WTFRC INTERNAL PROJECT – BUDGET SHARED FOR INFORMATIONAL PURPOSES ONLY

CROP YEAR: 2020

CONTINUING REPORT **PROJECT LENGTH (CROP YEARS)**: 2019-2021

Project Title: Pesticide Residues on WA Apples

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Cooperators: Gerardo Garcia, Sandy Stone, Pacific Agricultural Labs, Northwest Hort Council, Doug Stockwell, Doyle Smith, various ag chemical companies

Item	2019	2020 (est.)	2021 (est.)
Salaries			
Benefits			
Wages[1]	1350	1400	1450
Benefits[1]	700	725	750
RCA Room Rental			
Shipping			
Supplies/Chemicals	250	275	300
Travel[2]	1000	1000	1000
Plot Fees			
Analytical lab fees	3500	3750	4000
Total gross costs	6,800	7,150	7,500
Anticipated Income (contracts and gift grants)	0	0	0
Total net costs	6,800	7,150	7,500

Footnotes: Schmidt estimates 10% of his time is dedicated to this project on an annual basis
Most pesticides tested are donated by their registrants or an ag chemical supply company
1 Wages & benefits primarily for Garcia (spray applications), crew help for Garcia, and Stone (data entry & review)
2 Travel costs include hauling equipment to & from plots & delivery of samples to Sherwood, OR

2020 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 twelve insecticide/acaricides and five fungicides according to either an "aggressive" protocol intended to generate the highest possible residues while observing label guidelines (maximum label rates at minimum retreatment and pre-harvest intervals) or a "standard" protocol following more typical industry use patterns for rates and timings. Each treatment protocol was sprayed at both 100 (concentrate) and 200 (dilute) gallons of water per acre with a Rears Pak-Blast sprayer while holding the rate of pesticide per acre constant. Fruit samples were collected at commercial maturity on August 27 and delivered the next day to Pacific Agricultural Labs (Sherwood, OR) for chemical residue analysis.

TRIAL DETAILS

- 13th 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 0.01" of rain on July 28 and August 6 (30 & 21 days before harvest)

Measured residues vs. maximum residue levels (MRLs) for uniformly applied STANDARD industry apple pesticide programs in 100 or 200 gal water/acre utilizing typical rates, timings, and retreatment intervals. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2020.

Chemical name	Trade name	Application rate	Application timing(s)	100 gal/acre	200 gal/acre	US MRL[1]	India MRL[1]	Lowest export MRL[1]
		oz per acre	*dbh*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
flutianil	Gatten	8	35	<0.01	<0.01	0.15	0.01*	0.01 (many)
isofetamid	Kenja 400SC	12.5	35	0.017	0.018	0.6	0.01*	0.2 (Kor)
abamectin	AgriMek SC	4.25	35	<0.01	<0.01	0.02	0.01*	0.01 (many)
diazinon	Diazinon 50W	16	35	0.019	0.020	0.5	0.01*	0.01 (UAE)
spinetoram	Delegate WG	7	35 & 21	0.02	0.03	0.2	0.01*	0.05 (many)
cyantraniliprole	Exirel	13.5	35 & 21	0.14	0.15	1.5	0.01*	0.8 (many)
spinosad	Entrust	3	35 & 21	0.01	0.01	0.2	0.01*	0.1 (many)
tolfenpyrad	Bexar	27	35 & 21	0.42	0.42	1	0.01*	0.01 (many)
myclobutanil	Rally 40WSP	10	35 & 21	0.20	0.20	0.5	0.01	0.01 (UAE)
fenpropathrin	Danitol	18	35 & 21	0.43	0.37	5	0.01*	0.01 (many)
difenoconazole	Inspire Super	12	28	<0.01	<0.01	5	0.01	0.5 (China)
cyprodinil	Inspire Super	12	28	<0.01	<0.01	1.7	0.01*	0.05 (Indo)
cyflufenamid	Torino	6.8	28	<0.01	<0.01	0.06	0.01*	0.01 (Thai)
buprofezin	Centaur WDG	34.5	28	0.012	<0.01	3	0.01*	1 (Tai)
acequinocyl	Kanemite	31	28	<0.025	<0.025	0.4	0.01*	0.01 (Thai)
afidopyropen	Versys	3.5	28 & 14	<0.05	<0.05	0.02	0.01*	0.01 (many)
bifenazate	Acramite 50WS	16	14	0.045	0.056	0.7	0.01*	0.2 (China)
phosmet	Imidan 70-W**	92	14	1.6	1.2	10	0.01*	2 (Tai)

[1] Top markets for WA apples with established MRLs; 30 Sept 2020. https://nwhort.org/export-manual/, https://bcglobal.bryantchristie.com/

*No tolerance posted; MRL is based on national default value (0.01 ppm in India)

**Imidan 70-W was mixed with a buffering agent to reduce tank pH to 5.5 per standard industry practice

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, acarid, or fungal pest, 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.

Measured residues vs. maximum residue levels (MRLs) for uniformly applied AGGRESSIVE industry apple pesticide programs in 100 or 200 gal water/acre utilizing maximum labeled rates, and minimum preharvest and retreatment intervals. 'Gala'/M.9 Nic.29, Rock Island, WA. WTFRC 2020.

Chemical name	Trade name	Application rate	Application timing(s)	100 gal/acre	200 gal/acre	US MRL[1]	India MRL[1]	Lowest export MRL[1]
		oz per acre	*dbh*	*ppm*	*ppm*	*ppm*	*ppm*	*ppm*
flutianil	Gatten	8	21 & 14	0.021	<0.01	0.15	0.01*	0.01 (many)
isofetamid	Kenja 400SC	12.5	35 & 21	0.16	0.062	0.6	0.01*	0.2 (Kor)
abamectin	AgriMek SC	4.25	28	<0.01	<0.01	0.02	0.01*	0.01 (many)
diazinon	Diazinon 50W	16	35 & 21	0.026	0.017	0.5	0.01*	0.01 (UAE)
spinetoram	Delegate WG	7	14 & 7	0.051	0.030	0.2	0.01*	0.05 (many)
cyantraniliprole	Exirel	13.5	14 & 3	0.23	0.16	1.5	0.01*	0.8 (many)
spinosad	Entrust	3	21 & 7	0.022	0.017	0.2	0.01*	0.1 (many)
tolfenpyrad	Bexar	27	28 & 14	0.21	0.10	1	0.01*	0.01 (many)
myclobutanil	Rally 40WSP	10	21 & 14	0.33	0.15	0.5	0.01	0.01 (UAE)
fenpropathrin	Danitol	18	28 & 14	0.26	0.12	5	0.01*	0.01 (many)
difenoconazole	Inspire Super	12	21 & 14	0.11	0.058	5	0.01	0.5 (China)
cyprodinil	Inspire Super	12	21 & 14	0.19	0.11	1.7	0.01*	0.05 (Indo)
cyflufenamid	Torino	6.8	14	0.036	0.021	0.06	0.01*	0.01 (Thai)
buprofezin	Centaur WDG	34.5	14	1.3	0.84	3	0.01*	1 (Tai)
acequinocyl	Kanemite	31	35 & 14	<0.025	<0.025	0.4	0.01*	0.01 (Thai)
afidopyropen	Versys	3.5	14 & 7	<0.05	<0.05	0.02	0.01*	0.01 (many)
bifenazate	Acramite 50WS	16	7	0.076	0.072	0.7	0.01*	0.2 (China)
phosmet	Imidan 70-W**	92	21 & 7	5.3	2.6	10	0.01*	2 (Tai)

[1] Top markets for WA apples with established MRLs; 30 Sept 2020. https://nwhort.org/export-manual/, https://bcglobal.bryantchristie.com/
*No tolerance posted; MRL is based on national default value (0.01 ppm in India)
**Imidan 70-W was mixed with a buffering agent to reduce tank pH to 5.5 per standard industry practice

CONCLUSIONS

As we have observed in every study since 2011, no spray program produced a residue that exceeded the tolerance level set by the US Environmental Protection Agency; these findings are further evidence that apple growers following directions on product labels should expect their fruit to be in full compliance for domestic sales regarding pesticide residues. Several products we tested, however, did produce **residues which exceed Maximum Residue Levels** (MRLs) set in important export markets for Washington apples including: **Gatten, Diazinon 50W, Delegate WG, Bexar, Rally 40WSP, Danitol, Inspire Super, Torino, Centaur WDG, and Imidan 70-W**. India has yet to post tolerances for most pesticides used by WA apple growers; in the absence of a posted MRL, the default tolerance in India is 0.01 ppm, essentially meaning that any product which produced a detectable residue in our study would potentially violate India's standards. Trade representatives from the USDA and Northwest Horticultural Council continue to work with Indian authorities to encourage them to post more MRLs, which should make compliance more feasible.

Results from this year's study revealed a trend for higher detectable residues being recorded from concentrate (100 gal water/acre) than dilute (200 gal water/acre) applications under the aggressive protocol; under the standard protocol, however, there was virtually no difference in residue levels produced by spraying dilute vs. concentrate. Given that most materials in the standard protocol were applied earlier in the season and had more time to degrade than in the aggressive protocol, any treatment differences between dilute and concentrate applications may have diminished over time. The results of several years of testing the effect of carrier volume on pesticide residues have been largely inconsistent and therefore inconclusive.

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.org. We encourage growers and consultants to stay abreast of current information on international MRLs, which often change in response to trade negotiations and/or political developments. For more information, visit the Northwest Horticultural Council website, www.nwhort.org.

WASHINGTON TREE FRUIT RESEARCH COMMISSION

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