e-GRO Alert



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Swish-Swish: Dipping Unrooted Vegetative Cuttings to Reduce Incoming Pest Populations

Dipping unrooted vegetative cuttings in biopesticides has been shown to be effective at reducing whitefly, thrips, and spider mite populations.

Photo 1. Dr. Sarah Jandricic creating dip solution with BotaniGard 22WP. Photo: Heidi Lindberg.

One of the best ways to start off a new year in the greenhouse is to clean and sanitize benches, floors, and equipment. However, these efforts can feel futile when pest insects hitch a ride on unrooted cuttings and rooted liners. We know from prior research that any plant material entering the greenhouse is likely to have a small number of pests. These pests are difficult to detect and often possess some level of pesticide resistance. What if there were a way to suffocate any pest insects on the plant material coming into the greenhouse to have a better start?

Canadian scientists began investigating dipping unrooted vegetative cuttings a dozen years ago (Photo 1). The technique was refined about 5 years ago with a series of trials performed by Dr. Rose Buitenhuis

(Vineland Research & Innovation Centre) and 73% of Ontario growers began dipping their incoming cuttings in 2022. This technique is gaining traction with Michigan greenhouse growers. So, what's it all about?

Efficacy and Phytotoxicity Screening

Dipping cuttings in reduced-risk products (e.g., soaps, oils, microbials) is effective at reducing thrips, whitefly, and spider mite populations in spring greenhouse crops. In a study looking at chrysanthemum cuttings, 84% contained one to two thrips per batch of 20 cuttings. Pests reproduce quickly in the greenhouse, so reducing their numbers early in the season prevents higher populations later in the season. Dipping cuttings in different rates of biopesticides reduced initial pest numbers by 70 to 80%. In Canada, the following products are labeled as cutting dips: landscape oil, SuffOil-X, BotaniGard 22 WP, and Kopa soap. Note that recommended dip solution rates are lower than spray rates and can vary with both the product and the sensitivity of the plant species to prevent phytotoxicity (Table 1).

PEST	DIP PRODUCT(S) AND RATE
Bemisia whitefly	0.5% Kopa + 1.25 g/L BotaniGard 22WP (combination treatment) 0.1% SuffOil-X
Western flower thrips	0.1% to 0.5% Landscape oil* 0.1% to 0.5% SuffOil-X* 2.5 g/L BotaniGard 22WP
Two-spotted spider mite	0.1% to 0.5% Landscape oil* 0.1% to 0.5% SuffOil-X*

Table 1. Best performing dips for controlling pests on unrooted cuttings. *Rate depends on sensitivity of the crop. Chart courtesy of R. Buitenhuis (Vineland Research and Innovation Centre).

If you are going to integrate a dip program into your workflow for the coming season, you will want to test for phytotoxicity on a small number of cuttings from each species prior to implementing it on a larger scale. Some species are considered more sensitive (Osteospermum, mini rose, and petunia) while others are hardier (Mandevilla, Chrysanthemum, and ivy geranium). Buitenhuis et al. developed a summary efficacy chart that outlines the efficacy of different rates of products on whitefly, thrips, or spider mites with notes on phytotoxicity on various crops (Table 2). Oils were the most successful against pests but were more likely to cause some phytotoxicity.

Dip efficacy and phytotoxicity

	Hardy crops (mandevilla, chrysanthemum, ivy geranium)			Sensitive crops (poinsettia, osteospermum, mini rose, petunia)		
	Bemisia	**Thrips**	**TSSM**	**Bemisia**	**Thrips**	**TSSM**
Kopa 0.5% + BotaniGard 22WP 1.25 g/L	70%	?		70%	?	
Kopa 1-2%	85%	No effect	Some effect (not eggs)	⚠	⚠	⚠
BotaniGard 22WP 1.25 g/L	50%			50%		
BotaniGard 22WP 2.5 g/L *Only in greenhouse trials		High efficacy*	No effect		High efficacy*	No effect
Nemasys 2.5 M IJ/L	No effect	Some effect		No effect	Some effect	
SuffOil-X 0.1%	70%	75%	>95%	70%	75%	>95%
SuffOil-X 0.5%	?	75%	>95%	⚠	⚠	⚠
Landscape Oil 0.1%		80%	>95%		80%	>95%
Landscape Oil 0.5%		85%	>95%		⚠	⚠

Table 2. Efficacy of various reduced-risk products when used as cutting dips against various pests. Green boxes indicate high efficacy of treatments against specified pests. Caution symbols containing plants indicate a significant risk of phytotoxicity. Chart courtesy of R. Buitenhuis (Vineland Research and Innovation Centre).

How to Dip Cuttings

Growers can mix the solution of oils, soaps, or microbial pesticides in large plastic totes. Cuttings are placed in anything that can function as a strainer, submerged into the dipping solution, gently agitated for 5-10 seconds, and then removed from the solution. Many growers use mesh carrier trays (a.k.a. "daisy trays") as a strainer, but almost anything can be used as long as it can withstand the process and allows liquid to drain (Photos 2 & 3). Be sure that all surfaces of the cuttings are wet after dipping and be careful to not squeeze or crush cuttings in the process. Many growers let them drip dry and then continue to stick them into the growing media. Check out this video from the Vineland Research and Innovation Centre on how to perform cutting dips.

Effective cutting dips - Vineland Research and Innovation Centre

Photo 2. Cuttings can be dipped into solutions of reduced-risk products by using carrier (daisy) trays. Screenshot of Video Produced by Vineland Research and Innovation Centre.

Photo 3. Re-purposed deep fry baskets used for dipping cuttings in biopesticides. Photo: MSU Extension

In the United States, there are several different products labeled for cutting dips, including: Botanigard 22WP, EpiShield, Hexygon IQ, LalGuard M52, M-Pede, and TetraCURB MAX (Table 3). Always read the label, wear appropriate personal protective equipment, and perform in-house trials on small numbers of unrooted cuttings.

	Active Ingredient	Re-entry Interval (REI)
BotaniGard 22WP	Beauveria bassiana strain GHA	4
EpiShield	Peppermint Oil, Clove Oil, Sodium Lauryl Sulfate	0
Hexygon IQ	Hexythiazox	12
LalGuard M52 OD	Metarhizum brunneum strain F52	4
M-Pede	Potassium salts of fatty acids	12
TetraCURB MAX	Castor Oil, Rosemary Oil, Clove Oil, Peppermint Oil	0

Table 3. Some products labeled for cutting dips in the U.S. and their re-entry intervals.

Dipping cuttings in biopesticides to reduce pest numbers should also be evaluated for both risk vs. efficacy. For example, some plant species are famously sensitive to certain horticultural products and may not be good candidates for dipping in biopesticides. As a grower, you are already considering best management practices for unrooted cuttings with respect to temperature and applying rooting hormones or adjuvants. If the prospect of adding an additional step to your process is overwhelming or confusing, consider using cutting dips on only the most problematic species. Mandevilla and Dipladenia, I'm looking at you! Reducing incoming pests on your most pest-heavy species will still have a beneficial impact to your integrated pest management program.

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