### J. J. Mauget, Co. Arcadia, California

# Residue Study: Dinotefuran (Dinocide) and Imidacloprid (Imicide) Residues in Male Flower Parts of Apple (*Malus pomi*)

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**Objective**: To determine if residues of microinjected neonicotinoid insecticides

dinotefuran and imidacloprid were present in apple pollen and associated

tissues the year following injection.

Location: Research Farm, Shelburne, Massachusetts

Crop: apple

**Exp. design**: RCB **No. of reps**: 4 **Plot size**: single-tree

No. of applications: one treatment, June 15, 2018

Method of appl: tree injection

Procedure:

**2018:** Treatments were applied to single-tree plots that were replicated four times. Plots consisted of 24-year-old McIntosh trees, approximately 12 feet tall, which were planted on 16 by 24 foot spacings. Treatments were applied on June 15<sup>th</sup>, 2018 according to the rates outlined in Table 1., and trees were injected with capsules provided by J.J.Mauget Co.. Injections were made one-month post-bloom in 2018, to avoid any exposure to pollinators which would be visiting flowers to collect pollen. Trees were injected after foliage had fully expanded to minimize chemical sensitivity in tree tissues.

**2019:** During bloom (May 15<sup>th</sup>) of 2019, the same trees that were injected with dinotefuran and imidacloprid in June of 2018 were sampled for neonicotinoid residues in dehiscent anthers and attached filaments from freshly-opened apple blossoms. Five grams of pollen, anthers, and small pieces of attached filaments were collected and pooled from the four trees injected from each treatment made in 2018 (Appendix 1). Flower tissues were analyzed by LC/MS/MS A-Cu methodologies by Environmental Microanalysis Laboratories, Woodland, CA 95776 (ISO accredited, ELAP certified).

#### Results and Discussion:

Male flower parts (dehiscent anthers, pollen and filaments) were collected during bloom 2019 (May 15<sup>th</sup>), 11 months post-injection. Results are shown in Table 2. No detectable neonicotinoid-insecticide residues were found in the samples, indicating there were no detectable residues present in pollen, anthers and filaments of the apple flowers sampled.

#### Conclusion:

There were no detectable residues of dinotefuran or imidacloprid in male flower parts of apple blossoms sampled 11 months after microinjection.

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**Table 1.** Product name, DBH of treated tree and total active ingredient of product applied.

Treatment #	Replicate	Product	Tree Circumference (in)	Tree DBH (in)	Number of capsules	Total Insecticide - ai Applied (mg)
1	1	UTC	30.0	9.5	0	NA
	2		28.0	8.9	0	NA
	3		27.5	8.8	0	NA
	4		28.0	8.9	0	NA
2	1	Imicide <sup>1</sup>	24.0	7.6	4	1771.2
	2		27.0	8.6	4	1771.2
	3		23.0	7.3	3	1328.4
	4		24.5	7.8	4	1328.4
3	1	Dinocide <sup>2</sup>	26.0	8.2	4	2064.0
	2		22.0	7.0	3	1548.0
	3		26.0	8.2	4	2064.0
	4		21.0	6.7	3	1548.0

- 1. !0% imidacloprid in 4 ml capsules
- 2. 12% dinotefuran in 4 ml capsules

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Table 2: Residues of dinotefuran and imidacloprid in male flower parts of apple, trees injected June 15, 2018 and sampled for residues during bloom on May 15, 2019.

Treatment #	Product	PPM residues in male flower tissues	Limits of Detection-PPM	
1	UTC	ND <sup>3</sup>	0.020	
2	lmicide <sup>1</sup>	ND	0.020	
3	Dinocide <sup>2</sup>	ND	0.020	

<sup>1. 10%</sup> imidacloprid in 4 ml capsules

<sup>2. 12%</sup> dinotefuran in 4 ml capsules

<sup>3.</sup> ND=no detectable residues at 0.020 ppm limits of detection

Appendix 1.

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Dr. Rafael Vega collecting male flower parts for analysis, May 2019.