THE ECONOMIC IMPACT OF THE SUGARCANE APHID OUTBREAK IN SOUTH TEXAS

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TEXAS A&M AGRILIFE EXTENSION

SCA RESEARCH TEAM

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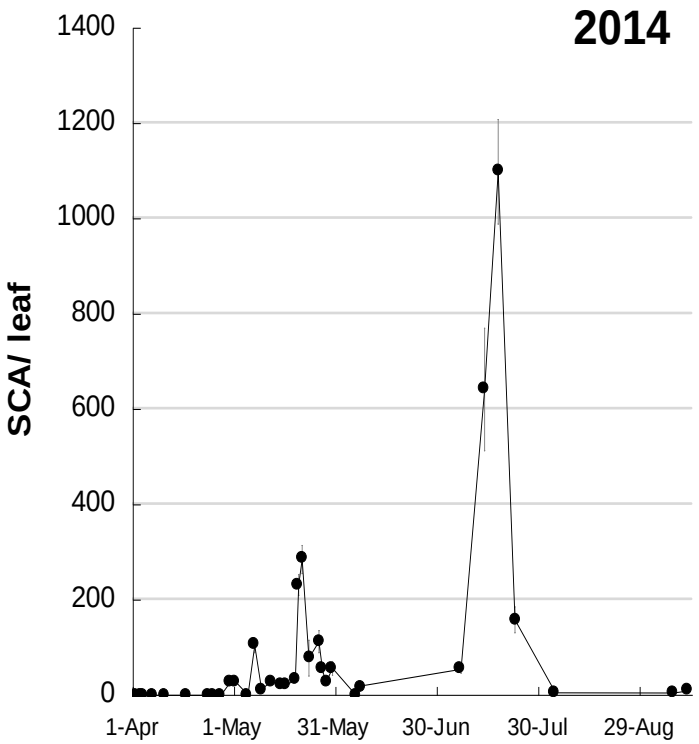
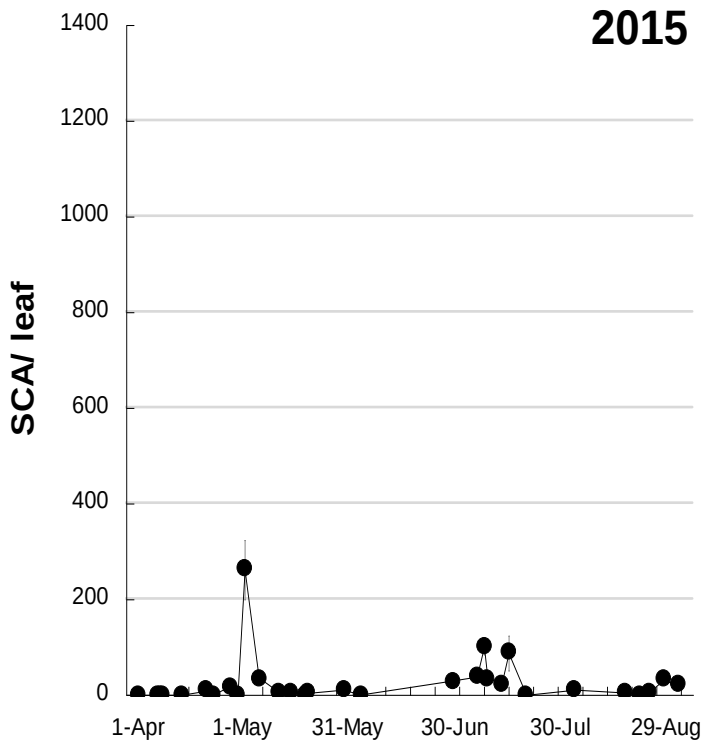
INTRODUCTION

- Sorghum is a multibillion-dollar crop with over 7 million acres planted each year in the U.S.
- The sorghum industry is threatened by a new invasive pest, the sugarcane aphid (SCA).
- SCA has become the most important pest in sorghum since its detection in 2013.
- Due to its rapid population growth, great dispersion capacity, and reduced availability of effective insecticides, this insect has caused significant economic losses to sorghum growers.

- Observed damages caused by the SCA include:
  - Leaf discoloration.
  - Honeydew produced support the growth of fungus which can inhibit plant growth.
  - Infestations of seedling grain sorghum can kill young plants and later infestations can prevent the formation of grain.
  - Honeydew prevents efficient movement of crop material through harvest equipment.
- Little work has been conducted to assess and better understand the economic impact of the SCA outbreak.

RANDOM SAMPLING OF COMMERCIAL FIELDS, LRGV





OBJECTIVES

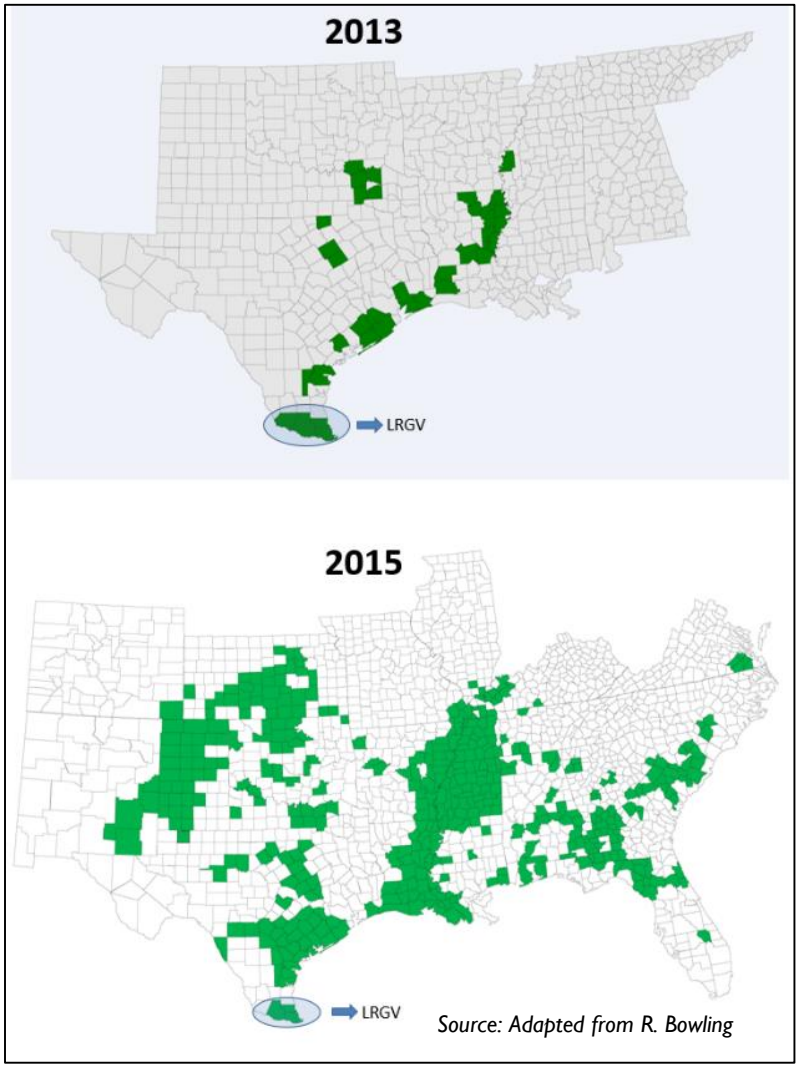
- To quantify the economic loss of SCA on sorghum growers in the Lower Rio Grande Valley (LRGV), Texas.

- To estimate the economic value of the prevented loss attributed to control efforts to mitigate the damage caused by the SCA

  - In 2015, about 310,000 acres of sorghum were planted in the region with and estimated economic value of $92.3M.

  - Given its geographical location, the LRGV is a key region to timely understand and identify the economic impact of new invasive pests.

SCA OUTBREAK OVER TIME

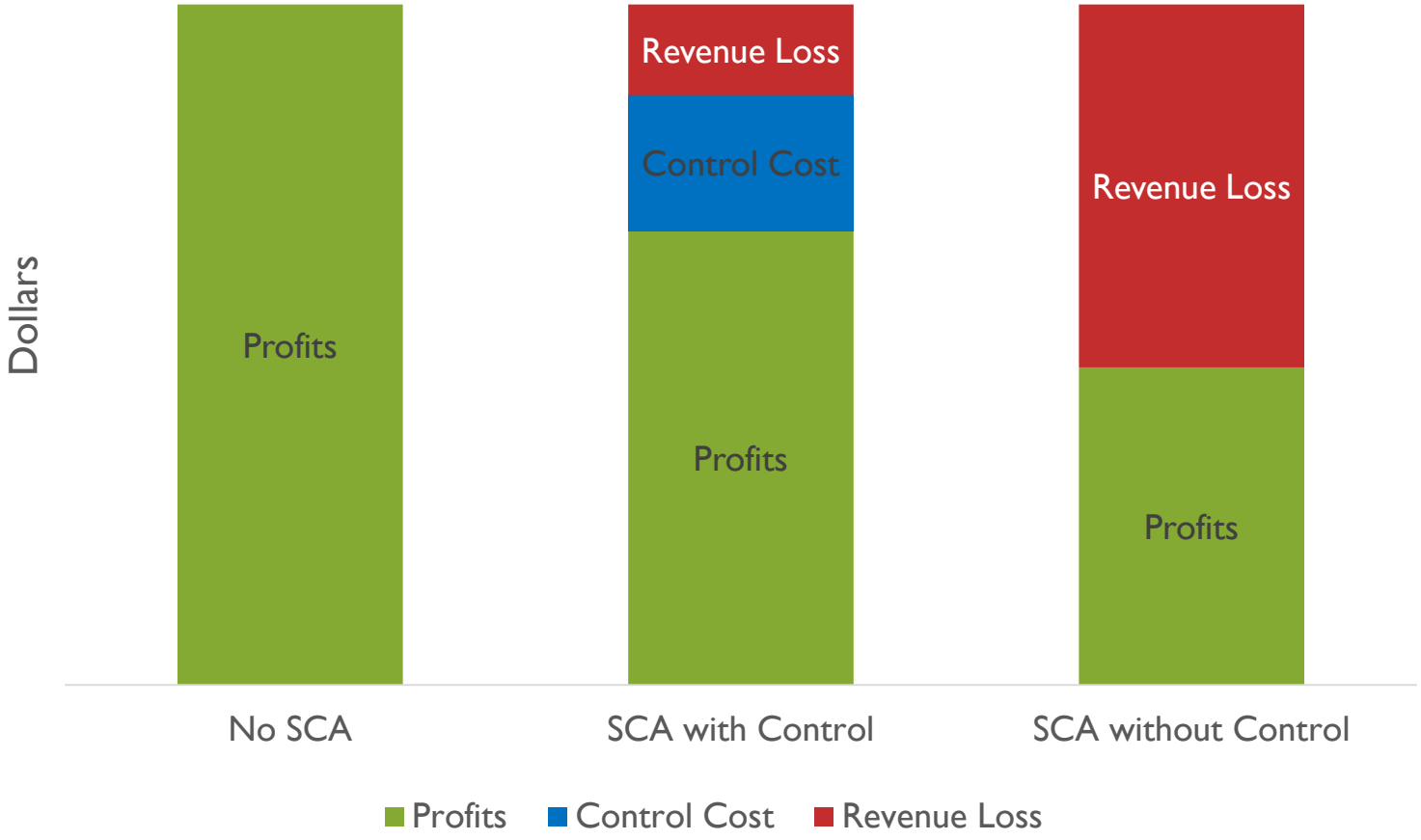


Source: Adapted from R. Bowling

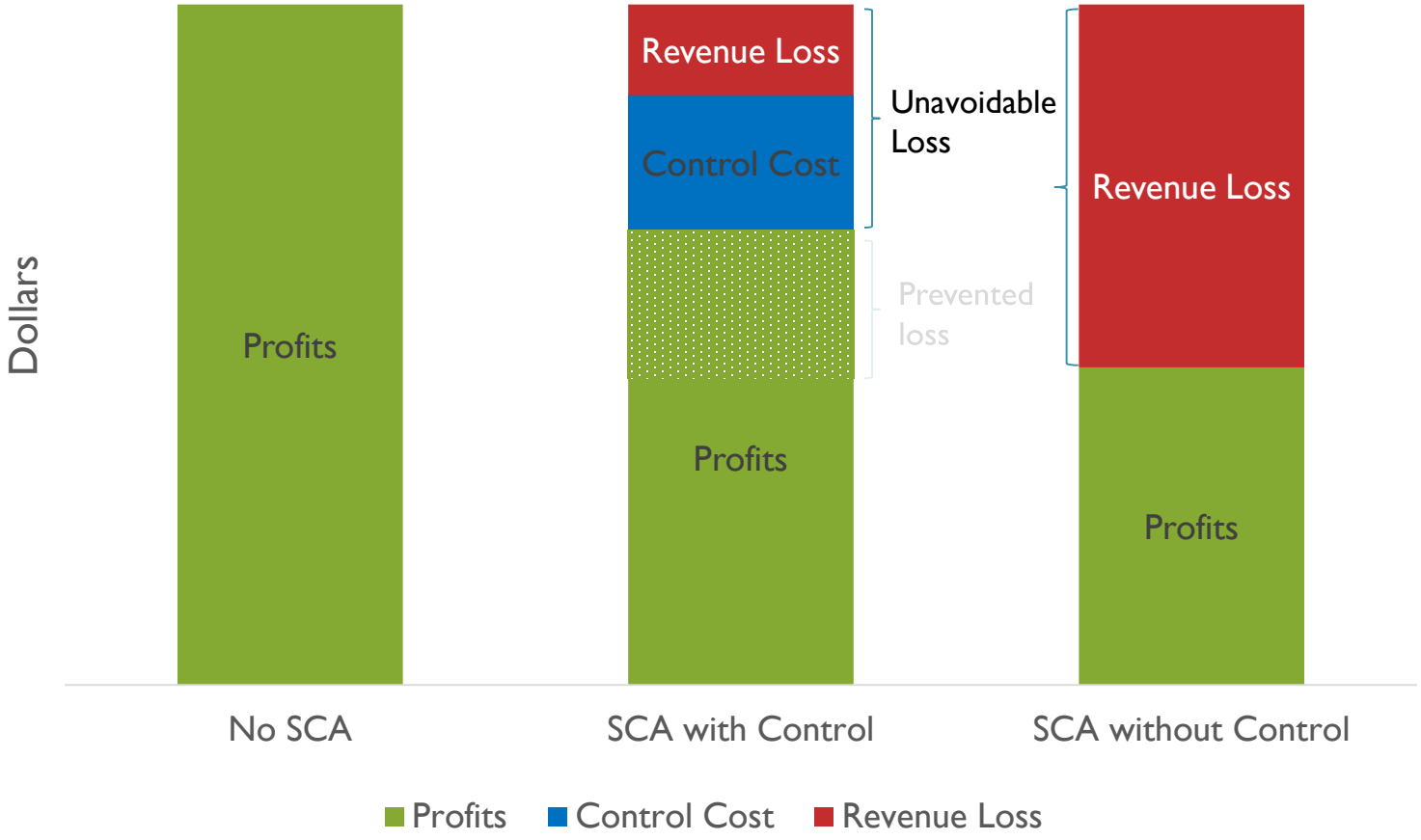
SORGHUM PRODUCERS SURVEY

- Forty-one local producers were surveyed resulting in a representative sample of 46,578 acres in 2014 and 49,761 acres in 2015.
- The questionnaire gathered detailed information about yearly crop yields, crop acreage, insecticide application decisions, and management and production practices.
- Collected data were used to estimate the economic impacts associated to the SCA infestation.

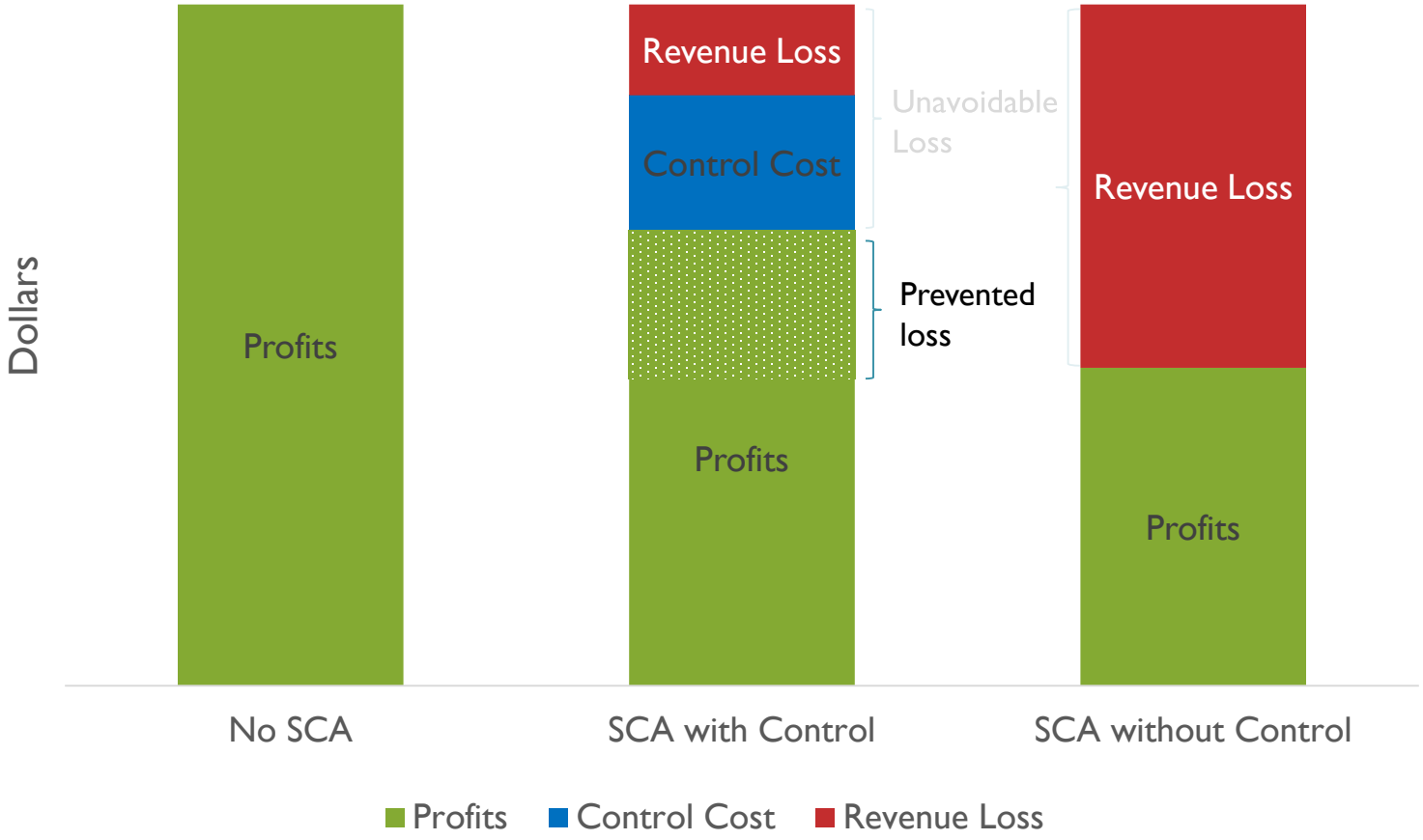
ECONOMIC IMPACT ESTIMATION



ECONOMIC IMPACT ESTIMATION

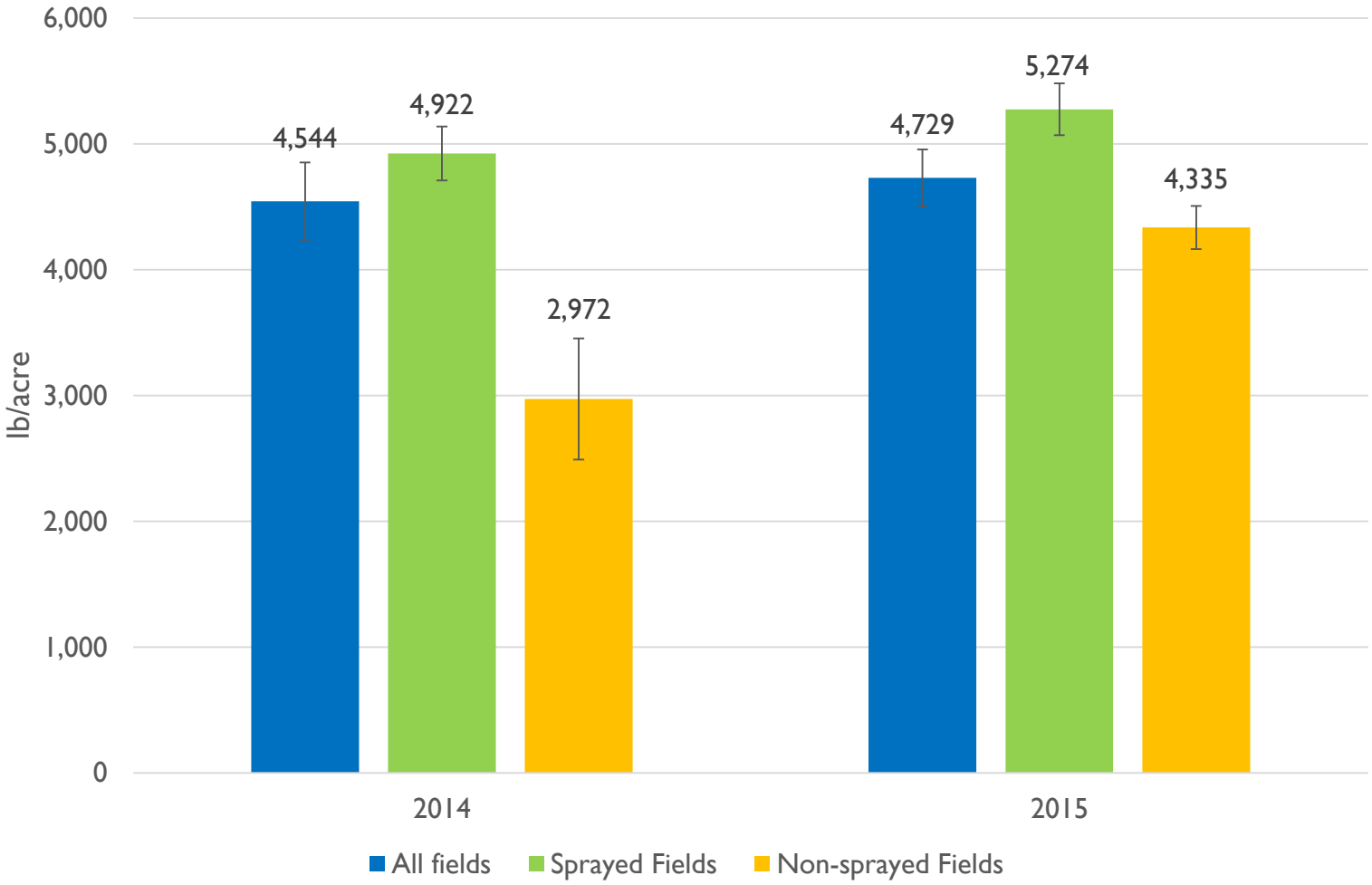


ECONOMIC IMPACT ESTIMATION

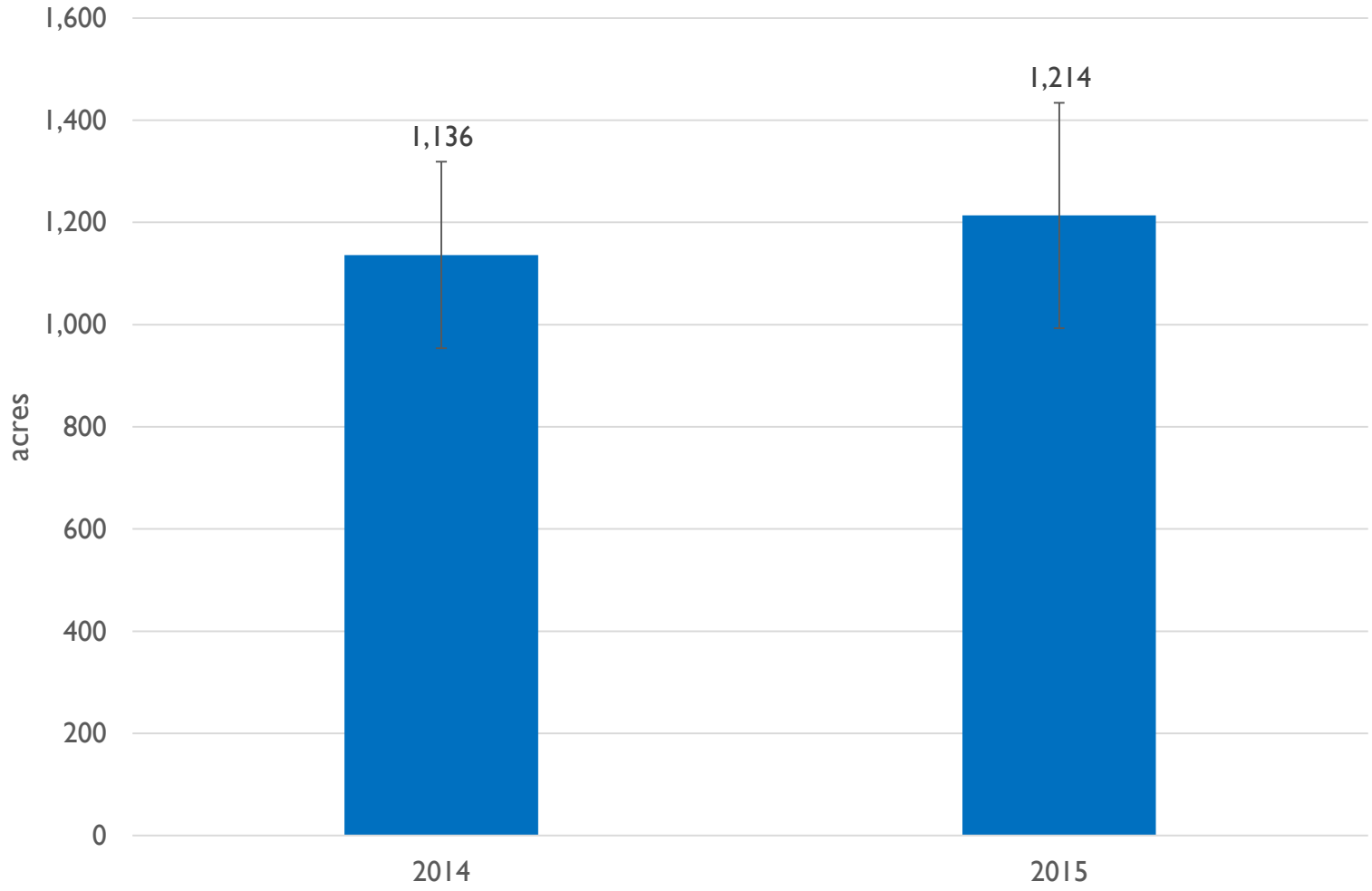


SURVEY RESULTS

Average Yield

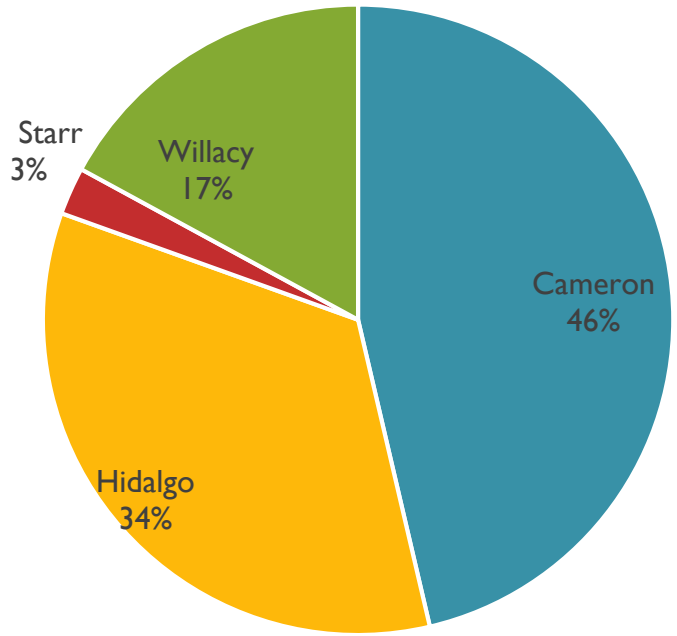


Average Farm Size

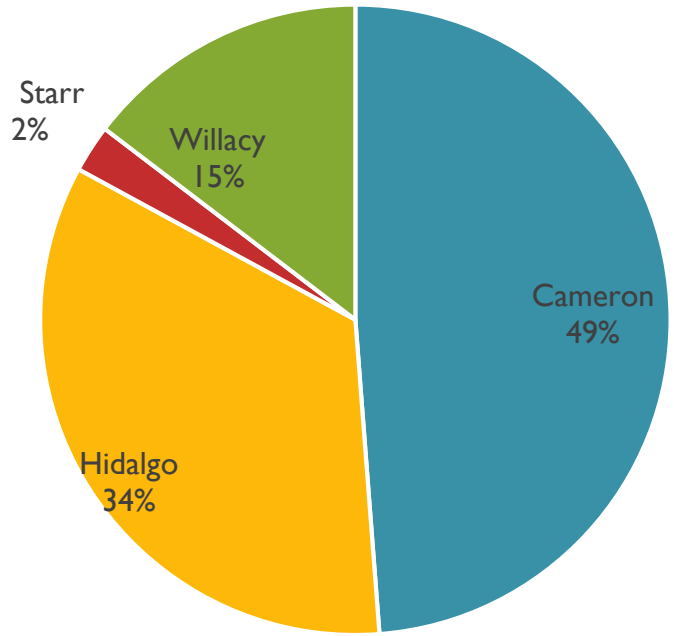


Farms Location

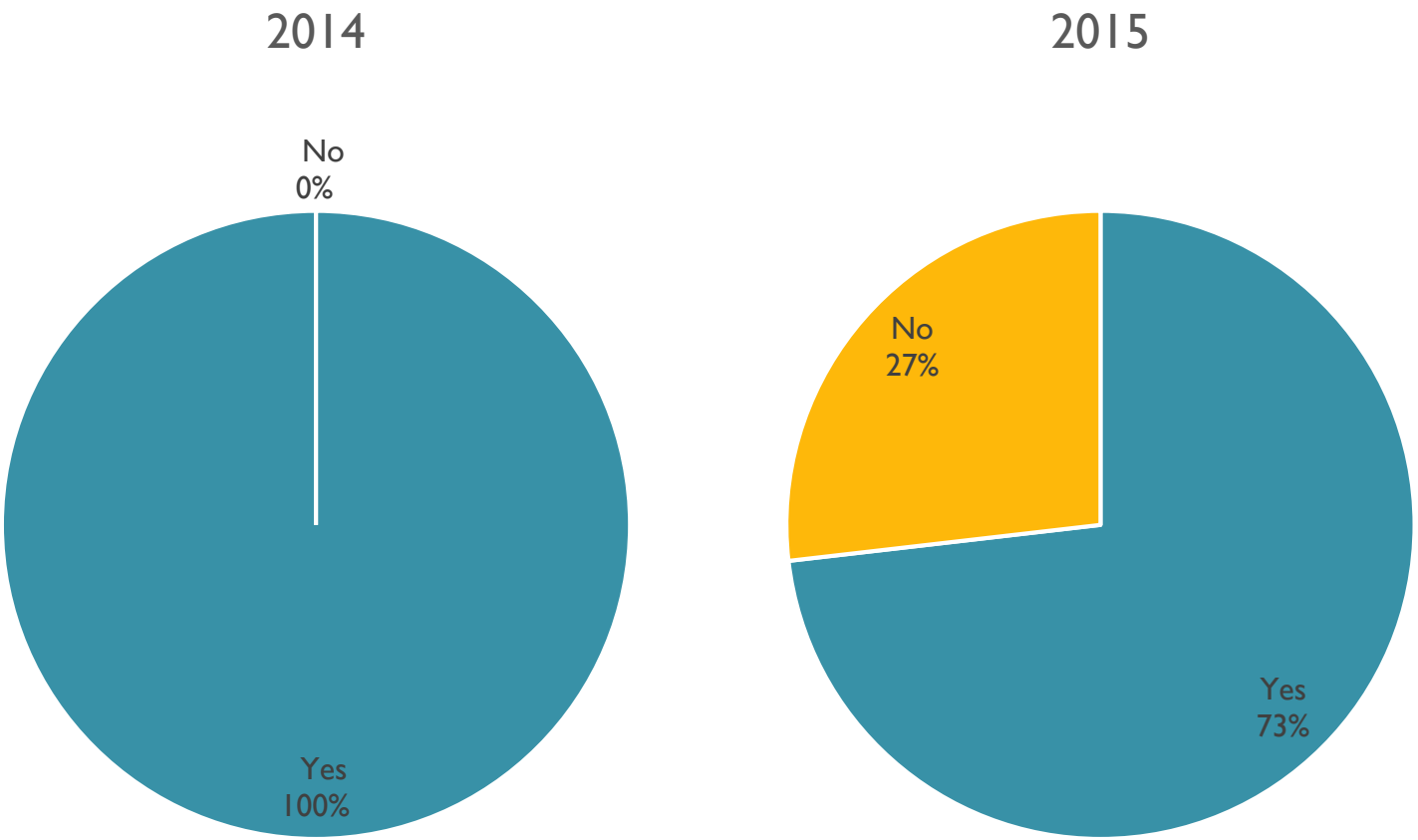
2014



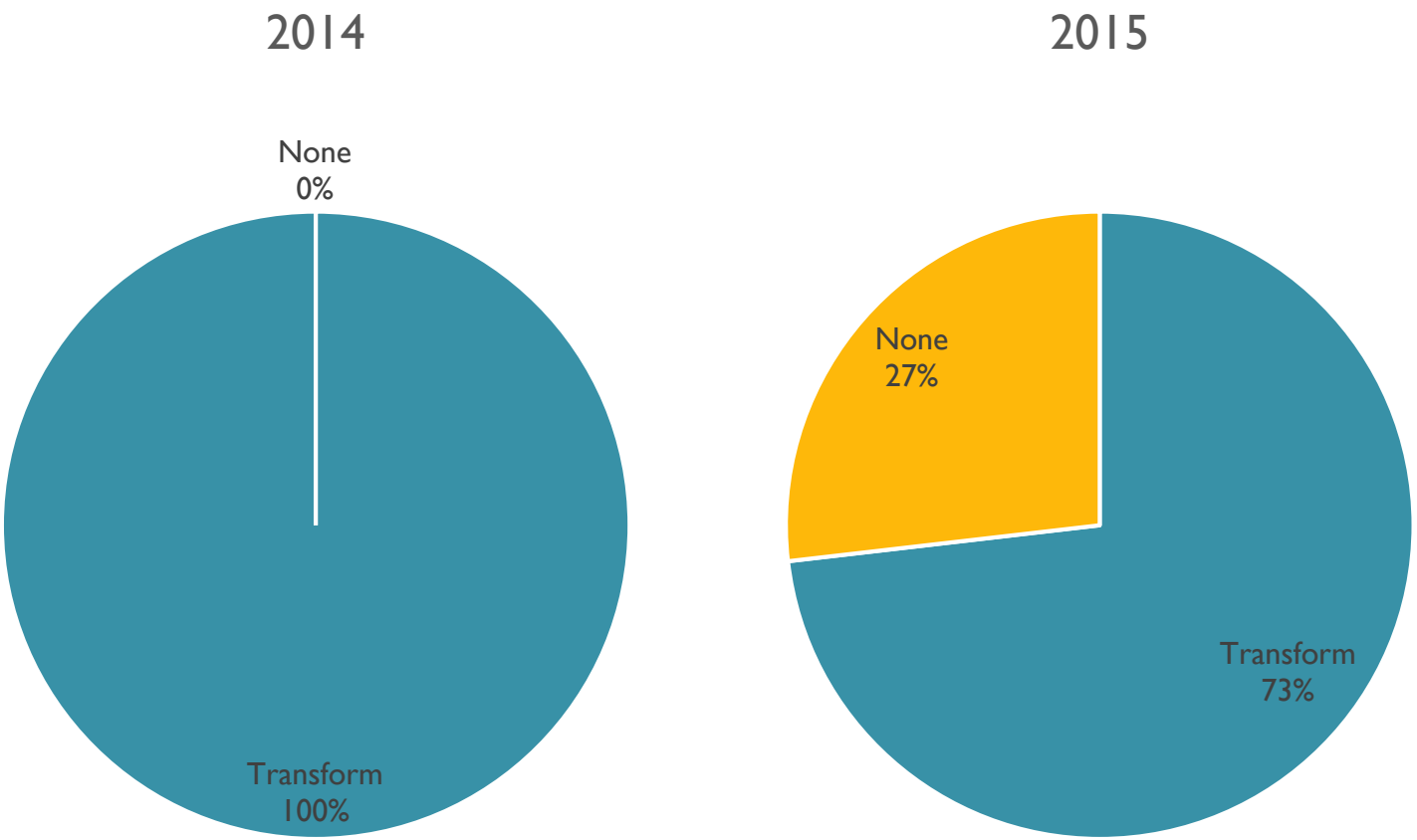
2015



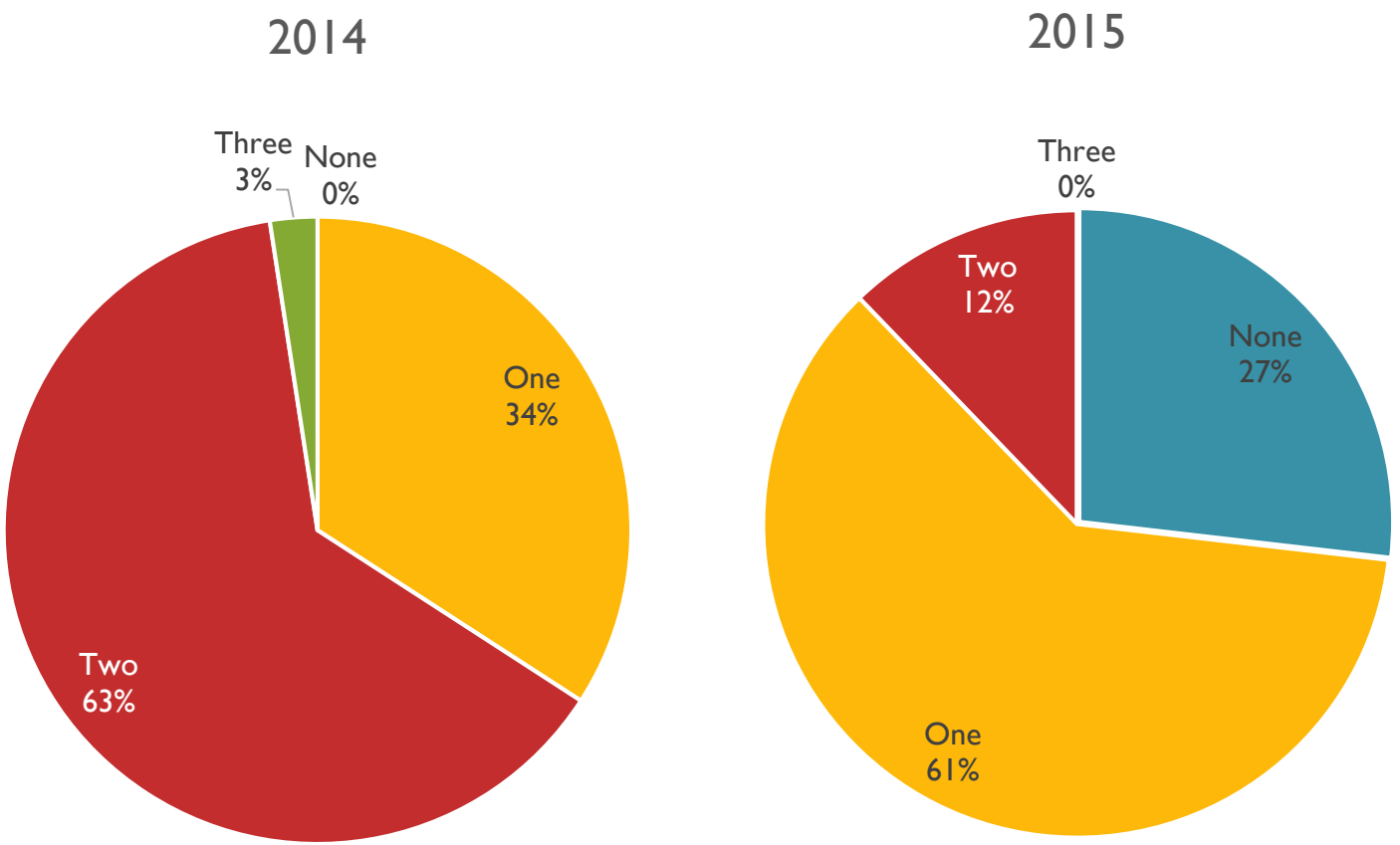
Spray to Control the SCA



Insecticide Used to Control the SCA

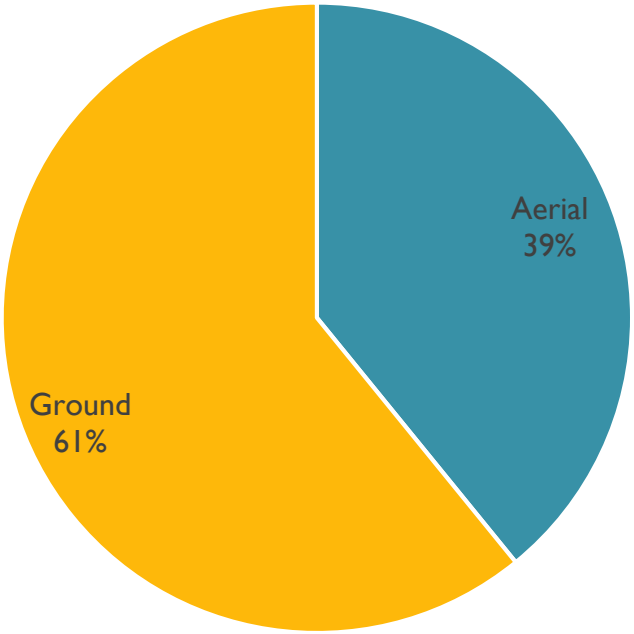


Insecticide Applications to Control the SCA

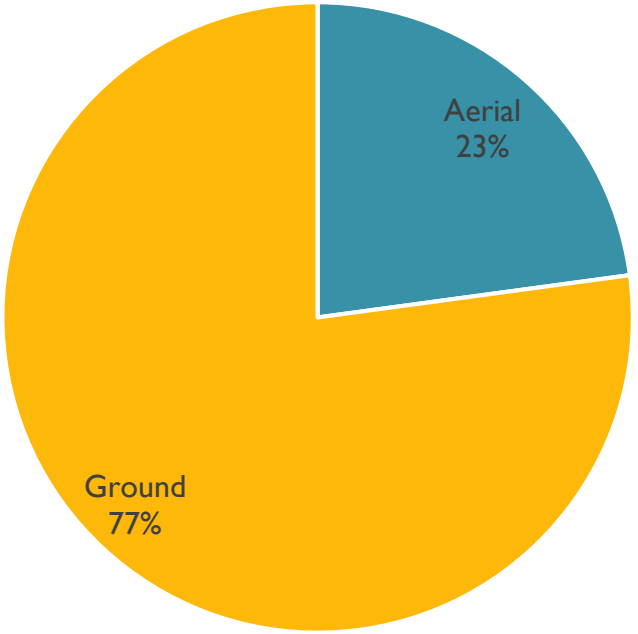


Insecticide Applications Type

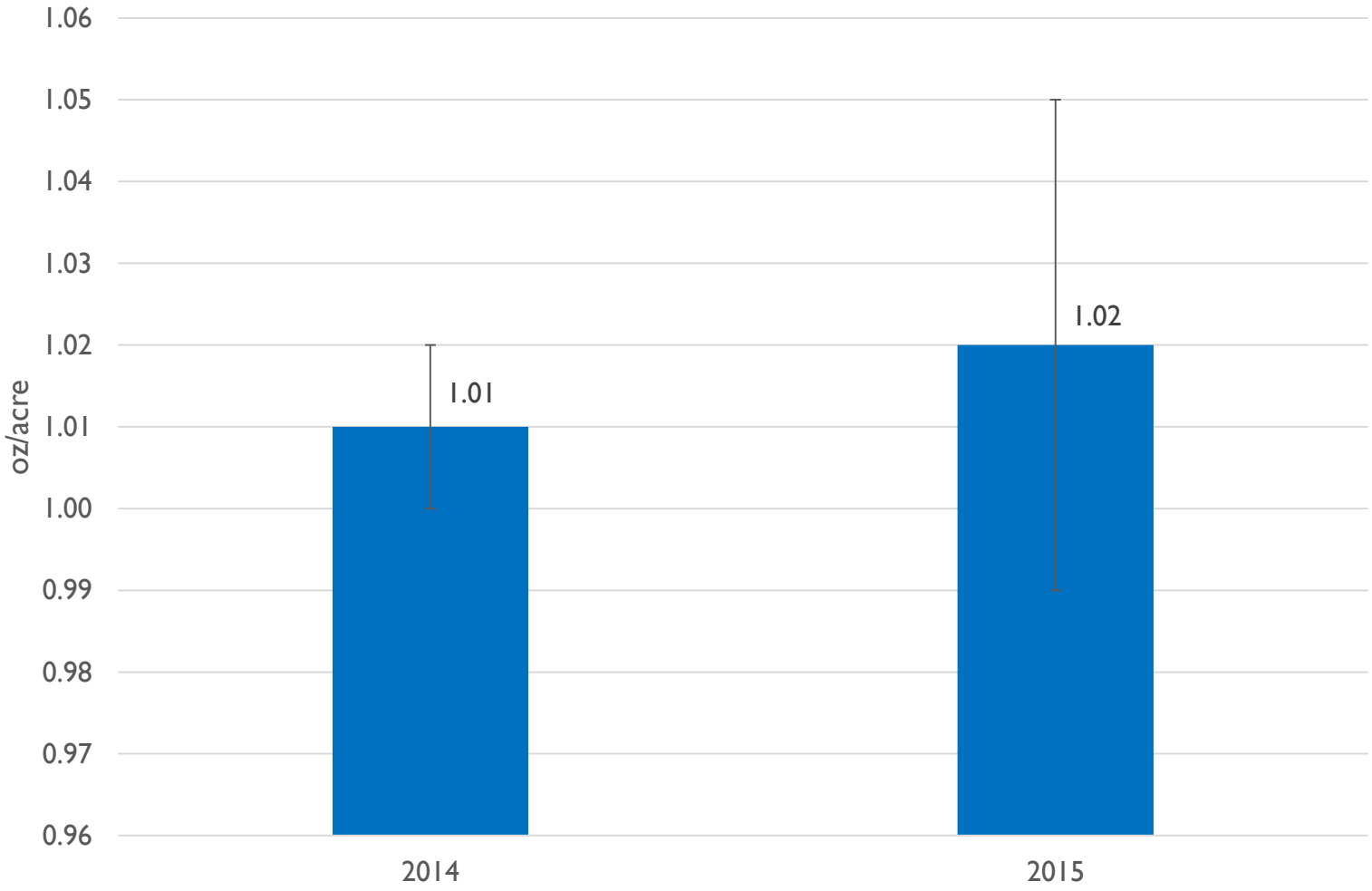
2014



2015

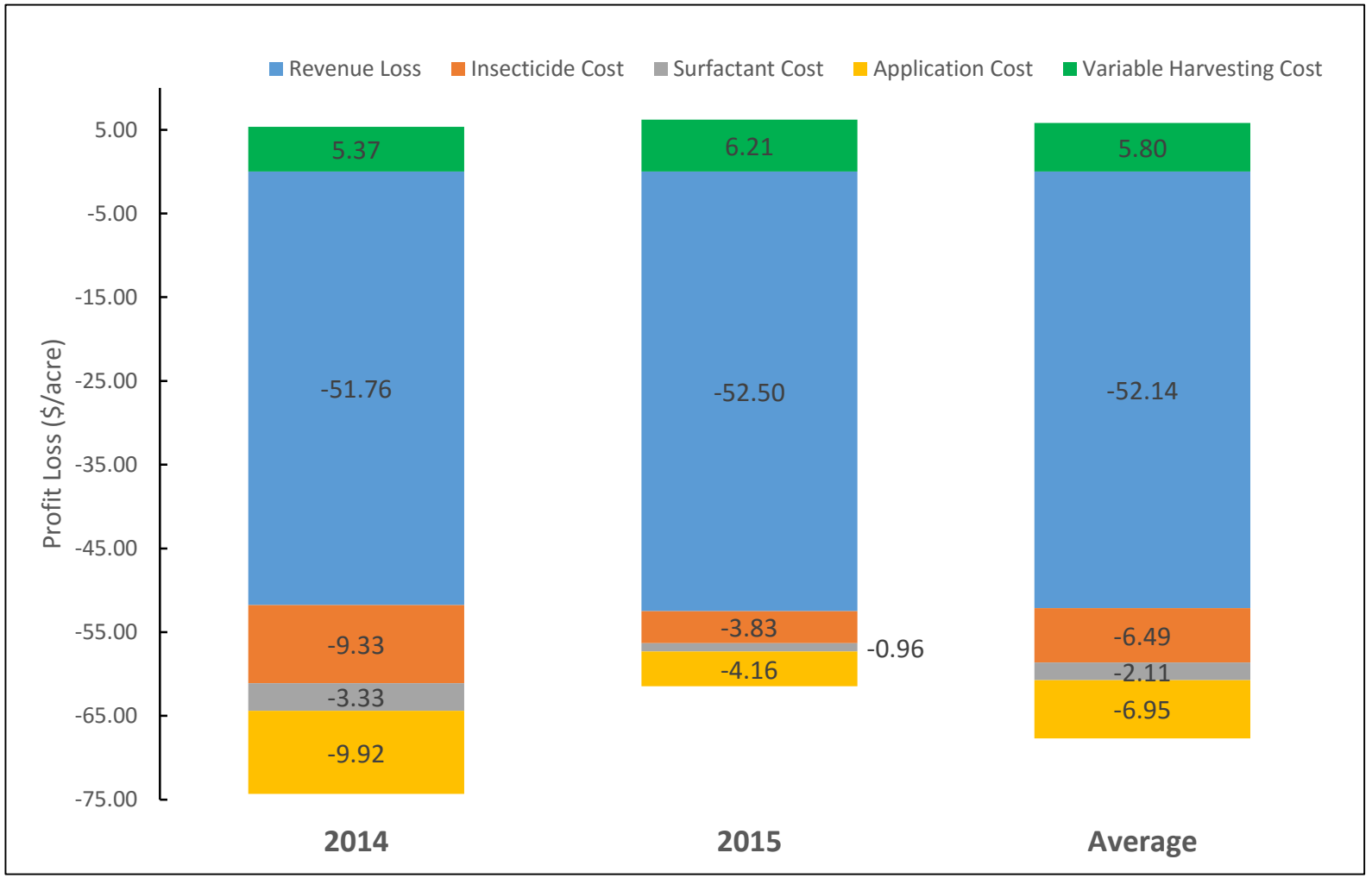


Average Transform® Application Rate



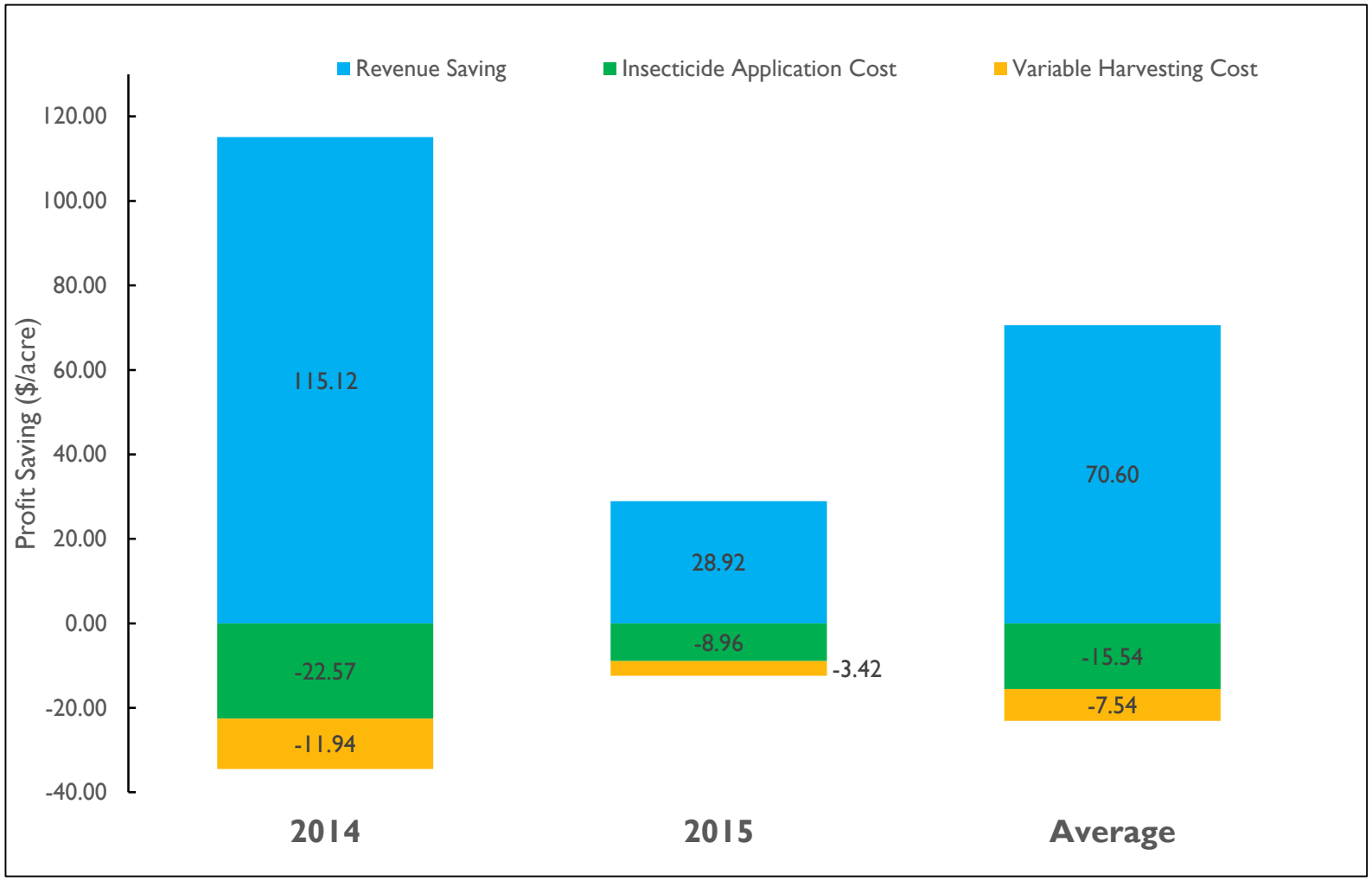
ECONOMIC IMPACT RESULTS

ECONOMIC LOSS



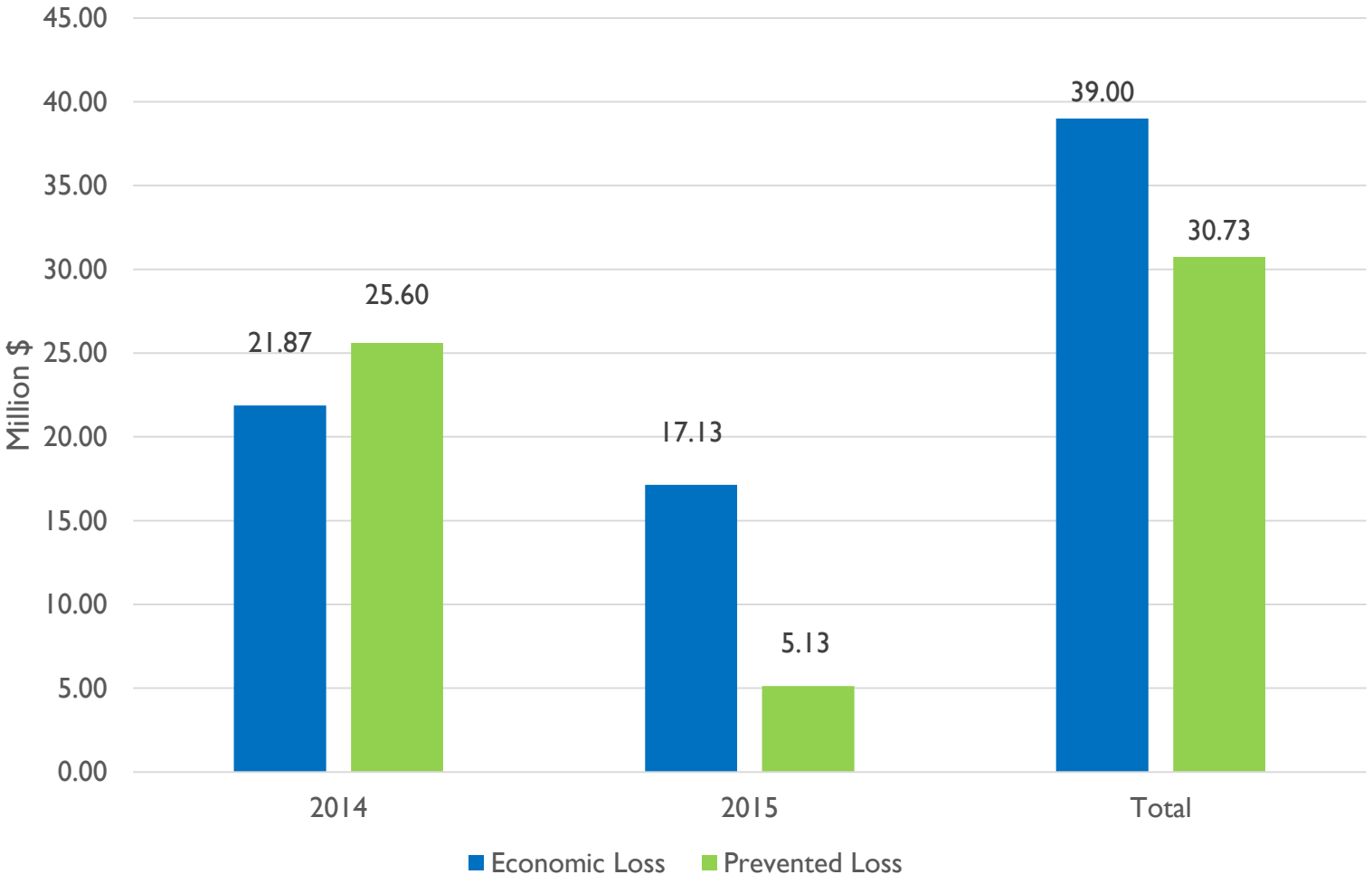
	2014	2015	Average
Total Loss	$68.96	$55.25	$61.88

PREVENTED LOSS



	2014	2015	Average
Total Savings	$80.61	$16.54	$47.52

OVERALL INDUSTRY ECONOMIC EFFECTS



SUMMARY AND CONCLUSIONS

- Assessed the economic impact of SCA on sorghum growers in the LRGV, Texas.
- SCA reduced profit by $68.96/acre in 2014 and by $55.25/acre in 2015.
- Control efforts saved $80.61/acre and $16.54/acre in 2014 and 2015, respectively
- After it appearance in 2013, the SCA has caused a total economic loss to farmers in the LRGV of about $39.00M. However, growers were able to protected $30.7M.

ONGOING AND FUTURE WORK

- Use aggregated farm-level economic estimates to assess the total economic impact of the SCA outbreak in the LRGV.
  - Output
  - Value-added
  - Labor income
  - Employment

- Extend the analysis to the rest of the state.

Thank you!

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MODEL PARAMETERS

Parameter	Units	Value	
		2014	2015
Sorghum Price	$/cwt	7.23	7.55
Insecticide Price	$/oz	7.30	7.50
Surfactant Price	$/oz	0.55	0.58
Aerial Application Cost	$/acre	9.60	10.00
Ground Application Cost	$/acre	7.30	8.00
Variable Harvesting Cost	$/cwt	0.75	0.89
Yield Penalty:			
Sprayed Fields	%	-10.00	-5.00
Non-sprayed Fields	%	-49.60	-22.80

SURVEY RESULTS

Variable	2014		2015	
	n	Mean (Standard Error)	n	Mean (Standard Error)
Surveyed farms	41		41	
Yield (lb/acre)	41	4,543.68 (308.38)	41	4,729.47 (225.71)
Farm size (acre)	41	1,136.05 (182.44)	41	1,213.69 (220.49)
Farmland type		0.34 (0.07)		0.34 (0.07)
0=Irrigated	27		27	
1=Dryland	14		14	
Farm location				
Cameron	19		20	
Hidalgo	14		14	
Starr	1		1	
Willacy	7		6	
Sprayed to control the SCA		1.00 (0.00)		0.73 (0.07)
0=No	0		11	
1=Yes	41		30	
Total area sprayed to control the SCA (%)	41	83.84 (3.89)	30	79.55 (6.05)
Insecticide used to control the SCA		1.00 (0.00)		0.73 (0.07)
0=None	0		11	
1=Transform	41		30	

SURVEY RESULTS - Continuation

Variable	2014		2015	
	n	Mean (Standard Error)	n	Mean (Standard Error)
Additional insecticide applications due to the SCA		1.68 (0.08)		0.85 (0.10)
0	0		11	
1	14		25	
2	26		5	
3	1		0	
Insecticide application rate to control the SCA (oz/acre)	41	1.01 (0.01)	30	1.02 (0.03)
Type of insecticide application to control the SCA		0.61 (0.06)		0.77 (0.07)
0=Aerial	27		8	
1=Ground	42		27	
Water used on each insecticide application aimed to control the SCA (gallons/acre)	41	11.77 (1.95)	30	9.65 (0.62)
Additional surfactant used due to the SCA		0.93 (0.04)		0.90 (0.06)
0=No	3		3	
1=Yes	38		27	

ECONOMIC LOSS - Sensitivity Analysis