

Mist-cooling Delays Bloom in Apple, 2013 – 2017

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Summary: Solid set canopy delivery systems were used to delay bloom in apple by mist-cooling trees at four locations in Michigan (Charlotte, Sparta, St. Joseph, and Williamston). Misting was computer-controlled based on air temperature and relative humidity to minimize water use and maximize evaporative cooling. Misting delayed bloom by an average of 7 days across all sites and years. Bloom delay was maximized by beginning mist-cooling prior to budbreak, but misting was effective even when started as late as ½” green.



Fig. 1. Bloom is delayed by 8 days in misted flowers (left), compared to untreated control (right). Red Delicious, St. Joseph, MI, 2013.



Fig. 2. Misting system in operation. Michigan, 2013.

Table 1. Date, degree days, and development stage when misting systems were turned on and off in apple orchards. Michigan, 2017.

Location	Date		GDD*		Stage		
	On	Off	On	Off	On	Off	
						Control	Misted
Charlotte	3/27	4/24	60	307	dormant	full pink	early pink
Sparta	4/12	5/3	172	363	1/4" green	king bloom	early pink
St. Joseph	4/10	4/22	195	365	1/2" green	king bloom	pink
Williamston	4/12	4/27	184	434	1/4" green	bloom	early pink

*Growing degree days (Baskerville-Emin, base 42F) are calculated from data at nearby Enviroweather sites.

Table 2. Days of bloom delay from mist cooling, number of hours mist was applied, and total volume of water applied in apple orchards. Michigan, 2013 – 2017.

Location	Cultivar	Bloom delay (days)				Mist duration (hrs)				Mist volume (acre-inch)		
		2013	2014	2015	2017	2013	2014	2015	2017	2013	2014	2015
Charlotte	Honeycrisp	6	6	6	7 - 10	56	62	43	53	8.2	14.9	7.4
St. Joseph	Gala	8	8	7	3 - 4	59	61	56	30	13.8	14.6	9.7
	Red Delicious	7	9	8	3 - 5	59	61	56	30	13.8	14.6	9.7
	Honeycrisp	8	8	8	3 - 5	59	61	56	30	13.8	14.6	9.7
Sparta	Honeycrisp				6				44			
Williamston	Honeycrisp				7				40			

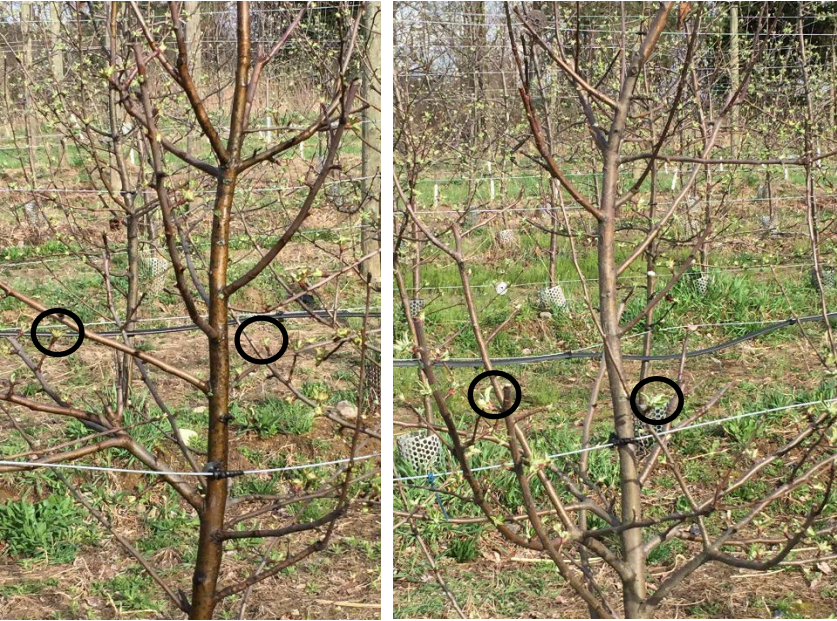


Fig. 3. Differences in growth and development are apparent in new growth (circled) after just 4 days of misting, beginning at half inch green. Williamston, MI, April 18, 2017.

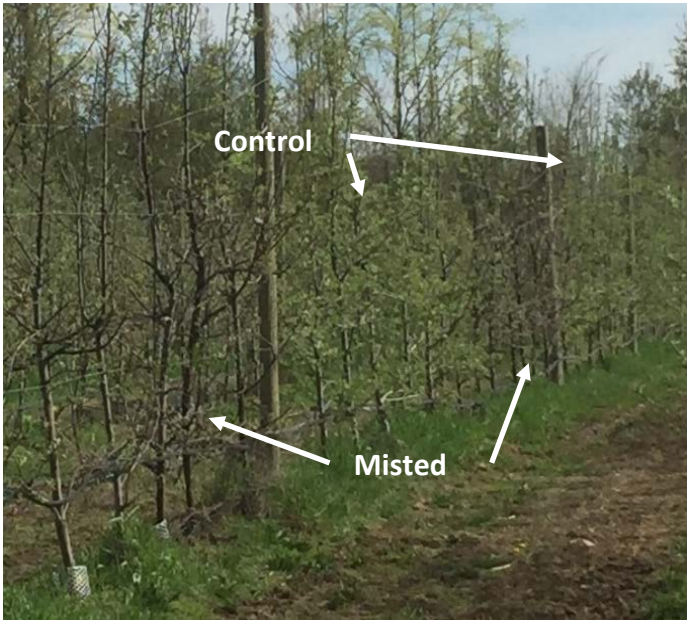


Fig. 4. Delay of growth and development in misted trees after 12 days of misting. Williamston, MI, 2017.