

Barley (*Hordeum vulgare* 'Conlon, Drummond, Lacey, Legacy, Robust')
Fusarium head blight; *Fusarium graminearum*
Septoria leaf blotch; *Septoria passerinii*

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

Barley cultivar response to fungicide application for the control of Fusarium head blight and leaf disease, 2003.

The experiment was conducted at the Langdon Research Extension Center, Langdon. Conlon, Drummond, Lacey, Legacy, and Robust barley cultivars were planted with an Almaco double disk drill to a site previously cropped barley. Conlon was planted on 10 May 8 days after the other cultivars to synchronize head emergence for fungicide application. Soil type was a Svea loam. Plots were 7 rows wide 16 ft long in a randomized complete block design arranged as a 5 x 5 factorial. Wheat grains colonized by *F. graminearum* were hand broadcast on 19 Jun on individual plots at 3.5 oz per plot to increase chance of infection to Fusarium head blight. Spray solutions were applied by CO₂ backpack sprayer at 18.4 GPA at 40 psi with XR8001 nozzles on a double swivel adapter angled 30° downward and oriented to spray forward and backward. Single applications of fungicides Folicur (tebuconazole) and Bayer experimental JAU 6476 (prothiaconazole) were applied to plots on 27 Jun at 9:00 a.m. at crop growth stage Feekes 10.5. All application rates were full rates, Folicur 4 fl oz/A and JAU 6476 5.7 fl oz/A. Both fungicides were mixed with Induce adjuvant at 0.125% v/v. Additional treatments included JAU 6476 and a subsequent application 10 days later on 7 Jul at 3:00 p.m. of either Folicur or JAU 6476. Fungicides treatments were compared to an untreated. Recommended production practices for Northeast North Dakota, NDSU Extension, were followed. The trial was harvested with a Hege plot combine on 12 Aug. Grain samples were cleaned and processed for yield, test weight, plump, and DON (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.

Stand reduction was evident early in the growing season, Table 1. Visual assessment of the roots indicated infection from *Pythium* sp. An assessment of the % ground coverage of each plot was made at Feekes growth stage 6 and recorded as percent reduction to reflect differences due to *Pythium* sp. Conlon had significantly greater ground coverage than other cultivars and Drummond had significantly less coverage. Leaf disease developed at a late growth stage and was visually assessed on 1 Aug by evaluating 5 leaves/plot. Conlon had the greatest leaf disease levels. Leaf disease on Drummond and Legacy was less than Lacey. Fusarium head blight levels were low and all fungicides reduced levels to less than 1%. Mean Fusarium head blight (FHB) incidence and severity (spikelet count per individual head multiplied times incidence of FHB infected spikes per plot) by untreated cultivar were 41 and 1.9, 55 and 2.6, 60 and 3.8, 58 and 2.2, and 53 and 2.4 for Conlon, Drummond, Lacey, Legacy, and Robust, respectively. Despite early season growth problems the growing season was one of the most productive in recent years due to little visible disease development. All yields were excellent. Lacey and Legacy had greater yields than the other cultivars. Test weight was not affected by fungicide application to Conlon and Legacy, increased by treatment that included subsequent application of JAU 6476 to Drummond, increased treatment that included a subsequent Folicur application to Lacey, and reduced by treatment with subsequent Folicur application to Legacy Figure 1. Test weight increases and decreases did not appear to be correlated with leaf disease. Plumps were excellent in all treatments. Treatments that included JAU 6476 had greater plumps. Conlon has been reported to have less deoxynivalenol concentration than many cultivars. Similar results were detected in this trial, Figure 2, with slight differences between some other cultivars. Subsequent applications with JAU 6476 reduced deoxynivalenol levels over Folicur applied alone on Legacy cultivar. Treatments that included either subsequent fungicide application reduced deoxynivalenol levels on Lacey. Deoxynivalenol reductions were measured by all fungicide applications to Drummond, Lacey, Legacy, and Robust.

Table 1. Pythium, leaf disease, yield, test weight, plump, and DON by cultivar and fungicide, 2003.

Cultivar	Fungicide	Pythium	Leaf Disease	Yield	Test Weight	Plump	DON
		%	%	bu/ac	lb/bu	%	ppm
Conlon	Untreated	95	80	79.8	49.3	91	0.7
	JAU 6476	90	57	94.2	50.8	94	0.5
	Folicur	85	95	88.9	49.8	94	0.5
	JAU+JAU	85	70	87.9	50.1	94	0.5
	JAU+Fol	92	62	96.9	50.0	94	0.5
Drummond	Untreated	54	25	83.1	45.1	81	4.5
	JAU 6476	66	45	88.0	45.5	86	1.4
	Folicur	59	42	86.4	45.9	84	1.6
	JAU+JAU	65	64	96.3	47.4	89	0.9
	JAU+Fol	56	25	82.5	45.6	86	1.3
Lacey	Untreated	81	66	93.9	47.1	87	3.0
	JAU 6476	64	49	97.1	47.6	92	1.2
	Folicur	69	61	90.0	47.1	87	1.7
	JAU+JAU	68	54	100.9	47.1	91	0.7
	JAU+Fol	88	67	101.9	49.9	93	0.6
Legacy	Untreated	84	33	96.3	46.1	85	4.0
	JAU 6476	68	33	95.2	45.5	88	1.0
	Folicur	76	41	100.4	45.8	85	1.5
	JAU+JAU	70	61	85.9	46.6	90	0.8
	JAU+Fol	85	36	105.1	46.3	88	1.1
Robust	Untreated	93	83	89.2	49.0	88	1.8
	JAU 6476	78	45	99.7	48.8	91	0.8
	Folicur	59	41	87.5	47.3	87	0.9
	JAU+JAU	78	22	89.7	48.4	92	0.5
	JAU+Fol	61	31	82.6	46.8	88	0.8

Cultivars averaged across fungicides

Conlon	89	73	89.5	50.0	93	0.5
Drummond	60	40	87.3	45.9	85	1.9
Lacey	74	59	96.7	47.8	90	1.4
Legacy	77	41	96.6	46.0	87	1.7
Robust	74	45	89.7	48.0	89	1.0

Fungicides averaged across cultivars

Untreated	81	57	88.5	47.3	87	2.8
JAU 6476	73	46	94.8	47.6	90	1.0
Folicur	70	56	90.6	47.2	87	1.3
JAU+JAU	73	54	92.1	47.9	91	0.7
JAU+Fol	76	44	93.8	47.7	90	0.9

Cultivar	11	17	6.0	0.8	2	0.3
Fungicide	NS	NS	NS	NS	2	0.3
Cult.*Fung.	NS	NS	NS	1.8*	5	0.7
% C.V.	23	52	10	3	4	33

*P=.0314

Test Weight by Cultivar and Fungicide, 2003

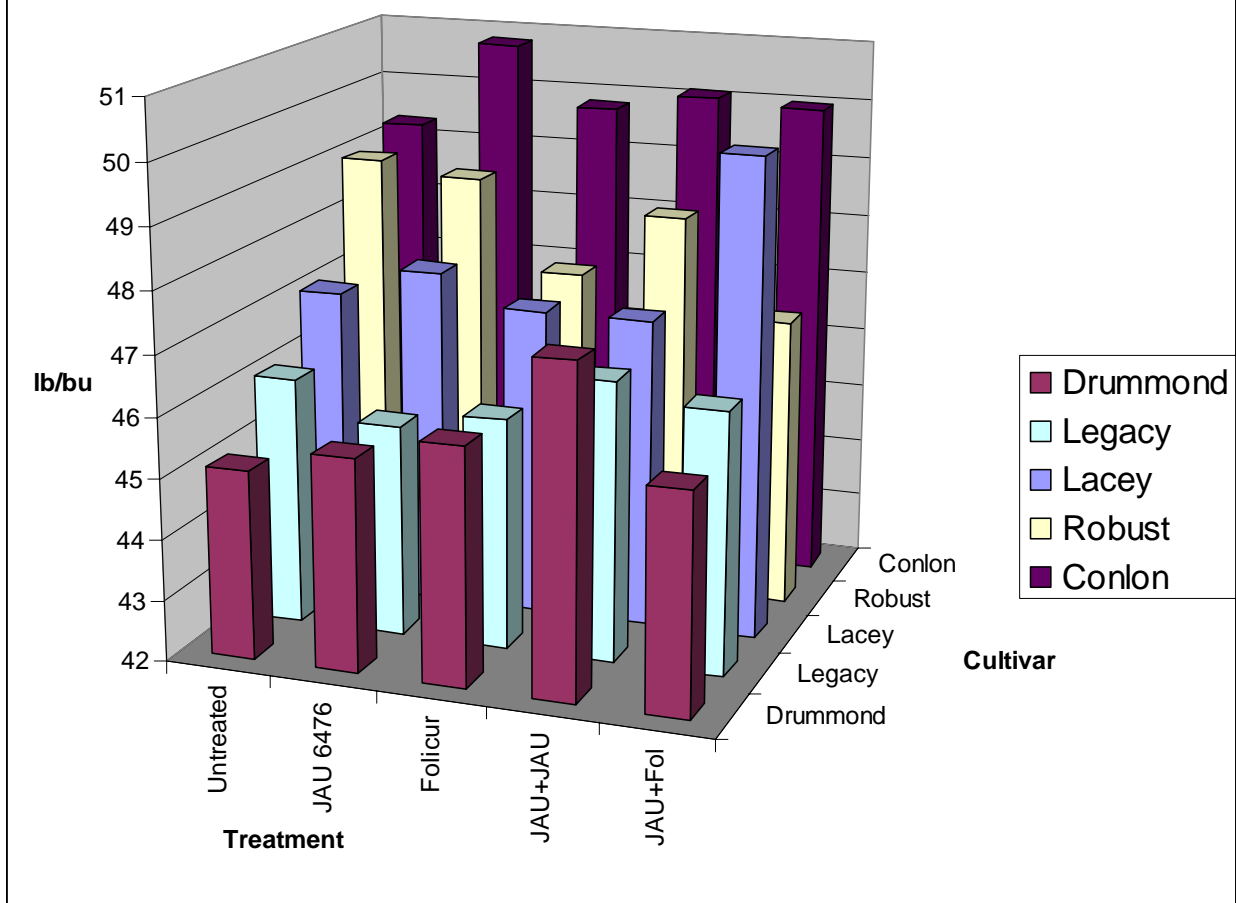


Figure 1. Test weight by barley cultivar and treatment, Langdon 2003.

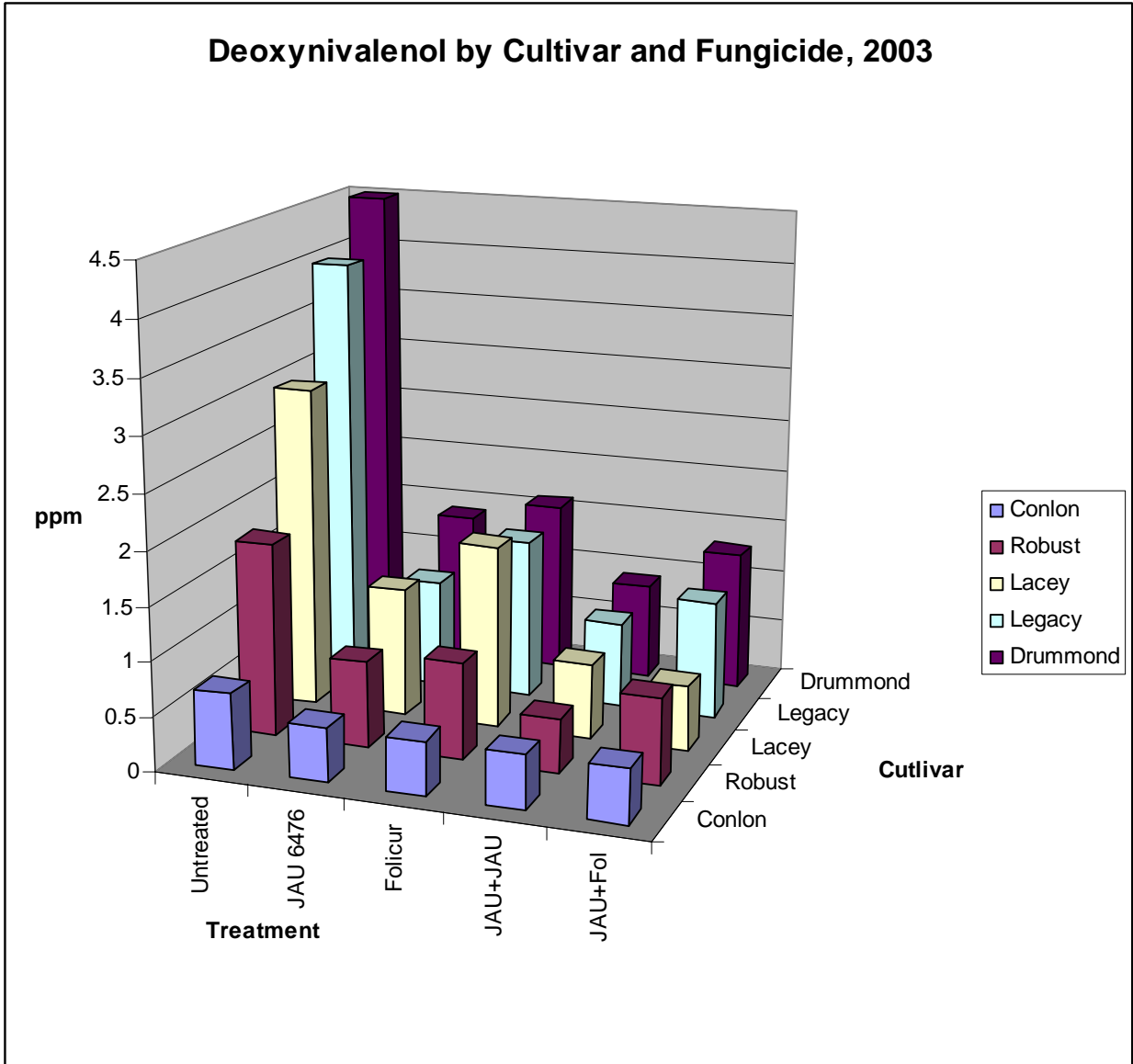


Figure 2. Deoxynivalenol levels by barley cultivar and treatment Langdon, 2003.