New Seed Treatments For Early Season Insect Pests And Resistance Monitoring For Rice Stink Bug

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There are several insects that can impact rice early season, including rice water weevil, grape colaspis, and rice seedling midge which feed on seeds and/or roots of young seedlings. These insects were effectively controlled by the seed treatment Icon in the late 1990's. Since the loss of Icon, control of rice water weevil and seedling midge was accomplished by the use of pyrethroid applications, but there were no effective means of control of grape colaspis. DuPont and Syngenta have been developing seed treatments for rice in recent years. Dermacor X-100 (DuPont) was available in 2008 and 2009 under a Section 18 in Missouri and other mid-southern rice producing states. Cruiser (Syngenta) was available in Arkansas in 2009 under a Section 18; however, both products received full labels for rice in mid-southern rice producing states for 2010. This report reviews performance of the two products and results from multiple trials in Missouri, Arkansas and Mississippi.

Dermacor X-100 is effective at reducing damage from rice water weevil and armyworms, and it offers at least suppression of stem borers. In a summary of 80 trials conducted in Missouri, Arkansas and Mississippi, Dermacor had a 69% likelihood of having a positive net return (Figure 1). Yield increases ranged from -11 bu/A to 33 bu/A, and the average yield increase of was 8.9 bu/A.

Cruiser is effective at reducing damage from grape colaspis, rice water weevil and chinch bugs. In a summary of 60 trials conducted in Missouri, Arkansas and Mississippi, Cruiser had a 75% likelihood of having a positive net return (Figure 2). Yield increases ranged from -12 bu/A to 23 bu/A, and the average yield increase was 5.5 bu/A.

Additionally, we have examined these seed treatments for their impact on non-target aquatic insects using rice fields. There appears to be no effect on non-target insects.

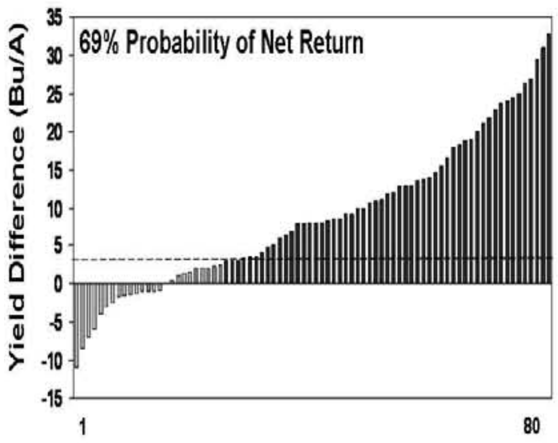

Figure 1. Performance of Dermacor X-100 on rice in 80 trials conducted between 2007-2009 in Arkansas, Missouri, and Mississippi. Dotted line denotes cost of product in bu/A. Figure developed by J. Gore, MSU.

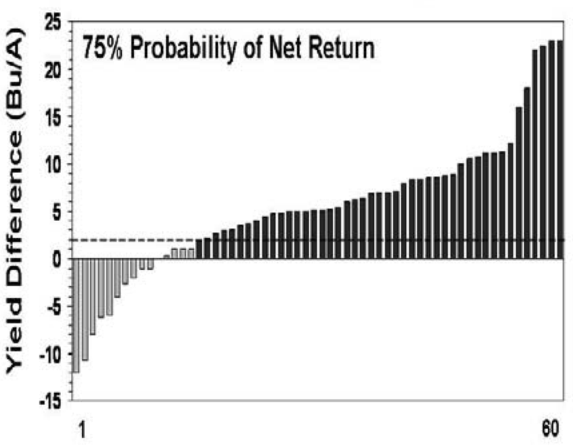

Figure 2. Performance of Cruiser on rice in 60 trials conducted between 2007-2009 in Arkansas, Missouri, and Mississippi. Dotted line denotes cost of product in bu/A. Figure developed by J. Gore, MSU.

Multi-State resistance monitoring for rice stink bug using the adult vial test

Rice stink bugs feed on grass hosts, including crops like wheat, sorghum, and corn. As a result, they may be exposed to insecticides in these crops when insecticides are applied for other pests. Some rice production areas in the mid-south have rice stink bug problems that are more severe than others. For instance, in areas of Texas, rice may be sprayed as many as six times a year, whereas, in Missouri, one application or less is made annually. High use and exposure in multiple crops are likely to lead to the development of resistance in rice stink bugs in these areas more quickly than areas with less use. There are concerns, especially in these high use areas, that pyrethroids are not as efficacious as they were when first used. In 2001-2002, baseline data were gathered in Louisiana for resistance monitoring purposes. In 2009, a multi-state project was initiated to determine LC50's for rice stink bug exposed to lambda-cyhalothrin in four mid-southern rice producing states and compare current data to baseline data collected in 2001-2002 using the adult vial test.

Data suggests rice stink bugs only show signs of resistance to lambda-cyhalothrin in areas of Texas (Round Mott resistance ratio = 5.6 and Ganado ratio =4.4). However, confidence intervals were not able to be calculated for Texas populations due to the variation. In 2010, concentrations will be tailored to each area to minimize variation so confidence intervals can be determined. It is, however, likely that the data from next year will reveal significant differences in the LC50's because Round Mott is an area with a large amount of grain sorghum that sees heavy insecticide use for pests that feed on the sorghum head. Because rice stink bug are part of the complex of pests that utilize developing sorghum heads, insecticide applications targeting other pests put unnecessary selection pressure on rice stink bugs. The rice stink bug could be negatively impacted by pyrethroid application used to eliminate other pests, such as sorghum midge. Δ

Location	LC50 (μg)	95% CI	Slope ± SE	n
LA 2001-2002	0.63	0.47-0.84	1.16 ± 0.09	1268
2001 -	0.76	0.59-0.98	1.41 ± 0.13	360
2002 -	0.57	0.34-0.91	1.10 ± 0.12	908
TX 2009	1.41	0.09-98.61	1.60 ± 0.65	698
Round Mott	3.51		1.44 ± 1.95	174
Ganado	2.8		2.14 ± 30.9	175
East Bernard	1.05		2.76 ± 8095	175
Beaumont	0.67		1.23 ± 0.53	174
AR 2009	0.53	0.27-0.99	1.73 ± 0.40	434
LA 2009	0.86	0.61-1.23	2.32 ± 0.39	161
MO 2009	0.65	0.34-1.34	0.92 ± 0.17	150

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