PARTNERSHIP for AG RESOURCE MANAGEMENT
sustainability | profitability | science

IPM in Corporate Sustainability Initiatives: What do Sysco, McDonald's, Whole Foods Market and Walmart have to do with IPM?

IPM Innovation in Europe
January 14, 2015 Poznan, Poland

Dr. Thomas Green, CCA, TSP, President and co-founder

ipmworks@ipminstitute.org

www.ipminstitute.org

IPM Institute of North America

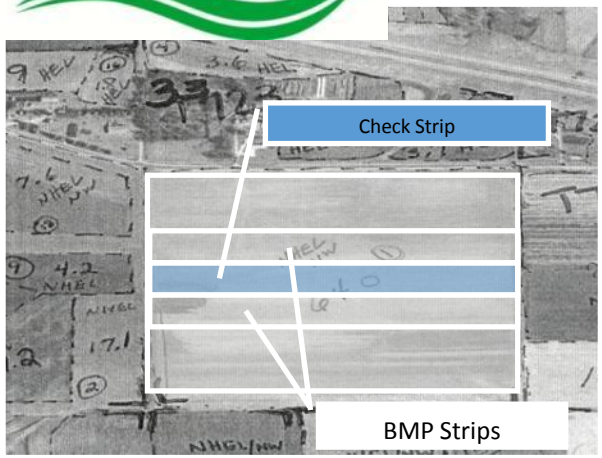
2012, 2009 US EPA Sustained Excellence in IPM Award

2009, 2008, 2005, 2004 National Champion, US EPA Pesticide Environmental Stewardship Program

2005 Children's Environmental Health Recognition Award,

US EPA Office of Children's Health Protection

Leveraging marketplace power to improve health, environment and economics



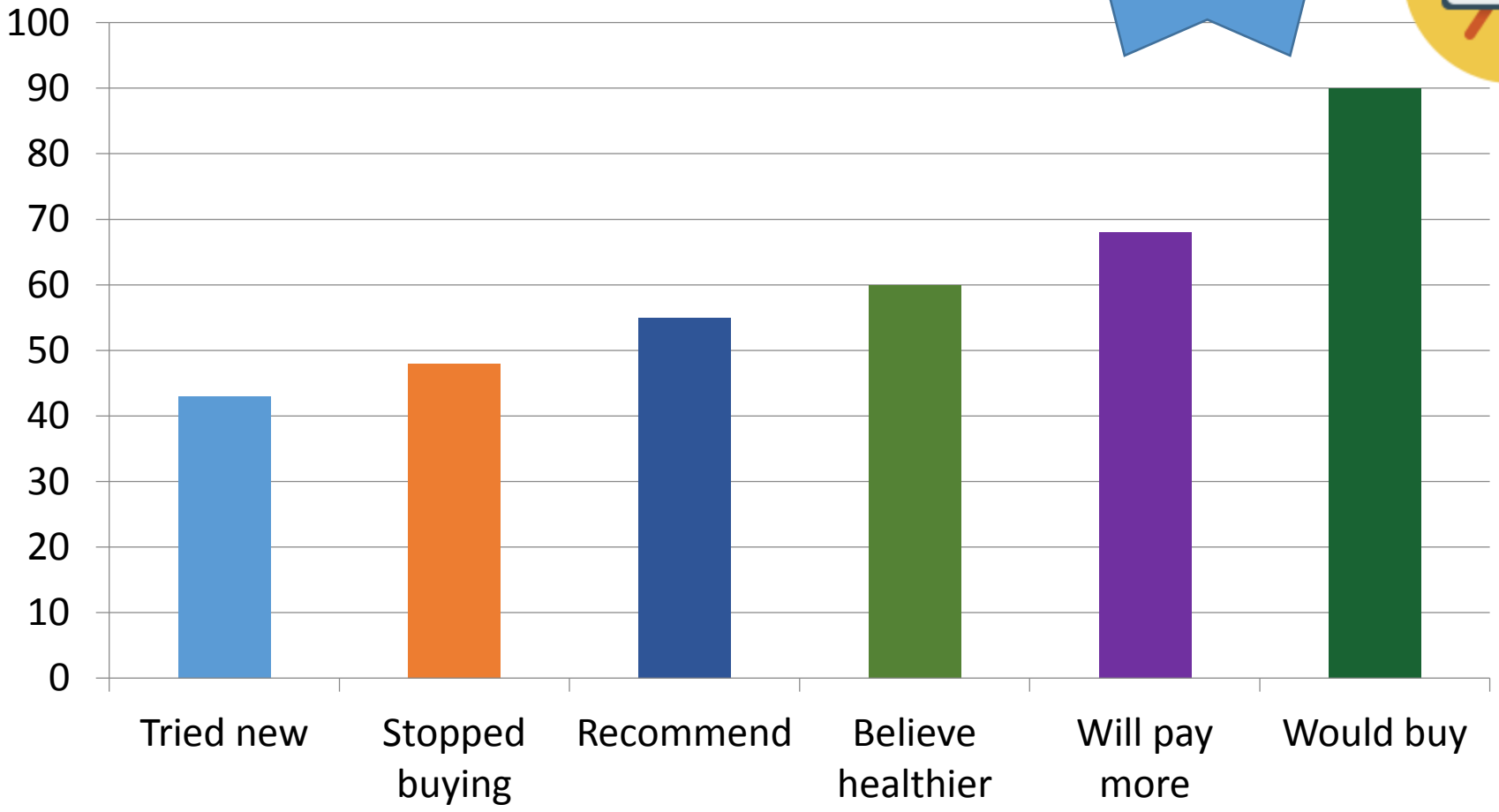
Eighth International IPM Symposium
March 2015, Salt Lake City, Utah, USA

International Congress of Entomology, IPM Track
2016, Orlando, Florida, USA
Symposia proposals due March 2, 2015

Market Drivers

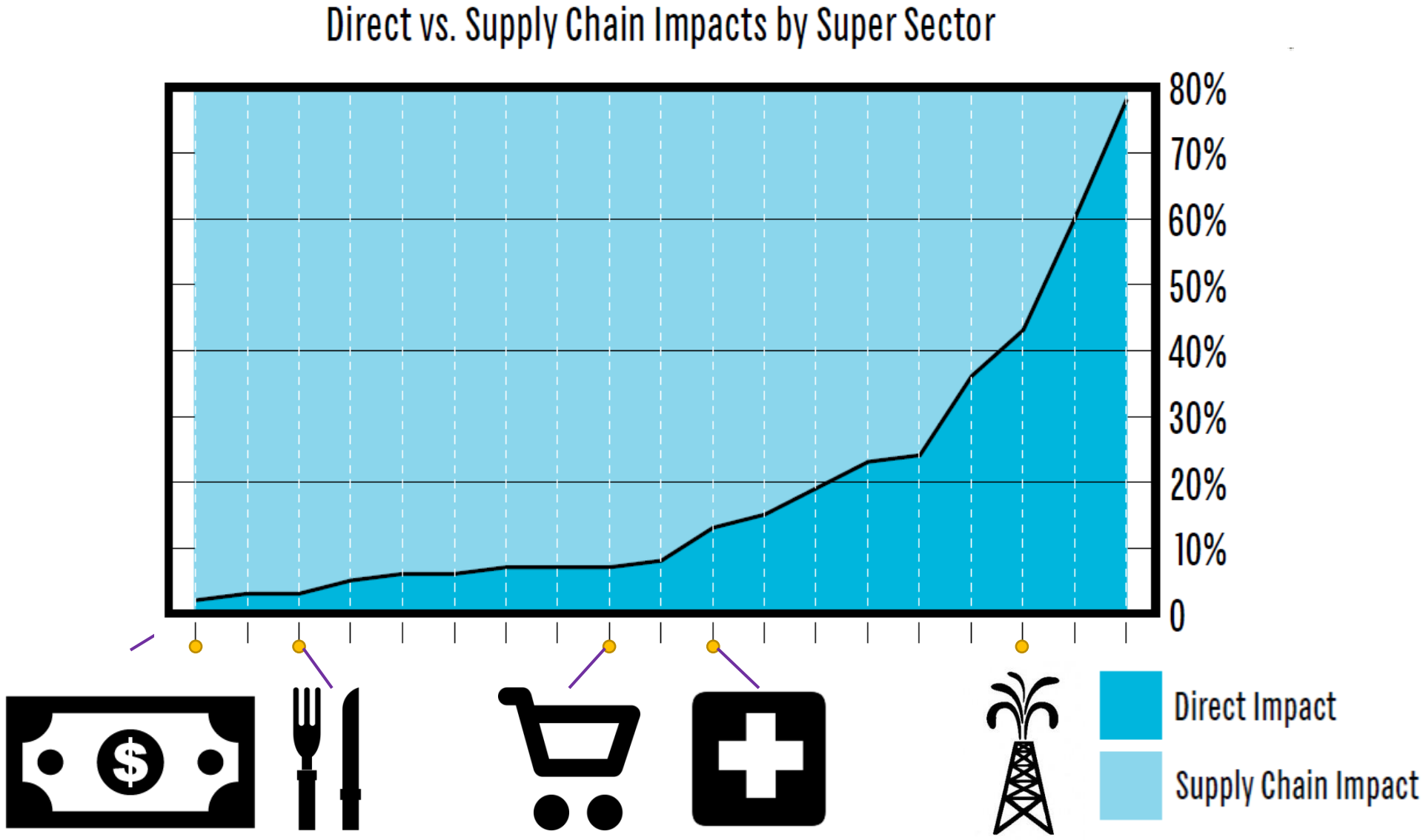
Pesticides a top concern!

Customers choosing green



Source: http://www.contextmarketing.com/sources/feb28-2010/cm-ethicalfood-cover.pdf

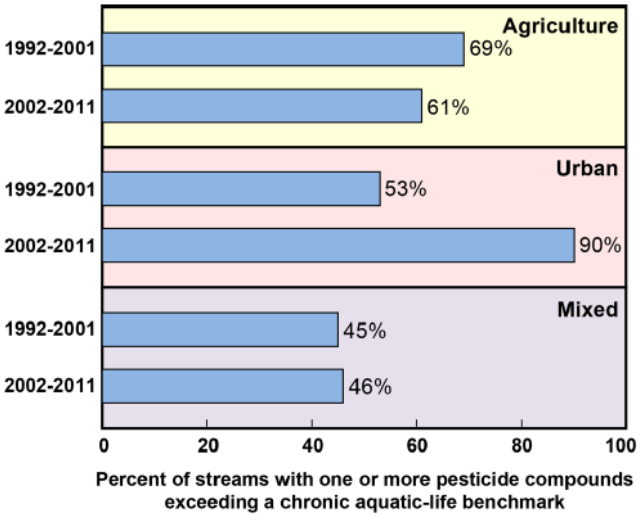
Food/Bev Supply Chain Impacts



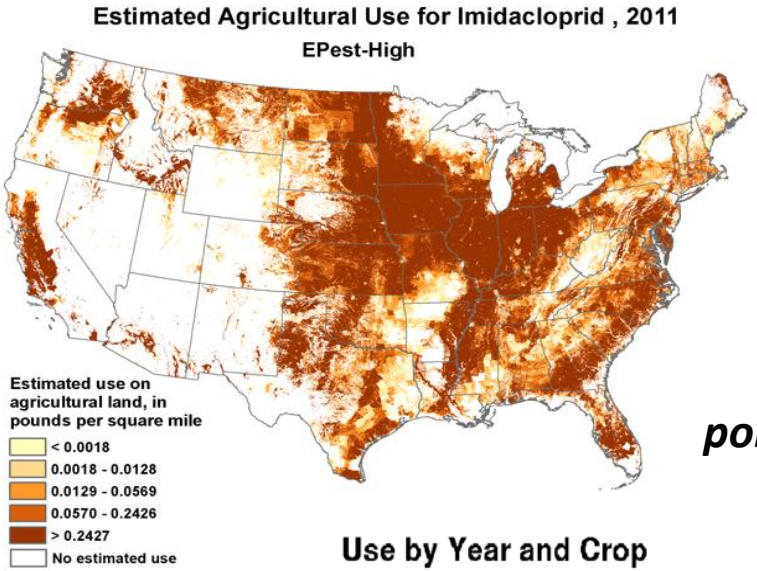
Source: http://www.greenbiz.com/research/report/2013/02/state-green-business-report-2013

IPM and impacts?

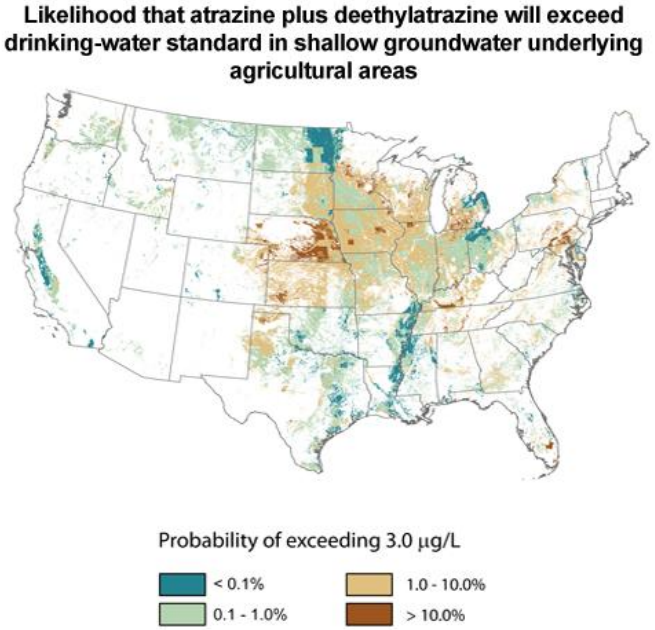
Lots of progress,
and plenty more to do



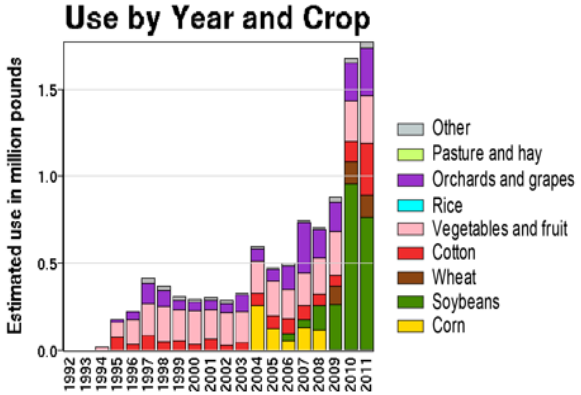
surface water



pollinators



ground water



Source: Stone *et al.*, 2014, Pesticides in US Streams, *Env. Sci. and Tech.*
USGS Pesticide National Synthesis Project, water.usgs.gov/nawqa/pnsp/

The IPM Institute
of North America, Inc.

Why not Organic?

Growing,
still less than 1% of US ag land

Long-standing and new production challenges:
plant diseases
spotted wing drosophila
brown marmorated stink bug

We all do IPM; the question is how much?

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2010-2012: USDA Natural Resources Conservation Service. Five watersheds assessed to date.

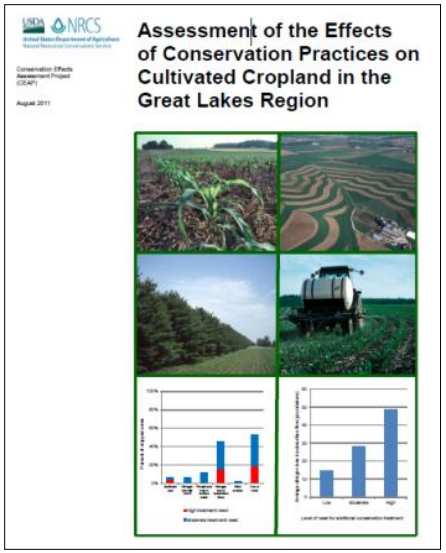


Figure 11. Integrated Pesticide Management indicator for the baseline conservation condition, Chesapeake Bay region

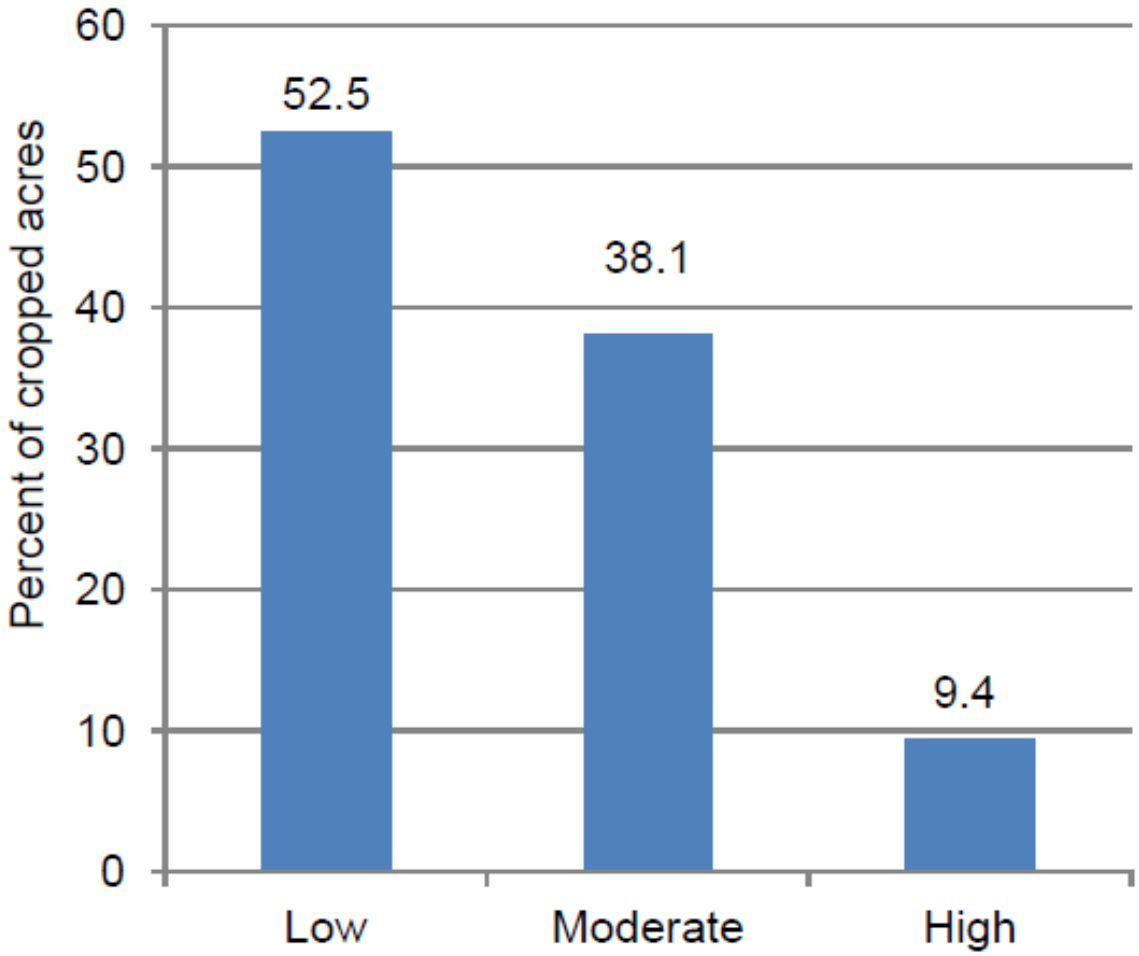


Table 10. Summary of survey responses to pest management questions, Chesapeake Bay region

Survey question*	Number samples with "yes" response	Percent of cropped acres
Prevention		
Pesticides with different action rotated or tank mixed to prevent resistance	252	33
Plow down crop residues	133	20
Chop, spray, mow, plow, burn field edges, etc.	264	33
Clean field implements after use	272	35
Remove crop residue from field	72	10
Water management used to manage pests (irrigated samples only)	12	1
Avoidance		
Rotate crops to manage pests	531	66
Use minimum till or no-till to manage pests	482	56
Choose crop variety that is resistant to pests	299	34
Planting locations selected to avoid pests	109	12
Plant/harvest dates adjusted to manage pests	53	6
Monitoring		
Scouting practice: general observations while performing routine tasks	278	36
Scouting practice: deliberate scouting	366	44
--Established scouting practice used	156	19
--Scouting due to pest development model	62	8
--Scouting due to pest advisory warning	99	9
Scouting done by: (only highest of the 4 scores is used)		
--Scouting by operator	221	27
--Scouting by employee	2	<1
--Scouting by chemical dealer	86	10
--Scouting by crop consultant or commercial scout	63	7
Scouting records kept to track pests?	140	17
Scouting data compared to published thresholds?	221	26
Diagnostic lab identified pest?	58	6
Weather a factor in timing of pest management practice	250	31

IPM Elements/Guidelines

The IPM Institute of North America, Inc.

= Lists of IPM and related practices. Also known as IPM checklists, protocols, standards, definitions.

Used to:

- Assess level of adoption/uptake.
- Identify potential practices to adopt
- Provide incentives for specific practices.
- Identify practices that suffer low adoption, to identify and address barriers.

Boutwell, J.L. and R.H. Smith. 1981. A new concept in evaluating integrated pest management programs. *Bull. Entomol. Soc. Amer. 27(2) 117-188.*

Coli, W.M. and C.S. Hollingsworth. 1996. Defining the ambiguous: Massachusetts' crop-specific IPM guidelines allow growers to understand and benefit from their pest management programs. *The Grower, April 1996, pp. 48-49, 58.*

Petzoldt, C., J. Kovach and A. Seaman. 1998. *Integrated Pest Management Elements for New York Crops. Cornell IPM Publication #124 .*

NEW YORK STATE Integrated Pest Management PROGRAM

Cornell University Cooperative Extension

Elements of IPM for Fresh Market Sweet Corn in New York State

MAJOR PESTS		
Insects	Diseases	Weeds
European corn borer	common rust	broadleaves
corn earworm	smut	annual grasses
fall armyworm	northern corn leaf blight	perennials
corn flea beetle	Stewart's wilt	
corn leaf aphid	anthracnose	
western corn rootworm	maize dwarf mosaic	
seed corn maggot	seed rots	
cutworms	barley yellow dwarf virus	
common armyworm		
sap beetles		

A. Site Preparation	Priority	Points	Acreage Goal	Achieved
1) Review weed map/list of fields to choose appropriate weed control strategies. See the Weed Assessment List available for use in satisfying this element.	M	5	50%	2.5
2) Crop Rotation. Plant only in fields where sweet or field corn has not been grown in the previous year to avoid corn root worm, anthracnose, smut, and northern corn leaf blight				
a. Fields harvested before Aug. 15:	L	3	25%	
b. Fields harvested after Aug. 15:	H	10	75%	
3) Soil test at least every three years; fertilize according to recommendation	H	10	100%	
B. Planting				
1) Use tolerant or resistant varieties whenever possible for controlling common rust, smut, and Stewart's wilt, NCLB, maize dwarf mosaic, barley yellow dwarf	M	5	25%	
2) Seed treatment. Use fungicide treated seed or biological seed treatment for control of root and seed rots.	H	10	100%	

1

Listing the major pests lets the reader assess how closely these match up with pests at their location.

Crop and geographic scope.

In this case, users can receive five points for implementing this element on 50% of their acreage.

In this example, practices are prioritized by importance. Users earn more points for practices that are more likely to improve health, environmental or economic impacts.

The user enters points scored, e.g., this practice was completed on 25% of the producer's total acreage.

Points allow developers to signal priority or level of difficulty, and users the flexibility to pick and choose practices that fit their operation.

Nutrient management practices are included. Although not typically considered an IPM practice, nutrient management addresses water quality concerns and can also impact pest populations, e.g., excessive nitrogen can sometimes flare aphid populations.

Available LGU Elements/Guidelines

Alfalfa (New York)
Alfalfa (Ohio)
Apple (Massachusetts)
Apple (Ohio)
Apples (New York)
Asparagus (New York)
Banana (Hawaii)
Beets (New Jersey)
Beets (New York)
Blueberries (New York)
Blueberry, Highbush (Massachusetts)
Brussels Sprouts (New York)
Cabbage (New Jersey)
Cabbage (New York)
Cabbage (Ohio)
Carrot (Ohio)
Carrots (New Jersey)
Carrots (New York)
Cauliflower (New Jersey)
Cauliflower (New York)
Cherry (Ohio)
Christmas Trees (North Carolina)
Christmas Trees (Virginia)
Cole Crops (Massachusetts)
Corn, Field (New York)
Corn, Field (Ohio)
Corn, Sweet (Ohio)
Cranberry (Massachusetts)
Cucumber (New York)
Cucumber (Pickles) (Ohio)
Cucumbers (New Jersey)
Dry Beans (New York)
Grapes (New York)
Greenhouses (New York)
Honey Bees (Delaware)
Honey Bees (Maryland)
Honey Bees (New Jersey)
Honey Bees (North Carolina)
Honey Bees (Pennsylvania)
Honey Bees (South Carolina)
Honey Bees (Virginia)
Honey Bees (West Virginia)
Lettuce (New York)
Lettuce (Ohio)
Macadamia Nut (Hawaii)
Melon (New York)
Melons (New Jersey)
Onions (New York)
Peach (Ohio)
Pear (Ohio)
Peas (New Jersey)
Peas (New York)
Pepper (Massachusetts)
Pepper (Ohio)
Peppers (New Jersey)
Peppers (New York)
Pineapple (Hawaii)
Plum (Ohio)
Poinsettia (Massachusetts)
Potato (Massachusetts)
Potato (Ohio)
Potatoes (New York)
Pumpkin (Massachusetts)
Pumpkin (New York)
Pumpkin (Ohio)
Pumpkins (New Jersey)
Radish (Ohio)
Raspberries (New York)
Raspberry (Massachusetts)
Residential Turfgrass (Ohio)
Snap Bean (Ohio)
Snap Beans (New Jersey)
Snap Beans (New York)
Soybean (Ohio)
Squash (Massachusetts)
Squash (Ohio)
Strawberries (New York)
Strawberry (Massachusetts)
Sugarcane (Hawaii)
Summer Squash (New Jersey)
Summer Squash (New York)
Sweet Cherries (New York)
Sweet corn (Massachusetts)
Sweet corn (New Jersey)
Sweet Corn, Fresh Market (New York)
Sweet Corn, Processing (New York)
Tomato, Field (Massachusetts)
Tomato, Greenhouse (Massachusetts)
Tomato, Processing (Ohio)
Tomatoes (New Jersey)
Tomatoes, Fresh Market (New York)
Tomatoes, Greenhouse (New York)
Wheat (Ohio)
Wine Grapes (Massachusetts)
Wine Grapes (North Carolina)
Wine Grapes (Virginia)
Winter Squash (New Jersey)
Winter Squash (New York)

http://www.ipmcenters.org/ipmelements/index.cfm

Eco Apple

The IPM Institute of North America, Inc.

- RED TOMATO distributes; IPM Institute maintains standards, certifies growers.
- IPM, water, energy, waste, LOCAL!
- Learning community: UMass, UConn, Penn State, Cornell, growers, crop consultants.
- Biggest customers? Trader Joe's, Whole Foods

Minimum requirements:
You must (for example) sample mites and mite predators before applying miticide, use insecticide for tarnished plant bug only if trap captures over threshold.

Point-based advanced practices:
E.g., use trap out to control apple maggot fly

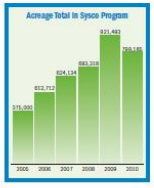
Red (do not use), Yellow (use with restrictions) and Green (use with justification) pesticide list:
E.g., do not use organophosphates, endosulfan, paraquat, permethrin, ziram, ….

Corporate Sustainability Initiatives

Good things come from Sysco™

Sysco Sustainable/Integrated Pest Management Initiative

Environmental Indicator Report Summary for the 2010 Processing Season



Participating suppliers submit written programs addressing criteria we establish with input from suppliers, university experts and other reviewers. These written programs are assessed and scored by the IPM Institute of North America. Suppliers implement the program and participate in an annual third-party audit of their performance that includes both processing facilities and their raw material suppliers. In addition, suppliers annually report environmental indicator information such as pesticide and nutrient applications, and recycling and reuse activities.

The purpose of this summary is to communicate results for the 2010 processing season.

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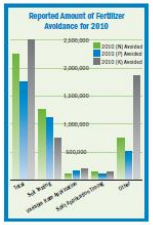
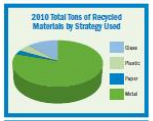
- The number of suppliers has increased as we reached out to our many small suppliers – those producing only one or two specialty crops for Sysco – and enrolled them in the program this past year. Processing locations involved in the program have declined due to several factors, including a shift in purchasing practices and processor consolidation.

2010 TOTAL POUNDS OF PESTICIDES AVOIDED BY STRATEGY USED

Strategy	2010 lbs. Avoided	2009 lbs. Avoided
Scouting and thresholds	74,338	189,226
Weather monitoring	35,441	61,015
Beneficial organisms released	11,868	2,855
Beneficial organisms conserved	13,374	3,802
Pheromone mating disruption	16,194	9,439
Crop Rotation	77,191	4,590
Trap cropping	9,002	100
Trapping	18,418	8,302
Other	20,569	573,949
Total	**276,395**	**797,277**

- Suppliers continue to recognize the value of documenting IPM practices and the significance of independent verification. Despite the decrease in the number of processing locations, third-party audits remained relatively stable in 2010. Audits are required for each supplier and in each geographic region of operation, regardless of the number of processing locations.
- Fifty-seven suppliers submitted environmental indicator reports in 2010, representing 40% of the total supplier base, a 9% decrease from 2009. Suppliers that were added in 2010 are beginning to build their programs and capacity to complete the indicator report. Many of these added specialty suppliers are from outside the US and face language hurdles. It is our intention to work very closely with the newest suppliers to assist in the development of their programs.
- The program currently includes more than 4,000 growers of agricultural products worldwide. Environmental indicator reports submitted this year represent results from 2,432 growing operations.
- We continue to track actual pesticide use in pounds per acre and by acute toxicity to mammals, indicated by the signal word (Danger, Warning or Caution) on the product label. Depending on weather conditions, new pests and other factors, pesticide use can fluctuate considerably from year to year. Reported pesticide use per acre in 2010 is similar to the information provided for 2004. suggesting the drop in use in 2009 was due to unusually light pest pressure that year. In addition, reported use indicates a trend towards use of least toxic pesticides, which includes a number of products used at higher rates per acre including oils and sulfur.





2010–2011 Highlights:

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- Our suppliers have reported a total avoidance of nearly 3 million pounds of pesticides over the six years of the program.
- The reported amount of fertilizer avoidance for 2010 was over 8 million pounds. Nutrient avoidance decreases the risk of nutrient losses and ground and surface water contamination. Soil testing, changes to fertilizer application methodology, cover crop programs, crop rotations, use of organics/manures and University partnerships were identified by our suppliers as leading strategies to ensure appropriate fertilization. The table at left summarizes strategies reported by our agricultural community. Recent increases in fertilizer costs and developments in technology permitting more precise application timing, amount and placement are key drivers of these improvements.
- The amount of resources reported as reused in the 2010 pack season exceeded six million tons. This includes organic material put back into the fields, used as cattle feed or otherwise recovered from the waste stream and diverted from disposal in landfills and waste-water treatment plants. Our suppliers reported a 27% increase in reused materials, despite the 13% decrease in acreage.
- Materials reported as recycled exceeded 445,000 tons. This includes metals, glass, wood based materials, plastics, pesticide containers and oils. This is an increase of 70% in the reported materials recycled. Suppliers are tracking their recycled materials with more accuracy, as beneficial avenues for disposal become more readily available.
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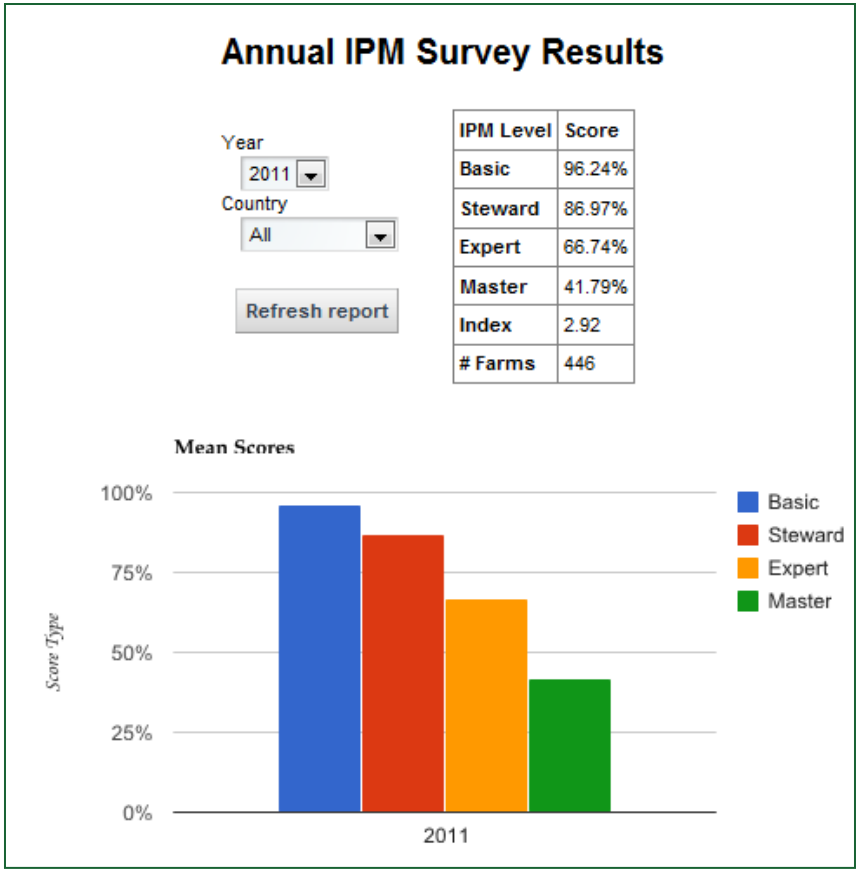
Processing water used in 2010 for irrigation was 41,712,417 tons.

In recognition of the importance of energy conservation in managing costs and slowing climate change, this year for the first time we are reporting the following reductions in fuel use as a result of conservation strategies for this crop, region and reporting year.

2010 FIELD AND PROCESSING ENERGY CONSERVATION

Strategy	2010 Gallons Conserved
Field production energy use: Improving energy efficiency of irrigation pumps	150,762
Field production energy use: Tractor auto-steering to increase fuel efficiency	22,681
Field production energy: Tillage equipment used to reduce energy use (no till, low till, avoid Moldboard plow, etc.)	14,262
Field production energy use: Transition to bio-diesel	63,593
Field production energy use: Transition to ethanol	1,846



Practices <u>and</u> performance metrics: pesticides, fertilizer, water, energy, waste…

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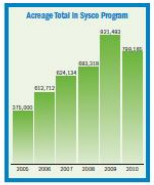

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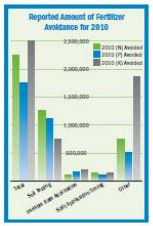

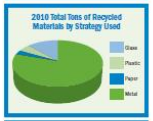

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Strategy	2010 Gallons Conserved
Field production energy use: Improving energy efficiency of irrigation pumps	150,762
Field production energy use: Tractor auto-steering to increase fuel efficiency	22,681
Field production energy: Tillage equipment used to reduce energy use (no till, low till, avoid Moldboard plow, etc.)	14,262
Field production energy use: Transition to bio-diesel	63,593
Field production energy use: Transition to ethanol	1,846

I'm lovin' it®

LambWeston.

BASIC AMERICAN FOODS

Simplot

Canadian Horticultural Council

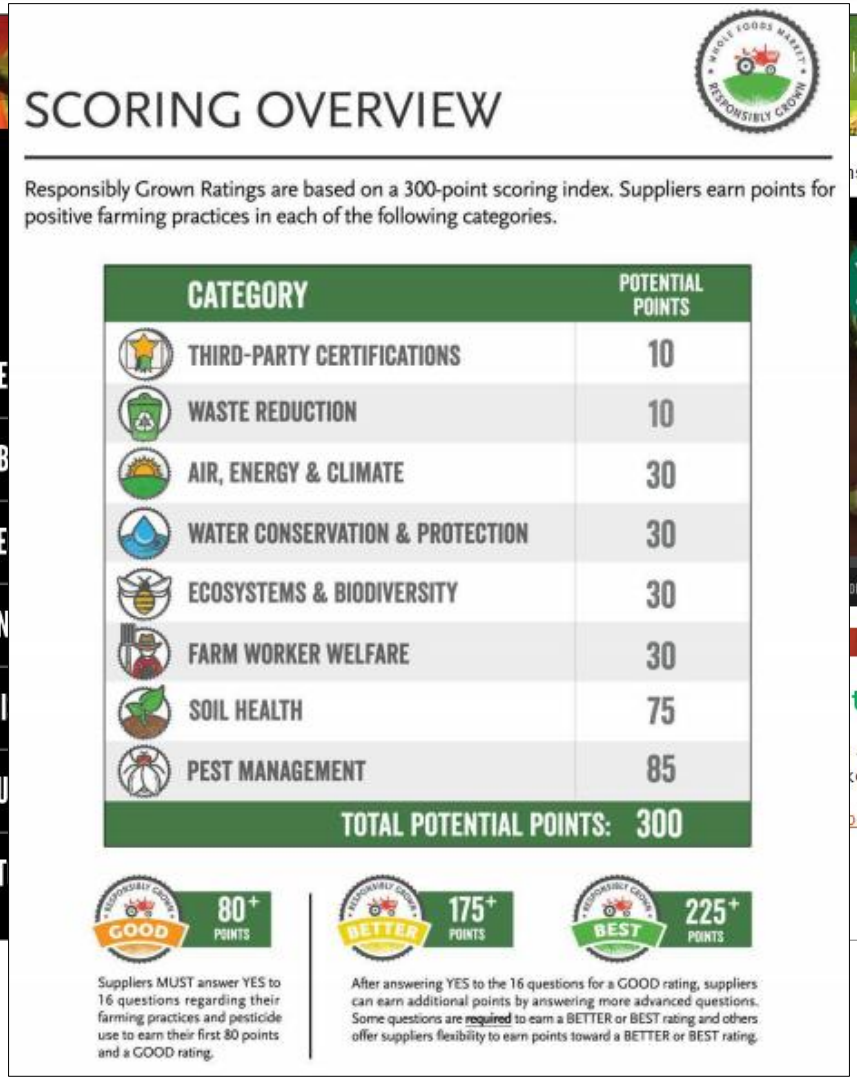
Heinz

NATIONAL POTATO COUNCIL
EST. 1948

LES FERMES CAVENDISH FARMS

McCain

Corporate Sustainability Initiatives



SCORING OVERVIEW

Responsibly Grown Ratings are based on a 300-point scoring index. Suppliers earn points for positive farming practices in each of the following categories.

CATEGORY	POTENTIAL POINTS
THIRD-PARTY CERTIFICATIONS	10
WASTE REDUCTION	10
AIR, ENERGY & CLIMATE	30
WATER CONSERVATION & PROTECTION	30
ECOSYSTEMS & BIODIVERSITY	30
FARM WORKER WELFARE	30
SOIL HEALTH	75
PEST MANAGEMENT	85
TOTAL POTENTIAL POINTS:	300

GOOD 80+ POINTS

Suppliers MUST answer YES to 16 questions regarding their farming practices and pesticide use to earn their first 80 points and a GOOD rating.

BETTER 175+ POINTS

BEST 225+ POINTS

After answering YES to the 16 questions for a GOOD rating, suppliers can earn additional points by answering more advanced questions. Some questions are **required** to earn a BETTER or BEST rating and others offer suppliers flexibility to earn points toward a BETTER or BEST rating.

COMPREHENSIVE SCORING SUMMARY

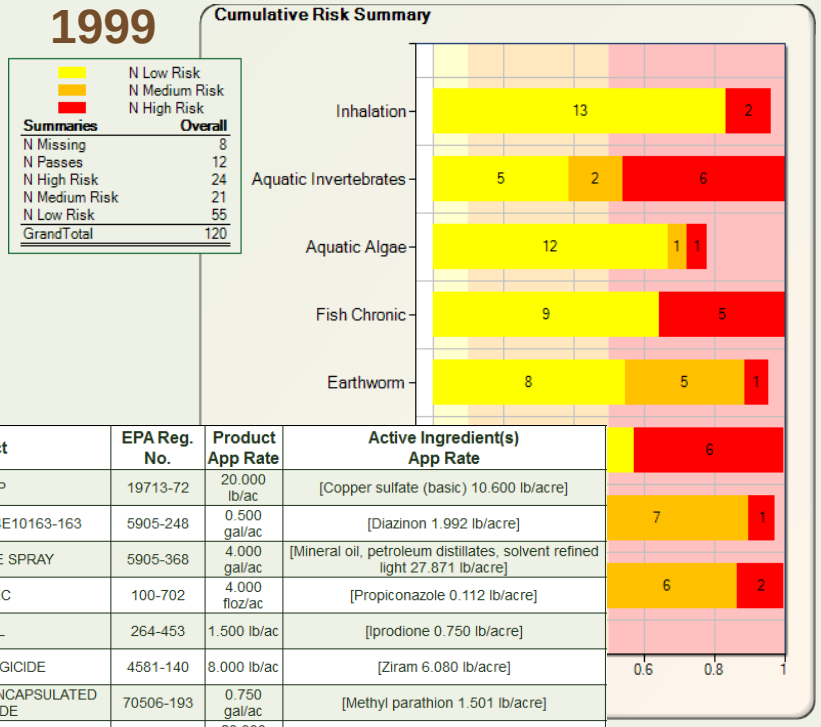
SCORING CATEGORY	POTENTIAL POINTS	SPECIFIC RATING REQUIREMENTS	MINIMUM SCORING REQUIREMENTS PER CATEGORY/RATING
Certification Base Points	10		
See page 8 for Third-Party Certification scoring details.	10	- - -	
Farming Practices	40		
Compliance with laws	5		Suppliers must earn **all 40 points** in this category to qualify for a Responsibly Grown rating.
Soil tests	5		
Irrigation by crop need	5		
Environmental planning	5		
Nutrient application: Planning	5		
Nutrient application: Recordkeeping	5		
Nutrient application: Equipment calibration	5		
Air quality	5		
Pesticide Use Policy	40		
Non-pesticidal strategies	5		Suppliers must earn **all 40 points** in this category to qualify for a Responsibly Grown rating.
Current knowledge of pests, diseases & weeds	5		
US EPA registration and label use	5		
Prohibited pesticides list	5		
Pesticide application: Planning	5		
Pesticide application: Recordkeeping	5		
Pesticide application: Equipment calibration	5		
Pesticide drift mitigation plan	5		
Advanced Pest Management	45		
Non-pesticidal measures	10	-	Must score a **minimum of 20 pts.** in this category to qualify for BETTER or BEST.
Pesticide resistance identification & mitigation	10	- - -	
ipmPRiME.com analysis	15	- * *	
Pesticide risk reduction (based on ipmPRiME.com)	10	- - -	
Ecosystems and Biodiversity	25		
Environmentally sensitive site protection	6	-	Must score a **minimum of 11 pts.** in this category to qualify for BETTER or BEST.
Habitat	8	- - -	
Reducing Impacts of Pesticides on Pollinators	6	- - *	
Reducing impacts of managed bees	5	- - -	

ipmprime.com: Pesticide risk metric

Data source: California DPR Pesticide Use Reporting

Applications to a block of peaches, illustrating risk reduction from 1999 to 2009.

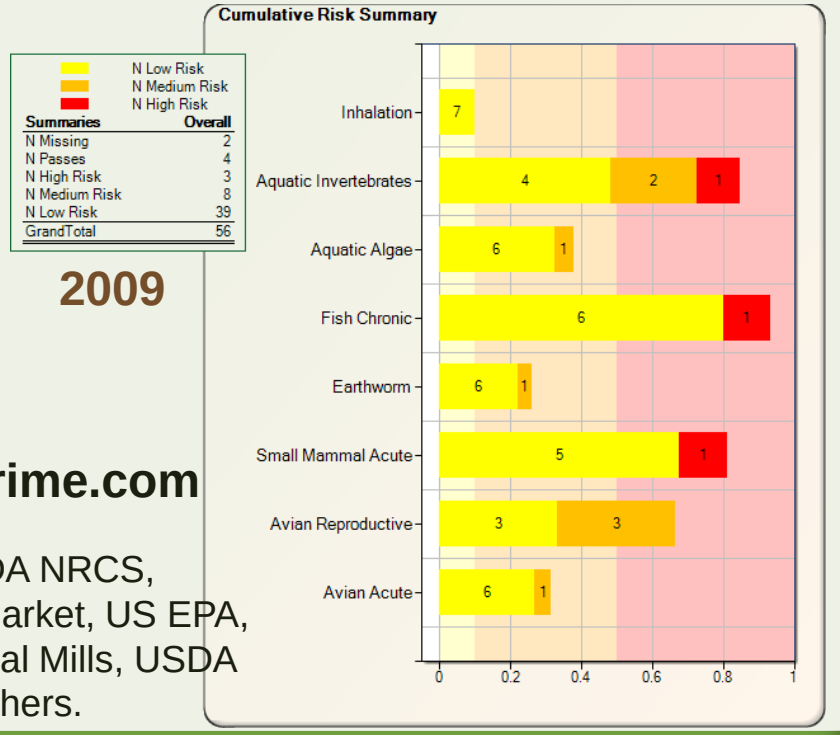
1999



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]

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]

2009



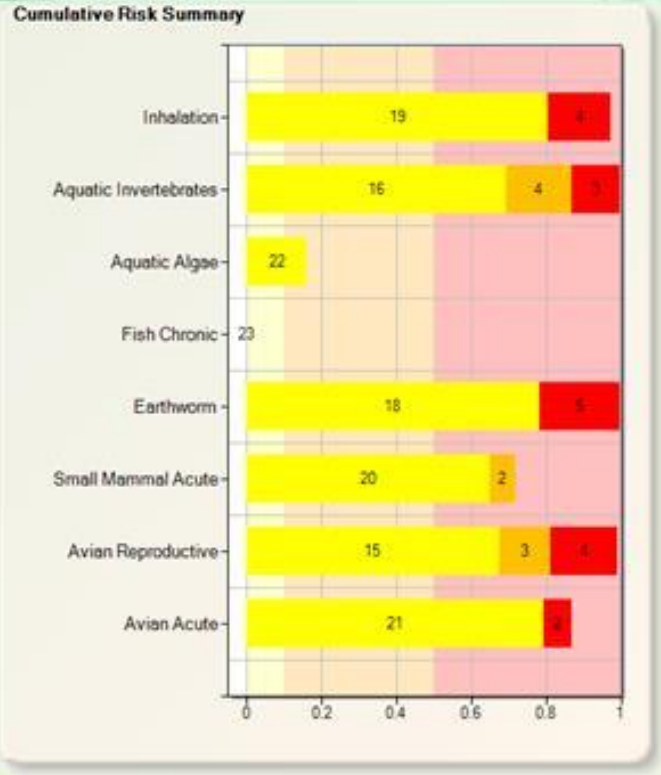
www.ipmprime.com

Funded by USDA NRCS, Whole Foods Market, US EPA, Unilever, General Mills, USDA IPM Centers, others.

Before IPM

ipmPRiME.com

Product	EPA Reg. No.	App Rate	Active Ingredient(s) App Rate
Manzate 75 DF	1812-414	1.940 lb/ac	[Mancozeb 1.455 lb/acre]
Dormant Oil	19713-123	2.500 gal/ac	[Kerosene 17.371 lb/acre]
Manzate 75 DF	1812-414	2.630 lb/ac	[Mancozeb 1.973 lb/acre]
Manzate 75 DF	1812-414	2.630 lb/ac	[Mancozeb 1.973 lb/acre]
Penncozeb	70506-185	2.630 lb/ac	[Mancozeb 1.973 lb/acre]
Danitol	59639-35	0.260 quart/ac	[Fenpropathrin 0.165 lb/acre]
Captan 80	66222-58	1.580 lb/ac	[Captan 1.236 lb/acre]
Delegate	62719-541	2.740 oz/ac	[Spinetoram (XDE-175-J) 4.281E-002 lb/acre]
Sevin XLR	264-333	1.050 quart/ac	[Carbaryl 1.053 lb/acre]
Flint	264-777	2.110 oz/ac	[Trifloxystrobin 6.594E-002 lb/acre]
Captan 80	66222-58	1.580 lb/ac	[Captan 1.236 lb/acre]
Assail	8033-36	0.210 lb/ac	[Acetamiprid 6.300E-002 lb/acre]
Captan 80	66222-58	1.580 lb/ac	[Captan 1.236 lb/acre]
Captan 80	66222-58	1.500 lb/ac	[Captan 1.173 lb/acre]
Rimon	66222-35	32.000 floz/ac	[Novaluron 0.207 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Imidan	10163-169	1.600 lb/ac	[Phosmet 1.120 lb/acre]
Zeal	59639-123	1.200 oz/ac	[Etoxazole 5.400E-002 lb/acre]
Captan 80	66222-58	1.680 lb/ac	[Captan 1.314 lb/acre]
Imidan	10163-169	1.680 lb/ac	[Phosmet 1.176 lb/acre]
Captan 80	66222-58	2.000 lb/ac	[Captan 1.564 lb/acre]
Assail	8033-36	0.250 lb/ac	[Acetamiprid 7.500E-002 lb/acre]



N Low Risk
N Medium Risk
N High Risk

Summaries	Overall
N Missing	3
N Passes	6
N High Risk	18
N Medium Risk	9
N Low Risk	148
GrandTotal	184

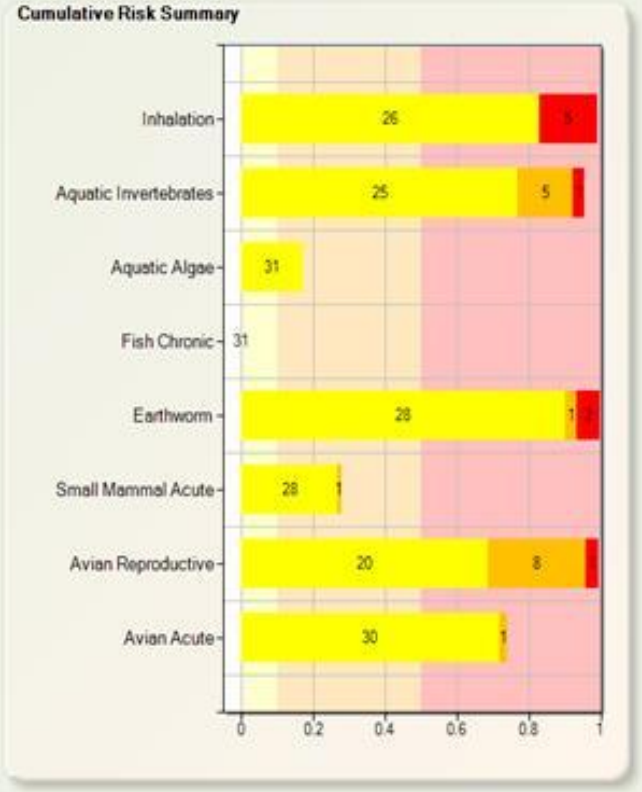
18 potential high risks

midwest apples, 2011

After IPM via NRCS EQIP contract

ipmPRiME.com

Product	EPA Reg. No.	App Rate	Active Ingredient(s) App Rate
Penncozeb 75 DF	70506-185	2.400 lb/ac	[Mancozeb 1.800 lb/acre]
Flint	264-777	1.600 oz/ac	[Trifloxystrobin 5.000E-002 lb/acre]
Dormant Oil	34704-805	2.500 gal/ac	[Mineral oil 17.640 lb/acre]
Penncozeb 75 DF	70506-185	2.570 lb/ac	[Mancozeb 1.928 lb/acre]
Penncozeb 75 DF	70506-185	2.400 lb/ac	[Mancozeb 1.800 lb/acre]
Penncozeb 75 DF	70506-185	2.400 lb/ac	[Mancozeb 1.800 lb/acre]
Penncozeb 75 DF	70506-185	2.400 lb/ac	[Mancozeb 1.800 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Flint	264-777	1.200 oz/ac	[Trifloxystrobin 3.750E-002 lb/acre]
Roundup	524-549	3.000 quart/ac	[Glyphosate, potassium salt 4.139 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Indar	62719-416	3.200 floz/ac	[Fenbuconazole 5.147E-002 lb/acre]
Avaunt	352-597	2.400 oz/ac	[Indoxacarb, S-isomer 4.500E-002 lb/acre]
Rimon	66222-35	32.000 floz/ac	[Novaluron 0.207 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Delegate	62719-541	3.900 lb/ac	[Spinetoram (XDE-175-J) 0.975 lb/acre]
Captan 80	66222-58	1.600 lb/ac	[Captan 1.251 lb/acre]
Delegate	62719-541	3.900 oz/ac	[Spinetoram (XDE-175-J) 6.094E-002 lb/acre]
Captan 80	66222-58	1.800 lb/ac	[Captan 1.408 lb/acre]
Assail	8033-23	6.400 oz/ac	[Acetamiprid 0.280 lb/acre]
Envidor 2.5 EC	264-831	14.000 floz/ac	[Spirodiclofen 0.222 lb/acre]
Captan 80	66222-58	1.875 lb/ac	[Captan 1.466 lb/acre]
Assail	8033-23	7.100 oz/ac	[Acetamiprid 0.311 lb/acre]
Avaunt	352-597	4.500 oz/ac	[Indoxacarb, S-isomer 8.438E-002 lb/acre]
Captan 80	66222-58	1.690 lb/ac	[Captan 1.322 lb/acre]
Imidan	10163-169	1.020 lb/ac	[Phosmet 0.714 lb/acre]
Captan 80	66222-58	1.700 lb/ac	[Captan 1.329 lb/acre]



N Low Risk
N Medium Risk
N High Risk

Summaries	Overall
N Missing	4
N Passes	6
N High Risk	9
N Medium Risk	16
N Low Risk	213
GrandTotal	248

high risks cut in half

same orchard, 2012

And structural pests: Walmart IPM Pilot

46 distribution centers on green program:

- **16,916 fewer gallons of preventive pesticide applications**
- **8421 gallons of pesticide for fogging eliminated in entire network**
- **3.1 tons of rodenticide eliminated**
- **3234 fewer exterior devices**
- **2880 fewer interior devices**
- **PVC eliminates the replacement of 3.5 devices a month for a total of 2,058 devices(1.71 tons of landfill waste).**

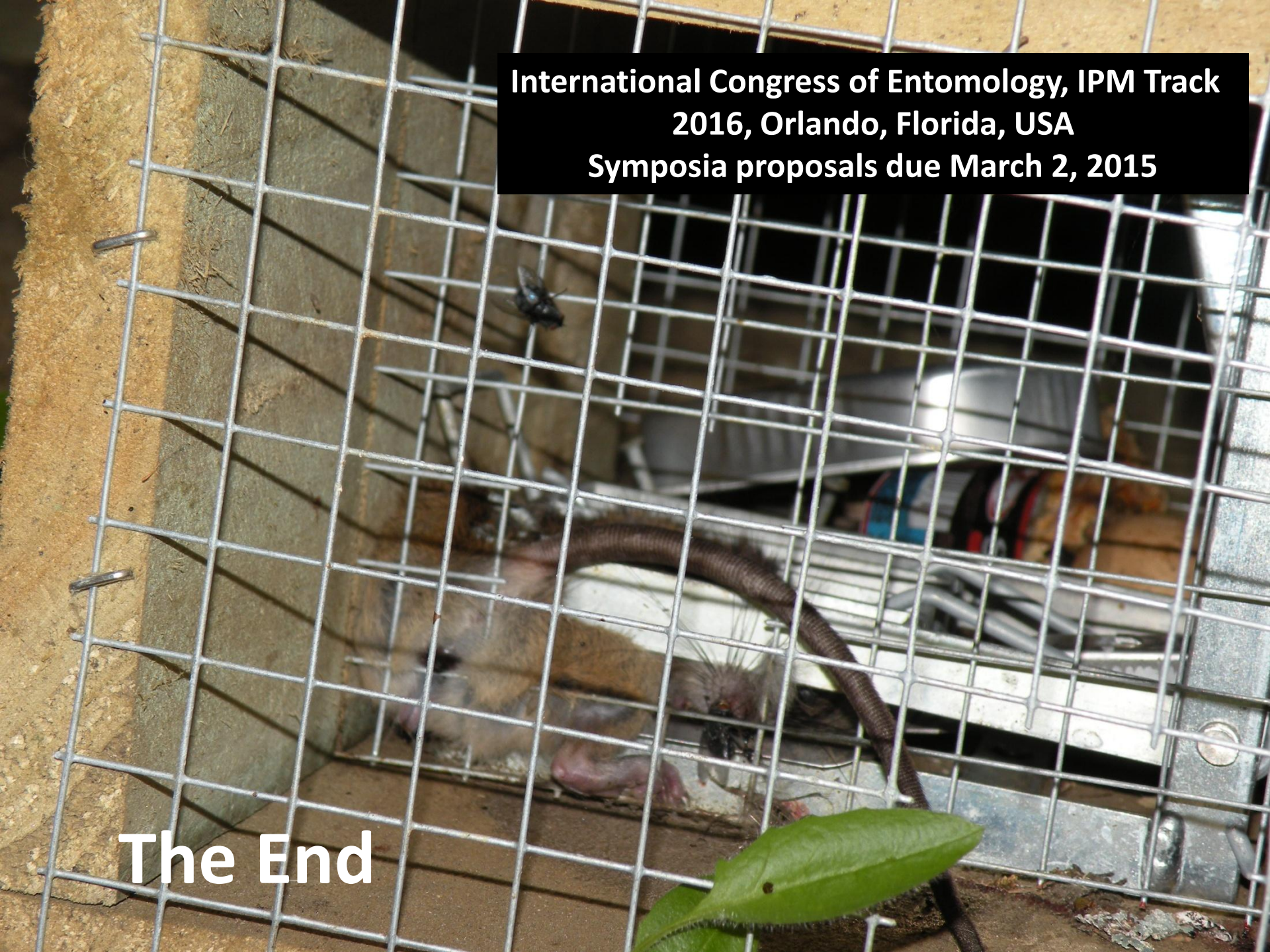
Source: US EPA Office of Pesticide Programs. 2009. *Wal-Mart's PESP Strategy.* www.epa.gov/oppbppd/pesp/strategies/2009/walmart09.htm Viewed on Dec. 8, 2009.

IPM Eco-labels

Eight sustainable agriculture programs requiring IPM of participants reported 40.4 million certified US acres and 375.7 million worldwide in 2013.

- Food Alliance
- Rainforest Alliance,
- Forest Stewardship Council
- Protected Harvest
- Northeast Eco Apple
- Central Coast Vineyard Team
- Low Input Viticulture and Enology (LIVE)
- Salmon Safe

Forest products (35 million acres), meats, dairy, fruits and vegetables, wine and cut flowers. www.ipminstitute.org/links.htm



International Congress of Entomology, IPM Track
2016, Orlando, Florida, USA
Symposia proposals due March 2, 2015

The End