

2012 WTFRC APPLE PESTICIDE RESIDUE STUDY



Spray application 1 day before harvest

For the second consecutive year, the Washington Tree Fruit Research Commission (WTFRC) conducted a trial to evaluate pesticide residues in 'Gala' at the WSU Sunrise Research Orchard near Rock Island, WA. Eleven insecticides and eight fungicides were applied using a Rears airblast sprayer according to either an "aggressive" (maximum label rates at minimum retreatment and pre-harvest intervals) or "standard" (typical industry rates and timings) protocol. Apples from each protocol were sampled at harvest with half of the fruit being subjected to a simulated commercial packing process. Fruit samples were delivered the day of harvest to Cascade Analytical (Wenatchee, WA) for processing in advance of chemical analysis by a Portland, OR lab specializing in pesticide residue screening.

TRIAL DETAILS

- 6th leaf 'Pacific' Gala / M.9 Nic.29 trained to central leader/spindle on 3' x 10' spacing
- 2 x 25 gal Rears Pak-Blast sprayer calibrated to 100 gal / acre
- All chemicals applied with 8 oz Regulaid / 100 gal water / acre
- Final precipitation event recorded before harvest was 0.43" of rain on July 20 (33 days before harvest)

Measured residues vs. maximum residue levels (MRLs) for **STANDARD** industry pesticide programs utilizing typical rates, application timings, and retreatment intervals on apples. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2012.

Chemical name	Trade name	Application rate	Application timing(s)	Field run fruit	Washed fruit	US MRL ¹	Lowest export MRL ²
		oz per acre	days before harvest	ppm	ppm	ppm	ppm
Formetanate	Carzol SP	16	Petal Fall	<0.01	<0.01	0.5	0.05 (EU)
Carbaryl	Carbaryl 4L	32	Petal Fall & 10mm	<0.01	<0.01	12	0.05 (EU)
Diazinon	Diazinon 50W	64	35 & 21	0.035	0.034	0.5	0.01 (EU)
Endosulfan*	Thionex 50W	64	35 & 21	0.069*	0.051*	1	0.05 (EU)
Methoxyfenozide	Intrepid	16	35 & 21	0.15	0.059	1.5	1.5 (many)
Acetamiprid	Assail 30SG	3.4	35 & 21	0.091	0.038	1	0.7 (EU)
Spinetoram	Delegate WG	7	35 & 21	<0.01	<0.01	0.2	0.05 (many)
Chlorantraniliprole	Altacor	4.5	35 & 21	0.075	0.032	1.2	0.4 (many)
Lambda-cyhalothrin	Warrior II	2.56	28 & 21	<0.05	<0.05	0.3	0.1 (EU)
Flutriafol	Topguard	12	28 & 13	0.11	<0.01	0.4	0.01 (TAI)
Trifloxystrobin	Flint	2.5	28 & 13	0.011	<0.01	0.5	0.5 (many)
Fenpropathrin	Danitol	21.3	28 & 13	0.27	0.18	5	0.01 (EU)
Triflumizole	Procure 480SC	12	28 & 13	0.025	<0.01	0.5	0.5 (many)
Difenoconazole	Inspire Super	12	28 & 13	0.061	0.013	1	0.01 (INDIA)
Cyprodinil	Inspire Super	12	28 & 13	0.055	0.052	1.7	0.05 (many)
Flubendiamide	Tourismo	17	21 & 13	0.13	0.043	0.7	0.7 (MEX)
Buprofezin	Tourismo	17	21 & 13	0.048	0.031	4	1 (TAI)
Imidacloprid	Nuprid 2SC	6.4	21 & 7	0.024	<0.01	0.5	0.5 (many)
Thiophanate-methyl**	Topsin 4.5FL	20	13 & 1	0.163**	0.014**	2	0.5 (EU)
Captan	Captan 4L	128	13 & 1	0.42	0.14	25	3 (EU)
Pyraclostrobin	Pristine	14	7 & 1	0.12	0.021	1.5	0.3 (EU)
Boscalid	Pristine	14	7 & 1	0.25	0.056	3	2 (many)

¹ 28 Sep 2012. <http://www.nwhort.org/AppleMRLs.html>

² Major export markets for WA apples; 28 Sep 2012. <http://www.nwhort.org/AppleMRLs.html>

* Endosulfan values reported are sum totals of Endosulfan I, Endosulfan II, and Endosulfan sulfate residues

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

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



Soapy fruit during simulated packing

FRUIT WASHING DETAILS

1. 3 minutes of gentle agitation in 90°F water with 80 ppm chlorine
2. 30 seconds on brush bed with EpiClean soap (Pace International)
3. 30 second overhead rinse with cool water
4. 2 minutes dry time on clean brush bed
5. No waxes applied



Residues before (L) and after (R) simulated packing

CONCLUSIONS

Neither aggressive nor standard use patterns of any product evaluated produced residues which exceed US tolerances. Results of both standard and aggressive **Diazinon 50W, Thionex 50W, Topguard, Danitol, and Inspire Super** programs exceeded MRLs for some foreign markets which set their tolerances at the minimum limit of quantification. In previous studies, late season applications of carbaryl produced residues exceeding several foreign MRLs, but use of the product only as a chemical thinner this year resulted in no detectable residues. Washing fruit in a simulated packing process generally reduced residue levels, but not consistently enough to be relied upon as a management strategy to bring residue-laden fruit into compliance. Results from previous residue studies on apple and cherry are available on the WTFRC website at www.treefruitresearch.com. For more information on MRLs, visit the Northwest Horticultural Council website, www.nwhort.org.

Measured residues vs. MRLs for **AGGRESSIVE** pesticide programs utilizing maximum label rates and minimum pre-harvest and retreatment intervals on apples. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2012.

Chemical name	Trade name	Application rate <i>oz per acre</i>	Application timing(s) <i>days before harvest</i>	Field run fruit <i>ppm</i>	Washed fruit <i>ppm</i>	US MRL ¹ <i>ppm</i>	Lowest export MRL ² <i>ppm</i>
Formetanate	Carzol SP	20	Petal Fall	<0.01	<0.01	0.5	0.05 (EU)
Carbaryl	Carbaryl 4L	96	Petal Fall & 10mm	<0.01	<0.01	12	0.05 (EU)
Diazinon	Diazinon 50W	64	35 & 21	0.099	0.078	0.5	0.01 (EU)
Endosulfan*	Thionex 50W	64	35 & 21	0.195*	0.181*	1	0.05 (EU)
Lambda-cyhalothrin	Warrior II	2.56	28 & 21	<0.05	<0.05	0.3	0.1 (EU)
Flutriafol	Topguard	12	28 & 13	0.094	0.017	0.4	0.01 (TAI)
Trifloxystrobin	Flint	2.5	28 & 13	0.014	0.011	0.5	0.5 (many)
Fenpropathrin	Danitol	21.3	28 & 13	0.26	0.30	5	0.01 (EU)
Methoxyfenozide	Intrepid	16	28 & 13	0.19	0.062	1.5	1.5 (many)
Triflumizole	Procure 480SC	16	21 & 13	0.025	<0.01	0.5	0.5 (many)
Difenoconazole	Inspire Super	12	21 & 13	0.081	0.019	1	0.01 (INDIA)
Cyprodinil	Inspire Super	12	21 & 13	0.092	0.093	1.7	0.05 (many)
Flubendiamide	Tourismo	17	21 & 13	0.31	0.16	0.7	0.7 (MEX)
Buprofezin	Tourismo	17	21 & 13	0.10	0.10	4	1 (TAI)
Acetamiprid	Assail 30SG	3.4	21 & 7	0.14	0.042	1	0.7 (EU)
Imidacloprid	Nuprid 2SC	6.4	21 & 7	0.021	<0.01	0.5	0.5 (many)
Spinetoram	Delegate WG	7	13 & 7	0.045	0.012	0.2	0.05 (many)
Chlorantraniliprole	Altacor	4.5	13 & 5	0.18	0.066	1.2	0.4 (many)
Captan	Captec 4L	128	13 & 1	0.16	0.20	25	3 (EU)
Thiophanate-methyl**	Topsin 4.5FL	20	7 & 1	0.131**	0.030**	2	0.5 (EU)
Pyraclostrobin	Pristine	18.5	7 & 1	0.17	0.043	1.5	0.3 (EU)
Boscalid	Pristine	18.5	7 & 1	0.40	0.11	3	2 (many)

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For more information, contact Tory Schmidt (509) 669-3903 or email tory@treefruitresearch.com

