W1386

Grower Responses to Flatheaded Borers and Control Methods

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Background

Flatheaded borers (*Chrysobothrwas*) are wood-boring insects that are native to the U.S. Their infestation can cause plant damage and death among woody ornamentals and orchard crops (Addesso et al., 2020). For example, in a maple cultivar study conducted in the Southeast U.S., untreated trees experienced 2.3 percent to 41 percent plant loss when infested by flatheaded borers (Oliver et al., 2010). Beyond the initial infestation, there was a heightened likelihood of reinfestation if the trees survive. Given that the U.S. nursery industry is valued at $4.6 billion (USDA-NASS, 2020), there is potential for substantial economic losses even if only a small portion of susceptible plant stocks are infested. This report summarizes findings from a 2023-2024 U.S. nursery and orchard industry survey addressing flatheaded borer damage and control methods. Results provide insights that can be used by Extension personnel, green industry stakeholders, entomologists and others working on assisting the industry with controlling flatheaded borers by providing a benchmark of current practices.

Methods

An online survey was conducted to collect information from nursery and orchard industry stakeholders across the U.S. The survey covered production practices, business strategies, information sources, pest management practices, flatheaded borer incidents and control methods, willingness to adopt alternative flatheaded borer control methods and business characteristics (e.g., crops, size, sales). Participants were recruited through Extension agents' and specialists' networks, postings in statewide newsletters and through postings on relevant online outlets (e.g., social media, grower networks, etc.) A total of 30 industry stakeholders completed the survey, with most located in Oregon (60 percent of the sample), Tennessee (30 percent) and other states (10 percent).

Firm Characteristics

A total of 30 industry members completed the survey. Given the topic, every firm was required to have an orchard or nursery component to participate. Respondents were able to select all business activities that applied to them; as many participants reported multiple activities, the percentages do not total 100 percent. The information presented reflects the full survey sample responses. Orchard was selected by the largest portion of the sample (63 percent), followed by a nursery or greenhouse (43 percent), landscaping (10 percent), other business activities (10 percent), retail garden centers (7 percent), field consultants (7 percent) and brokers/re-wholesalers (3 percent). The sample had an average of 166 acres dedicated to nursery or orchard crop production, with 396 acres managed for other purposes (e.g., other crops, future expansion efforts, forest, homestead, etc.) Among orchard crop growers, hazelnuts were the most common (63 percent), followed by tree fruits (16 percent), pecans (9 percent), blueberries (9 percent) and walnuts (3 percent). For nursery crops, the most frequently grown crops were deciduous trees (22 percent), deciduous shrubs (19 percent) and broad-leaf evergreen shrubs (16 percent), as shown in Figure 1.

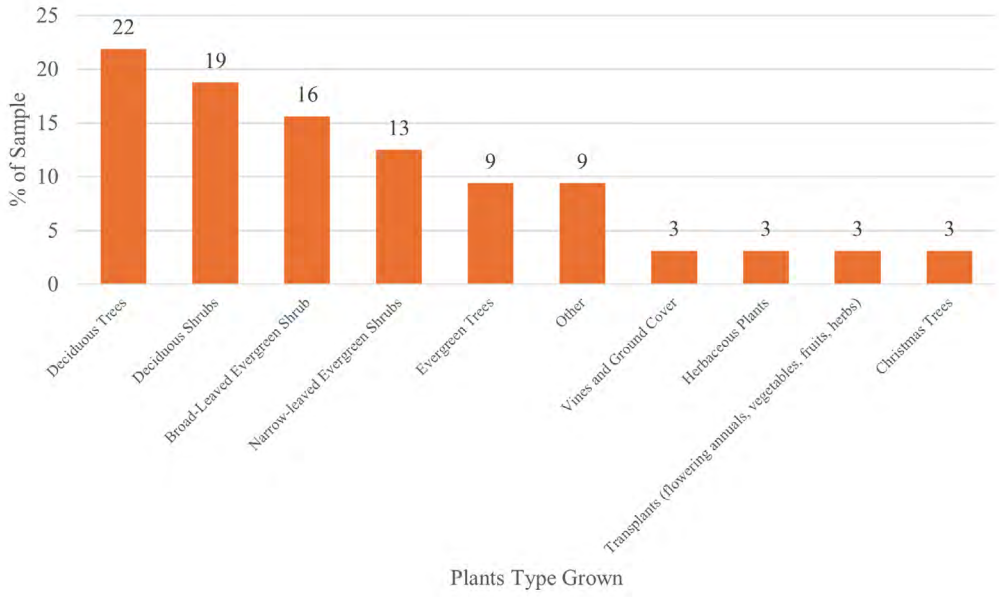

Figure 1: *Nursery Crops Grown by US Green Industry Firms Who Participated in a Flatheaded Borer Survey in 2023–2024 (n=30).*

Pest Management Strategies

Participants use a wide range of pest management practices. They could select all activities that were currently being used, meaning the percentages reflect the share of respondents using each activity and do not sum to 100 percent. The most common pest management activity was foliar sprays (selected by 73 percent of respondents), followed by insect scouting (70 percent), drenches (33 percent), cultivar selection (33 percent) and cover crops (27 percent). Less commonly used methods included fogging (13 percent), mechanical removal (13 percent), and physical barriers (7 percent). Companion plants were the least used (3 percent). These findings suggest that participants' firms utilized diverse strategies integrating both preventive measures, routine scouting and monitoring as well as conventional chemical controls in managing pests.

Flatheaded Borers—Impacts and Controls

Participants indicated their frequency of observing flatheaded borer damage to plants in their operations. Nearly two-thirds of respondents (64 percent) reported observing flatheaded borer damage annually or every other year. A small portion of the sample (7 percent) noted damage once every five years or less frequently. Approximately 14 percent reported never observing damage. The remaining 7 percent did not know if they had observed damage.

Approximately 41 percent of the sample currently uses flatheaded borer control measures. Of these participants, most (82 percent of the subsample; 33 percent of the total sample) reported that the damage was on less than 10 percent of their total inventory. A small portion of respondents (10 percent of the subsample; 3 percent of the total sample) indicated that the damage was between 40 percent and 50 percent of their inventory. These results suggest that flatheaded borer damage was minimal, affecting less than 10 percent of plants among firms that observed damage. There are potential economic impacts related to these results. For respondents reporting flatheaded borer damage to inventory (n = 11), their reported mean annual sales were $3,687,500. If these businesses were to experience flatheaded borer damage, a potential loss of up to $302,375 in annual sales could occur at the mean percentage of damage observed (8.2 percent).

Current Flatheaded Borer Control Methods

Participants indicated if their firms had flatheaded borer control methods in place and what those plans entailed when considering chemical and cultural management options (Figure 2). Approximately 81 percent of the total sample indicated they had flatheaded borer control plans with equal distribution between already having the plan implemented and having a plan ready to be activated if needed (41 percent each). However, 19 percent of the sample did not consider flatheaded borers a concern and had no plans to develop a control strategy.

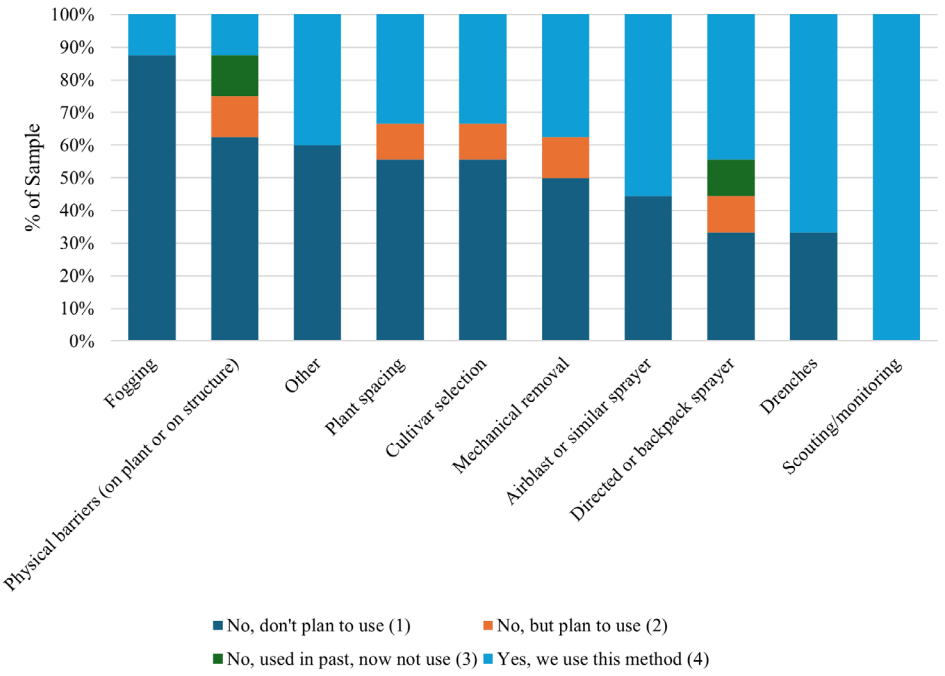

Figure 2: *Flatheaded Borer Control Methods Used by Green Industry Firms Who Are Currently Using Management Strategies for Flatheaded Borer in Their Operations (n=11).*

Only participants who have observed flatheaded borer damage and have control plans in place answered the following question on specific control practices for flatheaded borers. They selected whether they use specific practices, plan on using the practice or do not plan on using the practice (Figure 2). Drenches were used by 67 percent of respondents with 33 percent not planning to use them. Air blast or similar sprayers were selected by 56 percent of the sample while 44 percent do not plan on using this method. For directed or backpack sprayers, 44.4 percent of the sample currently use them, 33.3 percent do not plan to use them, and 22.2 percent have either used them in the past or plan to use them in the future. Fogging was used by 12 percent of respondents with 88 percent not planning to adopt it. These results may reflect the resources required to use the different control methods. Both the air blast/similar sprayers and fogging options require specialized equipment with high purchasing costs and may not be applicable in every operation. Whereas the directed or backpack sprayers require less initial investment and are small, portable options are more adaptable to different production systems.

Regarding cultural control methods, scouting and monitoring were universally adopted with 100 percent of respondents who have observed flatheaded borers and have plans in place use these methods. Currently, 33 percent use plant spacing as a control method while the majority (56 percent) do not plan to use plant spacing. Spacing plants aids in improving air flow while reducing insect pressures. However, it can be a challenge for some growers when considering limited space. As such, this may not be a viable option for all growers. Similarly, physical barriers were rarely used with 63 percent not planning to use them and 13 percent currently using them. For cultivar selection, 33 percent of participants selected resistant cultivars while 56 percent do not plan to change their cultivars. Lastly, 38 percent of respondents use mechanical removal while 50 percent do not.

Receptiveness to Alternative Flatheaded Borer Management Options

The previous section discussed currently used control methods by firms observing damage and with control plans. This section asked participants who have not observed flatheaded borer damage about their receptiveness to alternative management and control methods. Participants were provided a list of ten potential flatheaded borer methods and rated them on a 4-point scale where 1 equaled "No, will not use," 2 equaled "maybe, would use," 3 equaled "yes, plan to use" and 4 equaled "already using." The methods included drenches, sprays, plant orientation, irrigation method, delayed pruning, cover crops, trunk/stem painting, physical barriers (e.g., trunk wrapping), cultivar selection and companion planting. Overall, the irrigation control method was currently used by the largest portion of the sample (41 percent), followed by the trunk/stem painting (36 percent), spray options (32 percent), drenches (27 percent) and cover crops (23 percent). Fewer participants indicated they were already using delayed pruning (18 percent), cultivar selection (18 percent) and plant orientation (5 percent; Figure 3).

The portion of the sample that would never use the alternative management and control methods was also noted and was complementary to those already used (i.e., if it was frequently used, the method had a lower rating on "would not be used" scale). The plant orientation control method would not be used by most of the sample (59 percent), followed by the barrier method (50 percent), companion planting (50 percent), cultivar selection (36 percent), cover crops (27 percent), trunk/stem painting (23 percent), irrigation method (18 percent) and drenches (18 percent). Not surprisingly, the methods that were least likely to be implemented were those that would require additional resources (e.g., labor for repositioning plants, barrier materials and labor to wrap trees, additional plant purchases and care for companion plants, etc.) Conversely, the methods with the lowest implementation resistance were those with high adoption rates (e.g., irrigation, drenches).

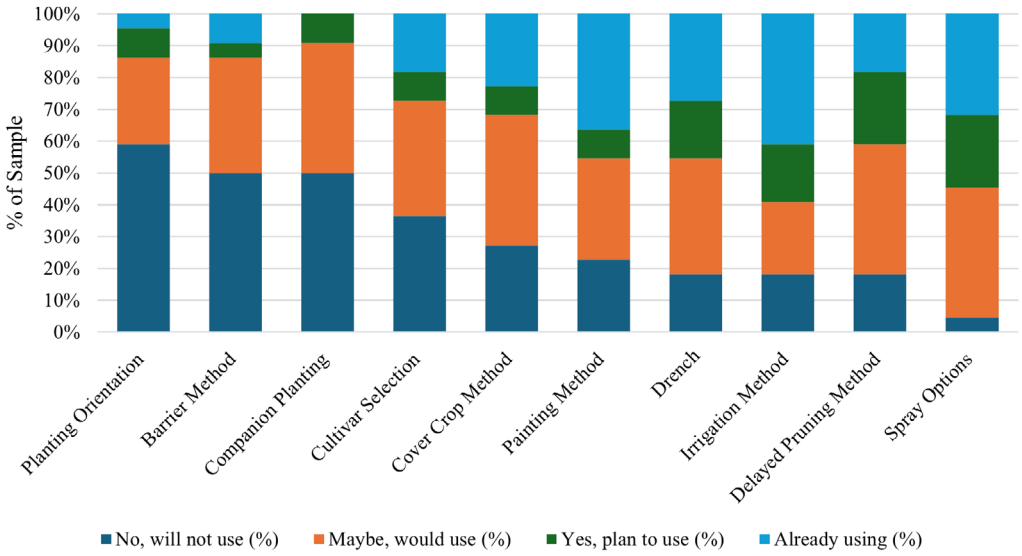

Figure 3: *Receptiveness to Alternative Flatheaded Borer Controls by Green Industry Firms Who Are Not Currently Controlling for Flatheaded Borer in Their Operations (n=16).*

Information Sources

Knowing current pest management strategies and future opportunities is important, but equally significant is understanding where industry members get information. In turn, as new options become available, the industry can be informed through the communication channels they already access. Participants indicated their sources for technical, business and marketing information from a given list where they could choose multiple answers (Figure 4). Results indicate that Extension agents were the most frequently used source, followed by in-person seminars, sales representatives, industry conferences, industry associations, print media and online sources, with social media being the least frequently used source.

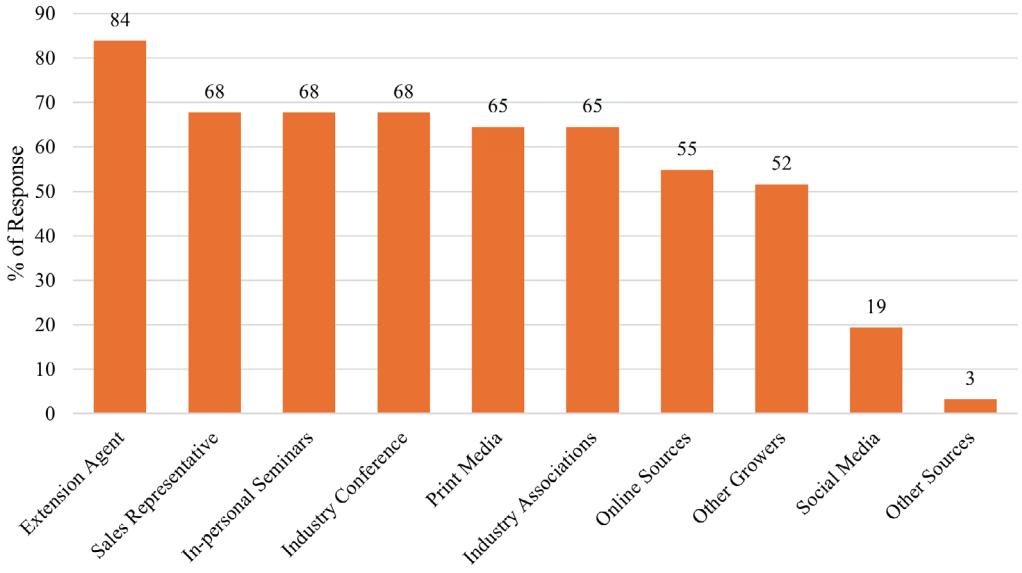

Figure 4: *Various Information Sources for Technical, Business and Marketing Information by Green Industry Firms Who Participated in a Flatheaded Borer Survey in 2023 – 2024 (n=30).*

Implications

The implications of these findings are particularly relevant for Extension and industry outreach efforts. Because most growers currently rely on familiar, conventional control practices, educational programs can play a key role in demonstrating the efficacy, cost-effectiveness and practicality of different pest management strategies through field trials, workshops and demonstration plots. Notably, the results from the information sources indicate that personal, professional and industry-related sources were more widely relied upon than social media sources in the nursery and orchard industries. Since most respondents rely on direct,

interpersonal and professional channels, Extension programs can maximize their impact through in-person engagement with producers. Activities such as workshops, field days and demonstration events, along with partnerships with sales representatives and industry associations to co-deliver information, could aid dissemination. Additionally, moderate use of online sources like blogs, newsletters or webinars would help reach younger or more tech-oriented producers while maintaining the credibility and trust associated with traditional channels. Key sources of information included Extension resources, meetings, industry associations and personal communications, meaning using these communication channels could aid in informing industry members about the control options availability and effectiveness. In turn, this could increase the adoption of those methods that are most impactful. Moreover, utilizing these trusted communication channels can help to disseminate evidence-based recommendations effectively.

Acknowledgements

This work is supported by Specialty Crop Research Initiative [grant no. 2020-51181-32199] from the USDA National Institute of Food and Agriculture.

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