

Effect of Endura, Priaxor, and Cobra on Soybeans with White Mold

RFR-A1580

Shrishail Navi, associate scientist
Tra Huynh, graduate research assistant
XB Yang, professor
Department of Plant Pathology and
Microbiology

Introduction

Soybean *Sclerotinia* stem rot or white mold caused by *Sclerotinia sclerotiorum* is a major disease in commercial production, particularly in intensive production regions of the United States, Argentina, and northern China. The occurrence of white mold (Figure 1) depends on various seasonal factors such as cool temperatures <85°F, good soil moisture during flowering or early pod formation stage, canopy closure, narrow row spacing, and germination of sclerotia producing apothecia during flowering. White mold management measures typically are a preventative program, which includes application of fungicides and also herbicides like Cobra. It is known that Cobra can cause phytotoxic effects on the canopy and yield responses may be variable. Fungicide use in soybean has gone up from <1 percent of the soybean planted acreage in 20 program states (Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Dakota, Tennessee, Virginia, and Wisconsin) to 11 percent of soybean planted acres in 2012 USDA-NASS (2013). The objective of this study was to assess foliar applications of Endura fungicide, either alone or in combination with other fungicides or Cobra herbicide, on soybean white mold and grain yield.

Material and Methods

The trial was set up in a randomized complete block design (RCBD) with four replications each with 10-ft wide (four 30-in. rows) × 39.5-ft long plots at the Northeast Research and Demonstration Farm, Nashua, IA. Pioneer 25T51R soybeans were no-till planted at 188.8k PPA in 30-in. row spacing with Kinze 3000 planter on May 1, 2015. Fungicides were sprayed at R1 and R3-growth stages using CO₂ backpack (10 ft hand boom/ XR8003 tips) as per the treatment details provided in Table 1 on July 8 and 31, respectively. To maintain weed-free plots, 21 oz/acre Outlook and 32 oz/acre Roundup WeatherMax herbicides were sprayed on May 14, followed by 6 oz/acre Select and 32 oz/acre Roundup WeatherMax on July 5. Plots were harvested using a John Deere 4420 combine with Shivvers grain moisture meter and Avery-Weigh Tronix weigh scale indicator. Yields were measured in bushels/acre converted to 13 percent grain moisture.

Treatments. Endura (Boscalid 70%) alone at 6 oz and 8 oz/acre, Endura 8 oz/acre plus Cobra (Lactofen 24%) 6 oz/acre, Endura 6 oz/acre plus Priaxor (Fluxapyroxad 14.33% + Pyraclostrobin 28.58%) 4 oz/acre were sprayed at R1. In another treatment, Endura 6 oz/acre was sprayed at R1 followed by Priaxor 4 oz/acre sprayed at R3. Unsprayed treatment served as control.

White mold and post-harvest data. Pre- and post-fungicide spray diseases ratings were recorded weekly from one week before application through two weeks before the harvest. However, only mean final percent white mold incidence is presented in Table 1. Also, during harvest, soybean grain was collected to assess 100 grain weight (g) and

sclerotia per kg of grain. White mold incidence in each plot was based on infected plants/total plants \times 100 and the severity was based on percent plants damaged by the disease.

Data analysis. Data was analyzed using PROC ANOVA in SAS 9.4. (SAS, LLC, Cray, NY). Fisher's least significant difference was used to detect the significant differences among the means ($P = 0.05$).

Results and Discussion

Diseases observed in this trial during the 2015 growing season were bacterial leaf blight (BLB) in July and white mold from August 14 to September 30 (Table 1). Severity of BLB was <10 percent (data not shown) and white mold incidence varied from 5.1 to 10.4 percent. Endura either alone or in combination with Priaxor fungicide or Cobra herbicide significantly ($P < 0.05$) reduced white mold incidence (Table 1). Also, the average yield advantage across treatments (Endura alone or

in combination with Priaxor or Cobra) was 5.77 bushels/acre (range 4.42 to 6.96 bu/ac) over unsprayed control (Table 1). However, Endura 8 oz/acre sprayed at R1 showed significant ($P < 0.05$) yield advantage (6.96 bu/ac) over unsprayed control (Table 1). Depending on the cost-benefit ratio, growers have options. In post-harvest data, Endura sprayed at R1 followed by Priaxor at R3 showed significant advantage in 100 grain weight compared with Endura + Cobra treatment (Table 1). Number of sclerotia/kg of soybean grain varied from 67.64 (Endura + Cobra) to 87.48 (unsprayed control). These results support *in vitro* observations reported about *S. sclerotiorum* and Endura fungicide and previous field tests.

Acknowledgements

Authors thank Ken Pecinovsky, farm superintendent, Northeast Research and Demonstration Farm, Nashua, for his assistance, and BASF for funding.

Table 1. Effect of Endura either solo or in combination with Priaxor and Cobra on soybean white mold and yield during 2015, Nashua, IA.^a

Products tested	Application rate (oz)	Spray timing	WM Inc. (%) ³	Yield bu/ac	100 grain wt (g)	Sclerotia/kg grain	Sclerotia wt (g)
Unsprayed control	-	-	10.40a	68.99b	20.45ba	87.48a	3.35a
Endura + NIS ¹	6 + 0.25%	R1	5.83b	73.92ba	20.08ba	82.47a	2.99a
Endura + NIS	8 + 0.25%	R1	6.79b	75.95a	20.69ba	82.98a	2.75a
Cobra + Endura + COC ²	6 + 8 + 0.125 gal	R1	5.52b	74.79ba	19.85b	67.64a	2.08a
Endura + Priaxor + NIS	6 + 4 + 0.25%	R1	5.15b	73.40ba	20.63ba	84.66a	3.09a
Endura + NIS and Priaxor + NIS	6 + 0.25% and 4 + 0.25%	R1 and R3	5.23b	75.54ba	20.80a	70.52a	2.59a

^aEndura is Succinate dehydrogenase inhibitors and Priaxor a mixture of Carboxamides and QoI group. Means with the same letter(s) within a column are not significantly different ($P < 0.05$). Values are means of four replications each replication with 395 sq ft plot.

¹Non-ion surfactant Activator 90 from Loveland Industries.

²Crop oil concentrate.

³WM Inc. (%) = White Mold Incidence as a percentage. Based on number of white mold infected plant counts in 1,712 plants/plot. Severity of white mold infected plants was 100% on a 0-100 scale.



Figure 1. White mold infected plants (a) appear wilted, stand erect above the canopy, and dark sclerotia formed both (b) outside and (c) inside pods.