Barley (*Hordeum vulgare* 'Robust')
Fusarium head blight; *Fusarium graminearum*
Net blotch; P*yrenophora. teres*

S. Halley
Langdon Research Extension Center
North Dakota State University
Langdon, ND 58249

G. Van Ee
Dept. of Ag Engineering
Michigan State University
East Lansing, MI 48824

V. Hofman
Ag & Biosystems Engineering
North Dakota State University
Fargo, ND 58105

'Robust' Barley Response to JAU 6476 Fungicide Rate and Spraying Systems, 2004

The Bayer CropScience experimental fungicide JAU 6476, prothioconazole, has shown improved efficacy in the control of Fusarium head blight on durum and hard red spring wheat (HRSW) and reductions in deoxynivalenol levels compared to most of the labeled fungicides on small grains. The fungicide's effects on disease reduction and deoxynivalenol concentrations are very linear with dosage on HRSW making the properties of the fungicide favorable for research to compare spray application technologies. A study was conducted to compare JAU 6476 dosages; 1) 0.25x (1.4 fl oz/A). 2) 0.5x (2.85 fl oz/A). 3) 1x (5.7 oz/A). 4) 2x (11.4 fl oz/A). 5) 4x (22.8 fl oz/A) and two different sprayer systems with differing types of spray solution delivery modes and drop size formation systems, air delivery/air shear and hydraulic delivery/hydraulic nozzles, respectively. An untreated treatment was included in the study but not included in the analysis. The study was designed as a randomized complete block arranged as a 5 x 2 factorial with six replicates. Three replicates were planted notill and three replicates conventional till on a field previously cropped soybean. The area was seeded 6 May with a notill drill with disks spaced 6 inches apart. The area was divided into plots 12 ft. wide by 30 ft. long. The sprayer was modified to distribute the solution from orifices angled 30 degrees downward from horizontal and oriented forward and backward to maximize spike coverage. The air delivery system had orifices spaced 10 inches apart and the hydraulic delivery system had nozzles space 20 inches apart. The nozzles were Spraying Systems™ XR8001. The systems are typical of two in use by producers for applying fungicide. A major difference is the drop size. The air delivery system can deliver a smaller drop. The drop size from the air delivery system would be classified as very fine and the hydraulic sprayer fine. The pressure was adjusted on each system to deliver 10 GPA at a 6 mph tractor travel speed. Recommended production practices of the NDSU Extension Service for Northeast North Dakota were followed. Wheat grains colonized by *F. graminearum* were hand broadcast on 15 June on individual plots at 3.5 oz per plot to increase chance of infection to Fusarium head blight. The tractor traveled on the left half of the plot area. This area also provided a border to reduce off target drift between treatment areas. A visual estimation was made from 20 samples per plot on 10 August to estimate the incidence (number of spikes infected) and field severity (number of FHB infected kernels per head divided by total kernels per individual spike) of FHB in each plot. Severity of leaf diseases was based on a visual estimate of the percent leaf necrosis from five leaves per plot. A flag leaf necrosis sample was one leaf and a head sample was one spike. Each plot was harvested with a Hege plot combine and the grain sample cleaned and processed for yield, test weight measurement, plump, protein, and deoxynivalenol determination. Data was analyzed with the general linear model (GLM) in SAS. Least significant differences (LSD) were used to compare means at the 5% probability level.

Foliar and head disease levels were low in 2004 in barley due to the cold temperatures throughout the growing season. No differences were measured in FHB disease among rates or spray systems. Leaf disease was reduced by three fungicide rates compared to the 0.25x rate but not by spray system. Yield was increased when a 2.0x rate of fungicide was applied and when the hydraulic delivery spray system was used. No differences were measured in test weight, plump, or protein. Only a few plots had deoxynivalenol levels above 0.5%.

ACKNOWLEDGEMENT

The study group wishes to acknowledge the contributions and support of Bayer CropScience, Marcia Van Ee, Grace Bredeson, and Kristin Karsky. "This material is based upon work supported by the U.S. Department of Agriculture, under Agreement Nos. 59-0790-3-079 and 59-0790-9-072. This is a cooperative project with the U.S. Wheat & Barley Scab Initiative." "Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture".

Treatment[z] and rate/A or spray system	FHB Incidence (%)	FHB Field Severity (%)	Leaf Disease (%)	Yield (bu/A)	Test Weight (lb/bu)	Plump (%)	Protein (%)
Untreated	63	2.7	28.2	94.5	44.3	80	10.2
0.25x 1.4 fl oz.....	50	1.7	14.2	93.4	43.8	79	10.2
0.5x 2.85 fl oz.....	47	1.6	7.7	95.1	43.8	80	9.9
1.0x 5.7 fl oz…….	54	2.3	11.3	90.9	44.0	80	10.2
2.0x 11.4 fl oz.....	45	1.5	5.7	102.5	44.3	80	10.2
4.0x 22.8 fl oz.....	39	1.1	7.1	93.9	44.0	79	9.7
Air Delivery	47	1.6	10.0	93.0	44.0	80	10.2
Hydraulic Delivery	47	1.7	8.4	97.4	44.0	79	9.9
Rate LSD	NS	NS	6.1	4.8[y]	NS	NS	NS
Spray System LSD	NS	NS	NS	4.3[x]	NS	NS	NS
Rate*Spray System	NS	NS	NS	NS	NS	NS	NS
C.V. %	36	71	81	10	2	6	6

[z] JAU 6476 (480 SC) applied with Induce Adjuvant at 0.125% v/v/A.
[y] *P*=.0686
[x] *P*=.091