 and analyzed at a 1-km mesh resolution from 2020 to 2024.

To address Objective 2, we established four >1-km² survey areas in Osaka and Wakayama prefectures and monitored for new infestations from 2022 to 2024. Our analysis indicated that in cherry tree plantations, new infestations tended to be higher in densely planted areas with large individual trees.

To address Objective 3, we performed laboratory dietary toxicity and choice tests and identified acetamiprid and sugar-vinegar solution as a fast-acting and highly effective insecticide against adult *A. bungii* and a low-cost and effective attractant, respectively. Using these agents, we deployed experimental bait devices in field trials to determine the kill rate among adults emerging from infested trees covered by a net. Mortality rates ranged from 22% to 81%.

We expect these findings will assist government efforts to control *A. bungii*, e.g., by identifying the locations that should be monitored because of their high-risk of invasion.

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