Pesticide Rainfastness Characteristics

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Pesticide wash-off from precipitation is a major factor for the loss of insecticide residual activity on fruit crop pests, and can result in the need for additional sprays to maintain crop protection. Michigan's spring production season regularly receives 10-15 inches of rainfall, precipitation patterns varying in their intensity, duration, and total amount of rain per event. Rainfall simulation studies conducted at the MSU Trevor Nichols Research Center aim to predict the amount of pesticides that are lost under precipitation events, and the resulting impact on pest control. Based on the results from these studies the following charts have been developed to serve as a guide for general rainfastness characteristics and re-application recommendations for certain insect pests. Note that these recommendations should not supersede farm-level knowledge based on site-specific pest scouting, but rather are meant to compliment a comprehensive pest management decision-making process.

Rainfastness rating chart: general characteristics for insecticide chemical classes.

Insecticide class	Rainfastness ≤ 0.5 inch Fruit	Leaves	Rainfastness ≤ 1.0 inch Fruit	Leaves	Rainfastness ≤ 2.0 inches Fruit	Leaves
Organophosphates	L	M	L	M	L	L
Pyrethroids	M/H	M/H	M	M	L	L
Carbamates	M	M/H	M	M	L	L
IGRs	M	M/H	M	M	L	L
Neonicotinoids	M,S	H,S	L,S	L,S	L,S	L,S
Spinosyns	H	H	H	M	M	L
Diamides	H	H	H	M	M	L
Avermectins	M,S	H,S	L,S	M,S	L	L

* H – highly rainfast (≤ 30% residue wash-off), M – moderately rainfast (≤ 50% residue wash-off), L – low rainfast (≤ 70% residue wash-off), S – systemic residues remain within plant tissue.

Apple insecticide precipitation wash-off reapplication decision chart: expected codling moth control in apples, based on each compound's inherent toxicity to CM larvae, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch *1 day	*7 days	Rainfall = 1.0 inch *1 day	*7 days	Rainfall = 2.0 inches *1 day	*7 days
Imidan		X		X	X	X
Asana		X	X	X	X	X
Assail			X	X	X	X
Proclaim		X		X	X	X
Rimon			X	X	X	X
Delegate					X	X
Altacor					X	X
Belt					X	X

* Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus an immediate re-application is recommended.

An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

Pesticide Rainfastness Characteristics (continued)

Grape insecticide precipitation wash-off reapplication decision chart: expected Japanese beetle control in grapes, based on each compound's inherent toxicity to JB adults, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch *1 day	*7 days	Rainfall = 1.0 inch *1 day	*7 days	Rainfall = 2.0 inches *1 day	*7 days
Imidan		X	X	X	X	X
Sevin			X	X	X	X
Brigade		X		X	X	X
Actara		X		X	X	X
Avaunt		X		X	X	X

Blueberry insecticide precipitation wash-off reapplication decision chart: expected cranberry fruitworm control in blueberries, based on each compound's inherent toxicity to CBFW larvae, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch *1 day	*7 days	Rainfall = 1.0 inch *1 day	*7 days	Rainfall = 2.0 inches *1 day	*7 days
Asana		X	X	X	X	X
Intrepid		X	X	X	X	X
Assail		X		X	X	X
Delegate		X		X	X	X

Blueberry insecticide precipitation wash-off reapplication decision chart: expected Japanese beetle control in blueberries, based on each compound's inherent toxicity to JB adults, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch *1 day	*7 days	Rainfall = 1.0 inch *1 day	*7 days	Rainfall = 2.0 inches *1 day	*7 days
Imidan	X	X	X	X	X	X
Provado		X		X	X	X
Mustang Max		X	X	X	X	X
Sevin		X	X	X	X	X

Blueberry insecticide precipitation wash-off reapplication decision chart: expected spotted wing Drosophila control in blueberries, based on each compound's inherent toxicity to SWD, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch *1 day	*7 days	Rainfall = 1.0 inch *1 day	*7 days	Rainfall = 2.0 inches *1 day	*7 days
Imidan		X		X	X	X
Mustang Max		X		X	X	X
Lannate		X		X	X	X
Malathion	X	X	X	X	X	X
Delegate	X	X	X	X	X	X
Assail	X	X	X	X	X	X

* Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus an immediate re-application is recommended.

An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.