MDARD Horticulture Fund Project Title: Reducing Pesticide Loss in Nursery Runoff through Optimized Irrigation
2020 Progress Report

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The objective of this project was to investigate the movement of pesticides in a model nursery in response to irrigation treatment. The experimental nursery located at the MSU HTRC is comprised of 16 independently controlled raised beds, each measuring 25 x 25 x 2 feet (LxWxH). The soil sub-base of each bed was graded to a swale to funnel water to a low point and covered with an impermeable pond liner. Over the top of the pond liner is 1 foot of 2NS screened sand, similarly graded as the soil sub-base, and covered with nursery fabric. Collection tanks were installed at the respective low-points of the nursery surface and the buried pondliner to collect surface runoff and the water infiltrating through the sand layer, respectively. A total of 81 plants were grown on each bed, comprised of four taxa. Three irrigation treatments were compared: a control of overhead irrigation applying ¾" daily, overhead irrigation applying ½" daily, overhead irrigation applying ½" on the first day before applying ¼" on the second and third day before repeating the cycle, spray stakes applying three five minute cycles (0.75 gallons per plant total) separated by five minutes, and finally spray stakes applying irrigation in 2 minute cycles separated by five minutes for a total of 10 minutes of irrigation (0.5 gallons per plant total). Two rounds of pesticide applications occurred during the 2019 growing season, July 30th and August 19th. The volume of irrigation water applied and the volume of water lost to surface runoff and soil infiltration was recorded, with water samples collected for pesticide analysis 1,2,4,8, and 16 days after each application. To date all samples have been collected and analyzed. The volume of water applied, lost to runoff, and lost to infiltration for the two rounds

is presented in the table below. Presentation of results has been made at the MNLA GLTE in 2020. Further statistical analysis is being conducted to prepare results for publication in refereed journals.

Irrigation Treatment	Round 1			
	Total Irrigation Applied (Gallons)	Average Runoff (Gallons)	Average Infiltration (Gallons)	Total Lost (Gallons
3/4" Overhead	2151	76	6	82
1/2" Overhead	1642	40	9	49
1/2"-1/4"-1/4" Overhead	1360	20	11	31
Spray Stakes 0.75 gallons per plant	767	5	8	13
Spray Stakes 0.5 gallons per plant	704	2	6	8
	Round 2			
	Total Irrigation Applied (Gallons)	Average Runoff (Gallons)	Average Infiltration (Gallons)	
3/4" Overhead	2365	79	9	88
1/2" Overhead	1621	54	13	67
1/2"-1/4"-1/4" Overhead	1006	9	18	27
Spray Stakes 0.75 gallons per plant	811	15	10	25
Spray Stakes 0.5 gallons per plant	600	13	6	19

Image: One of the 16 raised beds, with surface runoff tank on the left and infiltration water tank on the right