Insecticide Seed Treatments in Rice: Is There Value to the Grower?

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ABSTRACT

Insecticide seed treatments have been evaluated for their impact on rice since 2007. A data analysis of plot trials conducted indicate that insecticide seed treatments can improve stand, increase vigor, protect the plant from major pests such as grape colaspis and rice water weevil but most importantly increase yield and profitability for the grower.

INTRODUCTION

Many of the insect pest problems associated with rice production cannot be solved with foliar insecticides. Particularly, the major insect pests of rice, the grape colaspis (GC), Colaspis brunnea, referred to by many growers as the “lespedeza worm,” and, the rice water weevil (RWW), Lissorhopterus oryzae. Both of these pests have the potential to substantially reduce plant stand and subsequent yield in any given year. Prior to the development of new insecticide seed treatments in 2007, growers had few options for control of these key pests. Draining the field after infestation is still one of the most effective options, but the high cost of pumping in recent years has deterred growers from this practice (Thompson et al., 1994). Applying foliar insecticide has also been used as a means to control adult RWW and GC; however, difficulty in timing the application properly results in limited effectiveness.

Cruiser® 5FS (Syngenta Crop Protection) and Dermacor® X-100 (DuPont) were granted full labels for use during the spring of 2010. In the U.S. prior to 2010, an extensive testing program was conducted through Experimental Use Permits (EUPs). In 2008, Arkansas received a Section 18 with Louisiana and Mississippi for Dermacor
and we were able to observe the product in large block trials to verify small block test results (Wilf et al., 2009a, 2009b, 2010a). In 2009 Dermacor received a full label and Arkansas was the only state granted a Section 18 for Cruiser. We were able to compare Cruiser to Dermacor and untreated checks in several locations across the rice growing area of the state in large and small plot trials (Wilf et al., 2010a, 2010b; Fortner et al., 2010, 2011a, 2011b, 2011c, 2011d, 2011e). In 2011, a third seed treatment, NipsIt Inside, became available on limited acreage; a EUP was granted on 40,000 acres of which 20,000 was allotted in Arkansas.

The opportunity to evaluate this product in small plots as well as on grower fields across the state provided a good opportunity to evaluate the product on large plot trials in the state (Lorenz et al., 2012; Plummer et al., 2012; Taillon et al., 2012; Thrash et al., 2012). NipsIt Inside (Valent) received a full label for use in the fall of 2012 (Everett et al., 2013; Plummer et al., 2012; Taillon et al., 2013a, 2013b). In 2011 the Cruiser formulation was changed to Cruiser Maxx Rice which includes a premix of Cruiser and fungicides.

**PROCEDURES**

Experiments and demonstrations were conducted from 2007 to 2013 on numerous grower fields across the state, the University of Arkansas System Division of Agriculture's Pine Tree Research Station near Colt, Ark., and Rice Research Extension Center near Stuttgart, Ark. These trials consisted of small plot replicated experiments and large plot demonstration trials and the comments on these seed treatments herein, are based on these observations. In these trials we have used seeding rates ranging from 20 lb/acre to 120 lb/acre. We have observed these seed treatments on conventional, Clearfield and hybrid cultivars of rice. The selection of locations was based on fields with a history of problems with either grape colaspis or rice water weevil. However, we did not experience insect problems in every field.

A metadata analysis of impact on yield across these trials was conducted to determine the effect on yield for the insecticide seed treatments. Data is processed using the latest version of Agriculture Research Manager (Gylling Data Management, Inc., Brookings, S.D.), analysis of variance, and Duncan’s New Multiple Range Test ($P = 0.10$).

**RESULTS AND DISCUSSION**

Throughout the testing of these seed treatments we have seen a general trend to improve stand count and vigor in many fields with the use of seed treatments (Wilf et al., 2009b). Seed treatments have increased stand counts in many trials as much as 10% to 20% above the untreated check. We have also documented increased plant height in some fields (Wilf et al., 2009a, 2009b). The amount of vigor seen may be dependent on many factors including pest pressure, environmental conditions, and seed quality. Many times we have observed under stressful conditions the seed treatment helped to moderate or buffer stress including pressure caused by herbicide drift (Scott et al., 2013).
The insecticide seed treatments have continued to provide good control of RWW in Arkansas. Seed treatments provide good control when moderate populations of RWW are present on roots (Fortner et al., 2010, 2011a-e; Plummer et al., 2012; Taillon et al., 2012, 2013a, 2013b; Wilf et al., 2009a, 2009b, 2010a, 2010b). When higher populations occur (>20 larvae per core), NipsIt Inside and Cruiser provide adequate control while Dermacor provides a slightly higher level of control.

Each of the seed treatments provided substantial benefits in terms of yield (Figs. 1-3). Over the 8 year period, Dermacor provided an 8.67 bu/acre yield increase, Cruiser provided an 8.2 bu/acre yield increase, and NipsIt Inside provided an 8 bu/acre increase compared to the untreated check. Based on the yield results shown in the figures below, Dermacor, Cruiser, and NipsIt provided an 86%, 78%, and 72% probability of a net return, respectively.

**SIGNIFICANCE OF FINDINGS**

While our tests have demonstrated improved stand, increased vigor and control of some of the major pests associated with rice, including grape colaspis and rice water weevil, as well as buffering the impact of herbicide drift, the bottom line is profitability for rice producers. Insecticide seed treatments not only provide protection of the rice plant from insects and reduce stress, but increase yields and profitability.

**ACKNOWLEDGMENTS**

We would like to express our appreciation to Arkansas rice producers, Rice Research and Promotion Board, DuPont, Syngenta, and Valent for their support. We would also like to acknowledge the many county agents that helped with these trials.

**LITERATURE CITED**


Fig. 1. Increase or decrease in yield for Cruiser insecticide seed treatment compared to an untreated check in 81 trials conducted from 2007-2014.
Fig. 2. Increase or decrease in yield for NipsIt insecticide seed treatment compared to an untreated check in 46 trials conducted from 2007-2014.
Fig. 3. Increase or decrease in yield for Dermacor X-100 (chlorantraniliprole) insecticide seed treatment compared to an untreated check in 74 trials conducted from 2007-2014.