

2019 WTFRC APPLE PESTICIDE RESIDUE STUDY

Since 2011, the Washington Tree Fruit Research Commission (WTFRC) has conducted annual trials to evaluate pesticide residues on 'Gala' apples. This year, we applied ten insecticide/acaricides and five fungicides (seventeen total active ingredients) with a Rears Pak-Blast sprayer in two different scenarios. **SCENARIO A** simulates typical industry use patterns for these products applied at 100 gal water/acre. **SCENARIO B** reflects an aggressive protocol intended to simulate a worst-case scenario with the highest possible residues while observing label guidelines (maximum label rates at minimum retreatment and pre-harvest intervals) applied at 200 gal water/acre. We had intended to apply both standard and aggressive spray protocols at both carrier volumes, but sprayer error confounded the results. Fruit samples were collected at commercial maturity on August 28 and delivered the next day to Pacific Agricultural Labs (Sherwood, OR) for chemical residue analysis.



TRIAL DETAILS

- 12th 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 or 200 gal / acre
- All pesticides applied with 8 oz Regulaid / 100 gal water / acre
- No measurable precipitation recorded during trial except 0.75" of rain on Aug 9 & 10 (19 & 18 days before harvest)

Measured residues vs. maximum residue levels (MRLs) for apple pesticide programs in SCENARIO A: typical industry rates, timings, and retreatment intervals applied in 100 gal water/acre. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2019.

Chemical name	Trade name	Application rate <i>oz per acre</i>	Application timing(s) <i>dbh</i>	Measured residue <i>ppm</i>	US MRL ¹ <i>ppm</i>	Lowest export MRL ¹ <i>ppm</i>
Flutianil	Gatten	8	35	<0.01	0.15	0.01 (many)
Isofetamid	Kenja 400SC	12.5	35	0.019	0.6	0.01 (India)
Spinetoram	Delegate WG	7	35 & 21	<0.01	0.2	0.01 (India)
Cyantraniliprole	Exirel	13.5	35 & 21	0.097	1.5	0.01 (IND,TAI)
Spinosad	Entrust	3	35 & 21	<0.01	0.2	0.01 (India)
Tolfenpyrad	Bexar	27	35 & 21	0.20	1.0	0.01 (many)
Myclobutanil	Rally 40WSP	10	35 & 21	0.12	0.5	0.01 (UAE)
Novaluron	Rimon	32	35 & 21	0.22	3.0	0.01 (India)
Fluxapyroxad	Merivon	5.5	28	0.045	0.8	0.8 (CAN,MEX)
Pyraclostrobin	Merivon	5.5	28	0.029	1.5	0.5 (many)
Etozazole	Zeal	2	28	0.026	0.2	0.01 (India)
Difenoconazole	Inspire Super	12	28	0.027	5.0	0.01 (India)
Cyprodinil	Inspire Super	12	28	0.052	1.7	0.01 (India)
Diazinon	Diazinon 50WS	16	28	0.016	0.5	0.01 (India)
Bifenazate	Acramite 50WS	16	28	0.032	0.7	0.01 (India)
Phosmet*	Imidan 70-W*	92	14	3.4	10.0	0.01 (India)
Fenpropathrin	Danitol	18	14	0.20	5.0	0.01 (IND,SAU)

¹ Top markets for WA apples; 26 Sep 2019. <http://nwhort.org/export-manual/comparisonmrls/apple-mrls/>, <https://bcglobal.bryantchristie.com>

* Imidan 70-W applications included 8 fl oz Tech-Spray/100 gal water to acidify spray tank

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Measured residues vs. maximum residue levels (MRLs) for apple pesticide programs in **SCENARIO B: aggressive use patterns (maximum rates with minimum retreatment and preharvest intervals) applied in 200 gal water/acre. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2019.**

Chemical name	Trade name	Application rate	Application timing(s)	Measured residue	US MRL ¹	Lowest export MRL ¹
		oz per acre	dbh	ppm	ppm	ppm
Isofetamid	Kenja 400SC	12.5	35 & 21	0.034	0.6	0.01 (India)
Diazinon	Diazinon 50WS	16	35 & 21	<0.01	0.5	0.01 (India)
Tolfenpyrad	Bexar	27	28 & 14	0.20	1.0	0.01 (many)
Novaluron	Rimon	32	28 & 14	0.20	3.0	0.01 (India)
Difenoconazole	Inspire Super	12	28 & 14	0.045	5.0	0.01 (India)
Cyprodinil	Inspire Super	12	28 & 14	0.081	1.7	0.01 (India)
Fenpropathrin	Danitol	18	28 & 14	0.26	5.0	0.01 (IND,SAU)
Myclobutanil	Rally 40WSP	10	21 & 14	0.065	0.5	0.01 (UAE)
Flutianil	Gatten	8	21 & 14	<0.01	0.15	0.01 (many)
Spinosad	Entrust	3	21 & 7	0.024	0.2	0.01 (India)
Phosmet*	Imidan 70-W*	92	21 & 7	3.7	10.0	0.01 (India)
Spinetoram	Delegate WG	7	14 & 7	0.014	0.2	0.01 (India)
Cyantraniliprole	Exirel	13.5	14 & 5	0.11	1.5	0.01 (IND,TAI)
Bifenazate	Acramite 50WS	16	7	0.027	0.2	0.01 (India)
Fluxapyroxad	Merivon	5.5	7 & 1	0.086	0.8	0.8 (CAN,MEX)
Pyraclostrobin	Merivon	5.5	7 & 1	0.072	1.5	0.5 (many)

¹ Top markets for WA apples; 26 Sep 2019. <http://nwhort.org/export-manual/comparisonmrls/apple-mrls/>, <https://bcglobal.bryantchristie.com>
 * Imidan 70-W applications included 8 fl oz Tech-Spray/100 gal water to acidify spray tank

DISCUSSION

As with all previous WTFRC studies, no residue exceeded the US Environmental Protection Agency’s tolerance, affirming that application of these materials following label guidelines produce residues determined to be safe for domestic US markets. Most of the products assayed in our 2019 study, however, generated residues which exceed MRLs for important export markets, particularly India. In most cases, those actual residue levels were relatively low, but could trigger potential problems because India has yet to publish MRLs on apples for most of these products; in the absence of a posted MRL, the *de facto* limit falls to the national default value, which is 0.01 ppm for India. Once India publishes more apple MRLs, most of those tolerances will be relaxed, allowing US growers a better chance of using a variety of pesticides while still meeting Indian standards.

Our intent this year was to apply both “standard” and “aggressive” spray programs at 100 and 200 gal water/acre, as we have done in the past. Unfortunately, application error confounded the results in two of our plots, leaving only proper application of the standard protocol at 100 gal/acre (Scenario A) and the aggressive protocol at 200 gal/acre (Scenario B). This error precludes valid comparison of spraying standard vs. aggressive protocols or concentrate vs. dilute applications. Nonetheless, the results reported here are valid and accurately mimic real-world spray programs for commercial Washington apple orchards.

Reports from previous pesticide residue studies on apple and cherry which provide a broader context for these results are available on the WTFRC website at www.treefruitresearch.com. We encourage growers and consultants to stay abreast of current information on MRLs, which often change in response to trade negotiations and/or political developments. For more information, visit the Northwest Horticultural Council website at www.nwhort.org.



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, or a guarantee of similar results regarding residues for any user. Apple growers should consult their extension team members, crop advisors, and warehouses to develop responsible pest control programs.