

BARLEY (*Hordeum vulgare*)  
Fusarium head blight; *Fusarium graminearum*  
Leaf rust; *Puccinia hordei*  
Powdery mildew; *Blumeria graminis* f. sp. *hordei*  
Scald; *Rhynchosporium commune*

A.F. Blachez and G.C. Bergstrom, Plant Pathology and  
Plant-Microbe Biology Section, D. Benschler and M.E.  
Sorrells, Plant Breeding and Genetics Section, School  
of Integrative Plant Science, Cornell University, Ithaca,  
NY 14853

### **Evaluation of Fusarium head blight and foliar diseases on winter malting barley varieties in New York, 2017.**

Winter malting barley variety trials were conducted at four locations in central and western New York, including one trial each in Monroe and Seneca Counties and two trials in Tompkins County (Ketola and McGowan). Each trial was conducted in a randomized complete block design with three replicates. Plots were 13-ft long and six rows wide with 7-in. row spacing. Seed was planted the previous autumn at a rate of 96 lb/A on 27 Sep in Monroe County, 28 Sep in McGowan, 6 Oct in Ketola, and 7 Oct in Seneca County. Before planting, 200 lb/A of 20:20:20 fertilizer was applied (delivering 40 lb/A of nitrogen). In the spring, the field was top-dressed with 50 lb/A of nitrogen. A broadleaf herbicide (Harmony Extra and Bromoxynil with Induce) was applied in early April. No fungicides or insecticides were applied over the course of the trial, and no artificial inoculations were performed. Foliar disease ratings were estimated as the percent of the top two leaves affected by a disease averaged over the entire plot. Fusarium head blight (FHB) incidence and severity was assessed in each plot and a FHB index was calculated. Incidence was estimated by counting the number of symptomatic heads out of 25, and multiplying by four. Severity for each plot was determined by estimating the average percentage of infected kernels on symptomatic heads, reported as a whole number. FHB index was calculated as incidence x severity/100. Foliar diseases were rated at the soft dough growth stage in Tompkins and Seneca County, and at the hard dough growth stage in Monroe County. FHB was rated at the hard dough growth stage at Monroe and Seneca Counties at the ripening growth stage in Tompkins County. Disease severities and FHB index were square root-transformed and the means of the transformed data were analyzed with analysis of variance and separated by Tukey's HSD test ( $P=0.05$ ).

Fusarium head blight index was consistently highest for '10467r2', a 6-row breeding line. 'KWS Scala' had an equivalently high FHB index of 2.3 in McGowan, but had very low levels of the disease in the other two trials. 'DH140082', 'SU Mateo', and 'MW11S3034-006' had consistently low levels of FHB, with index scores at or below 0.3 at all locations. Leaf rust was only recorded at Monroe, where 'MW11S3029-010' (53.3%), '6Ab08-X03W012-5' (43.3%), and 'Charles' (23.7%) were the only lines with severities higher than 10%. Powdery mildew was highest on 'DH1400882' and 'MW11S3034-006', 2-row and 6-row breeding lines, respectively. 'Nectaria', '6W11-0064', and '6Ab08-X03W012-5' showed relatively high levels of powdery mildew, and several 6-row lines showed moderate levels of the disease, including '6W13-7041', '6W13-7041', 'Alba', and 'MW11S3029-010'. Overall, scald was the foliar disease with the highest severity in 2017, reaching a peak of 75% severity in Monroe and 60% severity in Ketola on 'KWS Scala'. In McGowan, the variety with the highest scald severity was 'Charles', with a severity of 41.7%. Across environments, 'KWS Scala' and 'Flavia' were consistently in the top three varieties with the most scald, and 'Charles', 'OSU10.0925', and '10/069/1' were consistently in the top five. All other varieties had average scald severities under 10% at all locations. Scald and FHB were also observed in Seneca County, but the levels were too low to report. These data indicate that the tested varieties have a range of susceptibility to all of the diseases observed.

Variety	Rows*	FHB Index			Leaf Rust (%)		Powdery Mildew (%)		Scald (%)										
		Ketola**		McGowan	Monroe		Monroe	Ketola		McGowan	Monroe								
Charles	2	0.2	b	1.2	a-d	0.3	ab	23.7	ab	0.0	c	0.0	e	30.0	abc	41.7	a	3.3	c
DH130718	2	0.2	b	2.4	ab	0.3	ab	3.7	bc	1.0	c	8.3	bcd	0.0	d	0.0	b	0.2	c
DH130910	2	0.2	b	0.5	a-d	0.3	ab	2.0	bc	0.0	c	0.0	e	6.8	bcd	1.0	b	0.2	c
DH1400882	2	0.2	ab	0.1	d	0.0	b	0.7	bc	10.3	abc	53.3	a	8.3	bcd	0.0	b	0.2	c
Endeavor	2	0.1	b	0.6	a-d	0.1	ab	0.3	bc	0.0	c	0.8	cde	3.0	bcd	2.2	b	3.7	c
Flavia	2	0.6	ab	0.8	a-d	0.2	ab	0.3	c	0.0	c	0.5	cde	46.7	a	10.0	b	70.0	a
KWS Scala	2	0.1	b	2.3	a	0.1	ab	0.0	c	0.0	c	0.2	de	60.0	a	11.7	ab	75.0	a
KWS Somerset	2	0.1	b	0.7	a-d	0.4	ab	0.5	bc	0.0	c	0.7	cde	6.0	bcd	0.0	b	1.8	c
KWS2-430	2	0.3	ab	0.8	a-d	0.3	ab	0.2	c	0.0	c	0.8	cde	5.2	bcd	0.0	b	10.2	bc
Nectaria	2	0.4	ab	0.2	cd	0.3	ab	0.5	bc	5.0	abc	35.0	a	2.0	cd	0.0	b	0.2	c
OSU10.0925	2	0.6	ab	1.6	abc	0.3	ab	0.2	c	0.0	c	0.3	de	23.3	abc	3.3	b	65.0	a
SU-Mateo	2	0.1	b	0.2	cd	0.1	ab	0.7	bc	0.0	c	0.0	e	0.5	d	0.2	b	0.2	c
SY Tepee (209-66)	2	0.3	ab	0.8	a-d	0.1	ab	0.2	c	0.0	c	0.0	e	2.2	bcd	0.2	b	5.2	c
Vincenta	2	0.0	b	0.3	bcd	0.1	ab	0.0	c	0.0	c	0.3	de	3.5	bcd	1.2	b	8.7	c
06-OR-9	6	0.1	b	1.6	abc	0.0	b	0.3	c	2.0	abc	11.0	bc	0.2	d	0.0	b	0.3	c
10/069/1	6	0.4	ab	1.8	abc	0.1	ab	0.0	c	0.0	c	0.5	cde	26.7	ab	6.7	b	36.7	ab
10467r2	6	1.5	a	2.3	a	1.1	a	0.5	bc	0.0	c	0.0	e	6.8	bcd	0.3	b	0.3	c
6Ab08-X03W012-5	6	0.4	ab	0.6	a-d	0.1	ab	43.3	a	11.7	ab	26.7	ab	0.2	d	0.0	b	0.2	c
6W11-0064	6	0.3	ab	1.6	abc	0.3	ab	2.2	bc	6.7	abc	40.0	a	0.3	d	0.0	b	0.3	c
6W13-7041	6	0.1	b	0.5	a-d	0.0	ab	2.2	bc	0.8	bc	21.7	ab	0.3	d	0.0	b	0.2	c
Alba	6	0.1	b	0.9	a-d	0.0	b	2.2	bc	6.0	abc	26.7	ab	0.0	d	0.0	b	0.0	c
MW11S3029-010	6	0.2	ab	0.4	a-d	0.4	ab	53.3	a	3.8	abc	26.7	ab	7.7	bcd	0.2	b	0.0	c
MW11S3034-006	6	0.3	ab	0.0	d	0.1	ab	3.8	bc	15.0	a	41.7	a	0.3	d	0.2	b	0.5	c
Saturn	6	0.4	ab	0.7	a-d	0.2	ab	8.8	bc	0.0	c	0.2	de	0.0	d	0.2	b	0.2	c
p-value		<0.01		<0.001		0.034		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	

\* Number of rows of fertile florets along the spike

\*\*Columns followed by the same letter are not significantly different at  $P=0.05$  as determined by Tukey's HSD