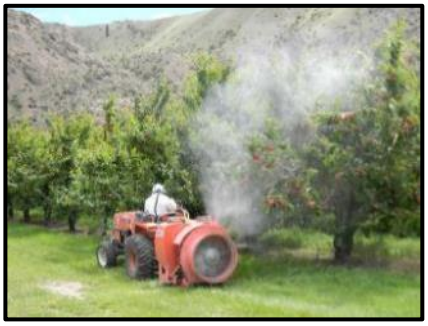
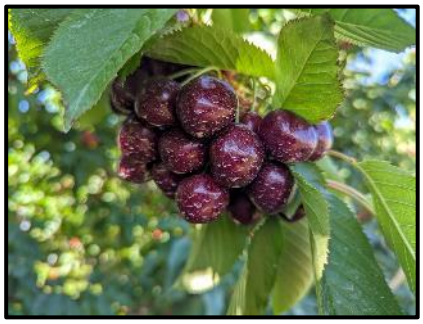
WTFRC CHERRY PESTICIDE RESIDUE STUDIES 2012-2023



Since 2012, the Washington Tree Fruit Research Commission has conducted annual field studies to evaluate the harvest residues of numerous insecticides, acaricides, and fungicides commonly used in commercial cherry production in the Pacific Northwest. In order to provide a broad summary of all measured residues, this report 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 results from specific years, please review annual reports of these studies, as well related projects conducted on California cherries in 2011, at www.treefruitresearch.org. 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 multiple leader open vase trees on 10' x 20' spacing near Orondo, WA; 2012-2020 trials were conducted on 'Bing'/Mazzard and 2021-2023 trials on 'Skeena'/Mazzard
- All applications made with 2 x 25 gal Rears Pak-Blast sprayer calibrated to either 200 or 400 gal water/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), 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
- Residue analyses conducted by Pacific Agricultural Labs (Sherwood, OR)

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 the rain protectants RainGard and Parka consistently increased the persistence of pesticide residues, particularly for chemicals applied shortly before harvest
- Spraying concentrate vs. dilute (200 vs. 400 gal water/acre) had no consistent effect on residue levels
- While ground applications of emulsifiable concentrate formulations of malathion are known to leave higher residues on cherries, only one of eight samples in these studies produced a detectable residue (0.012 ppm) when sprayed by helicopter with an ultra-low volume formulation the day before harvest
- All samples of cherries treated with **Torino, Asana XL, Danitol 2.4EC, Cevya, Miravis, or Bexar** produced residues greater than 0.01 ppm which exceed MRLs currently posted in some key export markets

*****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.***

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Minimum, maximum, and median residues vs. MRLs of pesticides applied to 'Bing'/Mazzard or 'Skeena'/Mazzard cherries near Orondo, WA. WTFRC 2012-2023.

Chemical name	Trade name	# years evaluated	# 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	10	38	0	0.043	0.013	0.09	0.06 (Kor)
acetamiprid	Assail 70WP	8	32	0.083	0.93	0.445	1.5	1 (Twn)
azoxystrobin	Abound	5	26	0.021	0.87	0.23	2	1 (Twn)
beta-cyfluthrin	Baythroid XL	7	32	0	**0.35**	0	0.3	0.01 (Twn, Tha)
bifenazate	Acramite 50WS	4	22	0	0.27	0.0155	2.5	2 (many)
boscalid	Pristine	5	20	0.072	1.1	0.37	3.5	1.7 (Can, Twn)
buprofezin	Centaur	5	22	0	1.2	0.51	2	1.5 (Twn)
carbaryl	Carbaryl 4L	12	42	0	**10**	**2.2**	10	0.01 (Tha)
chlorantraniliprole	Altacor	3	6	0.084	0.18	0.135	2.5	0.5 (Kor)
cyantraniliprole	Exirel	3	12	0.1	0.54	0.2	6	4 (Twn)
cyclaniliprole	Verdepryn 100SL	2	4	0.15	0.19	0.175	1	0.7 (Can, Tha)
cyflufenamid	Torino	3	6	**0.11**	**0.27**	**0.2**	0.6	0.01 (Tha)
diazinon	Diazinon 50W	5	22	0	0	0	0.2	0.01 (Kor)
esfenvalerate	Asana XL	1	2	**0.14**	**0.2**	**0.17**	3	0.01 (Tha)
etoxazole	Zeal	4	22	0	**0.16**	**0.0335**	1	0.01 (Tha)
fenpropathrin	Danitol 2.4EC	10	40	**0.14**	**2.8**	**0.72**	5	0.01 (Tha)
flubendiamide	Belt SC	5	26	0.039	0.81	0.071	1.6	1 (Twn)
fluopyram	Luna Sensation	3	18	0.021	0.25	0.0745	2	0.6 (Kor)
flutianil	Gatten	4	10	0.03	0.074	0.0455	0.4	0.4 (many)
flutriafol	TopGuard	9	36	0.087	0.64	0.215	1.5	0.8 (many)
fluxapyroxad	Merivon	3	12	0.23	0.59	0.285	3	2 (Twn, Vnm)
hexythiazox	Onager	7	20	0.18	**0.47**	**0.235**	1	0.2 (Kor)
imidacloprid	Nuprid 2SC	6	26	0.027	0.26	0.125	3	0.5 (many)
lambda-cyhalothrin	Warrior II	4	22	0	0.091	0	0.5	0.3 (many)
malathion	Fyfanon ULV AG	3	14	0	0.012	0	8	0.5 (Twn)
mefentrifluconazole	Cevya	1	2	**0.47**	**0.53**	**0.5**	4	0.01 (Tha)
metconazole	Quash	4	22	0.011	0.083	0.028	0.2	0.2 (many)
metrafenone	Vivando	3	16	0	0.075	0	2	1 (Twn)
myclobutanil	Rally 40WSP	4	12	0.35	0.79	0.425	5	1 (Can, Twn)
penthiopyrad	Fontelis	3	18	0.046	0.22	0.11	4	4 (many)
permethrin	Perm-Up 3.2EC	9	36	0	**1.2**	**0.275**	4	0.1 (Can)
phosphite*	Tree Shield	3	10	7.6	31	10.5	?	?
propiconazole	Orbit	11	42	0	0.53	0.225	4	2 (many)
pydiflumetofen	Miravis	2	4	**0.076**	**0.18**	**0.1365**	2	0.01 (Jpn)
pyraclostrobin	Pristine/Merivon	7	28	0.023	0.79	0.3	2.5	1 (HKG, Twn)
quinoxyfen	Quintec	6	26	0.013	0.16	0.037	0.7	0.4 (many)
spinetoram	Delegate WG	5	24	0	**0.16**	0.013	0.3	0.09 (many)
spinosad	Entrust	6	28	0.013	0.17	0.056	0.2	0.2 (many)
spirodiclofen	Envidor 2SC	3	18	0	0.13	0.0515	1	0.8 (Twn)
spirotetramat	Ultor	3	10	0	0.041	0.013	4.5	2 (CN)
sulfoxaflor	Closer/Transform	3	8	0.31	0.73	0.42	3	1.5 (many)
thiamethoxam	Actara	4	10	0.18	0.4	0.215	0.5	0.5 (many)
thiophanate-methyl **	Topsin 4.5FL	9	34	0	1.96	0.705	20	3 (Jpn)
tolfenpyrad	Bexar	7	20	**0.18**	**1.2**	**0.61**	2	0.01 (many)
trifloxystrobin	Luna Sensation	4	22	0	**0.55**	0.027	2	0.5 (Kor)
triflumizole	Procure 480SC	6	28	0.054	0.47	0.24	1.5	1 (Twn)
zeta-cypermethrin	Mustang MAX	10	40	0	0.34	0.11	2	1 (Kor)

[1] Major export markets for Pacific Northwest cherries; 7 August 2023. http://mrldb.nwhort.org/#top_markets, https://bcglobal.bryantchristie.com/db#/pesticides/query

* EU tolerance for fosetyl-Al formerly defined as sum total of residue levels of fosetyl-Al, phosphonic acid and all salts (including phosphite); no MRLs are published for fosetyl-Al or phosphite as of 7 August 2023

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

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