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Control of Broad Mite on English Ivy Cuttings with Dip Treatments

Daniel Gilrein[1], Kevin Dichtl[2], and Lucille Siracusano[2]

[1]Extension Entomologist;.[2]Program Assistant, Long Island Horticultural Research and Extension Center, Riverhead, New York, 11901 U.S.A.

dog1@cornell.edu

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Summary

Research into the control of broad mite [*Polyphagotarsonemus latus*] infesting English ivy (*Hedera helix*) is discussed. In general, mist in propagation as used here appears to be an effective control for broad mite, but in the absence of mist a cutting dip in horticultural oil provides significantly better control of the egg stage and to some extent adults as well compared with other treatments.

INTRODUCTION

Six cutting dip treatments were compared in two greenhouse trials for control of broad mite [*Polyphagotarsonemus latus* (Banks)] infesting English ivy (*Hedera helix*). Treatments included SuffOil-X at two rates (80% mineral oil, BioWorks), M-Pede (49% potassium salts of fatty acids, Gowan), Ultra-Pure Oil (98% mineral oil, BASF), water dip control, and undipped control cuttings. In the first trial, cuttings were maintained in

rooting blocks after treatment under mist until rooting. In the second trial, cuttings were kept after treatment under shade cloth in vases with water without mist until rooting.

MATERIALS AND METHODS

This work was conducted at Cornell University's Long Island Horticultural Research and Extension Center, Riverhead, NY from March 5 to March 25, 2014 in one greenhouse for the duration of the trial. English ivy mother plants in a greenhouse showing signs of broad mite infestation (stunted and distorted foliage, bronzing leaves) (**Fig. 1**) were used in this trial. Infestation was confirmed by examining foliage under magnification for both mites and characteristic eggs.

Figure 1. *Hedera helix* showing leaf distortion and stunting due to broad mite.

Terminal cuttings (~12 in.) with symptoms on newest growth were selected from mother plants on March 5 and randomly assigned to treatments noted above. Ten cuttings were used for each treatment in each trial. Cuttings were dipped (5 sec.) to thoroughly wet on March 5 in insecticide preparations, water, or left undipped, then laid out on a bench until dry. One set of cuttings (10 per treatment) was stuck in rockwool blocks (Grow-Cubes, Grodan B.V.) and randomly arranged on a mist bench until rooted. A second set of cuttings (10 per treatment) were stuck in vases of water and placed under shade cloth but without mist on an adjacent bench. Temperatures were maintained at 65- 75^{o}F under ambient light and humidity (ranging 60-80% RH). Plants in both trials were checked for symptoms of phytotoxicity (yellowing leaves; brown, necrotic spots on leaves; leaf drop) and rated on March 10, then examined under a microscope for broad mite eggs and adults on March 14 (both trials), March 17 (cuttings in vases only), and March 25 (both trials). Live eggs and adults found were tallied. ANOVA and pairwise comparisons of transformed or untransformed treatment means were done using Tukey's HSD test. Treatments and results are shown in Tables 1(Trial 1) and 2 (Trial 2).

RESULTS AND DISCUSSION

In the first trial (mist) (**Table 1**), no adult broad mites were found on cuttings on March 14 or 25 (SuffOil 1% and 2%, Ultra-Pure Oil) or at very low levels (undipped, M-Pede, water dip treatments) and treatments were not significantly different. No broad mite eggs were found on cuttings in this trial on either date.

Table 1. Control of broad mite on English ivy cuttings with dip treatments, plants rooted in Grow Cubes under mist, Riverhead, NY, 2014.

		3/10	3/14		3/25	
Treatment	Rate	Phyto[y]	Egg	Adult	Egg	Adult
SuffOil-X	1%	0.0b[z]	0.0ns	0.0ns	0.0ns	0.0ns
SuffOil-X	2%	0.0b	0.0ns	0.0ns	0.0ns	0.0ns
M-Pede	2%	0.9a	0.0ns	0.1ns	0.0ns	0.0ns
Ultra-Pure Oil	2%	1.2a	0.0ns	0.0ns	0.0ns	0.0ns
No dip	0%	0.0b	0.0ns	0.7ns	0.0ns	0.1ns
Water control	100%	0.0b	0.0ns	0.1ns	0.0ns	0.0ns

[z]Means within a column followed by the same letter are not significantly different at p=0.05 (LS means Tukey's HSD). Data were transformed prior to analysis using log(y+1). [y]Phyto (phytotoxicity) rated on a scale of 0 = no damage to 10 = dead plant.

In the second trial (cuttings in water vases under shade cloth, not under mist) (**Table 2**), mites were found but only at low levels on cuttings in all treatments on March 14 except for those dipped in 2% SuffOil; there were no significant differences among treatments.

Table 2. Control of broad mite on English ivy cuttings with dip treatments, plants rooted in water with no mist, Riverhead, NY, 2014.

		3/10	3/14		3/17		3/25	
Treatment	Rate	Phyto [y]	Egg	Adult	Egg	Adult	Egg	Adult
SuffOil-X	1%	0.0b[z]	1.7c	0.6ns	0.0b	0.0b	0.0b	0.0b
SuffOil-X	2%	0.0b	0.2c	0.0ns	0.0b	0.0b	0.1ab	0.0b
M-Pede	2%	0.0b	5.6ab	1.5ns	0.1b	0.1b	0.7ab	0.6b
Ultra-Pure Oil	2%	1.0a	0.0c	0.0ns	0.0b	0.0b	0.0b	0.1ns
No dip	0%	0.0b	13.8a	2.2ns	3.8a	1.3ab	0.4ab	2.4a
Water control	100%	0.0b	1.8b	1.2ns	3.0a	1.3ab	1.3a	0.7a

[z]Means within a column followed by the same letter are not significantly different at p=0.05 (LS means Tukey's HSD). Data were transformed prior to analysis using log(y+1). [y]Phyto (phytotoxicity) rated on a scale of 0 = no damage to 10 = dead plant.

Mite eggs on that date were high on undipped cuttings and on those dipped in M-Pede, with numbers significantly greater in both cases than observed in other treatments. On March 17, a moderate number of eggs and very low numbers of mites were found on undipped cuttings and on those dipped in water, with few or none in other treatments. By March 25 eggs were at low levels in all treatments with slightly but not significantly more on water-dipped cuttings. Mite numbers were low to extremely low in all dip treatments with significantly more found on undipped cuttings. Slight but significant phytotoxicity was noted in both trials on plants dipped in Ultra-Pure Oil and in the mist trial on cuttings dipped in M-Pede. There was no injury observed in any other treatment. In general, mist in propagation as used here appears to be an effective control for broad mite, but in the absence of mist a cutting dip in horticultural oil provides significantly better control of the egg stage and to some extent adults as well compared with other treatments. However, a water or M-Pede dip also appears to reduce mite levels on cuttings compared with not dipping cuttings for propagation in the absence of mist, so even a vigorous wash may provide some control over no insecticide dip treatment at all.