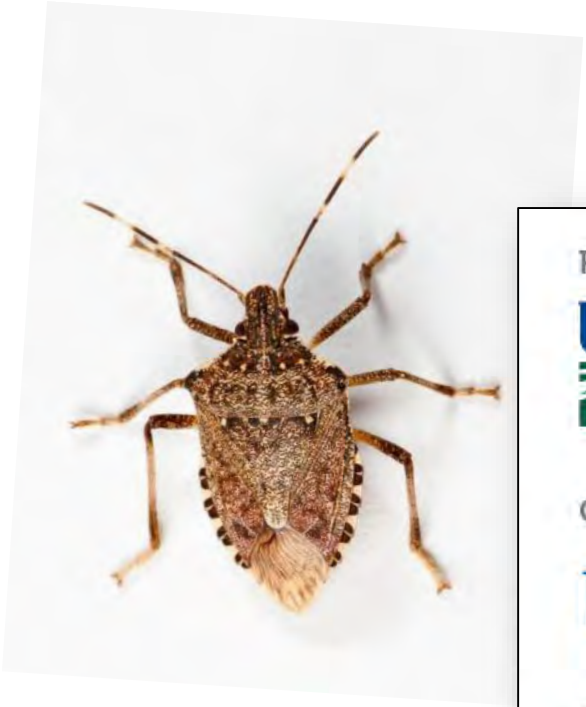
4.1 Economics



PENNSTATE 1855

PennState

Funding

USDA United States Department of Agriculture

National Institute of Food and Agriculture

Specialty Crop Research Initiative

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Collaborating Institutions

University of Delaware

ars

PennState 1855

The State University of New Jersey RUTGERS

Northeastern IPM Center

Washington State University

Cornell University

University of Maryland

VirginiaTech

OSU Oregon State University

NC State University

Stop BMSB .org

Economic Evaluation Team Report- 2015

Jayson K. Harper
Professor of Agricultural Economics
Penn State University

Objectives of the economic evaluation:

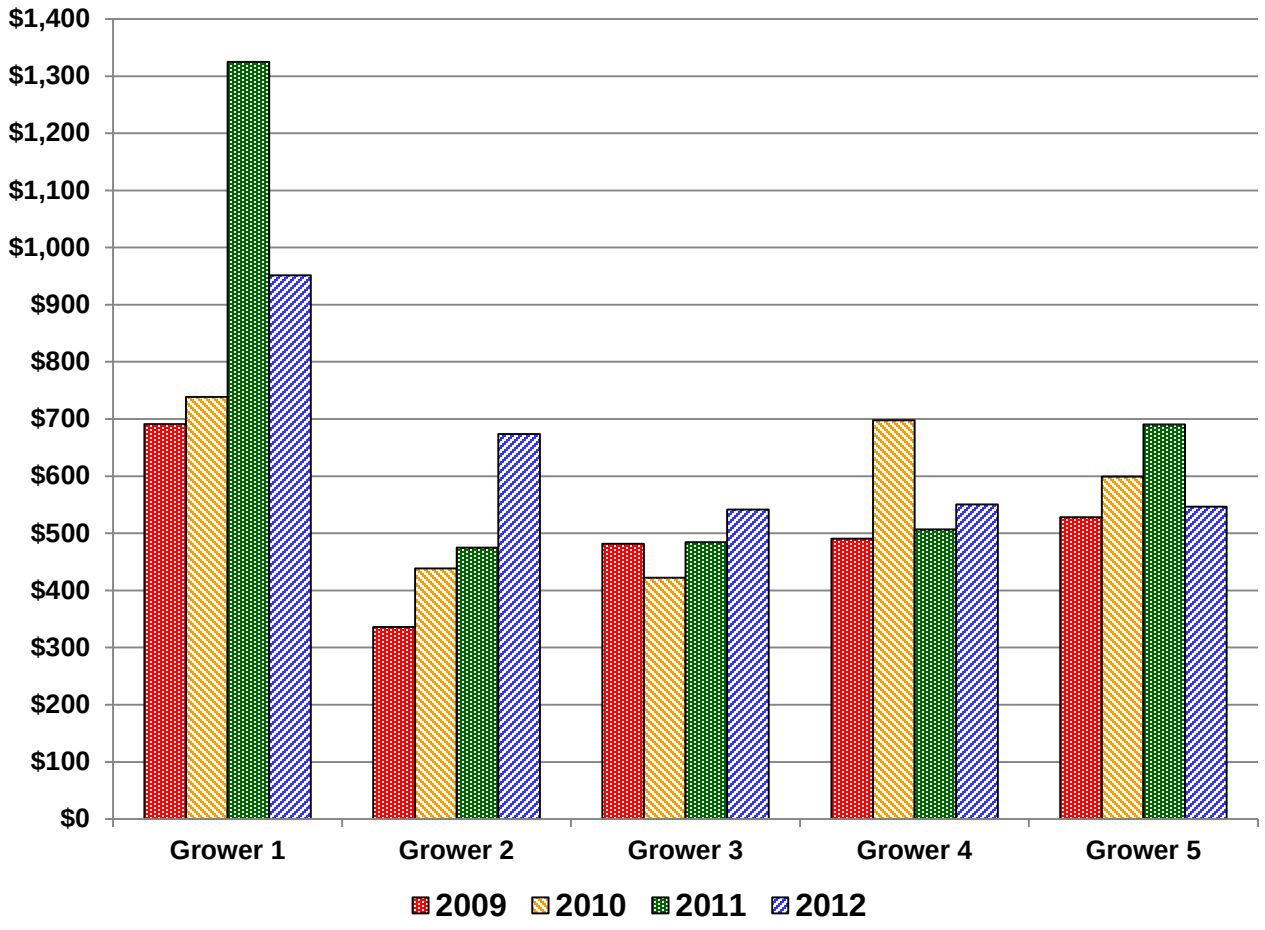
1) assess the impact of BMSB on specific commodities
2) estimate the cost of BMSB control strategies
3) project the cost and potential benefits of proposed management strategies

Economic information can be useful for:
- prioritizing research and extension efforts for individual commodities
- encouraging producer adoption of new control tactics
- informing policymakers of the economic impact of this pest

Evaluating the Economic Impact of BMSB

- For individual crops, have looked at how has BMSB has changed the use of insecticides (type of materials and number of applications)
  - Spray record data
- Impact of changes in quality (and marketable yield) can also be incorporated into the analysis (when available)
- Can help estimate the cost and benefit of new BMSB management techniques as they are developed

Impact of BMSB on Insecticide Costs for Apple Growers in WV and MD



Spray records provided by Tracy Leskey, USDA-ARS

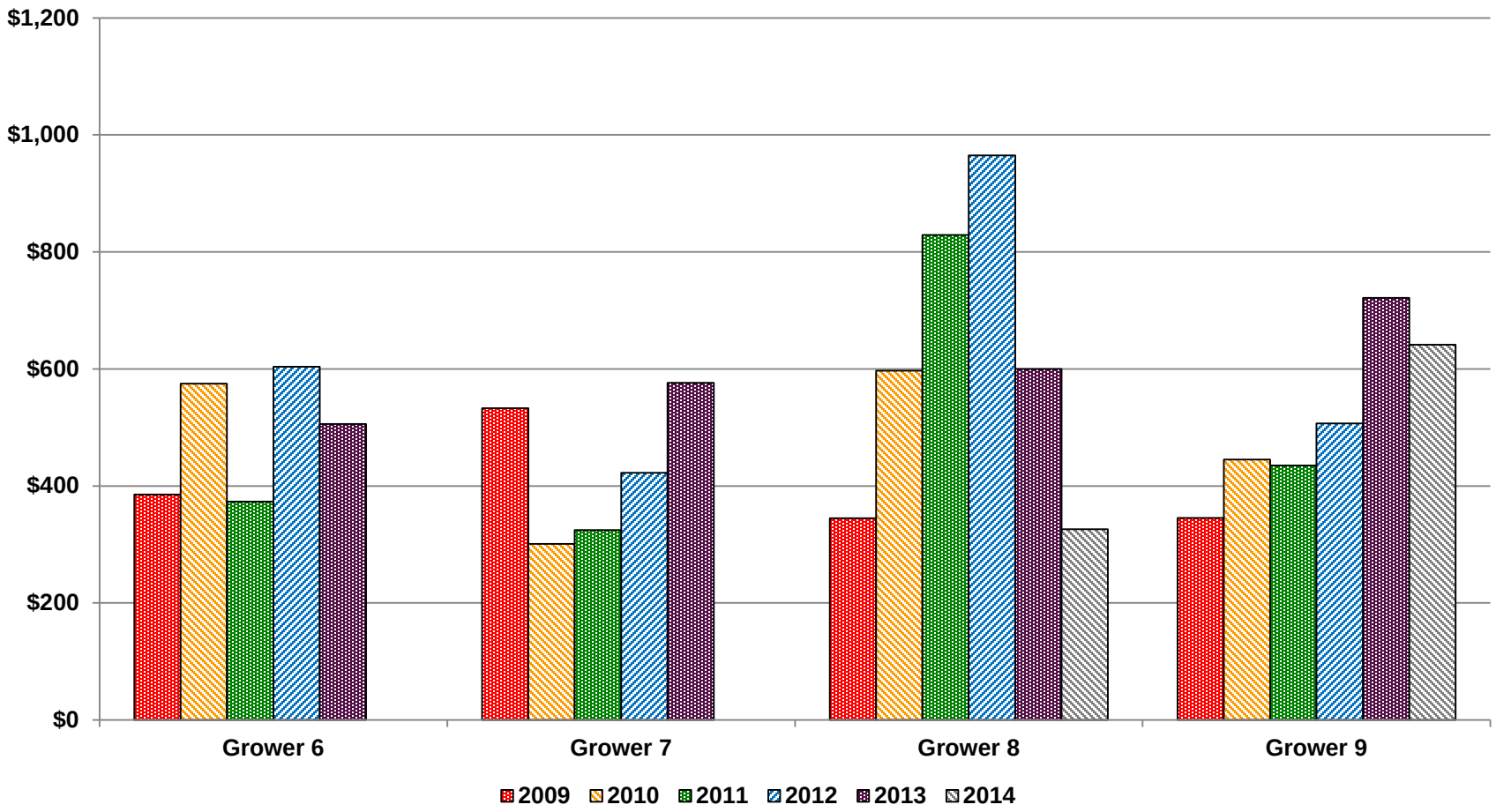
2009 – Pre-BMSB (BMSB had not yet become an issue for growers)

2010 – BMSB outbreak year, but no recommendations available (season-long problems for growers)

2011 – BMSB recommendations being developed and communicated (high populations in early season, but crash in the late season)

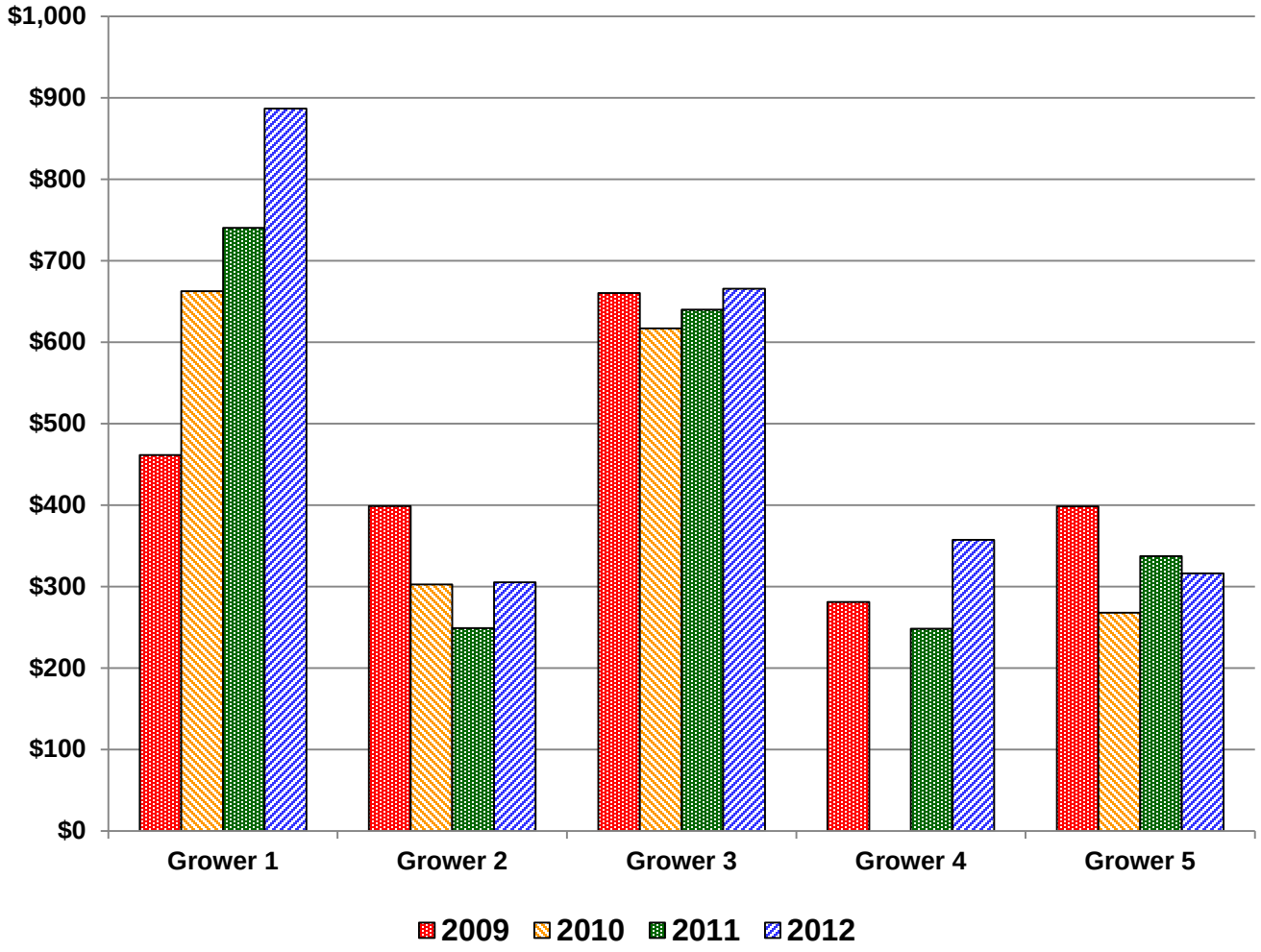
2012 – BMSB recommendations being developed and communicated (low populations in the early season, but high populations late)

Impact of BMSB on Insecticide Costs for Apple Growers in NJ and PA



Spray records provided by of Tracy Leskey, USDA-ARS, Greg Krawczyk, Penn State Univ., and Dean Polk, Rutgers Univ.

Impact of BMSB on Insecticide Costs for Peach Growers in WV and MD



2009 – Pre-BMSB (BMSB had not yet become an issue for growers)

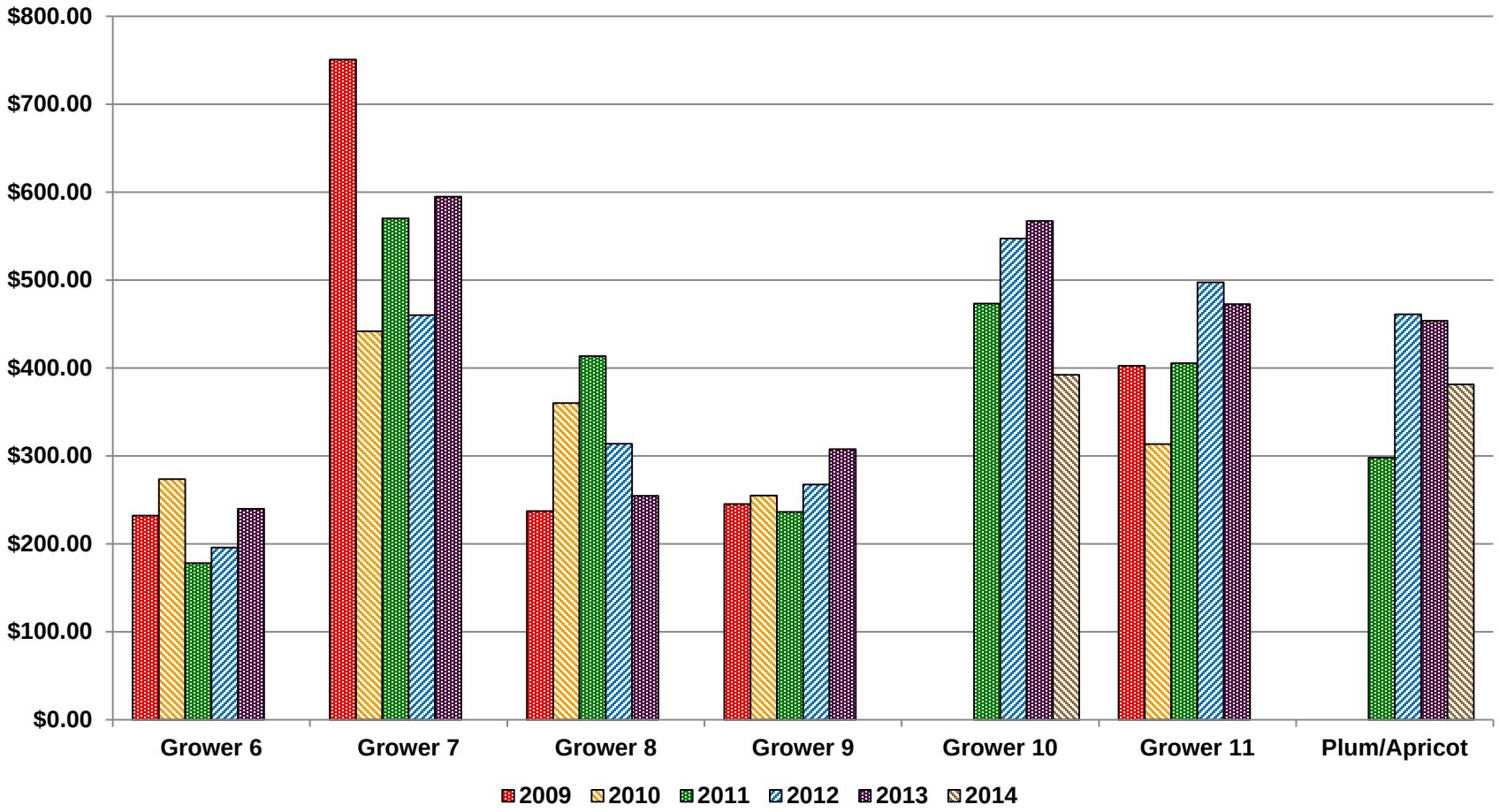
2010 – BMSB outbreak year, but no recommendations available (season-long problems for growers)

2011 – BMSB recommendations being developed and communicated (high populations in early season, but crash in the late season)

2012 – BMSB recommendations being developed and communicated (low populations in the early season, but high populations late)

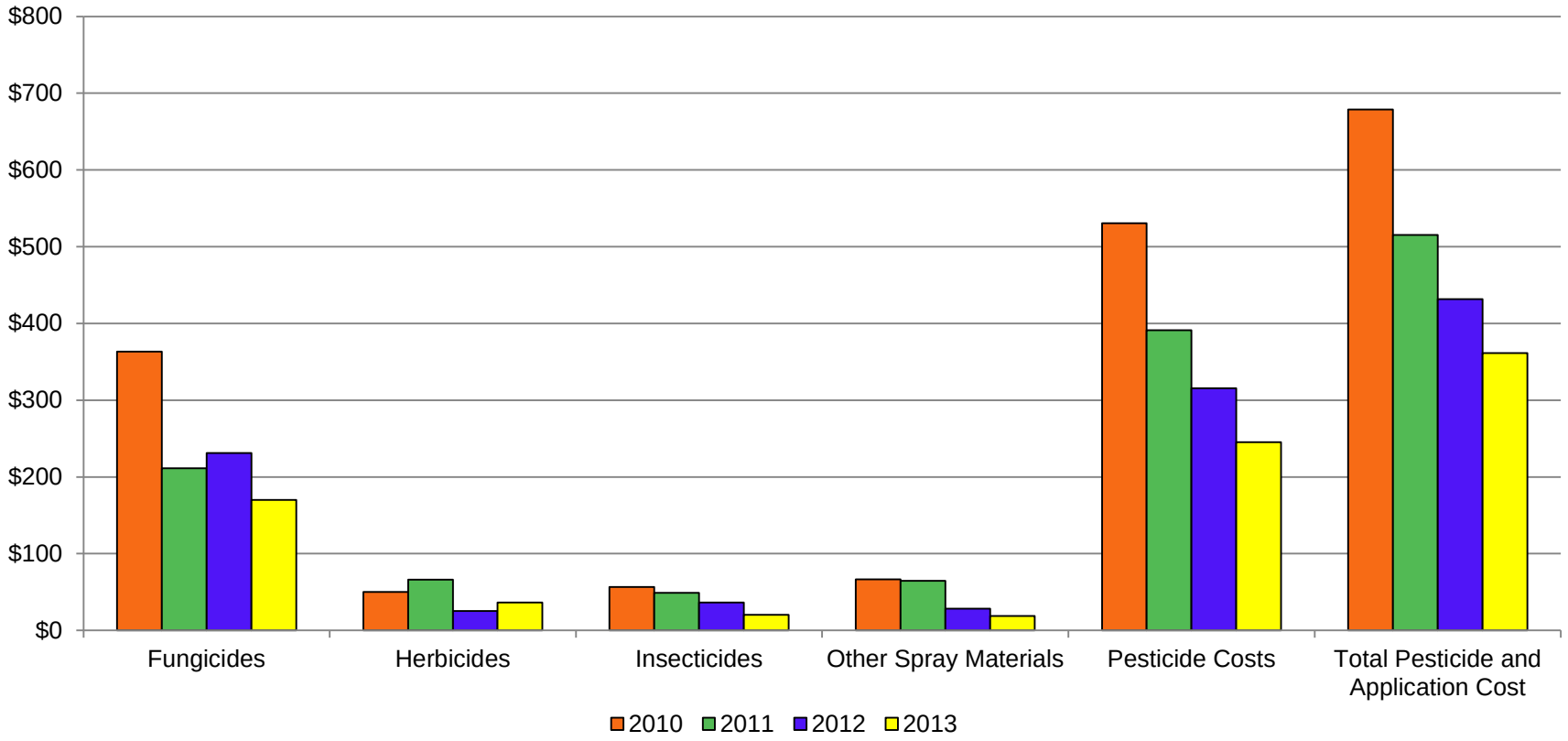
Spray records provided by Tracy Leskey, USDA-ARS

Impact of BMSB on Insecticide Costs for Stone Fruit Growers in NJ and PA



Spray records provided by of Tracy Leskey, USDA-ARS, Greg Krawczyk, Penn State Univ., and Dean Polk, Rutgers Univ.

Processing Tomatoes in central Pennsylvania

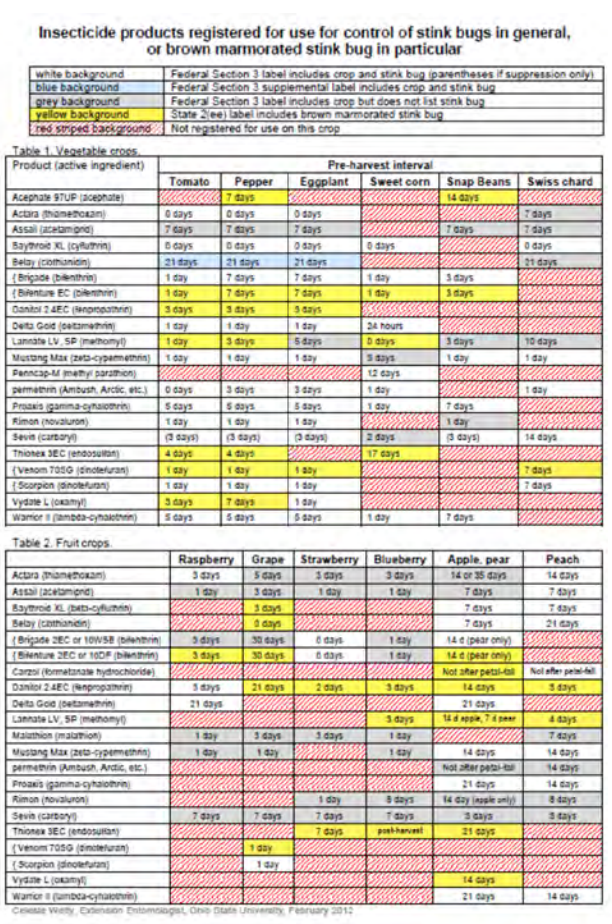


<u>Data from</u>: 9 growers in 2010, 11 growers in 2011, 28 growers in 2012, and 11 growers in 2013

Spray records provided by of Furmano Foods, Northumberland, PA

Cost of BMSB Spray Options

- Idea started with publications by Welty and Lewis, et al.
  - Insecticide PHI by crop
  - Insecticide efficacy by crop
- Developed an Excel spreadsheet to estimate the cost of BMSB spray options by crop (field crops, vegetables, and fruit)
  - Label rates
  - Cost range (default price list can adjusted by user)
  - PHI
  - IRAC mode of action
  - Efficacy
- Plan to make it available in early Spring 2016
  - Update insecticide prices
  - Recheck insecticide labels
  - Fine tune efficacy



Insecticide products registered for use for control of stink bugs in general, or brown marmorated stink bug in particular

white background	Federal Section 3 label includes crop and stink bug (parentheses if suppression only)
blue background	Federal Section 3 supplemental label includes crop and stink bug
grey background	Federal Section 3 label includes crop but does not list stink bug
yellow background	State 2(ee) label includes brown marmorated stink bug
red striped background	Not registered for use on this crop

Table 1. Vegetable crops.

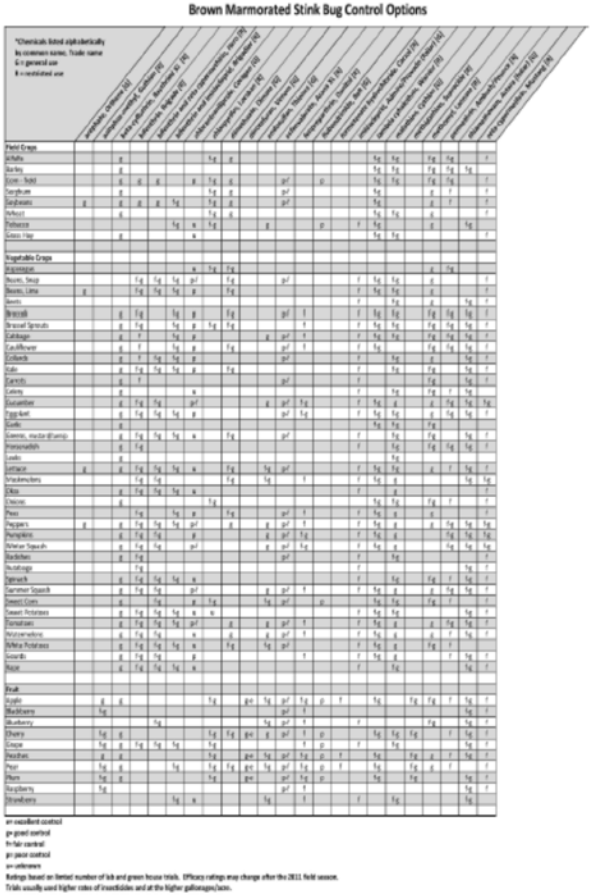
Product (active ingredient)	Pre-harvest interval					
	Tomato	Pepper	Eggplant	Sweet corn	Snap Beans	Swiss chard
Acephate 97UP (acephate)		7 days			14 days	
Actara (thiamethoxam)	0 days	0 days	0 days			7 days
Assail (acetamiprid)	7 days	7 days	7 days		7 days	7 days
Baythroid XL (cyfluthrin)	0 days	0 days	0 days	0 days		0 days
Belay (clothianidin)	21 days	21 days	21 days			21 days
(Brigade (bifenthrin)	1 day	7 days	7 days	1 day	3 days	
(Bifenture EC (bifenthrin)	1 day	7 days	7 days	1 day	3 days	
Danitol 2.4EC (fenpropathrin)	3 days	3 days	3 days			
Delta Gold (deltamethrin)	1 day	1 day	1 day	24 hours		
Lannate LV, SP (methomyl)	1 day	3 days	5 days	0 days	3 days	10 days
Mustang Max (zeta-cypermethrin)	1 day	1 day	1 day	5 days	1 day	1 day
Penncap-M (methyl parathion)				12 days		
permethrin (Ambush, Arctic, etc.)	0 days	3 days	3 days	1 day		1 day
Proaxis (gamma-cyhalothrin)	5 days	5 days	5 days	1 day	7 days	
Rimon (novaluron)	1 day	1 day	1 day		1 day	
Sevin (carbaryl)	(3 days)	(3 days)	(3 days)	2 days	(3 days)	14 days
Thionex 3EC (endosulfan)	4 days	4 days		17 days		
(Venom 70SG (dinotefuran)	1 day	1 day	1 day			7 days
(Scorpion (dinotefuran)	1 day	1 day	1 day			7 days
Vydate L (oxamyl)	3 days	7 days	1 day			
Warrior II (lambda-cyhalothrin)	5 days	5 days	5 days	1 day	7 days	

Table 2. Fruit crops.

	Raspberry	Grape	Strawberry	Blueberry	Apple, pear	Peach
Actara (thiamethoxam)	3 days	5 days	3 days	3 days	14 or 35 days	14 days
Assail (acetamiprid)	1 day	3 days	1 day	1 day	7 days	7 days
Baythroid XL (beta-cyfluthrin)		3 days			7 days	7 days
Belay (clothianidin)		0 days			7 days	21 days
(Brigade 2EC or 10WSB (bifenthrin)	3 days	30 days	0 days	1 day	14 d (pear only)	
(Bifenture 2EC or 10DF (bifenthrin)	3 days	30 days	0 days	1 day	14 d (pear only)	
Carzol (formetanate hydrochloride)					Not after petal-fall	Not after petal-fall
Danitol 2.4EC (fenpropathrin)	3 days	21 days	2 days	3 days	14 days	3 days
Delta Gold (deltamethrin)	21 days				21 days	
Lannate LV, SP (methomyl)				3 days	14 d apple, 7 d pear	4 days
Malathion (malathion)	1 day	3 days	3 days	1 day		7 days
Mustang Max (zeta-cypermethrin)	1 day	1 day		1 day	14 days	14 days
permethrin (Ambush, Arctic, etc.)					Not after petal-fall	14 days
Proaxis (gamma-cyhalothrin)					21 days	14 days
Rimon (novaluron)			1 day	8 days	14 day (apple only)	8 days
Sevin (carbaryl)	7 days	7 days	7 days	7 days	3 days	3 days
Thionex 3EC (endosulfan)			7 days	post-harvest	21 days	
(Venom 70SG (dinotefuran)		1 day				
(Scorpion (dinotefuran)		1 day				
Vydate L (oxamyl)					14 days	
Warrior II (lambda-cyhalothrin)					21 days	14 days

Celeste Welty, Extension Entomologist, Ohio State University, February 2012

Ohio State handout
(Welty, 2012)



University of Maryland publication
(Lewis, Dively, Hooks, and Brust, 2011)

Cornell Apple Insecticide Selection Tool

Click boxes: Instructions | CALCULATE RESULTS

Management scenarios evaluated:

- 1) Any insecticide (including restricted use materials)
- 2) No restricted-use pesticides
- 3) Pesticides approved for use on Long Island only
- 4) OMRI approved pesticides only
- 5) Reduced risk/low impact insecticides only
- 6) Non-OP insecticides only

Application Rate: (•) Low ( ) Mid ( ) High

Efficacy desired: (•) Moderate minimum ( ) Highest available

Pre-harvest interval: 14

Trade Name	Active ingredient	unit	Default Price per unit	Your price per unit	Price to use for analysis	Reduced Risk/Low Impact?	OP?
Acramite 50WS	bifenazate	lb	$65.98	$0.00	$65.98	N	N
Actara 25WDG	thiamethoxam	oz	$3.42	$0.00	$3.42	Y	N
Admire Pro 4.6SC	imidacloprid	oz	$2.68	$0.00	$2.68	N	N
Agree 3.8WS	*Bacillus thuringiensis*	lb	$13.00	$0.00	$13.00	Y	N
Agri-Flex SC	abamectin/thiamethoxam	oz	$3.84	$0.00	$3.84	N	N
Agri-Mek 8SC	abamectin	oz	$4.55	$0.00	$4.55	N	N
Altacor 35WDG	chlorantraniliprole	pt	$12.50	$0.00	$12.50	Y	N
Ambush 25WP	permethrin	oz	$0.45	$0.00	$0.45	N	N
Apollo 4SC	clofentezine	oz	$5.40	$0.00	$5.40	Y	N
Asana XL 0.66EC	esfenvalerate	oz	$0.56	$0.00	$0.56	N	N
Assail 30SG	acetamiprid	oz	$4.61	$0.00	$4.61	Y	N
Avaunt 30WDG	indoxacarb	oz	$6.35	$0.00	$6.35	Y	N
Aza-Direct 1.2L	azadirachtin	oz	$1.65	$0.00	$1.65	Y	N
Azatin XL 0.27EC	azadirachtin	oz	$3.00	$0.00	$3.00	Y	N
Baythroid XL 1EC	cyfluthrin	oz	$1.37	$0.00	$1.37	N	N
Beleaf 50SG	flonicamid	oz	$10.05	$0.00	$10.05	Y	N
Belt 4SC	flubendiamide	oz	$6.73	$0.00	$6.73	Y	N
Biobit XL 2.1FC	*Bacillus thuringiensis*	lb	$12.75	$0.00	$12.75	Y	N
Calypso 4F	thiacloprid	oz	$5.26	$0.00	$5.26	Y	N
Carpovirusine 0.99SC	granulosis virus	qt	$277.00	$0.00	$277.00	Y	N
Centaur 0.7WDG	buprofezin	oz	$2.43	$0.00	$2.43	Y	N

Pesticide list goes on for 75 lines…

BMSB Insecticide Selection Tool

Click boxes:

Instructions

CALCULATE RESULTS

BMSB management scenarios evaluated:

1) Least expensive option for PHI
2) Least expensive option for PHI with a different IRAC
3) Least expensive option for PHI with highest efficacy level
4) Least expensive option for PHI with highest efficacy level and different IRAC

Application Rate:

- ○ Low
- ◉ Mid
- ○ High

Pre-harvest interval: 14

Trade Name	Active ingredient	unit	Default Price per unit	Your price per unit	Price to use for per unit
Actara	thiamethoxam	oz.	$3.35	**$0.00**	**$3.35**
Admire Pro	imidacloprid	oz.	$1.08	**$0.00**	**$1.08**
Agri-Mek 1.5	abamectin	oz.	$2.06	**$0.00**	**$2.06**
Altacor	chlorantraniliprole	oz.	$10.90	**$0.00**	**$10.90**
Ambush	permethrin	oz	$0.35	**$0.00**	**$0.35**
Asana XL	esfenvalerate	oz.	$0.43	**$0.00**	**$0.43**
Assail	acetamiprid	oz.	$4.28	**$0.00**	**$4.28**
Avaunt	indoxacarb	oz.	$5.31	**$0.00**	**$5.31**
Aza-Direct	azadirachtin	oz.	$1.74	**$0.00**	**$1.74**
Baythroid	beta-cyflutrin	oz.	$1.09	**$0.00**	**$1.09**
Belay	clothianidin	oz.	$2.17	**$0.00**	**$2.17**

55 insecticides listed…

Mid-point rate, 14 day PHI	Least expensive option					Least expensive option, different IRAC					Least expensive option, highest efficacy					Least expensive option, highest efficac different IRAC				
Crop	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy	
alfalfa	Baythroid	$1.96	7	2	3	Dimethoate	$4.56	3	4	1	Lannate SP	$20.12	7	1	1	Baythroid	$ 1.96	7	2	
barley	Mustang	$3.64	14	3	3	Malathion 5EC	$7.44	7	4	1	Lannate SP	$10.06	1	1	1	Mustang	$ 3.64	14	3	
corn	Malathion 5EC	$7.44	7	4	1	Coragen	$27.97	14	3	28	Coragen	$27.97	14	3	28	Malathion 5EC	$ 7.44	7	4	
grass hay	Baythroid	$2.40	0	2	3	Malathion 5EC	$9.92	0	4	1	Baythroid	$2.40	0	2	3	Sevin XLR	$ 15.60	14	3	
sorghum, grain	Baythroid	$2.07	14	2	3	Malathion 5EC	$7.44	7	4	1	Lannate SP	$10.06	14	1	1	Baythroid	$ 2.07	14	2	
soybeans	Orthene	$5.84	14	3	1	Intrepid	$9.96	14	4	18	Lannate SP	$8.38	14	1	1	Coragen	$ 27.97	1	3	
tobacco	Admire Pro	$1.51	14	2	4	Thionex 3EC	$2.47	10	1	2	Thionex 3EC	$2.47	10	1	2	Belay	$ 7.60	14	1	
wheat	Mustang	$3.64	14	3	3	Malathion 5EC	$6.20	7	4	1	Lannate SP	$10.06	7	1	1	Mustang	$ 3.64	14	3	
asparagus	Ambush	$1.68	1	3	3	Malathion 5EC	$8.68	1	4	1	Assail	$16.69	1	1	4	Lannate SP	$ 20.12	1	1	
beans, lima	Admire Pro	$1.30	7	2	4	Baythroid	$2.18	7	2	3	Leverage	$5.15	7	1	3	Lannate SP	$ 20.12	1	1	
beans, snap	Admire Pro	$1.30	7	2	4	Brigade	$2.42	14	3	3	Leverage	$5.15	7	1	3	Lannate SP	$ 20.12	1	1	
beets	Admire Pro	$1.30	7	2	4	Brigade	$3.28	1	3	3	Actara	$16.75	7	1	4	Lannate SP	$ 16.76	0	1	
broccoli	Admire Pro	$1.40	7	2	4	Ambush	$1.68	1	3	3	Endigo	$5.10	1	1	3	Lannate SP	$ 16.76	3	1	
brussel sprouts	Admire Pro	$1.40	7	2	4	Ambush	$1.68	1	3	3	Endigo	$5.10	1	1	3	Lannate SP	$ 20.12	3	1	
cabbage	Admire Pro	$1.40	7	2	4	Baythroid	$1.74	0	2	3	Endigo	$5.10	1	1	3	Lannate SP	$ 16.76	1	1	
carrots	Admire Pro	$1.30	7	2	4	Baythroid	$2.40	0	2	3	Leverage	$5.15	7	1	3	Lannate SP	$ 16.76	1	1	
cauliflower	Admire Pro	$1.40	7	2	4	Ambush	$1.68	1	3	3	Endigo	$5.10	1	1	3	Lannate SP	$ 16.76	3	1	
celery	Baythroid	$2.18	0	2	3	Dimethoate	$6.08	10	4	1	Belay	$7.60	7	1	4	Lannate SP	$ 16.76	7	1	
collards	Admire Pro	$1.40	7	2	4	Dimethoate	$3.04	14	4	1	Leverage	$5.52	7	1	3	Lannate SP	$ 20.12	10	1	
cucumber	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	11	1	2	Thionex 3EC	$3.68	11	1	2	Endigo	$ 5.10	1	1	
eggplant	Admire Pro	$1.89	0	2	4	Baythroid	$2.40	0	2	3	Endigo	$5.10	5	1	3	Lannate SP	$ 16.76	5	1	
garlic	Mustang	$3.15	7	3	3	Malathion 5EC	$9.92	3	4	1	Lannate SP	$13.41	7	1	1	Assail	$ 27.82	7	1	
gourds	Warrior II	$3.46	1	2	3	Intrepid	$11.62	3	4	18	Endigo	$5.10	1	1	3	Coragen	$ 34.55	1	3	
greens, mustard/turnip	Admire Pro	$1.40	7	2	4	Baythroid	$1.74	0	2	3	Leverage	$5.52	7	1	3	Lannate SP	$ 20.12	10	1	
horseradish	Admire Pro	$1.30	7	2	4	Mustang	$3.64	1	3	3	Actara	$16.75	7	1	4	Lannate SP	$ 20.12	10	1	
kale	Admire Pro	$1.40	7	2	4	Baythroid	$1.74	0	2	3	Leverage	$5.52	7	1	3	Lannate SP	$ 20.12	10	1	
leeks	Malathion 5EC	$9.92	3	4	1	Actara	$16.75	3	1	4	Actara	$16.75	3	1	4	Coragen	$ 27.97	1	3	
lettuce	Admire Pro	$1.40	7	2	4	Ambush	$2.24	1	3	3	Thionex 3EC	$4.29	14	1	2	Endigo	$ 5.10	7	1	

Mid-point rate, 14 day PHI	Least expensive option					Least expensive option, different IRAC					Least expensive option, highest efficacy					Least expensive option, highest efficac different IRAC			
Crop	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy	IRAC	Insecticide	Cost/A	PHI	Efficacy
muskmelons	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	4	1	2	Thionex 3EC	$3.68	4	1	2	Endigo	$ 5.10	1	1
okra	Admire Pro	$1.89	0	2	4	Brigade	$2.42	7	3	3	Actara	$16.75	3	1	4	Brigade	$ 2.42	7	3
onions	Mustang	$3.15	7	3	3	Malathion 5EC	$9.92	3	4	1	Lannate SP	$20.12	7	1	1	Assail	$ 27.82	7	1
peas	Admire Pro	$1.30	7	2	4	Baythroid	$1.58	3	2	3	Leverage	$5.15	7	1	3	Lannate SP	$ 20.12	1	1
peppers	Admire Pro	$1.89	0	2	4	Baythroid	$2.40	0	2	3	Thionex 3EC	$3.68	4	1	2	Endigo	$ 5.10	5	1
pumpkins	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	11	1	2	Thionex 3EC	$3.68	11	1	2	Endigo	$ 5.10	1	1
radishes	Admire Pro	$1.30	7	2	4	Baythroid	$2.40	0	2	3	Leverage	$5.15	7	1	3	Sevin XLR	$ 15.60	7	3
rape	Admire Pro	$1.40	7	2	4	Baythroid	$1.74	0	2	3	Belay	$7.60	7	1	4	Baythroid	$ 1.74	0	2
rutabaga	Admire Pro	$1.30	7	2	4	Malathion 5EC	$7.44	7	4	1	Actara	$16.75	7	1	4	Sevin XLR	$ 15.60	14	3
spinach	Admire Pro	$1.40	7	2	4	Baythroid	$2.18	0	2	3	Leverage	$5.52	7	1	3	Lannate SP	$ 20.12	7	1
summer squash	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	4	1	2	Thionex 3EC	$3.68	4	1	2	Endigo	$ 5.10	1	1
sweet corn	Baythroid	$1.96	0	2	3	Malathion 5EC	$7.94	5	4	1	Assail	$19.90	7	1	4	Baythroid	$ 1.96	0	2
sweet potatoes	Admire Pro	$1.30	7	2	4	Baythroid	$1.96	0	2	3	Endigo	$5.10	14	1	3	Sevin XLR	$ 18.72	7	3
tomatoes	Admire Pro	$1.89	0	2	4	Baythroid	$2.40	0	2	3	Thionex 3EC	$3.68	4	1	2	Endigo	$ 5.10	5	1
watermelons	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	4	1	2	Thionex 3EC	$3.68	4	1	2	Endigo	$ 5.10	1	1
white potatoes	Admire Pro	$1.40	7	2	4	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	7	1	2	Endigo	$ 5.10	14	1
winter squash	Baythroid	$1.96	0	2	3	Thionex 3EC	$3.68	11	1	2	Thionex 3EC	$3.68	11	1	2	Endigo	$ 5.10	1	1
apple	Baythroid	$2.29	7	2	3	Admire Pro	$3.02	7	2	4	Leverage	$4.78	7	1	3	Lannate SP	$ 20.12	14	1
blackberry	Admire Pro	$3.02	3	2	4	Asana XL	$3.10	7	3	3	Actara	$10.05	3	1	4	Danitol	$ 16.94	3	1
blueberry	Admire Pro	$2.65	3	2	4	Asana XL	$3.10	14	3	3	Assail	$16.69	1	1	4	Danitol	$ 16.94	3	1
cherry	Baythroid	$2.29	7	2	3	Admire Pro	$3.02	0	2	4	Leverage	$4.78	7	1	3	Sevin XLR	$ 43.68	3	3
grape	Admire Pro	$1.30	0	2	4	Baythroid	$2.62	3	2	3	Leverage	$5.15	3	1	3	Malathion 5EC	$ 11.16	3	4
peach	Baythroid	$2.29	7	2	3	Admire Pro	$3.02	0	2	4	Leverage	$4.78	7	1	3	Lannate SP	$ 20.12	4	1
pear	Baythroid	$2.29	7	2	3	Admire Pro	$3.02	7	2	4	Leverage	$4.78	7	1	3	Thionex 3EC	$ 9.81	7	1
plum	Baythroid	$2.29	7	2	3	Admire Pro	$3.02	0	2	4	Leverage	$4.78	7	1	3	Sevin XLR	$ 43.68	3	3
raspberry	Admire Pro	$3.02	3	2	4	Asana XL	$3.10	7	3	3	Actara	$10.05	3	1	4	Danitol	$ 16.94	3	1
strawberry	Admire Pro	$1.40	7	2	4	Thionex 3EC	$4.89	7	1	2	Thionex 3EC	$4.89	7	1	2	Danitol	$ 20.32	2	1

Efficacy of insecticides vs. BMSB?

Name: _____

Title: _____

1) I use a _____ point scale for assigning efficacy values.

2) Describe the scale you are using (examples: “3 = excellent, 2 = good, 1 = fair” or “1 = best, 2 = good, 3 = fair, 4 = slight, 5 = none”, “E = excellent, G = good, F = fair, P = poor”)

_____

_____

_____

_____

_____

3) Please assign an efficacy value (or range of values) for each of the following insecticides versus brown marmorated stink bugs (BMSB). You can skip any insecticides with which you are unfamiliar or for crops outside your expertise.

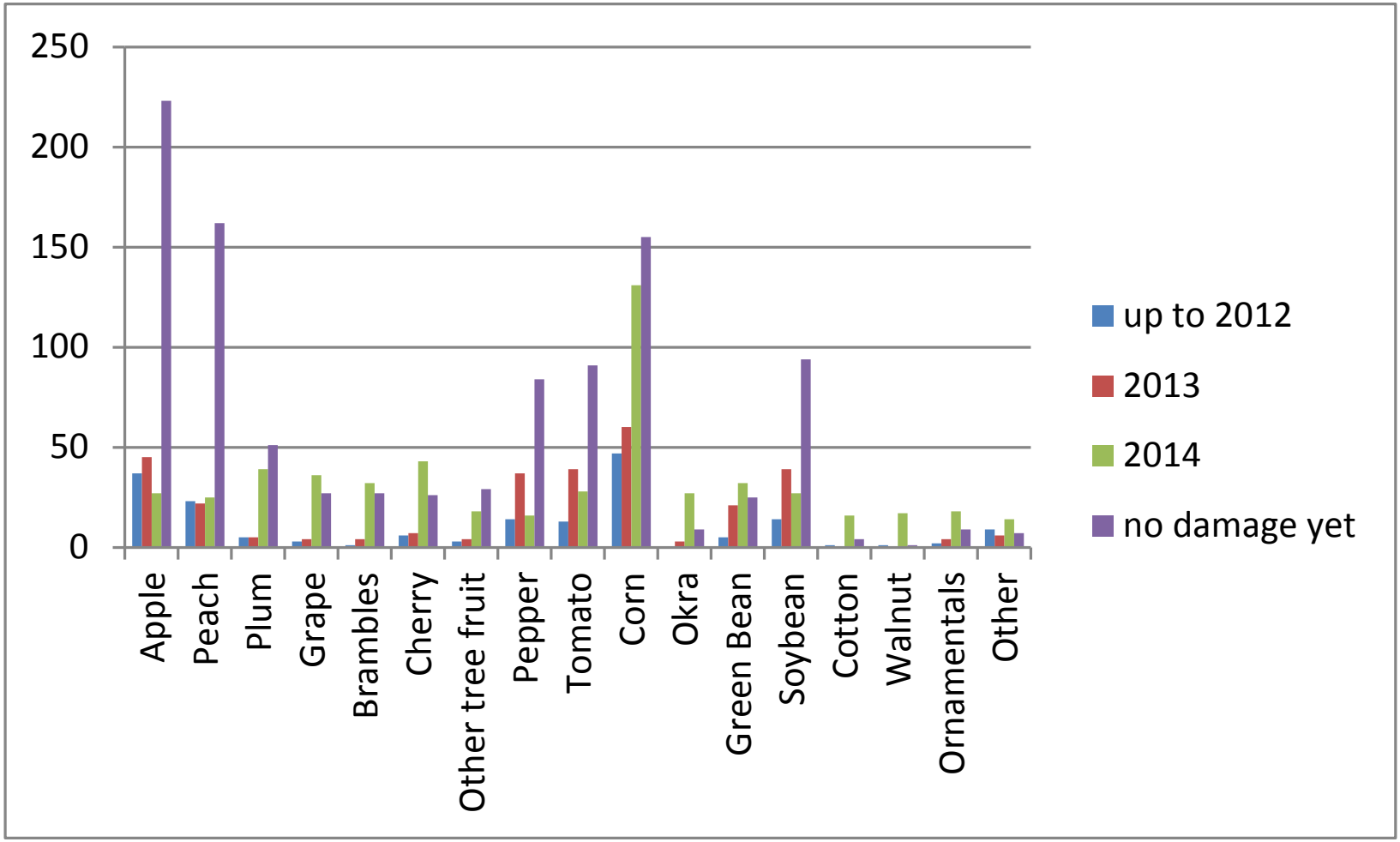
Efficacy	Chemical name	Trade name example	IRAC Group(s)	Crops labeled for:
_____	abamectin	Agri-Mek	6	many vegetables, tree fruits, strawberry
_____	acephate	Orthene	1B	soybeans, tobacco, some vegetables
_____	acequinocyl	Kanemite	20B	some vegetables, most fruits
_____	acetamiprid	Assail	4A	most vegetables, fruits

…48 more insecticides

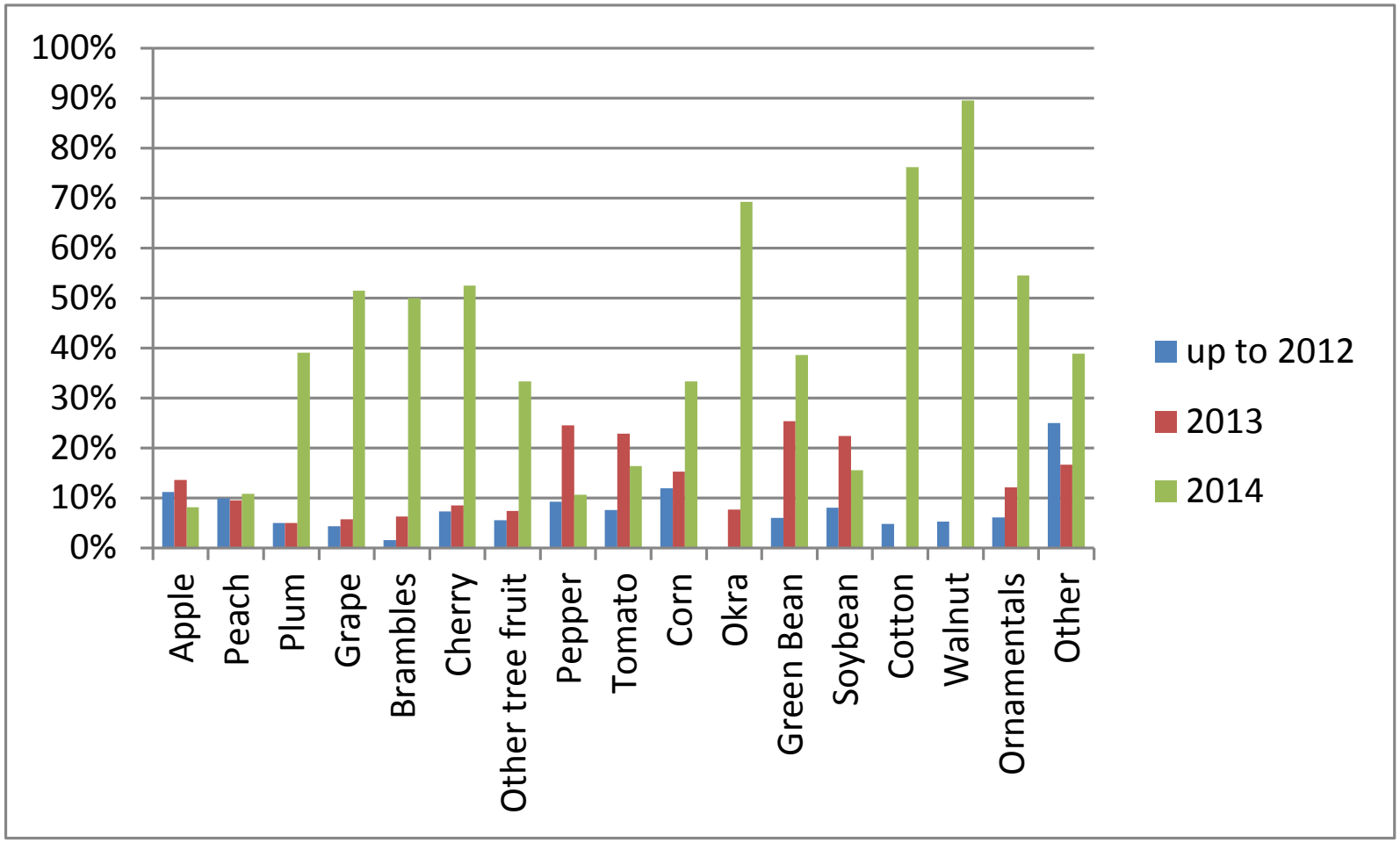
Evaluation of BMSB survey data

- Have conducted additional analysis of the economic data collected in both the on-line and grower meeting surveys collected by Day and Hanson (2013 and 2014, 1,122 observations)
- Questions 6-16 collected information on:
  - Grower assessment of the amount of economic damage caused by BMSB in specific crops by state
  - Number of additional sprays required for BMSB control in specific crops by state
  - Changes in other management tactics

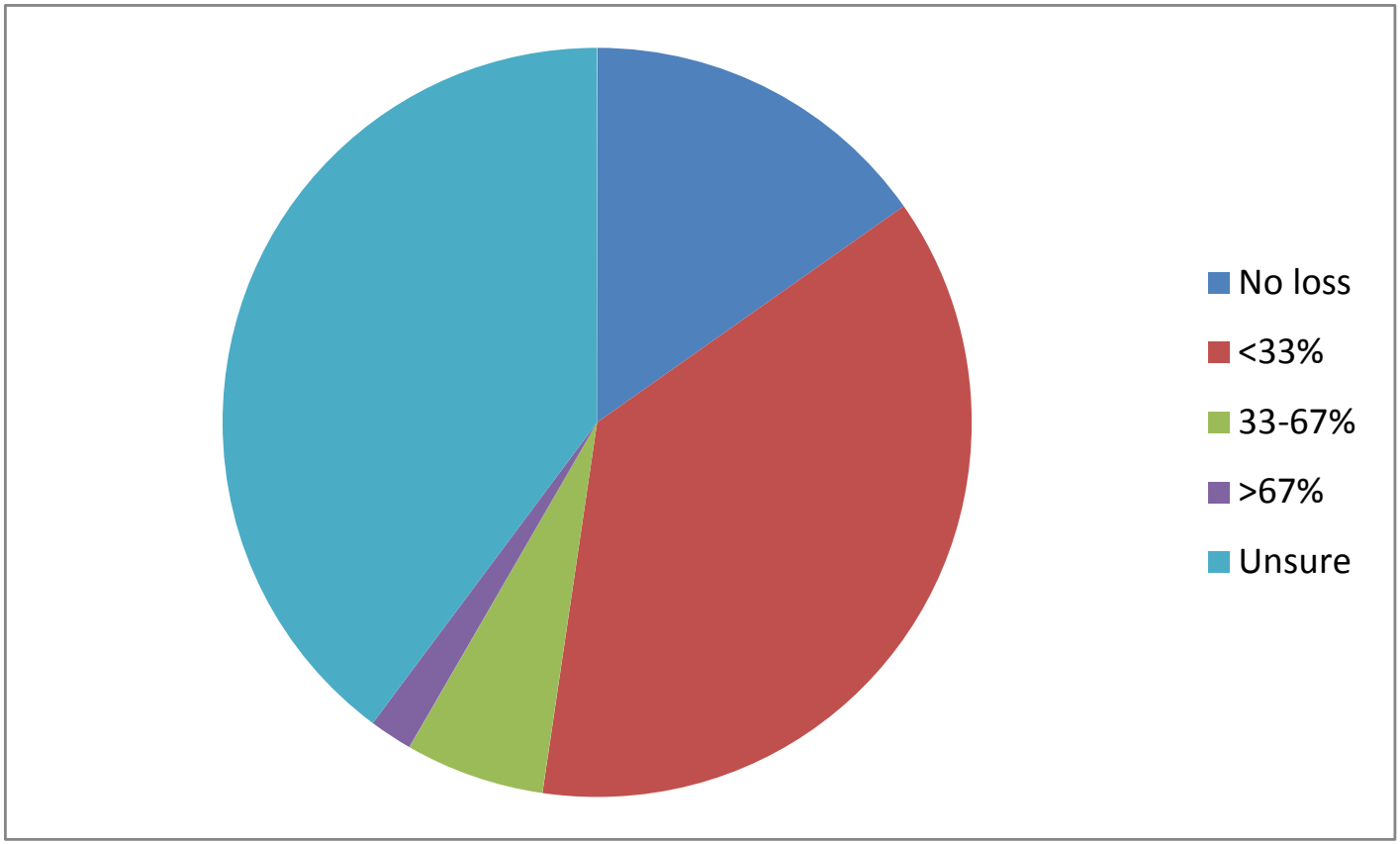
Growers: Year that BMSB showed up in different crops (number)



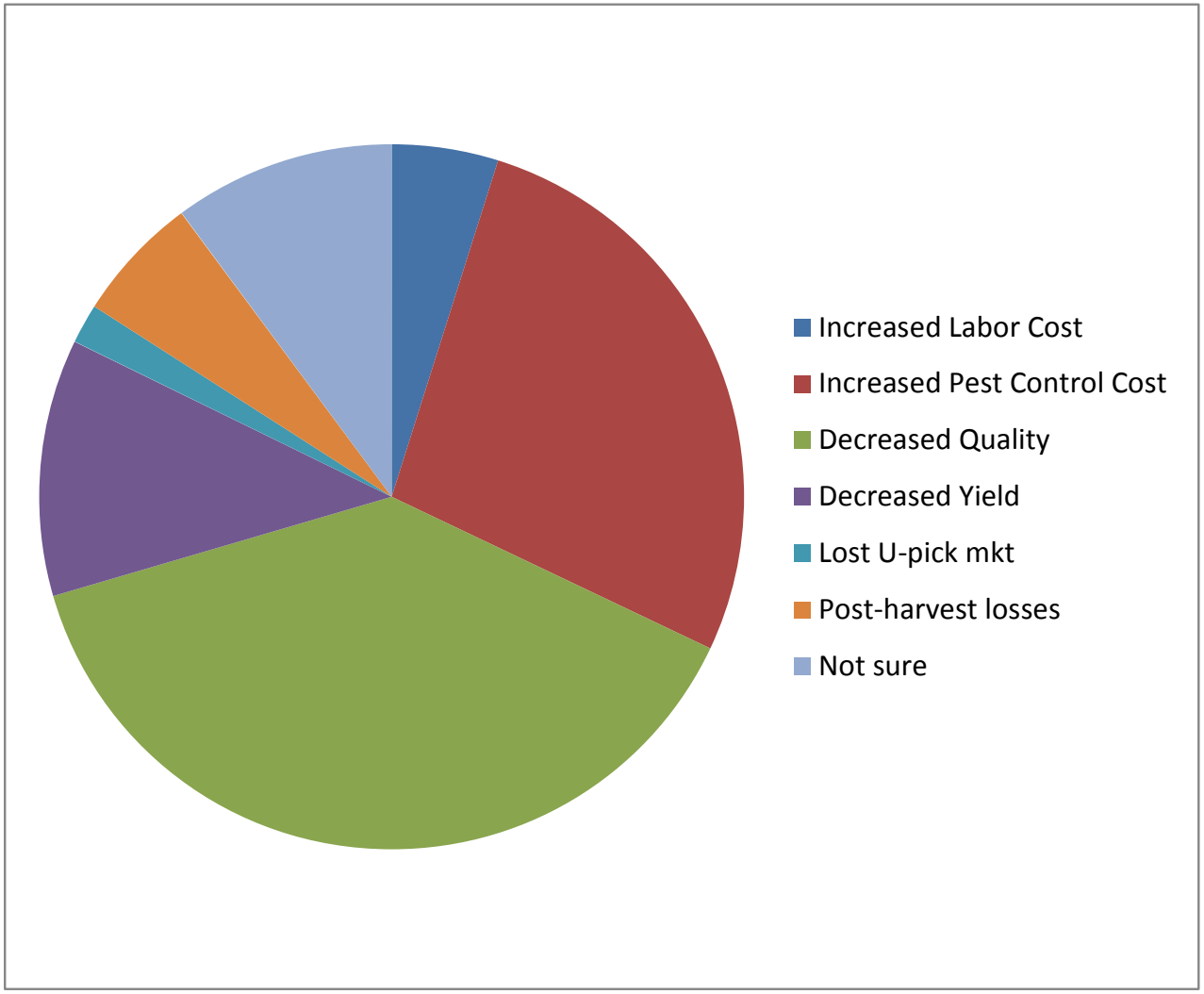
Growers: Year that BMSB showed up in different crops (percent)



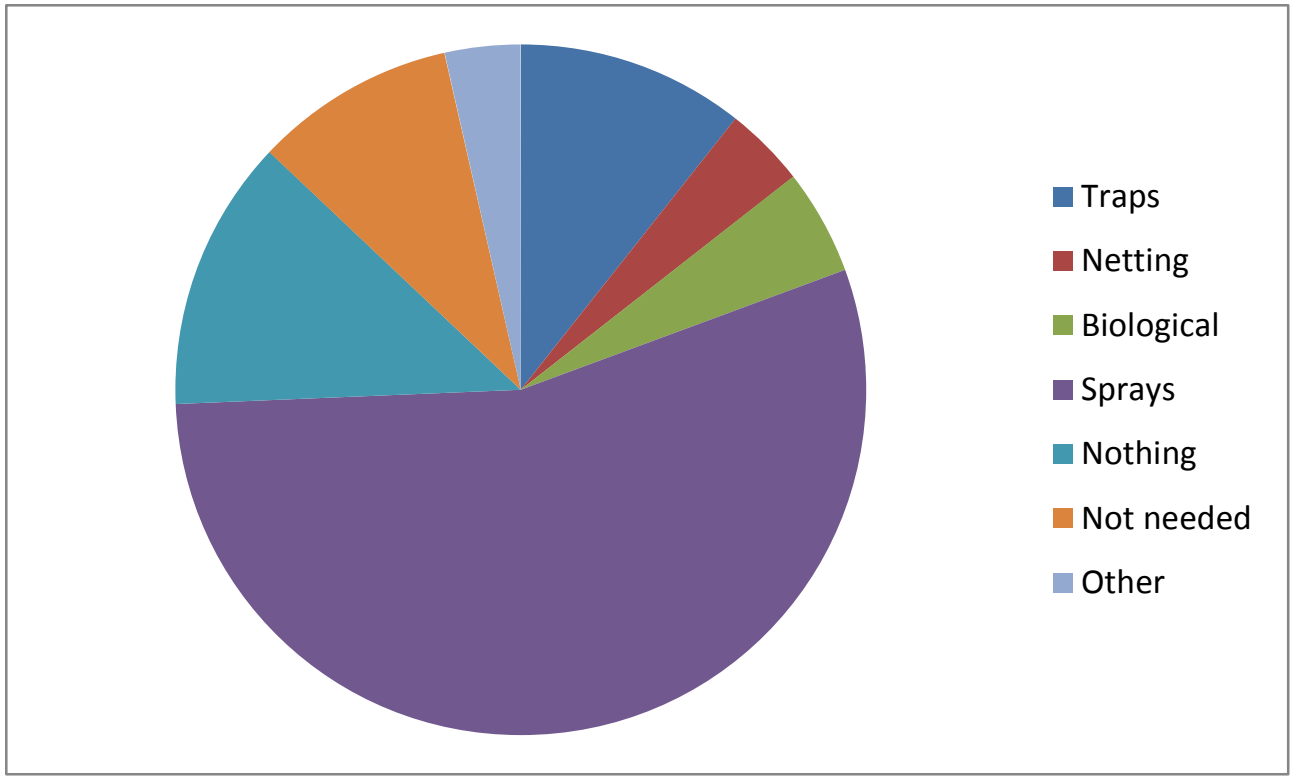
Growers: How much was profit decreased because of BMSB?



Growers: Most important cause of loss of profit by BMSB



Growers: Management Response to BMSB



Average number of sprays: 3.2

Range: 1-6

Summary of Economic Evaluation

- More data on the impact of BMSB on the cost of producing apples, peaches, and tomatoes will be evaluated in 2016.

- Will be helping determine the costs and potential benefits of proposed management tactics in 2016 (and beyond).
  - Estimate cost and benefits of proposed management strategies and make available through extension channels.
  - Evaluate potential physical and financial constraints faced by producers in implementing the proposed tactics.
  - Fine tune management recommendations and provide feedback to producers on the status and commercial viability of proposed control strategies.