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ENY-750

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A Dresser Drawer Method of Managing Insect and Mite Resistance in Ornamentals[1]

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Insect and mite resistance to pesticides long has been a problem in ornamentals production. Basic understanding of pesticides' modes of action (MOA) and handy access to MOA information create an opportunity for growers to preserve the useful pesticides now available. This article describes a dresser drawer method to develop pesticide rotation plans that can extend the useful lives of pesticides.

The main objectives of resistance management programs should be to minimize the number of exposures of pests to pesticides with a similar mode of action. Repeated exposures to a pesticide are the primary drivers of resistance but much can be done to manage pests by means other than chemicals. Care can be taken to rotate crops, establish new ones only after the older crops have been removed, use pest-resistant species and varieties, set pest-free transplants, conserve and release natural enemies, etc.

Sound rotation plans often recommend pesticides of one MOA for one pest generation and a pesticide of a different MOA for another generation. If multiple pesticide applications are required, rotations should continue through all practical MOA before returning to a previously used one.

The use of certain unique products with known general MOA (such as soaps and oils) is unlikely to result in pest resistance and no codes are assigned. These can be used without regard to a rotation plan for resistance management.

In developing a dresser drawer rotational plan for pesticides, applicators should:

1. Gather all pesticides practical for controlling the insect or mite of interest

2. Provide a large dresser of drawers each marked with a MOA to be used. (Similar, alternative storage systems can serve.)

3. Use the MOA Website for ornamentals production in Florida (http://edis.ifas.ufl.edu/IN715)) to identify and mark the numeric MOA on each pesticide container and place the containers into their corresponding MOA drawers. Drawer No. 3 (for MOA 3 products: Sodium channel modulators) for instance may hold containers of Talstar®, Decathlon®, Tame®, and Scimitar®, drawer No. 4 (for MOA 4: Nicotinic acetylcholine receptor agonists/antagonists) may hold containers of Tristar®, Celero®, Safari®,

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Marathon®, and Flagship®, and drawer No. 16 (for MOA 16: Inhibitors of chitin biosynthesis, Type 1, Homopteran) may hold only a container of Talus®.

4. At treatment, applicators should select and apply the first pesticide then return it to its drawer. Applicators can return to that drawer and select the first pesticide again or may select another pesticide from that drawer only during the period of one generation of the target pest.

5. After one generation of the target pest, the applicators must select from another drawer for as long as one generation, then must select from yet another drawer for as long as one generation, and so on. As an example, after applicators have used Talstar® (MOA 3) for one generation, they cannot use Tame® (MOA 3) regardless of their enthusiasm for the product until later in the rotation.

6. Only after all practical MOA have been used can the applicator return to a pesticide in the first drawer.

7. On subsequent rounds through the dresser, as applicators return to a drawer, they have the choice of applying the previously used pesticide or another from that drawer. As far as resistance management is concerned, it does not matter which product is chosen from a drawer...just so long as the applicator changes to products from another drawer after one generation.

The pesticide label is the law, must be followed, and doing so may place additional restrictions on how an applicator proceeds through the dresser. Periods of insect and mite life cycles vary especially by species and temperature. Table 1 presents approximate life cycles for some pests common in Florida ornamentals production.

If insecticide/miticide applicators follow rigid plans of insect resistance management that include minimizing pesticide use and rotating among drawers of pesticide MOA then the useful lives of pesticides can be extended to benefit ornamentals pest management.

Table 1. Approximate periods (in weeks) for one generation of common insects or mites to develop under warm and cool Florida production temperatures.

Insect/Mite Group	Production Temperatures	
	Warmer	Cooler
Aphids	1	2
Spider Mites	1	2
Thrips	1	2
Liriomyza spp. Leafminers	3	4
Whiteflies	3	4
Morhs/caterpillars	4	6
Chinch Bugs	5	8