

**Northern Uniform Winter Wheat Scab Nursery
(NUWWSN)**

Report on 2003-2004 Nursery

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This report is a compilation and analysis of data from the cooperative assessment of resistance to Fusarium Head Blight (scab) (causal agent *Fusarium graminearum* (teleomorph: *Gibberella zeae* Schwabe.)) in winter wheat germplasm adapted to the northern regions of North America. Funding for the evaluation comes from the U.S. Wheat and Barely Scab Initiative, state and provincial agricultural experiment stations, USDA-ARS, and private companies.

This report contains preliminary data that has not been confirmed and thus is not suitable for general release to the public. Interpretation of the presented results may be modified with additional research. Confirmed results should be published through established channels. This report is to be used as a tool for the cooperators in the NUWWSN, their staff, and persons having direct interest in the development of wheat germplasm and agricultural research programs.

This report and data is not intended for unrestricted publication or distribution and should not be used in or referred to in publicity or advertising. Use of this data may be granted for certain purposes upon written request to the agency or agencies involved.

Horticulture and Crop Science Series 690

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MATERIALS AND METHODS

Entries:

There were 49 lines and 6 checks in the 2004 trial (Table 1). The lines were from 13 breeding programs. Ten entries and four checks were repeated from the 2003 NUWWSN (Table 1). There were 51 entries in the 2003 nursery, 46 in the 2002 nursery, 49 entries in the 2001 nursery, 29 entries in the 2000 nursery, and 28 in the 1999 nursery.

Tests:

The entries were successfully evaluated in 14 field tests (locations) and four greenhouse tests (Table 2). Data was also obtained from Cornell University but was not used in the analyses due to very low disease pressure. All cooperators who received seed provided data.

Traits:

Data was collected on heading date (HD), height (HGT), disease severity (SEV), disease incidence (INC), disease index (IND), kernel rating (KR), percent scabby seed (PSS), ISK, and DON (Table 3). Severity was also assessed in the greenhouse assays (GH). Data was not collected on all traits in all tests (Table 3). Some groups collected additional data that are summarized and described in Table 17.

Data Analyses:

Most cooperators sent entry means (not raw data) with some summary statistics from their trials. These means and statistics are presented in the appropriate tables and no additional within test analyses were performed. The entry means from individual tests were used to analyze results over tests. We used the LSMEANS option in PROC GLM to calculate the means over tests even though the data was quite balanced. ANOVAs (model: trait = genotype + environment) were conducted for each trait and the genotype x environment mean square (residual or error in this model) was used as the error term to calculate a LSD (0.05) for entry means over environment. There was no test for significance for the genotype x environment interaction (GEI) effect.

Based on $1-R^2$ (not shown), the GEI appeared quite large for disease index (IND), and severity from field and greenhouse (SEV, GH) trials so multivariate statistics (Yan et al., 2000 Crop Science 40:597-605) were used to analyze the GEI and group those environments that produced similar results for each trait. Genotype means were then calculated (LSMEANS again) over the environments that produced similar rankings. A group of environments that produced similar genotype rankings and results is called a megaenvironment. Among the environments within a megaenvironment there is generally little GEI, and the means from environments within a megaenvironment are generally correlated. This suggests that the environments within a megaenvironment form a set that provide similar information.

Correlations were calculated between all traits using entry means averaged over all appropriate environments.

RESULTS and DISCUSSION

All Traits

Genotype was a significant source of variance for all traits. There was considerable GEI for most traits except field severity ($1-R^2 = .21\%$), index ($1-R^2 = .17$), and greenhouse severity ($1-R^2 = .44$) but not other traits. Thus, genotype means over all environments are appropriate estimators of genetic value for all other traits.

GEI for Disease Index (IND):

As in 2001, 2002, and 2003, the GEI pattern for IND was complex, accounting for 19% of the treatment sum of squares. The locations were placed in three megaenvironments: AK+MD+MI+MO, IL_IN+KS+KY, and AF+NE+OR+OH. The VA and OO locations were outliers. The average correlation among locations within a megaenvironment was > 0.5 while the average correlation between locations in different megaenvironments was < 0.34 . The OO location (Ottawa Canada) was clearly different from all other locations and experience severe disease pressure. The VA location had the lightest disease pressure.

The GEI would affect selection. Only 1 of the best 6 lines would be selected simultaneously between any two megaenvironments. 14% of the best lines (top 10%) or worst lines (bottom 10%) from the megaenvironment would be similarly classified in the other environments. Truman is the only entry that would be selected in each of the three megaenvironments (though it would not be selected in the OO location)

GEI for Disease Severity in the Field (SEV):

The GEI for SEV accounted for 21% of the treatment sum of squares. The analysis revealed a complex GxE pattern for SEV that was related to the pattern found for IND. This result is quite similar to that found in 2001, 2002, and 2003. The multivariate analyses and inspection of correlations suggested three megaenvironments: MI+MD+MO, IN+IL+KY, and OR+OH. The OO, VA, and NE locations were outliers.

The GEI would affect selection. Only 1.7 of the best 6 lines would be selected simultaneously between any two megaenvironments.

GEI Disease Severity in the Greenhouse (GH):

The GEI accounted for 44% of the treatment sum of squares. This is nearly twice as much as in 2003 or 2002 while in 2001 the GEI did not appear important for GH. The analysis grouped AF+KY+MO while VA was an outlier. .

The GEI would affect selection. Three of the best 6 lines would be selected simultaneously between the megaenvironment and the VA test.

Correlation Among Traits:

There was a strong correlation among the head traits (SEV, INC, IND) and these were moderately correlated to GH severity (Table 16). The head traits were moderately correlated to the kernel traits KR and PSS and strongly correlated to ISK which is a function of head traits. The head traits were not correlated to DON. DON was strongly correlated to only PSS and to heading date.

Most Resistant and Most Susceptible Genotypes:

The most resistant and susceptible, based on analysis of all disease traits is shown in Table 5 along with the possible sources of resistance. Six of the 12 most resistant genotypes in Table 5 have exotic sources of resistance (Ning 7840, W14, 201R from Romania) while six do not appear to have exotic parentage.

Table1. 2004 NUWWSN Entries. "r" by the entry number indicates an entry repeated from the 2003 NUWWSN

| SOURCE | ENTRY | NAME | PEDIGREE |
|------------|-------|-------------------|---|
| Check | 1 r | PIONEER 2545 | |
| Check | 2 r | ERNIE | Pike/MO9965 |
| Check | 3 r | FREEDOM | GR876/OH217 |
| Check | 4 r | IL97-6755 | IL90-4813//IL85-3132-1/Ning 7840 |
| Check | 5 | PATTERSON | P.69184B8-21-1-1-2-4*2/CALDWELL |
| Check | 6 | TRUMAN | MO11769/MADISON |
| Ohm | 7 | 97397J1-4-1-4-7 | 96204-A1-12(Freedom//Clark*3/Ning7840)//GOLDFIELD/(Clark*3/Ning7840) |
| Ohm | 8 | 981238A1-1-44-1 | ERNIE//91193D1-10/X117 |
| Ohm | 9 | 981312A1-6-2-2 | GOLDFIELD/X117//ROANE/92145A2-4-6 |
| Ohm | 10 | 981517A1-1-5-2 | GOLDFIELD/201R |
| Ohm | 11 | 992128A2-4-1 | PATTERSON/201R//91202D1-1/3/INW9811/X117//PATTERSON |
| Griffey | 12 | VAN98W-342 | CK983//GA-ANDY/VA90-21-20 (79IWWRN67//CK65-20/ATR) ,F13 |
| Griffey | 13 | VA03W-630 | VR95B717/PION2684,F4:6 |
| Griffey | 14 | VA03W-633 | VA96W-234//VR95B717/VA96W-234,BC1F5 |
| Griffey | 15 | VA03W-644 | Roane/W14/Roane,BC1F5 |
| Griffey | 16 | VA03W-674 | PC-7(CHILL"S"/YM16:SCAB-RES)/3/92-51-39(IN71761A4-31-4-48// 71-54-147 /MCN1813)// CK9803/RCT/4/93-52-55 (MSY*3/ BALKAN//SAL),F9 |
| Kolb | 17 r | IL96-24851-1 | IL90-6364//IL90-9464/Ning 7840 |
| Kolb | 18 r | IL99-27048 | IL90-6364/Pioneer brand 2571 |
| Kolb | 19 | IL00-8061 | P81138I1-16-5-50/Foster//IL93-2485 |
| Kolb | 20 | IL00-1665 | IL91-13114/Y88-3a// Foster//Pontiac |
| Kolb | 21 | IL99-20756 | P81311-16-2-1-2-3-3/Foster//IL93-2489 |
| Vansanford | 22 | KY97C-0151-1 | ROANE/KY9787C-42-8-5 |
| Vansanford | 23 | KY96C-0895-1 | JACKSON/COKER 9803//2552 |
| Bockus | 24 | KS00HW175-4 | ARL/89H20 |
| Bockus | 25 | KS950409-P-4 | HBK0935W-24/JGR'S//HEYNE |
| Costa | 26 | MD27-37 | LOV29/TYLER//RCT*2/GAINES/CKR9835 |
| McKendry | 27 | MO010925 | MO 94-182/Ernie |
| McKendry | 28 | MO010789 | Coker 9474/Clemens |
| McKendry | 29 | MO010574 | MO 94-103/Pioneer 2552 |
| McKendry | 30 r | MO010719 | MO 12278/Pioneer 2552 |
| McKendry | 31 | MO011130 | MO 94-046/Pioneer XW535 |
| Sorrells | 32 r | NY88046-8138 | Susquehanna/Harus |
| Sorrells | 33 r | Caledonia Resel-T | Reselection from Caledonia |
| Sorrells | 34 | NY91028-9073 | Harus/4/CS/A.Curvif//Glenn/3/Ald/Pvn(M-30) |
| Sorrells | 35 | NY91028SP-9245W | NY91028SP-9245WHarus/4/CS/A.Curvif//Glenn/3/Ald/Pvn(M-30) |
| Sorrells | 36 | NY89025-9111W | 88076(PF84432/Augusta)/FL302 |
| Sneller | 37 r | OH743 | OH529/OH506 |
| Sneller | 38 r | OH751 | 10584-0801/COKER 9663 |
| Sneller | 39 | OH776 | OH513/OH515 |
| Sneller | 40 | OH788 | PIONEER2571/OH483 |
| Sneller | 41 | OH790 | PIONEER2571/OH483 |
| Moreno | 42 | X00-1051 | T814//MO11769/LX8728D |
| Moreno | 43 | X00-1058 | T814//MO11769/LX8728D |
| Moreno | 44 | Y00-3044 | XY90-1B//LB291/PS8424 |
| Ward | 45 | E2057 | D2295/GR942 |
| Ward | 46 | E2038 | PIONEER 2555/D1098 |
| Ward | 47 | E2048 | D3583/TAM 101 |
| Ward | 48 | E2037 | PIONEER 2737W/D1098 |
| Ward | 49 r | E0009 | NY82-105-2/CAYUGA |
| Schaasma | 50 r | RCATL33 | (Ruby/Frontana #1 x AC Ron//WEKO609H3 x AC Ron) |
| Schaasma | 51 r | RCATL10 | (AC Ron x SVP72017//Balkan) |
| Schaasma | 52 | RCATL24 | (Ena x AC Ron//Ruby/Frontana #1) |
| Schaasma | 53 | RCATL12 | (Fundulea x AC Morley) |
| Schaasma | 54 | RCAT L2 | (Ruby/Frontana #1 x 2737W//Balkan) |
| Baenziger | 55 | WESLEY | KS831036-3//COLT/CODY |
| Baenziger | 56 | NE98466 | KS89H50-4/NE90518(-BRL//SXL/BENN) |

Table 2. Description of tests and locations

| | | | |
|----------------|---|-------------------------------|--|
| INSTITUTE | University of Arkansas (AF, AK) | | |
| COOPERATOR(S) | Gene Milus | | |
| TEST LOCATION | Fayetteville (AF) and Kibler (AK) AR | | |
| INSTITUTE | University of Illinois (IL) | FERTILIZER | 40 lbs N/A preplant, P and K ok, no spring topdress |
| COOPERATOR(S) | Frederic L Kolb, Eric Brucker, Norman Smith | IRR./MISTING METHOD | Misted daily early morning and late evening. |
| TEST LOCATION | Urbana, Illinois | INOCULATION METHOD | Wheat grain spawn, + corn fodder scattered in the field (in the fall) and fodder was sprayed with inoculum one month before anthesis.. |
| PLOT SIZE | 1 row x 3 feet | PRECIP DURING GRAIN FILL | ? |
| REPS | 3 | AVG. TEMP. DURING GRAIN FILL | ? |
| SEEDING DATE | 10/1/03 | DATE/FEEKES WHEN RATED | Feekes 10.5 + approx. 26 days. |
| HARVEST DATE | 6/29/04 | COMMENTS | Heading date of late heading lines not obtained by mistake. |
| INSTITUTE: | Purdue University (IN) | | |
| COOPERATOR(S): | Herb Ohm | | |
| TEST LOCATION: | Lafayette, IN | | |
| PLOT SIZE: | 4' X 4' | | |
| REPS: | 2 | | |
| SEEDING DATE: | 9/30/2003 | | |
| HARVEST DATE: | | | |
| INSTITUTE: | Kansas State University (KS) | FERTILIZER | none |
| COOPERATOR(S): | Bill Bockus and Mark Davis | IRR./MISTING METHOD | impulse sprinklers 3 minutes per hour from 9:00 pm TO 6:00 am |
| TEST LOCATION: | Manhattan, KS | INOCULATION METHOD | colonized corn kernels (8.5 g per square foot) |
| PLOT SIZE: | single, 7.5 foot row | | |
| REPS: | 4 | | |
| SEEDING DATE: | Oct. 3, 2003 | | |
| HARVEST DATE: | June 29, 2004 (plot combine) | | |
| INSTITUTE: | University of Kentucky (KY) | FERTILIZER: | P, K acc. to soil tests; 110# N, split appl. |
| COOPERATOR(S): | A.J. Stewart and Dave VanSanford | IRR./MISTING METHOD: | Overhead- Evening/ Early Morning Mist |
| TEST LOCATION: | Lexington, KY | INOCULATION METHOD: | Scabby Corn |
| PLOT SIZE: | 2 rows, 4 ft long | PRECIP DURING GRAIN FILL: | 9.3 Inches |
| REPS: | 2 | AVG. TEMP. DURING GRAIN FILL: | 69.9° F |
| SEEDING DATE: | 10/23/2003 | DATE/FEEKES WHEN RATED: | |
| HARVEST DATE: | 6/28/2004 | COMMENTS: | Feekes 10.5 +21 days |
| INSTITUTE: | University of Maryland (MD) | FERTILIZER: | 40 lbs/A N preplant, P and K ok, 60 N spring topdress |
| COOPERATOR(S): | Costa, Cooper | IRR./MISTING METHOD: | Mist |
| TEST LOCATION: | Salisbury, MD | INOCULATION METHOD: | Corn grain infected with Fusarium~1 month before anthesis |
| PLOT SIZE: | 2-row, 1.2m | PRECIP DURING GRAIN FILL: | |
| REPS: | 3 | AVG. TEMP. DURING GRAIN FILL: | |
| SEEDING DATE: | 10/21/2003 | DATE/FEEKES WHEN RATED: | |
| HARVEST DATE: | 6/14/2004 | COMMENTS: | Good Fusarium spread |

Table 2 cont. Description of tests and locations.

| | | | |
|----------------|--|-------------------------------|---|
| INSTITUTE | Michigan State University (MI) | FERTILIZER | 250# 19-19-19 Pre-Plant + 196# 46-0-0 at Spring Green-up |
| COOPERATOR(S) | Rick Ward | IRR./MISTING METHOD | Hourly misting for 4 minutes from 7am-9pm and once at 10pm and once at 3 am for 10 minutes each |
| TEST LOCATION | Clarksville, Michigan | INOCULATION METHOD | Lab-infected wheat seed scattered 10 days prior to heading |
| PLOT SIZE | 1 Row X 5 Feet | PRECIP DURING GRAIN FILL | 2.78 Inches rainfall + misting |
| REPS | 4 | AVG. TEMP. DURING GRAIN FILL | 65.9 F |
| SEEDING DATE | October 14, 2003 | DATE/FEEKES WHEN RATED | 18-24 days post anthesis |
| HARVEST DATE | August 3, 2004 | | |
| INSTITUTE | University of Missouri (MO) | FERTILIZER | |
| COOPERATOR(S) | Anne McKendry | IRR./MISTING METHOD | persistent natural rainfall; overhead mist as well |
| TEST LOCATION | Columbia, MO | INOCULATION METHOD | Spray at 75% anthesis with macroconidia concentrated to 50,000 spores/mL. Point inoculation in GH with 10 uL of 50,000 spores/mL |
| PLOT SIZE | 30 in x 28 in | PRECIP DURING GRAIN FILL | |
| REPS | 4 | AVG. TEMP. DURING GRAIN FILL | |
| SEEDING DATE | | DATE/FEEKES WHEN RATED | |
| HARVEST DATE | | | |
| INSTITUTE: | University of Nebraska (NE) | FERTILIZER: | none |
| COOPERATOR(S): | Dr. S. Baenziger, Dr. J. Watkins, J. Schimelfenig | IRR./MISTING METHOD: | misting from overhead risers |
| TEST LOCATION: | Mead, NE. | INOCULATION METHOD: | spray 70 000 conidia/ml - 5/17, 19, 21, 24 and 26, in 2003 |
| PLOT SIZE: | Total of 10 ft ² (1 row, 10 foot long, 1 foot between rows) | PRECIP DURING GRAIN FILL: | (unusually frequent and high precip for NE) AVG PRECIP - 1.85 or Total 6" |
| REPS: | 1 | AVG. TEMP. DURING GRAIN FILL: | 85-90 (unusually cool, for NE) |
| SEEDING DATE: | 9/30/2003 | DATE/FEEKES WHEN RATED: | Feekes 11.2 : date - 6/10/04 |
| HARVEST DATE: | 7/14/2004 | COMMENTS: | Ideal conditions - excellent infection in 2004. |
| INSTITUTE | Ohio State University (OH) | INOCULATION METHOD | Infected corn kernels were spread prior to anthesis |
| COOPERATOR(S) | Clay Sneller, Pat Lipps, Larry Herald | IRR./MISTING METHOD | Misted daily early morning and late evening. |
| TEST LOCATION | Wooster, OH | DATE/FEEKES WHEN RATED | 18-24 days post anthesis |
| PLOT SIZE | single 1M row | | |
| REPS | 3 | | |
| INSTITUTE: | University of Guelph (OR) | FERTILIZER: | |
| COOPERATOR(S): | Lily Tamburic-Ilincic, Art Schaafsma, Arend Smid | IRR./MISTING METHOD: | mist system |
| TEST LOCATION: | Ridgetown, Ontario, Canada | INOCULATION METHOD: | sprayed with mixture of 4 F.graminearum isolates |
| PLOT SIZE: | 4.0 m long, single row | AVG. TEMP. DURING GRAIN FILL: | |
| REPS: | 4 | DATE/FEEKES WHEN RATED: | May25-June17, 2004 |
| SEEDING DATE: | 20-Oct-03 | | |
| INSTITUTE: | ECORC-Ottawa (OO) | | |
| COOPERATOR(S): | Radhey Pandeya | | |
| TEST LOCATION: | Ottawa Ontario | | |
| INSTITUTE | Virginia Tech (VA) | INOCULATION METHOD | Conidial suspension was applied to field and floret inoculation was applied in greenhouse. The concentration of conidial was 5 x 10 ⁴ spores/ml. |
| COOPERATOR(S) | Carl A. Griffey and Jianli Chen, Virginia Tech | | |
| TEST LOCATION | Blacksburg, VA | | |

Table 3. Description of traits

| Code | Trait | Description | Tests where data was collected |
|------|--|--|---|
| HD | Heading date | Days from Jan 1 st when 50% of heads have emerged | KY,MD,MI,MO,OO,OR,IL,VA,OH |
| HGT | Plant height | Height in inches from ground to top of spike at maturity | KY,MO,OR,VA |
| SEV | Disease severity from field tests | % of infected spikelets in an infected head. Generally visually rated according to Stack & McMullen, 'A Visual scale to estimate severity of Fusarium Head Blight in Wheat', NDES. PP-1095 | IN,KY,MD,MI,MO,NE,OO,OR,IL,VA,OH |
| INC | Disease incidence | % of heads with at least one infected spikelets | IN,KY,MD,MI,MO,NE,OO,OR,IL,VA,OH |
| IND | Disease index | $IND = (SEV \times INC) / 100$ | AF,AK,IN,KY,KS,MD,MI,MO,NE,OO,OR,IL,VA,OH |
| GH | Disease severity from greenhouse tests | Same as SEV except using greenhouse data | AF,KY,MO,VA |
| KR | Kernel rating | A visual assessment of the percent infected kernels | KY,NE,IL |
| PSS | Percent scabby seed | Percent of scabby seed by weight | AF,KY,MD,KS,MO |
| ISK | Composite of head and kernel traits | ISK Index = .3 (Severity) + .3 (Incidence) + .4 (% FDK or PSS) | KY,MD,MO,NE,IL |
| DON | DON (vomitoxin) | PPM of vomitoxin in grain sample as assayed by Pat Hart, Michigan State University | AF,KY,MI,NE,IL,VA |

Table 4. Entry means for all traits. #l and #h are number of times an entry was not significantly different from the lowest (#l) or highest (#h) mean for the 8 FHB traits

| # | NAME | INC | SEV | IND | GH | KR | PSS | ISK | DON | #l | #h | HD | HGT |
|----|-------------------|---------------------|--------|--------|--------|--------|--------|--------|--------|----|----|-------|------|
| 1 | PIONEER 2545 | 80.7 h | 53.9 h | 43.5 h | 32.7 | 50.9 h | 48.2 h | 42.0 h | 11.1 | 0 | 6 | 141 | 33 |
| 2 | ERNIE | 60.2 | 33.0 | 24.4 | 13.9 l | 29.4 l | 18.6 l | 18.6 l | 4.4 l | 5 | 0 | 139 l | 30 l |
| 3 | FREEDOM | 62.9 | 39.4 | 26.3 | 12.2 l | 41.9 | 35.9 | 32.2 | 4.6 l | 2 | 0 | 142 | 35 |
| 4 | IL97-6755 | 47.0 l [†] | 21.1 l | 18.2 l | 9.8 l | 24.4 l | 17.9 l | 12.0 l | 2.6 l | 8 | 0 | 140 | 38 |
| 5 | PATTERSON | 69.7 | 44.4 h | 37.3 h | 44.7 h | 38.1 l | 22.9 l | 26.6 | 4.4 l | 3 | 3 | 140 | 35 |
| 6 | TRUMAN | 48.3 l | 20.4 l | 13.0 l | 8.2 l | 28.6 l | 22.6 l | 14.0 l | 3.9 l | 8 | 0 | 145 | 35 |
| 7 | 97397J1-4-1-4-7 | 59.1 | 28.6 l | 21.5 | 10.3 l | 33.1 l | 24.6 l | 18.8 l | 3.7 l | 6 | 0 | 139 l | 32 |
| 8 | 981238A1-1-44-1 | 63.4 | 36.6 | 27.3 | 22.6 l | 45.6 | 25.0 l | 24.5 | 3.4 l | 3 | 0 | 139 l | 32 |
| 9 | 981312A1-6-2-2 | 62.3 | 32.8 | 24.1 | 17.6 l | 37.5 l | 27.8 | 21.3 l | 3.7 l | 4 | 0 | 142 | 31 l |
| 10 | 981517A1-1-5-2 | 56.5 l | 29.0 l | 20.6 l | 10.8 l | 38.2 l | 21.9 l | 18.5 l | 4.3 l | 8 | 0 | 142 | 32 |
| 11 | 992128A2-4-1 | 79.0 h | 46.9 h | 38.9 h | 24.9 | 52.3 h | 30.9 | 35.2 h | 4.5 l | 1 | 5 | 139 l | 32 |
| 12 | VAN98W-342 | 76.6 h | 47.5 h | 35.4 | 25.1 | 48.9 h | 40.4 h | 41.6 h | 5.4 l | 1 | 5 | 141 | 29 l |
| 13 | VA03W-630 | 74.0 h | 51.0 h | 40.2 h | 49.2 h | 47.2 h | 36.1 | 35.9 h | 8.7 | 0 | 6 | 143 | 32 |
| 14 | VA03W-633 | 71.7 h | 43.2 h | 32.0 | 26.8 | 40.3 l | 34.6 | 33.7 | 7.3 | 1 | 2 | 141 | 30 l |
| 15 | VA03W-644 | 66.5 | 35.6 | 25.3 | 15.2 l | 39.7 l | 22.9 l | 22.7 l | 4.1 l | 5 | 0 | 140 | 30 l |
| 16 | VA03W-674 | 67.7 | 45.7 h | 33.7 | 34.2 | 43.6 | 30.4 | 29.6 | 8.6 | 0 | 1 | 139 l | 30 l |
| 17 | IL96-24851-1 | 60.8 | 28.9 l | 21.2 | 9.9 l | 40.8 l | 25.8 l | 19.9 l | 2.8 l | 6 | 0 | 142 | 32 |
| 18 | IL99-27048 | 60.0 | 32.7 | 26.7 | 19.1 l | 31.9 l | 19.3 l | 22.8 l | 3.5 l | 5 | 0 | 138 l | 34 |
| 19 | IL00-8061 | 54.5 l | 25.5 l | 18.3 l | 18.1 l | 33.3 l | 17.0 l | 15.2 l | 4.1 l | 8 | 0 | 141 | 36 |
| 20 | IL00-1665 | 61.2 | 34.7 | 24.0 | 23.3 l | 42.7 | 27.1 l | 24.9 | 4.4 l | 3 | 0 | 141 | 33 |
| 21 | IL99-20756 | 59.2 | 31.4 l | 25.0 | 11.9 l | 26.4 l | 13.8 l | 17.2 l | 4.7 l | 6 | 0 | 138 l | 34 |
| 22 | KY97C-0151-1 | 72.1 h | 46.4 h | 36.7 h | 32.3 | 46.7 h | 32.7 | 32.4 | 5.4 l | 1 | 4 | 141 | 35 |
| 23 | KY96C-0895-1 | 58.5 | 34.7 | 24.2 | 27.9 | 36.5 l | 27.1 l | 23.8 l | 6.1 l | 4 | 0 | 144 | 37 |
| 24 | KS00HW175-4 | 63.7 | 39.9 | 28.1 | 22.6 l | 42.9 | 37.1 | 30.5 | 9.1 | 1 | 0 | 143 | 35 |
| 25 | KS950409-P-4 | 70.2 | 42.8 | 32.5 | 18.8 l | 49.3 h | 43.5 h | 34.2 | 9.1 | 1 | 2 | 142 | 34 |
| 26 | MD27-37 | 66.3 | 41.4 | 34.0 | 25.0 | 37.9 l | 25.3 l | 28.5 | 4.0 l | 3 | 0 | 139 l | 32 |
| 27 | MO010925 | 61.3 | 37.7 | 27.6 | 29.5 | 40.9 l | 30.7 | 26.1 | 3.6 l | 2 | 0 | 142 | 35 |
| 28 | MO010789 | 58.1 | 38.1 | 26.0 | 37.5 h | 34.9 l | 28.2 | 29.2 | 6.6 | 1 | 1 | 143 | 37 |
| 29 | MO010574 | 67.1 | 37.2 | 27.8 | 19.4 l | 38.9 l | 28.8 | 25.5 | 6.2 l | 3 | 0 | 142 | 37 |
| 30 | MO010719 | 58.4 | 31.0 l | 23.2 | 14.5 l | 40.6 l | 29.0 | 21.8 l | 6.8 | 4 | 0 | 141 | 40 |
| 31 | MO011130 | 73.4 h | 45.4 h | 37.6 h | 32.6 | 49.3 h | 38.7 | 37.8 h | 9.2 | 0 | 5 | 142 | 38 |
| 32 | NY88046-8138 | 67.2 | 36.3 | 26.6 | 31.9 | 53.9 h | 51.5 h | 30.7 | 11.7 | 0 | 2 | 147 h | 36 |
| 33 | Caledonia Resel-T | 72.1 h | 37.2 | 25.8 | 32.6 | 49.5 h | 46.3 h | 34.0 | 14.8 h | 0 | 4 | 147 h | 36 |
| 34 | NY91028-9073 | 60.1 | 28.6 l | 20.1 l | 23.7 l | 54.4 h | 50.6 h | 28.4 | 15.5 h | 3 | 3 | 148 h | 35 |
| 35 | NY91028SP-9245W | 59.4 | 27.8 l | 19.4 l | 35.6 h | 47.6 h | 41.0 h | 22.0 l | 17.5 h | 3 | 4 | 148 h | 35 |
| 36 | NY89025-9111W | 62.2 | 32.6 | 23.2 | 35.4 h | 51.3 h | 43.6 h | 27.7 | 13.7 h | 0 | 4 | 148 h | 37 |
| 37 | OH743 | 64.5 | 40.1 | 30.6 | 24.1 l | 44.3 | 34.8 | 29.1 | 5.3 l | 2 | 0 | 143 | 36 |
| 38 | OH751 | 70.5 | 39.9 | 29.8 | 25.1 | 41.6 | 28.5 | 29.6 | 5.9 l | 1 | 0 | 142 | 35 |
| 39 | OH776 | 68.6 | 43.4 h | 34.0 | 35.1 h | 44.8 | 31.9 | 26.0 | 6.7 | 0 | 2 | 141 | 34 |
| 40 | OH788 | 64.9 | 45.6 h | 35.7 | 50.1 h | 52.6 h | 38.8 | 33.9 | 6.6 | 0 | 3 | 140 | 34 |
| 41 | OH790 | 71.5 h | 43.2 h | 35.4 | 43.7 h | 50.1 h | 38.1 | 35.9 h | 6.0 l | 1 | 5 | 141 | 34 |
| 42 | X00-1051 | 57.7 | 34.1 | 22.0 | 18.0 l | 36.2 l | 23.1 l | 23.0 l | 3.6 l | 5 | 0 | 142 | 33 |
| 43 | X00-1058 | 65.7 | 42.5 | 27.8 | 12.0 l | 44.8 | 34.0 | 30.8 | 7.5 | 1 | 0 | 144 | 33 |
| 44 | Y00-3044 | 65.9 | 49.1 h | 29.2 | 30.0 | 56.7 h | 45.8 h | 38.7 h | 8.8 | 0 | 4 | 145 | 33 |
| 45 | E2057 | 56.4 l | 29.0 l | 19.7 l | 22.4 l | 39.1 l | 40.5 h | 22.5 l | 12.5 | 6 | 1 | 146 h | 32 |
| 46 | E2038 | 58.3 | 29.2 l | 18.8 l | 13.4 l | 42.1 | 27.4 | 20.8 l | 11.3 | 4 | 0 | 147 h | 34 |
| 47 | E2048 | 57.4 | 29.0 l | 19.7 l | 26.7 | 47.6 h | 39.7 | 23.8 l | 8.9 | 3 | 1 | 146 h | 38 |
| 48 | E2037 | 59.4 | 34.2 | 21.6 | 23.0 l | 53.8 h | 38.4 | 29.6 | 12.3 | 1 | 1 | 147 h | 35 |
| 49 | E0009 | 55.0 l | 26.4 l | 18.9 l | 27.8 | 45.8 | 30.4 | 20.3 l | 8.2 | 4 | 0 | 148 h | 38 |
| 50 | RCATL33 | 57.0 l | 30.7 l | 23.0 | 51.0 h | 53.1 h | 28.5 | 25.0 | 4.4 l | 3 | 2 | 140 | 41 h |
| 51 | RCATL10 | 67.5 | 36.5 | 26.5 | 31.2 | 52.7 h | 43.0 h | 32.7 | 11.5 | 0 | 2 | 145 | 39 |
| 52 | RCATL24 | 49.7 l | 22.8 l | 16.2 l | 33.9 | 41.6 | 30.5 | 16.4 l | 10.6 | 4 | 0 | 147 h | 42 h |
| 53 | RCATL12 | 58.3 | 35.2 | 24.5 | 26.1 | 48.2 h | 44.5 h | 27.5 | 6.7 | 0 | 2 | 144 | 40 |
| 54 | RCAT L2 | 62.7 | 39.0 | 28.5 | 23.6 l | 39.3 l | 25.1 l | 24.0 | 5.4 l | 4 | 0 | 140 | 40 |
| 55 | WESLEY | 77.2 h | 54.1 h | 41.7 h | 34.2 | 63.1 h | 53.2 h | 46.6 h | 7.5 | 0 | 6 | 143 | 33 |
| 56 | NE98466 | 69.4 | 44.3 h | 33.4 | 31.0 | 47.8 h | 36.5 | 35.6 h | 5.0 l | 1 | 3 | 142 | 37 |
| | AVERAGE | 63.7 | 36.7 | 27.1 | 25.2 | 42.8 | 32.0 | 27.0 | 7.0 | | | 142 | 34 |
| | MINIMUM | 47.0 | 20.4 | 13.0 | 8.2 | 24.4 | 13.8 | 12.0 | 2.6 | | | 138 | 29 |
| | MAXIMUM | 80.7 | 53.9 | 43.5 | 51.0 | 56.7 | 51.5 | 42.0 | 17.5 | | | 148 | 41 |
| | LSD (0.05) | 10.1 | 11.2 | 7.6 | 16.6 | 16.6 | 13.4 | 11.8 | 4.3 | | | 2 | 2 |
| | # LOCATIONS | 11 | 11 | 14 | 4 | 3 | 5 | 5 | 6 | | | 9 | 4 |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 5. Most resistant (top) and most susceptible (bottom) entries. #l and #h are number of times an entry was not significantly different from the lowest (#l) or highest (#h) mean for the 8 FHB traits

| # | NAME | INC | SEV | IND | GH | KR | PSS | ISK | DON | #l | #h | HD | HGT |
|----|-----------------|---------------------|--------|--------|--------|--------|--------|--------|------|----|----|-------|-----|
| 6 | TRUMAN | 48.3 | 20.4 | 13.0 | 8.2 | 28.6 | 22.6 | 14.0 | 3.9 | 8 | 0 | 145 | 35 |
| 4 | IL97-6755 | 47.0 [†] | 21.1 | 18.2 | 9.8 | 24.4 | 17.9 | 12.0 | 2.6 | 8 | 0 | 140 | 38 |
| 19 | IL00-8061 | 54.5 | 25.5 | 18.3 | 18.1 | 33.3 | 17.0 | 15.2 | 4.1 | 8 | 0 | 141 | 36 |
| 10 | 981517A1-1-5-2 | 56.5 | 29.0 | 20.6 | 10.8 | 38.2 | 21.9 | 18.5 | 4.3 | 8 | 0 | 142 | 32 |
| 45 | E2057 | 56.4 | 29.0 | 19.7 | 22.4 | 39.1 | 40.5 h | 22.5 | 12.5 | 6 | 1 | 146 h | 32 |
| 17 | IL96-24851-1 | 60.8 | 28.9 | 21.2 | 9.9 | 40.8 | 25.8 | 19.9 | 2.8 | 6 | 0 | 142 | 32 |
| 7 | 97397J1-4-1-4-7 | 59.1 | 28.6 | 21.5 | 10.3 | 33.1 | 24.6 | 18.8 | 3.7 | 6 | 0 | 139 | 32 |
| 21 | IL99-20756 | 59.2 | 31.4 | 25.0 | 11.9 | 26.4 | 13.8 | 17.2 | 4.7 | 6 | 0 | 138 | 34 |
| 42 | X00-1051 | 57.7 | 34.1 | 22.0 | 18.0 | 36.2 | 23.1 | 23.0 | 3.6 | 5 | 0 | 142 | 33 |
| 2 | ERNIE | 60.2 | 33.0 | 24.4 | 13.9 | 29.4 | 18.6 | 18.6 | 4.4 | 5 | 0 | 139 | 30 |
| 15 | VA03W-644 | 66.5 | 35.6 | 25.3 | 15.2 | 39.7 | 22.9 | 22.7 | 4.1 | 5 | 0 | 140 | 30 |
| 18 | IL99-27048 | 60.0 | 32.7 | 26.7 | 19.1 | 31.9 | 19.3 | 22.8 | 3.5 | 5 | 0 | 138 | 34 |
| 12 | VAN98W-342 | 76.6 h | 47.5 h | 35.4 | 25.1 | 48.9 h | 40.4 h | 41.6 h | 5.4 | 1 | 5 | 141 | 29 |
| 41 | OH790 | 71.5 h | 43.2 h | 35.4 | 43.7 h | 50.1 h | 38.1 | 35.9 h | 6.0 | 1 | 5 | 141 | 34 |
| 11 | 992128A2-4-1 | 79.0 h | 46.9 h | 38.9 h | 24.9 | 52.3 h | 30.9 | 35.2 h | 4.5 | 1 | 5 | 139 | 32 |
| 31 | MO011130 | 73.4 h | 45.4 h | 37.6 h | 32.6 | 49.3 h | 38.7 | 37.8 h | 9.2 | 0 | 5 | 142 | 38 |
| 13 | VA03W-630 | 74.0 h | 51.0 h | 40.2 h | 49.2 h | 47.2 h | 36.1 | 35.9 h | 8.7 | 0 | 6 | 143 | 32 |
| 55 | WESLEY | 77.2 h | 54.1 h | 41.7 h | 34.2 | 63.1 h | 53.2 h | 46.6 h | 7.5 | 0 | 6 | 143 | 33 |
| 1 | PIONEER 2545 | 80.7 h | 53.9 h | 43.5 h | 32.7 | 50.9 h | 48.2 h | 42.0 h | 11.1 | 0 | 6 | 141 | 33 |
| | AVERAGE | 58.7 | 30.5 | 22.4 | 14.8 | 34.6 | 23.7 | 20.5 | 4.6 | | | 141 | 33 |
| | MINIMUM | 47.0 | 20.4 | 13.0 | 8.2 | 24.4 | 13.8 | 12.0 | 2.6 | | | 138 | 29 |
| | MAXIMUM | 76.6 | 47.5 | 35.4 | 25.1 | 48.9 | 40.5 | 41.6 | 12.5 | | | 146 | 38 |
| | LSD (0.05) | 10.1 | 11.2 | 7.6 | 16.6 | 16.6 | 13.4 | 11.8 | 4.3 | | | 2 | 2 |
| | # LOCATIONS | 11 | 11 | 14 | 4 | 3 | 5 | 5 | 6 | | | 9 | 4 |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

| Name | Possible source of resistance (SW = native Soft Winter) |
|-----------------|---|
| TRUMAN | SW |
| IL97-6755 | SW + Ning7840 |
| IL00-8061 | SW |
| 981517A1-1-5-2 | SW (Goldfield) plus F201R from Romania |
| E2057 | SW |
| IL96-24851-1 | SW + Ning 7840 |
| 97397J1-4-1-4-7 | SW (Freedom, Goldfield) plus Ning7840 |
| IL99-20756 | SW |
| X00-1051 | SW (perhaps MO11769 that is a parent of Truman) |
| ERNIE | SW |
| VA03W-644 | SW (Roane) plus Chinese line W14 |
| IL99-27048 | SW |

Table 6. Disease incidence (INC, %) from field trials.

| # | NAME | MEAN | IL | IN | KY | MD | MI | MO | NE | OH | OO | OR | VA |
|----|-------------------|--------|----|----|-----|----|----|-----|----|-----|----|----|----|
| 1 | PIONEER 2545 | 80.7 h | 52 | 83 | 91 | 53 | 98 | 100 | 80 | 97 | 80 | 90 | 63 |
| 2 | ERNIE | 60.2 | 36 | 37 | 87 | 27 | 98 | 100 | 0 | 98 | 90 | 83 | 7 |
| 3 | FREEDOM | 62.9 | 39 | 59 | 75 | 23 | 98 | 98 | 10 | 90 | 80 | 90 | 30 |
| 4 | IL97-6755 | 47.0 l | 34 | 29 | 83 | 13 | 96 | 89 | 0 | 40 | 85 | 43 | 7 |
| 5 | PATTERSON | 69.7 | 75 | 69 | 94 | 43 | 98 | 98 | 0 | 90 | 85 | 93 | 22 |
| 6 | TRUMAN | 48.3 l | 20 | 30 | 72 | 12 | 94 | 81 | 0 | 68 | 85 | 50 | 20 |
| 7 | 97397J1-4-1-4-7 | 59.1 | 24 | 21 | 100 | 23 | 98 | 100 | 0 | 85 | 85 | 88 | 27 |
| 8 | 981238A1-1-44-1 | 63.4 | 65 | 61 | 93 | 20 | 98 | 99 | 5 | 83 | 80 | 70 | 23 |
| 9 | 981312A1-6-2-2 | 62.3 | 39 | 77 | 84 | 25 | 98 | 100 | 0 | 98 | 80 | 78 | 8 |
| 10 | 981517A1-1-5-2 | 56.5 l | 24 | 56 | 89 | 13 | 98 | 100 | 0 | 100 | 80 | 40 | 22 |
| 11 | 992128A2-4-1 | 79.0 h | 62 | 78 | 97 | 78 | 98 | 100 | 0 | 100 | 85 | 90 | 80 |
| 12 | VAN98W-342 | 76.6 h | 62 | 61 | 97 | 58 | 98 | 100 | 65 | 100 | 85 | 78 | 38 |
| 13 | VA03W-630 | 74.0 h | 77 | 78 | 89 | 63 | 98 | 100 | 25 | 100 | 80 | 68 | 37 |
| 14 | VA03W-633 | 71.7 h | 50 | 72 | 85 | 40 | 98 | 99 | 30 | 100 | 80 | 95 | 40 |
| 15 | VA03W-644 | 66.5 | 23 | 53 | 97 | 43 | 98 | 100 | 20 | 100 | 80 | 90 | 27 |
| 16 | VA03W-674 | 67.7 | 57 | 63 | 93 | 47 | 98 | 99 | 10 | 92 | 85 | 85 | 17 |
| 17 | IL96-24851-1 | 60.8 | 12 | 28 | 91 | 35 | 98 | 100 | 25 | 97 | 85 | 88 | 10 |
| 18 | IL99-27048 | 60.0 | 37 | 37 | 91 | 67 | 98 | 99 | 0 | 88 | 85 | 43 | 17 |
| 19 | IL00-8061 | 54.5 l | 45 | 22 | 87 | 15 | 98 | 90 | 0 | 75 | 80 | 68 | 20 |
| 20 | IL00-1665 | 61.2 | 45 | 40 | 91 | 38 | 96 | 100 | 15 | 75 | 85 | 70 | 18 |
| 21 | IL99-20756 | 59.2 | 17 | 32 | 94 | 25 | 98 | 100 | 0 | 75 | 80 | 60 | 70 |
| 22 | KY97C-0151-1 | 72.1 h | 60 | 57 | 93 | 42 | 98 | 100 | 40 | 100 | 85 | 95 | 23 |
| 23 | KY96C-0895-1 | 58.5 | 56 | 46 | 86 | 22 | 98 | 100 | 0 | 82 | 80 | 60 | 13 |
| 24 | KS00HW175-4 | 63.7 | 43 | 49 | 93 | 38 | 98 | 100 | 25 | 82 | 80 | 73 | 20 |
| 25 | KS950409-P-4 | 70.2 | 50 | 77 | 88 | 37 | 98 | 100 | 30 | 95 | 85 | 98 | 15 |
| 26 | MD27-37 | 66.3 | 40 | 34 | 100 | 52 | 98 | 100 | 5 | 90 | 90 | 88 | 33 |
| 27 | MO010925 | 61.3 | 55 | 38 | 91 | 23 | 94 | 100 | 30 | 83 | 85 | 63 | 13 |
| 28 | MO010789 | 58.1 | 57 | 50 | 85 | 13 | 98 | 100 | 15 | 70 | 85 | 55 | 10 |
| 29 | MO010574 | 67.1 | 38 | 70 | 96 | 32 | 98 | 99 | 40 | 92 | 80 | 80 | 13 |
| 30 | MO010719 | 58.4 | 34 | 63 | 91 | 22 | 96 | 99 | 10 | 75 | 80 | 60 | 13 |
| 31 | MO011130 | 73.4 h | 84 | 71 | 87 | 45 | 98 | 100 | 50 | 90 | 80 | 83 | 20 |
| 32 | NY88046-8138 | 67.2 | 47 | 63 | 96 | 20 | 98 | 98 | 25 | 78 | 80 | 78 | 57 |
| 33 | Caledonia Resel-T | 72.1 h | 52 | 49 | 92 | 22 | 98 | 100 | 90 | 82 | 80 | 85 | 43 |
| 34 | NY91028-9073 | 60.1 | 25 | 63 | 91 | 8 | 98 | 96 | 30 | 60 | 80 | 73 | 37 |
| 35 | NY91028SP-9245W | 59.4 | 25 | 68 | 89 | 8 | 98 | 93 | 10 | 88 | 80 | 55 | 40 |
| 36 | NY89025-9111W | 62.2 | 46 | 47 | 95 | 12 | 98 | 90 | 35 | 82 | 75 | 68 | 37 |
| 37 | OH743 | 64.5 | 39 | 65 | 91 | 37 | 98 | 100 | 0 | 90 | 85 | 88 | 17 |
| 38 | OH751 | 70.5 | 47 | 80 | 93 | 42 | 98 | 100 | 35 | 100 | 80 | 88 | 13 |
| 39 | OH776 | 68.6 | 58 | 65 | 96 | 47 | 98 | 100 | 0 | 87 | 90 | 95 | 20 |
| 40 | OH788 | 64.9 | 72 | 51 | 90 | 47 | 98 | 100 | 10 | 83 | 85 | 65 | 13 |
| 41 | OH790 | 71.5 h | 73 | 75 | 91 | 60 | 96 | 100 | 15 | 83 | 80 | 90 | 23 |
| 42 | X00-1051 | 57.7 | 23 | 42 | 90 | 13 | 98 | 100 | 25 | 90 | 65 | 78 | 12 |
| 43 | X00-1058 | 65.7 | 42 | 56 | 86 | 23 | 98 | 100 | 20 | 87 | 80 | 80 | 50 |
| 44 | Y00-3044 | 65.9 | 55 | 66 | 85 | 25 | 98 | 99 | 10 | 85 | 80 | 88 | 35 |
| 45 | E2057 | 56.4 l | 42 | 29 | 72 | 10 | 98 | 98 | 0 | 85 | 85 | 65 | 37 |
| 46 | E2038 | 58.3 | 23 | 51 | 84 | 10 | 98 | 99 | 15 | 95 | 80 | 65 | 22 |
| 47 | E2048 | 57.4 | 41 | 46 | 75 | 22 | 98 | 99 | 0 | 72 | 75 | 70 | 33 |
| 48 | E2037 | 59.4 | 31 | 49 | 88 | 17 | 98 | 99 | 15 | 82 | 80 | 63 | 33 |
| 49 | E0009 | 55.0 l | 32 | 33 | 85 | 17 | 98 | 96 | 5 | 75 | 80 | 60 | 25 |
| 50 | RCATL33 | 57.0 l | 46 | 44 | 87 | 25 | 98 | 94 | 15 | 80 | 80 | 48 | 12 |
| 51 | RCATL10 | 67.5 | 55 | 62 | 87 | 14 | 98 | 99 | 35 | 87 | 80 | 93 | 33 |
| 52 | RCATL24 | 49.7 l | 15 | 31 | 91 | 7 | 98 | 95 | 5 | 58 | 80 | 48 | 20 |
| 53 | RCATL12 | 58.3 | 60 | 43 | 75 | 13 | 98 | 98 | 10 | 83 | 80 | 58 | 23 |
| 54 | RCAT L2 | 62.7 | 33 | 59 | 97 | 37 | 98 | 100 | 0 | 75 | 80 | 95 | 17 |
| 55 | WESLEY | 77.2 h | 82 | 73 | 91 | 63 | 98 | 100 | 50 | 90 | 80 | 93 | 30 |
| 56 | NE98466 | 69.4 | 70 | 62 | 85 | 43 | 98 | 99 | 40 | 90 | 85 | 70 | 20 |
| | AVERAGE | 63.7 | 45 | 54 | 89 | 31 | 98 | 98 | 18 | 85 | 82 | 74 | 26 |
| | MINIMUM | 47.0 | 12 | 21 | 72 | 7 | 94 | 81 | 0 | 40 | 65 | 40 | 7 |
| | MAXIMUM | 80.7 | 84 | 83 | 100 | 78 | 98 | 100 | 90 | 100 | 90 | 98 | 80 |
| | CV% | 18.7 | 24 | 26 | 8 | 54 | 2 | 3 | | 15 | 4 | 17 | 46 |
| | LSD (0.05) | 10.1 | 18 | 28 | 15 | 27 | 2 | 5 | | 3 | 5 | 18 | 16 |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 7. Field disease severity (SEV, %). Mean is mean over all trials. "Avg" is mean for a set of locations that were grouped based on GxE analysis: sets are boxed together in the table. NE, VA, and OO were outliers.

| # | NAME | MEAN | Avg IL IN KY | Avg OH OR | Avg MD MI MO | NE VA OO |
|----|-------------------|--------|--------------|-----------|--------------|----------|
| 1 | PIONEER 2545 | 53.9 h | 47 60 50 30 | 54 73 36 | 70 87 87 38 | 40 14 80 |
| 2 | ERNIE | 33.0 | 15 1 13 31 | 15 21 10 | 63 57 94 39 | 0 9 90 |
| 3 | FREEDOM | 39.4 | 49 87 25 36 | 24 27 21 | 46 53 56 28 | 14 7 80 |
| 4 | IL97-6755 | 21.1 l | 16 1 20 26 | 6 9 3 | 28 13 58 11 | 0 6 85 |
| 5 | PATTERSON | 44.4 h | 44 35 61 35 | 36 34 38 | 65 77 96 23 | 0 6 85 |
| 6 | TRUMAN | 20.4 l | 15 10 20 17 | 8 11 5 | 23 27 33 10 | 0 7 85 |
| 7 | 97397J1-4-1-4-7 | 28.6 l | 15 4 7 34 | 15 11 18 | 50 60 67 23 | 0 6 85 |
| 8 | 981238A1-1-44-1 | 36.6 | 39 52 30 36 | 15 24 7 | 54 50 89 21 | 7 7 80 |
| 9 | 981312A1-6-2-2 | 32.8 | 22 16 7 44 | 26 37 14 | 52 60 74 22 | 0 7 80 |
| 10 | 981517A1-1-5-2 | 29.0 l | 14 12 9 22 | 11 19 2 | 56 63 81 24 | 0 7 80 |
| 11 | 992128A2-4-1 | 46.9 h | 44 70 21 40 | 30 33 28 | 73 93 89 37 | 0 19 85 |
| 12 | VAN98W-342 | 47.5 h | 40 53 42 25 | 30 42 17 | 70 83 87 40 | 35 12 85 |
| 13 | VA03W-630 | 51.0 h | 68 65 74 64 | 32 51 13 | 66 80 81 38 | 7 13 75 |
| 14 | VA03W-633 | 43.2 h | 39 58 22 36 | 35 41 29 | 59 78 69 29 | 18 14 80 |
| 15 | VA03W-644 | 35.6 | 16 13 10 27 | 27 36 19 | 65 83 85 27 | 7 6 80 |
| 16 | VA03W-674 | 45.7 h | 47 42 46 52 | 25 32 18 | 70 83 91 35 | 11 8 85 |
| 17 | IL96-24851-1 | 28.9 l | 12 1 8 27 | 20 23 17 | 47 45 76 19 | 12 5 85 |
| 18 | IL99-27048 | 32.7 | 16 5 24 19 | 8 11 5 | 67 83 83 34 | 0 12 85 |
| 19 | IL00-8061 | 25.5 l | 13 3 7 28 | 11 13 9 | 44 40 72 20 | 0 9 80 |
| 20 | IL00-1665 | 34.7 | 33 23 29 48 | 14 16 12 | 50 63 63 24 | 9 10 85 |
| 21 | IL99-20756 | 31.4 l | 15 3 14 28 | 10 16 4 | 63 53 87 48 | 0 12 80 |
| 22 | KY97C-0151-1 | 46.4 h | 45 53 43 38 | 41 44 39 | 62 77 83 26 | 12 12 85 |
| 23 | KY96C-0895-1 | 34.7 | 36 38 33 37 | 19 23 15 | 48 55 61 29 | 0 10 80 |
| 24 | KS00HW175-4 | 39.9 | 39 52 19 48 | 18 24 11 | 66 80 78 38 | 7 7 75 |
| 25 | KS950409-P-4 | 42.8 | 51 77 24 52 | 24 27 21 | 62 68 81 38 | 7 5 70 |
| 26 | MD27-37 | 41.4 | 25 18 17 39 | 17 18 16 | 79 87 92 58 | 14 8 90 |
| 27 | MO010925 | 37.7 | 48 35 61 49 | 15 21 9 | 44 53 52 28 | 11 11 85 |
| 28 | MO010789 | 38.1 | 60 80 49 52 | 12 17 7 | 37 37 46 27 | 9 10 85 |
| 29 | MO010574 | 37.2 | 31 16 30 49 | 20 25 15 | 59 73 76 27 | 8 10 80 |
| 30 | MO010719 | 31.0 l | 29 22 22 43 | 15 20 9 | 46 50 65 22 | 7 6 75 |
| 31 | MO011130 | 45.4 h | 61 67 66 50 | 22 24 20 | 55 70 57 39 | 17 11 80 |
| 32 | NY88046-8138 | 36.3 | 44 40 45 47 | 21 28 15 | 42 57 51 17 | 8 12 80 |
| 33 | Caledonia Resel-T | 37.2 | 52 50 66 40 | 22 28 16 | 38 28 62 24 | 7 9 80 |
| 34 | NY91028-9073 | 28.6 l | 36 47 28 33 | 15 17 12 | 30 14 54 21 | 7 8 75 |
| 35 | NY91028SP-9245W | 27.8 l | 29 30 20 36 | 15 25 6 | 31 22 51 19 | 7 10 80 |
| 36 | NY89025-9111W | 32.6 | 45 47 39 48 | 17 23 11 | 34 18 67 16 | 6 9 75 |
| 37 | OH743 | 40.1 | 51 85 17 52 | 28 32 24 | 47 50 62 28 | 0 6 85 |
| 38 | OH751 | 39.9 | 44 65 34 33 | 27 34 20 | 53 63 66 31 | 4 9 80 |
| 39 | OH776 | 43.4 h | 39 27 42 48 | 32 35 30 | 64 83 83 25 | 0 15 90 |
| 40 | OH788 | 45.6 h | 62 70 74 43 | 18 27 9 | 60 70 81 31 | 7 7 85 |
| 41 | OH790 | 43.2 h | 53 67 51 41 | 23 22 24 | 59 77 65 36 | 7 10 75 |
| 42 | X00-1051 | 34.1 | 43 55 22 51 | 16 17 15 | 42 25 76 26 | 18 6 65 |
| 43 | X00-1058 | 42.5 | 46 73 25 40 | 26 37 15 | 56 60 81 28 | 20 9 80 |
| 44 | Y00-3044 | 49.1 h | 58 88 43 42 | 30 29 30 | 47 53 66 21 | 80 7 80 |
| 45 | E2057 | 29.0 l | 33 45 30 24 | 15 18 12 | 31 8 68 16 | 0 11 85 |
| 46 | E2038 | 29.2 l | 23 38 7 24 | 19 26 13 | 42 35 72 19 | 7 6 75 |
| 47 | E2048 | 29.0 l | 37 42 41 29 | 14 15 12 | 35 35 51 17 | 0 7 70 |
| 48 | E2037 | 34.2 | 31 35 32 27 | 13 16 10 | 53 65 76 19 | 7 9 80 |
| 49 | E0009 | 26.4 l | 29 30 24 34 | 14 21 7 | 32 18 61 16 | 7 7 65 |
| 50 | RCATL33 | 30.7 l | 31 13 41 40 | 9 15 3 | 43 40 74 17 | 12 9 75 |
| 51 | RCATL10 | 36.5 | 46 63 48 26 | 21 16 26 | 35 40 46 20 | 30 7 80 |
| 52 | RCATL24 | 22.8 l | 18 12 13 28 | 9 15 4 | 28 15 54 15 | 7 8 80 |
| 53 | RCATL12 | 35.2 | 56 47 68 52 | 16 24 8 | 30 17 43 29 | 11 8 80 |
| 54 | RCAT L2 | 39.0 | 42 32 40 55 | 11 9 12 | 64 73 87 31 | 0 10 80 |
| 55 | WESLEY | 54.1 h | 76 96 61 72 | 29 27 31 | 69 73 89 45 | 11 10 80 |
| 56 | NE98466 | 44.3 h | 63 78 54 57 | 19 28 11 | 51 48 72 33 | 10 12 85 |
| | AVERAGE | 36.9 | 38 42 33 39 | 20 25 15 | 51 55 71 27 | 9 9 80 |
| | MINIMUM | 20.4 | 12 1 7 17 | 6 9 2 | 23 8 33 10 | 0 5 65 |
| | MAXIMUM | 54.1 | 76 96 74 72 | 54 73 39 | 79 93 96 58 | 80 19 90 |
| | CV% | 35.7 | 35 38 29 | 40 15 | 31 13 36 | 37 7 |
| | LSD (0.05) | 11.2 | 23 25 23 | 17 9 | 27 13 14 | 5 9 |

† Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 8. Disease index (IND, %). Mean is mean over all trials. "Avg" is mean for a set of locations that were grouped based on GxE analysis: sets are boxed together in the table. VA and OO were outliers.

| # | NAME | MEAN | Avg | AF | NE | OH | OR | Avg | IL | IN | KS | KY | Avg | AK | MD | MI | MO | VA | OO | |
|----|-------------------|--------|-----|----|----|----|----|-----|----|----|----|----|-----|----|----|----|----|----|----|----|
| 1 | PIONEER 2545 | 43.5 h | 42 | 31 | 32 | 71 | 32 | 44 | 32 | 41 | 74 | 27 | 49 | 23 | 46 | 90 | 38 | 8 | 64 | |
| 2 | ERNIE | 24.4 | 8 | 3 | 0 | 20 | 9 | 15 | 0 | 5 | 27 | 27 | 42 | 19 | 16 | 96 | 39 | 1 | 81 | |
| 3 | FREEDOM | 26.3 | 15 | 13 | 1 | 26 | 19 | 31 | 34 | 16 | 46 | 26 | 30 | 23 | 13 | 58 | 27 | 2 | 64 | |
| 4 | IL97-6755 | 18.2 l | 3 | 5 | 0 | 4 | 1 | 21 | 0 | 6 | 56 | 22 | 22 | 15 | 2 | 61 | 10 | 0 | 73 | |
| 5 | PATTERSON | 37.3 h | 22 | 23 | 0 | 32 | 35 | 37 | 27 | 42 | 48 | 33 | 52 | 55 | 34 | 98 | 22 | 2 | 73 | |
| 6 | TRUMAN | 13.0 l | 4 | 4 | 0 | 8 | 3 | 10 | 2 | 6 | 20 | 12 | 13 | 5 | 4 | 35 | 9 | 2 | 73 | |
| 7 | 97397J1-4-1-4-7 | 21.5 | 8 | 5 | 0 | 10 | 16 | 17 | 1 | 1 | 31 | 34 | 32 | 23 | 14 | 69 | 23 | 2 | 73 | |
| 8 | 981238A1-1-44-1 | 27.3 | 9 | 8 | 0 | 22 | 5 | 33 | 33 | 19 | 46 | 34 | 37 | 26 | 10 | 91 | 21 | 2 | 64 | |
| 9 | 981312A1-6-2-2 | 24.1 | 14 | 7 | 0 | 37 | 12 | 20 | 5 | 5 | 33 | 37 | 34 | 23 | 16 | 76 | 22 | 1 | 64 | |
| 10 | 981517A1-1-5-2 | 20.6 l | 6 | 3 | 0 | 19 | 1 | 15 | 2 | 5 | 34 | 20 | 35 | 24 | 8 | 83 | 24 | 2 | 64 | |
| 11 | 992128A2-4-1 | 38.9 h | 18 | 15 | 0 | 33 | 26 | 38 | 43 | 17 | 51 | 40 | 58 | 30 | 74 | 91 | 37 | 16 | 73 | |
| 12 | VAN98W-342 | 35.4 | 20 | 9 | 16 | 42 | 14 | 32 | 33 | 26 | 44 | 24 | 53 | 30 | 52 | 89 | 40 | 5 | 73 | |
| 13 | VA03W-630 | 40.2 h | 17 | 6 | 2 | 51 | 9 | 56 | 52 | 58 | 56 | 56 | 52 | 35 | 50 | 83 | 38 | 5 | 60 | |
| 14 | VA03W-633 | 32.0 | 22 | 14 | 5 | 41 | 28 | 32 | 33 | 16 | 49 | 32 | 40 | 30 | 32 | 71 | 29 | 6 | 64 | |
| 15 | VA03W-644 | 25.3 | 15 | 5 | 1 | 36 | 17 | 16 | 3 | 5 | 30 | 27 | 41 | 15 | 37 | 87 | 27 | 2 | 64 | |
| 16 | VA03W-674 | 33.7 | 13 | 5 | 1 | 31 | 16 | 38 | 24 | 31 | 50 | 48 | 48 | 26 | 39 | 94 | 34 | 2 | 73 | |
| 17 | IL96-24851-1 | 21.2 | 10 | 2 | 3 | 22 | 15 | 12 | 0 | 2 | 22 | 24 | 34 | 10 | 28 | 78 | 19 | 1 | 73 | |
| 18 | IL99-27048 | 26.7 | 4 | 3 | 0 | 10 | 3 | 19 | 2 | 12 | 46 | 17 | 51 | 26 | 62 | 85 | 33 | 2 | 73 | |
| 19 | IL00-8061 | 18.3 l | 6 | 6 | 0 | 11 | 6 | 12 | 1 | 1 | 20 | 24 | 30 | 23 | 6 | 74 | 18 | 2 | 64 | |
| 20 | IL00-1665 | 24.0 | 7 | 6 | 1 | 13 | 10 | 22 | 11 | 12 | 23 | 43 | 36 | 23 | 31 | 66 | 24 | 2 | 73 | |
| 21 | IL99-20756 | 25.0 | 5 | 4 | 0 | 12 | 3 | 21 | 1 | 5 | 54 | 26 | 43 | 19 | 17 | 89 | 48 | 8 | 64 | |
| 22 | KY97C-0151-1 | 36.7 h | 26 | 19 | 5 | 44 | 37 | 36 | 32 | 25 | 51 | 35 | 47 | 45 | 33 | 85 | 26 | 3 | 73 | |
| 23 | KY96C-0895-1 | 24.2 | 10 | 9 | 0 | 20 | 9 | 25 | 22 | 15 | 33 | 32 | 33 | 30 | 12 | 63 | 29 | 1 | 64 | |
| 24 | KS00HW175-4 | 28.1 | 11 | 11 | 2 | 23 | 9 | 32 | 21 | 8 | 53 | 44 | 40 | 13 | 31 | 80 | 38 | 1 | 60 | |
| 25 | KS950409-P-4 | 32.5 | 16 | 13 | 2 | 26 | 21 | 40 | 37 | 19 | 59 | 45 | 43 | 26 | 26 | 83 | 38 | 1 | 61 | |
| 26 | MD27-37 | 34.0 | 11 | . | 1 | 17 | 14 | 28 | 7 | 6 | 60 | 39 | 58 | 31 | 48 | 94 | 58 | 3 | 81 | |
| 27 | MO010925 | 27.6 | 10 | 13 | 3 | 18 | 6 | 36 | 21 | 24 | 54 | 45 | 32 | 35 | 12 | 55 | 28 | 2 | 73 | |
| 28 | MO010789 | 26.0 | 6 | 6 | 1 | 14 | 4 | 41 | 46 | 24 | 50 | 44 | 26 | 23 | 5 | 47 | 27 | 1 | 73 | |
| 29 | MO010574 | 27.8 | 12 | 6 | 3 | 24 | 15 | 28 | 5 | 21 | 40 | 47 | 41 | 35 | 24 | 79 | 27 | 1 | 64 | |
| 30 | MO010719 | 23.2 | 7 | 3 | 1 | 19 | 6 | 26 | 7 | 13 | 46 | 39 | 33 | 30 | 10 | 69 | 22 | 1 | 60 | |
| 31 | MO011130 | 37.6 h | 21 | 36 | 9 | 22 | 18 | 49 | 56 | 47 | 50 | 42 | 45 | 50 | 32 | 58 | 39 | 3 | 64 | |
| 32 | NY88046-8138 | 26.6 | 16 | 28 | 2 | 22 | 12 | 38 | 19 | 29 | 60 | 45 | 21 | 5 | 11 | 52 | 17 | 6 | 64 | |
| 33 | Caledonia Resel-T | 25.8 | 16 | 19 | 6 | 24 | 14 | 34 | 26 | 33 | 40 | 37 | 24 | 3 | 6 | 64 | 24 | 4 | 64 | |
| 34 | NY91028-9073 | 20.1 l | 10 | 16 | 2 | 12 | 9 | 25 | 13 | 16 | 43 | 30 | 20 | 2 | 1 | 55 | 20 | 3 | 60 | |
| 35 | NY91028SP-9245W | 19.4 l | 11 | 18 | 1 | 22 | 3 | 21 | 8 | 14 | 31 | 32 | 19 | 2 | 2 | 53 | 17 | 4 | 64 | |
| 36 | NY89025-9111W | 23.2 | 11 | 14 | 2 | 19 | 8 | 33 | 20 | 17 | 50 | 46 | 22 | 3 | 3 | 69 | 15 | 3 | 57 | |
| 37 | OH743 | 30.6 | 16 | 15 | 0 | 29 | 21 | 35 | 33 | 11 | 46 | 47 | 38 | 40 | 20 | 63 | 28 | 1 | 73 | |
| 38 | OH751 | 29.8 | 16 | 11 | 1 | 34 | 17 | 29 | 30 | 27 | 29 | 30 | 43 | 40 | 33 | 68 | 31 | 1 | 64 | |
| 39 | OH776 | 34.0 | 18 | 13 | 0 | 33 | 28 | 34 | 15 | 27 | 46 | 45 | 46 | 35 | 40 | 85 | 25 | 3 | 81 | |
| 40 | OH788 | 35.7 | 10 | 9 | 1 | 22 | 6 | 47 | 51 | 37 | 63 | 39 | 50 | 50 | 35 | 83 | 31 | 1 | 73 | |
| 41 | OH790 | 35.4 | 13 | 13 | 1 | 18 | 21 | 46 | 48 | 38 | 60 | 37 | 49 | 45 | 46 | 69 | 36 | 3 | 60 | |
| 42 | X00-1051 | 22.0 | 9 | 4 | 4 | 15 | 12 | 29 | 13 | 10 | 47 | 46 | 28 | 5 | 3 | 78 | 26 | 1 | 45 | |
| 43 | X00-1058 | 27.8 | 15 | 8 | 4 | 35 | 12 | 33 | 32 | 14 | 51 | 34 | 33 | 5 | 15 | 83 | 28 | 5 | 64 | |
| 44 | Y00-3044 | 29.2 | 20 | 18 | 8 | 27 | 27 | 38 | 48 | 28 | 40 | 35 | 28 | 6 | 16 | 68 | 21 | 3 | 64 | |
| 45 | E2057 | 19.7 l | 8 | 7 | 0 | 15 | 9 | 20 | 19 | 8 | 34 | 18 | 22 | 3 | 1 | 70 | 16 | 5 | 73 | |
| 46 | E2038 | 18.8 l | 12 | 13 | 1 | 24 | 10 | 14 | 9 | 3 | 22 | 20 | 25 | 5 | 4 | 74 | 19 | 1 | 60 | |
| 47 | E2048 | 19.7 l | 8 | 11 | 0 | 13 | 9 | 26 | 17 | 19 | 48 | 21 | 21 | 5 | 8 | 53 | 17 | 3 | 53 | |
| 48 | E2037 | 21.6 | 9 | 14 | 1 | 13 | 6 | 23 | 13 | 16 | 39 | 24 | 28 | 3 | 11 | 78 | 19 | 3 | 64 | |
| 49 | E0009 | 18.9 l | 8 | 9 | 0 | 16 | 5 | 25 | 12 | 7 | 50 | 29 | 21 | 2 | 3 | 63 | 15 | 2 | 52 | |
| 50 | RCATL33 | 23.0 | 5 | 5 | 2 | 13 | 2 | 26 | 6 | 18 | 48 | 34 | 34 | 30 | 13 | 76 | 16 | 1 | 60 | |
| 51 | RCATL10 | 26.5 | 19 | 26 | 10 | 14 | 24 | 38 | 36 | 32 | 60 | 23 | 19 | 5 | 7 | 46 | 20 | 3 | 64 | |
| 52 | RCATL24 | 16.2 l | 6 | 8 | 0 | 13 | 2 | 16 | 2 | 4 | 34 | 25 | 18 | 2 | 1 | 56 | 14 | 2 | 64 | |
| 53 | RCATL12 | 24.5 | 11 | 18 | 1 | 22 | 5 | 33 | 29 | 29 | 38 | 38 | 25 | 23 | 3 | 44 | 29 | 2 | 64 | |
| 54 | RCAT L2 | 28.5 | 5 | 2 | 0 | 7 | 12 | 35 | 10 | 20 | 58 | 53 | 43 | 23 | 28 | 89 | 31 | 2 | 64 | |
| 55 | WESLEY | 41.7 h | 17 | 11 | 5 | 25 | 29 | 62 | 79 | 46 | 60 | 65 | 49 | 15 | 46 | 92 | 45 | 3 | 64 | |
| 56 | NE98466 | 33.4 | 12 | 10 | 4 | 27 | 8 | 49 | 55 | 34 | 58 | 48 | 37 | 13 | 31 | 74 | 33 | 2 | 73 | |
| | AVERAGE | 27.3 | 12 | 11 | 3 | 23 | 13 | 30 | 22 | 19 | 45 | 35 | 36 | 21 | 22 | 73 | 27 | 3 | 66 | |
| | MINIMUM | 13.0 | 3 | 2 | 0 | 4 | 1 | 10 | 0 | 1 | 20 | 12 | 13 | 2 | 1 | 35 | 9 | 0 | 45 | |
| | MAXIMUM | 43.5 | 42 | 36 | 32 | 71 | 37 | 62 | 79 | 58 | 74 | 65 | 58 | 55 | 74 | 98 | 58 | 16 | 81 | |
| | CV% | 36.6 | | | | 45 | 49 | 44 | 50 | 26 | 20 | | | | 77 | 14 | 37 | 73 | 9 | |
| | LSD (0.05) | 7.6 | | 10 | | 17 | 9 | 15 | 19 | 16 | 20 | | | | 12 | 27 | 13 | 14 | 3 | 10 |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 9. Kernel rating (KR, %) from field trials.

| # | NAME | MEAN | IL | KY | NE |
|----|-------------------|--------|------|------|------|
| 1 | PIONEER 2545 | 50.9 h | 63.3 | 87.5 | 2 |
| 2 | ERNIE | 29.4 l | 20.0 | 80.0 | |
| 3 | FREEDOM | 41.9 | 53.3 | 72.5 | 0 |
| 4 | IL97-6755 | 24.4 l | 20.0 | 70.0 | |
| 5 | PATTERSON | 38.1 l | 30.0 | 87.5 | |
| 6 | TRUMAN | 28.6 l | 23.3 | 62.5 | 0 |
| 7 | 97397J1-4-1-4-7 | 33.1 l | 20.0 | 87.5 | |
| 8 | 981238A1-1-44-1 | 45.6 | 40.0 | 92.5 | |
| 9 | 981312A1-6-2-2 | 37.5 l | 30.0 | 82.5 | 0 |
| 10 | 981517A1-1-5-2 | 38.2 l | 30.0 | 82.5 | 2 |
| 11 | 992128A2-4-1 | 52.3 h | 60.0 | 95.0 | 2 |
| 12 | VAN98W-342 | 48.9 h | 56.7 | 90.0 | 0 |
| 13 | VA03W-630 | 47.2 h | 46.7 | 95.0 | 0 |
| 14 | VA03W-633 | 40.3 l | 43.3 | 77.5 | 0 |
| 15 | VA03W-644 | 39.7 l | 26.7 | 92.5 | 0 |
| 16 | VA03W-674 | 43.6 | 43.3 | 87.5 | 0 |
| 17 | IL96-24851-1 | 40.8 l | 30.0 | 87.5 | 5 |
| 18 | IL99-27048 | 31.9 l | 23.3 | 72.5 | 0 |
| 19 | IL00-8061 | 33.3 l | 20.0 | 80.0 | 0 |
| 20 | IL00-1665 | 42.7 | 36.7 | 90.0 | |
| 21 | IL99-20756 | 26.4 l | 16.7 | 62.5 | 0 |
| 22 | KY97C-0151-1 | 46.7 h | 50.0 | 90.0 | 0 |
| 23 | KY96C-0895-1 | 36.5 l | 30.0 | 77.5 | 2 |
| 24 | KS00HW175-4 | 42.9 | 26.7 | 99.0 | 3 |
| 25 | KS950409-P-4 | 49.3 h | 50.0 | 97.0 | 1 |
| 26 | MD27-37 | 37.9 l | 36.7 | 75.0 | 2 |
| 27 | MO010925 | 40.9 l | 26.7 | 95.0 | 1 |
| 28 | MO010789 | 34.9 l | 43.3 | 57.5 | 4 |
| 29 | MO010574 | 38.9 l | 23.3 | 92.5 | 1 |
| 30 | MO010719 | 40.6 l | 36.7 | 85.0 | 0 |
| 31 | MO011130 | 49.3 h | 53.3 | 92.5 | 2 |
| 32 | NY88046-8138 | 53.9 h | 66.7 | 95.0 | 0 |
| 33 | Caledonia Resel-T | 49.5 h | 60.0 | 87.5 | 1 |
| 34 | NY91028-9073 | 54.4 h | 73.3 | 90.0 | 0 |
| 35 | NY91028SP-9245W | 47.6 h | 56.7 | 85.0 | 1 |
| 36 | NY89025-9111W | 51.3 h | 60.0 | 85.0 | 9 |
| 37 | OH743 | 44.3 | 50.0 | 80.0 | 3 |
| 38 | OH751 | 41.6 | 36.7 | 85.0 | 3 |
| 39 | OH776 | 44.8 | 33.3 | 97.0 | 4 |
| 40 | OH788 | 52.6 h | 56.7 | 99.0 | 2 |
| 41 | OH790 | 50.1 h | 56.7 | 92.5 | 1 |
| 42 | X00-1051 | 36.2 l | 36.7 | 70.0 | 2 |
| 43 | X00-1058 | 44.8 | 50.0 | 82.5 | 2 |
| 44 | Y00-3044 | 56.7 h | 80.0 | 90.0 | 0 |
| 45 | E2057 | 39.1 l | 33.3 | 80.0 | 4 |
| 46 | E2038 | 42.1 | 43.3 | 80.0 | 3 |
| 47 | E2048 | 47.6 h | 43.3 | 94.5 | 5 |
| 48 | E2037 | 53.8 h | 70.0 | 82.5 | 9 |
| 49 | E0009 | 45.8 | 50.0 | 87.5 | 0 |
| 50 | RCATL33 | 53.1 h | 36.7 | 87.5 | 35 |
| 51 | RCATL10 | 52.7 h | 60.0 | 90.0 | 8 |
| 52 | RCATL24 | 41.6 | 33.3 | 87.5 | 4 |
| 53 | RCATL12 | 48.2 h | 46.7 | 97.0 | 1 |
| 54 | RCAT L2 | 39.3 l | 23.3 | 82.5 | 12 |
| 55 | WESLEY | 63.1 h | 73.3 | 97.0 | 19 |
| 56 | NE98466 | 47.8 h | 53.3 | 85.0 | 5 |
| | AVERAGE | 43.5 | 42.7 | 85.5 | 3.2 |
| | MINIMUM | 24.4 | 16.7 | 57.5 | 0.0 |
| | MAXIMUM | 63.1 | 80.0 | 99.0 | 35.0 |
| | CV% | 22.5 | 22.9 | 16.0 | |
| | LSD (0.05) | 16.6 | 45.4 | 9.1 | |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 10. Percent scabby seed (PSS, %) on a per weight basis from field trials.

| # | NAME | MEAN | AF | KS | KY | MD | MO |
|----|-------------------|--------|------|------|------|------|------|
| 1 | PIONEER 2545 | 48.2 h | 41.0 | 41.3 | 82.6 | 8.0 | 68.0 |
| 2 | ERNIE | 18.6 l | 1.0 | 4.3 | 72.9 | 2.3 | 12.5 |
| 3 | FREEDOM | 35.9 | 9.0 | 27.5 | 59.0 | 5.0 | 78.8 |
| 4 | IL97-6755 | 17.9 l | 1.0 | 6.8 | 59.9 | 0.7 | 21.3 |
| 5 | PATTERSON | 22.9 l | 6.0 | 11.3 | 81.5 | 1.7 | 13.8 |
| 6 | TRUMAN | 22.6 l | 6.0 | 15.0 | 61.2 | 4.7 | 26.3 |
| 7 | 97397J1-4-1-4-7 | 24.6 l | 4.0 | 6.8 | 77.3 | 4.7 | 30.0 |
| 8 | 981238A1-1-44-1 | 25.0 l | 5.0 | 15.0 | 87.4 | 2.7 | 15.0 |
| 9 | 981312A1-6-2-2 | 27.8 | 10.0 | 17.5 | 73.0 | 2.3 | 36.3 |
| 10 | 981517A1-1-5-2 | 21.9 l | 1.0 | 16.5 | 71.1 | 2.0 | 18.8 |
| 11 | 992128A2-4-1 | 30.9 | 6.0 | 12.5 | 91.1 | 5.0 | 40.0 |
| 12 | VAN98W-342 | 40.4 h | 2.0 | 22.5 | 88.5 | 19.0 | 70.0 |
| 13 | VA03W-630 | 36.1 | 4.0 | 26.3 | 91.5 | 7.3 | 51.3 |
| 14 | VA03W-633 | 34.6 | 8.0 | 22.5 | 68.2 | 4.3 | 70.0 |
| 15 | VA03W-644 | 22.9 l | 1.0 | 8.8 | 86.8 | 3.0 | 15.0 |
| 16 | VA03W-674 | 30.4 | 6.0 | 26.3 | 81.6 | 3.3 | 35.0 |
| 17 | IL96-24851-1 | 25.8 l | 3.0 | 17.5 | 83.6 | 5.0 | 20.0 |
| 18 | IL99-27048 | 19.3 l | 1.0 | 6.3 | 72.5 | 4.3 | 12.5 |
| 19 | IL00-8061 | 17.0 l | 1.0 | 3.0 | 71.9 | 1.7 | 7.5 |
| 20 | IL00-1665 | 27.1 l | 2.0 | 16.3 | 82.7 | 3.0 | 31.3 |
| 21 | IL99-20756 | 13.8 l | 1.0 | 1.8 | 53.9 | 1.0 | 11.3 |
| 22 | KY97C-0151-1 | 32.7 | 6.0 | 28.8 | 82.8 | 2.0 | 43.8 |
| 23 | KY96C-0895-1 | 27.1 l | 7.0 | 23.8 | 64.8 | 3.7 | 36.3 |
| 24 | KS00HW175-4 | 37.1 | 9.0 | 18.8 | 94.8 | 8.0 | 55.0 |
| 25 | KS950409-P-4 | 43.5 h | 17.0 | 38.8 | 92.4 | 6.7 | 62.5 |
| 26 | MD27-37 | 25.3 l | 1.0 | 10.0 | 79.3 | 8.7 | 27.5 |
| 27 | MO010925 | 30.7 | 6.0 | 12.5 | 90.9 | 1.7 | 42.5 |
| 28 | MO010789 | 28.2 | 6.0 | 23.8 | 49.2 | 0.7 | 61.3 |
| 29 | MO010574 | 28.8 | 2.0 | 13.8 | 85.3 | 4.0 | 38.8 |
| 30 | MO010719 | 29.0 | 8.0 | 22.5 | 78.6 | 3.3 | 32.5 |
| 31 | MO011130 | 38.7 | 20.0 | 28.8 | 83.7 | 3.3 | 57.5 |
| 32 | NY88046-8138 | 51.5 h | 45.0 | 38.8 | 92.0 | 2.7 | 78.8 |
| 33 | Caledonia Resel-T | 46.3 h | 38.0 | 28.8 | 82.2 | 3.3 | 79.3 |
| 34 | NY91028-9073 | 50.6 h | 35.0 | 42.5 | 82.1 | 2.3 | 91.3 |
| 35 | NY91028SP-9245W | 41.0 h | 35.0 | 33.8 | 74.7 | 2.7 | 58.8 |
| 36 | NY89025-9111W | 43.6 h | 34.0 | 31.3 | 79.8 | 7.3 | 65.5 |
| 37 | OH743 | 34.8 | 7.0 | 28.8 | 84.3 | 1.7 | 52.5 |
| 38 | OH751 | 28.5 | 10.0 | 17.5 | 77.0 | 0.7 | 37.5 |
| 39 | OH776 | 31.9 | 11.0 | 23.8 | 93.0 | 5.3 | 26.3 |
| 40 | OH788 | 38.8 | 7.0 | 32.5 | 95.9 | 8.7 | 50.0 |
| 41 | OH790 | 38.1 | 11.0 | 24.0 | 91.6 | 7.7 | 56.3 |
| 42 | X00-1051 | 23.1 l | 11.0 | 16.3 | 54.0 | 0.3 | 33.8 |
| 43 | X00-1058 | 34.0 | 16.0 | 22.5 | 74.5 | 3.0 | 53.8 |
| 44 | Y00-3044 | 45.8 h | 23.0 | 40.0 | 87.6 | 6.0 | 72.5 |
| 45 | E2057 | 40.5 h | 15.0 | 33.8 | 74.6 | 2.7 | 76.3 |
| 46 | E2038 | 27.4 | 20.0 | 21.3 | 67.7 | 3.0 | 25.0 |
| 47 | E2048 | 39.7 | 15.0 | 38.8 | 89.0 | 5.0 | 50.5 |
| 48 | E2037 | 38.4 | 19.0 | 23.8 | 75.0 | 5.3 | 68.8 |
| 49 | E0009 | 30.4 | 13.0 | 17.5 | 84.5 | 2.0 | 35.0 |
| 50 | RCATL33 | 28.5 | 3.0 | 15.0 | 80.6 | 3.7 | 40.0 |
| 51 | RCATL10 | 43.0 h | 30.0 | 31.3 | 81.8 | 3.0 | 68.8 |
| 52 | RCATL24 | 30.5 | 10.0 | 22.5 | 81.8 | 1.7 | 36.3 |
| 53 | RCATL12 | 44.5 h | 12.0 | 36.3 | 93.2 | 3.7 | 77.5 |
| 54 | RCAT L2 | 25.1 l | 2.0 | 15.0 | 74.1 | 5.7 | 28.8 |
| 55 | WESLEY | 53.2 h | 29.0 | 43.8 | 94.7 | 6.0 | 92.3 |
| 56 | NE98466 | 36.5 | 6.0 | 32.5 | 75.2 | 2.7 | 66.3 |
| | AVERAGE | 32.7 | 11.8 | 22.5 | 79.3 | 4.1 | 45.8 |
| | MINIMUM | 13.8 | 1.0 | 1.8 | 49.2 | 0.3 | 7.5 |
| | MAXIMUM | 53.2 | 45.0 | 43.8 | 95.9 | 19.0 | 92.3 |
| | CV% | 32.5 | | 39.8 | 10.9 | 83.3 | 41.3 |
| | LSD (0.05) | 13.4 | | 12.8 | 17.8 | 5.5 | 26.4 |

† Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 11. ISK Index (ISK, %) that rates resistance based on INC, SEV and KR (or PSS) from field trials.

| # | NAME | MEAN | IL | KY | MD | MO | NE |
|----|-------------------|--------|------|-----|------|------|------|
| 1 | PIONEER 2545 | 42.0 h | 58.9 | 0.7 | 45.2 | 68.5 | 36.7 |
| 2 | ERNIE | 18.6 l | 19.2 | 0.7 | 25.9 | 46.5 | |
| 3 | FREEDOM | 32.2 | 59.0 | 0.6 | 25.0 | 69.1 | 7.2 |
| 4 | IL97-6755 | 12.0 l | 18.4 | 0.6 | 8.3 | 38.5 | |
| 5 | PATTERSON | 26.6 | 45.1 | 0.7 | 36.7 | 41.6 | |
| 6 | TRUMAN | 14.0 l | 18.3 | 0.5 | 13.4 | 38.0 | 0.0 |
| 7 | 97397J1-4-1-4-7 | 18.8 l | 16.4 | 0.8 | 26.9 | 48.9 | |
| 8 | 981238A1-1-44-1 | 24.5 | 51.0 | 0.8 | 22.1 | 42.0 | |
| 9 | 981312A1-6-2-2 | 21.3 l | 28.3 | 0.7 | 26.4 | 51.1 | 0.0 |
| 10 | 981517A1-1-5-2 | 18.5 l | 22.8 | 0.7 | 23.8 | 44.7 | 0.7 |
| 11 | 992128A2-4-1 | 35.2 h | 63.7 | 0.8 | 53.5 | 57.2 | 0.8 |
| 12 | VAN98W-342 | 41.6 h | 57.2 | 0.7 | 50.1 | 69.9 | 29.9 |
| 13 | VA03W-630 | 35.9 h | 61.2 | 0.8 | 45.9 | 62.0 | 9.6 |
| 14 | VA03W-633 | 33.7 | 49.8 | 0.7 | 37.2 | 66.5 | 14.3 |
| 15 | VA03W-644 | 22.7 l | 21.4 | 0.7 | 39.2 | 44.0 | 8.1 |
| 16 | VA03W-674 | 29.6 | 46.8 | 0.8 | 40.3 | 54.0 | 6.2 |
| 17 | IL96-24851-1 | 19.9 l | 16.1 | 0.7 | 26.0 | 43.7 | 13.2 |
| 18 | IL99-27048 | 22.8 l | 21.8 | 0.6 | 46.7 | 44.7 | 0.0 |
| 19 | IL00-8061 | 15.2 l | 22.5 | 0.7 | 17.2 | 35.9 | 0.0 |
| 20 | IL00-1665 | 24.9 | 35.0 | 0.8 | 31.7 | 49.8 | |
| 21 | IL99-20756 | 17.2 l | 12.7 | 0.6 | 23.9 | 49.0 | 0.0 |
| 22 | KY97C-0151-1 | 32.4 | 54.0 | 0.8 | 36.3 | 55.3 | 15.6 |
| 23 | KY96C-0895-1 | 23.8 l | 40.2 | 0.7 | 24.5 | 53.1 | 0.8 |
| 24 | KS00HW175-4 | 30.5 | 39.0 | 0.8 | 38.7 | 63.4 | 10.8 |
| 25 | KS950409-P-4 | 34.2 | 58.1 | 0.8 | 34.2 | 66.4 | 11.5 |
| 26 | MD27-37 | 28.5 | 32.1 | 0.7 | 45.0 | 58.4 | 6.5 |
| 27 | MO010925 | 26.1 | 37.7 | 0.8 | 23.7 | 55.3 | 12.8 |
| 28 | MO010789 | 29.2 | 58.5 | 0.7 | 15.3 | 62.7 | 8.9 |
| 29 | MO010574 | 25.5 | 25.5 | 0.8 | 33.1 | 53.3 | 14.8 |
| 30 | MO010719 | 21.8 l | 31.3 | 0.8 | 22.8 | 49.2 | 5.1 |
| 31 | MO011130 | 37.8 h | 66.6 | 0.8 | 35.8 | 64.7 | 21.0 |
| 32 | NY88046-8138 | 30.7 | 52.6 | 0.8 | 24.1 | 65.9 | 10.0 |
| 33 | Caledonia Resel-T | 34.0 | 54.7 | 0.8 | 16.3 | 68.8 | 29.4 |
| 34 | NY91028-9073 | 28.4 | 50.8 | 0.7 | 7.5 | 71.7 | 11.1 |
| 35 | NY91028SP-9245W | 22.0 l | 39.1 | 0.7 | 10.1 | 54.7 | 5.5 |
| 36 | NY89025-9111W | 27.7 | 51.9 | 0.8 | 11.9 | 58.1 | 15.8 |
| 37 | OH743 | 29.1 | 57.3 | 0.8 | 26.7 | 59.5 | 1.1 |
| 38 | OH751 | 29.6 | 48.2 | 0.7 | 31.8 | 54.2 | 12.9 |
| 39 | OH776 | 26.0 | 38.6 | 0.8 | 41.1 | 48.1 | 1.6 |
| 40 | OH788 | 33.9 | 65.3 | 0.8 | 38.5 | 59.2 | 5.9 |
| 41 | OH790 | 35.9 h | 64.4 | 0.8 | 44.1 | 63.4 | 7.0 |
| 42 | X00-1051 | 23.0 l | 38.1 | 0.7 | 11.6 | 51.2 | 13.6 |
| 43 | X00-1058 | 30.8 | 54.6 | 0.7 | 26.2 | 60.0 | 12.7 |
| 44 | Y00-3044 | 38.7 h | 74.9 | 0.7 | 25.9 | 65.0 | 27.0 |
| 45 | E2057 | 22.5 l | 39.3 | 0.6 | 6.6 | 64.6 | 1.6 |
| 46 | E2038 | 20.8 l | 35.8 | 0.6 | 14.7 | 45.3 | 7.8 |
| 47 | E2048 | 23.8 l | 42.2 | 0.7 | 19.0 | 55.1 | 1.9 |
| 48 | E2037 | 29.6 | 47.6 | 0.7 | 26.6 | 62.9 | 10.2 |
| 49 | E0009 | 20.3 l | 38.4 | 0.7 | 11.3 | 47.6 | 3.6 |
| 50 | RCATL33 | 25.0 | 32.3 | 0.7 | 21.0 | 49.1 | 22.0 |
| 51 | RCATL10 | 32.7 | 59.4 | 0.7 | 17.5 | 63.1 | 22.6 |
| 52 | RCATL24 | 16.4 l | 21.4 | 0.7 | 7.2 | 47.6 | 5.2 |
| 53 | RCATL12 | 27.5 | 50.7 | 0.8 | 10.5 | 69.0 | 6.6 |
| 54 | RCAT L2 | 24.0 | 28.6 | 0.8 | 35.3 | 50.9 | 4.6 |
| 55 | WESLEY | 46.6 h | 82.7 | 0.9 | 43.4 | 80.3 | 25.7 |
| 56 | NE98466 | 35.6 h | 65.9 | 0.8 | 28.6 | 66.0 | 16.9 |
| | AVERAGE | 27.4 | 43.3 | 0.7 | 27.4 | 55.9 | 10.3 |
| | MINIMUM | 12.0 | 12.7 | 0.5 | 6.6 | 35.9 | 0.0 |
| | MAXIMUM | 46.6 | 82.7 | 0.9 | 53.5 | 80.3 | 36.7 |
| | CV% | 33.5 | 16.7 | 6.4 | | 15.1 | |
| | LSD (0.05) | 11.8 | 11.4 | 0.1 | | 11.8 | |

^T Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 12. DON (DON, ppm) from field trials.

| # | NAME | MEAN | AF | IL | KY | MI | NE | VA |
|----|-------------------|--------|------|------|------|------|-----|------|
| 1 | PIONEER 2545 | 11.1 | 12.9 | 16.0 | 29.0 | 4.0 | 0.8 | 3.7 |
| 2 | ERNIE | 4.4 l | 0.6 | 1.5 | 21.0 | 4.0 | . | 1.2 |
| 3 | FREEDOM | 4.6 l | 2.2 | 6.6 | 14.5 | 2.6 | 0.3 | 1.3 |
| 4 | IL97-6755 | 2.6 l | 1.1 | 2.1 | 12.5 | 3.1 | . | 0.4 |
| 5 | PATTERSON | 4.4 l | 2.0 | 2.9 | 18.0 | 3.0 | . | 2.4 |
| 6 | TRUMAN | 3.9 l | 2.4 | 3.6 | 12.0 | 3.0 | 0.3 | 2.3 |
| 7 | 97397J1-4-1-4-7 | 3.7 l | 0.8 | 2.9 | 17.5 | 2.6 | . | 1.0 |
| 8 | 981238A1-1-44-1 | 3.4 l | 0.9 | 3.8 | 15.5 | 2.5 | . | 0.8 |
| 9 | 981312A1-6-2-2 | 3.7 l | 1.8 | 4.2 | 12.5 | 2.6 | 0.3 | 0.9 |
| 10 | 981517A1-1-5-2 | 4.3 l | 0.1 | 2.0 | 20.0 | 2.6 | 0.3 | 0.6 |
| 11 | 992128A2-4-1 | 4.5 l | 0.8 | 2.5 | 16.5 | 2.6 | 0.5 | 3.8 |
| 12 | VAN98W-342 | 5.4 l | 0.9 | 3.4 | 20.0 | 4.5 | 1.5 | 1.9 |
| 13 | VA03W-630 | 8.7 | 2.0 | 11.0 | 27.5 | 8.0 | 0.8 | 2.7 |
| 14 | VA03W-633 | 7.3 | 4.0 | 6.6 | 26.5 | 4.5 | 0.5 | 1.8 |
| 15 | VA03W-644 | 4.1 l | 0.3 | 3.0 | 17.5 | 2.7 | 0.3 | 1.0 |
| 16 | VA03W-674 | 8.6 | 6.5 | 8.5 | 29.5 | 5.6 | 0.3 | 1.3 |
| 17 | IL96-24851-1 | 2.8 l | 0.7 | 1.8 | 11.5 | 2.1 | 0.3 | 0.3 |
| 18 | IL99-27048 | 3.5 l | 0.7 | 1.7 | 14.5 | 2.8 | 0.3 | 1.0 |
| 19 | IL00-8061 | 4.1 l | 1.0 | 1.8 | 18.0 | 2.5 | 0.3 | 1.3 |
| 20 | IL00-1665 | 4.4 l | 2.0 | 3.3 | 16.0 | 3.0 | 1.3 | 0.8 |
| 21 | IL99-20756 | 4.7 l | 0.3 | 1.7 | 18.5 | 3.2 | 0.3 | 4.0 |
| 22 | KY97C-0151-1 | 5.4 l | 3.2 | 5.3 | 18.5 | 3.3 | 0.8 | 1.4 |
| 23 | KY96C-0895-1 | 6.1 l | 2.6 | 8.5 | 21.0 | 3.0 | 0.6 | 1.0 |
| 24 | KS00HW175-4 | 9.1 | 10.1 | 11.5 | 22.5 | 5.5 | 1.6 | 3.2 |
| 25 | KS950409-P-4 | 9.1 | 6.5 | 11.8 | 28.0 | 6.5 | 0.8 | 1.2 |
| 26 | MD27-37 | 4.0 l | 0.3 | 5.3 | 14.0 | 2.3 | 0.3 | 1.9 |
| 27 | MO010925 | 3.6 l | 2.5 | 3.0 | 12.0 | 2.6 | 0.3 | 1.1 |
| 28 | MO010789 | 6.6 | 1.9 | 5.9 | 27.0 | 3.0 | 0.9 | 0.9 |
| 29 | MO010574 | 6.2 l | 1.5 | 3.6 | 26.5 | 4.5 | 0.3 | 0.9 |
| 30 | MO010719 | 6.8 | 1.9 | 5.7 | 25.0 | 6.0 | 0.3 | 1.9 |
| 31 | MO011130 | 9.2 | 4.7 | 10.3 | 32.5 | 5.5 | 0.7 | 1.4 |
| 32 | NY88046-8138 | 11.7 | 12.3 | 11.3 | 29.5 | 10.0 | 1.1 | 5.9 |
| 33 | Caledonia Resel-T | 14.8 h | 16.0 | 17.3 | 32.5 | 11.5 | 1.5 | . |
| 34 | NY91028-9073 | 15.5 h | 13.9 | 18.5 | 37.5 | 12.0 | 1.1 | 10.0 |
| 35 | NY91028SP-9245W | 17.5 h | 24.0 | 20.0 | 37.0 | 12.5 | 1.0 | 10.7 |
| 36 | NY89025-9111W | 13.7 h | 13.6 | 16.5 | 35.0 | 9.0 | 1.3 | 6.9 |
| 37 | OH743 | 5.3 l | 2.7 | 5.0 | 18.5 | 3.5 | 0.6 | 1.4 |
| 38 | OH751 | 5.9 l | 2.3 | 7.5 | 18.5 | 4.5 | 1.5 | 1.0 |
| 39 | OH776 | 6.7 | 3.2 | 4.2 | 25.5 | 3.5 | 1.4 | 2.1 |
| 40 | OH788 | 6.6 | 1.6 | 7.2 | 21.0 | 3.0 | 4.3 | 2.3 |
| 41 | OH790 | 6.0 l | 1.7 | 10.5 | 19.0 | 2.9 | 0.5 | 1.5 |
| 42 | X00-1051 | 3.6 l | 1.5 | 3.9 | 11.0 | 3.0 | 0.8 | 1.3 |
| 43 | X00-1058 | 7.5 | 6.3 | 8.0 | 23.0 | 3.5 | 1.7 | 2.7 |
| 44 | Y00-3044 | 8.8 | 6.5 | 13.3 | 24.0 | 4.5 | 2.3 | 2.2 |
| 45 | E2057 | 12.5 | 14.1 | 16.3 | 19.5 | 14.5 | 0.6 | 9.9 |
| 46 | E2038 | 11.3 | 6.7 | 20.8 | 26.5 | 10.0 | 0.3 | 3.5 |
| 47 | E2048 | 8.9 | 4.2 | 12.0 | 17.5 | 12.0 | 1.1 | 6.8 |
| 48 | E2037 | 12.3 | 14.5 | 17.3 | 20.5 | 13.5 | 0.7 | 7.2 |
| 49 | E0009 | 8.2 | 6.5 | 13.3 | 17.5 | 8.5 | 0.3 | 3.0 |
| 50 | RCATL33 | 4.4 l | 1.2 | 2.5 | 16.5 | 3.5 | 2.2 | 0.6 |
| 51 | RCATL10 | 11.5 | 18.3 | 15.8 | 19.0 | 9.0 | 1.3 | 5.5 |
| 52 | RCATL24 | 10.6 | 13.4 | 10.0 | 22.0 | 13.0 | 0.5 | 4.4 |
| 53 | RCATL12 | 6.7 | 8.0 | 4.2 | 22.5 | 4.0 | 0.5 | 1.1 |
| 54 | RCAT L2 | 5.4 l | 1.2 | 3.3 | 17.5 | 5.5 | 3.1 | 1.9 |
| 55 | WESLEY | 7.5 | 5.3 | 18.8 | 12.5 | 3.0 | 4.3 | 0.9 |
| 56 | NE98466 | 5.0 l | 3.0 | 9.3 | 10.5 | 2.6 | 3.5 | 1.4 |
| | AVERAGE | 7.1 | 5.0 | 8.0 | 20.9 | 5.3 | 1.0 | 2.6 |
| | MINIMUM | 2.6 | 0.1 | 1.5 | 10.5 | 2.1 | 0.3 | 0.3 |
| | MAXIMUM | 17.5 | 24.0 | 20.8 | 37.5 | 14.5 | 4.3 | 10.7 |
| | CV% | 47.2 | | | 23.8 | 26.5 | | 53.6 |
| | LSD (0.05) | 4.3 | 5.1 | | 9.9 | 2.8 | | 2.0 |

† Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 13. Greenhouse disease severity (GH, %). Mean is mean over all trials. "Avg" is mean for a set of locations that were grouped based on GxE analysis: sets are boxed together in the table. VA was an outlier.

| # | NAME | MEAN | Avg | AF | KY | MO | VA |
|----|-------------------|--------|------|------|------|------|------|
| 1 | PIONEER 2545 | 32.7 | 32.8 | 39 | 23.1 | 36.3 | 32.3 |
| 2 | ERNIE | 13.9 l | 12.4 | 12 | 12.1 | 13.1 | 18.3 |
| 3 | FREEDOM | 12.2 l | 11.6 | 8 | 12.2 | 14.7 | 13.9 |
| 4 | IL97-6755 | 9.8 l | 11.3 | 12 | 18.0 | 3.8 | 5.3 |
| 5 | PATTERSON | 44.7 h | 44.0 | 39 | 38.5 | 54.4 | 47.0 |
| 6 | TRUMAN | 8.2 l | 8.6 | 7 | 15.1 | 3.7 | 7.1 |
| 7 | 97397J1-4-1-4-7 | 10.3 l | 11.4 | 9 | 18.7 | 6.4 | 7.0 |
| 8 | 981238A1-1-44-1 | 22.6 l | 24.7 | 34 | 26.8 | 13.3 | 16.2 |
| 9 | 981312A1-6-2-2 | 17.6 l | 15.9 | 11 | 22.5 | 14.3 | 22.6 |
| 10 | 981517A1-1-5-2 | 10.8 l | 11.6 | 11 | 14.8 | 8.9 | 8.6 |
| 11 | 992128A2-4-1 | 24.9 | 23.7 | 22 | 31.1 | 18.1 | 28.3 |
| 12 | VAN98W-342 | 25.1 | 30.2 | 43 | 27.3 | 20.2 | 10.0 |
| 13 | VA03W-630 | 49.2 h | 46.7 | 55 | 46.2 | 39.0 | 56.7 |
| 14 | VA03W-633 | 26.8 | 32.7 | 17 | 42.6 | 38.6 | 9.1 |
| 15 | VA03W-644 | 15.2 l | 17.6 | 13 | 34.1 | 5.8 | 7.9 |
| 16 | VA03W-674 | 34.2 | 39.1 | 22 | 40.9 | 54.5 | 19.4 |
| 17 | IL96-24851-1 | 9.9 l | 9.6 | 8 | 15.7 | 5.1 | 10.8 |
| 18 | IL99-27048 | 19.1 l | 22.6 | 15 | 31.1 | 21.7 | 8.5 |
| 19 | IL00-8061 | 18.1 l | 17.6 | 8 | 30.4 | 14.4 | 19.4 |
| 20 | IL00-1665 | 23.3 l | 27.5 | 16 | 41.8 | 24.6 | 10.6 |
| 21 | IL99-20756 | 11.9 l | 12.6 | 11 | 24.0 | 2.8 | 9.7 |
| 22 | KY97C-0151-1 | 32.3 | 32.2 | 19 | 33.7 | 43.8 | 32.8 |
| 23 | KY96C-0895-1 | 27.9 | 28.9 | 20 | 25.6 | 41.0 | 24.9 |
| 24 | KS00HW175-4 | 22.6 l | 22.4 | 23 | 33.7 | 10.5 | 23.4 |
| 25 | KS950409-P-4 | 18.8 l | 21.9 | 18 | 23.3 | 24.4 | 9.4 |
| 26 | MD27-37 | 25.0 | 25.6 | 12 | 47.2 | 17.7 | 22.9 |
| 27 | MO010925 | 29.5 | 29.2 | 21 | 51.2 | 15.4 | 30.3 |
| 28 | MO010789 | 37.5 h | 42.7 | 66 | 29.1 | 33.1 | 21.8 |
| 29 | MO010574 | 19.4 l | 19.9 | 14 | 36.1 | 9.5 | 18.0 |
| 30 | MO010719 | 14.5 l | 16.4 | 12 | 19.1 | 18.2 | 8.8 |
| 31 | MO011130 | 32.6 | 34.6 | 20 | 35.7 | 48.1 | 26.7 |
| 32 | NY88046-8138 | 31.9 | 27.7 | 19 | 32.9 | 31.3 | 44.4 |
| 33 | Caledonia Resel-T | 32.6 | 29.2 | 12 | 41.1 | 34.6 | 42.7 |
| 34 | NY91028-9073 | 23.7 l | 13.5 | 10 | | 17.0 | 39.0 |
| 35 | NY91028SP-9245W | 35.6 h | 23.1 | 24 | 26.5 | 18.9 | 73.1 |
| 36 | NY89025-9111W | 35.4 h | 29.6 | 9 | 35.3 | 44.5 | 52.9 |
| 37 | OH743 | 24.1 l | 23.7 | 25 | 31.1 | 15.0 | 25.2 |
| 38 | OH751 | 25.1 | 24.8 | 16 | 36.6 | 21.7 | 26.3 |
| 39 | OH776 | 35.1 h | 34.4 | 24 | 35.3 | 43.8 | 37.3 |
| 40 | OH788 | 50.1 h | 54.7 | 59 | 57.4 | 47.8 | 36.1 |
| 41 | OH790 | 43.7 h | 43.1 | 31 | 48.3 | 50.0 | 45.5 |
| 42 | X00-1051 | 18.0 l | 18.5 | 7 | 39.7 | 8.7 | 16.4 |
| 43 | X00-1058 | 12.0 l | 10.8 | 8 | 15.1 | 9.4 | 15.5 |
| 44 | Y00-3044 | 30.0 | 24.4 | 20 | 18.3 | 34.9 | 46.8 |
| 45 | E2057 | 22.4 l | 13.1 | 10 | 20.5 | 8.9 | 50.2 |
| 46 | E2038 | 13.4 l | 9.7 | 10 | | 9.3 | 15.8 |
| 47 | E2048 | 26.7 | 27.0 | 14 | | 39.9 | 21.3 |
| 48 | E2037 | 23.0 l | 22.7 | 8 | 41.1 | 19.0 | 23.9 |
| 49 | E0009 | 27.8 | 17.4 | 14 | 19.9 | 18.3 | 59.1 |
| 50 | RCATL33 | 51.0 h | 48.9 | 26 | 69.7 | 51.0 | 57.1 |
| 51 | RCATL10 | 31.2 | 17.8 | 18 | 23.6 | 11.9 | 71.3 |
| 52 | RCATL24 | 33.9 | 30.7 | 12 | 32.2 | 47.8 | 43.6 |
| 53 | RCATL12 | 26.1 | 24.7 | 22 | 19.9 | 32.1 | 30.6 |
| 54 | RCAT L2 | 23.6 l | 21.7 | 11 | 36.4 | 17.8 | 29.2 |
| 55 | WESLEY | 34.2 | 27.4 | 21 | 27.4 | 33.9 | 54.3 |
| 56 | NE98466 | 31.0 | 21.9 | 14 | 31.0 | 20.8 | 58.3 |
| | AVERAGE | 25.8 | | 19.3 | 31.0 | 24.4 | 28.6 |
| | MINIMUM | 8.2 | | 7.0 | 12.1 | 2.8 | 5.3 |
| | MAXIMUM | 51.0 | | 66.0 | 69.7 | 54.5 | 73.1 |
| | CV% | 45.5 | | 46.1 | | | |
| | LSD (0.05) | 16.6 | | 18 | 21.3 | | |

[†] Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 14. Heading date in Julian days

| # | NAME | MEAN | IL | KY | MD | MI | MO | OH | OO | OR | VA |
|----|-------------------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | PIONEER 2545 | 141 | 133 | 131 | 124 | 151 | 139 | 145 | 170 | 147 | 132 |
| 2 | ERNIE | 139 l | 131 | 129 | 124 | 147 | 136 | 142 | 166 | 144 | 132 |
| 3 | FREEDOM | 142 | 134 | 133 | 125 | 153 | 139 | 143 | 173 | 149 | 132 |
| 4 | IL97-6755 | 140 | 132 | 131 | 126 | 150 | 139 | 142 | 170 | 145 | 130 |
| 5 | PATTERSON | 140 | 131 | 132 | 127 | 148 | 139 | 141 | 169 | 145 | 128 |
| 6 | TRUMAN | 145 | | 141 | 127 | 157 | 143 | 144 | 176 | 149 | 135 |
| 7 | 97397J1-4-1-4-7 | 139 l | 131 | 129 | 124 | 149 | 139 | 141 | 169 | 145 | 129 |
| 8 | 981238A1-1-44-1 | 139 l | 131 | 131 | 123 | 147 | 138 | 145 | 166 | 142 | 129 |
| 9 | 981312A1-6-2-2 | 142 | 134 | 134 | 124 | 153 | 139 | 147 | 172 | 147 | 133 |
| 10 | 981517A1-1-5-2 | 142 | 130 | 131 | 125 | 150 | 139 | 141 | 172 | 155 | 131 |
| 11 | 992128A2-4-1 | 139 l | 131 | 129 | 124 | 148 | 137 | 141 | 169 | 143 | 127 |
| 12 | VAN98W-342 | 141 | 132 | 129 | 126 | 150 | 137 | 144 | 172 | 146 | 130 |
| 13 | VA03W-630 | 143 | 131 | 131 | 126 | 152 | 139 | 145 | 174 | 154 | 132 |
| 14 | VA03W-633 | 141 | 132 | 132 | 124 | 151 | 139 | 142 | 174 | 147 | 130 |
| 15 | VA03W-644 | 140 | 132 | 130 | 125 | 149 | 137 | 144 | 172 | 142 | 130 |
| 16 | VA03W-674 | 139 l | 131 | 130 | 124 | 148 | 137 | 142 | 171 | 143 | 128 |
| 17 | IL96-24851-1 | 142 | 135 | 135 | 127 | 151 | 139 | 145 | 168 | 147 | 132 |
| 18 | IL99-27048 | 138 l | 130 | 129 | 123 | 147 | 134 | 141 | 169 | 143 | 129 |
| 19 | IL00-8061 | 141 | 132 | 132 | 127 | 150 | 139 | 143 | 168 | 145 | 130 |
| 20 | IL00-1665 | 141 | 133 | 133 | 125 | 152 | 138 | 144 | 169 | 147 | 132 |
| 21 | IL99-20756 | 138 l | 130 | 129 | 127 | 147 | 133 | 140 | 166 | 141 | 127 |
| 22 | KY97C-0151-1 | 141 | 133 | 132 | 125 | 150 | 139 | 144 | 171 | 145 | 131 |
| 23 | KY96C-0895-1 | 144 | 133 | 133 | 128 | 152 | 139 | 145 | 172 | 158 | 132 |
| 24 | KS00HW175-4 | 143 | 135 | 135 | 127 | 152 | 140 | 145 | 170 | 149 | 132 |
| 25 | KS950409-P-4 | 142 | 134 | 133 | 126 | 151 | 139 | 145 | 167 | 148 | 131 |
| 26 | MD27-37 | 139 l | 131 | 129 | 126 | 147 | 133 | 142 | 170 | 143 | 127 |
| 27 | MO010925 | 142 | 133 | 135 | 125 | 154 | 140 | 145 | 171 | 149 | 131 |
| 28 | MO010789 | 143 | 135 | 135 | 124 | 156 | 139 | 145 | 170 | 150 | 132 |
| 29 | MO010574 | 142 | 133 | 132 | 127 | 152 | 139 | 145 | 170 | 151 | 132 |
| 30 | MO010719 | 141 | 133 | 132 | 123 | 151 | 138 | 143 | 172 | 146 | 130 |
| 31 | MO011130 | 142 | 133 | 132 | 128 | 152 | 139 | 145 | 171 | 149 | 132 |
| 32 | NY88046-8138 | 147 h | | 142 | 125 | 158 | 145 | 149 | 175 | 153 | 137 |
| 33 | Caledonia Resel-T | 147 h | | 142 | 125 | 158 | 145 | 150 | 175 | 154 | 137 |
| 34 | NY91028-9073 | 148 h | | 144 | 125 | 161 | 145 | 150 | 177 | 154 | 137 |
| 35 | NY91028SP-9245W | 148 h | | 144 | 127 | 161 | 145 | 150 | 177 | 154 | 137 |
| 36 | NY89025-9111W | 148 h | | 144 | 127 | 160 | 143 | 150 | 175 | 154 | 137 |
| 37 | OH743 | 143 | 135 | 133 | 124 | 152 | 139 | 146 | 173 | 149 | 132 |
| 38 | OH751 | 142 | 134 | 133 | 125 | 152 | 139 | 146 | 170 | 148 | 132 |
| 39 | OH776 | 141 | 133 | 131 | 124 | 150 | 138 | 144 | 169 | 146 | 132 |
| 40 | OH788 | 140 | 131 | 129 | 123 | 150 | 138 | 142 | 169 | 144 | 130 |
| 41 | OH790 | 141 | 132 | 131 | 125 | 151 | 139 | 142 | 171 | 147 | 132 |
| 42 | X00-1051 | 142 | 135 | 135 | 123 | 155 | 139 | 144 | 170 | 148 | 133 |
| 43 | X00-1058 | 144 | | 136 | 126 | 155 | 141 | 146 | 173 | 148 | 135 |
| 44 | Y00-3044 | 145 | | 140 | 128 | 157 | 144 | 146 | 174 | 148 | 135 |
| 45 | E2057 | 146 h | | 141 | 124 | 158 | 144 | 150 | 174 | 150 | 136 |
| 46 | E2038 | 147 h | | 140 | 125 | 159 | 144 | 150 | 175 | 153 | 136 |
| 47 | E2048 | 146 h | | 140 | 125 | 158 | 144 | 149 | 175 | 153 | 136 |
| 48 | E2037 | 147 h | | 140 | 127 | 160 | 145 | 149 | 176 | 152 | 137 |
| 49 | E0009 | 148 h | | 144 | 124 | 160 | 145 | 150 | 177 | 154 | 136 |
| 50 | RCATL33 | 140 | 132 | 131 | 127 | 149 | 138 | 142 | 169 | 146 | 130 |
| 51 | RCATL10 | 145 | | 140 | 125 | 156 | 144 | 149 | 173 | 151 | 135 |
| 52 | RCATL24 | 147 h | | 143 | 124 | 160 | 144 | 149 | 174 | 154 | 137 |
| 53 | RCATL12 | 144 | 135 | 133 | 126 | 154 | 141 | 146 | 173 | 151 | 134 |
| 54 | RCAT L2 | 140 | 131 | 129 | 125 | 150 | 139 | 141 | 168 | 153 | 129 |
| 55 | WESLEY | 143 | | 136 | 127 | 152 | 141 | 147 | 169 | 148 | 132 |
| 56 | NE98466 | 142 | 134 | 134 | 126 | 153 | 139 | 144 | 169 | 147 | 131 |
| | AVERAGE | 143 | 133 | 134 | 125 | 153 | 140 | 145 | 171 | 148 | 132 |
| | MINIMUM | 138 | 130 | 129 | 123 | 147 | 133 | 140 | 166 | 141 | 127 |
| | MAXIMUM | 148 | 135 | 144 | 128 | 161 | 145 | 150 | 177 | 158 | 137 |
| | CV% | 1.3 | | 69 | 2 | 2 | 1 | 33 | 1 | 2 | 9 |
| | LSD (0.05) | 1.8 | | 2 | 3 | 2 | 2 | 3 | 2 | 4 | 2 |

† Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 15. Plant height in inches

| # | NAME | MEAN | KY | MO | OR | VA |
|----|-------------------|------|----|----|----|----|
| 1 | PIONEER 2545 | 33 | 35 | 33 | 35 | 30 |
| 2 | ERNIE | 30 l | 30 | 29 | 33 | 29 |
| 3 | FREEDOM | 35 | 35 | 34 | 39 | 31 |
| 4 | IL97-6755 | 38 | 38 | 36 | 43 | 36 |
| 5 | PATTERSON | 35 | 35 | 35 | 36 | 33 |
| 6 | TRUMAN | 35 | 36 | 35 | 39 | 32 |
| 7 | 97397J1-4-1-4-7 | 32 | 34 | 31 | 34 | 29 |
| 8 | 981238A1-1-44-1 | 32 | 32 | 33 | 36 | 29 |
| 9 | 981312A1-6-2-2 | 31 l | 30 | 32 | 33 | 28 |
| 10 | 981517A1-1-5-2 | 32 | 30 | 32 | 35 | 30 |
| 11 | 992128A2-4-1 | 32 | 33 | 33 | 33 | 29 |
| 12 | VAN98W-342 | 29 l | 30 | 29 | 30 | 27 |
| 13 | VA03W-630 | 32 | 32 | 32 | 36 | 30 |
| 14 | VA03W-633 | 30 l | 30 | 31 | 32 | 27 |
| 15 | VA03W-644 | 30 l | 31 | 29 | 31 | 28 |
| 16 | VA03W-674 | 30 l | 32 | 29 | 33 | 27 |
| 17 | IL96-24851-1 | 32 | 33 | 33 | 32 | 30 |
| 18 | IL99-27048 | 34 | 35 | 34 | 35 | 31 |
| 19 | IL00-8061 | 36 | 36 | 36 | 38 | 35 |
| 20 | IL00-1665 | 33 | 34 | 32 | 36 | 30 |
| 21 | IL99-20756 | 34 | 35 | 33 | 37 | 31 |
| 22 | KY97C-0151-1 | 35 | 36 | 35 | 37 | 32 |
| 23 | KY96C-0895-1 | 37 | 37 | 36 | 40 | 34 |
| 24 | KS00HW175-4 | 35 | 35 | 36 | 37 | 33 |
| 25 | KS950409-P-4 | 34 | 33 | 35 | 37 | 33 |
| 26 | MD27-37 | 32 | 32 | 32 | 36 | 29 |
| 27 | MO010925 | 35 | 32 | 35 | 39 | 33 |
| 28 | MO010789 | 37 | 37 | 35 | 42 | 35 |
| 29 | MO010574 | 37 | 39 | 36 | 38 | 34 |
| 30 | MO010719 | 40 | 39 | 38 | 43 | 39 |
| 31 | MO011130 | 38 | 37 | 36 | 43 | 36 |
| 32 | NY88046-8138 | 36 | 37 | 34 | 40 | 32 |
| 33 | Caledonia Resel-T | 36 | 37 | 35 | 39 | 32 |
| 34 | NY91028-9073 | 35 | 34 | 34 | 40 | 32 |
| 35 | NY91028SP-9245W | 35 | 37 | 33 | 38 | 33 |
| 36 | NY89025-9111W | 37 | 39 | 36 | 40 | 34 |
| 37 | OH743 | 36 | 37 | 35 | 40 | 33 |
| 38 | OH751 | 35 | 36 | 35 | 38 | 32 |
| 39 | OH776 | 34 | 34 | 35 | 35 | 31 |
| 40 | OH788 | 34 | 35 | 33 | 38 | 31 |
| 41 | OH790 | 34 | 35 | 33 | 38 | 32 |
| 42 | X00-1051 | 33 | 33 | 33 | 34 | 30 |
| 43 | X00-1058 | 33 | 34 | 32 | 34 | 30 |
| 44 | Y00-3044 | 33 | 33 | 34 | 35 | 31 |
| 45 | E2057 | 32 | 31 | 32 | 34 | 29 |
| 46 | E2038 | 34 | 33 | 35 | 37 | 31 |
| 47 | E2048 | 38 | 37 | 37 | 41 | 36 |
| 48 | E2037 | 35 | 36 | 35 | 39 | 32 |
| 49 | E0009 | 38 | 39 | 37 | 42 | 35 |
| 50 | RCATL33 | 41 h | 40 | 40 | 46 | 39 |
| 51 | RCATL10 | 39 | 39 | 39 | 43 | 36 |
| 52 | RCATL24 | 42 h | 40 | 41 | 46 | 40 |
| 53 | RCATL12 | 40 | 38 | 38 | 46 | 38 |
| 54 | RCAT L2 | 40 | 38 | 40 | 44 | 37 |
| 55 | WESLEY | 33 | 31 | 35 | 35 | 30 |
| 56 | NE98466 | 37 | 37 | 39 | 39 | 34 |
| | AVERAGE | 35 | 35 | 34 | 38 | 32 |
| | MINIMUM | 29 | 30 | 29 | 30 | 27 |
| | MAXIMUM | 42 | 40 | 41 | 46 | 40 |
| | CV | 3.5 | 4 | 4 | 3 | 5 |
| | LSD (0.05) | 1.7 | 3 | 2 | 2 | 2 |

† Indicates a mean that is not different from the lowest (l) or highest (h) mean in the column based on LSD_(0.05)

Table 17. Pearson correlation among genotype means averaged over all locations. Correlations >0.6 are in bold while correlations between 0.3 and -0.3 are in small font and shown with less numerical precision.

| | SEV | INC | IND | GH | KR | PSS | ISK | DON | HD | HGT |
|-----|--------------|--------------|--------------|-------|-------|--------------|--------------|--------------|--------------|--------|
| SEV | 1 | 0.901 | 0.953 | 0.487 | 0.371 | 0.435 | 0.897 | -0.02 | -0.321 | -0.329 |
| INC | 0.901 | 1 | 0.904 | 0.403 | 0.395 | 0.470 | 0.864 | 0.10 | -0.25 | -0.380 |
| IND | 0.953 | 0.904 | 1 | 0.511 | 0.340 | 0.328 | 0.830 | -0.09 | -0.452 | -0.30 |
| GH | 0.487 | 0.403 | 0.511 | 1 | 0.412 | 0.432 | 0.506 | 0.294 | 0.08 | 0.23 |
| KR | 0.371 | 0.395 | 0.340 | 0.412 | 1 | 0.524 | 0.592 | 0.299 | 0.13 | -0.02 |
| PSS | 0.435 | 0.470 | 0.328 | 0.432 | 0.524 | 1 | 0.684 | 0.688 | 0.556 | 0.10 |
| ISK | 0.897 | 0.864 | 0.830 | 0.506 | 0.592 | 0.684 | 1 | 0.21 | -0.07 | -0.22 |
| DON | -0.02 | 0.10 | -0.09 | 0.29 | 0.30 | 0.688 | 0.21 | 1 | 0.762 | 0.186 |
| HD | -0.321 | -0.25 | -0.452 | 0.077 | 0.13 | 0.556 | -0.07 | 0.762 | 1 | 0.331 |
| HGT | -0.329 | -0.380 | -0.30 | 0.23 | -0.02 | 0.10 | -0.22 | 0.19 | 0.331 | 1 |

Table 14. Additional FHB data from MO, plus reaction to Stripe Rust (SR), Leaf Rust (LR), Barley Yellow Dwarf Virus (BYDV), Stagonospora nodorum (SN,) a complex of leaf diseases (CLD), plus seed weight.

| # | NAME | FIELD SPREAD | GH SPREAD | GH RACHIS | SR | CLD | LR | BYDV | SN | SEED WEIGHT |
|-------------|-------------------|--------------|-------------|-----------|------|------|------|------|-----|-------------|
| | | # spikelets | # spikelets | 0-1 | % | % | 0-9 | 0-9 | 0-9 | GMS/100 |
| 1 | PIONEER 2545 | 5.8 | 6.1 | 1.00 | 88.5 | 60.0 | 6.0 | 6.3 | 3.0 | 2.6 |
| 2 | ERNIE | 5.7 | 1.5 | 0.38 | 94.8 | 92.3 | 6.3 | 4.3 | 2.0 | 3.3 |
| 3 | FREEDOM | 4.7 | 2.5 | 0.63 | 86.5 | 80.8 | 5.3 | 7.0 | 2.0 | 2.6 |
| 4 | IL97-6755 | 1.7 | 0.5 | 0.13 | 22.5 | 35.0 | 7.3 | 5.0 | 4.3 | 3.1 |
| 5 | PATTERSON | 3.4 | 8.2 | 0.88 | 89.8 | 91.0 | 6.0 | 5.3 | 2.3 | 2.5 |
| 6 | TRUMAN | 1.8 | 0.8 | 0.38 | 4.8 | 26.3 | 4.7 | 2.7 | 2.3 | 2.8 |
| 7 | 97397J1-4-1-4-7 | 3.4 | 0.7 | 0.88 | 41.3 | 55.0 | 1.3 | 6.0 | 2.3 | 3.1 |
| 8 | 981238A1-1-44-1 | 3.2 | 1.5 | 0.88 | 31.3 | 55.0 | 5.3 | 4.7 | 3.7 | 3.2 |
| 9 | 981312A1-6-2-2 | 3.4 | 2.5 | 0.63 | 22.5 | 53.8 | 4.7 | 6.7 | 2.7 | 2.3 |
| 10 | 981517A1-1-5-2 | 3.4 | 1.3 | 0.38 | 9.8 | 55.0 | 1.3 | 5.7 | 4.7 | 3.2 |
| 11 | 992128A2-4-1 | 6.3 | 2.4 | 0.86 | 50.0 | 50.0 | 5.0 | 5.0 | 1.3 | 2.0 |
| 12 | VAN98W-342 | 5.9 | 2.5 | 0.71 | 96.8 | 96.8 | 2.3 | 5.7 | 3.3 | 2.9 |
| 13 | VA03W-630 | 5.8 | 4.8 | 0.71 | 57.0 | 95.5 | 3.3 | 4.3 | 1.3 | 3.0 |
| 14 | VA03W-633 | 4.0 | 5.7 | 0.88 | 70.8 | 72.5 | 6.7 | 6.0 | 1.7 | 2.3 |
| 15 | VA03W-644 | 4.3 | 0.8 | 0.25 | 20.5 | 95.5 | 7.0 | 6.0 | 3.0 | 2.4 |
| 16 | VA03W-674 | 4.6 | 6.9 | 0.86 | 69.5 | 95.5 | 6.7 | 3.7 | 1.7 | 3.3 |
| 17 | IL96-24851-1 | 3.1 | 0.9 | 0.38 | 50.0 | 53.8 | 5.7 | 4.3 | 1.7 | 2.6 |
| 18 | IL99-27048 | 5.4 | 3.3 | 0.88 | 24.8 | 50.0 | 1.0 | 5.3 | 1.3 | 2.4 |
| 19 | IL00-8061 | 2.6 | 2.0 | 0.50 | 21.5 | 30.0 | 2.7 | 6.0 | 1.7 | 2.9 |
| 20 | IL00-1665 | 3.9 | 3.8 | 0.63 | 27.5 | 30.0 | 5.7 | 6.0 | 2.3 | 2.8 |
| 21 | IL99-20756 | 7.5 | 0.4 | 0.25 | 28.5 | 50.0 | 5.0 | 5.7 | 3.0 | 3.2 |
| 22 | KY97C-0151-1 | 3.7 | 5.9 | 0.75 | 5.8 | 60.0 | 5.3 | 5.0 | 1.3 | 2.8 |
| 23 | KY96C-0895-1 | 4.6 | 6.9 | 1.00 | 71.5 | 72.5 | 5.7 | 4.0 | 2.7 | 3.2 |
| 24 | KS00HW175-4 | 5.5 | 1.4 | 0.50 | 14.0 | 72.5 | 1.0 | 5.7 | 5.7 | 2.6 |
| 25 | KS950409-P-4 | 5.4 | 3.7 | 0.88 | 9.8 | 60.0 | 1.3 | 7.3 | 4.0 | 3.1 |
| 26 | MD27-37 | 9.6 | 2.1 | 1.00 | 18.5 | 92.3 | 7.7 | 6.3 | 3.0 | 2.4 |
| 27 | MO010925 | 4.1 | 2.4 | 0.71 | 61.5 | 83.3 | 2.7 | 6.3 | 5.7 | 3.0 |
| 28 | MO010789 | 4.1 | 4.5 | 0.88 | 50.0 | 45.0 | 2.0 | 3.3 | 2.0 | 3.0 |
| 29 | MO010574 | 3.8 | 1.2 | 0.63 | 65.8 | 60.0 | 6.0 | 3.0 | 2.3 | 3.2 |
| 30 | MO010719 | 3.1 | 2.4 | 1.00 | 3.3 | 35.0 | 3.3 | 4.0 | 7.7 | 3.2 |
| 31 | MO011130 | 5.2 | 8.0 | 1.00 | 70.8 | 87.0 | 2.7 | 5.0 | 2.3 | 3.1 |
| 32 | NY88046-8138 | 2.7 | 6.5 | 0.88 | 72.8 | 69.0 | 6.3 | 5.0 | 1.3 | 2.4 |
| 33 | Caledonia Resel-T | 4.2 | 7.6 | 1.00 | 53.8 | 26.3 | 6.7 | 3.3 | 1.0 | 2.1 |
| 34 | NY91028-9073 | 3.2 | 3.6 | 0.75 | 12.3 | 18.8 | 3.0 | 4.3 | 1.3 | 3.0 |
| 35 | NY91028SP-9245W | 2.8 | 3.6 | 0.88 | 13.5 | 18.8 | 1.3 | 3.3 | 1.3 | 2.6 |
| 36 | NY89025-9111W | 2.6 | 8.0 | 0.88 | 3.3 | 18.8 | 5.7 | 5.7 | 1.3 | 2.5 |
| 37 | OH743 | 4.5 | 2.1 | 0.43 | 7.8 | 50.0 | 5.0 | 5.0 | 4.0 | 2.9 |
| 38 | OH751 | 4.5 | 3.4 | 0.63 | 90.3 | 94.3 | 2.3 | 4.0 | 1.0 | 2.8 |
| 39 | OH776 | 3.9 | 6.1 | 1.00 | 72.0 | 60.0 | 4.7 | 5.3 | 2.3 | 2.7 |
| 40 | OH788 | 4.4 | 6.1 | 0.83 | 70.8 | 55.0 | 3.0 | 4.3 | 6.3 | 2.7 |
| 41 | OH790 | 5.1 | 7.6 | 1.00 | 75.8 | 67.5 | 1.3 | 6.0 | 5.3 | 2.5 |
| 42 | X00-1051 | 3.9 | 1.8 | 0.75 | 7.8 | 40.0 | 3.3 | 3.0 | 1.7 | 2.8 |
| 43 | X00-1058 | 4.5 | 2.0 | 0.50 | 9.8 | 30.0 | 4.3 | 2.3 | 2.3 | 2.6 |
| 44 | Y00-3044 | 3.2 | 6.3 | 0.88 | 7.8 | 30.0 | 2.7 | 4.7 | 1.3 | 2.6 |
| 45 | E2057 | 2.6 | 2.1 | 0.57 | 46.3 | 55.0 | 4.0 | 5.3 | 1.0 | 3.1 |
| 46 | E2038 | 2.8 | 1.8 | 0.63 | 50.0 | 55.0 | 5.3 | 7.3 | 1.7 | 3.1 |
| 47 | E2048 | 3.0 | 8.9 | 1.00 | 5.3 | 26.3 | 1.3 | 6.7 | 2.3 | 2.4 |
| 48 | E2037 | 2.7 | 3.5 | 1.00 | 4.5 | 22.5 | 4.7 | 5.7 | 1.3 | 2.3 |
| 49 | E0009 | 2.5 | 3.0 | 0.40 | 2.8 | 15.0 | 8.3 | 2.7 | 4.7 | 2.5 |
| 50 | RCATL33 | 2.1 | 6.3 | 1.00 | 41.3 | 65.0 | 4.7 | 7.3 | 6.7 | 3.6 |
| 51 | RCATL10 | 3.3 | 5.7 | 0.86 | 40.0 | 35.0 | 5.0 | 6.3 | 2.3 | 2.9 |
| 52 | RCATL24 | 2.2 | 8.3 | 1.00 | 15.5 | 35.0 | 5.3 | 6.0 | 2.0 | 3.0 |
| 53 | RCATL12 | 5.2 | 5.2 | 0.86 | 31.3 | 45.0 | 1.3 | 6.3 | 2.3 | 2.5 |
| 54 | RCAT L2 | 4.3 | 1.8 | 1.00 | 40.0 | 73.8 | 5.3 | 6.3 | 5.7 | 3.2 |
| 55 | WESLEY | 6.6 | 5.8 | 1.00 | 3.3 | 65.0 | 4.0 | 7.3 | 4.7 | 3.1 |
| 56 | NE98466 | 4.5 | 2.9 | 0.88 | 34.3 | 73.8 | 2.7 | 5.7 | 5.0 | 2.6 |
| AVERAGE | | 4.1 | 3.9 | 0.7 | 39.1 | 56.0 | 4.3 | 5.2 | 2.8 | 2.8 |
| # LOCATIONS | | 1 MO | 1 MO | 1 MO | 1 AR | 1 AR | 1 VA | 1VA | 1VA | 1 MD |

CLD=% leaf area diseased at soft dough. Primarily septoria leaf blotch, stripe rust and leaf rust in this order

Rachis - 0-1 - where no rachis involvement = 0 and disease has spread to the rachis = 1