Emerald Ash Borer

Agrilus planipennis Fairmaire
Coleoptera: Buprestidae

Crook, D. J.; Khrimian, A.; Francese, J. A.; Fraser, I.; Poland, T. M.; Sawyer, A. J.; Mastro, V. C. 2008. Development of a host-based semiochemical lure for trapping emerald ash borer *Agrilus planipennis* (Coleoptera: Buprestidae). Environmental Entomology 37: 356-365.

Objective: To improve detection of *A. planipennis* using pheromone-baited prism traps.

Abstract: Emerald ash borer is an established, exotic woodborer attacking healthy green (*Fraxinus pennsylvanica* Marsh.), black (*F. nigra* Marsh.), and most importantly, white ash (*F. americana* L.) in northern North America. Tree mortality is high and rapid. Attempts at eradication appear to be failing, but nonetheless a useful survey system is required for this pest.

Research has shown that *A. planipennis* are attracted to the color purple and a purple box trap baited with ash logs was developed by Francese et al. (2005) (see our review in this volume) to detect adult populations. Further research indicates that purple, three-sided prism traps baited with volatiles found in ash bark distillates catch significantly more *A. planipennis* per m^2 of trapping surface than the original four-sided box trap baited with ash logs. No differences in trap catch were found among five sizes of the prism trap. Placing the purple prism traps in the mid-canopy of ash trees appeared to enhance their efficacy in attracting *A. planipennis* adults. Prism traps baited with Phoebe oil, a steam distillate from Brazilian walnut (*Phoebe porosa* Mez.), caught significantly more beetles than unbaited traps or traps baited with Manuka oil, a distillate from New Zealand tea tree (*Leptospermum scoparium* J.R. and G. Forst). Phoebe oil contains 7-*epi*-sesquithujene and an unidentified compound not found in Manuka oil, along with four sesquiterpenes shared with Manuka oil and also identified from green ash bark. These commercial oils are readily available and offer a viable alternative to the difficult and expensive option of synthesizing single or multiple component sesquiterpene lures for *A. planipennis* adults.

Sampling Procedure: Purple panels are the most efficient color in trapping adult *A. planipennis* (Francese et al. 2005). Tie three 35 x 60 cm panels of corrugated purple plastic (0.26 cm thick; Coroplast, Dallas, TX) together to form an open-ended prism with a 0.63 m^2 surface area, or fold a single sheet of plastic to these dimensions. Coat the outside of each panel with insect trapping glue (The Tanglefoot Company, Grand Rapids, MI).

Use lures formulated in polypropylene “bubble cap” or “pouch” devices (Synergy Semiochemicals, Burnaby, BC, Canada) to deliver a release rate of 50 mg Phoebe oil/day. Individual release rates of the identified components in Phoebe oil are approximately as follows:

Identified component	Release rate per day
α-cubebene	0.2 mg
α-copaene	3.0 mg
Trans-β-caryophyllene	0.5 mg
α-humulene	0.8 mg
7-*epi*-sesquithujene	0.75 mg

Hang each Phoebe oil lure from a black carabiner (5.6 cm long) from a hole punched in the bottom of one of the trap panels. Place traps 13 m above ground, preferably within the canopy of ash trees where adults are active (Francese et al. 2007). Traps should be separated by 40 m. Check traps weekly for adults. Replace lures after 4 weeks.

References:

Francese, J. A.; Fraser, I.; Lance, D. R.; Mastro, V. C. 2007. Developing survey techniques for emerald ash borer: the role of trap height and design. In: Mastro, V. C.; Lance, D.; Reardon, R.; Parra, G. editors. Proceedings of the Emerald ash borer research and Asian longhorned beetle research and development review meeting. October 29– November 2 2006; Cincinnati, OH. FHTET-2007-04. Morgantown, WV: U.S. Department of Agriculture, Forest Service; 72–73.

Francese, J. A.; Mastro, V. C.; Oliver, J. B.; Lance, D. R.; Youssef, N.; Lavallee, S. G. 2005. Evaluation of colors for trapping *Agrilus planipennis* (Coleoptera: Buprestidae). Journal of Entomological Science 40: 93-95.