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Japanese beetles and the longevity of carbaryl (Sevin) after rainfall

A number of reports from around the surrounding states are saying this could be the year when Japanese beetle populations peak. Many of the urban landscapes in Missouri are under a lot of pressure from Japanese beetles. The Japanese beetles are not just attacking trees and shrubs. The beetles have started to migrate into surrounding field crops such as sweet corn. What does this all mean for grape growers?



Japanese beetle populations likely are going to continue to rise until mid-July or later. Adult Japanese beetle emergence certainly has been helped along by consistent thunderstorms that have kept soil moisture conditions high. Adult beetle emergence increases with moist soil conditions.

Rainfall events that produce large amounts of rain can decrease insecticide residues. A simulated 1-inch rainfall removed 63% of the carbaryl (Sevin) applied as a wettable powder from cotton plants 2 h after application (Willis et al. 1988). A similar study conducted on soybeans produced similar results. A 1-inch rainfall removed 67% of carbaryl applied as Sevin XLS Plus. The authors conclude that rainfall amount has greater impact on washoff of carbaryl than the intensity of rainfall (Willis et al 1996).

I bring this to your attention, because of a few inquiries I have received saying that Sevin is no longer controlling Japanese beetles. Pesticides can degrade in the environment as a result of temperature, UV light, plant metabolism, and microorganisms. Rainfall also plays an important role in removing pesticides from plants. Carbaryl applied to grapevines is pretty rainfast and provides good protection when rainfall is 0.5 inch or less (Hulbert et al. 2011). If rainfall is 1-inch or greater there is insufficient carbaryl residues to protect leaf tissue. Besides losing carbaryl to rainfall, temperature can also play a role in carbaryl stability. Carbaryl becomes unstable at higher temperatures and has a short half life during the warmest months. Typically July and August are the hottest months in Missouri.

Refer to [Grape insecticide precipitation wash-off reapplication decision chart – Japanese beetles](#). This chart was developed by Michigan State University from research that evaluated five different insecticides from five insecticide classes (Organophosphate, Carbamate, Pyrethroid, Neonicotinoid, and Oxadazine).

Take Home

Sevin will protect your vines from Japanese beetles if 0.5 inches of rain or less has fallen. If 1-inch of rain or more has fallen, there are insufficient Sevin residues to protect against Japanese beetles. If large rainfall events are forecast consider



using other insecticides that provide sufficient residues for protection or reapply Sevin.

Lastly, always direct applications of Sevin into the top of the grapevine canopy where Japanese beetles are mainly feeding. Directing your spray application to the upper canopy limits Sevin residues on your berries.

References

Hulbert, D., R. Isaacs, C. Vandervoort, and J. C. Wise. 2011. Rainfastness and residual activity of insecticides to control Japanese beetle (Coleoptera: Scarabaeidae) in grapes. *J Econ. Entomol.* 104:1656-1664.

Willis, G.H., S. Smith, L.L. McDowell, and L.M. Southwick. 1996. Carbaryl washoff from soybean plants. *Archives of Environmental Contamination and Toxicology.* 31:239-243.

Willis, G.H., L.L. McDowell, s. Smith, and L.M. Southwick. 1988. Rainfall amount and intensity effects on carbaryl washoff from cotton plants. *Transactions of ASAE.* 31:86-90.

Cumulative Growing Degree Days for the Seven Grape Growing Regions of Missouri from April 1 to July 11, 2016.

Region	Location by County	Growing Degree Days ¹		
		2016	2015	30 Year Average
Augusta	St. Charles	1736	1740	1683
Hermann	Gasconade	1646	1658	1608
Ozark Highland	Phelps	1815	1832	1725
Ozark Mountain	Lawrence	1785	1775	1688
Southeast	Ste. Genevieve	1749	1827	1722
Central	Boone	1707	1647	1641
Western	Ray	1618	1592	1595

¹Growing degree days at base 50 from April 1 to July 11, 2016. Data compiled from Useful and Useable at <https://mygeohub.org/groups/u2u/tools>. Click on link below to determine growing degree days in your area.

To determine the number of growing degree days accumulated in your area since April 1, click this link [Search for GDD at your location using this tool](#).

Please scout your vineyards on a regularly scheduled basis in an effort to manage problem pests. This report contains information on scouting reports from specific locations and may not reflect pest problems in your vineyard. If you would like more information on IPM in grapes, please contact Dean Volenberg at 573-882-0476 or volenbergd@missouri.edu