

SOUTHERN UNIFORM WINTER WHEAT SCAB NURSERY

2005 NURSERY REPORT

J. P. Murphy
R. A. Navarro

This is a progress report of cooperative investigations underway and funded by the U. S. Wheat and Barley Scab Initiative, State Agricultural Experiment Stations, private companies and the United States Department of Agriculture, Agricultural Research Service. This report contains preliminary data that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. The report is a tool for the use of the cooperators and their official staff and those persons having direct interest in the development of agricultural research programs. This report is not intended for publication and should not be referred to in literature citations or quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the authors.

This material is based upon work supported by the U.S. Department of Agriculture, under Agreement No. 59-0790-4-117. 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.

North Carolina State University
Department of Crop Science
Box 7629
Raleigh, NC 27695-7629

December 1, 2005

This Report is available on the Web at;
http://scabusa.org/research_var.html#nuser

TABLE OF CONTENTS

Location Notes	3
Photographs from the 2004-05 Season	6
Entry List and Pedigrees, 2005 Nursery	7
FHB Incidence	8
FHB Severity	9
FHB Severity by Individual Isolates, Szeged, Hungary	10
FHB Severity by Individual Isolates, Fundulea, Romania	11
FHB Severity expressed as AUDPC, Fundulea, Romania	12
FHB Severity, GGE Biplot Analysis	13
FHB Index	14
Field Visual Ratings and Disease Spread in Spikelets	15
Percent and Weight of Fusarium Damaged Kernels	16
Fusarium Damaged Kernels % GGE Biplot Analysis	17
Incidence, Severity, Kernel Rating (ISK) Index	18
1000 Grain Weight	19
Grain Yield and Quality, Szeged, Hungary	20
Vomitoxin (DON)	21
Greenhouse Screening (Head Severity)	22
Greenhouse Screening (Rachis Involvement and Seed Quality)	23
Detached Leaf Evaluations, Nyon, Switzerland	24
SSR Analyses of 3BS and 5A Regions Associated with FHB resistance	25
Heading Date	26
Plant Height	27
Leaf and Viral Disease Ratings	28
Hessian Fly Screening	29
Means Across Locations	30
Genotype-by-Trait Biplot	31
Correlations Between Traits	32

LOCATION NOTES

Bay, Arkansas

- Cooperators: June Hancock, Luis Lazoanaya, David Hill, and Richard Grey Syngenta Seeds Inc.
- Reps: 2 Plot size: 2 rows 2 ft long.
Seed date: 11/15/04. Planted about one month late and remained wet all winter. Poor stands.
- Inoculation method: Infected corn kernels.
- Precipitation during grain fill: Misted daily, morning and evening.
Avg temp. during grain fill: Day 65-70, Night 45-50. Temperatures cooled down at start of heading. Heading was delayed. Mid-May was hot and dry with little humidity.

Fayetteville, Arkansas

- Cooperators: Gene Milus.
- University of Arkansas

Urbana, Illinois

Cooperators: Fred Kolb and Eric Brucker.

- University of Illinois
- Reps: 3 RCB. Plot size: 1 row x 3'. Seed date: 9/30/04. Harvest date: 6/29/05
- Fertilizer: 40 lb N/ac. preplant. P and K okay; no spring topdress.
- Inoculation method: Grain spawn and corn stalks.
- Precipitation during grain fill: Misted three times per day during flowering. Limited natural precipitation.
- Greenhouse inoculation method: Point inoculation (1,000 spores injected into one floret per head).

Lexington, Kentucky

- Cooperators: Carrie Knott and D. Van Sanford
University of Kentucky
- Reps: 2 RCB. Plot size: Two 4' rows. Seed date: 11/08/04. Harvest date: 6/7/05
- Fertilizer: P, K, according to soil tests, 110 lb N split application
- Inoculation method: Scabby corn
- Precipitation during grain fill: 3.59 in.
- Avg temperature during grain fill: 70°F.
- Greenhouse Inoculation method; Point inoculation.

Blacksburg, Virginia

- Cooperators: Jody Fanelli, Jianli Chen and Carl A. Griffey.
Virginia Tech
- Reps: 3 RCB Randomized complete block. Plot size: 4 x 5 ft (20 ft²).
- Inoculation method: Conidial suspension (5 x 10⁴ spores / ml) sprayed at anthesis (field), point inoculation (greenhouse).

Kinston, North Carolina

- Cooperators: Rene Navarro, Paul Murphy, Christina Cowger.
North Carolina State University
- Reps: 2 RCB. Plot size: 4 rows x 3.5' long. Seed date 10/22/2004. Harvest date: 6/14/2005.
- Fertilizer: 130 lbs N split application. P and K as per soil test.
- Field Inoculation method: Conidial suspension (3×10^4 spores/ml) sprayed on plots at anthesis. Corn stalks distributed in spring at jointing. Scabby corn distributed two weeks prior to anthesis.
- Precipitation during grain fill: Misted three times per day for 3 weeks beginning at anthesis.
- Greenhouse: point inoculation with 10 μ L at 50,000 spores per ml.
- Avg temp. during grain fill: 63F

Columbia, Missouri

- Cooperator: Anne L. McKendry.
University of Missouri
- Reps: 4 RCB. Plot size: 30in x 28in. Seed date: 10/25/04. Harvest date: 7/7/05
- Field inoculation method: Sprayed at 75% heading with a suspension of *Fusarium graminearum* macroconidia concentrated to 50,000 spores/mL
- Precipitation during grain fill: Overhead mist irrigation
- Greenhouse inoculations result from point inoculations of a basal central floret with 10 μ L of a 50,000 spores/mL suspension of *Fusarium graminearum* macrodonidia

Salisbury, Maryland.

- Cooperator: Jose Costa, Neely Gal-Edd and Aaron Cooper.
University of Maryland.
- Reps: 2 RCB. Plot size: 1 rows x 4' long. Seed date: 10/18/04. Harvest date: 6/24/05.
- Fertilizer: 160 lbs N.
- Field inoculation method: Planted following corn and corn grain infected with *Fusarium* scattered one month before anthesis.
- Precipitation during grain fill: Misted morning and evening. Irrigation as needed.

Szeged, Hungary.

Cooperator: Akos Mesterhazy.
Cereal Research Institute.

- Seed date: 10/22/04. Harvest date: 6/24/05.
- Fertilizer: NPK
- Field inoculation method: Four separate isolates sprayed on each plot on 5/31/2005 and inoculated heads enclosed in plastic bags.
- Precipitation during grain fill: Excessive precipitation in May (80 mm) June (70 mm), and July (70 mm).
- Winter temperatures were average with snow in February and minimum temperatures of -15 to -20 C. Cool spring delayed growth by 7-10 days. Severe Septoria and abundant leaf rust and virus.

West Lafayette, Indiana.

Cooperator: Sue Cambron

USDA-ARS, Department of Entomology

- The 2005 USFHBN was screened in the greenhouse to two biotypes of the Hessian fly.
- Greenhouse flats containing 12 rows each were divided into half rows. Four standard differentials (H7H8, H5, H3, and H6) were seeded in the four central half-rows with 15-20 seeds per entry seeded in the other 20 half-rows. This was duplicated for biotypes O and L.
- Bulk infested plant material was placed under a cheesecloth tent where adult flies were allowed to emerge, mate and oviposit for 24 – 48 hours, at which time the adults were removed.
- The eggs hatched in three to four days and the plant material was maintained for the following 18 days when the plants were rated for resistance.
- Plants of each entry were scored as resistant or susceptible based on plant phenotypic reaction.

Nyon, Switzerland

Cooperators: R. A. Browne and F. Mascher.

Agroscope RAC Changins.

- Detached leaf assay: Two repeated experiments each consisting five replicates (four leaves per replicate) inoculated with *Microdochium majus* [Glynn et al (2005) Myc Res 109, 872-880] (Formerly *Microdochium nivale* var *majus*) Irish isolate OP2A. Inoculation and disease development parameters, Incubation Period and Latent Period, assessed as described by Browne and Cooke (2004) Eur J. Plant Pathol. 110, 91-102

Fundulea, Romania.

Cooperator: Marianna Ittu.

Agricultural Research Development Institute

Photographs From The 2004-05 Season



Left and Right Above: *Fusarium* Head Blight on susceptible varieties in Crowley, Louisiana, 2005. The epidemic resulted from natural inoculum. Subsequent analysis of Louisiana isolates found a significant proportion of *F. asiaticum*, a nivalenol producer that was considered infrequent in the U.S.



Left: Carl Griffey and Wynse Brooks, (Virginia Tech) discuss FHB research with Christina Cowger (USDA-ARS) in a mist irrigated nursery at Kinston, N.C.



Left: Partially resistant and susceptible check genotypes in a mist irrigated FHB wheat segregating population nursery at Mt. Holly, VA.

Color photographs courtesy of Steve Harrison, Paul Murphy and Carl Griffey at web version of report:
http://scabusa.org/research_var.html#nuser

Entry List and Pedigrees, 2005 Nursery

ENTRY NO	CULTIVAR/ DESIGNATION	PEDIGREE	CONTRIBUTOR	IN NURSERY SINCE
1	ERNIE	PIKE /3/ STODDARD / BLUEBOY // STODDARD / D1707	CHECK(RES)	1999-00
2	COKER 9835	CK68-19 // CK61-19*3 / IN4946A4-18-2-10-2 /4/ Bb /3/ CK65-20*5 / W17-TRANS // TIFT /5/ P 2550	CHECK(SUS)	2000-01
3	B006624	COKER 9474/COKER 9663	Hancock	2003-04
4	B990081	L870537/PI382152	Hancock	2003-04
5	02JH000014	A92*3327/COKER 9474	Hancock	2004-05
6	AR97002-2-1	AR396-4-2/Ning 8026	Bacon	2004-05
7	AR97002-2-2	AR396-4-2/Ning 8026	Bacon	2004-05
8	AR97048-1-1	Elkhart/P88288C1-6-1-2	Bacon	2004-05
9	AR97048-4-1	Elkhart/P88288C1-6-1-2	Bacon	2004-05
10	AR97048-7-1	Elkhart/P88288C1-6-1-2	Bacon	2004-05
11	AR97124-4-1	P88288C1-6-1-2/Terra Sr 204	Bacon	2004-05
12	D00*6847-1	JACKSON/2545	Fogleman	2004-05
13	D00*6874-1	89M-4035A/2580	Fogleman	2004-05
14	D00*6874-9	89M-4035A/2580	Fogleman	2004-05
15	D01*7759	BULK OF 3 F1S (LIKELY ELKHART/MASON)	Fogleman	2004-05
16	D01-7017	MASON/2580	Fogleman	2004-05
17	F92080G-01102	201 R2-1 / DROPIA	Ittu	2004-05
18	F95812G1-1 Fz1	135U2-1 / 508U1-1	Ittu	2004-05
19	F96035G11-2	201R2-121 / 135U2-1	Ittu	2004-05
20	GA951395-3E25	87110/VA55/88151	Johnson	2004-05
21	GA961171-3E38	881130*2/GORE	Johnson	2004-05
22	GA961176-3A48	JACKSON/2*881130	Johnson	2004-05
23	GA961526-3E15	881175/JACKSON//AGS 2000	Johnson	2004-05
24	GA96229-3A41	881130*2/881582	Johnson	2004-05
25	GA96229-3E39	881130*2/881582	Johnson	2004-05
26	LA9560CA22-1	FL302/FR81-19,85430-D17-2-1//CK96	Harrison	2004-05
27	LA97407D-17-4	GMFHB:MASON*2/CATBRIDG90	Harrison	2004-05
28	LA97448D-27-4	GMFHB:MASON/CATBIRDG93	Harrison	2004-05
29	LSU04FHB02	(LA97448D-27-3) GMFHB:MASON/CATBIRDG93	Harrison	2004-05
30	M01*1019	FR86-2186/89I-4584/3/N873-6/YMI//ZAGREPCANKA	Fogleman	2004-05
31	MV-5-46	91-54-222 (71-54-147/CK68-15//IN65309C7-18-2-3-2)//FFR555W//93-52-55 (MSY*3/BALKAN//SAL)	Costa	2004-05
32	NC03-11457	NING 7840/P2643//NC95-22426	Murphy	2004-05
33	NC03-11458	NING 7840/P2643//NC95-22426	Murphy	2004-05
34	NC03-11465	NING 7840/P2643//NC95-22426	Murphy	2004-05
35	NC03-11561	NING 7840/P2643//NC95-22426	Murphy	2004-05
36	NC03-11588	NCV93-6345//P92823(FHB)/GA90078	Murphy	2004-05
37	PI564341	Pedigree unknown. Powdery mildew resistant. Origin Tolbukhin, Bulgaria	Marshall	2004-05
38	PI564385	Pedigree unknown. Powdery mildew resistant. Origin Tolbukhin, Bulgaria (AK3837-5-71)	Marshall	2004-05
39	TX96D1073	TX86D1310/Kavkaz/TX86D1308	Marshall	2004-05
40	TX98D1170	TX89D1253*2/TTCC404	Marshall	2004-05
41	TX98D2423	2163*W3453/W2441	Marshall	2004-05
42	TX99D4478	TX92D8040*3/TTCC259	Marshall	2004-05
43	VA01W-310	POCAHONTAS/MSY/93-54-418 (SAL *2/SC822290=NAINARI60/ATR71//KVZ);3/TFGL/3/PION2643, F10	Griffey	2004-05
44	VA04W-433	NING 7840/PION2684/96-54-244 (CK9803/FREEDOM), F8	Griffey	2004-05
45	VA04W-503	JACKSON//JACKSON//SHAAN85-2/JACKSON, BC2F6	Griffey	2004-05
46	VA04W-547	PION2684*2//W14/PION2684, BC2F5	Griffey	2004-05
47	VA04W-608	ERNIE*2//VR95B71/ERNIE, BC2F5	Griffey	2004-05
48	VA04W-628	ERNIE//NING7840/ERNIE, BC1F6	Griffey	2004-05

FHB Incidence (1-100)

CULTIVAR/ DESIGNATION	BAY	COL'BIA	S'BURY	B'BURG	URBANA	KINSTON	LEX'TON	MEAN
	AR	MO	MD	VA	IL	NC	KY	ALL LOC.
	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK
1 ERNIE	98 46	50 1	30 3	40 3	13 2	5 4	50 14	42 3
2 COKER 9835	55 7	100 48	90 44	90 46	97 42	46 43	82 42	80 47
3 B006624	60 8	81 35	60 19	67 24	70 23	25 32	.	60 23
4 B990081	50 4	60 6	75 34	73 33	41 11	12 13	45 12	51 10
5 02JH000014	45 3	86 41	30 3	60 19	83 30	32 39	51 15	55 14
6 AR97002-2-1	90 34	63 7	45 7	40 3	78 28	9 8	42 8	52 11
7 AR97002-2-2	75 17	69 14	30 3	47 11	44 13	15 18	32 4	45 4
8 AR97048-1-1	65 10	78 28	65 23	67 24	57 19	24 30	57 19	59 21
9 AR97048-4-1	75 17	69 14	50 11	87 42	100 45	31 38	88 43	72 42
10 AR97048-7-1	.	73 23	65 23	67 24	93 37	34 40	72 34	70 38
11 AR97124-4-1	50 4	58 5	50 11	60 19	65 21	18 25	26 2	47 5
12 D00*6847-1	90 34	68 12	55 15	53 17	95 40	13 15	33 5	58 19
13 D00*6874-1	70 12	74 25	70 29	33 1	38 8	27 36	27 3	49 9
14 D00*6874-9	80 22	71 21	70 29	50 13	31 6	23 28	44 10	53 12
15 D01*7759	85 28	71 21	45 7	77 37	83 30	67 47	80 38	73 44
16 D01-7017	85 28	68 12	65 23	67 24	93 37	26 33	42 8	64 28
17 F92080G-01102	75 17	80 32	50 11	60 19	43 12	26 33	60 24	56 16
18 F95812G1-1 Fz1	70 12	83 36	80 35	70 29	98 43	9 8	80 38	70 38
19 F96035G11-2	80 22	79 29	65 23	43 9	85 33	16 23	46 13	59 21
20 GA951395-3E25	80 22	86 41	85 38	87 42	52 14	45 42	58 20	70 38
21 GA961171-3E38	85 28	93 47	85 38	83 41	55 16	14 16	34 6	64 28
22 GA961176-3A48	90 34	84 39	80 35	63 22	70 23	15 18	64 29	67 34
23 GA961526-3E15	70 12	79 29	55 15	70 29	98 43	42 41	53 17	67 34
24 GA96229-3A41	70 12	86 41	95 46	87 42	55 16	48 45	98 44	77 45
25 GA96229-3E39	60 8	83 36	85 38	87 42	76 27	23 28	71 33	69 37
26 LA9560CA22-1	80 22	73 23	45 7	80 40	100 45	15 18	66 30	66 32
27 LA97407D-17-4	85 28	66 10	60 19	37 2	38 8	4 2	.	48 6
28 LA97448D-27-4	40 2	65 9	60 19	47 11	53 15	6 5	62 26	48 6
29 LSU04FHB02	95 40	69 14	65 23	53 17	82 29	.	37 7	60 23
30 M01*1019	95 40	80 32	70 29	70 29	92 36	24 30	72 34	72 42
31 MV-5-46	75 17	88 45	60 19	77 37	91 35	30 37	75 37	71 41
32 NC03-11457	95 40	83 36	90 44	50 13	73 26	16 23	63 28	67 34
33 NC03-11458	80 22	86 41	70 29	40 3	22 4	11 11	67 32	54 13
34 NC03-11465	22 1	70 18	20 1	40 3	18 3	12 13	73 36	37 1
35 NC03-11561	50 4	64 8	40 6	67 24	57 19	47 44	61 25	55 14
36 NC03-11588	85 28	80 32	85 38	93 47	94 39	20 26	81 40	77 45
37 PI564341	80 22	88 45	100 48	93 47	100 45	58 46	81 40	86 48
38 PI564385	75 17	85 40	85 38	63 22	65 21	11 11	66 30	64 28
39 TX96D1073	70 12	70 18	55 15	77 37	55 16	15 18	.	57 18
40 TX98D1170	85 28	66 10	55 15	73 33	83 30	2 1	.	60 23
41 TX98D2423	65 10	70 18	45 7	73 33	100 45	4 2	62 26	60 23
42 TX99D4478	90 34	69 14	70 29	40 3	72 25	7 7	59 23	58 19
43 VA01W-310	90 34	53 2	65 23	73 33	95 40	26 33	58 20	66 32
44 VA04W-433	90 34	76 27	25 2	43 9	22 4	6 5	25 1	41 2
45 VA04W-503	95 40	79 29	80 35	50 13	40 10	21 27	53 17	60 23
46 VA04W-547	95 40	74 25	50 11	70 29	85 33	15 18	58 20	64 28
47 VA04W-608	95 40	53 2	95 46	50 13	33 7	14 16	51 15	56 16
48 VA04W-628	100 47	54 4	85 38	40 3	5 1	9 8	44 10	48 6
Mean	76	74	64	63	65	21	58	61
L.S.D.(0.05)	.	18	33	14	33	17	30	17
CV%	24	18	26	16	34	45	35	27

FHB Severity (1-100)

CULTIVAR/ DESIGNATION	BAY	COL'BIA	S'BURY	B'BURG	URBANA	KINSTON	LEX'TON	SZEGED ¹	FUN'LEA ¹	MEAN
	AR	MO	MD	VA	IL	NC	KY	HUN	ROM	ALL LOC.
	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK
1 ERNIE	15 38	4 1	20 5	10 13	18 4	7 4	19 11	3 7	47 19	16 5
2 COKER 9835	7 12	34 46	50 29	26 47	61 46	50 46	88 48	30 47	71 43	46 47
3 B006624	5 3	14 21	25 9	15 32	45 28	14 28	12 1	5 12	37 11	19 9
4 B990081	5 3	12 15	30 14	12 19	42 25	12 27	18 8	6 14	47 19	21 12
5 02JH000014	4 2	15 25	15 2	12 19	38 18	11 18	14 5	4 10	33 7	16 5
6 AR97002-2-1	10 24	11 10	18 4	8 4	23 6	7 4	19 11	4 10	48 22	17 8
7 AR97002-2-2	8 16	9 5	15 2	10 13	13 2	6 2	18 8	7 18	44 15	14 2
8 AR97048-1-1	9 21	17 31	35 20	14 26	45 28	15 32	35 29	14 34	48 22	26 24
9 AR97048-4-1	6 6	33 44	25 9	23 44	50 36	21 35	82 46	24 46	61 35	36 42
10 AR97048-7-1	.	16 30	30 14	20 40	36 15	24 36	46 38	23 44	38 12	27 27
11 AR97124-4-1	6 6	13 16	25 9	11 15	48 33	11 18	14 5	8 22	34 9	19 9
12 D00*6847-1	26 46	15 25	30 14	12 19	45 28	7 4	24 16	14 34	57 31	25 23
13 D00*6874-1	8 16	21 37	60 34	8 4	68 47	15 32	41 34	15 36	55 27	32 37
14 D00*6874-9	7 12	19 34	60 34	8 4	41 22	20 34	28 21	10 23	76 46	30 31
15 D01*7759	13 33	26 40	35 20	13 23	47 31	40 44	32 27	20 41	65 41	32 37
16 D01-7017	9 21	10 7	60 34	13 23	60 44	27 39	43 35	13 32	55 27	32 37
17 F92080G-01102	8 16	13 16	25 9	11 15	22 5	14 28	20 14	5 12	23 4	16 5
18 F95812G1-1 Fz1	12 30	26 40	60 34	13 23	37 17	11 18	59 41	6 14	46 18	30 31
19 F96035G11-2	6 6	11 10	20 5	8 4	23 6	11 18	16 7	2 5	35 10	15 3
20 GA951395-3E25	8 16	24 39	75 46	19 39	41 22	53 47	31 25	20 41	48 22	35 40
21 GA961171-3E38	13 33	40 47	85 48	20 40	42 25	9 15	39 32	16 37	52 26	35 40
22 GA961176-3A48	15 38	28 42	50 29	12 19	47 31	11 18	36 30	19 39	55 27	30 31
23 GA961526-3E15	6 6	21 37	30 14	20 40	89 48	24 36	52 40	23 44	75 45	38 44
24 GA96229-3A41	11 26	41 48	70 42	29 48	60 44	37 43	84 47	31 48	83 48	50 48
25 GA96229-3E39	7 12	33 44	65 38	24 45	52 38	14 28	81 45	22 43	78 47	42 46
26 LA9560CA22-1	12 30	18 33	25 9	15 32	54 40	14 28	74 44	18 38	38 12	30 31
27 LA97407D-17-4	13 33	11 10	40 23	8 4	58 43	7 4	18 8	1 2	59 33	24 21
28 LA97448D-27-4	6 6	15 25	45 26	7 1	42 25	7 4	37 31	7 18	71 43	26 24
29 LSU04FHB02	13 33	17 31	50 29	11 15	50 36	.	31 25	10 23	61 35	29 28
30 M01*1019	23 45	14 21	45 26	14 26	23 6	11 18	30 23	10 23	33 7	23 16
31 MV-5-46	11 26	15 25	40 23	15 32	53 39	40 44	43 35	7 18	57 31	31 36
32 NC03-11457	15 38	11 10	73 45	11 15	38 18	11 18	40 33	0 1	65 41	29 28
33 NC03-11458	8 16	10 7	55 33	7 1	23 6	7 4	26 19	2 5	56 30	22 14
34 NC03-11465	2 1	9 5	20 5	8 4	16 3	7 4	44 37	3 7	25 5	15 3
35 NC03-11561	5 3	10 7	23 8	15 32	29 10	27 39	63 42	12 29	22 3	23 16
36 NC03-11588	20 44	19 34	65 38	22 43	36 15	11 18	73 43	19 39	60 34	36 42
37 PI564341	40 47	28 42	75 46	24 45	39 21	33 42	51 39	10 23	62 37	40 45
38 PI564385	11 26	15 25	65 38	14 26	33 13	9 15	34 28	10 23	47 19	26 24
39 TX96D1073	6 6	13 16	50 29	15 32	30 11	10 17	13 3	6 14	64 39	23 16
40 TX98D1170	14 37	14 21	43 25	15 32	56 42	4 1	13 3	7 18	32 6	22 14
41 TX98D2423	7 12	11 10	35 20	14 26	34 14	11 18	25 17	6 14	40 14	20 11
42 TX99D4478	15 38	13 16	45 26	8 4	48 33	6 2	22 15	12 29	48 22	24 21
43 VA01W-310	15 38	14 21	30 14	14 26	55 41	24 36	30 23	13 32	64 39	29 28
44 VA04W-433	9 21	8 4	13 1	9 4	10 1	7 4	12 1	1 2	17 1	10 1
45 VA04W-503	12 30	19 34	70 42	14 26	30 11	27 39	26 19	12 29	63 38	30 31
46 VA04W-547	11 26	13 16	30 14	15 32	49 35	7 4	29 22	11 28	44 15	23 16
47 VA04W-608	10 24	5 2	65 38	9 4	38 18	7 4	25 17	3 7	45 17	23 16
48 VA04W-628	19 43	6 3	70 42	7 1	41 22	7 4	19 11	1 2	21 2	21 12

Mean	11	17	43	14	41	16	36	11	50	27
L.S.D.(0.05)	.	10	33	5	32	16	20	4	20	10
CV%	73	42	38	28	21	36	36	.	.	42

Severity by Individual Isolates, Szeged, Hungary

Cultivar/ Designation	<i>F. gramin.</i>	<i>F. gramin.</i>	<i>F. culmor.</i>	<i>F. culmor.</i>	Mean	
	Isol. 12377	Isol. 44	Isol. 12375	Isol. 12551	All Isolates	RANK
1 ERNIE	0.8	0.8	3.5	5.1	3	7
2 COKER 9835	16.2	1.9	42.9	59.2	30	47
3 B006624	1.3	1.0	5.7	12.3	5	12
4 B990081	2.2	1.0	8.8	12.6	6	14
5 02JH000014	0.6	0.8	2.5	10.6	4	10
6 AR97002-2-1	0.5	1.0	5.7	8.9	4	10
7 AR97002-2-2	1.0	0.1	11.6	14.5	7	18
8 AR97048-1-1	8.8	4.2	18.3	26.7	14	34
9 AR97048-4-1	12.3	1.4	33.8	47.1	24	46
10 AR97048-7-1	9.8	3.8	31.7	46.3	23	44
11 AR97124-4-1	3.8	1.1	9.4	18.9	8	22
12 D00*6847-1	5.3	0.3	21.0	27.8	14	34
13 D00*6874-1	5.1	0.8	26.3	28.6	15	36
14 D00*6874-9	2.0	0.8	14.5	22.9	10	23
15 D01*7759	8.8	1.4	31.8	38.1	20	41
16 D01-7017	5.5	2.7	16.4	28.3	13	32
17 F92080G-01102	1.2	0.0	9.6	8.2	5	12
18 F95812G1-1 Fz1	1.4	0.2	6.8	14.1	6	14
19 F96035G11-2	0.3	0.1	2.5	5.2	2	5
20 GA951395-3E25	6.7	2.7	33.5	36.1	20	41
21 GA961171-3E38	5.5	3.3	20.9	33.5	16	37
22 GA961176-3A48	7.4	4.6	26.0	38.0	19	39
23 GA961526-3E15	13.3	1.7	32.9	44.9	23	44
24 GA96229-3A41	13.8	3.3	51.3	54.5	31	48
25 GA96229-3E39	10.1	1.8	32.9	44.5	22	43
26 LA9560CA22-1	11.2	1.9	22.1	36.1	18	38
27 LA97407D-17-4	0.9	0.3	0.8	0.8	1	2
28 LA97448D-27-4	1.8	1.1	5.8	17.3	7	18
29 LSU04FHB02	3.4	1.4	11.8	23.2	10	23
30 M01*1019	4.8	0.5	8.7	26.8	10	23
31 MV-5-46	2.9	0.7	6.0	17.8	7	18
32 NC03-11457	0.0	0.0	0.0	1.9	0	1
33 NC03-11458	1.3	0.0	1.2	6.7	2	5
34 NC03-11465	0.3	0.1	5.8	6.6	3	7
35 NC03-11561	0.7	0.3	12.9	33.8	12	29
36 NC03-11588	5.3	1.7	19.7	47.9	19	39
37 PI564341	1.3	0.2	8.6	29.8	10	23
38 PI564385	2.8	1.2	9.8	26.3	10	23
39 TX96D1073	1.2	0.2	6.7	16.8	6	14
40 TX98D1170	1.3	0.7	10.6	14.7	7	18
41 TX98D2423	0.5	0.5	9.5	11.6	6	14
42 TX99D4478	2.5	1.1	16.0	29.9	12	29
43 VA01W-310	2.2	0.3	17.9	29.8	13	32
44 VA04W-433	0.0	0.0	0.8	3.9	1	2
45 VA04W-503	2.2	1.0	14.1	30.3	12	29
46 VA04W-547	1.8	0.3	14.3	28.1	11	28
47 VA04W-608	0.3	1.0	2.3	7.4	3	7
48 VA04W-628	0.0	0.0	2.3	1.7	1	2
Mean	4.0	1.1	14.7	23.7	10.9	

Severity by Individual Isolates 10 and 20 Days After Inoculation Fundulea, Romania.

10 Days after Inoculation

Cultivar/
Designation F. gram. F. gram. F. gram. F. gram. F. gram. F. culm. Mean
Isol 96 Isol 92 Isol 54 Isol 8713 Isol 111 Isol 46 All Isolates

1	ERNIE	15	7	39	26	20	31	23
2	COKER 9835	31	16	26	22	16	54	28
3	B006624	26	5	6	7	23	12	13
4	B990081	23	36	30	7	12	33	24
5	02JH000014	23	15	19	5	8	16	14
6	AR97002-2-1	9	20	27	22	16	23	20
7	AR97002-2-2	6	21	35	25	12	20	20
8	AR97048-1-1	25	4	19	7	27	54	23
9	AR97048-4-1	54	7	28	13	15	54	29
10	AR97048-7-1	21	5	9	15	20	21	15
11	AR97124-4-1	14	6	24	19	11	14	15
12	D00*6847-1	23	4	35	11	14	30	20
13	D00*6874-1	33	3	45	6	13	45	24
14	D00*6874-9	30	39	38	8	41	50	34
15	D01*7759	27	4	60	11	29	37	28
16	D01-7017	22	4	45	10	14	41	23
17	F92080G-01102	7	4	13	5	7	9	8
18	F95812G1-1 Fz1	27	5	35	7	10	33	20
19	F96035G11-2	13	16	41	19	13	14	19
20	GA951395-3E25	9	4	35	9	12	29	16
21	GA961171-3E38	11	25	53	6	19	22	23
22	GA961176-3A48	16	47	14	6	11	50	24
23	GA961526-3E15	20	17	46	14	50	63	35
24	GA96229-3A41	32	14	51	20	43	75	39
25	GA96229-3E39	22	15	47	14	27	54	30
26	LA9560CA22-1	10	4	27	8	17	16	14
27	LA97407D-17-4	21	45	14	53	16	25	29
28	LA97448D-27-4	37	55	9	15	44	50	35
29	LSU04FHB02	16	10	10	18	26	46	21
30	M01*1019	16	3	11	5	14	12	10
31	MV-5-46	8	54	17	12	10	37	23
32	NC03-11457	23	25	18	43	16	48	29
33	NC03-11458	20	25	14	13	16	31	20
34	NC03-11465	9	3	24	3	5	32	13
35	NC03-11561	29	5	5	4	7	19	12
36	NC03-11588	100	9	31	5	8	25	30
37	PI564341	18	44	21	7	17	35	24
38	PI564385	11	6	20	5	10	31	14
39	TX96D1073	36	51	56	8	21	39	35
40	TX98D1170	3	7	23	11	10	31	14
41	TX98D2423	11	6	22	9	5	33	14
42	TX99D4478	27	39	24	10	6	4	18
43	VA01W-310	41	8	76	24	8	53	35
44	VA04W-433	12	17	19	4	10	13	13
45	VA04W-503	35	45	28	11	22	33	29
46	VA04W-547	33	4	27	7	5	41	20
47	VA04W-608	13	46	44	6	12	20	24
48	VA04W-628	10	13	13	13	11	11	12

Mean 23 18 29 13 17 33 22
L.S.D.(0.05) 5

20 Days after Inoculation

F. gram. F. gram. F. gram. F. gram. F. gram. F. culm. Mean
Isol 96 Isol 92 Isol 54 Isol 8713 Isol 111 Isol 46 All Isolates

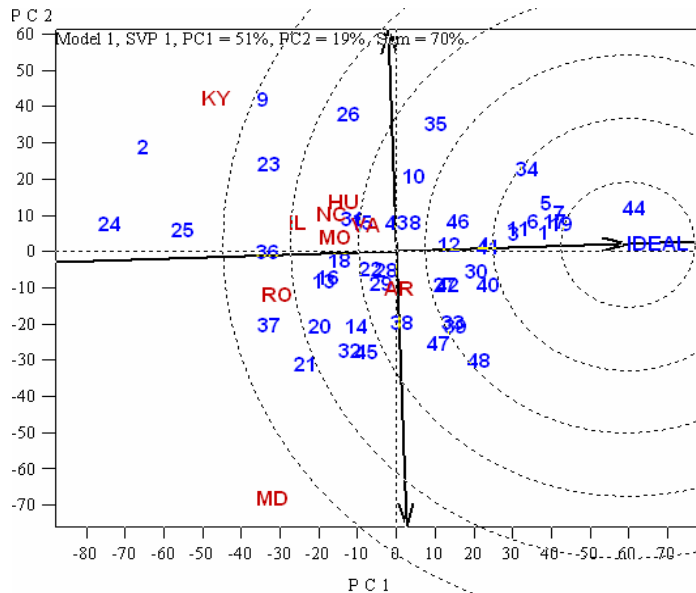
								RANK
32	35	46	53	45	68	47	19	
62	51	93	80	63	77	71	43	
59	10	65	13	31	45	37	11	
62	53	70	13	24	60	47	19	
46	28	63	11	15	36	33	7	
25	44	82	48	26	61	48	22	
28	41	82	36	25	54	44	15	
51	17	87	18	35	79	48	22	
88	23	86	32	56	80	61	35	
42	14	34	33	64	41	38	12	
30	22	85	14	24	27	34	9	
51	23	98	27	73	67	57	31	
93	6	90	10	35	96	55	27	
79	64	100	41	75	97	76	46	
49	34	91	51	88	77	65	41	
44	33	67	50	45	90	55	27	
28	8	44	15	23	17	23	4	
48	33	57	37	21	82	46	18	
29	22	66	51	21	19	35	10	
36	30	70	38	44	68	48	22	
48	52	84	37	37	51	52	26	
42	68	59	27	47	85	55	27	
64	51	91	56	95	91	75	45	
91	70	80	79	77	100	83	48	
79	76	81	63	80	89	78	47	
24	21	70	24	42	49	38	12	
73	79	19	85	30	66	59	33	
83	83	35	54	82	87	71	43	
59	46	52	50	79	82	61	35	
58	10	37	24	35	36	33	7	
37	72	75	35	51	73	57	31	
61	56	67	85	38	85	65	41	
69	46	75	30	28	88	56	30	
15	8	54	11	12	52	25	5	
29	12	13	16	17	46	22	3	
100	32	84	26	39	79	60	34	
36	80	85	26	51	92	62	37	
51	19	85	22	22	82	47	19	
85	75	85	18	45	75	64	39	
12	10	60	22	17	73	32	6	
26	13	79	24	16	81	40	14	
75	70	94	25	17	8	48	22	
74	48	84	65	35	79	64	39	
15	22	24	6	16	19	17	1	
72	73	80	37	61	54	63	38	
59	13	83	22	15	74	44	15	
16	71	71	27	18	68	45	17	
18	16	27	35	15	16	21	2	

Mean 51 39 69 36 41 65 50
L.S.D.(0.05) 20

Head Severity Expressed as Area Under the Disease Progress Curve (AUDPC) Fundulea, Romania

	CULTIVAR/ DESIGNATION	AUDPC ¹	RANK
1	ERNIE	458	21
2	COKER 9835	635	40
3	B006624	317	9
4	B990081	467	24
5	02JH000014	311	7
6	AR97002-2-1	434	19
7	AR97002-2-2	418	16
8	AR97048-1-1	464	23
9	AR97048-4-1	591	35
10	AR97048-7-1	339	11
11	AR97124-4-1	314	8
12	D00*6847-1	478	25
13	D00*6874-1	519	32
14	D00*6874-9	723	45
15	D01*7759	606	38
16	D01-7017	501	28
17	F92080G-01102	190	1
18	F95812G1-1 Fz1	434	19
19	F96035G11-2	370	13
20	GA951395-3E25	401	15
21	GA961171-3E38	485	27
22	GA961176-3A48	511	29
23	GA961526-3E15	724	46
24	GA96229-3A41	804	47
25	GA96229-3E39	689	43
26	LA9560CA22-1	328	10
27	LA97407D-17-4	584	34
28	LA97448D-27-4	704	44
29	LSU04FHB02	518	31
30	M01*1019	272	5
31	MV-5-46	516	30
32	NC03-11457	616	39
33	NC03-11458	478	25
34	NC03-11465	252	4
35	NC03-11561	228	3
36	NC03-11588	597	36
37	PI564341	545	33
38	PI564385	373	14
39	TX96D1073	672	42
40	TX98D1170	303	6
41	TX98D2423	340	12
42	TX99D4478	423	18
43	VA01W-310	671	41
44	VA04W-433	211	2
45	VA04W-503	604	37
46	VA04W-547	419	17
47	VA04W-608	461	22
48	VA04W-628	224	48
	Mean	469	
	L.S.D.(0.05)	63	

FHB Severity GGE Biplot Analysis¹



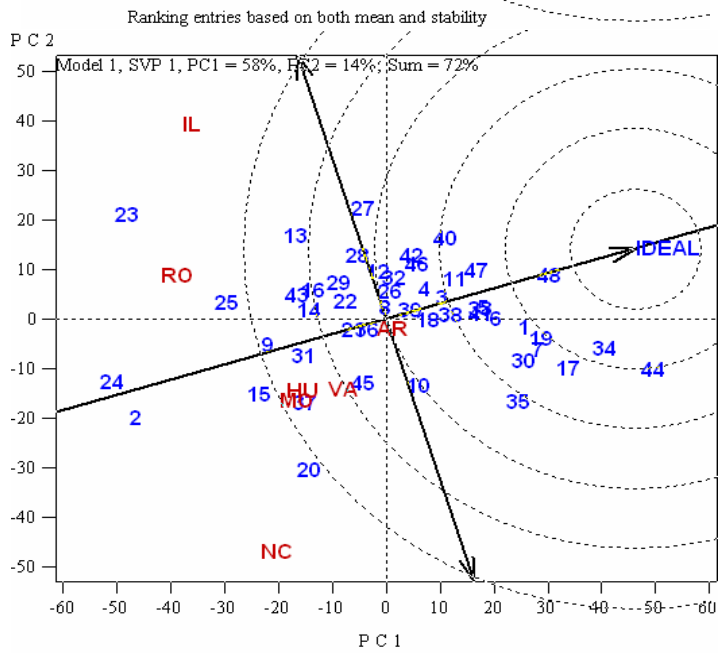
Test location main effect accounted for 55% of the variation in FHB Severity. Seven of nine test locations formed a relatively tight cluster with Lexington, KY and Salisbury, MD being outliers. Entry main effects accounted for 18% of variation and Entry x Test Location accounted for 27% of variation.

The Average Environment Coordinate abscissa (single arrowed-line passing through the biplot origin) approximated the mean Severity of entries. Entries towards the right of the abscissa had lower overall Severities while entries towards the left of the abscissa had the highest Severity scores.

Entries 44, 19, 17, 7, 1, 5, 6, 34, 11 and 3 all fell within two concentric circles of the 'Ideal' entry.

The Average Environment Coordinate ordinate (double-arrowed line perpendicular to the abscissa) approximated the genotype x location (GxE) interaction associated with each entry. The greater the projection onto the ordinate, in either direction, the greater the instability of the entry over locations. Most of the more resistant entries exhibited stability, with the possible exception of entry 34.

13



Elimination of the outlying Kentucky and Maryland locations reduced the Entry x Test Location interaction contribution to 19% of variation, but did not alter the overall results substantially. All the previously mentioned entries maintained their resistance ratings, but entries 30, 33, 47 and 48 were added to the most resistant entry list. In fact, entry 48 was closest to the 'Ideal' in the new analysis and entries 44, 7, 19, 34 and 17 all exhibited lower stability than the very stable entry 48.

¹Yan, W., and M. S. Kang. 2003. GGE Biplot Analysis. CRC Press, Boca Raton, FL.

FHB Index (1-100)

CULTIVAR/ DESIGNATION	BAY		COL'BIA		S'BURY		B'BURG		URBANA		KINSTON		LEX'TON		MEAN	
	AR	MO	MD	VA	IL	NC	KY	ALL LOC.								
	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK
1 ERNIE	15.3	42	1.9	1	6.0	5	3.9	11	2.7	3	0.4	3	9.4	10	5.7	3
2 COKER 9835	4.6	12	34.3	46	45.0	36	23.5	47	58.8	47	23.2	46	72.0	42	37.3	46
3 B006624	3.1	5	11.5	26	16.0	13	10.5	31	34.0	28	3.8	31	.	.	14.3	18
4 B990081	2.9	4	7.9	13	22.5	21	8.9	25	12.3	9	1.5	19	8.1	8	9.2	8
5 02JH000014	3.7	7	13.0	30	5.0	4	7.2	21	30.4	25	3.9	32	7.1	4	10.1	10
6 AR97002-2-1	9.0	27	6.6	5	11.0	6	3.3	6	16.7	13	0.6	6	8.0	7	7.9	5
7 AR97002-2-2	5.9	16	6.2	4	4.5	3	4.5	13	3.7	5	1.0	13	5.8	3	4.5	2
8 AR97048-1-1	6.5	20	13.7	33	23.0	22	9.9	28	25.3	23	3.6	29	19.8	25	14.5	19
9 AR97048-4-1	4.7	13	22.9	41	13.5	10	19.4	43	50.3	43	6.4	36	72.6	43	27.1	43
10 AR97048-7-1	.	.	12.0	27	20.0	20	12.9	39	34.7	32	8.1	39	33.2	35	18.8	31
11 AR97124-4-1	2.7	2	7.2	9	14.0	11	6.2	17	31.1	26	2.0	22	3.6	2	9.5	9
12 D00*6847-1	25.0	46	11.0	24	18.0	16	6.8	18	42.5	40	0.9	12	7.9	6	16.0	25
13 D00*6874-1	5.8	15	15.4	36	43.0	34	2.5	1	23.8	22	4.0	33	11.1	11	15.1	21
14 D00*6874-9	6.0	17	13.8	34	44.0	35	4.1	12	11.2	8	6.2	35	12.0	13	13.9	15
15 D01*7759	10.6	32	19.8	39	16.5	14	10.3	30	37.9	34	26.8	47	25.7	31	21.1	33
16 D01-7017	8.3	24	7.3	10	40.0	30	8.4	23	55.4	46	6.8	37	18.1	23	20.6	32
17 F92080G-01102	6.2	19	10.5	23	13.0	9	6.8	18	10.1	7	3.6	29	12.2	14	8.9	7
18 F95812G1-1 Fz1	8.7	26	22.9	41	48.0	37	9.2	26	36.0	33	1.1	15	46.8	38	24.7	40
19 F96035G11-2	5.2	14	9.1	19	11.5	7	3.5	9	18.9	15	1.9	21	7.2	5	8.2	6
20 GA951395-3E25	6.5	20	21.1	40	64.5	44	16.8	41	19.4	16	23.1	45	18.3	24	21.2	36
21 GA961171-3E38	11.4	34	36.4	47	72.5	47	17.6	42	23.3	21	1.3	18	13.2	17	25.1	41
22 GA961176-3A48	13.6	38	24.5	43	42.0	33	7.7	22	34.6	31	2.1	24	23.1	29	21.1	33
23 GA961526-3E15	4.4	9	17.2	38	19.0	18	13.9	40	87.6	48	9.4	40	27.8	32	25.6	42
24 GA96229-3A41	9.3	28	36.4	47	65.5	45	25.2	48	37.9	34	17.5	43	82.3	44	39.2	48
25 GA96229-3E39	4.4	9	26.8	45	56.0	39	21.3	45	40.0	37	3.0	28	57.3	40	29.8	45
26 LA9560CA22-1	9.8	29	12.9	29	11.5	7	12.3	38	53.7	45	2.2	25	48.9	39	21.6	37
27 LA97407D-17-4	10.7	33	7.5	12	28.0	23	3.1	4	22.8	19	0.3	2	.	.	13.2	13
28 LA97448D-27-4	2.7	2	9.6	20	34.5	28	3.1	4	22.4	18	0.4	3	22.7	28	13.6	14
29 LSU04FHB02	12.6	37	11.3	25	32.0	26	6.0	16	41.7	39	.	.	11.5	12	17.1	26
30 M01*1019	22.1	45	12.6	28	31.0	25	9.7	27	21.8	17	2.4	26	21.3	26	17.2	27
31 MV-5-46	8.2	23	13.5	32	30.0	24	11.9	37	47.5	42	11.8	41	32.3	33	22.2	39
32 NC03-11457	13.7	39	9.0	18	67.5	46	5.4	15	29.7	24	2.0	22	24.8	30	21.7	38
33 NC03-11458	6.0	17	8.5	15	41.0	32	2.8	2	4.7	6	0.8	10	17.5	22	11.6	11
34 NC03-11465	1.2	1	6.8	7	4.0	1	3.3	8	2.9	4	0.8	10	32.3	33	7.3	4
35 NC03-11561	3.4	6	6.6	5	14.3	12	10.1	29	17.0	14	14.7	42	38.7	36	15.0	20
36 NC03-11588	17.1	43	16.3	37	57.5	41	20.1	44	34.3	29	2.4	26	59.3	41	29.6	44
37 PI564341	38.2	47	25.5	44	75.0	48	22.2	46	38.5	36	22.9	44	41.4	37	37.7	47
38 PI564385	8.0	22	13.3	31	55.0	38	8.7	24	22.9	20	1.1	15	22.2	27	18.7	30
39 TX96D1073	4.3	8	8.8	17	35.0	29	11.3	36	16.1	12	1.5	19	.	.	13.9	15
40 TX98D1170	11.9	36	9.8	22	40.3	31	10.7	32	46.9	41	0.2	1	.	.	21.1	33
41 TX98D2423	4.4	9	7.4	11	18.0	16	11.0	35	33.5	27	0.5	6	15.6	19	12.9	12
42 TX99D4478	14.4	41	8.6	16	32.0	26	3.3	6	34.4	30	0.5	6	12.8	16	15.1	21
43 VA01W-310	14.1	40	8.3	14	19.0	18	10.7	32	51.7	44	7.9	38	17.3	21	18.4	29
44 VA04W-433	8.5	25	6.8	7	4.3	2	3.8	10	2.1	2	0.4	3	2.9	1	4.1	1
45 VA04W-503	11.5	35	15.2	35	57.0	40	7.1	20	14.5	11	5.8	34	13.8	18	17.8	28
46 VA04W-547	10.5	31	9.6	20	17.0	15	10.7	32	41.5	38	1.1	15	17.0	20	15.3	24
47 VA04W-608	9.8	29	2.8	2	61.5	42	4.6	14	13.4	10	1.0	13	12.7	15	15.1	21
48 VA04W-628	18.6	44	3.3	3	62.5	43	2.8	2	1.0	1	0.6	6	8.2	9	13.9	15
Mean	9.3		13.4		32.5		9.6		28.2		5		24.5		17.6	
L.S.D.(0.05)	.		10.1		32.2		5.2		45.6		9.2		23		12.4	
CV%	92.6		54.1		49.1		40.2		20.8		50.5		57.6		67.0	

Field Visual Rating and Disease Spread in Spikelets

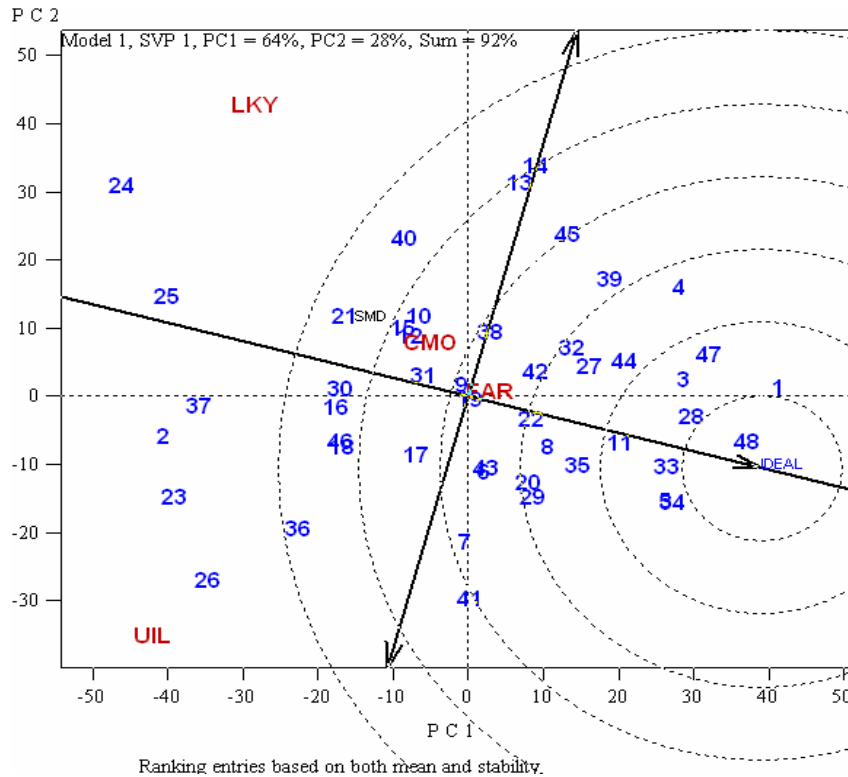
CULTIVAR/ DESIGNATION	VISUAL SCORE (1-9)		SPIKLET SPREAD (NUMBER)	
	BAY AR	RANK	COL'BIA MO	RANK
1 ERNIE	3.5	12	0.5	1
2 COKER 9835	4.5	26	5.6	46
3 B006624	3.5	12	2.0	21
4 B990081	3.5	12	1.9	18
5 02JH000014	2.5	2	2.0	21
6 AR97002-2-1	3.0	5	1.5	6
7 AR97002-2-2	4.0	19	1.2	4
8 AR97048-1-1	3.0	5	2.8	32
9 AR97048-4-1	3.5	12	5.1	45
10 AR97048-7-1	2.0	1	2.5	30
11 AR97124-4-1	3.5	12	1.6	11
12 D00*6847-1	4.5	26	2.2	24
13 D00*6874-1	5.5	43	3.1	36
14 D00*6874-9	5.0	33	2.9	33
15 D01*7759	5.0	33	4.3	43
16 D01-7017	4.5	26	1.6	11
17 F92080G-01102	3.0	5	2.0	21
18 F95812G1-1 Fz1	5.5	43	3.9	40
19 F96035G11-2	3.0	5	1.5	6
20 GA951395-3E25	3.5	12	3.5	39
21 GA961171-3E38	5.5	43	5.6	46
22 GA961176-3A48	5.0	33	4.0	41
23 GA961526-3E15	5.5	43	3.4	38
24 GA96229-3A41	4.5	26	6.4	48
25 GA96229-3E39	4.5	26	4.9	44
26 LA9560CA22-1	4.5	26	2.9	33
27 LA97407D-17-4	4.0	19	1.7	16
28 LA97448D-27-4	4.0	19	2.3	26
29 LSU04FHB02	4.0	19	2.6	31
30 M01*1019	5.0	33	2.2	24
31 MV-5-46	5.0	33	2.3	26
32 NC03-11457	3.0	5	1.6	11
33 NC03-11458	3.5	12	1.5	6
34 NC03-11465	3.0	5	1.6	11
35 NC03-11561	2.5	2	1.9	18
36 NC03-11588	5.5	43	3.0	35
37 PI564341	4.0	19	4.1	42
38 PI564385	4.5	26	2.3	26
39 TX96D1073	4.0	19	1.5	6
40 TX98D1170	3.0	5	1.8	17
41 TX98D2423	2.5	2	1.6	11
42 TX99D4478	5.5	43	1.5	6
43 VA01W-310	5.0	33	2.4	29
44 VA04W-433	5.0	33	1.2	4
45 VA04W-503	5.0	33	3.2	37
46 VA04W-547	5.0	33	1.9	18
47 VA04W-608	4.0	19	0.7	2
48 VA04W-628	5.0	33	0.9	3
Mean	4.1		2.5	
L.S.D.(0.05)	.		1.5	
CV%	73		40.9	

Percent Fusarium Damaged Kernels and Weight of Fusarium Damaged Kernels

Cultivar/ Designation	% BAY AR		% COL'BIA MO		% URBANA IL		% F'VILLE AR		% LEX'TON KY		% S'BURY MD		% MEAN ALL LOC.		grams LEXINGTON KY	
	RANK		RANK		RANK		RANK		RANK		RANK		RANK		RANK	
1 ERNIE	36	23	2	2	17	1	0	1	23	3	15	31	16	3	15.6	2
2 COKER 9835	13	8	11	44	85	46	2	3	62	37	38	47	35	42	50.8	37
3 B006624	6	2	2	2	27	5	3	4	34	10	10	17	14	1	25.1	12
4 B990081	61	40	2	2	20	2	5	5	48	21	4	2	23	16	35.5	19
5 02JH000014	90	45	2	2	40	15	1	2	22	1	6	7	27	24	15.8	3
6 AR97002-2-1	36	23	2	2	57	32	0	1	42	17	6	7	24	17	32.5	16
7 AR97002-2-2	60	39	3	14	65	37	1	2	34	10	8	11	28	29	26.2	13
8 AR97048-1-1	33	21	4	25	47	21	2	3	36	14	14	28	22	14	21.8	7
9 AR97048-4-1	55	34	6	38	50	24	1	2	48	21	23	41	31	38	38.7	23
10 AR97048-7-1	.	.	7	41	50	24	3	4	63	39	16	35	30	35	51.4	39
11 AR97124-4-1	29	15	2	2	40	15	5	5	32	9	11	20	20	8	28.5	15
12 D00*6847-1	50	27	4	25	53	26	1	2	63	39	13	24	31	38	50.7	36
13 D00*6874-1	55	34	5	34	27	5	1	2	69	45	22	40	30	35	58.6	42
14 D00*6874-9	31	19	6	38	25	4	1	2	74	46	9	14	24	17	63.8	46
15 D01*7759	30	16	4	25	53	26	1	2	64	41	15	31	28	29	54.9	41
16 D01-7017	18	10	3	14	67	38	1	2	60	35	16	35	28	29	52.6	40
17 F92080G-01102	20	11	2	2	63	35	0	1	49	23	11	20	24	17	40.0	27
18 F95812G1-1 Fz1	12	6	3	14	70	40	1	2	55	31	15	31	26	21	42.6	29
19 F96035G11-2	9	3	2	2	53	26	1	2	53	28	5	3	20	8	33.1	17
20 GA951395-3E25	55	34	6	38	53	26	0	1	34	10	13	24	27	24	22.4	9
21 GA961171-3E38	11	4	21	47	57	32	0	1	65	42	21	39	29	33	60.5	45
22 GA961176-3A48	50	27	7	41	47	21	1	2	41	16	14	28	27	24	38.7	23
23 GA961526-3E15	50	27	8	43	92	47	1	2	62	37	17	37	38	45	51.0	38
24 GA96229-3A41	30	16	36	48	67	38	3	4	91	48	41	48	45	48	88.5	48
25 GA96229-3E39	40	25	12	46	75	43	2	3	86	47	19	38	39	46	84.5	47
26 LA9560CA22-1	56	37	5	34	96	48	1	2	50	27	15	31	37	44	36.7	21
27 LA97407D-17-4	33	21	3	14	37	12	0	1	46	20	6	7	21	13	38.3	22
28 LA97448D-27-4	30	16	2	2	30	10	1	2	29	7	11	20	17	4	23.5	11
29 LSU04FHB02	12	6	3	14	53	26	0	1	29	7	23	41	20	8	21.9	8
30 M01*1019	3	1	4	25	63	35	1	2	55	31	36	45	27	24	44.9	31
31 MV-5-46	49	26	4	25	55	31	1	2	57	33	13	24	30	35	44.7	30
32 NC03-11457	20	11	2	2	37	12	0	1	49	23	9	14	19	7	40.8	28
33 NC03-11458	14	9	4	25	37	12	0	1	25	5	10	17	15	2	20.9	6
34 NC03-11465	.	.	3	14	40	15	1	2	22	1	5	3	17	4	14.7	1
35 NC03-11561	53	30	3	14	47	21	1	2	35	13	5	3	24	17	22.4	9
36 NC03-11588	27	14	5	34	82	45	1	2	49	23	13	24	29	33	36.6	20
37 PI564341	53	30	11	44	80	44	2	3	66	43	30	44	40	47	58.7	44
38 PI564385	32	20	4	25	43	18	0	1	53	28	23	41	26	21	45.2	32
39 TX96D1073	64	41	3	14	27	5	1	2	54	30	9	14	26	21	46.8	33
40 TX98D1170	66	43	3	14	43	18	1	2	68	44	36	45	36	43	58.6	42
41 TX98D2423	11	4	3	14	70	40	1	2	27	6	8	11	20	8	19.1	5
42 TX99D4478	90	45	2	2	43	18	1	2	49	23	10	17	32	40	39.2	25
43 VA01W-310	58	38	4	25	57	32	1	2	42	17	7	10	28	29	35.4	18
44 VA04W-433	26	13	2	2	33	11	0	1	44	19	5	3	18	6	39.9	26
45 VA04W-503	54	33	5	34	27	5	0	1	61	36	14	28	27	24	48.3	34
46 VA04W-547	64	41	4	25	70	40	1	2	57	33	11	20	34	41	49.3	35
47 VA04W-608	53	30	3	14	23	3	0	1	36	14	8	11	20	8	28.3	14
48 VA04W-628	79	44	1	1	27	5	1	2	24	4	3	1	22	14	16.3	4
Mean	40.4		5.0		49.3		1.1		48.7		14.1		26.4		39.9	
L.S.D.(0.05)	.		5.4		29.7		ns		16.8		21.3		15.6		15.9	
CV%	.		76.7		23.7		.		24.8		75.2		52.4		28.8	

Fusarium Damaged Kernels % GGE Biplot Analysis

17



Bay, Arkansas was an extreme outlier when all six locations were included in a single analysis. This location was dropped and the resulting biplot is shown (left). Location main effect accounted for 75% of the variation in FDK %. Columbia MO, Fayetteville AR and Salisbury MD clustered together, while Lexington KY, and Urbana IL were more unique and discriminating.

Entry main effects accounted for 10% of variation in FDK % and Entry X Location interaction accounted for 15% of variation. The Average Environment Coordinate abscissa (single arrowed line passing through the biplot origin) approximated the entry effect. Entries towards the right of the abscissa had lower overall FDK % scores, while entries towards the left of the abscissa had the highest FDK % scores.

Entry 48 was closest to the 'ideal' entry, and entries 1, 3, 11, 28, 33, 34 and 47 all fell within two concentric circles of the ideal.

The average Environmental Coordinate ordinate (double arrowed line perpendicular to the abscissa) approximated the genotype x environment interaction associated with each entry. The greater the projection on to the ordinate, in either direction, the greater the instability of the entry over locations. Entries 11, 33 and 48 were the most stable of the more resistant entries.

Incidence, Severity, Kernel Rating (ISK) Index ¹
(0.3 * Incidence + 0.3 * Severity + 0.4 * Fusarium Damaged Kernels)

CULTIVAR/ DESIGNATION	BAY AR		COL'BIA MO		URBANA IL		LEX'TON KY		S'BURY MD		MEAN ALL LOC.	
	RANK		RANK		RANK		RANK		RANK		RANK	
1 ERNIE	48	31	17	1	16	1	18	2	21	5	24	1
2 COKER 9835	24	2	45	46	81	46	73	42	57	45	56	46
3 B006624	22	1	29	23	45	16	.	.	29	14	31	6
4 B990081	41	21	23	6	33	9	27	12	33	21	31	6
5 02JH000014	51	36	31	31	52	23	15	1	16	3	33	10
6 AR97002-2-1	44	27	23	6	53	25	25	10	21	5	33	10
7 AR97002-2-2	49	34	24	9	37	11	21	5	17	4	29	4
8 AR97048-1-1	35	11	30	29	49	20	31	18	35	22	36	18
9 AR97048-4-1	46	30	33	40	65	36	66	41	32	18	48	41
10 AR97048-7-1	.	.	29	23	59	29	49	35	35	22	44	33
11 AR97124-4-1	28	5	22	4	50	22	18	2	27	8	29	4
12 D00*6847-1	55	40	26	17	63	35	35	22	31	16	42	26
13 D00*6874-1	45	28	30	29	43	13	43	31	48	34	42	26
14 D00*6874-9	38	18	29	23	31	6	41	28	43	29	37	21
15 D01*7759	41	21	31	33	60	31	43	31	30	15	41	23
16 D01-7017	36	12	25	11	73	44	42	29	44	31	44	33
17 F92080G-01102	33	9	29	23	45	16	29	15	27	8	33	10
18 F95812G1-1 Fz1	30	7	34	42	69	42	54	37	48	34	47	39
19 F96035G11-2	29	6	28	22	54	27	28	13	27	8	33	10
20 GA951395-3E25	48	31	35	43	49	20	28	13	53	43	43	31
21 GA961171-3E38	34	10	48	47	52	23	42	29	59	46	47	39
22 GA961176-3A48	52	37	36	44	54	27	34	21	44	31	44	33
23 GA961526-3E15	43	26	33	40	93	48	49	35	32	18	50	42
24 GA96229-3A41	36	12	53	48	61	33	86	44	66	48	60	48
25 GA96229-3E39	36	12	32	36	68	38	76	43	52	41	53	45
26 LA9560CA22-1	50	35	29	23	84	47	57	39	27	8	50	42
27 LA97407D-17-4	42	24	24	9	44	14	.	.	32	18	35	16
28 LA97448D-27-4	26	3	25	11	41	12	30	16	36	26	31	6
29 LSU04FHB02	37	15	27	20	61	33	24	9	44	31	39	22
30 M01*1019	37	15	30	29	60	31	37	24	49	37	42	26
31 MV-5-46	45	28	32	36	65	36	46	34	35	22	45	37
32 NC03-11457	41	21	29	23	48	19	39	27	52	41	42	26
33 NC03-11458	32	8	30	29	28	5	23	7	42	28	31	6
34 NC03-11465	.	.	25	11	26	4	32	20	14	2	25	2
35 NC03-11561	37	15	23	6	44	14	44	33	21	5	34	14
36 NC03-11588	42	24	32	36	70	43	60	40	50	38	51	44
37 PI564341	57	43	39	45	74	45	54	37	64	47	58	47
38 PI564385	38	18	32	36	47	18	38	26	54	44	42	26
39 TX96D1073	48	31	26	17	36	10	.	.	35	22	36	18
40 TX98D1170	56	42	25	11	59	29	.	.	43	29	46	38
41 TX98D2423	26	3	25	11	68	38	23	7	27	8	34	14
42 TX99D4478	68	46	25	11	53	25	30	16	38	27	43	31
43 VA01W-310	55	40	22	4	68	38	31	18	31	16	41	23
44 VA04W-433	40	20	26	17	23	2	22	6	13	1	25	2
45 VA04W-503	53	38	31	31	32	8	36	23	50	38	41	23
46 VA04W-547	57	43	27	20	68	38	37	24	28	13	44	33
47 VA04W-608	53	38	18	2	31	6	26	11	51	40	36	18
48 VA04W-628	67	45	18	2	25	3	18	2	48	34	35	16

Mean	42	29.1	51.2	44.6	37.7	40
L.S.D.(0.05)	.	8.8	20.4	13.6	22.5	14
CV%	.	21.6	17.0	20.8	29.6	29

¹Kolb, F. L., and L. K. Boze. 2003. An alternative to the FHB index: incidence, severity, kernel rating (ISK) index
In: Canty, S.M., J. Lewis, and R.W. Ward (Eds.), 2003 National Fusarium Head Blight Forum Proceedings.
Dec 13-15, Bloomington, MN. Michigan State University, East Lansing, MI.

1000 Grain Weight (grams)

	Cultivar/ Designation	1000 GR. WT. S'BURY MD	RANK
1	ERNIE	33.3	16
2	COKER 9835	18.9	48
3	B006624	34.1	12
4	B990081	28.7	34
5	02JH000014	32.3	20
6	AR97002-2-1	24.7	39
7	AR97002-2-2	27.4	35
8	AR97048-1-1	26.8	36
9	AR97048-4-1	31.0	25
10	AR97048-7-1	29.3	33
11	AR97124-4-1	26.8	37
12	D00*6847-1	31.6	24
13	D00*6874-1	33.5	13
14	D00*6874-9	36.1	3
15	D01*7759	34.7	8
16	D01-7017	21.9	45
17	F92080G-01102	36.9	2
18	F95812G1-1 Fz1	33.4	14
19	F96035G11-2	35.7	5
20	GA951395-3E25	21.7	46
21	GA961171-3E38	24.1	41
22	GA961176-3A48	30.0	31
23	GA961526-3E15	32.2	21
24	GA96229-3A41	24.0	42
25	GA96229-3E39	30.4	28
26	LA9560CA22-1	32.8	19
27	LA97407D-17-4	34.5	9
28	LA97448D-27-4	35.4	6
29	LSU04FHB02	33.0	17
30	M01*1019	33.4	15
31	MV-5-46	34.5	10
32	NC03-11457	24.7	40
33	NC03-11458	30.1	30
34	NC03-11465	23.1	44
35	NC03-11561	23.3	43
36	NC03-11588	25.0	38
37	PI564341	29.4	32
38	PI564385	30.6	26
39	TX96D1073	30.5	27
40	TX98D1170	32.9	18
41	TX98D2423	21.5	47
42	TX99D4478	32.0	23
43	VA01W-310	35.8	4
44	VA04W-433	30.3	29
45	VA04W-503	32.0	22
46	VA04W-547	40.8	1
47	VA04W-608	34.9	7
48	VA04W-628	34.3	11

Mean	3.0
L.S.D.(0.05)	0.9
CV%	15.0

Grain Yield and Quality, Szeged, Hungary

Cultivar/ Designation	PLOT YIELD (kg/plot)	LOGGING (%)	NIR %WET GLUTEN	NIR HARD- NESS	NIR %GRAIN PROTEIN
	<i>RANK</i>			<i>RANK</i>	<i>RANK</i>
1 ERNIE	2.3 35	40	31	3.3 44	14.0 32
2 COKER 9835	3.4 4	30	29	2.1 45	13.8 37
3 B006624	2.1 41	20	35	25.6 17	14.6 9
4 B990081	3.4 4	60	34	26.5 15	14.2 26
5 02JH000014	3.0 13	80	38	28.6 13	15.3 1
6 AR97002-2-1	2.8 16	70	36	7.6 38	15.0 3
7 AR97002-2-2	2.9 14	60	35	13.1 34	14.6 9
8 AR97048-1-1	2.7 20	80	34	13.7 33	14.5 11
9 AR97048-4-1	2.5 27	80	35	20.0 25	14.9 5
10 AR97048-7-1	2.7 20	60	32	7.0 39	14.4 15
11 AR97124-4-1	2.2 37	15	33	6.4 41	15.2 2
12 D00*6847-1	3.2 7	15	33	11.4 36	14.1 29
13 D00*6874-1	3.1 10	5	34	21.7 20	14.5 11
14 D00*6874-9	2.9 14	0	35	21.7 20	14.7 8
15 D01*7759	3.1 10	0	35	30.8 10	14.8 7
16 D01-7017	3.2 7	10	33	14.2 31	14.5 11
17 F92080G-01102	2.7 20	0	31	44.7 1	13.3 45
18 F95812G1-1 Fz1	3.1 10	0	34	29.0 12	14.4 15
19 F96035G11-2	2.2 37	0	34	39.8 2	14.4 15
20 GA951395-3E25	3.5 2	0	33	31.1 9	14.1 29
21 GA961171-3E38	2.4 30	5	31	32.8 6	13.6 40
22 GA961176-3A48	2.6 24	0	34	34.7 3	13.9 35
23 GA961526-3E15	4.2 1	5	33	33.1 5	14.1 29
24 GA96229-3A41	3.3 6	0	33	17.3 27	14.3 21
25 GA96229-3E39	2.8 16	0	34	31.3 8	14.3 21
26 LA9560CA22-1	2.4 30	80	36	12.7 35	15.0 3
27 LA97407D-17-4	1.2 48	0	33	7.7 37	14.3 21
28 LA97448D-27-4	2.2 37	0	33	20.2 24	14.0 32
29 LSU04FHB02	3.2 7	0	31	30.2 11	13.5 43
30 M01*1019	2.8 16	0	33	13.9 32	13.9 35
31 MV-5-46	2.8 16	0	27	21.5 22	12.6 48
32 NC03-11457	2.4 30	0	31	1.4 46	13.7 39
33 NC03-11458	1.9 44	0	32	21.9 19	14.0 32
34 NC03-11465	2.5 27	0	33	5.5 42	14.4 15
35 NC03-11561	1.9 44	0	32	0.6 47	14.3 21
36 NC03-11588	2.4 30	0	34	24.6 18	14.4 15
37 PI564341	2.2 37	0	30	7.0 39	13.6 40
38 PI564385	2.1 41	0	34	31.9 7	14.4 15
39 TX96D1073	3.5 2	0	33	20.0 25	14.5 11
40 TX98D1170	2.7 20	40	32	33.8 4	13.6 40
41 TX98D2423	2.4 30	30	29	16.0 29	13.2 47
42 TX99D4478	2.6 24	30	34	26.3 16	14.2 26
43 VA01W-310	2.3 35	10	35	16.7 28	14.9 5
44 VA04W-433	2.0 43	10	28	21.4 23	13.3 45
45 VA04W-503	2.6 24	0	33	28.6 13	13.8 37
46 VA04W-547	2.5 27	5	30	0.3 48	13.5 43
47 VA04W-608	1.8 46	5	33	15.5 30	14.2 26
48 VA04W-628	1.7 47	0	33	4.7 43	14.3 21
Mean	2.6	17.6	32.9	19.4	14.2

Vomitoxin (DON)* (ppm)

Cultivar/ Designation	BAY	B'BURG	URBANA	LEX'TON	F'VILLE	KINSTON	S'BURY	MEAN
	AR	VA	IL	KY	AR	NC	MD	ALL LOC.
	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK
1 ERNIE	3.0	2.1	2.7	31.0	0.2	0.8	3.6	6.2
2 COKER 9835	4.8	1.2	14.8	32.5	0.8	6.4	40.0	14.4
3 B006624	5.4	1.2	4.1	24.5	0.6	1.7	12.3	7.1
4 B990081	2.3	1.0	1.9	14.0	0.1	1.4	0.5	3.0
5 02JH000014	2.8	0.8	4.8	26.0	0.4	1.3	7.2	6.2
6 AR97002-2-1	1.7	0.5	5.3	17.5	0.1	0.6	3.5	4.2
7 AR97002-2-2	3.2	0.2	6.0	23.5	0.2	0.4	4.1	5.4
8 AR97048-1-1	3.5	1.2	6.5	34.0	0.9	2.4	13.5	8.9
9 AR97048-4-1	5.0	1.7	20.3	70.5	1.7	12.0	31.8	20.4
10 AR97048-7-1	4.0	1.8	14.0	83.0	0.9	6.0	15.0	17.8
11 AR97124-4-1	4.6	1.5	5.0	23.0	1.0	0.8	5.3	5.9
12 D00*6847-1	14.6	2.1	15.3	42.0	0.7	1.8	12.5	12.7
13 D00*6874-1	10.0	2.2	9.0	59.5	0.9	4.9	14.8	14.5
14 D00*6874-9	15.0	1.4	15.0	45.5	1.1	3.5	7.8	12.8
15 D01*7759	18.4	1.8	14.8	51.0	1.1	2.9	6.8	13.8
16 D01-7017	10.0	1.8	6.8	41.0	1.1	2.1	14.0	11.0
17 F92080G-01102	5.5	0.3	8.8	33.0	1.0	1.0	6.8	8.1
18 F95812G1-1 Fz1	11.6	1.9	11.0	36.5	1.0	1.4	7.3	10.1
19 F96035G11-2	7.8	1.7	8.7	28.5	0.9	2.9	2.4	7.6
20 GA951395-3E25	8.1	3.3	11.5	34.5	1.4	6.6	12.8	11.2
21 GA961171-3E38	5.2	3.8	9.0	68.0	0.9	4.0	23.3	16.3
22 GA961176-3A48	7.9	3.6	5.4	47.0	2.4	4.8	13.8	12.1
23 GA961526-3E15	19.9	2.7	32.8	47.5	2.6	9.5	21.3	19.5
24 GA96229-3A41	12.3	12.0	18.8	85.0	3.3	17.5	37.8	26.7
25 GA96229-3E39	8.3	3.3	16.8	61.5	3.0	15.3	8.5	16.7
26 LA9560CA22-1	7.3	1.8	37.8	26.5	0.7	3.2	12.8	12.9
27 LA97407D-17-4	3.6	0.9	4.5	30.5	0.7	0.6	2.1	6.2
28 LA97448D-27-4	5.3	0.7	4.1	26.5	1.2	0.4	7.5	6.5
29 LSU04FHB02	6.5	2.0	5.4	34.5	0.9	2.3	8.0	8.5
30 M01*1019	7.4	0.7	19.3	43.5	2.2	3.1	1.4	11.1
31 MV-5-46	8.3	3.4	11.3	40.5	2.1	5.0	11.5	11.7
32 NC03-11457	6.7	0.8	2.9	19.5	0.2	0.5	4.3	5.0
33 NC03-11458	3.7	0.1	1.5	17.0	0.0	0.9	5.1	4.0
34 NC03-11465	1.7	0.1	1.5	15.0	0.5	0.4	2.6	3.1
35 NC03-11561	3.1	0.1	2.7	25.5	0.4	1.6	4.0	5.3
36 NC03-11588	7.5	0.6	10.8	37.5	1.8	6.9	13.8	11.3
37 PI564341	7.7	2.8	12.3	48.0	2.4	9.0	18.0	14.3
38 PI564385	4.6	1.3	12.8	44.5	1.2	2.6	20.0	12.4
39 TX96D1073	2.6	0.9	10.0	45.0	1.8	1.3	3.2	9.3
40 TX98D1170	4.1	1.8	14.3	38.5	1.8	2.1	14.0	10.9
41 TX98D2423	1.9	1.1	11.8	30.0	1.4	2.3	1.3	7.1
42 TX99D4478	7.5	2.3	11.3	37.5	2.5	2.1	5.0	9.7
43 VA01W-310	8.4	0.6	10.8	37.5	0.7	4.2	1.9	9.2
44 VA04W-433	4.1	0.4	4.8	19.5	0.0	0.2	1.3	4.3
45 VA04W-503	7.2	1.8	4.8	31.0	0.5	3.6	9.3	8.3
46 VA04W-547	12.7	2.0	21.0	31.5	0.4	3.6	4.8	10.9
47 VA04W-608	6.6	2.0	2.1	32.5	0.4	1.5	3.5	6.9
48 VA04W-628	4.2	0.2	1.6	21.5	0.2	1.2	2.1	4.4
Mean	6.8	1.7	10.2	37.4	1.1	3.6	10.1	10.1
L.S.D.(0.05)	6.4	.	.	16.1	.	3.6	13.1	7.1
CV%	47.0	.	.	30.0	,	50.5	65.2	65.9

*DON analysis conducted by Pat Hart, Dept of Plant Pathology, Michigan State University.

Greenhouse Screening¹

Cultivar/ Designation	NC		VA		KY		MO		MEAN		NC		MO		IL		MEAN	
	SEVERITY	RANK	SEVERITY	RANK	SEVERITY	RANK	SEVERITY	RANK	SEVERITY	RANK	SPREAD	RANK	SPREAD	RANK	SPREAD	RANK	SEVERITY	RANK
1 ERNIE	5	2	9	4	11	9	12	7	9	3	0.6	1	1.3	4	0.9	2	0.9	1
2 COKER 9835	55	43	25	24	47	36	56	43	46	43	9.8	43	9.0	46	10.8	37	9.9	42
3 B006624	43	41	28	31	39	35	42	33	38	38	7.4	40	5.1	27	5.8	23	6.1	36
4 B990081	15	28	13	11	37	33	38	32	26	25	2.9	30	6.4	35	2.9	11	4.1	21
5 02JH000014	5	2	7	1	14	12	11	5	9	3	1.0	4	1.8	7	3.7	15	2.2	7
6 AR97002-2-1	10	19	9	4	3	4	29	20	13	9	1.6	18	4.7	23	2.6	10	3.0	10
7 AR97002-2-2	7	10	10	7	2	3	11	5	8	2	1.0	4	1.6	5	0.8	1	1.1	3
8 AR97048-1-1	6	4	7	1	29	25	28	17	18	13	1.0	4	5.5	30	5.6	21	4.0	18
9 AR97048-4-1	7	10	14	13	65	45	61	45	37	37	1.6	18	7.9	43	7.9	30	5.8	33
10 AR97048-7-1	6	4	19	18	20	17	15	9	15	11	1.2	10	2.4	9	6.8	24	3.5	14
11 AR97124-4-1	16	29	20	20	25	22	37	30	24	21	2.5	27	7.0	40	7.1	28	5.5	29
12 D00*6847-1	34	38	30	34	60	41	45	37	42	41	5.3	37	6.7	37	6.9	27	6.3	37
13 D00*6874-1	12	24	41	43	55	39	49	40	39	39	1.8	21	7.2	42	11.3	39	6.8	39
14 D00*6874-9	79	48	27	28	22	20	37	30	41	40	12.6	46	4.9	25	16.5	48	11.3	46
15 D01*7759	70	46	36	40	64	44	52	41	56	46	13.8	47	11.0	47	12.8	41	12.5	48
16 D01-7017	10	19	29	33	21	18	25	13	21	16	2.0	23	4.7	23	11.2	38	6.0	35
17 F92080G-01102	6	4	19	18	1	1	19	10	11	7	1.1	9	2.9	11	2.3	9	2.1	6
18 F95812G1-1 Fz1	3	1	18	16	15	13	33	24	18	13	2.5	27	4.9	25	5.0	18	4.1	21
19 F96035G11-2	6	4	17	15	3	4	31	21	14	10	0.9	2	4.0	18	3.0	12	2.6	8
20 GA951395-3E25	52	42	18	16	27	23	23	12	30	28	9.3	42	3.4	15	3.2	13	5.3	28
21 GA961171-3E38	12	24	12	8	21	18	55	42	25	23	1.9	22	6.5	36	1.8	5	3.4	13
22 GA961176-3A48	10	19	27	28	12	11	42	33	23	19	1.5	14	5.2	28	4.7	16	3.8	15
23 GA961526-3E15	36	39	34	39	71	46	69	48	53	45	6.1	39	12.1	48	12.9	42	10.4	43
24 GA96229-3A41	76	47	45	45	90	47	45	37	64	47	13.9	48	6.9	38	16.2	46	12.3	47
25 GA96229-3E39	60	44	53	48	100	48	63	46	69	48	9.9	44	8.8	45	15.0	45	11.2	44
26 LA9560CA22-1	11	22	49	46	60	41	25	13	36	36	1.5	14	4.0	18	6.8	24	4.1	21
27 LA97407D-17-4	23	33	40	42	33	28	33	24	32	32	3.9	33	4.4	20	8.4	32	5.6	30
28 LA97448D-27-4	66	45	49	46	53	38	32	23	50	44	11.4	45	5.9	32	16.3	47	11.2	44
29 LSU04FHB02	39	40	33	36	34	30	33	24	35	35	8.0	41	5.9	32	14.0	44	9.3	41
30 M01*1019	7	10	20	20	31	26	26	16	21	16	1.0	4	5.6	31	5.0	18	3.9	17
31 MV-5-46	13	26	31	35	35	31	34	27	29	26	2.3	25	7.0	40	13.8	43	7.7	40
32 NC03-11457	16	29	25	24	11	9	9	3	15	11	3.0	31	2.0	8	4.8	17	3.3	12
33 NC03-11458	11	22	12	8	33	28	28	17	21	16	2.4	26	3.9	16	5.7	22	4.0	18
34 NC03-11465	23	33	25	24	18	15	34	27	25	23	4.4	34	3.9	16	6.8	24	5.0	26
35 NC03-11561	9	14	26	27	27	23	63	46	31	30	1.5	14	8.4	44	5.3	20	5.0	26
36 NC03-11588	6	4	21	22	61	43	28	17	29	26	1.0	4	3.2	13	8.5	33	4.0	18
37 PI564341	14	27	42	44	35	31	47	39	34	34	2.1	24	5.9	32	11.7	40	6.6	38
38 PI564385	8	13	28	31	19	16	42	33	24	21	1.6	18	5.3	29	9.8	35	5.6	30
39 TX96D1073	31	35	33	36	15	13	44	36	31	30	4.6	35	4.4	20	8.2	31	5.7	32
40 TX98D1170	9	14	9	4	9	8	14	8	10	5	1.5	14	1.6	5	1.8	5	1.6	4
41 TX98D2423	21	32	37	41	38	34	25	13	30	28	3.3	32	3.0	12	3.3	14	3.2	11
42 TX99D4478	9	14	13	11	22	20	36	29	20	15	1.4	11	4.4	20	2.2	8	2.7	9
43 VA01W-310	32	37	27	28	57	40	59	44	44	42	5.6	38	6.9	38	1.0	3	4.5	25
44 VA04W-433	9	14	23	23	4	6	5	1	10	5	1.4	11	0.5	1	10.5	36	4.1	21
45 VA04W-503	31	35	33	36	32	27	31	21	32	32	4.6	35	3.3	14	9.4	34	5.8	33
46 VA04W-547	9	14	12	8	51	37	19	10	23	19	1.4	11	2.4	9	7.6	29	3.8	15
47 VA04W-608	17	31	15	14	1	1	9	3	11	7	2.6	29	0.9	3	2.1	7	1.9	5
48 VA04W-628	6	4	7	1	4	6	7	2	6	1	0.9	2	0.7	2	1.0	3	0.9	1
Mean	22		25		32		13		28		3.8		1.4		7		5.3	
L.S.D.(0.05)	.		.		25		4		18		.		1		6.4		4.2	
CV%	.		.		105.6		73		47.2		.		9.1		77.9		48.8	

¹ Severity data based on the percentage of infected spikelets / total spikelets 21 to 28 days post inoculation
 Spread = total number of diseased spikelets in a head.

Greenhouse Rachis Involvement and Seed Quality

Cultivar/ Designation	Rachis ¹ COL'BIA MO (0-1)	Seed Quality RALEIGH NC (1-5)	Rank
	1 ERNIE	0.5	1.2	1
2 COKER 9835	1.0	4.4	43
3 B006624	0.9	4.0	36
4 B990081	0.9	3.7	27
5 02JH000014	0.5	2.6	5
6 AR97002-2-1	1.0	3.2	14
7 AR97002-2-2	0.6	2.7	6
8 AR97048-1-1	1.0	3.6	24
9 AR97048-4-1	1.0	3.4	19
10 AR97048-7-1	0.8	3.0	9
11 AR97124-4-1	1.0	3.8	32
12 D00*6847-1	0.9	3.7	28
13 D00*6874-1	0.9	2.4	3
14 D00*6874-9	0.6	4.4	44
15 D01*7759	1.0	4.7	47
16 D01-7017	0.9	3.6	25
17 F92080G-01102	0.6	2.9	8
18 F95812G1-1 Fz1	1.0	3.7	29
19 F96035G11-2	0.6	2.7	7
20 GA951395-3E25	0.8	4.0	37
21 GA961171-3E38	1.0	3.0	10
22 GA961176-3A48	0.9	3.0	11
23 GA961526-3E15	1.0	4.1	39
24 GA96229-3A41	0.9	4.8	48
25 GA96229-3E39	1.0	4.0	38
26 LA9560CA22-1	0.8	4.4	45
27 LA97407D-17-4	0.6	3.4	20
28 LA97448D-27-4	0.9	4.3	42
29 LSU04FHB02	0.6	4.1	40
30 M01*1019	0.9	3.8	33
31 MV-5-46	1.0	3.4	21
32 NC03-11457	0.6	3.8	34
33 NC03-11458	0.5	4.4	46
34 NC03-11465	0.6	3.7	30
35 NC03-11561	1.0	3.5	22
36 NC03-11588	0.8	3.2	15
37 PI564341	0.9	3.9	35
38 PI564385	0.9	3.3	16
39 TX96D1073	0.7	4.2	41
40 TX98D1170	0.5	3.0	12
41 TX98D2423	0.6	3.3	17
42 TX99D4478	0.9	3.5	23
43 VA01W-310	1.0	3.7	31
44 VA04W-433	0.1	2.1	2
45 VA04W-503	0.6	3.1	13
46 VA04W-547	0.9	3.6	26
47 VA04W-608	0.3	3.3	18
48 VA04W-628	0.1	2.5	4

Mean . 3.5

¹ Records whether the rachis on an individual head has symptoms where 0=no rachis involvement and 1=rachis showed symptoms

Detached Leaf Evaluations Nyon, Switzerland

	Cultivar/ Designation	Incubation Period (days) RANK	Latent Period (days) RANK
1	ERNIE	2.53 2	6.48 2
2	COKER 9835	3.78 33	8.13 18
3	B006624	4.13 44	9.25 35
4	B990081	2.53 3	7.05 5
5	02JH000014	2.60 6	6.63 3
6	AR97002-2-1	3.78 33	7.70 13
7	AR97002-2-2	3.55 23	7.63 12
8	AR97048-1-1	3.40 21	7.50 9
9	AR97048-4-1	3.73 31	8.08 17
10	AR97048-7-1	3.78 33	8.25 21
11	AR97124-4-1	2.90 11	7.30 7
12	D00*6847-1	4.20 45	9.65 42
13	D00*6874-1	2.55 5	10.73 47
14	D00*6874-9	2.48 1	9.75 44
15	D01*7759	3.68 28	8.68 28
16	D01-7017	3.30 18	8.23 20
17	F92080G-01102	2.80 8	8.90 29
18	F95812G1-1 Fz1	3.10 14	9.70 43
19	F96035G11-2	3.45 22	9.25 35
20	GA951395-3E25	3.69 30	9.26 37
21	GA961171-3E38	4.03 40	9.85 46
22	GA961176-3A48	4.58 47	9.53 41
23	GA961526-3E15	4.20 45	10.85 48
24	GA96229-3A41	4.10 43	8.98 30
25	GA96229-3E39	4.00 38	8.55 25
26	LA9560CA22-1	3.75 32	9.19 34
27	LA97407D-17-4	3.35 20	8.47 24
28	LA97448D-27-4	3.08 13	7.05 5
29	LSU04FHB02	2.85 10	9.13 31
30	M01*1019	3.55 23	7.95 15
31	MV-5-46	3.05 12	7.75 14
32	NC03-11457	4.00 38	8.45 23
33	NC03-11458	4.60 48	9.13 31
34	NC03-11465	3.65 26	8.00 16
35	NC03-11561	3.95 36	9.13 31
36	NC03-11588	3.29 17	8.27 22
37	PI564341	3.68 28	8.63 27
38	PI564385	3.10 14	8.13 18
39	TX96D1073	3.58 25	8.58 26
40	TX98D1170	3.13 16	7.50 9
41	TX98D2423	2.68 7	7.58 11
42	TX99D4478	3.33 19	7.48 8
43	VA01W-310	3.65 26	9.28 38
44	VA04W-433	3.98 37	9.38 40
45	VA04W-503	4.08 42	9.30 39
46	VA04W-547	4.05 41	9.83 45
47	VA04W-608	2.80 8	5.95 1
48	VA04W-628	2.53 3	6.70 4

Mean	3.47	8.47
L.S.D.(0.05)	0.77	1.50
CV%	11.0	8.80

SSR Analyses of 3BS and 5A Regions Associated with FHB Resistance in Sumai 3

ENTRY NO	CULTIVAR/ DESIGNATION	PEDIGREE	Qfhs.ndsu-3BS ¹					Qfhs.ifa-5A ²	
			Xgwm389 154 bp	Xgwm533.1 161 bp	Xbarc133 142 bp	Xgwm 493 214 bp	Xbarc102 202 bp	Xgwm533.2 113 bp	Xgwm293 218 bp
	Sumai 3		X	X	X	X	X	X	X
1	ERNIE	PIKE /3/ STODDARD / BLUEBOY // STODDARD / D1707	.	.	X	.	.	.	.
2	COKER 9835	CK68-19 // CK61-19*3 // IN4946A4-18-2-10-2 /4/ Bb /3/ CK65-20*5 / W17-	.	.	.	.	.	.	.
3	B006624	COKER 9474/COKER 9663	.	X	.	X	.	.	.
4	B990081	L870537/PI382152	.	X	.	X	.	.	.
5	02JH000014	A92*3327/COKER 9474	.	X	.	X	.	X	.
6	AR97002-2-1	AR396-4-2/Ning 8026	.	.	.	.	.	.	X
7	AR97002-2-2	AR396-4-2/Ning 8026	.	.	.	.	.	.	X
8	AR97048-1-1	Elkhart/P88288C1-6-1-2	.	X	.	X	.	.	.
9	AR97048-4-1	Elkhart/P88288C1-6-1-2	.	X	.	X	.	.	.
10	AR97048-7-1	Elkhart/P88288C1-6-1-2	.	X	.	X	.	.	.
11	AR97124-4-1	P88288C1-6-1-2/Terra Sr 204	.	.	.	.	.	.	.
12	D00*6847-1	JACKSON/2545	.	.	.	.	.	.	.
13	D00*6874-1	89M-4035A/2580	.	.	.	.	.	.	.
14	D00*6874-9	89M-4035A/2580	.	.	.	.	.	.	.
15	D01*7759	BULK OF 3 F1S (LIKELY ELKHART/MASON)	.	.	.	.	.	.	.
16	D01-7017	MASON/2580	.	.	.	.	.	.	.
17	F92080G-01102	201 R2-1 / DROPIA	.	.	.	.	.	.	.
18	F95812G1-1 Fz1	135U2-1 / 508U1-1	.	.	.	.	.	.	.
19	F96035G11-2	201R2-121 / 135U2-1	.	.	.	.	.	.	.
20	GA951395-3E25	87110/VA55/88151	.	.	.	.	.	.	.
21	GA961171-3E38	881130*2/GORE	.	.	.	.	.	.	.
22	GA961176-3A48	JACKSON/2*881130	.	.	.	.	.	.	.
23	GA961526-3E15	881175/JACKSON//AGS 2000	.	.	.	.	.	.	.
24	GA96229-3A41	881130*2/881582	.	.	.	.	.	.	.
25	GA96229-3E39	881130*2/881582	.	.	.	.	.	.	.
26	LA9560CA22-1	FL302/FR81-19,85430-D17-2-1//CK96	.	.	.	.	.	.	.
27	LA97407D-17-4	GMFHB:MASON*2/CATBRIDG9C	.	.	.	.	.	.	.
28	LA97448D-27-4	GMFHB:MASON/CATBIRDG93	.	.	.	.	.	.	.
29	LSU04FHB02	(LA97448D-27-3) GMFHB:MASON/CATBIRDG93	.	.	.	.	.	.	.
30	M01*1019	FR86-2186/89I-4584/3/N873-6/YMI//ZAGREPCANKA	.	.	.	.	.	.	.
31	MV-5-46	91-54-222 (71-54-147/CK68-15//IN65309C7-18-2-3-2)/FFR555W//93-52-55	.	.	.	.	.	.	.
32	NC03-11457	NING 7840/P2643/NC95-22426	X	X	X	X	X	X	X
33	NC03-11458	NING 7840/P2643/NC95-22426	X	X	X	X	X	X	X
34	NC03-11465	NING 7840/P2643/NC95-22426	X	X	X	X	X	.	.
35	NC03-11561	NING 7840/P2643/NC95-22426	X	X	X	X	X	X	.
36	NC03-11588	NCV93-6345//P92823(FHB)/GA9007E	.	.	.	.	.	.	.
37	PI564341	Pedigree unknown. Powdery mildew resistant. Origin Tolbukhin, Bulgaria	.	.	.	.	.	.	.
38	PI564385	Pedigree unknown. Powdery mildew resistant. Origin Tolbukhin, Bulgaria	.	.	.	.	.	.	.
39	TX96D1073	TX86D1310/Kavkaz/TX86D130E	.	.	.	.	.	.	.
40	TX98D1170	TX89D1253*2/TTCC404	.	.	.	.	.	.	.
41	TX98D2423	2163*W3453/W2441	.	.	.	.	.	.	.
42	TX99D4478	TX92D8040*3/TTCC25E	.	.	.	.	.	.	.
43	VA01W-310	POCAHONTAS/MSY//93-54-418	X	.	.	.	.	.	.
44	VA04W-433	NING 7840/PION2684//96-54-244 (CK9803/FREEDOM), F1	.	X	X	X	X	.	.
45	VA04W-503	JACKSON//JACKSON//SHAAN85-2/JACKSON, BC2F6	.	.	.	.	.	.	.
46	VA04W-547	PION2684*2//W14/PION2684, BC2F5	.	.	.	.	.	.	.
47	VA04W-608	ERNIE*2//VR95B71/ERNIE, BC2F5	.	.	.	.	.	.	.
48	VA04W-628	ERNIE//NING7840/ERNIE, BC1F6	.	.	X	.	.	.	.

¹ Liu and Anderson (2003) Crop Sci. 43:760-766

² Buerstmayr et al., (2003) TAG 107:503-508

Heading Date (Julian Days*)

	BAY AR	COL'BIA MO	KINSTON NC	B'BURG VA	S'BURY MD	LEX'TON KY	FUN'LEA ROM	SZEGED HUN	MEAN ALL LOC.	RANK
1 ERNIE	112	135	109	133	132	136	139	140	130	5
2 COKER 9835	120	139	111	134	139	141	143	144	134	41
3 B006624	118	137	110	133	135	135	142	142	132	20
4 B990081	119	136	116	134	134	137	140	141	132	20
5 02JH000014	121	136	116	134	134	135	140	143	132	20
6 AR97002-2-1	112	136	113	132	131	138	139	141	130	5
7 AR97002-2-2	112	136	112	131	131	136	139	141	130	5
8 AR97048-1-1	121	139	114	134	137	138	141	143	133	33
9 AR97048-4-1	122	139	113	134	137	139	143	144	134	41
10 AR97048-7-1	123	140	117	134	137	139	143	145	135	46
11 AR97124-4-1	117	136	117	134	134	134	143	143	132	20
12 D00*6847-1	112	138	107	134	134	134	143	143	131	12
13 D00*6874-1	113	134	111	132	133	134	142	143	130	5
14 D00*6874-9	115	133	110	133	133	133	139	143	130	5
15 D01*7759	116	138	112	134	134	137	143	143	132	20
16 D01-7017	117	137	109	134	136	138	143	144	132	20
17 F92080G-01102	117	138	118	137	137	138	143	142	134	41
18 F95812G1-1 Fz1	116	137	117	135	135	138	143	143	133	33
19 F96035G11-2	114	135	114	134	135	132	139	142	131	12
20 GA951395-3E25	118	137	112	134	136	137	143	145	133	33
21 GA961171-3E38	111	134	107	133	131	132	139	141	129	2
22 GA961176-3A48	114	136	112	133	133	134	141	143	131	12
23 GA961526-3E15	114	139	105	134	135	139	144	144	132	20
24 GA96229-3A41	117	138	112	134	137	138	143	144	133	33
25 GA96229-3E39	117	137	110	134	135	137	143	144	132	20
26 LA9560CA22-1	114	139	107	134	134	142	144	146	133	33
27 LA97407D-17-4	112	133	104	133	130	133	139	141	128	1
28 LA97448D-27-4	115	134	108	132	130	135	139	141	129	2
29 LSU04FHB02	115	135	107	133	133	136	142	141	130	5
30 M01*1019	114	139	114	134	135	139	144	141	133	33
31 MV-5-46	118	137	113	134	136	136	142	143	132	20
32 NC03-11457	117	136	116	134	135	137	139	141	132	20
33 NC03-11458	116	136	116	134	134	136	139	141	132	20
34 NC03-11465	122	139	120	136	137	143	145	145	136	47
35 NC03-11561	123	141	122	137	137	142	145	147	137	48
36 NC03-11588	119	139	110	134	137	144	145	144	134	41
37 PI564341	115	138	116	134	134	137	139	143	132	20
38 PI564385	115	138	117	135	133	138	144	143	133	33
39 TX96D1073	113	135	116	134	133	133	139	141	131	12
40 TX98D1170	116	136	116	134	134	133	144	141	132	20
41 TX98D2423	118	138	119	134	138	136	144	143	134	41
42 TX99D4478	114	136	118	134	132	134	141	141	131	12
43 VA01W-310	114	138	112	134	135	137	144	146	133	33
44 VA04W-433	112	137	108	133	134	132	139	141	129	2
45 VA04W-503	116	136	111	134	134	133	139	146	131	12
46 VA04W-547	112	139	106	133	133	136	144	142	131	12
47 VA04W-608	116	135	109	133	133	137	139	141	130	5
48 VA04W-628	115	134	112	133	134	135	139	146	131	12

Mean:	116	137	112	134	134	136	142	143	132
L.S.D. (0.05)	4	2	2	2	3	.	2	.	2
CV%	2	1	1	9	1.1	.	.	.	1.5

Plant Height (in)

CULTIVAR/ DESIGNATION	COL'BIA MO	B'BURG VA	LEX'TON KY	KINSTON NC	FUN'LEA ROM	SZEGED HUN	MEAN ALL LOC.	Rank
1 ERNIE	34	30	30	35	35	41	34	6
2 COKER 9835	35	28	30	32	33	39	33	1
3 B006624	40	30	32	38	37	45	37	27
4 B990081	38	29	31	38	45	45	38	36
5 02JH000014	41	30	34	42	43	45	39	41
6 AR97002-2-1	37	29	33	36	39	41	36	21
7 AR97002-2-2	38	27	28	36	41	41	35	11
8 AR97048-1-1	44	33	39	45	43	47	42	47
9 AR97048-4-1	45	36	37	45	41	45	42	47
10 AR97048-7-1	42	37	38	41	45	43	41	46
11 AR97124-4-1	42	32	35	41	45	43	40	44
12 D00*6847-1	38	30	34	36	41	41	37	27
13 D00*6874-1	38	30	31	40	43	43	38	36
14 D00*6874-9	38	30	35	38	41	41	37	27
15 D01*7759	41	32	35	37	45	41	39	41
16 D01-7017	40	30	32	38	41	43	37	27
17 F92080G-01102	39	31	32	33	43	37	36	21
18 F95812G1-1 Fz1	38	28	32	36	35	39	35	11
19 F96035G11-2	35	30	32	35	37	39	35	11
20 GA951395-3E25	35	27	30	39	37	39	35	11
21 GA961171-3E38	35	28	29	35	33	39	33	1
22 GA961176-3A48	36	29	33	38	39	41	36	21
23 GA961526-3E15	35	31	32	38	43	39	36	21
24 GA96229-3A41	37	31	31	40	43	39	37	27
25 GA96229-3E39	38	31	33	42	41	39	37	27
26 LA9560CA22-1	42	34	39	40	43	39	40	44
27 LA97407D-17-4	37	26	32	37	39	37	35	11
28 LA97448D-27-4	41	30	36	39	43	39	38	36
29 LSU04FHB02	40	32	35	38	43	43	39	41
30 M01*1019	36	28	32	36	39	33	34	6
31 MV-5-46	37	29	32	36	31	35	33	1
32 NC03-11457	36	31	30	35	39	35	34	6
33 NC03-11458	37	30	32	35	37	35	34	6
34 NC03-11465	37	31	31	36	39	39	36	21
35 NC03-11561	33	31	33	35	37	33	34	6
36 NC03-11588	37	30	32	34	39	39	35	11
37 PI564341	35	28	29	37	35	35	33	1
38 PI564385	40	32	34	41	43	38	38	36
39 TX96D1073	38	28	34	38	41	38	36	21
40 TX98D1170	38	33	34	35	41	39	37	27
41 TX98D2423	40	31	32	34	45	41	37	27
42 TX99D4478	40	31	33	39	39	39	37	27
43 VA01W-310	37	28	33	35	41	38	35	11
44 VA04W-433	34	28	33	36	41	35	35	11
45 VA04W-503	40	32	35	39	39	43	38	36
46 VA04W-547	36	29	35	36	37	39	35	11
47 VA04W-608	37	30	33	36	37	35	35	11
48 VA04W-628	35	29	31	35	33	33	33	1

Mean:	38	30	33	37	40	39	36
L.S.D. (0.05)	1	2	.	6	1	.	2
CV%	1	5	.	3.9	.	.	5.4

Leaf and Viral Disease Ratings

CULTIVAR/ DESIGNATION	STRIPE RUST		LEAF RUST		<i>Septoria tritici</i>		<i>Stag. ndorum</i>		P. Mildew	VIRUS	
	%		%		%		(1-9)		(1-9)	WSSM	BYDV
	F'VILLE	FUN'LEA	SZEGED	HUN.	SZEGED	HUN.	KINSTON	B'BURG	KINSTON	(1-9)	% Plot
	AR	ROM	14-Jun	23-Jun	14-Jun	23-Jun	NC	VA	NC	BAY	SZEGED
1 ERNIE	43	60S	30	90	5	0	4	1	2.5	2.5	0
2 COKER 9835	75	100FS	0	0	15	0	4	1	2.0	4.5	5
3 B006624	1	60S	0	0	0	0	4	1	3.5	2.5	20
4 B990081	4	30MR-MS	0	0	2	0	5	1	2.0	3.0	20
5 02JH000014	1	40 MSS	0	0	5	0	3	3	2.5	3.5	5
6 AR97002-2-1	22	20MR	0	0	10	0	4	1	5.0	4.0	5
7 AR97002-2-2	15	25MR-MS	0	0	5	0	5	1	5.5	3.5	0
8 AR97048-1-1	0	40MSS	0	0	10	0	5	2	1.0	5.5	0
9 AR97048-4-1	0	80FS	5	10	2	0	4	1	0.5	4.5	5
10 AR97048-7-1	1	80FS	0	5	5	20	6	1	1.5	3.0	1
11 AR97124-4-1	1	50MSS	0	0	0	15	5	1	4.5	6.5	10
12 D00*6847-1	43	70S	0	0	2	5	6	1	1.0	2.5	1
13 D00*6874-1	1	.	0	0	1	10	4	2	1.5	4.0	10
14 D00*6874-9	0	.	0	0	1	10	6	1	2.5	5.5	1
15 D01*7759	0	.	0	10	3	10	6	2	6.5	6.0	0
16 D01-7017	1	60S	0	5	5	10	4	1	3.5	2.0	5
17 F92080G-01102	2	90FS	1	20	40	5	4	1	0.0	2.5	0
18 F95812G1-1 Fz1	0	30 MS	0	5	30	50	8	4	2.5	5.8	0
19 F96035G11-2	0	50MSS	1	5	5	60	6	2	0.5	5.0	10
20 GA951395-3E25	0	40MS	0	0	10	50	2	1	3.0	4.0	20
21 GA961171-3E38	0	5MR	0	0	0	5	3	1	1.5	4.0	40
22 GA961176-3A48	0	.	0	0	5	5	2	1	4.0	2.5	10
23 GA961526-3E15	83	tr S	0	0	0	15	5	2	3.5	4.5	0
24 GA96229-3A41	0	tr MS	0	0	1	5	3	2	0.0	5.5	0
25 GA96229-3E39	0	60 MSS	0	0	5	5	4	3	0.5	6.5	10
26 LA9560CA22-1	17	70FS	1	0	2	5	6	1	5.5	6.0	5
27 LA97407D-17-4	57	80FS	0	0	30	5	5	1	3.5	4.5	60
28 LA97448D-27-4	1	.	0	0	5	30	6	1	5.0	3.5	15
29 LSU04FHB02	1	30MS	0	0	5	15	8	1	4.5	4.5	5
30 M01*1019	0	.	0	5	30	40	5	1	5.5	7.5	10
31 MV-5-46	88	60 MSS	10	100	20	-	4	1	1.0	7.0	0
32 NC03-11457	4	tr MS	20	100	5	-	7	1	2.5	5.5	40
33 NC03-11458	2	50 MSS	90	100	5	-	6	1	2.0	5.0	50
34 NC03-11465	16	70 MSS	0	0	5	50	5	1	0.5	6.0	15
35 NC03-11561	30	70S	0	0	5	40	6	1	0.0	5.0	60
36 NC03-11588	36	60 MSS	1	0	5	5	8	3	1.0	4.5	5
37 PI564341	1	tr MS	0	-	40	60	9	2	0.0	5.0	0
38 PI564385	1	tr MR-MS	5	30	10	-	6	4	1.0	3.5	10
39 TX96D1073	1	80FS	0	0	15	60	7	2	2.0	4.0	0
40 TX98D1170	0	70S	0	-	5	-	9	4	0.5	4.0	0
41 TX98D2423	15	30MSS	0	0	30	70	7	1	6.5	4.0	5
42 TX99D4478	32	80FS	0	0	5	5	9	4	0.0	3.0	20
43 VA01W-310	75	100FFS	0	0	5	20	5	1	1.0	4.5	10
44 VA04W-433	71	.	0	10	20	80	5	1	3.0	4.5	0
45 VA04W-503	75	.	1	5	5	40	4	1	4.5	3.5	0
46 VA04W-547	25	40MSS	30	90	10	-	8	1	1.0	4.0	2
47 VA04W-608	5	.	15	90	5	5	2	1	1.5	6.0	30
48 VA04W-628	37	30MR	10	90	5	10	5	2	1	3.5	5
Mean	18	.	.	.	.	.	5	2	2.4	4.4	11
L.S.D.(0.05)	.	.	.	.	.	.	2.2	1	1.4	.	.
CV%	14	.	.	.	.	.	24.6	32	33	.	.

Hessian Fly Screening (Resistant - Susceptible plants)

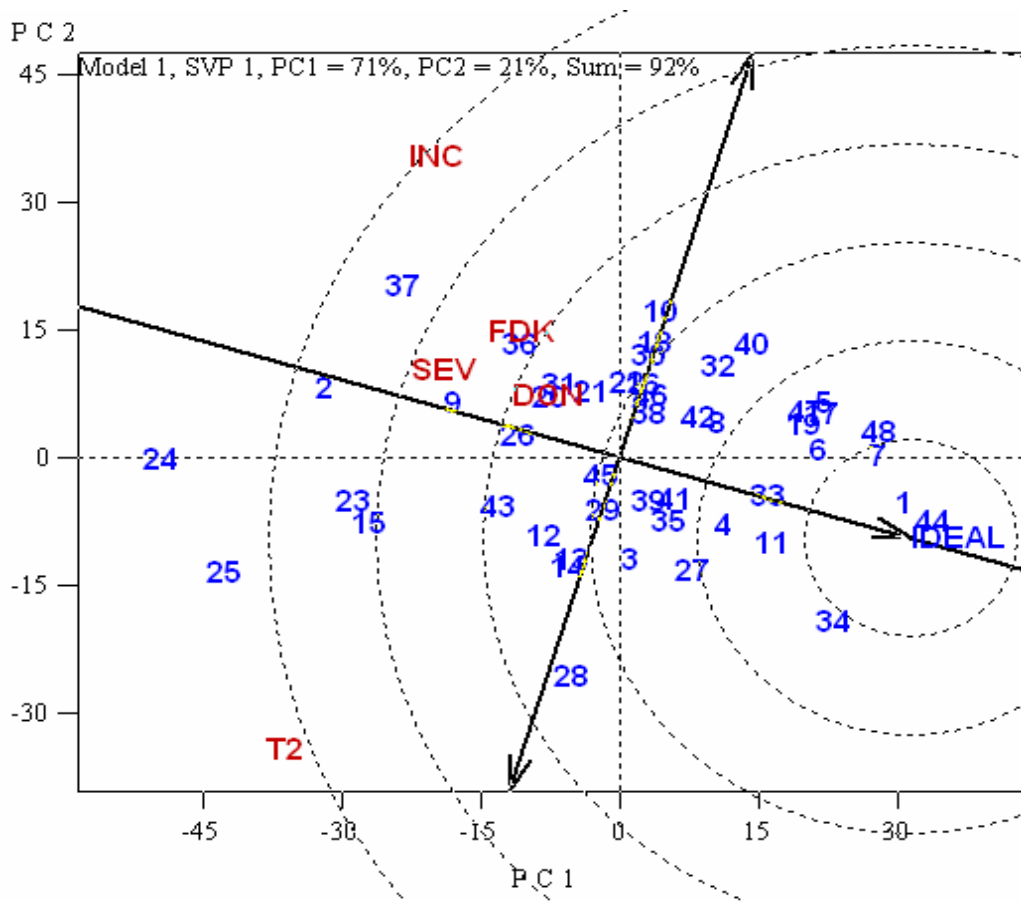
CULTIVAR/ DESIGNATION	West Lafayette ¹ IN	
	Biotype O	Biotype L
1 ERNIE	0-14	0-14
2 COKER 9835	20-0	0-17
3 B006624	0-17	0-16
4 B990081	0-11	0-18
5 02JH000014	0-12	0-18
6 AR97002-2-1	0-14	0-15
7 AR97002-2-2	0-16	0-18
8 AR97048-1-1	0-17	0-17
9 AR97048-4-1	0-14	0-17
10 AR97048-7-1	0-16	0-16
11 AR97124-4-1	0-17	0-20
12 D00*6847-1	13-0	0-19
13 D00*6874-1	4-11	0-16
14 D00*6874-9	10-5	0-19
15 D01*7759	0-19	0-20
16 D01-7017	0-18	0-16
17 F92080G-01102	0-15	0-16
18 F95812G1-1 Fz1	0-18	0-20
19 F96035G11-2	0-16	0-17
20 GA951395-3E25	14-0	0-15
21 GA961171-3E38	10-7	12-0
22 GA961176-3A48	11-7	17-0
23 GA961526-3E15	9-11	0-20
24 GA96229-3A41	14-0	0-19
25 GA96229-3E39	15-0	0-23
26 LA9560CA22-1	7-9	0-17
27 LA97407D-17-4	0-12	0-18
28 LA97448D-27-4	0-15	0-14
29 LSU04FHB02	0-18	0-18
30 M01*1019	0-15	0-17
31 MV-5-46	0-7	0-14
32 NC03-11457	18-0	16-7
33 NC03-11458	18-0	16-6
34 NC03-11465	17-0	12-7
35 NC03-11561	18-0	11-8
36 NC03-11588	0-14	0-16
37 PI564341	0-13	0-18
38 PI564385	0-16	0-15
39 TX96D1073	18-0	0-20
40 TX98D1170	0-14	0-16
41 TX98D2423	0-16	0-19
42 TX99D4478	15-1	17-2
43 VA01W-310	19-0	0-16
44 VA04W-433	0-19	0-16
45 VA04W-503	0-19	0-15
46 VA04W-547	18-0	0-15
47 VA04W-608	0-18	0-16
48 VA04W-628	0-18	0-16

¹ Sue Cambron, USDA-ARS, Dept Entomology, Purdue Univ.

Means Across Locations 2004-05

Cultivar/ Designation	FHB	FHB	FHB	FDK	ISK	DON	G'hse Type II	Heading Date	Plant Height	Qfhs.ndsu-3BS		Qfhs.ifa-5A	
	Incidence	Severity	Index							Xgwm533.1	Xbarc133	Xgwm293	Xgwm156
	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	RANK	161	142	218	342
1 ERNIE	42 3	16 5	5.7 3	16 3	24 1	6.2 11	9 3	130 5	34 6	.	X	.	.
2 COCKER 9835	80 47	46 47	37.3 46	35 42	56 46	14.4 41	46 43	134 41	33 1	.	.	.	.
3 B006624	60 23	19 9	14.3 18	14 1	31 6	7.1 16	38 38	132 20	37 27	X	.	.	.
4 B990081	51 10	21 12	9.2 8	23 16	31 6	3.0 1	26 25	132 20	38 36	X	.	.	.
5 02JH000014	55 14	16 5	10.1 10	27 24	33 10	6.2 11	9 3	132 20	39 41	X	.	.	.
6 AR97002-2-1	52 11	17 8	7.9 5	24 17	33 10	4.2 4	13 9	130 5	36 21	.	.	X	.
7 AR97002-2-2	45 4	14 2	4.5 2	28 29	29 4	5.4 9	8 2	130 5	35 11	.	.	X	.
8 AR97048-1-1	59 21	26 24	14.5 19	22 14	36 18	8.9 22	18 13	133 33	42 47	X	.	.	.
9 AR97048-4-1	72 42	36 42	27.1 43	31 38	48 41	20.4 47	37 37	134 41	42 47	X	.	.	.
10 AR97048-7-1	70 38	27 27	18.8 31	30 35	44 33	17.8 45	15 11	135 46	41 46	X	.	.	.
11 AR97124-4-1	47 5	19 9	9.5 9	20 8	29 4	5.9 10	24 21	132 20	40 44	.	.	.	.
12 D00*6847-1	58 19	25 23	16.0 25	31 38	42 26	12.7 36	42 41	131 12	37 27	.	.	.	.
13 D00*6874-1	49 9	32 37	15.1 21	30 35	42 26	14.5 42	39 39	130 5	38 36	.	.	.	.
14 D00*6874-9	53 12	30 31	13.9 15	24 17	37 21	12.8 37	41 40	130 5	37 27	.	.	.	.
15 D01*7759	73 44	32 37	21.1 33	28 29	41 23	13.8 39	56 46	132 20	39 41	.	.	.	.
16 D01-7017	64 28	32 37	20.6 32	28 29	44 33	11.0 29	21 16	132 20	37 27	.	.	.	.
17 F92080G-01102	56 16	16 5	8.9 7	24 17	33 10	8.1 19	11 7	134 41	36 21	.	.	.	.
18 F95812G1-1 Fz1	70 38	30 31	24.7 40	26 21	47 39	10.1 26	18 13	133 33	35 11	.	.	.	.
19 F96035G11-2	59 21	15 3	8.2 6	20 8	33 10	7.6 18	14 10	131 12	35 11	.	.	.	.
20 GA951395-3E25	70 38	35 40	21.2 36	27 24	43 31	11.2 31	30 28	133 33	35 11	.	.	.	.
21 GA961171-3E38	64 28	35 40	25.1 41	29 33	47 39	16.3 43	25 23	129 2	33 1	.	.	.	.
22 GA961176-3A48	67 34	30 31	21.1 33	27 24	44 33	12.1 34	23 19	131 12	36 21	.	.	.	.
23 GA961526-3E15	67 34	38 44	25.6 42	38 45	50 42	19.5 46	53 45	132 20	36 21	.	.	.	.
24 GA96229-3A41	77 45	50 48	39.2 48	45 48	60 48	26.7 48	64 47	133 33	37 27	.	.	.	.
25 GA96229-3E39	69 37	42 46	29.8 45	39 46	53 45	16.7 44	69 48	132 20	37 27	.	.	.	.
26 LA9560CA22-1	66 32	30 31	21.6 37	37 44	50 42	12.9 38	36 36	133 33	40 44	.	.	.	.
27 LA97407D-17-4	48 6	24 21	13.2 13	21 13	35 16	6.2 11	32 32	128 1	35 11	.	.	.	.
28 LA97448D-27-4	48 6	26 24	13.6 14	17 4	31 6	6.5 14	50 44	129 2	38 36	.	.	.	.
29 LSU04FHB02	60 23	29 28	17.1 26	20 8	39 22	8.5 21	35 35	130 5	39 41	.	.	.	.
30 M01*1019	72 42	23 16	17.2 27	27 24	42 26	11.1 30	21 16	133 33	34 6	.	.	.	.
31 MV-5-46	71 41	31 36	22.2 39	30 35	45 37	11.7 33	29 26	132 20	33 1	.	.	.	.
32 NC03-11457	67 34	29 28	21.7 38	19 7	42 26	5.0 7	15 11	132 20	34 6	X	X	X	X
33 NC03-11458	54 13	22 14	11.6 11	15 2	31 6	4.0 3	21 16	132 20	34 6	X	X	X	X
34 NC03-11465	37 1	15 3	7.3 4	17 4	25 2	3.1 2	25 23	136 47	36 21	X	X	.	.
35 NC03-11561	55 14	23 16	15.0 20	24 17	34 14	5.3 8	31 30	137 48	34 6	X	X	.	.
36 NC03-11588	77 45	36 42	29.6 44	29 33	51 44	11.3 32	29 26	134 41	35 11	.	.	.	.
37 PI564341	86 48	40 45	37.7 47	40 47	58 47	14.3 40	34 34	132 20	33 1	.	.	.	.
38 PI564385	64 28	26 24	18.7 30	26 21	42 26	12.4 35	24 21	133 33	38 36	.	.	.	.
39 TX96D1073	57 18	23 16	13.9 15	26 21	36 18	9.3 24	31 30	131 12	36 21	.	.	.	.
40 TX98D1170	60 23	22 14	21.1 33	36 43	46 38	10.9 27	10 5	132 20	37 27	.	.	.	.
41 TX98D2423	60 23	20 11	12.9 12	20 8	34 14	7.1 16	30 28	134 41	37 27	.	.	.	.
42 TX99D4478	58 19	24 21	15.1 21	32 40	43 31	9.7 25	20 15	131 12	37 27	.	.	.	.
43 VA01W-310	66 32	29 28	18.4 29	28 29	41 23	9.2 23	44 42	133 33	35 11	.	.	.	.
44 VA04W-433	41 2	10 1	4.1 1	18 6	25 2	4.3 5	10 5	129 2	35 11	X	X	.	.
45 VA04W-503	60 23	30 31	17.8 28	27 24	41 23	8.3 20	32 32	131 12	38 36	.	.	.	.
46 VA04W-547	64 28	23 16	15.3 24	34 41	44 33	10.9 27	23 19	131 12	35 11	.	.	.	.
47 VA04W-608	56 16	23 16	15.1 21	20 8	36 18	6.9 15	11 7	130 5	35 11	.	.	.	.
48 VA04W-628	48 6	21 12	13.9 15	22 14	35 16	4.4 6	6 1	131 12	33 1	.	X	.	.
	61	27	17.6	26.4	40	10.1	28	132	36				
	17	10	12.4	15.6	14	7.1	18	2	2				
	27	42	67.0	52.4	29.0	65.9	47.2	1.5	5.4				

Genotype-by-Trait Biplot

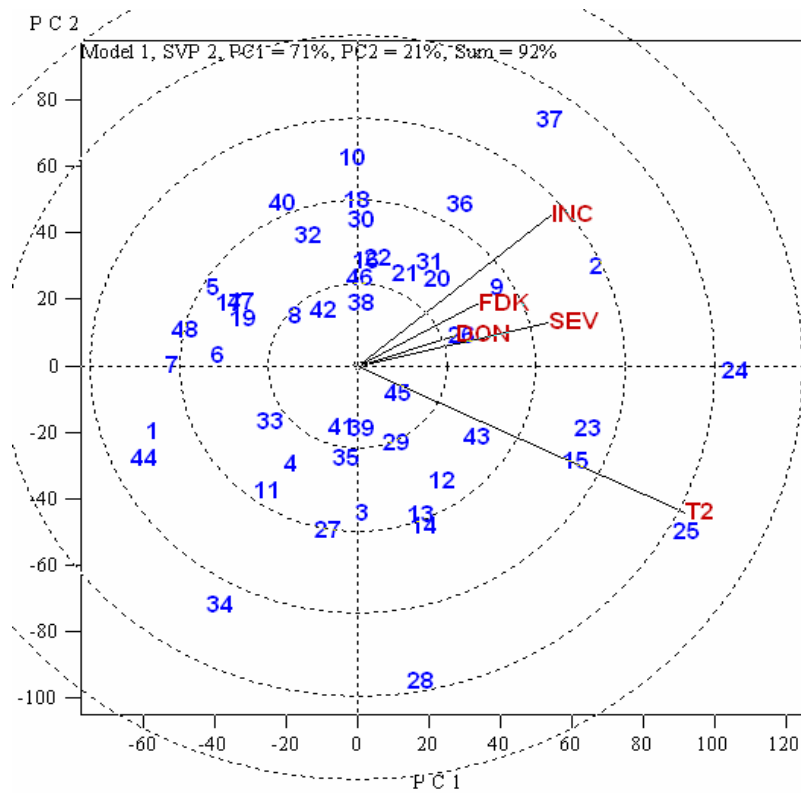


The FHB Index and ISK were omitted from this analysis.

The theoretical 'Ideal' entry, represented by the small circle with the arrow pointing to the center, had the best combined resistance when the variables Incidence, Severity, FDK, DON and Greenhouse Type II resistance were considered. Entries 44, 1, 7, 48 and 34 fell within, or on the circumference of the smallest circle, indicating they were closest to the "Ideal" entry. Entries 4, 11 and 33 also displayed relatively consistent rankings across the different resistance measurements.

Correlations Between Traits Over Locations

	SEVERITY	INDEX	FDK	ISK	DON	G'HOUSE TYPE 2	HEADING DATE	PLANT HEIGHT
INCIDENCE	0.77	0.88	0.64	0.87	0.67	0.41	0.32	ns
SEVERITY		0.94	0.69	0.89	0.80	0.70	ns	ns
INDEX			0.72	0.94	0.77	0.56	0.28	ns
FDK				0.86	0.77	0.44	ns	ns
ISK					0.82	0.51	ns	ns
VOMITOXIN (DON)						0.59	ns	ns
G'HOUSE TYPE 2							ns	ns
HEADING DATE								ns



Vector view of the entry-by-trait biplot showing the interrelationships among resistance traits. Field-based estimates of Incidence, Severity, FDK and DON had greater correlations with each other than they had with greenhouse-based Type II resistance. Greenhouse Type II was the most discriminating variable in that it displayed the largest standard deviation, followed by Incidence, Severity, FDK and DON.

Entry 25 was the most susceptible based on greenhouse Type II evaluation and Entry 2 (the susceptible check) displayed the greatest average susceptibility based on the combined estimates of Incidence, Severity, FDK and DON.