# FIELD EVALUATION OF THE EFFICACY OF TWO HOMS PRODUCTS TO CONTROL TWO ANT SPECIES IN SOUTHERN ONTARIO, 2008

## FINAL REPORT

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by

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## INTRODUCTION

The purpose of this study was to assess, under field conditions, the efficacy of two HOMS products, Bio Product 1 and Bio Product 2, to control two ant species: the black carpenter ant (*Camponotus pennsylvanicus*) and the moisture ant (*Lasius pallitarsis*) in southern Ontario. Black carpenter ants make galleries in dead wood, both naturally occurring and wood associated with human activity (e.g. homes, decks, firewood, etc.). Moisture ants can be found making small mounds of excavated soil in lawns and laneways similar to the more familiar pavement ants.

## MATERIALS AND METHODS

### Site

The study was conducted utilizing natural dead wood and firewood piles (carpenter ants) and on a grass lawn and unpaved laneway (moisture ants). The study area bordered a large mixed deciduous/coniferous woodlot (e.g. maples, poplars, birch, tamarack, white cedar, and white pine are predominant species) with secondary growth under the canopy in a rural area four km south of the southern city limit of Guelph, Ontario. Adjacent to the study area was a cattail marsh (>four hectares) approximately 30 meters from the center of the study area.

### Ant nests

Prior to the start of the test, ant nests were located at the study site. Each nest was marked with a numbered stake and ants were collected from each nest. Ants were frozen and subsequently identified. The test proceeded when 15 nests of each species were located and colony activity was later confirmed. Nests were at least 2 m apart but were typically 3-6 m apart.

**Experimental design**

The test consisted of two trials: one with 15 nests of the ant *Camponotus pennsylvanicus*, the black carpenter ant, and one with 15 nests of the ant *Lasius pallitarsis*, the moisture ant. Each trial consisted of ten treated nests (five per product) and five non-treated control nests. Treatments were assigned randomly. Trials and nests were designated as:

**Trial #1 = Nests C101 - C503**
**Trial #2 = Nests M101 - M503**
C = black carpenter ant
M = moisture ant
First number = rep
Last number = treatment
Treatment 1 = Control
Treatment 2 = Bio Product 2
Treatment 3 = Bio Product 1

**Observations**

The study took place from September 6-16, 2008. Observations were made one day prior to treatment, the day of treatment (before treatment) and one, two, three, and nine days post-treatment. Observations were made once a day. Time of observations was dependent on weather. On hot sunny days, ant activity was very low or non-existent mid-day so observations were made early evening, 1800-1900 h. On overcast cooler days observations were made afternoons, 1200-1600 h to ensure presence of ant activity which could be lower evenings if cool. Presence or forecast of rain also influenced observation times.

An observation consisted of a 2-minute count per nest. The number of ants entering and leaving the nest was counted or estimated and at the end of the 2-minute count, activity was also rated on a scale of 0-5. The rating scale used was as follows:

| | | | |
|---|---|---|---|
| **0 ants** | **= 0** | **21-50** | **= 3** |
| **1-5 ants** | **= 1** | **51-75** | **= 4** |
| **6-20 ants** | **= 2** | **>76** | **= 5** |

Temperature, relative humidity and general weather conditions (wind, cloud cover, precipitation) were monitored at each observation time. At the conclusion of the trials two treated nests (one per product) and one control nest from each trial was excavated. The number of live ants was recorded.

**Treatment**

Treatments took place from 1900-2000 h on September 7, 2008. Both products were poured into graduated hand mister bottles. Bio Product 2 was too viscous to be sprayed so was diluted 50/50 with water, after which spraying was possible. To record the volume applied, the volume was recorded before and after each treatment. The amount applied was relative to the size of the nest. A treatment was determined to be complete when the nest was saturated. The mean amount applied to carpenter ant nests was $28.5 \pm 4.5$ ml and the mean amount applied to moisture ant nests was $25.8 \pm 5.6$ ml.

**Data analysis**

The mean number of ants observed at treated and non-treated nests was compared using analysis of variance and a Duncan's Multiple Range Test. Differences in the mean ant activity rating was determined non-parametrically using the Kruskal-Wallis analysis of variance and the Mann-Witney-Wilcoxon comparison of means. Both trials were analysed separately for each day of observation and pre-treatment and post-treatment days combined. The analyses were completed using Statistical Analysis Systems version 6.12 (SAS Institute Inc., Cary, NC).

**RESULTS**

Pre-treatment counts demonstrated that all nests (compared within species) had similar levels of activity and were not statistically different. Post-treatment, Bio Product 1 and Bio Product 2 provided 100% control of carpenter ants (Tables 1 and 2). On Day 1 (one day post-treatment) numerous dead carpenter ants were observed in treated nests. Bio Product 1 and Bio Product 2 provided 99% control of moisture ants for all post-treatment days combined. For both species and products, differences in ant activity between treated and non-treated nests were statistically different post-treatment ($P<0.05$).

The mean temperature during observations was 14.8 $^\circ$C (range = 11.2, 19.2) and the mean

relative humidity was 80.3% (range = 65, 93).

At the conclusion of the trials, six nests were dug up (one per treatment per species) and live ants were counted. For carpenter ants, no ants were found in either product-treated nest. Upon examination of a carpenter ant control nest, 53 carpenter ants were counted. For moisture ants, no ants were found in either product-treated nest. Upon examination of a moisture ant control nest, 165 ants were counted.

Table 1. Mean number[1,2] (± one standard deviation) of ants observed in field tests conducted near Guelph, Ontario, 2008, before and after treatment with two HOMS products.

| | Trial 1 - Black Carpenter Ants | | |
|---|---|---|---|
| Day | Control | Bio Product 2 | Bio Product 1 |
| -1 | 22.40 ± 2.91 **a** | 18.60 ± 4.99 **a** | 15.80 ± 4.84 **a** |
| 0 | 31.80 ± 5.18 **a** | 14.60 ± 4.48 **a** | 26.80 ± 7.21 **a** |
| 1 | 36.20 ± 12.28 **a** | 0 **b** | 0 **b** |
| 2 | 31.00 ± 8.93 **a** | 0 **b** | 0 **b** |
| 3 | 31.60 ± 9.56 **a** | 0 **b** | 0 **b** |
| 9 | 22.60 ± 10.60 **a** | 0 **b** | 0 **b** |
| Days pre-treatment | 27.10 ± 3.21 **a** | 16.60 ± 3.23 **a** | 21.30 ± 4.49 **a** |
| Days post-treatment | 30.35 ± 4.91 **a** | 0 **b** | 0 **b** |

[1]Values followed by different letters in the same **row** are significantly different (P<0.05).
[2]Number of repetitions equalled five.

Table 2. Mean activity rating[1,2] (± one standard deviation) of ants observed in field tests conducted near Guelph, Ontario, 2008, before and after treatment with two HOMS products.

| | Trial 1 - Black Carpenter Ants | | |
|---|---|---|---|
| Day | Control | Bio Product 2 | Bio Product 1 |
| -1 | 2.60 ± 0.24 **a** | 2.20 ± 0.20 **a** | 2.40 ± 0.24 **a** |
| 0 | 2.60 ± 0.24 **a** | 1.80 ± 0.49 **a** | 2.40 ± 0.68 **a** |
| 1 | 3.00 ± 0.45 **a** | 0 **b** | 0 **b** |
| 2 | 2.60 ± 0.68 **a** | 0 **b** | 0 **b** |
| 3 | 2.20 ± 0.58 **a** | 0 **b** | 0 **b** |
| 9 | 1.80 ± 0.58 **a** | 0 **b** | 0 **b** |
| Days pre-treatment | 2.60 ± 0.16 **a** | 2.00 ± 0.26 **a** | 2.40 ± 0.34 **a** |
| Days post-treatment | 2.40 ± 0.28 **a** | 0 **b** | 0 **b** |

[1]Values followed by different letters in the same **row** are significantly different (P<0.05).
[2]Number of repetitions equalled five.

Table 3.  Mean number[1,2] (± one standard deviation) of ants observed in field tests conducted near Guelph, Ontario, 2008, before and after treatment with two HOMS products.

| | | Trial 2 - Moisture Ants | |
|---|---|---|---|
| Day | Control | Bio Product 2 | Bio Product 1 |
| -1 | 18.00 ± 5.07 **a** | 10.20 ± 2.18 **a** | 19.80 ± 4.47 **a** |
| 0 | 19.80 ± 6.23 **a** | 17.00 ± 5.83 **a** | 17.40 ± 6.19 **a** |
| 1 | 33.20 ± 10.80 **a** | 0 **b** | 0 **b** |
| 2 | 30.50 ± 9.42 **a** | 0.80 ± 0.80 **b** | 0 **b** |
| 3 | 34.00 ± 16.19 **a** | 0 **b** | 0.20 ± 0.20 **b** |
| 9 | 24.00 ± 2.75 **a** | 0.60 ± 0.60 **b** | 1.20 ± 0.80 **b** |
| Days pre-treatment | 18.90 ± 3.80 **a** | 13.60 ± 3.15 **a** | 18.60 ± 3.62 **a** |
| Days post-treatment | 30.59 ± 5.03 **a** | 0.35 ± 0.24 **b** | 0.35 ± 0.22 **b** |

[1]Values followed by different letters in the same **row** are significantly different (P<0.05).
[2]Number of repetitions equalled five.

Table 4.  Mean activity rating[1,2] (± one standard deviation) of ants observed in field tests conducted near Guelph, Ontario, 2008, before and after treatment with two HOMS products.

| | | Trial 2 - Moisture Ants | |
|---|---|---|---|
| Day | Control | Bio Product 2 | Bio Product 1 |
| -1 | 2.40 ± 0.24 **a** | 1.80 ± 0.20 **a** | 2.60 ± 0.24 **a** |
| 0 | 2.40 ± 0.24 **a** | 2.40 ± 0.24 **a** | 2.40 ± 0.24 **a** |
| 1 | 3.00 ± 0.45 **a** | 0 **b** | 0 **b** |
| 2 | 2.75 ± 0.48 **a** | 0.20 ± 0.20 **b** | 0 **b** |
| 3 | 3.25 ± 0.63 **a** | 0 **b** | 0.20 ± 0.20 **b** |
| 9 | 2.75 ± 0.25 **a** | 0.20 ± 0.20 0 **b** | 0.40 ± 0.24 **b** |
| Days pre-treatment | 2.40 ± 0.16 **a** | 2.10 ± 0.18 **a** | 2.50 ± 0.17 **a** |
| Days post-treatment | 2.94 ± 0.22 **a** | 0.10 ± 0.07 **b** | 0.15 ± 0.08 **b** |

[1]Values followed by different letters in the same **row** are significantly different (P<0.05).
[2]Number of repetitions equalled five.

**CONCLUSIONS**

Two HOMS products, Bio Product 1 and Bio Product 2, provided excellent control of black carpenter ants (*Camponotus pennsylvanicus*) and moisture ants (*Lasius pallitarsis*) in a field test in southern Ontario, Canada.  Both products provided 100% control of carpenter ants throughout the post-treatment observation period.  Both products provided 99% control of moisture ants throughout the post-treatment observation period.  There was no statistical difference in the performance of the two products.