



Effects of Lure Composition and Release Rate on Catch of EDRR Target Species and other Forest Coleoptera



B.L. Strom¹, S.L. Smith², J.R. Meeker³ & R.J. Rabaglia⁴

¹USDA-FS, Southern Research Station, Pineville, LA; ²USDA-FS, R5 Forest Health Protection, Susanville, CA;

³USDA-FS, R8 Forest Health Protection, Pineville, LA; ⁴USDA-FS, Forest Health Protection, Arlington, VA

Project Goal

To assess effectiveness of host-based general attractants for the USDA Forest Service's Early Detection Rapid Response Program.

Introduction

The USDA Forest Service's Early Detection and Rapid Response Program (EDRR) is a nationally coordinated program that employs traps for detecting, delimiting and monitoring newly introduced exotic bark and ambrosia beetles. The utility of the trapping portion depends upon effectiveness of lures; a difficult proposition because target species are varied and likely have specific host-finding behaviors. To meet program goals, generally attractive host-based lures are used, consisting primarily of α -pinene and ethanol (ETOH). As the program matures, optimization of lure compositions and release rates will improve their utility and efficiency. Our goal was to assess effects of release rates and compositions of host-based general attractants on catch of EDRR target species and other forest dwelling beetles.

Two identical experiments were implemented in central Louisiana (LA) and northern California (CA) during the EDRR trapping season in 2008; one primarily addressing monoterpene composition and release rate, and a second addressing ETOH dosage and interactions with monoterpenes. Commercial releasers were used along with a home-made bottle

(various wicks) to increase flexibility in release rates. Lures are, from left: Synergy UHR-ETOH, Phero Tech UHR- α -pinene, Synergy UHR- α -pinene, Synergy Sirex (top), Synergy CA blend (below), bottle with wick.



Synergy UHR-ETOH lures were deployed in pairs to increase release of ethanol. Monoterpene treatments were based on pine compositions in LA (Sirex blend) and CA (CA blend). Funnel traps were coated with World Klass dry teflon and deployed in all experiments. EDRR protocols were otherwise used. Collections are being processed but

results from Experiment 1 with EDRR target species in LA are shown to the right. Lure release rates were measured during the studies—results from LA are listed below. Enantiomeric composition of α -pinene is indicated as the percentage of 'plus' enantiomer.

Lure	Composition	Release rate ^a
Synergy UHR	α -pinene-(+)-25%	2.06 g/d
Synergy Sirex ^b	α -pinene-(+)-75%/ β -pinene	1.33
Synergy CA	β -pinene/ 3-carene/ α -pinene-(+)-25%/ myrcene/limonene/ terpinolene	1.48
Phero Tech UHR	α -pinene-(+)-5%	2.61
Bottle mix	1:1 ETOH: α -pinene-(+)-25%	1.63
Bottle ETOH	ETOH 95%	8 - 14 ^c
Synergy UHR	ETOH 95%	0.3 - 0.8 ^d

^a mean per lure weight loss during LA portion of experiments.

^b components listed highest to lowest concentration in blends.

^c depending on wick type, two pipe cleaners or burner.

^d April and July means. Deployed in pairs, so release was 2x.

Experiment 1 consisted of 6 treatments in a randomized complete block design with 6 replicates (36 traps). Treatments are shown in the table below with results from LA and EDRR target species. To date, more than 50 additional beetle species have been identified in LA.

Species	Synergy Sirex	Synergy α -pinene x4	Synergy α -pinene	Synergy CA blend	Phero Tech α -pinene	Bottle mix
<i>Ambrosiodmus obliquus</i>	○	○	○	○	○	○
<i>Cnesinus strigicollis</i>	○	○	○	○	○	○
<i>Crypturgus alutaceus</i>	○	○	○	○	○	○
<i>Dendroctonus terebrans</i>	○	○	○	○	◆	○
<i>Dryoxylon onoharaensum</i>	○	○	○	○	○	○
<i>Gnathotrichus materiarius</i>	○	○	○	○	○	○
<i>Hylastes porculus</i>	○	○	○	○	○	○
<i>Hylastes salebrosus</i>	◆	◆	◆	◆	◆	◆
<i>Hylastes tenuis</i>	◆	◆	◆	◆	◆	◆
<i>Hyllocurus rudis</i>	○	○	○	○	○	○
<i>Hypothenemus</i> spp.	○	○	○	○	○	○
<i>Ips avulsus</i>	○	○	○	○	○	○
<i>Ips grandicollis</i>	○	○	○	○	○	○
<i>Micracisella nanula</i>	○	○	○	○	○	○
<i>Monarthrum fasciatum</i>	○	○	○	○	○	○
<i>Monarthrum mali</i>	○	○	○	○	○	○
<i>Orthotomicus caelatus</i>	○	○	○	○	○	○
<i>Pityophthorus</i> spp.	○	○	○	○	○	○
<i>Xyleborinus saxesenii</i>	○	○	○	○	○	○
<i>Xyleborus affinis</i>	○	○	○	○	○	○
<i>Xyleborus celsus</i>	○	○	○	○	○	○
<i>Xyleborus ferrugineus</i>	○	○	○	○	○	○
<i>Xyleborus octiesdentatus*</i>	○	○	○	○	○	○
<i>Xyleborus pubescens</i>	○	○	○	◆	○	○
<i>Xylosandrus compactus</i>	○	○	○	○	○	○
<i>Xylosandrus crassiusculus</i>	○	○	○	○	○	○

* new North American record. ○ = zero caught, ○ = 1-10, ⊙ = 11-100, ◆ = 100

Experiment 2 consisted of 9 treatments (3 x 3 factorial) in a randomized complete block design with 6 replicates (54 traps). Treatments were crossed from 3 monoterpene lures (Phero Tech UHR- α -pinene, Synergy Sirex, Synergy CA blend) and 3 ETOH lures (Synergy UHR-ETOH [x2], bottle ETOH with a two pipe cleaner wick, bottle ETOH with burner wick). This experiment was conducted in July, about two months after Experiment 1 concluded. Collections are being processed; when finished, there will be 8 tables like above, resulting from two experiments, two locations (CA and LA), and two sets of insects (EDRR target species and other forest dwelling Coleoptera).