REPORT

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2018 Rice Insect Losses in the United States

Bateman, N.R.*[1], G.M. Lorenz[2], B.C. Thrash[2], J. Gore[3], M.O. Way[4], and B.E. Wilson[5], L.A. Espino[6]

[1]University of Arkansas, Cooperative Extension Service, 2900 HWY 130 E, Stuttgart, AR 72160. [2]University of Arkansas CES, Lonoke Extension Center, [3]Mississippi State University, Department of Entomology, Delta Research and Extension Center, [4]Texas A&M University, Beaumont Center, [5]Louisiana State University Agricultural Center, Department of Entomology, Baton Rouge, and [6]University of California Cooperative Extension, Butte County *corresponding author email: nbateman@uada.edu

Abstract

Estimated insect management costs and losses for multiple insect pests of rice during the 2018 growing season were compiled for 5 rice-producing states. Participating states included Arkansas, California, Louisiana, Mississippi, and Texas, accounting for approximately 90% of the rice grown in the US. Overall, insects accounted for more than $141 million in costs and losses during 2017, averaging $52.06 per acre. Rice water weevil and rice stink bug caused more yield loss, and cost more to control than all other insect pests across participating states.

Key Words: rice, yield loss, pest management

Introduction

Rice is a major commodity in some areas of the US. Multiple insect pests have been documented to cause yield losses in rice. Rice insect losses were first compiled in 2017 from 5 rice-producing states in the US. The participating states were Arkansas, California, Louisiana, Mississippi, and Texas (Bateman et al., 2020). Estimates were made for yield loss, control costs, insecticide applications per acre for each pest, and several other factors to determine the impact insect pests had on rice in a given state. In 2018, estimates were made for the same five states to document changes in insect pressure in rice. These estimates will continue to be made annually to record changes in pest populations, management decisions, and impacts throughout the rice-growing regions of the US.

Material and Methods

Rice growers, crop consultants, university specialists, and retailers were informally contacted by the authors about their experiences with rice insect pests during the fall of 2018. Acreage, yield, and price values were obtained from the National Agricultural Statistical Service (NASS USDA 2020). An estimate of pureline and hybrid rice acreage was also included. In 2018, row rice acreage was also included, which is the practice of watering rice through furrow irrigation instead of flooding. All data were processed in an Excel spreadsheet adapted from Musser et al. (2008).

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Results and Discussion

All comparisons to 2017 rice insect losses are referencing Bateman et al 2020. Rice acres increased from 2.2 million acres in 2017 to 2.7 million acres (6% were row rice acres) in 2018, along with an estimated 4% increase in acres receiving an insecticide seed treatment for the participating states. All hybrid rice acres received NipsIt Inside (Clothianidin, Valent USA Corporation, Walnut Creek, CA) as a seed treatment. Growers over-treated 8% of these acres with CruiserMaxx Rice (Thiamethoxam, Syngenta Crop Protection, Greensboro, NC) and 3% of these acres with Dermacor X-100 (Corteva Crop Science, Wilmington, DE). Only 56% of the pureline rice seed planted received a seed treatment, with CruiserMaxx Rice being the predominant seed treatment used (28% of acres). A large percentage (44%) of the pureline acres did not receive a seed treatment. A 1% increase in scouted rice acreage was observed in 2018 compared to 2017. Similar to 2017, rice water weevil (*Lissorhoptrus oryzophilus*, Kuschel) caused the greatest amount of yield loss (2.51%/acre), and rice stink bug (*Oebalus pugnax*, F.) received the most foliar insecticide applications (1.16 applications/acre) in 2018. An overall decrease in yield loss was estimated in 2018 (3.17%) when compared to 2017 (3.80%), although the total costs + losses estimate increased from $130 million in 2017 to $141 million in 2018 due to increased rice acreage (Table 1, Appendix 1).

State Highlights

Arkansas. Rice water weevil and rice stink bug were the two most abundant pests in Arkansas in 2018. During 2018, 50% of the rice acres received a foliar application for rice stink bug, a 10% increase compared to 2017.

California. Similar to 2017, tadpole shrimp and armyworms infested the most acres in 2018 in California. A slight decrease in acres receiving foliar applications for tadpole shrimp was observed compared to 2017, and acres treated for armyworm decreased from 20% to 8% in 2018.

Louisiana. In 2018, Louisiana experienced a higher infestation of rice water weevil, rice stink bug, and stem borers compared to 2017. A large increase in acreage infested with fall armyworm was also observed, increasing from 25% in 2017 to 70% in 2018. Dermacor X-100 seed treatment was used on more acres in Louisiana than in all other states in 2018.

Mississippi. Rice stink bug and rice water weevil infested more acres than all other insect pests in 2018. A 40% decrease in fall armyworm infested acres was observed in 2018 compared to 2017. The number of foliar applications per acre for control of rice stink bug also decreased from 1.5 in 2017 to 1.25 in 2018.

Texas. High populations of rice stink bug were observed during 2018, infesting 100% of the rice acres. Rice delphacid infested acres increased from 0% in 2017 to 5% in 2018, although all of these infested acres were on the ratoon crop.

Table 1. Insect management practices for multiple rice growing states in the US for 2018.

State	Scouted*	Insecticide Seed Treatment*	Total Foliar Applications/acre	Costs+Losses†
Arkansas	85%	84%	0.860	$62.22
California	90%	0%	0.003	$10.17
Louisiana	60%	85%	0.370	$48.22
Mississippi	100%	89%	1.668	$53.95
Texas	40%	100%	0.860	$51.66
Average (weighted by acreage)	80%	70%	0.725	$52.06

*Percent of acreage

†Dollars per acre

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References

Bateman, N.R., G.M. Lorenz, B.C. Thrash, J. Gore, M.O. Way, B.E. Wilson, L.A. Espino, and F.M. Musser. 2020. 2017 Rice insect losses in the United States. Midsouth Entomol. 13: 24-32.

Musser, F.R., and A. Catchot. 2008. Mississippi soybean insect losses. Midsouth Entomol. 1: 29-36.

USDA NASS. 2020. United States Department of Agriculture National Agricultural Statistics Service, Data and Statistics, https://quickstats.nass.usda.gov/

Appendix 1. Overall rice insect losses from 5 surveyed states, 2018.

Combined in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	397,650	14.7%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	295,321	10.9%	2,780	0.1%	0	0.0%	0.00	$0.00	0.73	0.000	$0.00	0.08%	379,639	$2,189,277	$0.81	2.1%
Chinch Bug	531,412	19.6%	45,150	1.7%	73,970	2.7%	1.00	$9.77	0.00	0.027	$0.27	0.00%	0	$722,434	$0.27	0.7%
Fall Armyworm	925,736	34.1%	166,926	6.2%	282,206	10.4%	1.00	$8.43	0.05	0.104	$0.88	0.02%	83,891	$2,863,388	$1.06	2.7%
Grape Colaspis	814,275	30.0%	187,512	6.9%	0	0.0%	0.00	$0.00	0.90	0.000	$0.00	0.27%	1,280,714	$7,385,531	$2.72	6.9%
Leafhoppers	335,200	12.4%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	1,975,162	72.8%	6,950	0.3%	6,950	0.3%	1.10	$8.50	0.02	0.003	$0.02	0.01%	54,930	$381,752	$0.14	0.4%
Mexican Rice Borer	486,286	17.9%	62,612	2.3%	0	0.0%	0.00	$0.00	0.69	0.000	$0.00	0.12%	587,230	$3,386,397	$1.25	3.2%
Rice Delphacid	9,600	0.4%	9,600	0.4%	0	0.0%	0.00	$0.00	10.00	0.000	$0.00	0.04%	168,612	$972,337	$0.36	0.9%
Rice Seed Midge	288,200	10.6%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	324,681	12.0%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	2,206,123	81.3%	892,149	32.9%	1,043,181	38.5%	1.16	$7.96	0.91	0.448	$3.57	0.74%	3,537,546	$30,069,116	$11.09	28.3%
Rice Water Weevil	2,021,833	74.5%	571,943	21.1%	205,600	7.6%	1.00	$10.15	2.51	0.076	$0.77	1.87%	8,917,216	$53,509,228	$19.73	50.3%
Shorthonred Grasshopper	313,540	11.6%	14,410	0.5%	14,410	0.5%	1.00	$10.00	0.03	0.005	$0.05	0.00%	18,982	$253,564	$0.09	0.2%
Sugarcane Borer	108,531	4.0%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	166,210	6.1%	126,500	4.7%	126,500	4.7%	1.00	$20.00	0.00	0.047	$0.93	0.00%	0	$2,530,000	$0.93	2.4%
Thrips	558,129	20.6%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	122,650	4.5%	40,480	1.5%	40,480	1.5%	1.00	$40.00	0.41	0.015	$0.60	0.02%	88,872	$2,131,703	$0.79	2.0%
Wireworms/Other grubs	148,441	5.5%	0	0.0%	0	0.0%	0.00	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**0.725**	**$7.09**	**3.17%**	**15,117,632**	**$106,394,726**	**$39.23**	**100.0%**

SUMMARY DATA

Data Input

State	Combined
Year	2018
Total Acres	2,712,123
% Pureline	66%
% Hybrid	34%
% Acres of Row Rice	6%
Pureline Seeding Rate lbs/acre	89
Hybrid Seeding Rate lbs/acre	18
Yield (bushels/acre)	170
Price/Bushel	$5.77
% Acres Scouted	80%
Scouting Fee/scouted acre	$8.53
% Acres Insect Seed Trt.	70%
Avg. Seed Trt Cost/treated ac	$8.60

Seed Treatment Breakdown

	% of Acres	# of Acres	Price/Acre
Pureline			
Nipslt Suite	10%	186,236	$11.00
CruiserMaxx	28%	493,464	$15.00
Dermacor X-100	18%	314,596	$22.80
Untreated	44%	796,121	$0.00
Hybrid			
Nipslt Suite	100%	921,707	$5.00
CruiserMaxx	8%	71,100	$7.00
Dermacor X-100	3%	26,112	$14.40
Untreated	0%	0	$0.00

Yield & Management Results

Total Bushels Harvested	461,231,557
Total Bushels Lost to Insects	15,117,632
Percent Yield Loss	3.17%
Yield w/o Insects	175.64
Ave. # Spray Applications	0.725
Seed Treated Acres	1,895,155
Scouted Acres	2,156,524

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$19,215,452	$7.09
Seed Treatment Costs	$16,300,369	$6.01
Scouting costs	$18,384,920	$6.78
Total Costs	$53,900,740	$19.87
Yield Lost to insects	$87,179,274	$32.14
Total Losses + Costs	$141,080,014	$52.02

Appendix 2. Arkansas rice insect losses in 2018.

Arkansas in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	360,250	25.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	288,200	20.0%	0	0.0%	0	0.0%	0	$0.00	0.75	0.000	$0.00	0.15%	377,614	$1,835,203	$1.27	2.8%
Chinch Bug	288,200	20.0%	43,230	3.0%	72,050	5.0%	1	$10.00	0.00	0.050	$0.50	0.00%	0	$720,500	$0.50	1.1%
Fall Armyworm	504,350	35.0%	100,870	7.0%	216,150	15.0%	1	$10.00	0.00	0.150	$1.50	0.00%	0	$2,161,500	$1.50	3.2%
Grape Colaspis	720,500	50.0%	144,100	10.0%	0	0.0%	0	$0.00	1.00	0.000	$0.00	0.50%	1,258,713	$6,117,344	$4.25	9.2%
Leafhoppers	288,200	20.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	1,441,000	100.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Mexican Rice Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Delphacid	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Seed Midge	288,200	20.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	216,150	15.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	1,441,000	100.0%	504,350	35.0%	720,500	50.0%	1.1	$10.00	1.00	0.550	$5.50	1.00%	2,517,426	$20,160,188	$13.99	30.3%
Rice Water Weevil	1,441,000	100.0%	432,300	30.0%	144,100	10.0%	1	$11.45	2.75	0.100	$1.15	2.75%	6,922,920	$35,295,337	$24.49	53.1%
Shorthonred Grasshopper	216,150	15.0%	14,410	1.0%	14,410	1.0%	1	$10.00	0.05	0.010	$0.10	0.01%	18,881	$235,860	$0.16	0.4%
Sugarcane Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	14,410	1.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	259,380	18.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	72,050	5.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Wireworms/Other grubs	144,100	10.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**0.860**	**$8.75**	**4.41%**	**11,095,553**	**$66,525,933**	**$46.17**	**100.0%**

SUMMARY DATA

Data Input

State	AR
Year	2018
Total Acres	1,441,000
% Pureline	55%
% Hybrid	45%
% Acres of Row Rice	10%
Pureline Seeding Rate lbs/acre	70
Hybrid Seeding Rate lbs/acre	22
Yield (bushels/acre)	167
Price/Bushel	$4.86
% Acres Scouted	85%
Scouting Fee/scouted acre	$10.00
% Acres Insect Seed Trt.	84%
Avg. Seed Trt Cost/treated ac	$8.88

Seed Treatment Breakdown

	% of Acres	# of Acres	Price/Acre
Pureline			
Nipslt Suite	18%	142,659	$11.00
CruiserMaxx	55%	435,903	$15.00
Dermacor X-100	0%	0	$22.80
Untreated	27%	213,989	$0.00
Hybrid			
Nipslt Suite	100%	648,450	$5.00
CruiserMaxx	10%	64,845	$7.00
Dermacor X-100	0%	0	$14.40
Untreated	0%	0	$0.00

Yield & Management Results

Total Bushels Harvested	240,647,000
Total Bushels Lost to Insects	11,095,553
Percent Yield Loss	4.41%
Yield w/o Insects	174.70
Ave. # Spray Applications	0.860
Seed Treated Acres	1,210,440
Scouted Acres	1,224,850

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$12,601,545	$8.75
Seed Treatment Costs	$10,744,477	$7.46
Scouting costs	$12,248,500	$8.50
Total Costs	$35,594,522	$24.70
Yield Lost to insects	$53,924,388	$37.42
Total Losses + Costs	$89,518,910	$62.12

Appendix 3. California rice insect losses in 2018.

California in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Chinch Bug	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Fall Armyworm	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Grape Colaspis	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Leafhoppers	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Mexican Rice Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Delphacid	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Seed Midge	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Water Weevil	5,060	1.0%	1,518	0.3%	1,518	0.3%	1	$20.00	0.00	0.003	$0.06	0.00%	0	$30,360	$0.06	0.6%
Shorthonred Grasshopper	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Sugarcane Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	151,800	30.0%	126,500	25.0%	126,500	25.0%	1	$20.00	0.00	0.250	$5.00	0.00%	0	$2,530,000	$5.00	49.2%
Thrips	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	50,600	10.0%	40,480	8.0%	40,480	8.0%	1	$40.00	1.00	0.080	$3.20	0.10%	96,743	$2,586,627	$5.11	50.3%
Wireworms/Other grubs	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**0.003**	**$8.26**	**0.10%**	**96,743**	**$5,146,987**	**$10.17**	**100.0%**

SUMMARY DATA

Data Input

State	CA
Year	2018
Total Acres	506,000
% Pureline	100%
% Hybrid	0%
% Acres of Row Rice	0%
Pureline Seeding Rate lbs/acre	180
Hybrid Seeding Rate lbs/acre	0
Yield (bushels/acre)	191
Price/Bushel	$10.00
% Acres Scouted	90%
Scouting Fee/scouted acre	$0.00
% Acres Insect Seed Trt.	0%
Avg. Seed Trt Cost/treated ac	$0.00

Seed Treatment Breakdown

	% of Acres	# of Acres	Price/Acre
Pureline			
Nipslt Suite			
CruiserMaxx			
Dermacor X-100			
Untreated	100%	506,000	$0.00
Hybrid			
Nipslt Suite			
CruiserMaxx			
Dermacor X-100			
Untreated			

Yield & Management Results

Total Bushels Harvested	96,646,000
Total Bushels Lost to Insects	96,743
Percent Yield Loss	0.10%
Yield w/o Insects	191.19
Ave. # Spray Applications	0.003
Seed Treated Acres	0
Scouted Acres	455,400

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$4,179,560	$8.26
Seed Treatment Costs	$0	$0.00
Scouting costs	$0	$0.00
Total Costs	$4,179,560	$8.26
Yield Lost to insects	$967,427	$1.91
Total Losses + Costs	$5,146,987	$10.17

Appendix 4. Louisiana rice insect losses in 2018.

Louisiana in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	4,341	1.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Chinch Bug	217,062	50.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Fall Armyworm	303,886	70.0%	21,706	5.0%	21,706	5.0%	1	$10.00	0.10	0.050	$0.50	0.07%	50,039	$447,242	$1.03	3.5%
Grape Colaspis	86,825	20.0%	43,412	10.0%	0	0.0%	0	$0.00	0.10	0.000	$0.00	0.02%	14,297	$65,766	$0.15	0.5%
Leafhoppers	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	217,062	50.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Mexican Rice Borer	303,886	70.0%	43,412	10.0%	0	0.0%	0	$0.00	0.50	0.000	$0.00	0.35%	250,196	$1,150,903	$2.65	8.9%
Rice Delphacid	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Seed Midge	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	108,531	25.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	434,123	100.0%	173,649	40.0%	108,531	25.0%	1.2	$10.00	1.00	0.300	$3.00	1.00%	714,846	$4,590,662	$10.57	35.5%
Rice Water Weevil	434,123	100.0%	86,825	20.0%	8,682	2.0%	1	$10.00	2.00	0.020	$0.20	2.00%	1,429,693	$6,663,410	$15.35	51.6%
Shorthonred Grasshopper	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Sugarcane Borer	108,531	25.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	173,649	40.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Wireworms/Other grubs	4,341	1.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**0.370**	**$3.70**	**3.44%**	**2,459,071**	**$12,917,983**	**$29.76**	**100.0%**

SUMMARY DATA

Data Input

State	LA
Year	2018
Total Acres	434,123
% Pureline	78%
% Hybrid	22%
% Acres of Row Rice	1%
Pureline Seeding Rate lbs/acre	60
Hybrid Seeding Rate lbs/acre	25
Yield (bushels/acre)	159
Price/Bushel	$4.60
% Acres Scouted	60%
Scouting Fee/scouted acre	$8.50
% Acres Insect Seed Trt.	85%
Avg. Seed Trt Cost/treated ac	$15.72

Seed Treatment Breakdown

	% of Acres	# of Acres	Price/Acre
Pureline			
Nipslt Suite	0%	0	$11.00
CruiserMaxx	10%	33,862	$15.00
Dermacor X-100	70%	237,031	$22.80
Untreated	20%	67,723	$0.00
Hybrid			
Nipslt Suite	100%	95,507	$5.00
CruiserMaxx	0%	0	$7.00
Dermacor X-100	20%	19,101	$14.40
Untreated	0%	0	$0.00

Yield & Management Results

Total Bushels Harvested	69,025,557
Total Bushels Lost to Insects	2,459,071
Percent Yield Loss	3.44%
Yield w/o Insects	164.66
Ave. # Spray Applications	0.370
Seed Treated Acres	369,005
Scouted Acres	260,474

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$1,606,255	$3.70
Seed Treatment Costs	$5,800,315	$13.36
Scouting costs	$2,214,027	$5.10
Total Costs	$9,620,597	$22.16
Yield Lost to insects	$11,311,728	$26.06
Total Losses + Costs	$20,932,325	$48.22

Appendix 5. Mississippi rice insect losses in 2018.

Mississippi in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	27,800	20.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	2,780	2.0%	2,780	2.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Chinch Bug	6,950	5.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Fall Armyworm	69,500	50.0%	34,750	25.0%	34,750	25.0%	1	$6.00	0.25	0.250	$1.50	0.13%	29,130	$358,517	$2.58	6.8%
Grape Colaspis	6,950	5.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Leafhoppers	27,800	20.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	125,100	90.0%	6,950	5.0%	6,950	5.0%	1.1	$8.50	0.25	0.055	$0.47	0.23%	52,433	$335,014	$2.41	6.4%
Mexican Rice Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Delphacid	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Seed Midge	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	139,000	100.0%	118,150	85.0%	118,150	85.0%	1.25	$8.50	1.00	1.063	$9.03	1.00%	233,037	$2,455,483	$17.67	46.7%
Rice Water Weevil	132,050	95.0%	41,700	30.0%	41,700	30.0%	1	$9.50	1.50	0.300	$2.85	1.43%	332,077	$2,106,349	$15.15	40.1%
Shorthonred Grasshopper	1,390	1.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Sugarcane Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	125,100	90.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Wireworms/Other grubs	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**1.668**	**$13.85**	**2.78%**	**646,677**	**$5,255,363**	**$37.81**	**100.0%**

SUMMARY DATA

Data Input

State	MS
Year	2018
Total Acres	139,000
% Pureline	55%
% Hybrid	45%
% Acres of Row Rice	2%
Pureline Seeding Rate lbs/acre	65
Hybrid Seeding Rate lbs/acre	24
Yield (bushels/acre)	163
Price/Bushel	$5.15
% Acres Scouted	100%
Scouting Fee/scouted acre	$8.50
% Acres Insect Seed Trt.	89%
Avg. Seed Trt Cost/treated ac	$8.58

Seed Treatment Breakdown

	% Acres	# of Acres	Price/Acre
Pureline			
Nipsit Suite	57%	43,577	$10.50
CruiserMaxx	31%	23,700	$11.50
Dermacor X-100	1%	765	$14.82
Untreated	11%	8,410	$0.00
Hybrid			
Nipsit Suite	100%	62,550	$5.00
CruiserMaxx	10%	6,255	$7.00
Dermacor X-100	2%	1,251	$14.40
Untreated	0%	0	$0.00

Yield & Management Results

Total Bushels Harvested	22,657,000
Total Bushels Lost to Insects	646,677
Percent Yield Loss	2.78%
Yield w/o Insects	167.65
Ave. # Spray Applications	1.668
Seed Treated Acres	123,710
Scouted Acres	139,000

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$1,924,976	$13.85
Seed Treatment Costs	$1,061,935	$7.64
Scouting costs	$1,181,500	$8.50
Total Costs	$4,168,411	$29.99
Yield Lost to insects	$3,330,387	$23.96
Total Losses + Costs	$7,498,798	$53.95

Appendix 6. Texas rice insect losses in 2018.

Texas in the year 2018

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total rice acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Aphids	9,600	5.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Billbug	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Chinch Bug	19,200	10.0%	1,920	1.0%	1,920	1.0%	1	$13.85	0.00	0.010	$0.14	0.00%	0	$26,592	$0.14	0.5%
Fall Armyworm	48,000	25.0%	9,600	5.0%	9,600	5.0%	1	$13.85	0.00	0.050	$0.69	0.00%	0	$132,960	$0.69	2.3%
Grape Colaspis	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Leafhoppers	19,200	10.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Longhorned Grasshopper	192,000	100.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Mexican Rice Borer	182,400	95.0%	19,200	10.0%	0	10.0%	1	$13.85	1.00	0.000	$0.00	0.95%	311,731	$1,402,791	$7.31	23.9%
Rice Delphacid	9,600	5.0%	9,600	5.0%	0	0.0%	0	$0.00	10.00	0.000	$0.00	0.50%	164,069	$738,311	$3.85	12.6%
Rice Seed Midge	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stalk Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Rice Stink Bug	192,000	100.0%	96,000	50.0%	96,000	50.0%	1.5	$21.25	0.00	0.750	$15.94	0.00%	0	$3,060,000	$15.94	52.2%
Rice Water Weevil	9,600	5.0%	9,600	5.0%	9,600	5.0%	1	$13.85	5.00	0.050	$0.69	0.25%	82,035	$502,116	$2.62	8.6%
Shorthonred Grasshopper	96,000	50.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Sugarcane Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Tadpole Shrimp	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
True Armyworm	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Wireworms/Other grubs	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
									TOTAL	**0.860**	**$17.46**	**1.70%**	**557,835**	**$5,862,770**	**$30.54**	**100.0%**

SUMMARY DATA

Data Input

State	TX
Year	2018
Total Acres	192,000
% Pureline	40%
% Hybrid	60%
% Acres of Row Rice	0%
Pureline Seeding Rate lbs/acre	80
Hybrid Seeding Rate lbs/acre	20
Yield (bushels/acre)	168
Price/Bushel	$4.50
% Acres Scouted	40%
Scouting Fee/scouted acre	$20.00
% Acres Insect Seed Trt.	100%
Avg. Seed Trt Cost/treated ac	$13.12

Seed Treatment Breakdown

	Treated	# of Acres	Price/Acre
Pureline			
NipsIt Suite	0%	0	$11.00
CruiserMaxx	0%	0	$15.00
Dermacor X-100	100%	76,800	$22.80
Untreated	0%	0	$0.00
Hybrid			
NipsIt Suite	100%	115,200	$5.00
CruiserMaxx	0%	0	$7.00
Dermacor X-100	5%	5,760	$14.40
Untreated	0%	0	$0.00

Yield & Management Results

Total Bushels Harvested	32,256,000
Total Bushels Lost to Insects	557,835
Percent Yield Loss	1.70%
Yield w/o Insects	170.91
Ave. # Spray Applications	0.860
Seed Treated Acres	192,000
Scouted Acres	76,800

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$3,352,512	$17.46
Seed Treatment Costs	$2,519,048	$13.12
Scouting costs	$1,536,000	$8.00
Total Costs	$7,407,560	$38.58
Yield Lost to insects	$2,510,258	$13.07
Total Losses + Costs	$9,917,818	$51.66