ipmprime.com

Pesticide Risk Mitigation Engine

A User-Friendly Online Tool for Pesticide Risk Assessment and Mitigation

What is ipmprime.com?

- Pesticides are invaluable tools for food and fiber production. Pesticide use presents risks that must be carefully managed. **ipmprime.com** is a web application which uses the best available science in an easy-to-use format to help users evaluate pesticide risks.
- **ipmprime.com** uses site-specific and empirical field data to estimate risk to workers, consumers, birds, small mammals, earthworms and aquatics.
- **ipmprime.com** helps users make more informed choices on practices and products and can also track progress in reducing risk over time. Mitigation practices are often part of an Integrated Pest Management (IPM) strategy.
- **ipmprime.com** is currently available to use for free at http://ipmprime.com

Development

- **ipmprime.com** was developed with funding from the US Department of Agriculture (USDA) Natural Resources Conservation Service Conservation Innovation Grants Program, USDA North Central IPM Center, USDA National Institute of Food and Agriculture, US Environmental Protection Agency Region V and X, Whole Foods Market, Unilever, Great Lakes Protection Fund, General Mills and ipmprime.com users/subscribers.
- **The ipmprime.com project team** includes Charles and Karen Benbrook, BCS-Ecologic; Susan Kegley, Timothy Brown, Pesticide Research Institute; Pierre Mineau, Pierre Mineau Consulting; Patrick Shannon-Hughes, Daniel Skolnik , Catherine Harris, Kelly Adams and Thomas Green, IPM Institute of North America.
- Due to the growth in interest in the tool and the broad scope of potential users, the Integrated Plant Protection Center at Oregon State University and IPM Institute of North America are each leading separate efforts to address the needs of specific sectors. Oregon State's team, led by Paul Jepson and Michael Guzy, is predominantly focusing on meeting the needs of the public sector including governments and agencies and Extension delivery to farmers at ipmprime.org. IPM Institute is primarily focusing on applications for food industry supply chains and other commercial sector uses at ipmprime.com.
- White papers and more information about ipmPRiME.com project development can be found at https://ipmprime.com/materials
- New indices under development for **ipmprime.com**, launching in May 2015:
  - Consumer Dietary Risk – risk to consumers based on residue test results from the USDA AMS Pesticide Data Program.
  - Worker Dermal Exposure Route - risk to workers exposed to pesticides after re-entering a treated area.

Make Decisions: View, Interpret and Use ipmprime.com Risk Scores

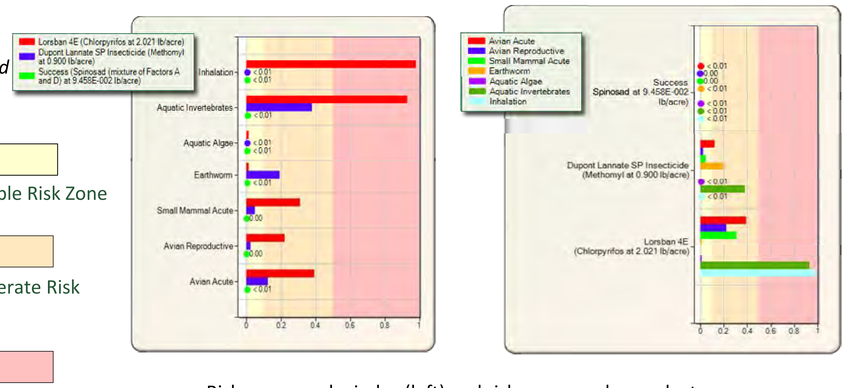
Output for chlorpyrifos applied at 3 lbs./acre show high acute risks for bystander inhalation and aquatic invertebrates; moderate acute risk for small mammals and birds.

ipmprime.com Indices

Human Bystander
- Inhalation
- Acute Worker Dermal
- Cancer Worker Dermal

Consumer Dietary
- Acute Dietary Risk
- Cancer Dietary Risk

Environmental
- Avian Acute
- Avian Reproductive
- Earthworm
- Pollinator
- Aquatic Invertebrates
- Aquatic Algae



Risk summary by index (left) and risk summary by product (right).

applications

Assess relative risks of product, rate, application scenarios

Use in IPM planning

Evaluate changes in risk over time

- ipmprime.com is risk (not hazard) based: accounts not just for chemical hazards but also the likelihood of exposure.
- Addresses interspecies toxicity range.
- Adjusts risk for different application methods and mitigation practices.
- Calibrates scores against documented field impacts where data permit.

Modeling: The Science Behind ipmprime.com Risk Indices

Aquatic Concentrations

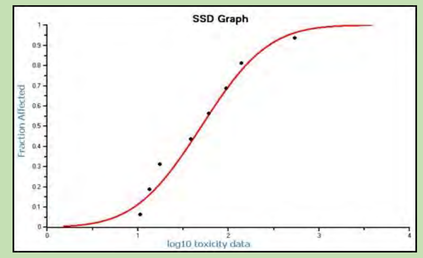
- Ipmprime.com uses various methods to calculate aquatic concentrations. The method used is dependent on how much information about a specific site or application is known.
- When sufficient information is available for the physical-chemical properties as well as climate, soil and landcover, the PRZM+EXAMS framework from Waterborne Environmental is used to calculate aquatic concentrations.
- In the absence of complete information, PRiME uses GENEEC2.

Sensitivities of individual species.

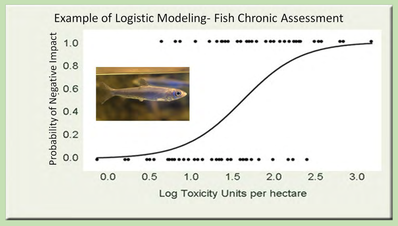
Species	Toxicity (ppb)
Chanos chanos	38.7
Gambusia affinis	543
Gasterosteus aculeatus	10.7
Lepomis cyanellus	60.4
Lepomis macrochirus	17.5
Oncorhynchus mykiss	13.5
Pimephales promelas	140
Tilapia nilotica	94.3

Risk Modeling

Determination of the hazard concentration at the 5% tail of a Species Sensitivity Distribution



Plot of normal cumulative distribution function.



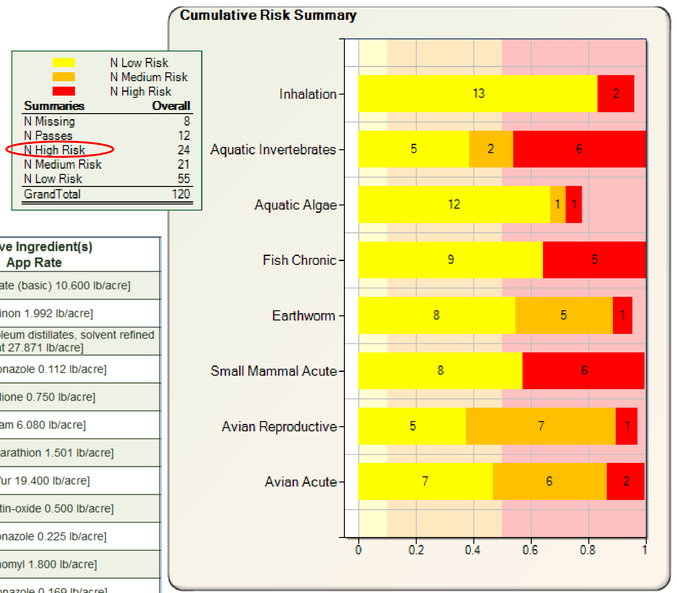
LL HC5	0.719174472
HC5	5.099081571
UL HC5	14.06414958

- Most ipmprime.com risk index models are based on a logistic regression and probability of impact is given based on toxicity and application rate, sometimes aided by a physico-chemical constant that appeared to better define non-dietary sources of exposure.
- Because the models are based on empirical data, there is less uncertainty with the results than there is with a more standard approach to risk assessment.

Case Study: California Peaches 1999 and 2009

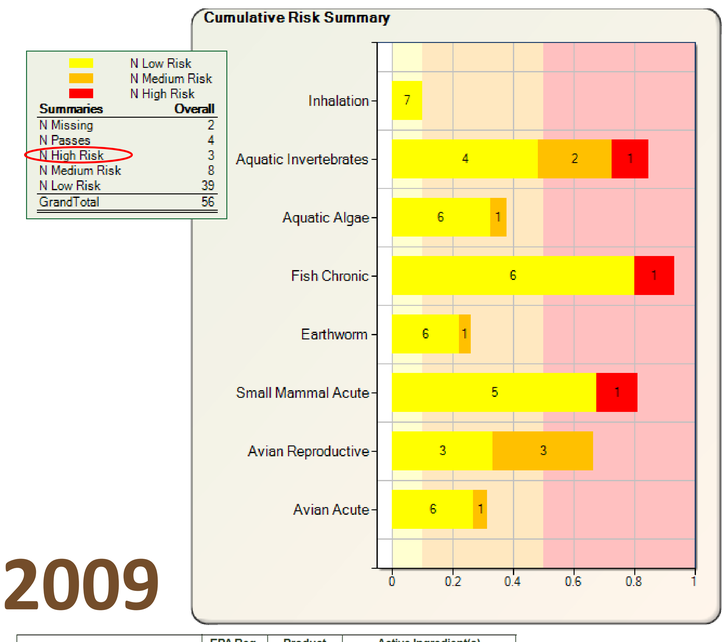
Low Risk
Moderate Risk
High Risk

1999



Product	EPA Reg. No.	Product App Rate	Active Ingredient(s) App Rate
BASICOP	19713-72	20.000 lb/ac	[Copper sulfate (basic) 10.600 lb/acre]
GOWAN DIAZINON 4E10163-163	5905-248	0.500 gal/ac	[Diazinon 1.992 lb/acre]
OMNI SUPREME SPRAY	5905-368	4.000 gal/ac	[Mineral oil, petroleum distillates, solvent refined light 27.871 lb/acre]
BREAK EC	100-702	4.000 floz/ac	[Propiconazole 0.112 lb/acre]
ROVRAL	264-453	1.500 lb/ac	[Iprodione 0.750 lb/acre]
ZIRAM 76 FUNGICIDE	4581-140	8.000 lb/ac	[Ziram 6.080 lb/acre]
PENNCAP-M MICROENCAPSULATED INSECTICIDE	70506-193	0.750 gal/ac	[Methyl parathion 1.501 lb/acre]
RED-TOP SPRAY SULFUR	2935-92	20.000 lb/ac	[Sulfur 19.400 lb/acre]
DU PONT VENDEX 50WP MITICIDE	70506-211	1.000 lb/ac	[Fenbutatin-oxide 0.500 lb/acre]
ELITE 45 DF	264-749	8.000 oz/ac	[Tebuconazole 0.225 lb/acre]
DU PONT LANNATE INSECTICIDE	352-342	2.000 lb/ac	[Methomyl 1.800 lb/acre]
ELITE 45 DF	264-749	6.000 oz/ac	[Tebuconazole 0.169 lb/acre]
DU PONT LANNATE INSECTICIDE	352-342	2.000 lb/ac	[Methomyl 1.800 lb/acre]
METHYL BROMIDE 89.5%	11220-17	30.000 gal/ac	[Methyl bromide 387.472 lb/acre]
ZIRAM 76DF FUNGICIDE	4581-140	8.000 lb/ac	[Ziram 6.080 lb/acre]

2009



Product	EPA Reg. No.	Product App Rate	Active Ingredient(s) App Rate
BUMPER 41.8EC (PROPICONAZOLE) FUNGICIDE	66222-42	3.250E-002 gal/ac	[Propiconazole 0.122 lb/acre]
DUPONT ALTACOR INSECT CONTROL	352-730	0.200 lb/ac	[Chlorantraniliprole 7.000E-002 lb/acre]
SULFUR 6L	66330-211	1.000 gal/ac	[Sulfur 6.032 lb/acre]
ZIRAM 76DF FUNGICIDE	4581-140	8.000 lb/ac	[Ziram 6.080 lb/acre]
CHATEAU HERBICIDE SW	59639-99	0.750 lb/ac	[Flumioxazin 0.383 lb/acre]
GLYFOS X-TRA HERBICIDE	4787-23	0.600 gal/ac	[Glyphosate, isopropylamine salt 2.391 lb/acre]
SURFLAN A.S. AGRICULTURAL HERBICIDE	70506-43	1.000 gal/ac	[Oryzalin 4.000 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.
- Above and right, pesticide schedules and ipmprime.com annual cumulative risk summaries from the same peach orchard ten years apart.
- Three high risks were generated in 2009 vs. 24 in 1999.

Who's Using ipmprime.com in the Marketplace?

Whole Foods Market

- Responsibly Grown Rating System encourages ipmprime.com for pesticide risk reduction and mitigation.

Third Party Certifications

- Red Tomato Eco Apple ™ and TruEarth Certified use ipmprime.com to inform pesticide use restrictions and prohibitions.
- EquiTable Food Initiative (EFI), developed by Oxfam with Costco participating, focuses on pesticide risk reduction and on farm worker well being.

OXFAM · RED TOMATO righteous produce! · WHOLE FOODS MARKET · EFI · COSTCO WHOLESALE · TruEarth CERTIFIED

Learn more about how ipmprime.com can help your company or organization. Visit ipmprime.com or contact pshannon-hughes@ipminstitute.org.

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