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® Roundup WeatherMax is a trademark of Monsanto Technology LLC. All other trademarks are the property of their respective owners.

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Appendix D: Materials and Methods Used for the Analysis of the Levels of MON 87708 DMO

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Appendix E: Materials, Methods, and Individual-Site Results for Compositional Analysis of MON 87708 Soybean Seed and Forage

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E.5. Analytical Method Summaries and Reference Standards

E.5.1. Acid Detergent Fiber

The sample was placed in a fritted vessel and washed with an acidic boiling detergent solution that dissolved the protein, carbohydrate, and ash. An acetone wash removed the fats and pigments. The lignocellulose fraction was collected on the frit and determined gravimetrically (Goering and Van Soest, 1970). The limit of quantitation (LOQ) for this analysis was 0.100%.

E.5.2. Amino Acid Composition

The sample was assayed by three methods to obtain the full profile. Tryptophan required a base hydrolysis with sodium hydroxide. The sulfur-containing amino acids required an oxidation with performic acid prior to hydrolysis with hydrochloric acid. Analysis of the samples for the remaining amino acids was accomplished through direct acid hydrolysis with hydrochloric acid. Once hydrolyzed, the individual amino acids were then quantitated using an automated amino acid analyzer (AOAC-International, 2005a). The LOQ for this analysis was 0.100 mg/g.

Reference Standards:

- ThermoScientific K18, 2.5 µmol/mL per constituent except cystine (1.25 µmol/mL), Lot Number JK126327
- Sigma, L-Tryptophan, 100%, Lot Number 076K0075
- Sigma/BioChemika, L-Cysteic Acid Monohydrate, 99.5% (used as 100%), Lot Number 1305674
- Sigma, L-Methionine Sulfone, 100%, Lot Number 047K1321

E.5.3. Ash

The sample was placed in an electric furnace at 550 °C and ignited to drive off all volatile organic matter. The nonvolatile matter remaining was quantitated gravimetrically and calculated to determine percent ash (AOAC-International, 2005b). The LOQ for this analysis was 0.100%.

E.5.4. Carbohydrates

The total carbohydrate level was calculated by difference using the fwt-derived data and the following equation (USDA, 1973):

% carbohydrates = 100 % - (% protein + % fat + % moisture + % ash)

The LOQ for this analysis was 0.100%.

E.5.5. Crude Fiber

Crude fiber was quantitated as the loss on ignition of dried residue remaining after digestion of the sample with 1.25% sulfuric acid and 1.25% sodium hydroxide solutions under specific conditions (AOAC-International, 2005c). The limit of quantitation for this study was 0.100%.

E.5.6. Fat by Acid Hydrolysis

The sample was hydrolyzed with hydrochloric acid at an elevated temperature. The fat was extracted with ether and hexane. The extract was evaporated on a steambath, re-dissolved in hexane and filtered through a sodium sulfate column. The hexane extract was then evaporated again on a steambath under nitrogen, dried, and weighed (AOAC-International, 2005d). The LOQ for this analysis was 0.100%.

E.5.7. Fat by Soxhlet Extraction

The sample was weighed into a cellulose thimble containing sodium sulfate and dried to remove excess moisture. Pentane was dripped through the sample to remove the fat. The extract was then evaporated, dried, and weighed (AOAC-International, 2005e). The LOQ for this analysis was 0.100%.

E.5.8. Fatty Acids

The lipid was extracted and saponified with 0.5 N sodium hydroxide in methanol. The saponification mixture was methylated with 14% boron trifluoride in methanol. The resulting methyl esters were extracted with heptane containing an internal standard. The methyl esters of the fatty acids were analyzed by gas chromatography using external standards for quantitation (AOAC-International, 2005f; AOCS, 1997a; AOCS, 2001). The limit of quantitation was 0.0200%.

Reference Standards:

- Nu Chek Prep GLC Reference Standard Hazleton No. 1, *, Lot Number AU18-S
- Nu Chek Prep GLC Reference Standard Hazleton No. 2, *, Lot Number M13-O
- Nu Chek Prep GLC Reference Standard Hazleton No. 3, *, Lot Number MA18-S
- Nu Chek Prep GLC Reference Standard Hazleton No. 4, *, Lot Number JA16-T
- Nu Chek Prep Methyl Gamma Linolenate, used as 100%, Lot Number U-63M-JY12-R
- Nu Chek Prep Methyl Tridecanoate, used as 100%, Lot Number N-13M-JA16-T

* Overall purity of the sum of the mixture of components is used as 100%.

E.5.9. Isoflavones

The sample was extracted using a solution of hydrochloric acid and reagent alcohol heated on steam baths or hot plates. The extract was brought to volume, diluted, and centrifuged. An aliquot of the supernatant was placed onto a C18 solid-phase extraction column. Unwanted components of the matrix were rinsed off with 20% methanol and then the isoflavones were eluted with 80% methanol. The sample was analyzed on a high-performance liquid chromatography system with ultraviolet detection and was compared to an external standard curve of known standards for quantitation (Pettersson and Kiessling, 1984; Seo and Morr, 1984). The LOQ for each component was 10.0 ppm (µg/g).

Reference Standards:

- Chromadex, Daidzein, 96.5%, Lot Number 04007-120
- Chromadex, Glycitein, 96.3%, Lot Number 07344-571
- Indofine, Genistein, ≥99% (100% used in calculations), Lot Number 0309074

E.5.10. Lectin

The sample was suspended in phosphate buffered saline (PBS), shaken, and filtered. An aliquot of the resulting extract was serially diluted in 10 cuvettes containing PBS. A 10% hematocrit of lyophilized rabbit blood in PBS was added to each dilution. After 2.5 hours, the absorbance of each dilution of the sample and lectin control was measured on a spectrophotometer at 620 nm, using PBS to zero the instrument. One hemagglutinating unit (H.U.) was defined as the level that caused 50% of the standard cell suspension to sediment in 2.5 hours (Klurfeld and Kritchevsky, 1987; Liener, 1955). The LOQ for this analysis was 0.10 H.U./mg.

Reference Standard:

- Sigma-Aldrich, Red Blood Cells, Rabbit, Product #R1629, Lot Number 105K6042

E.5.11. Moisture

The sample was dried in a vacuum oven at approximately 100°C to a constant weight. The moisture weight loss was determined and converted to percent moisture (AOAC-International, 2005g). The LOQ for this analysis was 0.100%.

E.5.12. Neutral Detergent Fiber, Enzyme Method

The sample was placed in a fritted vessel and washed with a neutral boiling detergent solution that dissolved the protein, carbohydrate, enzyme, and ash. An acetone wash removed the fats and pigments. Hemicellulose, cellulose, and lignin fractions were collected on the frit and determined gravimetrically (AACC, 1998; Goering and Van Soest, 1970). The LOQ for this analysis was 0.100%.

E.5.13. Phytic Acid

The sample was extracted using 0.5 M HCl with ultrasonication. Purification and concentration were accomplished on a silica-based anion-exchange column. The sample was analyzed on a polymer high-performance liquid chromatography column PRP-1, 5 µm (150 × 4.1 mm) with a refractive index detector (Lehrfeld, 1989; Lehrfeld, 1994). The LOQ for this analysis was 0.100%.

Reference Standard:

- Aldrich, Phytic Acid, Dodecasodium Salt Hydrate, 98%, Lot Number 068K0755

E.5.14. Protein

Nitrogenous compounds in the sample were reduced in the presence of boiling sulfuric acid and a mercury catalyst mixture to form ammonia. The acid digest was made alkaline. The ammonia was distilled and then titrated with a previously standardized acid. The percent nitrogen was calculated and converted to equivalent protein using the factor 6.25 (AOAC-International, 2005h; Bradstreet, 1965; Kalthoff and Sandell, 1948). The LOQ for this analysis was 0.100%.

E.5.15. Raffinose and Stachyose

The sample was extracted with deionized water and the extract treated with a hydroxylamine hydrochloride solution in pyridine, containing phenyl-β-D-glucoside as an internal standard. The resulting oximes were converted to silyl derivatives by treatment with hexamethyldisilazane and trifluoracetic acid and analyzed by gas chromatography using a flame ionization detector (Brobst, 1972; Mason and Slover, 1971). The LOQ for this analysis was 0.0500%.

Reference Standards:

- Sigma, D-(+)-Raffinose Pentahydrate, 95.5% after correction for degree of hydration, Lot Number 037K1059
- Sigma, Stachyose, 97.1% after correction for degree of hydration, Lot Number 078K3802

E.5.16. Trypsin Inhibitor

The sample was ground and defatted with petroleum ether. A sample of matrix was extracted with 0.01 N sodium hydroxide. Varying aliquots of the sample suspension were exposed to a known amount of trypsin and benzoy1-DL-arginine~p~nitroanilide hydrochloride. The sample was allowed to react for 10 minutes at 37°C. After 10 minutes, the reaction was halted by the addition of acetic acid. The solution was centrifuged and then the absorbance was determined at 410 nm. Trypsin inhibitor activity was determined by photometrically measuring the inhibition of trypsin's reaction with benzoyl-DL-arginine~p~nitroanilide hydrochloride (AOCS, 1997b). The LOQ for this analysis was 1.00 Trypsin Inhibitor Units (TIU)/mg.

E.5.17. Vitamin E

The sample was saponified to break down any fat and release vitamin E. The saponified mixture was extracted with ethyl ether and then quantitated by high-performance liquid chromatography using a silica column (Cort et al., 1983; McMurray et al., 1980; Speek et al., 1985). The LOQ for this analysis was 0.500 mg/100g.

Reference Standard:

- USP, Alpha Tocopherol, 100%, Lot Number M

E.6. Data Processing and Statistical Analysis

After compositional analyses were performed, data spreadsheets were forwarded to Monsanto Company. The data were reviewed, formatted, and sent to Certus International, Inc. for statistical analysis.

The following formulas were used for re-expression of soybean composition data for statistical analysis (Table E-2):

Table E-2. Re-Expression Formulas for Statistical Analysis of Composition Data

Component	From (X)	To	Formula[1]
Proximates (excluding Moisture), Fiber, Phytic Acid, Raffinose, Stachyose	% fwt	% dwt	X/d
Isoflavones	µg/g fwt	µg/g dwt	X/d
Lectin	H.U./fwt	H.U./dwt	X/d
Trypsin Inhibitor	TIU/mg fwt	TIU/mg dwt	X/d
Vitamin E	mg/100g fwt	mg/100g dwt	X/d
Amino Acids (AA)	mg/g fwt	% dwt	X/(10d)
Fatty Acids (FA)	% fwt	% Total FA	$(100)X_j/\Sigma X$, for each FA_j where ΣX is over all the FA

[1]'X' is the individual sample value; 'd' is the fraction of the sample that is dry matter.

In order to complete a statistical analysis for a compositional analyte, at least 50% of the values for an analyte had to be greater than the assay LOQ. The following 14 analytes with more than 50% of observations below the assay LOQ (b) (4) [redacted]

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The data were assessed for potential outliers using a studentized PRESS residuals calculation. A PRESS residual is the difference between any value and its predicted value from a statistical model that excludes the data point. The studentized version scales these residuals so that the values tend to have a standard normal distribution when outliers are absent. Thus, most values are expected to be between ± 3. Extreme data points that are also outside of the ± 6 studentized PRESS residual range are considered for exclusion, as outliers, from the final analyses. No results had PRESS residual values outside of the ± 6 range.

All soybean compositional components were statistically analyzed using a mixed model analysis of variance. The five replicated sites were analyzed both separately and combined. Individual replicated site analyses used model *(1)*.

(1) $Y_{ij} = U + T_i + B_j + e_{ij}$,

where Y_{ij} = unique individual observation, U = overall mean, T_i = substance effect, B_j = random block effect, and e_{ij} = residual error.

Combined-site analyses used model *(2)*.

(2) $Y_{ijk} = U + T_i + L_j + B(L)_{jk} + LT_{ij} + e_{ijk}$,

where Y_{ijk} = unique individual observation, U = overall mean, T_i = substance effect, L_j = random site effect, $B(L)_{jk}$ = random block within site effect, LT_{ij} = random site by substance interaction effect, and e_{ijk} = residual error.

A range of observed values from the reference varieties was determined for each analytical component. Additionally, data from the reference varieties were used to develop tolerance intervals. A tolerance interval is an interval that one can claim, with a specified degree of confidence, contains at least a specified proportion, p, of an entire sampled population for the parameter measured.

For each compositional component, 99% tolerance intervals were calculated that are expected to contain, with 95% confidence, 99% of the quantities expressed in the population of commercial reference varieties. Because negative quantities are not possible, negative calculated lower tolerance bounds were set to zero.

SAS® (Version 9.2) software was used to generate all summary statistics and perform all analyses.

Report tables present p-values from SAS as either <0.001 or the actual value truncated to three decimal places.

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Appendix F: Materials, Methods, and Individual Site Results for the Seed Dormancy and Germination Assessment of MON 87708

(b) (4) [redacted]

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F.2. Characterization of the Materials

For the MON 87708, conventional control, and the commercial reference varieties starting seed lots, the presence or absence of the *dmo* expression cassette was confirmed by event-specific polymerase chain reaction analyses.

F.3. Germination Testing Facility and Experimental Methods

Seed dormancy and germination evaluations were conducted at BioDiagnostics, Inc. in River Falls, WI. The principal investigator was qualified to conduct seed dormancy and germination testing consistent with the standards established by the Association of Official Seed Analysts, a seed trade association (AOSA, 2000; AOSA, 2006; AOSA, 2007).

Seed lots of MON 87708, the conventional control, and four commercial reference varieties were produced from each of three sites and tested under six different temperature regimes. Six germination chambers were maintained dark under one of the following temperature regimes: constant temperature of approximately 10, 20, or 30°C or alternating temperatures of approximately 10/20, 10/30, or 20/30°C. The alternating temperature regimes were maintained at the lower temperature for 16 hours and the higher temperature for eight hours. The temperature inside each germination chamber was monitored and recorded every 15 minutes throughout the duration of the assessment. For each seed lot, four replicated paper germination towels were prepared per facility SOPs for each temperature regime. Wax coated paper was placed on a large tray followed by a water-moistened germination towel. A target of 100 seeds per seed lot were placed on the germination towel (*i.e.*, one seed lot per towel) using a vacuum planting system. A second water-moistened germination towel was placed on top of the seed. The towels were then rolled up and secured with a rubber band. All rolled germination towels were placed into appropriately labeled buckets that were then covered with ventilated plastic bags attached with rubber bands. The buckets were arranged in the germination chambers in a split-plot design, where the whole-plot treatment was seed production site and the sub-plot treatment was seed material (*i.e.*, MON 87708, the conventional control, or commercial reference varieties).

A description of each germination characteristic evaluated and the timing of evaluations are presented in Table VII-1. The types of data collected depended on the temperature regime. Each rolled germination towel in the AOSA-recommended temperature regime (*i.e.*, 20/30°C) was evaluated periodically during the study for normal germinated, abnormal germinated, hard, dead, and firm-swollen seed as defined by AOSA guidelines (AOSA, 2006; AOSA, 2007). AOSA only provides guidelines (AOSA, 2007) for testing seed under optimal temperatures (20/30°C); however, additional temperature regimes were included to test a range of temperature conditions. Each rolled germination towel in the additional temperature regimes (*i.e.*, 10, 20, 30, 10/20, and 10/30°C) was evaluated periodically for germinated, hard, dead, and firm-swollen seed. Emergence and/or development of essential structures of seedlings that otherwise would be categorized as "normal germinated" under optimal temperature conditions may not be so at non-optimal temperatures. Therefore, for the additional temperature regimes, no distinction was made between normal and abnormal germinated seed.

F.4. Statistical Analysis

Analysis of variance was conducted according to a split-plot design with four replications. SAS® (Version 9.2) was used to compare MON 87708 to the conventional control within each seed production site (individual-site analyses) and in a combined-site analysis, in which the data were pooled across all sites, for the following germination characteristics: percent germinated (categorized as percent normal germinated and percent abnormal germinated for the AOSA temperature regime), percent viable hard, percent dead, and percent viable firm-swollen seed. The level of statistical significance was predetermined to be 5% ($\alpha = 0.05$). MON 87708 was not statistically compared to the commercial reference varieties nor were comparisons made across temperature regimes. For each assessed characteristic, the minimum and maximum means were determined from among the commercial reference varieties to provide a range of values that are representative of commercial soybean varieties. The following is a summary of the results from the individual-site analyses. Results from the combined-site analysis are presented in Table VII-2.

F.5. Individual-Site Seed Dormancy and Germination Analysis

In the individual-site analyses, no statistically significant differences were detected between MON 87708 and the conventional control for any of the measured characteristics (*i.e.*, percent germinated, viable hard, dead, or viable firm-swollen seed) in any temperature regime for seed produced at the MO site. Six statistically significant differences in total were detected between MON 87708 and the conventional control for seed produced at the IA and IL sites (Table F-2). MON 87708 had lower percent germinated seed than the conventional control at 10°C for seed produced at the IA (97.5% vs. 99.3%) and IL (99.3% vs. 100.0%) sites and at 10/30°C for seed produced at the IA site (96.8% vs. 99.0%). MON 87708 had lower percent viable hard seed than the conventional control at 10/30°C for seed produced at the IA site (0.0% vs. 0.3%). Percent dead seed was higher for MON 87708 than the conventional control at 10°C (2.0% vs. 0.3%) and 10/30°C (3.3% vs. 0.8%) for seed produced at the IA site.

Statistically significant differences between MON 87708 and the conventional control for germination characteristics in the individual-site analyses were not consistently detected across temperature regimes or seed production sites. While some statistically significant differences were detected in the combined-site analysis, the assessed dormancy and germination characteristics of MON 87708 were within the range of values expected for the commercial reference varieties and therefore are considered not biologically meaningful in terms of increased weediness of MON 87708 compared to the conventional soybean.

Table F-2. Dormancy and Germination Characteristics of MON 87708 and Conventional Control Seed Produced at each of Three Field Sites

		Mean % (S.E.)[1]					
		IA		IL		MO	
Temperature Regime	Germination Category	MON 87708	Control	MON 87708	Control	MON 87708	Control
10°C	Germinated	97.5 (1.0)*	99.3 (0.5)	99.3 (0.3)*	100.0 (0.0)	100.0 (0.0)	99.8 (0.3)
	Viable Hard	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Dead	2.0 (0.9)*	0.3 (0.3)	0.5 (0.3)	0.0 (0.0)	0.0 (0.0)	0.3 (0.3)
	Viable Firm-swollen	0.5 (0.3)	0.5 (0.3)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
20°C	Germinated	98.0 (0.9)	98.3 (0.6)	99.8 (0.3)	99.8 (0.3)	100.0 (0.0)	100.0 (0.0)
	Viable Hard	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)
	Dead	2.0 (0.9)	1.8 (0.6)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Viable Firm-swollen	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
30°C	Germinated	96.3 (1.1)	98.3 (0.3)	100.0 (0.0)	100.0 (0.0)	99.8 (0.3)	99.8 (0.3)
	Viable Hard	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Dead	3.8 (1.1)	1.8 (0.3)	0.0 (0.0)	0.0 (0.0)	0.3 (0.3)	0.3 (0.3)
	Viable Firm-swollen	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)

Table F-2 (continued). Dormancy and Germination Characteristics of MON 87708 and Conventional Control Seed Produced at each of Three Field Sites

		Mean % (S.E.)[1]					
		IA		IL		MO	
Temperature Regime	Germination Category	MON 87708	Control	MON 87708	Control	MON 87708	Control
10/20°C	Germinated	98.0 (0.4)	97.8 (0.3)	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)
	Viable Hard	0.3 (0.3)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Dead	1.8 (0.3)	1.8 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Viable Firm-swollen	0.0 (0.0)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
10/30°C	Germinated	96.8 (0.8)*	99.0 (0.4)	99.0 (0.6)	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)
	Viable Hard	0.0 (0.0)*	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Dead	3.3 (0.8)*	0.8 (0.5)	1.0 (0.6)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Viable Firm-swollen	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
20/30°C[2]	Normal Germinated	91.5 (2.1)	92.0 (0.7)	97.5 (1.0)	99.0 (0.4)	98.8 (0.5)	98.8 (0.6)
	Abnormal Germinated	5.8 (1.0)	6.3 (1.0)	1.8 (0.9)	0.8 (0.5)	1.3 (0.5)	1.3 (0.6)
	Viable Hard	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	Dead	2.8 (1.3)	1.8 (0.8)	0.8 (0.3)	0.3 (0.3)	0.0 (0.0)	0.0 (0.0)
	Viable Firm-swollen	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)

Note: Seed for the germination study were produced in Howard County, IA; Stark County, IL; and Shelby County, MO in 2008. Seed was arranged in germination chambers in a split-plot design where the whole-plot treatment was seed production site and the sub-plot treatment was seed material (*i.e.*, MON 87708, the conventional control, or commercial reference soybean varieties).
*Indicates a statistically significant difference between MON 87708 and the conventional control (α=0.05).
†No statistical comparisons were made due to lack of variability in the data.
[1]Means based on four replicates (n = 4) of 100 seeds. The total percentage of all germination characteristics of MON 87708 or the conventional control in some temperature regimes is greater than 100.0% due to numerical rounding of the means. S.E. = Standard Error
[2]Germinated seed in the AOSA temperature regime 20/30°C were categorized as either normal germinated or abnormal germinated seed.

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Appendix G: Materials, Methods, and Individual-Site Results from the Phenotypic, Agronomic, and Environmental Interaction Assessment of MON 87708 under Field Conditions

G.1. Materials

The soybean materials for the phenotypic and environmental interactions assessment in the field included MON 87708, the near isogenic conventional soybean control A3525, and 18 commercial reference soybean varieties. The references included both conventional and Roundup Ready® soybean varieties. The list of the soybean materials planted at each of 18 field sites is presented in Table G-1.

G.2. Characterization of the Materials

For the MON 87708 and the conventional control starting seed lots, the presence or absence of the *dmo* expression cassette was confirmed by event-specific polymerase chain reaction analyses.

G.3. Field Sites and Plot Design

Data were collected at 16 field sites in the U.S. and two sites in Canada during 2008 (Section VII, Table VII-3). These 18 locations provided a diverse range of environmental and agronomic conditions representative of commercial soybean production areas in North America. The researchers at each field site were familiar with the growth, production, and evaluation of soybean characteristics.

The experiment was established at each of the 18 sites in a randomized complete block design with three replications. Each plot at the IL2, IN1, MI, and MO1 sites consisted of twelve 30 feet long rows spaced approximately 30 inches apart. Rows # 2 and 3 were designated for the collection of phenotypic data. Rows # 5 and 6 were designated for the collection of abiotic stress response, disease damage, and arthropod-related damage data. Rows # 8-10 were designated for the collection of arthropod samples. Rows # 1, 4, 7, 11, and 12 were used as buffer rows. Each plot was surrounded by approximately 5-15 feet of a commercial soybean variety by planting border rows in the alleyways between blocks and around the entire perimeter of the plot area. The purpose of the planted borders was to create a continuous soybean stand across the plot area to ensure collection of more robust arthropod abundance data.

Each plot at the AR, Can1, Can2, IA1, IA2, IA3, IL1, IN2, IN3, KS, MO2, NE, PA, and WI sites consisted of four 20 feet long rows spaced approximately 30 inches apart. Rows # 2 and 3 were designated for the collection of phenotypic, abiotic stress response, disease damage, and arthropod-related damage data. Rows # 1 and 4 were used as buffer rows. The entire plot area was surrounded by an approximately 10 foot wide, four-row border of a commercial soybean variety.

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G.4. Planting and Field Operations

Field and planting information are listed in Table G-2. Agronomic practices used to prepare and maintain each study site were characteristic of those used in each respective geographic region. All maintenance operations were performed uniformly over the entire trial area.

Table G-1. Starting Seed for the Phenotypic, Agronomic, and Environmental Interaction Assessment

Material Name	Material Type	Relative Maturity	Phenotype	Monsanto Seed Lot #	Sites[1]
MON 87708	Test	3.5	Dicamba-Tolerant	10001256	All
A3525	Control	3.5	Conventional	10001257	All
FS 3591	Reference	3.5	Conventional	10001448	AR, IA2, IN1, MI, PA
AG3505	Reference	3.5	Roundup Ready[2]	10001281	AR, IA2, IN1, MI, PA
Wilken 3316	Reference	3.3	Conventional	10001505	AR, IA2, IN1, MI, PA
Stine 3300-0	Reference	3.3	Conventional	10001312	AR, IA2, IN1, MI, PA
Garst 3585N	Reference	3.5	Conventional	10000883	IA3, IN2, MO1, WI
Crows C37003N	Reference	3.7	Conventional	10001508	IA3, IN2, MO1, WI
Garst S33-A8	Reference	3.3	Roundup Ready[2]	10001284	Can1, IA3, IN2, MO1, WI
Pioneer 93B15	Reference	3.1	Conventional	10001304	Can1, IA3, IN2, MO1, WI
Dekalb DKB28-53	Reference	2.8	Roundup Ready[2]	10001950	Can1, Can2
Asgrow AG2801	Reference	2.8	Roundup Ready[2]	10001951	Can1, Can2
Pioneer 93M52	Reference	3.5	Conventional	10001311	Can2, IL1, IN3, MO2
NK S38-T8	Reference	3.8	Conventional	10001509	IL1, IN3, MO2
Lewis 3716	Reference	3.7	Roundup Ready[2]	10001278	IL1, IN3, MO2
Hoegemeyer 333	Reference	3.2	Conventional	10001590	Can2, IL1, IN3, MO2
Croplan HT3596STS	Reference	3.5	Conventional	10001450	IA1, IL2, KS, NE
NK S37-N4	Reference	3.7	Roundup Ready[2]	10001286	IA1, IL2, KS, NE
Stewart SB3454	Reference	3.4	Conventional	10000887	IA1, IL2, KS, NE
Midland 363	Reference	3.3	Conventional	10001570	IA1, IL2, KS, NE

[1]MON 87708 and the conventional control were planted at all field sites; the commercial reference varieties were site-specific. Site codes are as follows: AR = Jackson County, AR; Can1 = Norfolk, Ontario, Canada; Can2 = Kent, Ontario, Canada; IA1 = Jefferson County, IA; IA2 = Benton County, IA; IA3 = Howard County, IA; IL1 = Clinton County, IL; IL2 = Stark County, IL, IN1 = Boone County, IN; IN2 = Clinton County, IN; IN3 = Parke County, IN; KS = Pawnee County, KS; MI = Ottawa County, MI; MO1 = Shelby County, MO; MO2 = Macon County, MO; NE = York County, NE; PA = Berks County, PA; WI = Walworth County, WI.
[2]Commercial Roundup Ready soybean variety.

Table G-2. Field and Planting Information

Site	Planting Date[1]	Planting Rate (seeds/ft)	Planting Depth (in)	Plot Size (ft)[2]	Rows/ Plot	Soil Series, Organic Matter, pH	Cropping History 2007	Cropping History 2006
AR	05-29-08	8-9	0.75	10 × 20	4	Bosket sandy loam; 1.2%; 6.4	Cotton	Soybean
Can1	05-26-08	9	1.5	10 × 20	4	Norfolk sandy loam; 1.5%; 6.6	Corn	Soybean
Can2	05-27-08	9	1.5	10 × 20	4	Thames clay loam; 3.4%; 7.4	Corn	Soybean
IA1	06-07-08	9	1.25	10 × 20	4	Mahaska silty clay loam; 3.18%; 5.9	Sorghum	Soybean
IA2	06-19-08	9	2.0	10 × 20	4	Tama Muscatine silty clay loam; 3.9%; 6.1	Soybean	Milk thistle
IA3	06-26-08	9	1.0	10 × 20	4	Lawler loam; 7.3%; 7.6	Corn	Soybean
IL1	06-19-08	9	1.25	10 × 20	4	Cisne-Huey Complex silt loam; 1.3%; 7.1	Milo	Soybean
IL2	06-02-08	9	1.25	30 × 30	12	Plano silt loam; 3.5%; 6.4	Corn	Soybean
IN1	05-28-08	9	1.5	30 × 30	12	Crosby silt loam; 2.5%; 7.1	Corn	Soybean
IN2	05-27-08	9	1.5	10 × 20	4	Fincastle silt loam; 2.0%; 7.0	Sweet corn	Soybean
IN3	07-01-08	9	1.0	10 × 20	4	Silty loam; 3%; 6.5	Soybean	Wheat
KS	06-04-08	9	1−1.25	10 × 20	4	Farnum loam; 2.6%; 7.6	Sorghum	Winter wheat
MI	05-27-08	9	1.5	30 × 30	12	Nester loam; 2.1%; 6.5	Corn	Soybean
MO1	06-18-08	9	1.25	30 × 30	12	Putnam silt loam; 2.1%; 6.6	Corn	Soybean
MO2	06-19-08	9	1.0	10 × 20	4	Gorin silt loam; 4.2%; 6.3	Soybean	Fescue
NE	06-02-08	9	1.0	10 × 20	4	Hastings silt loam; 3.0%; 6.2	Soybean	Soybean
PA	06-03-08	9	1.25	10 × 20	4	Philo/Atkins silt loam; 2.0%; 6.2	Fallow	Tomatoes
WI	05-29-08	9	1.25	10 × 20	4	Radford silt loam; 2.2%; 5.9	Corn	Corn

[1]Month-day-year.
[2]Width × length.

G.5. Phenotypic Observations

The description of the characteristics measured and the designated developmental stages when observations occurred are listed in Table VII-1.

G.6. Environmental Interaction Observations

Environmental interactions (*i.e.*, interactions between the crop plants and their receiving environment) were used to characterize MON 87708 by evaluating plant response to abiotic stress, disease damage, arthropod-related damage, and pest and beneficial arthropod abundance in the plots using the methods described in G.7 and G.8.

G.7. Abiotic Stress Response, Disease Damage, and Arthropod-Related Damage

MON 87708 and the conventional control were evaluated at all 18 sites for differences in plant response to abiotic stress, disease damage, and arthropod-related damage. Three abiotic stressors, three diseases, and three arthropod pests were evaluated four times during the growing season at the following intervals:

Observation 1: V2 – V4 growth stage
Observation 2: R1 – R2 growth stage
Observation 3: R3 – R5 growth stage
Observation 4: R6 – R8 growth stage

The researcher at each field site chose abiotic stressors, diseases, and arthropod pests that were either actively causing plant injury in the study area or were likely to occur in soybean during the given observation period. Therefore, abiotic stressors, diseases, and arthropod pests assessed often varied between observations at a site and between sites.

Abiotic stress response and disease damage observations were collected from each plot using a continuous 0 – 9 scale of increasing severity. Data were collected numerically and then placed into one of the following categories for reporting purposes:

Rating	Severity of plant damage
0	none (no symptoms observed)
1 – 3	slight (symptoms not damaging to plant development)
4 – 6	moderate (intermediate between slight and severe)
7 – 9	severe (symptoms damaging to plant development)

Arthropod-related damage was assessed from each plot on the upper four nodes of 10 representative plants using the arthropod-specific 0 – 5 rating scales of increasing severity listed below.

Defoliating arthropods (*e.g.*, corn earworm, bean leaf beetle, Japanese beetle, soybean looper)	
Rating	**Severity of plant damage**
0	None
1	1 – 20 % defoliation
2	21 – 40% defoliation
3	41 – 60% defoliation
4	61 – 80% defoliation
5	> 80% defoliation

Pod feeding arthropods (*e.g.*, corn earworm, bean leaf beetle, stink bug, Lygus bug on reproductive plant parts)	
Rating	**Severity of plant damage**
0	None
1	1 – 20 % damaged pods
2	21 – 40% damaged pods
3	41 – 60% damaged pods
4	61 – 80% damaged pods
5	> 80% damaged pods

Leafhoppers (*e.g.*, potato leafhopper)	
Rating	**Severity of plant damage**
0	None
1	1 – 50% of foliage with leaf yellowing; no leaf puckering or leaf margin necrosis
2	1 – 50% of foliage with leaf yellowing, leaf puckering and/or leaf margin necrosis
3	> 50% of foliage with leaf yellowing; no leaf puckering or leaf margin necrosis
4	> 50% of foliage with leaf yellowing, leaf puckering, and/or leaf margin necrosis
5	> 50% of foliage with necrotic leaves (leaves dead due to leafhopper damage)

Aphids (*e.g.*, soybean aphid)	
Rating	**Severity of plant damage**
0	None
1	1 – 100 aphids per plant; no leaf puckering
2	101 – 250 aphids per plant; no leaf puckering
3	≥ 250 aphids per plant with leaf puckering
4	≥ 250 aphids per plant with leaf puckering and leaf yellowing and/or necrosis
5	≥ 250 aphids per plant with plant stunting

G.8. Arthropod Abundance

Pest and beneficial arthropods were collected at the IL2, IN1, MI, and MO1 sites four times during the growing season at the following intervals:

Collection 1: R1 – R2 growth stage
Collection 2: Approximately two weeks after collection 1
Collection 3: Approximately two weeks after collection 2
Collection 4: Approximately two weeks after collection 3

Arthropods were collected using a beat sheet sampling method (Kogan and Pitre, 1980). The beat sheet was a 36 × 42 inch white, vinyl sheet that was spread between the plants of two adjacent rows. Plants were shaken vigorously along the length of each side of the beat sheet to dislodge arthropods from the plants. A total of four subsamples were collected in this way from each plot. Specifically, two subsamples were collected from rows # 8 and 9 of each plot (subsamples 1 and 3) and two subsamples were collected from rows # 9 and 10 of each plot (subsamples 2 and 4). The subsamples collected from within each pair of rows were at least 10 feet apart and at least 3 feet from the edge of each plot. The four subsamples were combined into one pre-labeled container and placed on freezer ice packs. The samples were then sent overnight to Monsanto Company, St. Louis, MO for arthropod identification and enumeration.

A maximum of six pest and six beneficial arthropods were evaluated for each collection interval. These specific arthropods were then enumerated across all samples from a given collection interval at each individual site. Three of the six pest and three of the six beneficial arthropods were predetermined prior to the collection of samples, namely bean leaf beetle, green cloverworm, and stink bugs for the pests and Araneae (spiders), *Nabis* spp. and *Orius* spp. for the beneficial arthropods, and were evaluated from all collections from all sites. For each specific collection interval at each individual site, up to three additional pest and three additional beneficial arthropods, which were determined to be the most abundant, were evaluated across all samples from the site in addition to the predetermined arthropods. The suite of pest and beneficial arthropods assessed often varied between collections from a site and between sites due to differences in temporal activity and geographical distribution of arthropod taxa.

G.9. Environmental Interactions Evaluation Criteria

For the assessments of abiotic stress response and disease damage, MON 87708 and the conventional control were considered different in susceptibility or tolerance to an abiotic stress or disease on a particular observation date at a site if the range of injury severity to MON 87708 did not overlap with the range of injury severity to the conventional control across all three replications. These data are categorical and were not subjected to statistical analysis. For each observation at a site, the range of injury severity across the commercial reference varieties provided data that are representative of commercial soybean varieties. Arthropod-related damage and abundance data were quantitatively evaluated and subjected to statistical analysis as appropriate.

G.10. Data Assessment

Experienced scientists familiar with the experimental design and evaluation criteria were involved in all components of data collection, summarization, and analysis. Personnel assessed that measurements were taken properly, data were consistent with expectations based on experience with the crop, and the experiment was carefully monitored. Prior to analysis, the overall dataset was evaluated for evidence of biologically relevant changes and for possible evidence of an unexpected plant response. Any unexpected observations or issues that would impact the evaluation objectives were noted. Data were then subjected to statistical analysis as indicated below.

G.11. Statistical Analysis

Analysis of variance was conducted according to a randomized complete block design using SAS® (Version 9.2). The level of statistical significance was predetermined to be 5% (α=0.05). MON 87708 was compared to the conventional control within each site (individual-site analyses) and in a combined-site analysis, in which the data were pooled across sites, for early stand count, seedling vigor, days to 50% flowering, plant height, lodging, pod shattering, final stand count, seed moisture, 100 seed weight, seed test weight, and yield. Growth stage, flower color, plant pubescence, abiotic stress response, and disease damage data were categorical and not statistically analyzed. Arthropod-related damage and pest and beneficial arthropod abundance data were statistically analyzed only within individual observations/collections and sites due to the variation in temporal activity and geographical distribution of the taxa.

No statistical comparisons were made between MON 87708 and the commercial reference varieties. The reference range for each measured phenotypic characteristic was determined from the minimum and maximum mean values from among the 18 commercial reference varieties planted among the sites. The reference range for the damage from and abundance of each arthropod evaluated from a given observation/collection and site was determined from the minimum and maximum mean damage or abundance values collected from the commercial reference varieties planted at the site.

G.12. Individual Field Site Plant Growth and Development Results and Discussion

In the individual-site analyses, no statistically significant differences were detected between MON 87708 and the conventional control for 153 out of 179 comparisons for the assessed phenotypic characteristics (Table G-3). Lack of variability in the data precluded statistical comparisons between MON 87708 and the conventional control for seedling vigor at the IL2 site; days to 50% flowering at the IN1 site and MI sites; lodging at the Can1, IN3, and MO1 sites; and pod shattering at the Can1, Can2, IA1, IA2, IA3, IL1, IL2, IN1, IN2, IN3, KS, MI, and NE sites. For these data, the means for MON 87708 and the conventional control were the same value, indicating no biological differences (Table G-3).

A total of 26 statistically significant differences were detected between MON 87708 and the conventional control in the individual-site analyses (Table G-3). These differences were distributed among nine phenotypic characteristics. Seedlings of MON 87708 were less vigorous than the conventional control at the Can2 site (6.3 vs. 5.0 rating). MON 87708 flowered one day later than the conventional control at the MO2 site (214 vs. 213 days after Jan. 1, 2008), but one day earlier than the conventional control at the WI site (210 vs. 211 days after Jan. 1, 2008). Plants of MON 87708 were taller than the conventional control at the AR (28.9 vs. 27.1 inches), IA1 (39.1 vs. 34.1 inches), IA2 (37.1 vs. 34.6 inches), IL1 (26.1 vs. 22.3 inches), IN1 (33.6 vs. 30.5 inches), IN2 (39.6 vs. 37.3 inches), MO1 (23.4 vs. 21.1 inches), and MO2 (31.4 vs. 28.7 inches) sites. MON 87708 had more lodging than the conventional control at the IA1 (2.0 vs. 0.7 rating), IL2 (1.0 vs. 0.3 rating), and the WI (1.3 vs. 0.0 rating) sites, but less lodging than the conventional control at the KS site (1.3 vs. 2.0 rating). Final stand count was higher for MON 87708 than the conventional control at the IN3 site (330.3 vs. 298.0 plants/plot). Seed moisture was higher for MON 87708 than the conventional control at the WI site (11.7 vs. 11.2%). The weight of 100 seeds was lower for MON 87708 than the conventional control at the Can1 (15.9 vs. 17.1 g), Can2 (16.9 vs. 18.1 g), IL2 (14.2 vs. 15.0 g), NE (15.4 vs. 15.9 g), and PA (13.4 vs. 15.4 g) sites. Test weight was higher for MON 87708 than the conventional control at the AR site (55.4 vs. 54.0 lb/bu), but lower than the conventional control at the IL1 site (54.2 vs. 55.9 lb/bu). Yield was lower for MON 87708 than the conventional control at the AR (63.3 vs. 70.4 bu/a) and PA (53.9 vs. 65.5 bu/a) sites. Since the statistically significant differences detected in the individual-site analyses for seedling vigor, days to 50% flowering, lodging, final stand count, seed moisture, test weight, and yield were not detected in the combined--site analysis, this suggests these differences were not indicative of a consistent response in the data associated with the trait and are considered not biologically meaningful in terms of increased weediness of MON 87708 compared to the conventional control. While a statistically significant difference was detected for plant height and 100 seed weight in the combined-site analysis, the assessed phenotypic values of MON 87708 for both characteristics in the combined-site analysis were within the range of values observed for the commercial reference varieties.

Table G-3. Individual-Site Phenotypic Comparison of MON 87708 to Conventional Control

	Phenotypic Characteristic (units)							
	Early stand count (#/plot)		Seedling vigor (1-9 scale)		Days to 50% flowering[1]		Flower Color/Plant pubescence[2]	
Site	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708	Control
AR	160.3 (11.3)	142.7 (13.3)	6.0 (0.0)	6.0 (0.0)	183.3 (0.3)	183.0 (0.0)	Purple/hairy	Purple/hairy
Can1	224.7 (2.0)	237.3 (15.1)	3.0 (0.0)	3.0 (0.0)	201.0 (0.6)	200.3 (0.3)	Purple/hairy	Purple/hairy
Can2	327.3 (24.5)	363.0 (13.3)	6.3 (0.3)*	5.0 (0.0)	202.0 (0.0)	202.7 (0.7)	Purple/hairy	Purple/hairy
IA1	281.0 (11.9)	251.7 (16.8)	1.7 (0.7)	1.7 (0.3)	203.7 (0.7)	202.3 (1.3)	Purple/hairy	Purple/hairy
IA2	142.3 (23.0)	111.0 (21.3)	3.3 (0.3)	4.0 (0.6)	221.7 (0.7)	221.7 (0.7)	Purple/hairy	Purple/hairy
IA3	328.3 (13.7)	293.7 (2.7)	1.0 (0.0)	1.0 (0.0)	216.0 (0.0)	216.0 (0.0)	Purple/hairy	Purple/hairy
IL1	317.3 (4.4)	315.3 (5.0)	4.3 (0.3)	4.3 (0.3)	212.0 (0.0)	212.0 (0.0)	Purple/hairy	Purple/hairy
IL2	299.9 (3.5)	309.9 (1.2)	2.0 (0.0) †	2.0 (0.0)	203.3 (0.7)	203.3 (0.3)	Purple/hairy	Purple/hairy
IN1	307.9 (3.7)	305.0 (4.2)	5.7 (0.3)	4.7 (0.3)	206.0 (0.0)†	206.0 (0.0)	Purple/hairy	Purple/hairy
IN2	285.7 (55.4)	304.0 (39.3)	5.0 (1.0)	4.3 (0.7)	202.0 (0.0)	202.0 (0.0)	Purple/hairy	Purple/hairy
IN3	338.0 (5.1)	310.3 (15.5)	3.7 (0.9)	3.3 (0.9)	220.0 (0.0)	220.7 (0.7)	Purple/hairy	Purple/hairy
KS	198.0 (11.2)	175.3 (29.2)	2.7 (0.3)	3.3 (0.7)	198.7 (0.3)	199.0 (0.0)	Purple/hairy	Purple/hairy
MI	333.7 (3.1)	342.8 (3.2)	4.0 (0.0)	3.7 (0.3)	208.0 (0.0)†	208.0 (0.0)	Purple/hairy	Purple/hairy
MO1	195.2 (13.9)	219.4 (14.6)	4.7 (0.3)	4.7 (0.3)	212.7 (0.9)	213.0 (0.0)	Purple/hairy	Purple/hairy
MO2	325.7 (0.9)	318.0 (6.0)	3.3 (0.3)	2.7 (0.3)	214.0 (0.0)*	213.0 (0.0)	Purple/hairy	Purple/hairy
NE	271.3 (9.5)	254.7 (3.3)	2.3 (0.3)	2.3 (0.3)	199.3 (1.3)	198.0 (0.0)	Purple/hairy	Purple/hairy
PA	266.3 (14.3)	262.3 (14.0)	3.0 (0.6)	2.7 (0.3)	201.3 (0.3)	201.0 (0.0)	Purple/hairy	Purple/hairy
WI	277.0 (24.2)	254.0 (0.0)	1.3 (0.3)	1.0 (0.0)	210.0 (0.0)*	211.0 (0.0)	Purple/hairy	Purple/hairy

Table G-3 (continued). Individual-Site Phenotypic Comparison of MON 87708 to Conventional Control

	Phenotypic Characteristic (units)							
	Plant height (inch)		Lodging (0-9 scale)		Pod shattering (0-9 scale)		Final stand count (#/plot)	
Site	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)
AR	28.9 (0.2)*	27.1 (0.1)	2.7 (0.3)	2.0 (0.6)	0.3 (0.3)	0.3 (0.3)	140.3 (8.7)	138.0 (16.0)
Can1	32.1 (0.6)	31.7 (0.5)	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	240.3 (1.7)	248.0 (5.5)
Can2	40.1 (0.7)	38.6 (0.8)	4.0 (0.6)	3.3 (0.9)	0.0 (0.0)†	0.0 (0.0)	309.3 (6.9)	287.7 (2.3)
IA1	39.1 (0.5)*	34.1 (0.3)	2.0 (0.6)*	0.7 (0.3)	0.0 (0.0)†	0.0 (0.0)	242.7 (5.8)	221.3 (15.1)
IA2	37.1 (0.3)*	34.6 (0.4)	2.0 (0.0)	2.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	123.0 (17.7)	102.7 (17.9)
IA3	24.6 (0.5)	23.5 (0.8)	0.7 (0.3)	0.7 (0.3)	0.0 (0.0)†	0.0 (0.0)	293.3 (4.7)	285.7 (5.2)
IL1	26.1 (1.4)*	22.3 (0.2)	1.0 (0.0)	0.3 (0.3)	0.0 (0.0)†	0.0 (0.0)	321.7 (6.1)	317.0 (7.2)
IL2	39.0 (0.3)	37.4 (0.5)	1.0 (0.0)*	0.3 (0.3)	0.0 (0.0)†	0.0 (0.0)	295.9 (4.5)	287.0 (3.5)
IN1	33.6 (2.3)*	30.5 (1.9)	1.3 (0.3)	0.7 (0.3)	0.0 (0.0)†	0.0 (0.0)	223.5 (25.1)	223.9 (29.1)
IN2	39.6 (0.6)*	37.3 (0.4)	1.0 (0.0)	1.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	262.3 (7.0)	264.0 (39.2)
IN3	25.3 (0.3)	24.3 (0.5)	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	330.3 (7.7)*	298.0 (15.9)
KS	40.5 (1.5)	38.2 (1.3)	1.3 (0.3)*	2.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	187.7 (10.5)	167.0 (24.0)
MI	29.5 (2.6)	30.9 (1.8)	0.7 (0.3)	0.3 (0.3)	0.0 (0.0)†	0.0 (0.0)	304.2 (4.5)	308.8 (5.2)
MO1	23.4 (1.0)*	21.1 (0.8)	0.0 (0.0)†	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	186.8 (3.7)	214.8 (9.0)
MO2	31.4 (1.7)*	28.7 (1.1)	0.7 (0.3)	0.3 (0.3)	1.0 (0.0)	1.0 (0.0)	308.3 (1.7)	299.3 (1.9)
NE	40.5 (0.9)	38.9 (1.3)	0.3 (0.3)	1.0 (0.0)	0.0 (0.0)†	0.0 (0.0)	254.0 (7.8)	233.7 (5.9)
PA	32.9 (0.8)	33.3 (0.8)	1.3 (0.3)	0.7 (0.7)	0.0 (0.0)	0.0 (0.0)	260.0 (16.2)	255.0 (11.4)
WI	39.5 (0.7)	37.3 (0.3)	1.3 (0.3)*	0.0 (0.0)	0.0 (0.0)	0.5 (0.5)	235.7 (20.2)	223.0 (1.0)

Table G-3 (continued). Individual-Site Phenotypic Comparison of MON 87708 to Conventional Control

	Phenotypic Characteristic (units)							
	Seed moisture (%)		100 seed weight (g)		Test weight (lb/bu)		Yield bu/a)	
Site	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)	MON 87708 Mean (S.E.)	Control Mean (S.E.)
AR	9.5 (0.1)	9.7 (0.3)	16.1 (0.3)	15.1 (1.1)	55.4 (0.4)*	54.0 (0.7)	63.3 (3.7)*	70.4 (3.3)
Can1	12.4 (0.1)	12.1 (0.3)	15.9 (0.5)*	17.1 (0.0)	55.7 (0.4)	55.5 (0.5)	66.7 (3.0)	65.8 (5.0)
Can2	13.3 (0.2)	13.2 (0.1)	16.9 (0.2)*	18.1 (0.2)	57.3 (0.2)	57.4 (0.2)	76.4 (0.1)	78.5 (3.3)
IA1	11.4 (0.2)	11.2 (0.1)	15.0 (0.0)	14.7 (0.3)	55.6 (0.8)	54.5 (0.3)	71.7 (3.3)	75.0 (3.4)
IA2	12.6 (0.1)	12.1 (0.5)	16.5 (0.3)	16.0 (0.2)	57.3 (0.3)	57.3 (0.3)	54.7 (6.7)	45.5 (2.7)
IA3	7.5 (0.1)	7.5 (0.1)	12.0 (0.3)	12.5 (0.2)	58.1 (0.6)	57.2 (0.7)	20.5 (1.1)	20.4 (2.0)
IL1	10.4 (0.0)	10.4 (0.1)	11.7 (0.5)	12.0 (0.5)	54.2 (0.7)*	55.9 (0.2)	46.5 (5.5)	37.2 (1.8)
IL2	12.3 (0.1)	12.3 (0.3)	14.2 (0.1)*	15.0 (0.2)	54.3 (0.3)	54.3 (0.9)	55.3 (0.8)	55.9 (2.8)
IN1	9.2 (0.1)	9.3 (0.1)	14.5 (0.0)	14.6 (0.0)	55.4 (0.9)	54.6 (0.9)	56.0 (2.4)	55.5 (4.1)
IN2	10.9 (0.2)	10.7 (0.3)	14.9 (0.1)	15.0 (0.1)	51.0 (1.1)	50.7 (0.5)	61.9 (4.3)	66.2 (4.8)
IN3	10.0 (0.1)	10.0 (0.2)	16.0 (0.2)	16.4 (0.3)	59.5 (1.3)	59.6 (1.5)	48.7 (2.6)	45.8 (0.6)
KS	17.7 (0.2)	17.9 (0.3)	15.0 (0.0)	15.7 (0.3)	56.2 (0.4)	55.4 (0.3)	66.0 (2.9)	60.0 (6.0)
MI	15.5 (0.0)	14.8 (0.2)	18.2 (0.7)	18.8 (0.3)	56.6 (0.3)	56.2 (0.2)	42.9 (4.7)	44.2 (2.6)
MO1	11.9 (0.4)	12.1 (0.4)	14.3 (0.3)	15.0 (2.0)	55.8 (0.2)	55.7 (0.3)	35.1 (2.4)	31.6 (5.2)
MO2	12.0 (0.0)	11.8 (0.2)	15.3 (0.3)	15.7 (0.3)	54.0 (0.3)	53.5 (1.2)	43.5 (1.4)	40.0 (2.2)
NE	13.1 (0.1)	13.4 (0.3)	15.4 (0.2)*	15.9 (0.3)	59.2 (0.1)	59.1 (0.2)	69.3 (1.3)	71.5 (1.2)
PA	10.4 (0.2)	10.5 (0.2)	13.4 (0.3)*	15.4 (0.2)	57.2 (0.3)	57.5 (0.3)	53.9 (1.3)*	65.5 (2.1)
WI	11.7 (0.1)*	11.2 (0.1)	14.2 (0.2)	15.4 (0.4)	58.0 (0.6)	58.3 (0.3)	65.0 (2.7)	66.4 (1.3)

Note: The experimental design at each site was a randomized complete block with three replications. S.E. = Standard Error
[1]Calendar day number when approximately 50% of the plants in each plot were flowering.
[2]Flower color and plant pubescence data were categorical and were not statistically analyzed.
*Indicates a statistically significant difference between MON 87708 and the conventional control (α=0.05).
†No statistical comparisons were made due to lack of variability in the data.

Table G-4. Growth Stage Monitoring of MON 87708, Conventional Control, and the Commercial Reference Varieties

		Assessment Date and Range of Growth Stages Observed[2]									
Site[1]	Material	Obs. 1	Obs. 2	Obs. 3	Obs. 4	Obs. 5	Obs. 6	Obs. 7	Obs. 8	Obs. 9	Obs. 10
AR		06/18/2008	07/6/2008	07/23/2008	08/06/2008	08/23/2008	09/02/2008	9/24/2008	—	—	—
	MON 87708	V2	R2	R3	R5	R6	R6	R8	—	—	—
	Control	V2	R2	R3	R5	R6	R6	R8	—	—	—
	References	V2-V3	R2	R3	R5	R6	R6	R8	—	—	
Can1		06/11/2008	06/24/2008	07/08/2008	07/25/2008	08/11/2008	08/25/2008	09/08/2008	09/23/2008	10/10/2008	10/18/2008
	MON 87708	VE	V1-V2	V3-V4	R2	R3-R4	R4-R5	R5-R6	R6-R7	R7-R8	R8
	Control	VE	V1-V2	V3-V4	R2	R3-R4	R4-R5	R5-R6	R6-R7	R7-R8	R8
	References	VE	V1-V2	V3-V4	R2	R3-R4	R4-R5	R5-R6	R6-R7	R7-R8	R8
Can2		06/10/2008	06/25/2008	07/10/2008	07/21/2008	08/06/2008	08/23/2008	09/03/2008	09/20/2008	10/15/2008	
	MON 87708	VE	V2-V3	V5	R2	R3	R5	R6	R7	R8	—
	Control	VE	V2-V3	V5-V6	R2	R3	R5	R6	R7	R8	—
	References	VE	V2-V3	V5-V6	R2	R3	R5	R6	R7	R8	—
IA1		07/01/2008	07/16/2008	08/06/2008	08/27/2008	09/15/2008	10/1/2008				
	MON 87708	V1-V2	V6-V7	R2	R4	R6	R7-R8	—	—	—	—
	Control	V2	V6	R2-R3	R4	R6	R7-R8	—	—	—	—
	References	V1-V2	V6-V7	R2-R3	R4	R6	R7	—	—	—	—
IA2		07/17/2008	08/05/2008	08/20/2008	09/10/2008	09/29/2008	10/15/2008	11/04/2008			
	MON 87708	V3	R2	R3	R5	R6	R7	R8	—	—	—
	Control	V3	R2	R3	R5	R6	R7	R8	—	—	—
	References	V3	R2	R3	R5	R6	R7	R8	—	—	—

Table G-4 (continued). Growth Stage Monitoring of MON 87708, Conventional Control, and the Commercial Reference Varieties

		Date and Range of Growth Stages Observed[2]									
Site[1]	Substance	Obs. 1	Obs. 2	Obs. 3	Obs. 4	Obs. 5	Obs. 6	Obs. 7	Obs. 8	Obs. 9	Obs. 10
IA3		07/10/2008	07/20/2008	08/04/2008	08/24/2008	09/13/2008	09/30/2008				
	MON 87708	VC-V1	V1-V2	R2	R4	R5	R6	—	—	—	—
	Control	V1	V2	R2	R4	R5	R6	—	—	—	—
	References	VC-V1	V1-V2	R2-R3	R3-R4	R4-R6	R6	—	—	—	—
IL1		07/07/2008	07/22/2008	08/12/2008	09/01/2008	09/19/2008	10/06/2008				
	MON 87708	V1	R1	R2-R3	R6	R6	R8	—	—	—	—
	Control	V1	R1	R2	R5-R6	R6-R7	R8	—	—	—	—
	References	V1	R1	R2-R3	R5-R6	R6-R7	R8	—	—	—	—
IL2		06/25/2008	07/16/2008	08/07/2008	08/27/2008	09/17/2008	10/08/2008				
	MON 87708	V2	V6	R3	R5	R7	R7-R8	—	—	—	—
	Control	V2	V6	R3	R5	R7	R7-R8	—	—	—	—
	References	V2	V6	R3	R5	R7	R7-R8	—	—	—	—
IN1		06/25/2008	07/14/2008	07/25/2008	08/13/2008	08/28/2008	09/18/2008	10/01/2008			
	MON 87708	V2-V3	R1	R2	R5	R6	R7	R8	—	—	—
	Control	V2-V3	R1	R2	R4-R5	R6	R7	R8	—	—	—
	References	V2-V3	R1	R2	R4-R5	R6	R7-R8	R8	—	—	—
IN2		06/25/2008	07/14/2008	07/21/2008	08/11/2008	08/26/2008	09/10/2008	10/01/2008			
	MON 87708	V3	R1	R2	R5	R6	R6	R8	—	—	—
	Control	V2-V3	R1	R2	R5	R6	R6-R7	R8	—	—	—
	References	V2-V3	R1	R2	R4-R5	R6	R6-R7	R8	—	—	—

Table G-4 (continued). Growth Stage Monitoring of MON 87708, Conventional Control, and the Commercial Reference Varieties

		Date and Range of Growth Stages Observed[2]									
Site[1]	Substance	Obs. 1	Obs. 2	Obs. 3	Obs. 4	Obs. 5	Obs. 6	Obs. 7	Obs. 8	Obs. 9	Obs. 10
IN3		07/15/2008	08/08/2008	08/27/2008	09/11/2008	09/25/2008	10/07/2008	10/20/2008			
	MON 87708	V2	R1-R2	R4	R5	R6	R7	R8	—	—	—
	Control	V2	R1-R2	R4	R5	R6	R7	R8	—	—	—
	References	V2	R1-R2	R4	R5	R6	R7	R8	—	—	—
KS		06/27/2008	07/08/2008	07/23/2008	08/04/2008	08/18/2008	08/29/2008	09/10/2008	09/26/2008	10/10/2008	
	MON 87708	V2	V5-V6	R2	R3	R5	R5	R6	R8	R8	—
	Control	V2	V5-V6	R2	R3	R5	R5	R6	R8	R8	—
	References	V2	V5-V6	R2	R3	R4-R5	R5	R6	R7	R8	—
MI		06/24/2008	07/08/2008	07/22/2008	08/05/2008	08/18/2008	09/02/2008	09/17/2008	10/02/2008	10/13/2008	
	MON 87708	V2	V4-V5	V8-V9	R3	R5	R6	R6	R7	R8	—
	Control	V2	V4-V5	V8-V9	R3	R5	R6	R6	R7	R8	—
	References	V2	V4-V5	V8-V9	R3	R5	R6	R6	R7	R8	—
MO1		07/16/2008	07/30/2008	08/19/2008	09/09/2008	09/23/2008	10/07/2008	10/21/2008	10/31/2008		
	MON 87708	V2-V3	V5-R2	R4	R5	R6	R8	R8	R8	—	—
	Control	V3	R1	R4	R5	R6	R8	R8	R8	—	—
	References	V2-V3	R1-R2	R4	R5	R6	R7-R8	R8	R8	—	—
MO2		07/14/2008	08/02/2008	08/14/2008	08/20/2008	09/10/2008	09/24/2008	10/07/2008	10/31/2008		
	MON 87708	V2	R2	R3	R4	R6	R6	R8	R8	—	—
	Control	V2	R2	R3	R4	R6	R6	R8	R8	—	—
	References	V2-V3	R1-R2	R2-R3	R4	R5-R6	R6	R7-R8	R8	—	—

Table G-4 (continued). Growth Stage Monitoring of MON 87708, Conventional Control, and the Commercial Reference Varieties

		Date and Range of Growth Stages Observed[2]									
Site[1]	Substance	Obs. 1	Obs. 2	Obs. 3	Obs. 4	Obs. 5	Obs. 6	Obs. 7	Obs. 8	Obs. 9	Obs. 10
NE		06/26/2008	07/17/2008	08/07/2008	08/28/2008	09/23/2008	10/08/2008				
	MON 87708	V2	R1-R2	R4	R6	R7	R8	—	—	—	—
	Control	V2	R2	R4	R6	R7	R8	—	—	—	—
	References	V2	R1-R2	R4	R6	R7	R8	—	—	—	—
PA		06/20/2008	07/10/2008	07/24/2008	08/12/2008	08/29/2008	09/16/2008	09/30/2008	10/15/2008		
	MON 87708	V1	V4	R2	R4	R5-R6	R7	R8	R8	—	—
	Control	V1	V4	R2	R4	R5	R7	R7-R8	R8	—	—
	References	V1	V4-V5	R2-R3	R4-R5	R5-R6	R6-R7	R7-R8	R8	—	—
WI		07/01/2008	07/16/2008	08/08/2008	08/29/2008	09/16/2008	09/30/2008				
	MON 87708	V3	V5*	R3	R5	R6	R7	—	—	—	—
	Control	V3	V4	R3	R5	R6	R7	—	—	—	—
	References	V3	V4-V5	R3	R5	R6	R7	—	—	—	—

*Indicates that MON 87708 and the conventional control were not within the same range of plant growth stages on this observation date.
[1]Site codes are as follows: AR = Jackson County, AR; Can1 = Norfolk, Ontario, Canada; Can2 = Kent, Ontario, Canada; IA1 = Jefferson County, IA; IA2 = Benton County, IA; IA3 = Howard County, IA; IL1 = Clinton County, IL; IL2 = Stark County, IL; IN1 = Boone County, IN; IN2 = Clinton County, IN; IN3 = Parke County, IN; KS = Pawnee County, KS; MI = Ottawa County, MI; MO1 = Shelby County, MO; MO2 = Macon County, MO; NE = York County, NE; PA = Berks County, PA; WI = Walworth County, WI.
[2]Obs. = Observation number; dates in month/day/year format.
Dash (—) indicates information not available or plants had already reached full maturity (R8).

Table G-5. Abiotic Stress Response Evaluations of MON 87708 and Conventional Control Using an Observational Severity Scale

Abiotic Stressor	Number of observations across all sites	Number of observations where no differences were observed between MON 87708 and conventional control
Total	194	193
Cold	6	6
Compaction	9	9
Crusting	1	1
Drought	27	27
Excess moisture	20	20
Flooding	18	18
Frost	3	3
Hail	30	30
Heat damage	21	21
Mineral Toxicity	1	1
Nutrient deficiency[1]	28	28
Wind	30	29*

Note: The experimental design was a randomized complete block with three replications. Observations were conducted at four crop developmental stages: Observation 1 at V2-V4; Observation 2 at R1-R2; Observation 3 at R3-R5; Observation 4 at R6-R8.
*Indicates a difference observed between MON 87708 (slight damage observed) and the conventional control (no damage observed) for wind damage during Observation 4 at the WI site. Data were not subjected to statistical analysis.
[1]Includes iron deficiency.

Table G-6. Disease Damage Evaluations of MON 87708 and Conventional Control Using an Observational Severity Scale

Disease stressor	Number of observations across all sites	Number observations where no differences were observed between MON 87708 and conventional control
Total	215	215
Alternaria leaf spot	7	7
Anthracnose	10	10
Asian rust	4	4
Bacterial blight	16	16
Brown stem rot	5	5
Cercospora[1]	3	3
Charcoal rot	4	4
Downy mildew	7	7
Frogeye leaf spot	24	24
Phytophthora[2]	13	13
Pod and stem blight	1	1
Powdery mildew	20	20
Pythium	7	7
Rhizoctonia	10	10
Septoria brown spot[3]	39	39
Soybean cyst nematode	2	2
Soybean mosaic virus	1	1
Soybean rust[4]	14	14
Stem canker	2	2
Sudden death syndrome[5]	14	14
White mold	11	11
Yellow mosaic virus	1	1

Note: The experimental design was a randomized complete block with three replications. Observations were conducted at four crop developmental stages: Observation 1 at V2-V4; Observation 2 at R1-R2; Observation 3 at R3-R5; Observation 4 at R6-R8.

[1]Includes *Cercospora* leaf blight and *Cercospora* leaf disease.
[2]Includes *Phytophthora* root rot.
[3]Includes *Septoria.*
[4]Includes rust.
[5]Includes sudden death.

Table G-7. Arthropod–Related Damage Evaluations of MON 87708 and Conventional Control Using an Observational Severity Scale

Arthropod	Number of observations across sites[1]	Number of observations where no differences were detected between MON 87708 and conventional control[2]	Statistically Significant Differences[4]				
			Site[3]	Observation Number	Arthropod-Related Damage Rating (0-5 scale)		
					MON 87708 (S.E.)	Control (S.E.)	Reference Range
Aphid	33	31	IA2	3	0.3 (0.06)	0.5 (0.07)	0.3-0.5
			IA3	2	0.8 (0.03)	0.9 (0.06)	0.8-1.0
Armyworm	2	2	–	–	–	–	–
Bean leaf beetle	48	48	–	–	–	–	–
Blister beetle	5	4	MO1	2	0.1 (0.03)	0.4 (0.12)	0.0-0.2
Cabbage looper	1	1	–	–	–	–	–
Corn rootworm beetle	3	3	–	–	–	–	–
Cutworm	1	1	–	–	–	–	–
Fall armyworm	3	3	–	–	–	–	–
Grasshopper	29	29	–	–	–	–	–
Green cloverworm	10	10	–	–	–	–	–

Table G-7 (continued). Arthropod-Related Damage Evaluations of MON 87708 and Conventional Control Using an Observational Severity Scale

Arthropod	Number of observations across sites[1]	Number of observations where no differences were detected between MON 87708 and conventional control[2]	Statistically Significant Differences[4]				
			Site[3]	Observation Number	Arthropod-Related Damage Rating (0-5 scale)		
					MON 87708 (S.E.)	Control (S.E.)	Reference Range
Japanese beetle	27	25	IN1	2	0.6 (0.03)	0.9 (0.12)	0.7-0.9
			PA	4	0.6 (0.07)	0.4 (0.03)	0.3-0.5
Leafhopper[5]	5	4	PA	1	1.1 (0.07)	0.6 (0.23)	0.4-1.3
Seedcorn maggot	1	1	–	–	–	–	–
Soybean looper	7	7	–	–	–	–	–
Spider mite	8	8	–	–	–	–	–
Sting bug	24	24	–	–	–	–	–
Thistle caterpillar	3	3	–	–	–	–	–
Thrips	2	2	–	–	–	–	–
Yellow woollybear	4	4	–	–	–	–	–

Note: The experimental design was a randomized complete block design with three replications. Observations were conducted at four crop developmental stages: Observation 1 = V2-V4, Observation 2 = R1-R2, Observation 3 = R3-R5, and Observation 4 = R6-R8.

[1]Statistical comparisons were made between MON 87708 and the conventional control for 95 of the observations. Lack of variability in the data precluded statistical comparisons for 121 of the observations.

[2]No statistically significant difference ($\alpha = 0.05$) or numerical difference.

[3]Site codes IA2 = Benton County, IA; IA3 = Howard County, IA; IN1 = Boone County, IN; MO1 = Shelby County, MO; PA = Berks County, PA.

[4]Means, standard errors (S.E.), and reference ranges for differences between MON 87708 and the conventional control that were statistically different (α=0.05). Reference ranges were determined from the minimum and maximum mean values from among the commercial reference varieties.

[5]The difference detected in leafhopper damage during the first observation at the PA site was for damage caused by potato leafhoppers.

Dash (–) indicates no statistically significant difference between MON 87708 and the conventional control ($\alpha = 0.05$).

Table G-8. Abundance of Pest Arthropods in Beat Sheet Samples Collected from MON 87708, Conventional Control, and the Commercial Reference Varieties

		Pest Arthropod[2]								
		Aphid			Bean Leaf Beetle			Grape Colaspis		
Coll.	Site[1]	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range
1	IL2	–	–	–	13.7 (4.8)	13.7 (4.1)	6.3 - 13.3	0.7 (0.3)	1.3 (1.3)	0.3 - 2.7
	IN1	–	–	–	0.3 (0.3)	0.3 (0.3)	0.7 - 1.0	0.0 (0.0)	0.3 (0.3)	0.0 - 0.0
	MI	–	–	–	0.0 (0.0) †	0.0 (0.0)	0.0 - 0.0	–	–	–
	MO1	–	–	–	0.0 (0.0)	0.0 (0.0)	0.3 - 0.7	–	–	–
2	IL2	–	–	–	4.3 (2.6)	5.7 (3.5)	2.7 - 5.0	–	–	–
	IN1	–	–	–	1.3 (0.9)	2.0 (0.6)	0.3 - 1.7	–	–	–
	MI	816.7 (252.2)	383.3 (116.7)	600.0 - 1366.7	0.0 (0.0) †	0.0 (0.0)	0.0 - 0.0	–	–	–
	MO1	–	–	–	0.0 (0.0)	0.0 (0.0)	0.0 - 0.3	0.0 (0.0)	0.3 (0.3)	0.0 - 0.0
3	IL2	–	–	–	0.3 (0.3)	1.3 (0.9)	0.7 - 1.3	–	–	–
	IN1	–	–	–	0.3 (0.3)	0.7 (0.3)	0.0 - 1.3	–	–	–
	MI	93.3 (78.4)	33.3 (16.7)	3.3 - 60.0	0.0 (0.0)	0.0 (0.0)	0.0 - 0.3	–	–	–
	MO1	13.3 (3.3)	16.7 (3.3)	6.7 - 33.3	1.0 (1.0)	0.0 (0.0)	0.0 - 1.3	–	–	–
4	IL2	–	–	–	14.0 (3.5)	14.3 (4.7)	5.7 - 10.3	–	–	–
	IN1	–	–	–	2.0 (0.6)	2.3 (1.2)	0.3 - 2.0	–	–	–
	MI	–	–	–	0.0 (0.0) †	0.0 (0.0)	0.0 - 0.0	–	–	–
	MO1	–	–	–	5.0 (2.6)	3.3 (0.9)	3.3 - 4.7	–	–	–

Table G-8 (continued). Abundance of Pest Arthropods in Beat Sheet Samples Collected from MON 87708, Conventional Control, and the Commercial Reference Varieties

		Pest Arthropod[2]								
		Garden Flea-hopper			Green Clover-worm			Japanese Beetle		
Coll.	Site[1]	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range
1	IL2	-	-	-	0.0 (0.0) *	2.0 (0.0)	0.3 - 2.7	0.3 (0.3)	0.0 (0.0)	0.0 - 0.7
	IN1	-	-	-	0.0 (0.0)	0.3 (0.3)	0.0 - 1.3	9.0 (4.6)	12.0 (7.6)	0.7 - 11.7
	MI	-	-	-	1.7 (0.9) *	0.0 (0.0)	0.0 - 1.7	2.3 (1.9) *	8.0 (4.2)	1.7 - 5.7
	MO1	-	-	-	2.3 (1.9)	5.0 (2.1)	1.0 - 3.7	–	–	–
2	IL2	-	-	-	16.0 (5.0)	14.7 (2.8)	7.3 - 17.7	–	–	–
	IN1	-	-	-	6.3 (0.3)	3.7 (0.9)	3.7 - 7.3	1.3 (0.7)	0.7 (0.7)	0.5 - 2.7
	MI	-	-	-	1.7 (0.7)	2.7 (1.7)	1.0 - 3.0	2.7 (0.3)	5.3 (2.9)	1.0 - 5.0
	MO1	0.3 (0.3)	1.0 (0.6)	0.0 - 1.0	7.0 (2.3)	7.7 (0.3)	0.7 - 8.3	–	–	–
3	IL2	-	-	-	6.3 (2.8)	6.3 (2.4)	7.7 - 15.7	–	–	–
	IN1	-	-	-	7.0 (1.7) *	11.3 (2.2)	8.0 - 13.0	2.3 (0.3)	0.3 (0.3)	0.5 - 5.7
	MI	-	-	-	1.0 (0.6)	2.0 (0.6)	0.3 - 2.3	1.3 (0.9)	5.3 (1.8)	0.7 - 4.3
	MO1	-	-	-	1.3 (0.9)	1.3 (0.9)	0.0 - 1.3	–	–	–
4	IL2	-	-	-	1.0 (1.0)	1.0 (0.0)	0.3 - 2.0	–	–	–
	IN1	-	-	-	1.7 (0.9)	2.3 (1.2)	1.0 - 3.7	0.0 (0.0)	0.0 (0.0)	0.0 - 1.3
	MI	-	-	-	0.0 (0.0) *	0.7 (0.3)	0.0 - 0.0	0.0 (0.0)	0.3 (0.3)	0.0 - 1.3
	MO1	0.3 (0.3)	0.0 (0.0)	0.0 - 0.3	0.0 (0.0)	0.7 (0.7)	0.0 - 0.7	–	–	–

Table G-8 (continued). Abundance of Pest Arthropods in Beat Sheet Samples Collected from MON 87708, Conventional Control, and the Commercial Reference Varieties

		Pest Arthropod[2]								
		Potato Leafhopper			Stink Bug			Tarnished Plant Bug		
Coll.	Site[1]	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range
1	IL2	13.0 (10.1)	28.7 (12.3)	15.7 - 43.3	0.0 (0.0)	0.0 (0.0)	0.0 - 2.7	–	–	–
	IN1	–	–	–	0.0 (0.0)	0.3 (0.3)	0.0 - 0.3	–	–	–
	MI	–	–	–	0.0 (0.0)	0.3 (0.3)	0.0 - 0.3	1.3 (1.3)	0.3 (0.3)	0.3 - 1.0
	MO1	0.0 (0.0)	0.3 (0.3)	0.0 - 1.0	0.3 (0.3)	1.0 (0.6)	0.0 - 0.7	–	–	–
2	IL2	–	–	–	0.3 (0.3)	0.3 (0.3)	0.3 - 1.3	–	–	–
	IN1	–	–	–	0.7 (0.3)	0.0 (0.0)	0.3 - 0.7	–	–	–
	MI	–	–	–	0.3 (0.3)	1.0 (0.6)	1.0 - 6.3	1.3 (1.3)	3.0 (2.5)	0.7 - 4.0
	MO1	–	–	–	0.3 (0.3)	0.0 (0.0)	0.0 - 1.3	–	–	–
3	IL2	–	–	–	0.0 (0.0) *	1.3 (0.9)	0.0 - 0.7	0.0 (0.0)	0.0 (0.0)	0.0 - 1.0
	IN1	–	–	–	2.0 (1.5) *	0.0 (0.0)	0.0 - 0.7	–	–	–
	MI	–	–	–	2.0 (1.2)	2.3 (0.9)	1.7 - 3.7	6.0 (1.5)	12.3 (0.3)	6.0 – 13.0
	MO1	–	–	–	0.3 (0.3)	0.7 (0.7)	0.3 - 1.3	–	–	–
4	IL2	–	–	–	2.3 (0.3)	2.0 (1.5)	1.7 - 5.0	0.7 (0.7)	2.3 (0.7)	0.3 - 1.3
	IN1	–	–	–	1.3 (0.9)	1.0 (0.6)	1.0 - 5.0	–	–	–
	MI	–	–	–	3.7 (0.7)	3.0 (0.6)	1.7 - 4.7	2.0 (1.2)	1.7 (0.3)	1.3 - 1.3
	MO1	–	–	-	1.3 (0.9)	1.0 (0.6)	0.3 - 4.0	–	–	–

Table G-8 (continued). Abundance of Pest Arthropods in Beat Sheet Samples Collected from MON 87708, Conventional Control, and the Commercial Reference Varieties

		Pest Arthropod[2]					
		Velvet-bean Caterpillar			Wooly-bear Caterpillar		
Coll.	Site[1]	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range
1	IL2	–	–	–	–	–	–
	IN1	–	–	–	–	–	–
	MI	–	–	–	–	–	–
	MO1	–	–	–	–	–	–
2	IL2	–	–	–	–	–	–
	IN1	–	–	–	–	–	–
	MI	–	–	–	–	–	–
	MO1	–	–	–	–	–	–
3	IL2	–	–	–	–	–	–
	IN1	0.7 (0.7)	1.3 (0.3)	0.0 - 1.5	–	–	–
	MI	–	–	–	–	–	–
	MO1	–	–	–	–	–	–
4	IL2	–	–	–	–	–	–
	IN1	–	–	–	2.3 (0.9)	3.0 (1.2)	0.7 - 3.0
	MI	–	–	–	0.7 (0.3)	0.3 (0.3)	0.3 - 1.0
	MO1	–	–	–	0.0 (0.0)	0.0 (0.0)	0.0 - 0.7

Note: The experimental design was a randomized complete block with three replications. Arthropod collection (Coll.) 1 was conducted at the R1-R2 growth stage, and the three subsequent collections were conducted at approximately two week intervals thereafter.
* Indicates a statistically significant difference between MON 87708 and the conventional control (α=0.05).
† No statistical comparisons were made due to lack of variability in the data.
[1]Site codes are as follows: IL2 = Stark County, IL; IN1 = Boone County, IN; MI = Ottawa County, MI; MO1 = Shelby County, MO.
[2]MON 87708 and the conventional control values represent mean number of arthropods collected from three replications. S.E. = Standard Error Reference ranges were determined from the minimum and maximum mean values from among the commercial reference varieties at the site.
Dash (−) indicates arthropod not evaluated.

Table G-9. Abundance of Beneficial Arthropods in Beat Sheet Samples Collected from MON 87708, Conventional Control, and the Commercial Reference Varieties

		Beneficial Arthropod[2]								
		Araneae (spiders)			Big eyed bug			Carabidae		
Coll.	Site[1]	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range	MON 87708 (S.E.)	Control (S.E.)	Reference range
1	IL2	1.0 (1.0)	0.0 (0.0)	0.0 - 1.0	–	–	–	–	–	–
	IN1	0.0 (0.0)	0.0 (0.0)	0.0 - 0.7	–	–	–	–	–	–
	MI	0.0 (0.0)	0.0 (0.0)	0.0 - 0.3	–	–	–	–	–	–
	MO1	0.0 (0.0)	0.0 (0.0)	0.3 - 1.0	0.0 (0.0)	0.0 (0.0)	0.0 - 0.3	–	–	–
2	IL2	0.7 (0.3)	1.0 (0.0)	0.0 - 1.3	–	–	–	–	–	–
	IN1	0.3 (0.3)	0.7 (0.7)	0.3 - 0.7	–	–	–	–	–	–
	MI	1.3 (0.3)	0.7 (0.3)	0.0 - 1.0	–	–	–	–	–	–
	MO1	3.7 (2.7)	1.0 (0.0)	0.7 - 2.3	0.0 (0.0)	0.3 (0.3)	0.0 - 0.3	–	–	–
3	IL2	0.0 (0.0)	0.3 (0.3)	0.0 - 0.3	–	–	–	0.3 (0.3)	0.0 (0.0)	0.0 - 0.7
	IN1	0.0 (0.0)	0.3 (0.3)	0.0 - 0.3	–	–	–	–	–	–
	MI	0.3 (0.3)	0.3 (0.3)	0.0 - 0.0	–	–	–	–	–	–
	MO1	7.7 (0.9)	7.7 (0.9)	4.3 - 7.7	–	–	–	–	–	–
4	IL2	0.3 (0.3)	0.7 (0.7)	0.3 - 1.3	–	–	–	–	–	–
	IN1	0.3 (0.3)	0.0 (0.0)	0.0 - 1.0	–	–	–	–	–	–
	MI	0.0 (0.0)*	3.0 (0.6)	0.7 - 1.0	–	–	–	–	–	–
	MO1	0.3 (0.3)	0.3 (0.3)	1.0 - 2.0	–	–	–	–	–	–

(b) (4)

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References for Appendix G

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SAS Software Release 9.2 (TS1M0). ©2002-2008 by SAS Institute Inc., Cary, North Carolina.

Appendix H: Materials and Methods for Pollen Morphology and Viability Assessment

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[redacted] samples from all plots within a replicate were stained and evaluated on the same day.

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Alexander, M.P. 1980. A versatile stain for pollen fungi, yeast and bacteria. Stain Technology 55:13-18.

SAS Software Release 9.2 (TS1M0). ©2002-2008 by SAS Institute Inc., Cary, North Carolina.

Appendix I: Materials and Methods for Symbiont Assessment

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References for Appendix I

SAS Software Release 9.2 (TS1M0). ©2002-2008 by SAS Institute Inc., Cary, North Carolina.

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Monsanto considers product stewardship to be a fundamental component of customer (b) (4) [redacted]

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[29] An allele is any of several forms of a gene, usually arising through mutation, that are responsible for hereditary variation.

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