WTFRC CHERRY PESTICIDE RESIDUE STUDIES 2012-2017

In six years of field trials, the Washington Tree Fruit Research Commission has evaluated the harvest residues of numerous insecticides, acaricides, and fungicides commonly used in commercial cherry production in the Pacific Northwest. In an effort to provide a broad summary of all measured residues, the table below summarizes all results regardless of application rates and timings or supplemental treatments such as hydrocooling or application of commercial rain protectants; values in **bold red font** highlight those residue levels which **exceed current maximum residue levels** (MRLs) in some key export markets. For specific results, please review annual reports of these studies, as well as two related projects conducted on California cherries in 2011, at www.treefruitresearch.com. For more information on MRLs or other regulatory issues, please consult the Northwest Horticultural Council at www.nwhort.org.

STUDY DETAILS

- All trials conducted on mature 'Bing'/Mazzard multiple leader open vase trees on 10' x 20' spacing near Orondo, WA
- All applications made with 2 x 25 gal Rears Pak-Blast sprayer calibrated to 400 gal / acre, except for malathion (Fyfanon ULV AG), which was applied by helicopter as formulated (no water added)
- All pesticides except malathion (Fyfanon ULV AG) applied with 8 oz Regulaid / 100 gal water / acre
- Pesticides were typically applied at the maximum concentration and minimum preharvest interval as allowed by their respective labels
- Additional treatments in some years included: application of rain protectants (RainGard or Parka) and postharvest fruit rinsing in a commercial hydrocooler with a 120 second cycle, application in dilute (400 gal water/acre) vs. concentrated (200 gal water/acre) sprays

MAJOR FINDINGS

- Residues measured for all treatments in all years complied with domestic tolerances set by US EPA
- Most findings in which residues exceeded foreign MRLs occurred in markets which set their tolerances at the limit of quantitation (LOQ), the smallest amount which standard laboratory instruments can accurately measure
- Residues of some pesticides were decreased on fruit which received hydrocooling, but results were too inconsistent and unpredictable to consider it a reliable method for reducing residue levels
- Application of both rain protectants RainGard and Parka consistently increased the persistence of pesticide residues, particularly in the case of chemicals applied shortly before harvest
- Preliminary results indicate dilute sprays (400 gal water/acre) leave slightly higher residues than same amount of pesticide/acre applied in 200 gal water/acre; results need to be corroborated by further study
- While ground application of emulsifiable concentrate formulations of malathion are known to leave residues on cherries, none were detected on fruit in these studies sprayed by helicopter with an ultra-low volume formulation of malathion the day before harvest
- Use of potash/phosphite fertilizers produce residues which exceed the European Union MRL for fosetyl-Al (Aliette fungicide)

Minimum, maximum, and median residues vs. MRLs of pesticides applied to 'Bing'/Mazzard cherries near Orondo, WA. WTFRC 2012-2017.

Chemical name	Trade name	# of years evaluated	# of samples analyzed	Minimum residue	Maximum residue	Median residue	US MRL[1]	Lowest export MRL[1]
				ppm	*ppm*	*ppm*	*ppm*	*ppm*
Abamectin	Agri-Mek 0.15EC	5	24	<0.01	**0.018**	<0.01	0.09	0.01 (EU/UK)
Acetamiprid	Assail 70WP	5	24	0.083	**0.93**	**0.3**	1.2	0.2 (KOR)
Azoxystrobin	Abound	5	26	0.021	0.87	0.23	2	1 (TAI)
Beta-cyfluthrin	Baythroid XL	5	24	<0.01	0.35	<0.01	0.3	0.01 (TAI)
Bifenazate	Acramite 50WS	4	22	<0.01	0.27	0.0155	2.5	0.3 (KOR)
Boscalid	Pristine	4	20	0.072	1.1	0.37	3.5	1.7 (CAN, TAI)
Buprofezin	Centaur	4	18	<0.01	**1.2**	**0.44**	1.9	0.2 (AUS)
Carbaryl	Carbaryl 4L	6	28	<0.01	**10**	**1.25**	10	0.01 (EU/UK)
Cyantraniliprole	Exirel	3	12	0.1	0.54	0.2	6	6 (many)
Diazinon	Diazinon 50W	4	22	<0.01	<0.01	<0.01	0.2	0.01 (EU/UK)
Etoxazole	Zeal	4	22	<0.01	0.16	0.0335	1	0.2 (KOR)
Fenpropathrin	Danitol 2.4EC	6	28	**0.14**	**2.8**	**0.455**	5	0.01 (EU/UK)
Flubendiamide	Belt SC	5	26	0.039	0.81	0.071	1.6	1 (TAI)
Fluopyram	Luna Sensation	3	18	0.021	0.25	0.0745	2	0.6 (KOR)
Flutriafol	TopGuard	5	24	**0.087**	**0.5**	**0.16**	1.5	0.01 (JAP)
Fluxapyroxad	Merivon	3	12	0.23	0.59	0.285	3	2 (TAI)
Hexythiazox	Onager	2	6	**0.18**	**0.45**	**0.235**	1	0.1 (KOR)
Imidacloprid	Nuprid 2SC	5	26	0.027	0.26	0.125	3	0.5 (many)
Lambda-cyhalothrin	Warrior II	4	22	<0.01	0.091	<0.01	0.5	0.3 (many)
Malathion	Fyfanon ULV AG	2	10	<0.01	0.01	<0.01	8	0.02 (EU/UK)
Metconazole	Quash	4	22	0.011	0.083	0.028	0.2	0.2 (many)
Metrafenone	Vivando	3	12	<0.01	<0.01	<0.01	2	0.01 (EU)
Penthiopyrad	Fontelis	3	18	0.046	**0.22**	0.11	4	0.2 (KOR)
Permethrin	Perm-Up 3.2EC	5	24	<0.01	**1.2**	**0.2**	4	0.05 (EU/UK)
Potash/phosphite fertilizer*	33% phosphite fertilizer	2	6	7.6	31	9.45	na	2* (EU/UK)
Propiconazole	Orbit	6	28	<0.01	**0.53**	**0.19**	4	0.01 (EU/UK)
Pyraclostrobin	Pristine	6	28	0.023	0.79	0.3	2.5	1 (HKG, TAI)
Quinoxyfen	Quintec	5	26	0.013	0.16	0.037	0.7	0.3 (EU/UK)
Spinetoram	Delegate WG	5	24	<0.01	0.16	0.013	0.3	0.2 (many)
Spinosad	Entrust	6	28	0.013	0.17	0.056	0.2	0.2 (many)
Spirodiclofen	Envidor 2SC	3	18	<0.01	0.13	0.0515	1	0.8 (TAI)
Spirotetramat	Ultor	2	6	<0.01	0.041	<0.01	4.5	3 (many)
Thiophanate-methyl**	Topsin 4.5FL	5	24	<0.01	**0.98**	**0.6785**	20	0.3 (EU/UK)
Tolfenpyrad	Bexar	2	6	0.18	**0.97**	**0.24**	2	0.01 (KOR, TAI)
Trifloxystobin	Luna Sensation	4	22	<0.01	0.55	0.027	2	2 (CAN, KOR)
Triflumizole	Procure 480SC	6	28	0.054	0.47	0.24	1.5	1 (TAI)
Zeta-cypermethrin	Mustang MAX	6	28	<0.01	**0.34**	0.09	1	0.1 (CAN)

[1] Top markets for Pacific Northwest cherries; 1 March 2018; tolerances may be based on published MRLs or default values. http://nwhort.org/CherryMRLs.html , http://www.globalmrl.com

* EU tolerance for fosetyl-Al defined as sum total of residue levels of fosetyl-Al, phosphonic acid and all of its salts (including phosphite)

** Thiophanate-methyl values reported are sum totals of thiophanate-methyl and carbendazim residues

Results of these unreplicated trials are shared for informational purposes only and should not be construed as endorsements of any product, reflections of their efficacy against any insect, acarid, or fungal pest, or a guarantee of similar results regarding residues for any user. Cherry growers should consult with their university extension staff, crop advisors, and warehouses to develop responsible pest control programs.