Advancing IPM for Midwest Apple Production using the Pesticide Risk Mitigation Engine

ipmprime.com
Pesticide Risk Mitigation Engine

Since 2006, the IPM Institute of North America has helped over 60 orchardists in Illinois, Iowa, Minnesota and Wisconsin improve their use of IPM strategies through participation in the IPM Institute scouting program, AppleTalk, sprayer calibration, ipmprime.com analysis, TruEarth certification and the USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP). This work has been supported by grower fees; grants from USDA and US EPA Region V; Wescott Agri Products; and NRCS EQIP. The USDA-NRCS supports IPM through voluntary programs with private landowners that protect and enhance natural resources.

Ipmprime.com Documents Pesticide-Risk Reduction

WI Eco Fruit Project

Since 2000, the Wisconsin Eco-Fruit Project has helped growers reduce pesticide risk and apply Integrated Pest Management (IPM). The project supports growers with the resources to learn IPM scouting, monitoring, and sampling techniques. Apple producers receive additional support through participation in the IPM Institute's scouting program, NRCS EQIP 595 and AppleTalk.

AppleTalk is an innovative weekly IPM conference call where 30+ growers, consultants and researchers participate in an open discussion of the weeks pest phenology and the IPM techniques required to manage the emerging pests.

To create a greater incentive to adopt advanced IPM, a local packing house began developing the **TruEarth Certified** eco label for their wholesale suppliers. TruEarth developed out of the successful Red Tomato Eco Apple program. The program prohibits the most highly toxic pesticides and uses additional pesticide use restrictions, to minimize pesticide risk. TruEarth certification requires documenting IPM strategies, complying with pesticide use restrictions and passing on-farm and record audits.

Eco-Fruit is a project of a partnership with the Wisconsin Apple Growers Association, the IPM Institute of North America, and the UW-Madison Center for Integrated Agricultural Systems.

This ipmprime.com analysis documents a tree fruit grower's reduction in pesticide risk from 2002 to 2012. Implementation of advanced IPM and participation in the NRCS-EQIP 595 standard began in 2009.

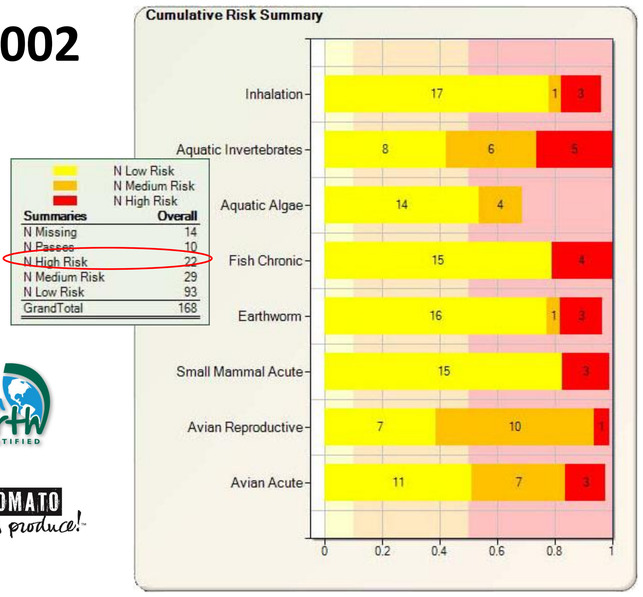
Product	Active Ingredient (s)	EPA Reg. No.	Product App Rate	Active Ingredient(s) App Rate
Agri-Mycin 17	streptomycin sulfate	55146-96	16 oz./acre	0.224 lb./acre
Captan 50W	captan	19713-235	6 lb./acre	2.934 lb./acre
COCS WDG	copper sulfate copper oxycholoride copper oxychloride sulfate	34704-326	10 lb./acre	1.420 lb./acre 7.480 lb./acre 7.480 lb./acre
Danitol	fenpropathrin	59639-35	10 fl. oz./acre	0.198 lb./acre
Flint	trifloxystrobin	264-777	2 oz./acre	6.250E-002 lb./acre
Imidan	phosmet	10163-169	2 lb./acre	1.400 lb./acre
Polyram 80DF	metiram	7969-105	3 lb./acre	2.400 lb./acre
Pounce	permethrin	279-3051	10 oz./acre	0.156 lb./acre
Rally 40 WSP	myclobutainil	62719-410	5 oz./acre	0.125 lb./acre
Vydate	oxamyl	352-372	4 pt./acre	0.982 lb./acre

Product	Active Ingredient(s)	EPA Reg. No.	Product App. Rate	Active Ingredient(s) App. Rate
Altacor	chlorantraniliprole	352-730	3.2 oz./acre	7.000E-002 lb./acre
Assail 30SG	acetamiprid	8033-36	8 oz./acre	0.15 lb./acre
Avaunt	indoxacarb	352-597	5 oz./acre	9.375E-002 lb./acre
Biocover Oil	mineral oil	34704-805	4 gal./acre	28.224 lb./acre
Captan 80WDG	captan	66222-58	3 lb./acre	2.35 lb./acre
COCS WDG	copper sulfate copper oxycholoride copper oxychloride sulfate	34704-326	4 lb./acre	0.57 lb./acre 2.99 lb./acre 2.99 lb./acre
Delegate	spinetoram	62719-541	4.35 oz./acre	6.797E-002 lb./acre
Esteem 35 WP	pyriproxyfen	59639-115	5 oz./acre	0.11 lb./acre
Penncozeb 75DF	mancozeb	70506-185	3 lb./acre	2.25 lb./acre
Rally 40 WSP	myclobutanil	62719-410	6.4 oz./acre	0.16 lb./acre
Serenade Max	*Bacillus subtilis*	69592-11	2 lb./acre	0.29 lb./acre
Surround WP	kaolin	61842-18	10 lb./acre	9.50 lb./acre
Topsin M 70WP	thiophanate-methyl	73545-11	1 lb./acre	0.70 lb./acre

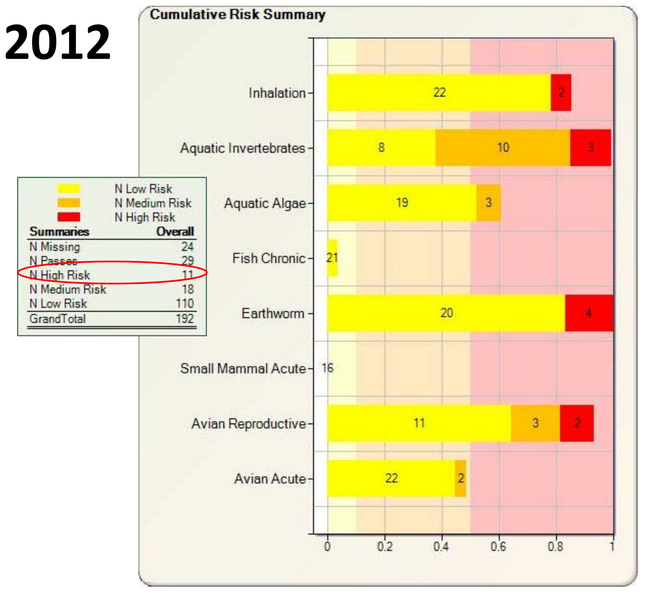
Cumulative Risk Summaries

- The length of the bar represents the cumulative probability of an undesirable effect for each risk index.
- The cumulative risk tool makes it easy for the user to track change and improvement over time.
- The two graphs and tables for 2002 and 2012 show pesticides applied and ipmprime.com annual cumulative risk summaries from the same apple orchard ten years apart.
- Eleven high risks were generated in 2012 vs. 22 in 2002.
- For more information on ipmprime.com see poster # 89.

2002



2012



Individual Risk Summaries

- Risk to all eight indices is calculated as a probability from zero to one. Zero is the lowest and 1.0 is the highest chance of negative impact. .
- Six indices measure acute risk, or the potential for immediate harm.
- Two indices for avian and aquatic wildlife measure reproductive or long-term risk.
- Results can be sorted by index or by product.
- For more information on ipmprime.com see poster # 89.

What pesticides are driving risk?

Active Ingredient	Trade Name	Avian Acute	Avian Reproduction	Small Mammals	Earthworms	Aquatic Algae	Aquatic Invertebrates	Worker Inhalation
Acetamiprid	Assail							
Carbaryl	Sevin							
Chlorpyrifos	Lorsban							
Clothianidin	Belay							
Copper hydroxide	Badge, Kocide							
Copper oxychloride	Badge							
Copper sulfate	C-O-C-S							
Cyhalothrin, lambda	Province							
Imidacloprid	Alias, Montana							
Mancozeb	Penncozeb 80WP							
Metiram	Polyram							
Mineral oil	Crop Oil							
Paraquat dichloride	Gramoxone Inteon							
Pendimethalin	Prowl							
Phosmet	Imidan							
Thiophanate-methyl	Topsin M WSB							

= Low Risk
= Moderate Risk
= High Risk
= No data

Sprayer Calibration: Immediate and Measurable Savings Guaranteed!

In 2012 we calibrated air-blast sprayers in the Upper Mississippi River Valley region of Minnesota and Wisconsin. This work was completed with funding support from the US-EPA Strategic Agricultural Initiative between 2010 and 2012. Tree fruit producers in the region use both the tradition high pressure air-blast sprayer and the low-pressure sprayer produced by AgTec. The calibration results represent 11 orchards and two to three spray scenarios per orchard, for a total of 32 calibration events.


Pest Management

Airblast sprayer calibration:

Opportunities to improve performance and save money

Grower	Reported Gallons Per Acre	Calibrated Gallons Per Acre	% Change	
A	75	130	73%	Increase
B	40	91	128%	Increase
C	40	48	20%	Increase
D	40	71	78%	Increase
E	100	84.26	16%	Decrease
E	50	57	18%	Increase
F	40	68.73	72%	Increase
F	40	51.55	29%	Increase
G	50	66.65	33%	Increase
G	80	92.08	15%	Increase
H	40	53.17	33%	Increase
I	40	64.45	61%	Increase
J	50	40	20%	Decrease
K	54	46.77	13%	Decrease
K	65	57.09	12%	Decrease

2012 Air-blast Sprayer Calibration Results

Five Reasons to Calibrate

1. 10-15% of spray material is routinely lost in air-blast applications.
2. Speeds two to three-tenths of a MPH off change sprayer output 5%.
3. Charts that estimate travel speed based on gears are often inaccurate.
4. Our results found tractors with digital speedometers were inaccurate.
5. Nozzle wear of 10% can change spray patterns.

Calibration observations and results:

- ✓ Over applying water and pesticide to orchard blocks by 52%;
- ✓ Other frequent observations:
  - ❖ Missing/broken pressure gauges,
  - ❖ Leaking manifolds, fittings and nozzles,
  - ❖ Broken/clogged/missing nozzles.

Recalibration and follow up 2013-2014:

- ✓ Five growers installed electronic spray-control system, a $2,500 to $5,000 investment;
- ✓ Nine growers calibrated with assistance from the IPM Institute;
- ✓ Three orchards calibrated sprayers independently.

What did we find after three years of calibration outreach?

- ✓ Growers made a consistent 3.5% to 15% improvement in calibration results by 2014 after implementing annual sprayer calibration.
- ✓ The average over application declined to 9.81% among four sprayers and under application declined to 11.64% in seven sprayers.

Learn more about how ipmprime.com can help your company or organization. Web resources: www.ipmprime.com; AppleTalk www.ecofruit.wisc.edu/appletalk Thank you to our funders US-EPA Strategic Agricultural Initiative project R5 2010-03, USDA NIFA RIPM project WIS01668, MN and WI NRCS, participating growers and Wescott Agri Products.
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