

Abacide 2 and Inject-a-cide B Efficacy Trial
Winter Moth in Red Oak, West Roxbury, Massachusetts
J.J. Mauget Co., Arcadia, CA
Final Report

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July 15, 2008

Abstract: Winter Moth (*Operophtera brumata*) has become a perennial pest of oaks in eastern areas of Massachusetts. Considered an invasive species, this widely-distributed insect was introduced from Europe to North America (eastern Canada) in the 1930s. Since then, Winter Moth has become widely distributed throughout eastern Canada, the western US and western Canada. Massachusetts is the first-known outbreak located in New England. Females lay eggs during the winter months which give rise to tiny larvae (less than 1 mm) which burrow into overwintering buds and eat foliar tissues as they emerge in the spring. The site used for this J. J. Mauget research trial is located in the W. Roxbury section of Boston, Massachusetts, in a planting of 150-year-old red oaks (*Quercus rubrum*), which have been perennially severely infected with Winter Moth for at least the previous three years. Trees were injected with J. J. Mauget's Abacide 2 in fall 2007 and early spring 2008 and Inject-a-cide B in early spring of 2008. Trees were sampled in spring of 2008 and the number of Winter Moth-infested terminals was determined. All treatments at both timings resulted in similar and significant reductions in infestation compared to the untreated controls.

- Abacide-2 at two different rates: one 3.0 ml capsule per inch diameter breast height (dbh)/2 and one 3.0 ml capsule per inch dbh (2X), injected in autumn 2007, and Abacide-2 at one 3.0 ml capsule per inch dbh/2, injected in spring 2008, were equally effective in reducing infestation of Winter Moth in spring 2008.
- Inject-a-cide B at one 2.0 ml capsule per inch dbh/2 injected in spring 2008 demonstrated the same efficacy as the Abacide-2 treatments.
- All treatments reduced Winter Moth infestation of red oak to less than 15% of oak tree terminals infected, compared to 53% infestation of terminals of the untreated control trees, resulting in a 71% reduction in infestation.

Objectives:

The objectives of this study were:

1. To evaluate the effectiveness of fall injections with 2 different rates of Abacide 2 for control of Winter Moth (*Operophtera brumata* L.) in red oak (*Quercus rubrum*) in Boston, Massachusetts.
2. To compare efficacy of fall injections of Abacide 2 with subsequent spring injections of Abacide 2 and Inject-a-cide B against Winter Moth.
3. To evaluate the comprehensive efficacy of all three materials against Winter Moth.
4. To evaluate any phytotoxicity resulting from the injections.

Study design:

The study site was located along a major thoroughfare known as the VFW Parkway in the W. Roxbury area of Boston, Massachusetts (Appendix 2.). Test trees were 150-year-old red oaks of approximately 30" dbh. Experimental plots were arranged in a randomized block design and consisted of single-tree plots with four replicates per treatment. (Appendix 1.) Two treatments were applied in autumn, 2007, and 2 treatments were applied in spring, 2008 (see Table 1.) One set of plots was left as untreated controls. Treatments were evaluated spring 2008.

Timing 1: Autumn 2007:

Test trees were injected on October 31, 2007 with one of 2 doses (standard or 2X dose) of Abacide 2 (1.9% abamectin) formulated in 3 ml micro-injectable capsules (Treatments 1 and 2).

Timing 2: Spring 2008:

Test trees were injected on April 10, 2008 with either the standard dose of Abacide 2 formulated in 3 ml micro-injectable capsules or Inject-a-cide B (82% Bidrin) formulated in 2 ml capsules (Treatments 3 and 4).

Table 1. Product, rate and timing of treatments

Treatments-autumn 2007	Dosage	Timing
1. Abacide 2 (standard dose) (a.i. 1.9% abamectin)	one 3.0 ml capsule per inch dbh/2	autumn 2007
2. Abacide 2 (2X dose) (a.i. 1.9% abamectin)	one 3.0 ml capsule per inch dbh	autumn 2007
Treatments-spring 2008		
3. Abacide 2 (standard dose) (a.i. 1.9% abamectin)	one 3.0 ml capsule per inch dbh/2	spring 2008
4. Inject-a-cide B (a.i. 82.0% Bidrin)	one 2.0 ml capsule per inch dhh/2	spring 2008
5. untreated control	-	-

Final data collection and observations were made on May 5, 2008, 25 days post-spring injection, just as oak leaves were beginning to expand. Leaf size at the time of sampling was 1 inch. Fifty 10-inch terminals per tree were collected by means of a bucket truck which was used to access the tree canopy (Figure 1).

Figure 1. Collection of samples taken from oak tree canopy on May 5, 2005, W. Roxbury, Boston, Massachusetts.



Results and discussion:

All treatments and applications made at both timings resulted in statistically similar reduction of winter moth infestation of tree terminals (Table 2.). No phytotoxicity was observed in any of the treatments. It appears that microinjection of Abacide 2 in either autumn or spring at the standard J. J. Mauget recommended rate of one 3 ml microinjection capsule per inch of tree diameter at breast height (dbh) divided by 2 was as effective in reducing winter moth infestation as microinjection with a double rate of Abacide 2 at one 3ml capsule per inch dbh. Additionally and importantly, Abacide 2 residues in the tree from both rates used in fall injections made in October 2007 were as effective in reducing winter moth infestation as Abacide 2 injections made in spring 2008, indicating that residues in the tree from injections made in October 2007 were adequate

to significantly reduce wintermoth infestation in April 2008. Inject-a-cide B microinjections, made in spring 2008, at the standard Mauguet rate of one 2 ml capsule per inch dbh/2 were also very effective, and performed similarly to the Abacide 2 treatments.

Table 2. Per cent infection of red oak terminals after microinjection with Abacide-2 and Inject-a-cide B, W. Roxbury, Boston, Massachusetts, May 2008.

Treatments-autumn 2007	per cent infected terminals
1. Abacide 2 (standard dose) (a.i. 1.9% abamectiin)	12.5 b ¹
2. Abacide 2 (2X dose) (a.i. 1.9% abamectin)	14.5 b
Treatments-spring 2008	
3. Abacide 2 (standard dose) (a.i. 1.9% abamectin)	16.5 b
4. Inject-a-cide B (a.i. 82.0% Bidrin)	14.0 b
5. untreated control	53.5 a

¹Means within columns followed by the same letter are not significantly different (Fisher's Protected LSD, p<0.05).

Conclusions:

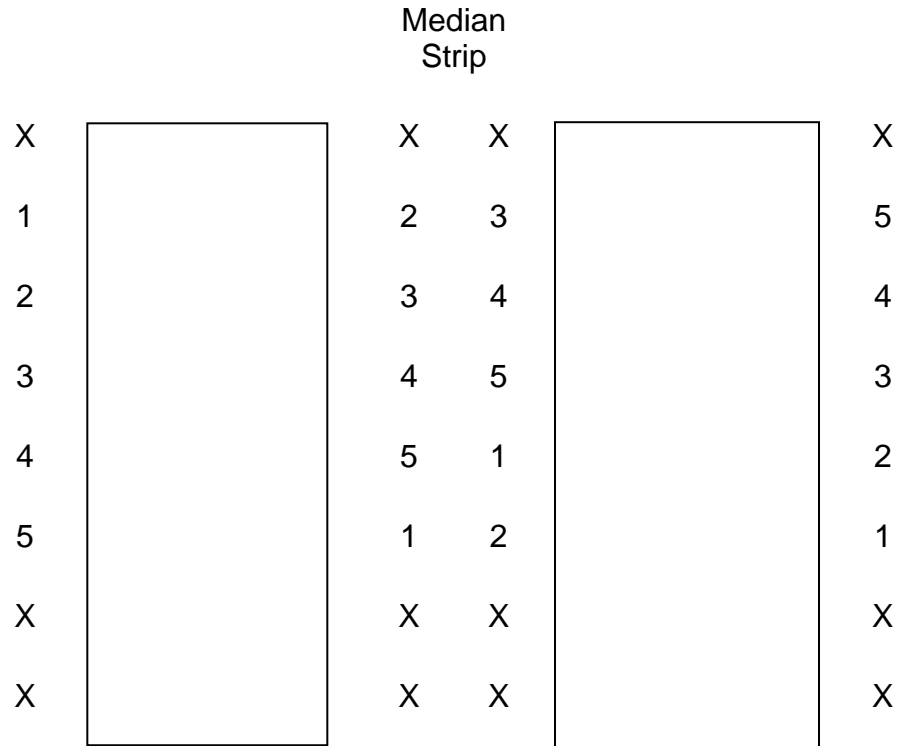
Several important conclusions can be drawn from this study. It is clear from the results that the standard J. J. Mauguet formula of one microinjection per inch dbh/2 provided adequate dosage to affect wintermoth populations with both materials tested, Abacide 2 and Inject-a-cide B. In fact, treatment 1, which was the JJM standard dosage for Abacide 2, had the lowest levels of infestation numerically of all the treatments (Table 2.). Comprehensive conclusions are as follows.

- The low rate of Abacide 2 performed equally as well as the 2X rate.
- Autumn (October 2007) injection of Abacide 2 worked as well as spring injection of Abacide 2 (April 2008) in preventing Winter Moth infestation (May 2008), indicating strong overwintering stability of Abacide 2 residues from autumn injection.
- Abacide 2 and Inject-a-cide B performed equally when applied to prior to spring infestations of wintermoth larvae.

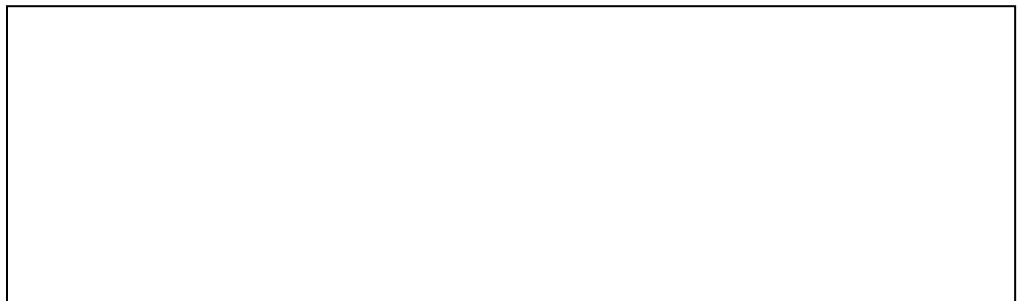
Appendix 1.

JJ Mauget Winter Moth Trial - West Roxbury, MA - October 31, 2007

Plot Plan



Median Strip



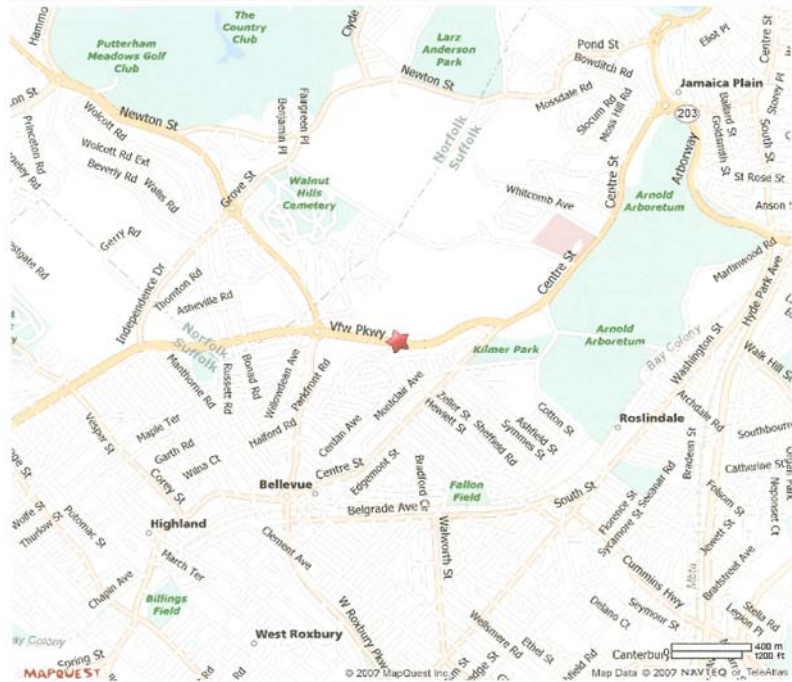
Appendix 2 - Site Map

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Roslindale, MA 02131, US

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