

**SUMMARY**

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for public release after registration)

**STUDY TITLE**

Quantitative ELISA Analysis of Cry1F and PAT Protein Expression Levels, and Composition of the  
Hybrid Maize Line Containing Event TC1507

**DATA REQUIREMENTS**

None

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**STUDY COMPLETED ON**

January 15, 2002

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**STUDY NUMBER**

PHI-2000-016

Quantitative ELISA Analysis of Cry1F and PAT Protein Expression Levels, and Composition of the Hybrid Maize Line Containing Event TC1507

### SUMMARY

Maize containing event TC1507 was modified to express the Cry1F protein from *Bacillus thuringiensis* var. *aizawai*. This protein confers resistance to certain lepidopteran pests including the European Corn Borer (*Ostrinia nubilalis* Hubner) insect pest. Maize containing event TC1507 also contains a synthetic *pat* gene, derived from *Streptomyces viridochromogenes*, which encodes phosphinothricin acetyl transferase (PAT). Expression of the PAT protein in transformed plants confers tolerance to broad spectrum, non-systemic, non-selective herbicides containing the active ingredient glufosinate-ammonium.

This study was conducted to evaluate expression levels of Cry1F and PAT proteins in line 1507 and to demonstrate equivalency of this modified hybrid to the non-modified (control) version. Nutrient composition was evaluated and compared with the control hybrid. Agronomic characteristics of each hybrid were also recorded throughout the growing season. To identify potential effects related to glufosinate-ammonium herbicide application, the 1507 hybrid was evaluated with and without glufosinate-ammonium herbicide treatment.

The study contained 6 separate field trials located within commercial maize growing regions (France, Italy and Bulgaria) of Europe. Grain and forage samples were collected and analyzed for nutrient composition. Multiple plant tissues (leaf, whole plant, pollen, stalk and grain) were collected at various growth stages (V9, R1, R4, R6 and senescence) throughout the growing season and analyzed by ELISA to quantify levels of the Cry1F and PAT protein.

Agronomic characteristic evaluations and nutrient composition analysis demonstrate that the modified *B. t.* Cry1F maize line 1507 is substantially equivalent to the non-transformed comparator and commercial maize.

ELISA analysis of *B. t.* Cry1F maize line 1507 detected quantifiable levels of Cry1F protein in all tissue types evaluated with mean levels of 69 to 1310 pg/ $\mu$ g total extractable protein (TEP) in grain and R1 whole plant, respectively. When evaluated on a dry weight basis, mean Cry1F levels were from 1.6 and 22.4 ng/mg for whole plant (forage and senescence) and pollen, respectively. Cry1F levels were similar between the glufosinate-ammonium treated plants and the non-treated plants. No quantifiable levels of Cry1F protein were detected in the control tissues.

Quantifiable levels of PAT protein were present in early developing (V9) leaf (mean values from 55.3 to 81.9 pg/ $\mu$ g TEP) and whole plant (V9 and R1) (mean values from 8.6 to 9.9 pg/ $\mu$ g TEP) tissue. Mean PAT levels on a dry weight basis ranged from 0.04 to 5.2 ng/mg in whole plant and leaf, respectively. Mean PAT protein levels were below the level of quantitation (LOQ) in grain, pollen, stalk, forage and senescent whole plant tissue.

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**STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS**

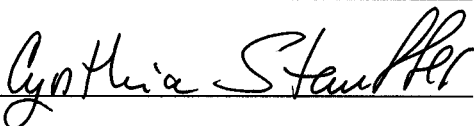
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No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA Section 10(d)(1)(A), (B), or (C). \*

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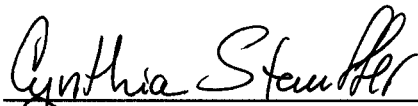
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### STATEMENT OF COMPLIANCE

This study was not conducted according to the United States EPA FIFRA Good Laboratory Practice Standards (40 CFR Part 160). However, documentation of all critical data and quality control measures were used to ensure the integrity of the study results. Quality control measures included, but were not limited to, maintenance of test substance chain of custody; separation of test and control substances during planting and sampling; and documentation of critical data.

  
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15 January 2002  
Date

  
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**SIGNATURE PAGE**

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**ABSTRACT**

Maize containing event TC1507 was modified to express the Cry1F protein from *Bacillus thuringiensis* var. *aizawai*. This protein confers resistance to certain lepidopteran pests including the European Corn Borer (*Ostrinia nubilalis* Hubner) insect pest. Maize containing event TC1507 also contains a synthetic *pat* gene, derived from *Streptomyces viridochromogenes*, which encodes phosphinothricin acetyl transferase (PAT). Expression of the PAT protein in transformed plants confers tolerance to broad spectrum, non-systemic, non-selective herbicides containing the active ingredient glufosinate-ammonium.

This study was conducted to evaluate expression levels of Cry1F and PAT proteins in line 1507 and to demonstrate equivalency of this modified hybrid to the non-modified (control) version. Nutrient composition was evaluated and compared with the control hybrid. Agronomic characteristics of each hybrid were also recorded throughout the growing season. To identify potential effects related to glufosinate-ammonium herbicide application, the 1507 hybrid was evaluated with and without glufosinate-ammonium herbicide treatment.

The study contained 6 separate field trials located within commercial maize growing regions (France, Italy and Bulgaria) of Europe. Grain and forage samples were collected and analyzed for nutrient composition. Multiple plant tissues (leaf, whole plant, pollen, stalk and grain) were collected at various growth stages (V9, R1, R4, R6 and senescence) throughout the growing season and analyzed by ELISA to quantify levels of the Cry1F and PAT protein.

Agronomic characteristic evaluations and nutrient composition analysis demonstrate that the modified *B. t.* Cry1F maize line 1507 is substantially equivalent to the non-transformed comparator and commercial maize.

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Quantifiable levels of PAT protein were present in early developing (V9) leaf (mean values from 55.3 to 81.9 pg/ $\mu$ g TEP) and whole plant (V9 and R1) (mean values from 8.6 to 9.9 pg/ $\mu$ g TEP) tissue. Mean PAT levels on a dry weight basis ranged from 0.04 to 5.2 ng/mg in whole plant and leaf, respectively. Mean PAT protein levels were below the level of quantitation (LOQ) in grain, pollen, stalk, forage and senescent whole plant tissue.

**SCIENTIFIC TERMS AND ABBREVIATIONS**

ADF	Acid Detergent Fiber
AOAC	Association of Official Analytical Chemists
AOCS	American Oil Chemists' Society
BSA	Bovine Serum Albumin
BU1	Tchavdarzi, Bulgaria field site 1
CH	Control Hybrid
cm	centimeter
<i>cry1F</i>	gene that encodes the Cry1F insecticidal crystal protein
Cry1F	insecticidal crystal protein from <i>Bacillus thuringiensis</i> var. <i>aizawai</i>
d.w.	dry weight basis
ECB	European Corn Borer
ELISA	Enzyme Linked Immunosorbant Assay
ESI	Eurofins Scientific, Inc.
FR1	Verneuil, France field site 1
FR2	Menville, France field site 2
FR3	Meauzac, France field site 3
IT1	Cremona, Italy field site 1
IT2	Crevalcore, Italy field site 2
K	Potassium
kg ai/ha	kilograms of active ingredient per hectare
LLOQ	Lower Limit Of Quantitation
LOQ	Level Of Quantitation
N	Nitrogen
NA	Not Applicable
NDF	Neutral Detergent Fiber
NR	Not Recorded
OD	Optical Density
P	Phosphate
<i>pat</i>	phosphinothricin acetyl transferase gene
PAT	phosphinothricin acetyl transferase enzyme
PHI	Pioneer Hi-Bred International, Inc.
pNNP	para-nitrophenol phosphate
ppm	parts per million
R1	"silking", stage of plant development when silks become visible

R4	"dough", stage of plant development when the material within the kernel is of a doughy consistency. This stage can occur as early as 24 days after pollination.
R6	"physiological maturity", stage of plant development when kernels have reached their maximum dry weight or dry matter accumulation. The husk and many leaves are no longer green (stalk may be green).
SA/AP	Streptavidin-Alkaline Phosphatase
SDS-PAGE	Sodium Dodecyl Sulfate - Polyacrylamide Gel Electrophoresis
TIU	Trypsin Inhibitor Units
TEP	Total Extractable Protein
V4	stage of plant development when the collar of the 4 <sup>th</sup> leaf is visible
V5	stage of plant development when the collar of the 5 <sup>th</sup> leaf is visible
V7	stage of plant development when the collar of the 7 <sup>th</sup> leaf is visible
V9	stage of plant development when the collar of the 9 <sup>th</sup> leaf is visible

## INTRODUCTION

### A. Background

Maize (*Zea mays*) lines containing event TC1507 have been modified with the *cry1F* gene from *Bacillus thuringiensis* that encodes the Cry1F protein. The Cry1F protein possesses insecticidal activity against certain lepidopteran insect pests including the European corn borer (ECB). Maize lines containing event TC1507 also contain a synthetic *pat* gene, derived from *Streptomyces viridochromogenes*, which encodes the phosphinothricin acetyl transferase (PAT) protein (enzyme) that confers tolerance to herbicides containing the active ingredient glufosinate-ammonium. The PAT protein is present to enable the selection of cells, in tissue culture, that contain the *cry1F* gene and also confers tolerance to glufosinate-ammonium under field conditions.

### B. Purpose

The purpose of this study was to evaluate the hybrid maize line containing event TC1507 for: Cry1F and PAT protein expression, nutrient composition and agronomic characteristics with and without glufosinate-ammonium herbicide treatment.

## MATERIALS

### A. Test substance

The test substance was seed of a maize line containing event TC1507. Plants grown from this seed are capable of expressing the Cry1F and PAT proteins.

Initial characterization of the test substance consisted of documentation of the breeding lineage of the seed designated 35R57-TC1507. The test substance seed source used in the study was assumed to be fixed for the *cry1F* and *pat* gene. Therefore, all plants of the test substance were capable of producing the Cry1F and PAT protein. Confirmation of the PAT protein expression was verified through broadcast (sprayed plots) or localized leaf-paint applications (non-sprayed) of glufosinate-ammonium to plants to be sampled. All plants sampled were confirmed positive (tolerant of glufosinate-ammonium) prior to sampling. Pedigree information for the hybrid is proprietary information and is on file with staff breeders at Pioneer Hi-Bred International, Inc., Johnston, Iowa, U.S.A.. Definitive characterization of the test substance occurred during the study; confirmation of tolerance to glufosinate-ammonium in the field and specific ELISA for the detection and quantification of the Cry1F and PAT proteins were performed.

### B. Control substance

The control substance 35R57 was a maize hybrid with background genetics representative of the test substance but did not contain the gene for Cry1F and PAT (designated CH, for Control Hybrid), i.e., was not genetically modified. Pedigree information for the hybrid control is on file with staff breeders at Pioneer Hi-Bred International, Inc., Johnston, Iowa.

Prior to planting, all seed was stored under appropriate conditions to maintain seed viability and vigor (Wych, 1988).

### C. Reference substances

Reference substances employed in the analytical portion of this study were purified Cry1F and PAT proteins used as standards in the enzyme linked immunosorbant assay (ELISA) analysis and bovine serum albumin (BSA) used as the standard for total extractable protein analysis.

#### Cry1F Protein Standard

Identity: Cry1F Protein Standard  
Source: Dow AgroSciences LLC, San Diego, CA.  
Lot #: 082597  
Purity: >95%  
Storage conditions: 4°C  
Stability: The reference substance was considered stable under the storage conditions noted above. Stability was demonstrated through consistency of standard responses and by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) over the course of the study.

#### PAT Protein Standard

Identity: PAT Protein Standard  
Source: Pioneer Hi-Bred International, Inc., Johnston, IA.  
Lot #: 020800  
Purity: >95%  
Storage conditions: short term storage: 4°C (opened aliquot)  
long-term storage: -80°C (unopened aliquot)  
Stability: The reference substance was considered stable under the storage conditions noted above. Stability was demonstrated through consistency of standard responses and by SDS-PAGE over the course of the study.

#### Bradford Protein Standard

Identity: Bio-Rad Protein Assay Standard II Bovine Serum Albumin (Bio-Rad catalog #500-0007)  
Source: Bio-Rad Laboratories, Hercules, CA.  
Lot #: 69300A  
Purity: 64.46%  
Storage conditions: short term storage: 2-8°C  
long-term storage: -10 to -24°C  
Stability: As supplied by the manufacturer:

- short term storage: 60 days at a concentration of 1.38 mg/ml in nanopure water.
- long term storage: 5 years, as supplied.
- Stability was demonstrated through consistency of standard responses over the course of the study.

### D. Test system

The test system for this study was the environment in which the maize plants were grown. Test or control substances were administered to the field test system by conventional planting. Six field sites were employed in the study; all located within suitable maize-growing regions of Europe. Sites were located in France (3 sites), Italy (2 sites) and Bulgaria (1 site). Each site was identified by a unique identification code.

## METHODS

### A. Field trial

#### 1. Summary of experimental design

Each site contained 3 blocks (replicates) with hybrid entries located randomly within each block. Each block contained 3 entries (TC1507, TC1507 S with glufosinate-ammonium, non-sprayed control). To prevent possible effects from herbicide drift, the non-sprayed control was nested (grouped) with the non-sprayed TC1507 entry in each block. Block 1 contained 3-row plots to provide sufficient plants for the collection of expression and nutrient composition samples. Blocks 2 and 3 contained 2-row plots which provided nutrient composition samples only. Each location utilized a unique entry randomization (Figures 1-6).

#### 2. Planting

The field sites at each location were prepared by plowing and/or cultivation prior to planting. The test and control lines were planted at a depth of 3.5 to 7 cm. Between 24 and 30 kernels of each line were planted per row of each plot. The row lengths were between 5.20 meters and 6 meters. Rows were 0.75 to 0.80 meters apart. Important crop dates (i.e. planting, pollination and field trial termination) are shown in Table 1.

#### 3. Agronomic practices

Agricultural practices for growing the test and control substances were typical for producing maize in the regions chosen for this study. Pesticide and fertilizer applications were typical for commercial maize production and are shown in Tables 2-7. Besides the glufosinate-ammonium spray treatment, all maintenance and production practices were applied consistently across the entire trial site at each location.

Planting occurred within the normal range of planting dates for the maize growing area of each location.

#### 4. Herbicide Application

Since event TC1507 contains the pat gene, the transgenic maize line was evaluated with and without glufosinate-ammonium herbicide treatment. Glufosinate-ammonium was applied as a broadcast spray in sequential (V4 followed by V7) treatments. The first application (V4) was made at a rate of 0.50 kg ai/ha followed by a second application (V7) at a rate of 0.41 kg ai/ha.

#### 5. Preservation of Genetic Purity

Controlled, hand-pollinations were performed to ensure that each plant selected for sampling was self-pollinated (fertilized with its own pollen).

#### 6. Climate

Weather conditions (daily min/max temperatures and precipitation) were documented at each site from the time of planting until final sample collection and are summarized in Tables 8-9. Environmental conditions during the growing season were similar to historical averages (recorded at nearby government recording stations) except for higher precipitation at the IT2 (July, Oct.) and FR2 (June, Oct.) locations. Conditions at the Bulgaria location were typically dry, however, irrigation was used to supplement natural rainfall. Rainfall and supplemental irrigation was sufficient to produce maize typical of the growing area.

## 7. Sampling

All samples were uniquely identified by project number and samples codes that described the origin of a sample by location, line, replicate, block and tissue type. Silk tissue was not analyzed for protein expression due to poor recovery of PAT and Cry1F protein in silk tissue. Forage samples from the FR2 location were in poor condition and therefore not analyzed. These samples were removed from the study via protocol amendment. Table 21 lists the sampling dates for all tissue samples collected.

Protein expression samples were collected from block 1. Nutrient composition samples were collected from blocks 1, 2 and 3. All samples were maintained cool in the field using coolers with artificial, wet or dry ice until transfer to frozen (<-12°C) storage within 3 hours of sampling. All samples collected were shipped frozen to the Pioneer Hi-Bred International, Inc. laboratory in Aussonne, France where they were consolidated and dried (lyophilized or oven-dried) prior to frozen shipment to the U.S.A. for analysis.

Leaf: Leaf samples were collected at approximately the V9 growth stage (collar of 9<sup>th</sup> leaf visible). For each test entry, single leaves from five positive plants were collected. For the control line, a leaf from one plant was collected.

Whole plant [V9, R1, R4 (forage) and senescence]: Three whole plants were collected from each entry (test and control) at the appropriate growth stage (V9, R1, R4 and senescence). Each sample (three plants per entry) was chopped in approximately 1 to 3 cm sections. The samples were either oven-dried at the field site or stored frozen at the field site before shipment to the laboratory where they were dried prior to analysis. The chopped samples were dried at 55 to 65°C for 24 to 48 hours (or until a constant weight was achieved).

Pollen: For each test entry, pollen from five positive plants was collected at the R1 (silking) stage of development. For the control line, pollen from one plant was collected at the same stage of development. Pollen samples were lyophilized prior to analysis.

Stalk: For each test entry, 5 stalk samples were collected from 5 separate plants at the R1 (silking) stage of development. Stalk tissue was collected from 1 plant of the control entry. Stalk samples were lyophilized prior to processing and analysis.

Grain: Five ears from five test and control entry plants were collected at the R6 stage of development (physiological maturity). Ears were harvested when they were below 15% moisture content or were dried at 27 to 38°C to bring the moisture content to less than 15%. After drying, the ears were individually shelled and placed in separate labeled bags.

## C. Sample Processing

Following collection of the field samples, tissues were processed prior to submitting them for analysis. Whole plant and stalk samples were ground using a Wiley mill fitted with a 1 mm screen. Leaf samples were lyophilized prior to grinding with proprietary equipment designed to homogenize tissue using ball-bearings and agitation. Grain samples designated for ELISA were homogenized using a similar homogenization procedure followed by lyophilization. The remaining whole grain samples and ground forage samples were submitted to the nutrient analysis laboratory where they were further processed and analyzed according to standard procedures. Pollen samples required no special processing prior to or after lyophilization.

To prepare the samples for protein analysis, pre-weighed samples were removed from ultra-low (-80°C) storage and allowed to equilibrate to ambient temperature (20 - 25°C). Samples were extracted with 600 µl phosphate buffered saline with tween solution (PBST) and two steel balls using the GenoGrinder 2000™ (Spex CertiPrep, Inc). Insoluble material was removed by centrifugation.

## D. Analytical methods

### Total extractable protein

The total extractable protein (TEP) concentration of supernatant from each sample was determined by the Bradford method (Bradford, 1976) using the microtiter plate application of the Bio-Rad Protein Assay. Bio Rad's Protein Assay Standard II was used as the protein standard. Results from this assay were expressed in mg total protein/ml of extract. Based on these concentrations, the volume of extract for further analyses was determined such that a constant amount of protein was delivered in each well of the plate. The amount of TEP dispensed on the Cry1F and PAT ELISA plates for each tissue type was as follows:

- **Leaf extracts:**
  - TEP of 1 µg/well (20 µg/ml) for the Cry1F assay.
  - TEP of 2.5 µg/well (50 µg/ml) for the PAT assay.
- **Whole Plant V9 extracts:**
  - TEP of 0.1 µg/well (2 µg/ml) for the Cry1F assay.
  - TEP of 5 µg/well (100 µg/ml) for the PAT assay.
- **Pollen extracts:**
  - TEP of 1 µg/well (20 µg/ml) for the Cry1F assay.
  - TEP of 5 µg/well (100 µg/ml) for the PAT assay.
- **Stalk extracts:**
  - TEP of 0.2 or 1 µg/well (4 or 20 µg/ml) for the Cry1F assay.
  - TEP of 2.5 or 5 µg/well (50 or 100 µg/ml) for the PAT assay.
- **Whole Plant R1 extracts:**
  - TEP of 0.1 µg/well (2 µg/ml) for the Cry1F assay.
  - TEP of 5 µg/well (100 µg/ml) for the PAT assay.
- **Forage R4 extracts:**
  - TEP of 0.1 µg/well (2 µg/ml) for the Cry1F assay.
  - TEP of 5 µg/well (100 µg/ml) for the PAT assay.
- **Grain extracts:**
  - TEP of 1 µg/well (20 µg/ml) for the Cry1F assay.
  - TEP of 2.5 µg/well (50 µg/ml) for the PAT assay.
- **Whole Plant Senescence extracts:**
  - TEP of 0.5 µg/well (10 µg/ml) for the Cry1F assay.
  - TEP of 5 µg/well (100 µg/ml) for the PAT assay.

### Cry1F ELISA.

A direct double antibody ELISA was employed to quantify levels of Cry1F protein in all plant tissue samples. The method uses a polyclonal rabbit antibody specific to the Cry1F protein to capture the analyte in the microtiter well. The captured protein is detected by a second Cry1F-specific polyclonal antibody conjugated to biotin. The binding of the biotinylated antibody to the captured Cry1F protein is detected by a conjugate of streptavidin-alkaline phosphatase (SA/AP). The enzyme substrate, para-nitrophenyl phosphate (pNPP), is added for color development. Quantification of Cry1F protein is accomplished by extrapolation [based on sample absorbance (optical density; OD) value] from a Cry1F standard protein curve. Duplicate wells were used for

each sample. The ELISA values were expressed as pg Cry1F protein/ $\mu$ g TEP and as ng Cry1F protein/mg tissue on a dry weight basis.

Samples designated as "0" or <LLOQ yielded an interpolated concentration of <25 pg/well (0.5 ng/ml) for the Cry1F assay. The 25 pg/well (0.5 ng/ml) standard concentration is the lower limit of quantitation (LLOQ) for the Cry1F ELISA analytical method.

#### PAT ELISA.

A direct double antibody ELISA was employed to quantify levels of PAT protein in all plant tissue samples. The method uses a polyclonal rabbit antibody specific to the PAT protein to capture the analyte in the microtiter well. The captured protein is detected by a second PAT-specific polyclonal antibody conjugated to biotin. The binding of the biotinylated antibody to the captured PAT protein is detected by a conjugate of streptavidin-alkaline phosphatase (SA/AP). The enzyme substrate, para-nitrophenyl phosphate (pNPP), is added for color development. Quantification of PAT protein is accomplished by extrapolation [based on sample absorbance (optical density; OD) value] from a PAT standard protein curve. Duplicate wells were used for each sample. The ELISA values were expressed as pg PAT protein/ $\mu$ g TEP and as ng PAT protein/mg tissue on a dry weight basis.

Samples designated as "0" or <LLOQ yielded an interpolated concentration of <30 pg/well (0.6 ng/ml) for the PAT assay. The 30 pg/well (0.6 ng/ml) standard concentration is the lower limit of quantitation for the PAT ELISA. Formulas and example calculations are presented in Appendix 4.

### **E. Composition analyses**

*The following analyses were conducted at Eurofins Scientific, Inc.(ESI) laboratories, Memphis, TN, USA.*

#### Moisture (Grain and Forage)

Moisture content (% of wet weight) was determined using Association of Official Analytical Chemists (AOAC) method 934.01 / 4.1.03 16<sup>th</sup> Ed. The level of quantitation for this assay was 0.03 %. Moisture is the actual water content and any material which is volatile under the conditions of the test.

#### Fat (Grain and Forage)

Crude fat content [% of dry weight (d.w.)] was determined using the AOAC method 954.02. This determines the substances extracted by petroleum ether under the conditions of the method. The level of quantitation for this assay was 0.1 % d.w.

#### Protein (Grain and Forage)

Crude protein content (% of dry weight) was determined by use of the American Oil Chemists' Society (AOCS) method Ba 4e-93. Mixtures of true proteins, composed of amino acids, and non-protein nitrogen make up the crude protein content. Protein is determined by measuring the amount of nitrogen and multiplying by 6.25. The general term "protein" refers to crude protein which includes both available and non-available crude protein. The level of quantitation for this assay was 0.30 % d.w.

#### Crude Fiber (Grain)

Crude Fiber content (% of dry weight) was determined using AOAC method 962.09. The level of quantitation for this assay was 0.1 % d.w.

#### Acid Detergent Fiber (Grain and Forage)

Acid Detergent Fiber (ADF) content (% of dry weight) was determined using AOAC method 973.18 (final action 1977) 4.6.3 16<sup>th</sup> Ed. The level of quantitation for this assay was 0.2 % d.w.

#### Neutral Detergent Fiber (Grain and Forage)

Neutral Detergent Fiber (NDF) content (% of dry weight) was determined using JAOAC, Vol 50, p.50. The level of quantitation for this assay was 0.2 % d.w.

Ash (Grain and Forage)

Ash analysis (% of dry weight) was conducted using AOAC method 942.05. This method determines as ash the residue remaining after incineration under the conditions of this test. The level of quantitation for this assay was 0.03 % d.w.

Carbohydrate (Grain and Forage)

Carbohydrate (by difference) content (% of dry weight) was determined using the following formula:  $100\% - \% \text{ protein (d.w.)} - \% \text{ fat (d.w.)} - \% \text{ ash (d.w.)}$ . This method determines as ash the residue remaining after incineration under the conditions of this test.

Fatty Acid Profile (Grain)

The percent relative fatty acid composition was determined using the AOAC method 969.33. The level of quantitation for this assay was 0.10 %.

Amino Acid Profile (Grain)

Alanine, arginine, aspartic acid, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine, valine, tryptophan and cysteine content (% of dry weight) was determined following the AOAC method 982.30. The level of quantitation for this assay was 0.01 % d.w.

Copper (Grain)

Copper content (% of dry weight) was determined using AOAC method 985.01 (for digest) and 984.27 [modified (for quantitation)]. The level of quantitation for this assay was 0.000250 % d.w. (2.5 ppm).

Iron (Grain)

Iron content (% of dry weight) was determined using AOAC method 985.01 (for digest) and 984.27 [modified (for quantitation)]. The level of quantitation for this assay was 0.000125 % d.w.

Phosphorous (Grain and Forage)

Phosphorous content (% of dry weight) was determined using AOAC method 965.17. The level of quantitation for this assay was 0.000250 % d.w.

Calcium (Grain and Forage)

Calcium content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.000250 % d.w.

Magnesium (Grain)

Magnesium content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.000125 % d.w.

Manganese (Grain)

Manganese content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.0000125 % d.w.

Potassium (Grain)

Potassium content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.000500 % d.w.

Sodium (Grain)

Sodium content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.000500 % d.w.

Zinc (Grain)

Zinc content (% of dry weight) was determined using AOAC method 985.01 and 984.27 (modified). The level of quantitation for this assay was 0.000500 % d.w.

Beta Carotene (Grain)

Beta-carotene content (mg/kg dry weight) was determined using AOAC method 974.29. The level of quantitation for this assay was 0.26 mg/kg d.w.

Vitamin B1 (Grain)

Vitamin B1 content (mg/kg dry weight) was determined using AOAC method 942.2. The level of quantitation for this assay was 0.11 mg/kg d.w.

Vitamin B2 (Grain)

Vitamin B2 content (mg/kg dry weight) was determined using AOAC method 970.65. The level of quantitation for this assay was 0.11 mg/kg d.w.

Folic Acid (Grain)

Folic Acid content (mg/kg dry weight) was determined using AOAC method 992.05. The level of quantitation for this assay was 0.110 mg/kg d.w.

Tocopherols (Grain)

Alpha, beta, gamma and delta tocopherol content (mg/kg dry weight) were determined using AOAC method 971.30 (modified). The level of quantitation for this assay was 1.00 mg/kg d.w.

Inositol (Grain)

Inositol content (% of dry weight) was determined using the Infant Formula Council, Inositol (modified) method. The level of quantitation for this assay was 0.0125 % d.w.

Raffinose (Grain)

Raffinose content (% of dry weight) was determined using the methods of Enzymatic Food Analysis, Raffinose kit cat # 428167. The level of quantitation for this assay was 0.1 % d.w.

Furfural (Grain)

Furfural content (% of dry weight) was determined using Eurofins Scientific, Inc. (ESI) method LC298. The level of quantitation for this assay was 0.0001 % d.w.

P-Coumaric Acid (Grain)

P-Coumaric Acid content (% of dry weight) was determined using ESI method LC297. The level of quantitation for this assay was 0.001 % d.w.

Ferulic Acid (Grain)

Ferulic Acid content (% of dry weight) was determined using ESI method LC297. The level of quantitation for this assay was 0.001 % d.w.

Phytic acid (Grain)

Phytic Acid content (% of dry weight) was determined using the method described in Anal. Biochem. 77:536-539 (1997). The level of quantitation for this assay was 0.0200 % d.w.

Trypsin Inhibitor (Grain)

Trypsin Inhibitor content (TIU/g of dry weight) was determined using AOCS method Ba 12-75 (1989). TIU = Trypsin Inhibitor Units. The level of quantitation for this assay was 2,000 TIU/g d.w.

The statistical analysis included means for the test line, *B.t.* Cry1F maize line 1507 (sprayed and non-sprayed), the control line, and a comparison of means between the control and the sprayed and non-sprayed test entry. Any statistically significant differences ( $p = 0.05$ ) between the test line and the control line were generally considered to have no nutritional effect, as long as the means for Cry1F maize line 1507 fell within the range published in the literature for commercial maize hybrids.

Moisture levels in samples for compositional analysis were determined for calculation purposes only and are therefore not shown in this report. Moisture was measured so that nutrient composition levels could be reported on a dry weight basis.

## F. Agronomic Characteristics

Various agronomic traits were evaluated for each entry. These traits are typically used when comparing maize lines in commercial maize breeding programs. Plants of each entry in all 3 blocks were evaluated. The following traits were evaluated at each location: time to silking (accumulated heat units when approximately 50% of the plants in each plot were at silk stage), time to pollen shed (accumulated heat units when approximately 50% of the plants in each plot were shedding pollen), plant height (measured to the tip of the tassel of 10 plants per plot at the R6 growth stage), ear height (measured to the base of the primary ear of 10 plants per plot at the R6 growth stage), stalk lodging (percent of plants broken below the primary ear in each plot), root lodging (percent of plants leaning 30° or more in the first ½ meter above the soil surface in each plot), final population (number of viable plants remaining at the R6 growth stage), stay green (overall plant health of plants in each plot evaluated at the R6 growth stage), disease incidence (evaluated for each plot at the R6 growth stage), insect damage (evaluated for each plot at the R6 growth stage) and grain moisture (percent water content of representative sample at harvest time). Agronomic data are presented in Tables 10-20.

## G. Control of bias

Bias in the study was controlled by: non-systematic selection of trial areas and plot areas within each trial; randomization of the entries within a block; non-systematic collection of samples within a plot; and uniform maintenance treatments across each plot area.

## H. Data reduction

### 1. Expression data reduction

Absorbance readings from the TEP and ELISA determinations were obtained using the Spectramax plate reader. Mean pg/µg TEP and standard deviation calculations were made for the Cry1F and PAT proteins in each tissue (sprayed and non-sprayed). If the ELISA value was below the lower limit of quantitation (LLOQ) then a 0 replaced the value and was used in calculating the mean. The associated standard deviation was also calculated for this mean.

If the calculated mean was greater than 0 but less than the LLOQ, the mean was not included in the summary tables for expression, however the range was included.

### 2. Statistical analysis of nutrient composition data

Data were analyzed to test for differences between the modified hybrid (TC1507) and the near isogenic control hybrid. There were 2 separate statistical analyses performed. The first analysis was a combined analysis including data from all 3 replicates of each entry from the 6 separate locations. The combined analysis across all 6 locations used the following mixed model to describe the data (random effects indicated in italics):

$$\text{response} = \text{site } \textit{rep}(\textit{site}) \textit{entry} \textit{site} * \textit{entry} \textit{residual}$$

The second analysis was a single-site analysis which tested for differences between the modified hybrid (sprayed and non-sprayed) and the control using data from 3 replicates of each of the 6 separate locations. The single-site analysis used the following mixed model:

$$\text{Response} = \text{rep } \textit{entry} \textit{residual}$$

The least-squares means of sites and entries were computed. Significant differences between the test entry and the control were identified using a *t*-test at a 5% level of significance.

## I. Protocol deviations

The following study changes occurred as protocol deviations during the conduct of the study.

### Treatment period

At the Meauzac, France location (FR3), due to weather conditions the first application of glufosinate was applied at crop growth stage V5 instead of V4 as specified by the protocol. This deviation had no impact on the study.

### Maintenance of genetic purity

At the Meauzac, France location (FR3), only primary ears were covered in order to maintain genetic purity. All non-covered secondary, tertiary, etc. ears were removed prior to sampling. This deviation had no impact on the study.

### Plot length reduction

Plots were established using a plot length of approximately 6.0 meters rather than approximately 7.5 meters as indicated in the protocol. The reduced plot length was required to be consistent with the previously approved transgenic planting permit. At locations where the plants had already been planted, plots size was reduced by removing plants beyond the 6 meter length in each plot. This deviation had no impact on the study.

### Unidentified samples discarded

Three whole plant senescence samples at the FR1 location as well as one forage sample from the FR3 location were not analyzed due to improper labeling. The outside label became detached and there were no security labels placed inside the sample bag as required by the protocol. For FR3, a sub-sample was collected from a similar forage sample and submitted for ELISA analysis in place of the missing sample. This deviation had no impact on the study.

### Treatment rate

At the IT2 location, the second application of glufosinate (done at growth stage V7) was done at the same rate of 0.5 kg ai/ha as the first application rather than at 0.41 kg ai/ha as specified by the protocol. This deviation had no impact on the study.

## RESULTS AND DISCUSSION

### A. Field Trial

The test and control lines were grown under environmental conditions representative of typical maize growing regions of Europe. Tissue samples of the test and control hybrids were collected, identified, shipped and stored in a manner to preserve line identity and sample integrity. Plant samples were collected from test and control hybrids that were grown under typical, representative conditions for commercially grown maize (Tables 1 – 9).

### B. Agronomic observations

Observations of agronomic characteristics (time to silking, time to pollen shed, plant height, ear height, stalk lodging, root lodging, final population, stay green, disease incidence, insect damage and grain moisture) (Tables 10 – 20) throughout the growing season were very similar between the TC1507 and the control, based on comparisons of the means from the evaluations.

Time to silking and pollen shed for entry TC1507 was 101% of the time required for the control. Mean plant and ear height measurements for entry TC1507 were 102% and 101%, respectively, of the heights observed in the control. Stay green, disease incidence and grain moisture of TC1507 was 100% of that observed in the control. There was no increase in stalk lodging, root lodging or

differences in final populations for entry TC1507 when compared with the control. These results indicate no unexpected differences in growth, development or performance between the *B.t.* Cry1F maize hybrid and the control regardless of glufosinate-ammonium treatment..

### C. Composition analyses

The conclusions in this report are primarily derived from a comparison of nutrient levels in the test line compared to levels in the control and to levels reported in the literature, based on standard approaches in food safety assessment. There were a total of 54 (3 entries x 3 blocks x 6 locations) grain samples and 41 [3 entries x 3 blocks x 5 locations (- 4 samples lost due to poor condition or improper labeling)] forage samples included in the analysis. Forage samples from the FR2 location were not analyzed due to poor sample quality resulting from inadequate drying.

#### 1. Forage analysis

**Summary data and single site data from nutrient composition analysis of forage:** Appendix 3, Tables 22 – 33.

**Individual data from nutrient composition analysis of forage:** Appendix 5, Table 80.

##### Proximate analysis of maize forage

An analysis of the fat, protein, acid detergent fiber (ADF), neutral detergent fiber (NDF), ash, carbohydrate, and moisture levels in forage in hybrid maize line 1507 (sprayed and non-sprayed) and the control hybrid was conducted and the results summarized across all locations are shown in Table 22. The results on an individual location basis are reported in Tables 23-27. The levels of fat, protein, ash, and carbohydrates in maize line 1507 were all within the reported literature ranges for maize forage both when averaged across all locations and at each individual location. The published literature reports means for forage ADF and NDF of 30% and 51%, respectively; however, no range of values is available. The ADF and NDF levels in maize line 1507 are similar to the means reported in the literature. Significant differences were seen in fat, protein, and carbohydrate levels when summarized across all locations, however there was no trend seen when each individual location was observed. Other isolated significant differences were observed at individual locations, but again there was no trend across all locations.

##### Mineral analysis of maize forage

Forage levels of phosphorus and calcium were analyzed in maize line 1507 (sprayed and non-sprayed) and the control hybrid. The mineral levels in maize line 1507 were within the literature range for maize forage, both when averaged across all locations and at each individual location. The results summarized across all locations are presented in Table 28 and the results on an individual basis are reported in Tables 29-33. When viewed on an individual location basis there was a single location where the control was significantly greater than the *B.t.* Cry1F maize lines for phosphorus, but this was not consistent at the other locations.

##### Conclusion

In summary, the analysis of nutrient composition of forage from maize line 1507 (sprayed and non-sprayed) showed that it is comparable to forage from the non-transformed version of the hybrid and within typical ranges reported in literature for commercial maize hybrids. Statistically significant differences were occasionally observed in some of the traits, however there were no differences that were consistently observed at every location.

#### 2. Grain analysis

**Summary data and single site data from nutrient composition analysis of grain:** Appendix 3, Tables 34 – 75.

**Individual data from nutrient composition analysis of grain:** Appendix 5, Tables 82 – 85.

#### Proximate analysis of maize grain

An analysis of the fat, protein, crude fiber, acid detergent fiber (ADF), neutral detergent fiber (NDF), ash, carbohydrate, and moisture levels in grain from hybrid maize line 1507 (sprayed and non-sprayed) and the control hybrid was conducted. The levels in maize line 1507 of fat, protein, crude fiber, ADF, NDF, ash, and carbohydrates were all within the literature range for maize grain. While sporadic differences were observed, there was no trend for any analyte across all locations. (Tables 35-40).

#### Fatty acid composition of maize grain

Grain from hybrid maize line 1507 (sprayed and non-sprayed) and the control hybrid was analyzed for the six major fatty acids in maize: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), linolenic (C18:3), and arachidic (C20:0). The data presented in Table 41 is a summary across all locations, the data presented in Tables 42 – 47 is from the individual locations. The levels of the six fatty acids were all within the literature range for grain from maize line 1507. Levels of Oleic acid and Linoleic acid in hybrid maize line 1507 were significantly different than the control when summarized across all locations, but these differences were not seen in the individual locations. Levels of Linolenic acid in hybrid maize 1507 were significantly different than the control hybrid at two individual locations, but there was no general trend seen at all locations.

#### Amino acid analysis of maize grain

Both the nutritionally essential and non-essential amino acids were analyzed in grain from maize line 1507 (sprayed and non-sprayed) and the control hybrid. Levels of all essential amino acids were within the expected literature range. Significant differences were observed when analyzed across all locations (Table 48), but this was not consistent when the individual locations were analyzed (Tables 49 – 54). Levels of all non-essential amino acids were either very close or within the ranges published in the literature or determined by the analysis of 22 commercial Pioneer® Brand hybrids. At most locations, levels for tyrosine in both maize line 1507 and the control hybrid were slightly below the published range of 0.17 - 0.31%. Since these lower levels were seen in both the test hybrids and the control hybrid, this was not an effect of the genetic modification 1507 maize line.

#### Mineral analysis of maize grain

Levels of nine minerals (phosphorus, calcium, copper, iron, magnesium, manganese, potassium, sodium, and zinc) were analyzed in maize line 1507 (sprayed and non-sprayed) and the control hybrid. The mineral levels in maize line 1507 were all within the literature range for maize grain. There were significant differences when comparing levels of Phosphorus, Calcium, Manganese and Potassium in the test and control hybrids when analyzed across all locations (Table 55), but these differences were not consistent when viewed on an individual location basis (Tables 56 – 61).

#### Vitamin analysis of maize grain

Grain from hybrid maize line 1507 (sprayed and non-sprayed) and the control hybrid was analyzed for vitamin content. Levels of Vitamin A, Vitamin B1, Vitamin B2, folic acid, Vitamin E and total tocopherols were determined and were found to be within the published range for maize grain. There is no typical range available for folic acid in maize grain, although an average value of 0.3 ppm has been reported (Watson, 1987). The levels of folic acid in maize line 1507 and the control hybrid were similar to this average value. Levels of vitamin B2 in the non-sprayed hybrid maize line 1507 were significantly different from the control hybrid when the data were summarized across all locations (Table 62). However, this difference was not observed on an individual location comparison (Tables 63 – 68). There were other isolated significant differences on an individual location basis, but there was no consistent trend.

#### Secondary metabolites and anti-nutrient analysis of maize grain

Grain from hybrid maize line 1507 (sprayed and non-sprayed) and the control hybrid was analyzed for secondary metabolites (inositol, raffinose, furfural, P-coumaric acid and ferulic acid) and two potential anti-nutrients (phytic acid and trypsin inhibitor). The results summarized across all locations are presented in Table 69 and the results on an individual basis are reported in Tables 70 - 75.

Levels of raffinose for the test and control hybrids were within the literature range. However there were no literature ranges available for inositol, furfural, P-coumaric acid, ferulic acid and trypsin inhibitor. Levels of furfural and P-coumaric acid in the hybrid maize line 1507 and 1507S, respectively, were significantly different from the control when analyzed across locations. Similar differences were not consistently observed at the individual locations.

Maize grain typically contains low concentrations of the anti-nutrient phytic acid (Cheryan, 1980). Phytic acid levels in maize line 1507 were found to be within the published literature range for maize grain. Maize usually contains only low levels of the anti-nutrient trypsin inhibitor (Watson, 1987; Del Valle, 1983). As expected, trypsin inhibitor levels in both maize line 1507 and the control line were below the limit of quantitation of the enzyme assay that was used in this analysis.

#### Conclusion

In summary, the analysis of nutrient composition of grain from maize line 1507 (sprayed and non-sprayed) showed that it is comparable to grain from commercial maize hybrids. Statistically significant differences were occasionally observed in some of the traits, however there were no differences that were consistently observed at every location.

### **D. Protein expression analyses**

#### **1. Cry1F Protein Expression**

**Summary data for leaf, grain, pollen, stalk and whole plants:** Appendix 4, Tables 76 – 77.

**Individual data for leaf, grain, pollen, stalk and whole plants (hybrid sprayed and non-sprayed and controls):** Appendix 6, Tables 89 – 112.

Leaf, grain, pollen, stalk and whole plant (V9, R1, forage and senescence) samples from all locations expressed the Cry1F protein at measurable levels when expressed on a TEP or dry weight basis. Expression levels of the Cry1F protein were comparable for the sprayed and the non-sprayed hybrid line within a tissue.

Mean expression levels on a TEP basis ranged from a minimum value of 69 pg/μg TEP in grain to a maximum of 1310 pg/μg TEP in whole plant (R1).

Mean Expression levels on a tissue dry weight basis ranged from a minimum of 1.6 ng/mg tissue dry weight in whole plant (forage and senescence) to a maximum of 22.4 ng/mg tissue dry weight in pollen.

None of the control tissues expressed the Cry1F protein.

#### **2. PAT Protein Expression**

**Summary data for leaf, grain, pollen, stalk and whole plants:** Appendix 4, Tables 78 – 79.

**Individual data for leaf, grain, pollen, stalk and whole plants (hybrid sprayed and non-sprayed and controls):** Appendix 6, Tables 113 – 136.

Leaf samples from all locations expressed the PAT protein at measurable levels when expressed on a TEP or dry weight basis. Expression levels of the PAT protein in leaf were comparable for the sprayed and the non-sprayed hybrid line.

None of the grain or pollen samples expressed the PAT protein at levels greater than the LLOQ.

The majority of stalk and whole plant (V9, R1, forage and senescence) samples did not express the PAT protein at levels greater than the LLOQ.

None of the control tissues expressed the PAT protein.

## **CONCLUSIONS**

The hybrid maize line containing event TC1507 was grown at six different locations representative of typical maize growing regions of Europe where these hybrids would be suitable commercial products. The conduct of this study led to the following conclusions:

- There are no agronomic differences between the transformed hybrid maize line containing event TC1507 and the non-transgenic, near isoline control.
- Hybrid maize line containing event TC1507 is substantially equivalent to the non-transgenic control and other commercial hybrids.
- Cry1F protein is expressed in leaf, grain, pollen, stalk and whole plant tissues of the hybrid maize line containing event TC1507.
- The hybrid maize line containing event TC1507 expresses PAT protein in leaf tissue.
- Quantifiable levels of PAT protein are not expressed in grain or pollen and not consistently expressed in stalk or whole plant.
- Protein expression and nutrient composition was similar in the hybrid line containing TC1507 regardless of glufosinate-ammonium treatment.
- Cry1F or PAT protein was not expressed in the non-transgenic, near isoline control

## **ARCHIVING**

Raw data and the original copy of the final report will be filed in the Pioneer Hi-Bred International, Inc. Regulatory Science and Registration Department archives, Johnston, Iowa.

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**APPENDIX 1. FIELD PLOT DESIGN, FERTILIZER/PESTICIDE PRACTICES AND IMPORTANT  
CROP DATES**

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507	Alley	hybrid TC1507	Alley	control hybrid	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	Border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border

<sup>1</sup> hybrid TC1507 S: test entry sprayed

<sup>2</sup> hybrid TC1507: test entry

**Figure 1. Field Plot Map: Verneuil, France (FR1)**

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border	Alley	Border	Alley	Border	Commercial border
Commercial border	control hybrid		hybrid TC1507		control hybrid	Commercial border
Commercial border	control hybrid		hybrid TC1507		control hybrid	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507 S		Border		Border	Commercial border
Commercial border	hybrid TC1507 S		Commercial border		Commercial border	Commercial border
Commercial border	hybrid TC1507 S		Commercial border		Commercial border	Commercial border
Commercial border	Border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		

<sup>1</sup> hybrid TC1507: test entry  
<sup>2</sup> hybrid TC1507 S: test entry sprayed

Figure 2. Field Plot Map: Menville, France (FR2)

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border	Alley	hybrid TC1507	Alley	control hybrid	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	Border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border

<sup>1</sup> hybrid TC1507 S: test entry sprayed

<sup>2</sup> hybrid TC1507: test entry

Figure 3. Field Plot Map: Meuzac, France (FR3)

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border	Alley	hybrid TC1507	Alley	control hybrid	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507 S	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507 S	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	Border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		

<sup>1</sup> hybrid TC1507 S: test entry sprayed

<sup>2</sup> hybrid TC1507: test entry

**Figure 4. Field Plot Map: Tchavdarzi, Bulgaria (BU1)**

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507 S		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid TC1507 S		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid TC1507 S		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border	Alley	control hybrid	Alley	hybrid TC1507	Commercial border
Commercial border	control hybrid		control hybrid		hybrid TC1507	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507 S	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507 S	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Commercial border		Commercial border	Commercial border
Commercial border	hybrid TC1507		Commercial border		Commercial border	Commercial border
Commercial border	Border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border

<sup>1</sup> hybrid TC1507 S: test entry sprayed  
<sup>2</sup> hybrid TC1507: test entry

Figure 5. Field Plot Map: Cremona, Italy (IT1)

	Block 1		Block 2		Block 3	
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	hybrid <sup>1</sup> TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		control hybrid		hybrid TC1507 S	Commercial border
Commercial border	hybrid TC1507 S		Border		Border	Commercial border
Commercial border	Border		Border		Border	Commercial border
Commercial border	Border	Alley	hybrid TC1507	Alley	control hybrid	Commercial border
Commercial border	hybrid <sup>2</sup> TC1507		hybrid TC1507		control hybrid	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	hybrid TC1507		Border		Border	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	Border		hybrid TC1507 S		hybrid TC1507	Commercial border
Commercial border	control hybrid		Border		Border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	control hybrid		Commercial border		Commercial border	Commercial border
Commercial border	Border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border		Commercial border		Commercial border	Commercial border
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		
Commercial border	Commercial border	Commercial border	Commercial border	Commercial border		

<sup>1</sup> hybrid TC1507 S: test entry sprayed  
<sup>2</sup> hybrid TC1507: test entry

Figure 6. Field Plot Map: Crevalcore, Italy (IT2)

**Table 1. Important Crop Dates for Field Trials FR1, FR2, FR3, BU1, IT1 and IT2**

<b>Field Site Site Code</b>	<b>Planting</b>	<b>Pollination</b>	<b>Field Trial Termination</b>
Verneuil, France FR1	06/09/00	08/22/00 – 08/23/00	NR <sup>1</sup>
Menville, France FR2	05/23/00	08/07/00 – 08/08/00	11/13/00
Meauzac, France FR3	06/07/00	08/16/00 – 08/24/00	12/11/00
Tchavdarzi, Bulgaria BU1	06/24/00	08/29/00 – 09/09/00	10/29/00
Cremona, Italy IT1	05/23/00	07/21/00 – 07/25/00	09/27/00
Crevalcore, Italy IT2	05/26/00	08/03/00 – 08/10/00	10/23/00

<sup>1</sup> NR: Not Recorded

**Table 2. Chemical and Fertilizer Applications for the Verneuil, France Site (FR1)**

Field Site Site Code	Date	Product	Rate (kg ai/ha) <sup>1</sup>
Verneuil, France FR1	<b>Maintenance</b>		
	06/15/00	dimethenamid	1.44
	06/15/00	atrazine	0.5
	06/26/00	alphametrine	0.07

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**Table 3. Chemical and Fertilizer Applications for the Menville, France Site (FR2)**

Field Site Site Code	Date	Product	Rate (kg ai/ha) <sup>1</sup>
Menville, France FR2	<b>Prior to planting</b>		
	03/15/00	N-P-K	0-100-100
	<b>Maintenance</b>		
	05/24/00	alachlor	2.4
	05/24/00	atrazine	1
	6/22/00	N-P-K	184-0-0

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**Table 4. Chemical and Fertilizer Applications for the Meauzac, France Site (FR3)**

Field Site Site Code	Date	Product	Rate (kg ai/ha) <sup>1</sup>
Meauzac, France FR3	<b>Prior to planting</b>		
	04/11/00	N-P-K	84-70-126
	04/27/00	glyphosate	12
	<b>Maintenance</b>		
	06/07/00	isoxaflutole	0.075
	06/07/00	aclonifen	0.5
	06/07/00	dimethenamid	1.05
	06/07/00	atrazine	0.525
	08/05/00	lambda-cyhalothrin	0.01

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**Table 5. Chemical and Fertilizer Applications for the Tchavdarzi, Bulgaria Site (BU1)**

<b>Field Site Site Code</b>	<b>Date</b>	<b>Product</b>	<b>Rate (kg ai/ha)<sup>1</sup></b>
Tchavdarzi, Bulgaria BU1	<b>Maintenance</b>		
	08/03/00	N-P-K	138-0-0
	08/03/00	MgO	2

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**Table 6. Chemical and Fertilizer Applications for the Cremona, Italy Site (IT1)**

Field Site Site Code	Date	Product	Rate (kg ai/ha) <sup>1</sup>
Cremona, Italy IT1	<b>Prior to planting</b>		
	05/15/00	N-P-K	48-96-216
	<b>Maintenance</b>		
	05/25/00	carbofuran	0.528
	05/25/00	metolachlor + terbuthylazine	1.2 + 0.6
	05/25/00	isoxaflutole	0.0375
	06/02/00	chlorpyrifos-methyl + cypermethrin	0.24 + 0.024
	06/16/00	N-P-K	166-0-0

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**Table 7. Chemical and Fertilizer Applications for the Crevalcore, Italy Site (IT2)**

<b>Field Site Site Code</b>	<b>Date</b>	<b>Product</b>	<b>Rate (kg ai/ha)<sup>1</sup></b>
Crevalcore, Italy IT2	<b>Prior to planting</b>		
	04/10/00	N-P-K	0-115-0
	05/24/00	glyphosate	1.08
	05/24/00	2,4-D + MCPA	0.35 + 0.30
	05/24/00	mineral oil	2
	<b>Maintenance</b>		
06/20/00	N-P-K	138-0-0	

<sup>1</sup>Abbreviation: kg Ai/ha = kg active ingredient applied per hectare

**APPENDIX 2. AGRONOMIC DATA – SUMMARY INFORMATION AND SAMPLE DATES**

**Table 8. Summary of Temperatures and Rainfall: France Locations**

Month	Parameter	FR1	Normal <sup>4</sup> Cognac, France	FR2	Normal <sup>5</sup> Blagnac, France	FR3	Normal <sup>6</sup> Montauban France
May <sup>1</sup>	Maximum Temp <sup>3</sup> – °C	NA <sup>7</sup>	NA <sup>7</sup>	29	20	NA <sup>7</sup>	NA <sup>7</sup>
	Minimum Temp <sup>3</sup> – °C	NA	NA	6	10	NA	NA
	Average Temp <sup>3</sup> – °C	NA	NA	17	15	NA	NA
	Total Rainfall – mm	NA	NA	64.4	77.1	NA	NA
June	Maximum Temp – °C	24	23	32	24	26	24
	Minimum Temp – °C	13	12	10	13	15	14
	Average Temp – °C	19	18	21	19	20	19
	Total Rainfall – mm	50	46.6	116.8	62.7	65.0	79.5
July	Maximum Temp – °C	24	26	33	28	26	28
	Minimum Temp – °C	12	14	10	16	15	16
	Average Temp – °C	18	20	21	22	21	22
	Total Rainfall – mm	85	45.1	58.6	43.7	55.2	46.3
August	Maximum Temp – °C	27	25	34	28	29	29
	Minimum Temp – °C	13	14	12	16	16	17
	Average Temp – °C	20	20	23	22	23	23
	Total Rainfall – mm	46	50.9	53.4	49.7	33.0	55.3
September	Maximum Temp – °C	24	23	32	24	26	24
	Minimum Temp – °C	11	12	8	13	13	13
	Average Temp – °C	17	18	20	19	19	18
	Total Rainfall – mm	26	59.2	31	51.3	59.6	88.9
October <sup>2</sup>	Maximum Temp – °C	17	19	22	19	18	19
	Minimum Temp – °C	9	9	5	10	10	10
	Average Temp – °C	13	14	14	15	14	14
	Total Rainfall – mm	118	68.6	107.2	52.6	85.0	62.6
November <sup>2</sup>	Maximum Temp – °C	NA <sup>7</sup>	NA <sup>7</sup>	20	13	14	13
	Minimum Temp – °C	NA	NA	0	5	7	5
	Average Temp – °C	NA	NA	10	9	10	9
	Total Rainfall – mm	NA	NA	79.4	49.8	110.4	70.2

<sup>1</sup> From the date of planting<sup>2</sup> Until harvest<sup>3</sup> Monthly mean of maximum temperatures

Monthly mean of minimum temperatures

Monthly mean of average temperatures, (T max + T min)/2

<sup>4</sup> Monthly normal from Meteo France, French climatology administration for a period of 30 years (1961-90) from the Cognac weather station located close to the FR1 trial site<sup>5</sup> Monthly normal from Meteo France, French climatology administration for a period of 30 years (Jan 1970-Dec 1999) from the Blagnac weather station located close to the FR2 trial site<sup>6</sup> Monthly normal from Meteo France, French climatology administration for a period of 10 years (Jan 1990-Dec 1999) from the Montauban weather station located close to the FR3 trial site<sup>7</sup> NA: Not Applicable

**Table 9. Summary of Temperatures and Rainfall: Bulgaria and Italy Locations**

Month	Parameter	BU1	Normal <sup>4</sup> Lovetch, Bulgaria	IT1	Normal <sup>5</sup> Cremona, Italy	IT2	Normal <sup>6</sup> Finale Emilia, Italy
May <sup>1</sup>	Maximum Temp <sup>3</sup> – °C	NA <sup>7</sup>	NA	27	25	25	22
	Minimum Temp <sup>3</sup> – °C	NA	NA	14	11	13	11
	Average Temp – °C	NA	NA	21	18	19	16
	Total Rainfall – mm	NA	NA	30	60.3	12	56.2
June <sup>1</sup>	Maximum Temp – °C	34	32	29	24	28	27
	Minimum Temp – °C	14	10	16	12	16	15
	Average Temp – °C	24	21	23	18	22	21
	Total Rainfall – mm	3.75	31	56	45.7	47.4	53.3
July	Maximum Temp – °C	37	36	30	26	28	30
	Minimum Temp – °C	16	12	15	12	15	17
	Average Temp – °C	27	24	22	19	22	23
	Total Rainfall – mm	28.75	47	27	25.0	123.8	50.3
August	Maximum Temp – °C	37	35	32	26	31	28
	Minimum Temp – °C	15	11	16	14	17	17
	Average Temp – °C	26	23	24	19	24	22
	Total Rainfall – mm	1	43	72	50.8	24.2	70.7
September <sup>2</sup>	Maximum Temp – °C	27	31	28	22	26	25
	Minimum Temp – °C	10	7	12	10	13	14
	Average Temp – °C	19	19	20	15	19	19
	Total Rainfall – mm	91.2	84	67	99.5	37.4	58.2
October <sup>2</sup>	Maximum Temp – °C	21	28	NA	NA	18	18
	Minimum Temp – °C	5	0	NA	NA	11	9
	Average Temp – °C	13	14	NA	NA	14	13
	Total Rainfall – mm	5.5	46	NA	NA	127.0	49.5

<sup>1</sup> From the date of planting<sup>2</sup> Until harvest<sup>3</sup> Monthly mean of maximum temperatures<sup>4</sup> Monthly mean of minimum temperatures<sup>4</sup> Monthly normal for a period of 5 years (1995 - 1999) from the Lovetch weather station located close to the BU1 trial site<sup>5</sup> Monthly normal from the Regional Department of Lombardia, Italy for a period of 10 years (1990 - 2000) from the Cremona weather station located close to the IT1 trial site<sup>6</sup> Monthly normal from Servizio Meteorologico Regionale (Italian climatology administration) for a period of 17 years (Jan 1968 - Dec 1984) from the Finale Emilia weather station located close to the IT2 trial site<sup>7</sup> NA: Not Applicable

**Table 10. Time to Silking (number of accumulated heat units when approximately 50% of the plants were silking).**

Entry	Site Code						
	FR1	FR2	FR3	IT1	IT2	BU1	Avg.
1507	NR <sup>1</sup>	796	752	1245	768	906	893
1507S	NR	794	753	1245	768	919	896
Control	NR	794	747	1231	768	878	884

<sup>1</sup> NR: Not Recorded

**Table 11. Time to Pollen Shed (number of accumulated heat units when approximately 50% of the plants were shedding pollen).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
1507	NR <sup>1</sup>	798	814	1252	796	914	915
1507S	NR	797	824	1245	796	925	917
Control	NR	796	824	1231	796	908	911

<sup>1</sup> NR: Not Recorded

**Table 12. Plant Height (cm to tip of tassel) at R6, n=30.**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1 <sup>1</sup>	IT2	BU1	
<b>1507</b>	256	278	219	280	264	191	248
<b>1507S</b>	243	274	204	280	250	194	241
<b>Control</b>	253	268	193	280	250	195	240

<sup>1</sup> n=12, other detasseled plants not measured.

**Table 13. Ear Height (cm to base of primary ear) at R6, n=30.**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
1507	79	111	115	143	114	84	108
1507S	75	112	101	145	107	81	104
Control	79	109	106	142	115	81	105

**Table 14. Stalk Lodging (percent of plants broken below the primary ear) at R6.**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
1507	0	0	0	0	1	0	0
1507S	0	0	0	0	1	0	0
Control	0	3	0	0	6	0	2

**Table 15. Root Lodging at R6 (percent of plants leaning 30° in the first ½ meter above the soil surface).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
1507	0	0	0	0	0	0	0
1507S	0	0	0	0	0	0	0
Control	0	0	0	0	4	0	1

**Table 16. Final Population at R6 (total number of viable plants remaining).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
<b>1507</b>	129	159	130	143	113	113	131
<b>1507S</b>	122	157	122	140	129	92	127
<b>Control</b>	130	164	110	127	116	103	125

**Table 17. Stay Green at R6 (overall plant health evaluated on a 1 to 9 scale where 1 is completely dead and 9 is very green).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1 <sup>1</sup>	
1507	7	7	7	4	1	1	5
1507S	6	7	7	4	1	1	5
Control	6	7	8	2	2	1	5

<sup>1</sup> Low rating due to early frost.

**Table 18. Disease Incidence at R6 (level of disease resistance evaluated on a 1 to 9 scale where 1 is poor resistance and 9 is high resistance or no visible disease).**

Entry	Site Code						
	FR1	FR2	FR3	IT1	IT2	BU1	Avg.
1507	7	9	9	9	6	9	8
1507S	7	9	8	9	7	9	8
Control	6	9	9	9	6	9	8

**Table 19. Insect Damage at R6 (level of destructive insect resistance evaluated on a 1 to 9 scale where 1 is poor resistance and 9 is high resistance or no damage).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
1507	7	9	9	9	9	9	9
1507S	6	9	9	9	9	9	9
Control	6	9	9	7	6	9	8

**Table 20. Grain Moisture at Harvest (% water content of grain).**

Entry	Site Code						Avg.
	FR1	FR2	FR3	IT1	IT2	BU1	
<b>1507</b>	32	NR <sup>1</sup>	30	26	29	50	33
<b>1507S</b>	33	NR	30	26	28	50	33
<b>Control</b>	32	NR	32	23	28	50	33

<sup>1</sup> NR: Not Recorded

**Table 21. Summary of Tissue Sampling Dates for the FR1, FR2, FR3, BU1, IT1 and IT2 sites.**

<b>Field Site Site Code</b>	<b>Verneuil, France FR1</b>	<b>Menville, France FR2</b>	<b>Meauzac, France FR3</b>	<b>Tchavdarzi, Bulgaria BU1</b>	<b>Cremona, Italy IT1</b>	<b>Crevalcore, Italy IT2</b>
<b>Leaf (V9)</b>	07/26/00	07/05/00	07/31/00	08/23/00	06/26/00	07/27/00
<b>Whole plant (V9)</b>	07/26/00	07/05/00	07/31/00	08/23/00	06/26/00	07/27/00
<b>Pollen (R1)</b>	08/23/00	08/09/00	08/22/00	09/08/00	07/22/00	08/09/00
<b>Silk (R1)</b>	08/24/00	08/09/00	08/22/00	09/08/00	07/22/00	08/09/00
<b>Stalk (R1)</b>	08/24/00	08/09/00	08/22/00	09/08/00	07/22/00	08/09/00
<b>Whole plant (R1)</b>	08/23/00	08/09/00	08/22/00	09/08/00	07/20/00	08/09/00
<b>Forage (R4)</b>	09/19/00	09/11/00	10/02/00	09/28/00	08/23/00	08/31/00
<b>Grain (maturity R6)</b>	11/16/00	11/09/00	11/30/00	10/28/00	09/25/00	09/10/00
<b>Whole Plant (senescence)</b>	11/17/00	11/13/00	12/07/00	10/28/00	09/27/00	10/17/00

### **APPENDIX 3. COMPOSITION ANALYSIS – SUMMARY INFORMATION**

**Table 22. Summary Analysis of Proximates in Forage**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	2.10 * ± 0.06	2.10 * ± 0.06	2.33 ± 0.06
Protein	3.5 – 15.9	9.82 <sup>4</sup> ± 0.17	9.82 * ± 0.16	10.30 ± 0.16
ADF	30 (mean)	30.1 ± 0.6	29.5 ± 0.5	30.5 ± 0.5
NDF	51 (mean)	52.9 ± 0.9	52.2 ± 0.8	53.1 ± 0.8
Ash	1.3 – 10.5	5.17 ± 0.17	5.13 ± 0.16	5.48 ± 0.16
Carbohydrates	66.9 – 94.5	82.9 * ± 0.30	82.9 * ± 0.29	81.9 ± 0.29

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

<sup>4</sup> Note: A test entry can be marked as significantly different from the control (\*) although it has the same mean as the other test entry since the combined analysis of variance used to determine the significant difference is based on the non-rounded means of the set of samples for each entry.

**Table 23. Single Site Analysis of Proximates in Forage from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	1.54 * ± 0.04	1.47 * ± 0.04	1.84 ± 0.04
Protein	3.5 – 15.9	9.45 * ± 0.40	9.73 ± 0.40	11.06 ± 0.40
ADF	30 (mean)	28.8 * ± 0.8	29.5 * ± 0.8	32.7 ± 0.8
NDF	51 (mean)	53.1 * ± 0.9	54.3 ± 0.9	56.7 ± 0.9
Ash	1.3 – 10.5	4.77 * ± 0.20	5.13 ± 0.20	5.64 ± 0.20
Carbohydrates	66.9 – 94.5	84.2 * ± 0.6	83.7 ± 0.6	81.5 ± 0.6

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 24. Single Site Analysis of Proximates in Forage from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	1.93 ± 0.27	2.32 ± 0.38	2.14 ± 0.38
Protein	3.5 – 15.9	10.28 ± 0.50	10.34 ± 0.71	10.35 ± 0.71
ADF	30 (mean)	30.0 ± 1.13	28.5 ± 1.59	29.2 ± 1.59
NDF	51 (mean)	54.3 ± 2.0	51.7 ± 2.9	52.2 ± 2.9
Ash	1.3 – 10.5	4.47 ± 0.09	3.95 ± 0.13	4.39 ± 0.13
Carbohydrates	66.9 – 94.5	83.3 ± 0.8	83.4 ± 1.1	83.1 ± 1.1

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 25. Single Site Analysis of Proximates in Forage from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	2.48 ± 0.17	2.32 ± 0.13	2.53 ± 0.13
Protein	3.5 – 15.9	9.61 ± 0.39	9.49 ± 0.29	9.08 ± 0.29
ADF	30 (mean)	32.1 ± 3.0	30.3 ± 2.3	31.8 ± 2.3
NDF	51 (mean)	54.8 ± 4.5	51.5 ± 3.4	52.4 ± 3.4
Ash	1.3 – 10.5	5.56 ± 0.84	5.40 ± 0.64	5.26 ± 0.64
Carbohydrates	66.9 – 94.5	82.3 ± 1.0	82.8 ± 0.8	83.1 ± 0.8

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 26. Single Site Analysis of Proximates in Forage from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	2.49 ± 0.15	2.19 ± 0.11	2.65 ± 0.11
Protein	3.5 – 15.9	9.05 * ± 0.20	9.10 * ± 0.15	9.91 ± 0.15
ADF	30 (mean)	29.9 ± 1.0	30.0 ± 0.8	28.1 ± 0.8
NDF	51 (mean)	49.2 ± 1.6	51.7 ± 1.2	49.4 ± 1.2
Ash	1.3 – 10.5	5.61 ± 0.25	5.48 ± 0.19	6.00 ± 0.19
Carbohydrates	66.9 – 94.5	82.8 * ± 0.1	83.2 * ± 0.1	81.4 ± 0.1

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 27. Single Site Analysis of Proximates in Forage from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	0.7 – 6.7	2.08 * ± 0.08	2.20 ± 0.08	2.47 ± 0.08
Protein	3.5 – 15.9	10.64 ± 0.27	10.50 ± 0.27	11.13 ± 0.27
ADF	30 (mean)	28.9 * ± 0.4	28.6 * ± 0.4	30.3 ± 0.4
NDF	51 (mean)	52.0 ± 0.5	50.4 * ± 0.5	53.3 ± 0.5
Ash	1.3 – 10.5	5.24 * ± 0.29	5.47 ± 0.29	5.86 ± 0.29
Carbohydrates	66.9 – 94.5	84.0 ± 0.5	81.8 ± 0.5	80.5 ± 0.5

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 28. Summary Analysis of Minerals in Forage**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.223 ± 0.005	0.228 ± 0.005	0.229 ± 0.005
Calcium	0.2 – 0.6	0.335 ± 0.013	0.301 ± 0.013	0.334 ± 0.013

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 29. Single Site Analysis of Minerals in Forage from BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.175 * ± 0.006	0.177 * ± 0.006	0.208 ± 0.006
Calcium	0.2 – 0.6	0.323 ± 0.025	0.288 ± 0.025	0.346 ± 0.025

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 30. Single Site Analysis of Minerals in Forage from FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.218 ± 0.012	0.234 ± 0.017	0.223 ± 0.017
Calcium	0.2 – 0.6	0.432 ± 0.029	0.311 ± 0.041	0.400 ± 0.041

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 31. Single Site Analysis of Minerals in Forage from FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.263 ± 0.012	0.283 ± 0.009	0.256 ± 0.009
Calcium	0.2 – 0.6	0.304 ± 0.052	0.290 ± 0.039	0.314 ± 0.039

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 32. Single Site Analysis of Minerals in Forage from IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.259 ± 0.013	0.238 ± 0.010	0.243 ± 0.010
Calcium	0.2 – 0.6	0.257 ± 0.018	0.255 ± 0.014	0.249 ± 0.014

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 33. Single Site Analysis of Minerals in Forage from IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.15 – 0.55	0.192 ± 0.010	0.207 ± 0.010	0.212 ± 0.010
Calcium	0.2 – 0.6	0.337 ± 0.019	0.319 ± 0.019	0.322 ± 0.019

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 34. Summary Analysis of Proximates in Grain**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.57 ± 0.04	3.53 ± 0.04	3.54 ± 0.04
Protein	6 – 12	10.9 * ± 0.1	10.2 ± 0.1	10.1 ± 0.1
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.6 ± 0.0	2.6 ± 0.0	2.5 ± 0.0
ADF	3.0 – 4.3 <sup>4</sup>	3.6 ± 0.1	3.6 ± 0.1	3.6 ± 0.1
NDF	8.3 – 11.9	10.1 ± 0.1	9.9 ± 0.1	9.9 ± 0.1
Ash	1.1 – 3.9	1.64 * ± 0.02	1.63 * ± 0.02	1.54 ± 0.02
Carbohydrates	78.4 – 89.8	83.9 * ± 0.1	84.6 ± 0.1	84.9 ± 0.1

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Watson, 1982

**Table 35. Single Site Analysis of Proximates in Grain from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.50 ± 0.03	3.47 ± 0.03	3.47 ± 0.03
Protein	6 – 12	10.4 * ± 0.1	10.2 * ± 0.1	9.8 ± 0.1
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.7 ± 0.1	2.7 ± 0.1	2.8 ± 0.1
ADF	3.0 – 4.3 <sup>4</sup>	3.6 ± 0.1	3.4 ± 0.1	3.7 ± 0.1
NDF	8.3 – 11.9	8.5 ± 0.4	8.9 ± 0.4	8.9 ± 0.4
Ash	1.1 – 3.9	1.74 * ± 0.02	1.79 * ± 0.02	1.59 ± 0.02
Carbohydrates	78.4 – 89.8	84.3 * ± 0.1	84.5 * ± 0.1	85.2 ± 0.1

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Watson, 1982

**Table 36. Single Site Analysis of Proximates in Grain from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.23 ± 0.13	3.30 ± 0.13	3.40 ± 0.13
Protein	6 – 12	11.6 * ± 0.2	10.2 ± 0.2	10.8 ± 0.2
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.8 * ± 0.0	2.9 * ± 0.0	2.4 ± 0.0
ADF	3.0 – 4.3 <sup>4</sup>	3.4 ± 0.1	3.7 ± 0.1	3.7 ± 0.1
NDF	8.3 – 11.9	11.4 ± 0.5	11.7 ± 0.5	11.0 ± 0.5
Ash	1.1 – 3.9	1.65 ± 0.02	1.72 ± 0.02	1.66 ± 0.02
Carbohydrates	78.4 – 89.8	83.5 ± 0.2	84.7 ± 0.2	84.1 ± 0.2

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Watson, 1982

**Table 37. Single Site Analysis of Proximate in Grain from Location FR2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	4.07 * ± 0.06	3.67 ± 0.06	3.63 ± 0.06
Protein	6 – 12	9.3 ± 0.3	8.9 ± 0.3	8.6 ± 0.3
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.6 ± 0.1	2.5 ± 0.1	2.6 ± 0.1
ADF	3.0 – 4.3 <sup>4</sup>	3.1 * ± 0.1	4.0 ± 0.1	3.7 ± 0.1
NDF	8.3 – 11.9	9.8 ± 0.2	9.5 ± 0.2	9.5 ± 0.2
Ash	1.1 – 3.9	1.57 ± 0.05	1.56 ± 0.05	1.59 ± 0.05
Carbohydrates	78.4 – 89.8	85.1 ± 0.3	85.9 ± 0.3	86.2 ± 0.3

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1987

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

<sup>4</sup> Watson, 1982

**Table 38. Single Site Analysis of Proximates in Grain from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.60 ± 0.15	3.67 ± 0.15	3.60 ± 0.15
Protein	6 – 12	11.2 * ± 0.3	10.7 ± 0.3	9.8 ± 0.3
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.7 ± 0.1	2.7 ± 0.1	2.5 ± 0.1
ADF	3.0 – 4.3 <sup>4</sup>	3.8 ± 0.2	3.2 ± 0.2	3.6 ± 0.2
NDF	8.3 – 11.9	11.1 * ± 0.2	10.3 ± 0.2	9.8 ± 0.2
Ash	1.1 – 3.9	1.75 ± 0.05	1.67 ± 0.05	1.55 ± 0.05
Carbohydrates	78.4 – 89.8	83.5 ± 0.5	83.9 ± 0.5	85.0 ± 0.5

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Watson, 1982

**Table 39. Single Site Analysis of Proximates in Grain from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.57 ± 0.12	3.47 ± 0.12	3.63 ± 0.12
Protein	6 – 12	11.8 ± 0.2	11.0 ± 0.2	11.1 ± 0.2
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.4 * ± 0.0	2.4 <sup>5</sup> ± 0.0	2.3 ± 0.0
ADF	3.0 – 4.3 <sup>4</sup>	4.1 ± 0.2	3.9 ± 0.2	3.7 ± 0.2
NDF	8.3 – 11.9	10.4 ± 0.2	10.0 * ± 0.2	11.1 ± 0.2
Ash	1.1 – 3.9	1.64 * ± 0.05	1.56 ± 0.05	1.43 ± 0.05
Carbohydrates	78.4 – 89.8	83.0 ± 0.3	83.9 ± 0.3	83.8 ± 0.3

<sup>1</sup> Percent of dry weight

<sup>2</sup> Watson, 1987

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

<sup>4</sup> Watson, 1982

<sup>5</sup> Note: A test entry can be marked as significantly different from the control (\*) although it has the same mean as the other test entry since the combined analysis of variance used to determine the significant difference is based on the non-rounded means of the set of samples for each entry.

**Table 40. Single Site Analysis of Proximates in Grain from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Fat	3.1 – 5.7	3.47 ± 0.14	3.60 ± 0.14	3.50 ± 0.14
Protein	6 – 12	11.0 ± 0.2	10.3 ± 0.2	10.3 ± 0.2
Fiber (crude)	2.0 – 5.5 <sup>4</sup>	2.2 * ± 0.1	2.5 ± 0.1	2.5 ± 0.1
ADF	3.0 – 4.3 <sup>4</sup>	3.6 ± 0.2	3.5 ± 0.2	3.3 ± 0.2
NDF	8.3 – 11.9	9.2 ± 0.2	9.3 ± 0.2	9.3 ± 0.2
Ash	1.1 – 3.9	1.51 ± 0.0	1.50 ± 0.0	1.41 ± 0.0
Carbohydrates	78.4 – 89.8	84.0 ± 0.3	84.6 ± 0.3	84.8 ± 0.3

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Watson, 1982

**Table 41. Summary Analysis of Fatty Acids in Grain**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	11.0 ± 0.1	11.0 ± 0.1	11.0 ± 0.1
Stearic acid	1 – 3	1.62 ± 0.05	1.68 ± 0.05	1.64 ± 0.05
Oleic acid	20 – 46	32.6* ± 0.3	31.9 ± 0.3	31.6 ± 0.3
Linoleic acid	35 – 70	52.2* ± 0.3	52.9 ± 0.3	53.3 ± 0.3
Linolenic acid	0.8 – 2	1.32 ± 0.02	1.34 ± 0.02	1.30 ± 0.02
Arachidic acid	0.1 – 2	0.38 ± 0.00	0.37 ± 0.00	0.37 ± 0.00

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 42. Single Site Analysis of Fatty Acids in Grain from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	12.7 ± 0.2	13.3 ± 0.2	13.1 ± 0.2
Stearic acid	1 – 3	1.45 ± 0.24	1.97 ± 0.24	1.46 ± 0.24
Oleic acid	20 – 46	27.9 ± 0.2	27.6 ± 0.2	27.6 ± 0.2
Linoleic acid	35 – 70	54.7 ± 0.4	54.0 ± 0.4	55.0 ± 0.4
Linolenic acid	0.8 – 2	1.57 ± 0.04	1.56 ± 0.04	1.53 ± 0.04
Arachidic acid	0.1 – 2	0.34 ± 0.01	0.37 ± 0.01	0.34 ± 0.01

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 43. Single Site Analysis of Fatty Acids in Grain from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	11.5 ± 0.3	10.9 ± 0.3	11.0 ± 0.3
Stearic acid	1 – 3	1.87 ± 0.12	1.57 ± 0.12	1.73 ± 0.12
Oleic acid	20 – 46	29.4 ± 1.0	28.1 ± 1.0	28.6 ± 1.0
Linoleic acid	35 – 70	54.4 ± 1.6	57.2 ± 1.6	56.5 ± 1.6
Linolenic acid	0.8 – 2	1.21 ± 0.08	1.34 ± 0.08	1.27 ± 0.08
Arachidic acid	0.1 – 2	0.37 ± 0.02	0.33 ± 0.02	0.34 ± 0.02

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 44. Single Site Analysis of Fatty Acids in Grain from Location FR2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	10.4 ± 0.1	10.5 ± 0.1	10.3 ± 0.1
Stearic acid	1 – 3	1.50 ± 0.04	1.49 ± 0.04	1.59 ± 0.04
Oleic acid	20 – 46	32.3 ± 0.4	32.6 ± 0.4	32.1 ± 0.4
Linoleic acid	35 – 70	53.4 ± 0.3	53.2 ± 0.3	53.5 ± 0.3
Linolenic acid	0.8 – 2	1.28 ± 0.01	1.29 ± 0.01	1.28 ± 0.01
Arachidic acid	0.1 – 2	0.38 ± 0.01	0.37 ± 0.01	0.37 ± 0.01

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 45. Single Site Analysis of Fatty Acids in Grain from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	10.4 ± 0.1	10.8 ± 0.1	10.5 ± 0.1
Stearic acid	1 – 3	1.56 ± 0.10	1.78 ± 0.10	1.57 ± 0.10
Oleic acid	20 – 46	33.3 ± 0.7	30.8 ± 0.7	31.0 ± 0.7
Linoleic acid	35 – 70	52.3 ± 0.7	53.9 ± 0.7	54.5 ± 0.7
Linolenic acid	0.8 – 2	1.28 ± 0.01	1.25 ± 0.01	1.30 ± 0.01
Arachidic acid	0.1 – 2	0.38 ± 0.01	0.39 ± 0.01	0.38 ± 0.01

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 46. Single Site Analysis of Fatty Acids in Grain from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	10.4 ± 0.1	10.4 ± 0.1	10.7 ± 0.1
Stearic acid	1 – 3	1.74 ± 0.13	1.60 ± 0.13	1.71 ± 0.13
Oleic acid	20 – 46	37.2 ± 0.8	36.8 ± 0.8	35.3 ± 0.8
Linoleic acid	35 – 70	48.1 ± 1.0	48.7 ± 1.0	49.9 ± 1.0
Linolenic acid	0.8 – 2	1.30 ± 0.02	1.33 * ± 0.02	1.23 ± 0.02
Arachidic acid	0.1 – 2	0.40 ± 0.01	0.40 ± 0.01	0.40 ± 0.01

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 47. Single Site Analysis of Fatty Acids in Grain from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Palmitic acid	7 – 19	10.4 ± 0.0	10.3 ± 0.0	10.5 ± 0.0
Stearic acid	1 – 3	1.58 ± 0.06	1.64 ± 0.06	1.75 ± 0.06
Oleic acid	20 – 46	35.5 ± 0.6	35.3 ± 0.6	35.1 ± 0.6
Linoleic acid	35 – 70	50.1 ± 0.5	50.2 ± 0.5	50.1 ± 0.5
Linolenic acid	0.8 – 2	1.30 * ± 0.01	1.27 * ± 0.01	1.21 ± 0.01
Arachidic acid	0.1 – 2	0.38 ± 0.01	0.39 ± 0.01	0.40 ± 0.01

<sup>1</sup> Percent relative total fatty acids

<sup>2</sup> Watson, 1982

<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control

**Table 48. Summary Analysis of Amino Acids in Grain**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.19 ± 0.00	0.18 * ± 0.00	0.19 ± 0.00
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.21 * ± 0.00	0.20 ± 0.00	0.20 ± 0.00
Lysine	0.20 – 0.38	0.29 * ± 0.00	0.28 ± 0.00	0.28 ± 0.00
Tryptophan	0.05 – 0.12	0.10 ± 0.00	0.09 ± 0.00	0.09 ± 0.00
Threonine	0.29 – 0.39	0.36 * ± 0.00	0.34 ± 0.00	0.34 ± 0.00
Isoleucine	0.26 – 0.40	0.35 * ± 0.00	0.33 ± 0.00	0.32 ± 0.00
Histidine	0.20 – 0.28	0.27 * ± 0.00	0.26 ± 0.00	0.26 ± 0.00
Valine	0.21 – 0.52	0.47 * ± 0.00	0.45 ± 0.00	0.44 ± 0.00
Leucine	0.78 – 1.52	1.31 * ± 0.02	1.23 ± 0.02	1.19 ± 0.02
Arginine	0.29 – 0.59	0.36 * ± 0.00	0.35 ± 0.00	0.34 ± 0.00
Phenylalanine	0.29 – 0.57	0.52 * ± 0.01	0.49 * ± 0.01	0.47 ± 0.01
Glycine	0.26 – 0.47	0.36 ± 0.04	0.35 ± 0.04	0.42 ± 0.04
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.80 * ± 0.01	0.76 * ± 0.01	0.73 ± 0.01
Aspartic Acid	0.58 – 0.72	0.69 * ± 0.01	0.65 ± 0.01	0.64 ± 0.01
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	1.99 * ± 0.03	1.88 ± 0.03	1.82 ± 0.03
Proline	0.66 – 1.03	0.79 * ± 0.01	0.76 ± 0.01	0.75 ± 0.01
Serine	0.42 – 0.55	0.49 * ± 0.01	0.46 ± 0.01	0.45 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.16 * ± 0.00	0.16 * ± 0.00	0.15 ± 0.00

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 49. Single Site Analysis of Amino Acids in Grain from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.19 ± 0.00	0.19 ± 0.00	0.19 ± 0.00
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.18 ± 0.00	0.18 ± 0.00	0.18 ± 0.00
Lysine	0.20 – 0.38	0.28 ± 0.00	0.28 ± 0.00	0.28 ± 0.00
Tryptophan	0.05 – 0.12	0.09 ± 0.00	0.09 ± 0.00	0.09 ± 0.00
Threonine	0.29 – 0.39	0.34 ± 0.00	0.33 ± 0.00	0.32 ± 0.00
Isoleucine	0.26 – 0.40	0.33 * ± 0.00	0.31 ± 0.00	0.31 ± 0.00
Histidine	0.20 – 0.28	0.24 ± 0.00	0.24 ± 0.00	0.23 ± 0.00
Valine	0.21 – 0.52	0.44 ± 0.01	0.43 ± 0.01	0.42 ± 0.01
Leucine	0.78 – 1.52	1.16 ± 0.02	1.11 ± 0.02	1.08 ± 0.02
Arginine	0.29 – 0.59	0.29 ± 0.00	0.28 ± 0.00	0.28 ± 0.00
Phenylalanine	0.29 – 0.57	0.59 * ± 0.01	0.57 ± 0.01	0.54 ± 0.01
Glycine	0.26 – 0.47	0.32 ± 0.01	0.33 ± 0.01	0.32 ± 0.01
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.74 * ± 0.01	0.72 ± 0.01	0.69 ± 0.01
Aspartic Acid	0.58 – 0.72	0.64 ± 0.01	0.63 ± 0.01	0.62 ± 0.01
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	1.76 ± 0.04	1.68 ± 0.04	1.65 ± 0.04
Proline	0.66 – 1.03	0.75 ± 0.02	0.72 ± 0.02	0.72 ± 0.02
Serine	0.42 – 0.55	0.45 ± 0.01	0.43 ± 0.01	0.43 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.14 ± 0.01	0.15 ± 0.01	0.14 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 50. Single Site Analysis of Amino Acids in Grain from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.20 ± 0.01	0.20 ± 0.01	0.20 ± 0.01
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.21 ± 0.00	0.20 ± 0.00	0.20 ± 0.00
Lysine	0.20 – 0.38	0.28 ± 0.00	0.28 ± 0.00	0.26 ± 0.00
Tryptophan	0.05 – 0.12	0.08 ± 0.00	0.08 ± 0.00	0.09 ± 0.00
Threonine	0.29 – 0.39	0.37 ± 0.01	0.35 ± 0.01	0.35 ± 0.01
Isoleucine	0.26 – 0.40	0.36 ± 0.01	0.34 ± 0.01	0.34 ± 0.01
Histidine	0.20 – 0.28	0.28 ± 0.00	0.26 ± 0.00	0.26 ± 0.00
Valine	0.21 – 0.52	0.48 ± 0.01	0.46 ± 0.01	0.46 ± 0.01
Leucine	0.78 – 1.52	1.41 ± 0.03	1.29 ± 0.03	1.32 ± 0.03
Arginine	0.29 – 0.59	0.36 * ± 0.00	0.33 ± 0.00	0.33 ± 0.00
Phenylalanine	0.29 – 0.57	0.51 ± 0.01	0.48 ± 0.01	0.49 ± 0.01
Glycine	0.26 – 0.47	0.35 ± 0.00	0.34 ± 0.00	0.34 ± 0.00
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.84 ± 0.01	0.78 ± 0.01	0.79 ± 0.01
Aspartic Acid	0.58 – 0.72	0.70 ± 0.01	0.67 ± 0.01	0.68 ± 0.01
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	2.11 ± 0.05	1.95 ± 0.05	1.99 ± 0.05
Proline	0.66 – 1.03	0.84 ± 0.02	0.80 ± 0.02	0.85 ± 0.02
Serine	0.42 – 0.55	0.50 ± 0.01	0.47 ± 0.01	0.48 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.18 ± 0.01	0.17 ± 0.01	0.17 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 51. Single Site Analysis of Amino Acids in Grain from Location FR2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.16 ± 0.01	0.16 ± 0.01	0.17 ± 0.01
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.19 ± 0.00	0.19 ± 0.00	0.19 ± 0.00
Lysine	0.20 – 0.38	0.28 ± 0.01	0.27 ± 0.01	0.27 ± 0.01
Tryptophan	0.05 – 0.12	0.12 ± 0.02	0.08 ± 0.02	0.08 ± 0.02
Threonine	0.29 – 0.39	0.31 ± 0.01	0.31 ± 0.01	0.31 ± 0.01
Isoleucine	0.26 – 0.40	0.29 ± 0.01	0.29 ± 0.01	0.29 ± 0.01
Histidine	0.20 – 0.28	0.24 ± 0.01	0.23 ± 0.01	0.24 ± 0.01
Valine	0.21 – 0.52	0.41 ± 0.01	0.40 ± 0.01	0.40 ± 0.01
Leucine	0.78 – 1.52	1.05 ± 0.05	1.06 ± 0.05	1.05 ± 0.05
Arginine	0.29 – 0.59	0.33 ± 0.01	0.33 ± 0.01	0.33 ± 0.01
Phenylalanine	0.29 – 0.57	0.41 ± 0.02	0.41 ± 0.02	0.40 ± 0.02
Glycine	0.26 – 0.47	0.34 ± 0.26	0.32 ± 0.26	0.78 ± 0.26
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.66 ± 0.03	0.65 ± 0.03	0.65 ± 0.03
Aspartic Acid	0.58 – 0.72	0.59 ± 0.02	0.57 ± 0.02	0.57 ± 0.02
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	1.63 ± 0.07	1.62 ± 0.07	1.64 ± 0.07
Proline	0.66 – 1.03	0.63 ± 0.03	0.63 ± 0.03	0.64 ± 0.03
Serine	0.42 – 0.55	0.41 ± 0.02	0.40 ± 0.02	0.41 ± 0.02
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.13 ± 0.01	0.14 ± 0.01	0.13 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 52. Single Site Analysis of Amino Acids in Grain from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.19 * ± 0.00	0.19 * ± 0.00	0.18 ± 0.00
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.22 * ± 0.00	0.21 * ± 0.00	0.19 ± 0.00
Lysine	0.20 – 0.38	0.29 * ± 0.00	0.28 ± 0.00	0.27 ± 0.00
Tryptophan	0.05 – 0.12	0.09 * ± 0.00	0.09 * ± 0.00	0.08 ± 0.00
Threonine	0.29 – 0.39	0.39 * ± 0.01	0.38 * ± 0.01	0.33 ± 0.01
Isoleucine	0.26 – 0.40	0.39 * ± 0.01	0.38 * ± 0.01	0.32 ± 0.01
Histidine	0.20 – 0.28	0.29 * ± 0.01	0.28 * ± 0.01	0.25 ± 0.01
Valine	0.21 – 0.52	0.52 * ± 0.01	0.50 * ± 0.01	0.43 ± 0.01
Leucine	0.78 – 1.52	1.50 * ± 0.05	1.46 * ± 0.05	1.19 ± 0.05
Arginine	0.29 – 0.59	0.39 * ± 0.01	0.37 ± 0.01	0.33 ± 0.01
Phenylalanine	0.29 – 0.57	0.56 * ± 0.02	0.54 * ± 0.02	0.44 ± 0.02
Glycine	0.26 – 0.47	0.38 * ± 0.01	0.36 ± 0.01	0.34 ± 0.01
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.89 * ± 0.02	0.86 * ± 0.02	0.71 ± 0.02
Aspartic Acid	0.58 – 0.72	0.74 * ± 0.02	0.73 * ± 0.02	0.63 ± 0.02
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	2.25 * ± 0.06	2.17 * ± 0.06	1.82 ± 0.06
Proline	0.66 – 1.03	0.87 * ± 0.02	0.83 * ± 0.02	0.74 ± 0.02
Serine	0.42 – 0.55	0.54 * ± 0.01	0.53 * ± 0.01	0.44 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.19 * ± 0.01	0.17 * ± 0.01	0.14 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 53. Single Site Analysis of Amino Acids in Grain from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.19 ± 0.00	0.19 ± 0.00	0.20 ± 0.00
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.22 ± 0.00	0.21 ± 0.00	0.21 ± 0.00
Lysine	0.20 – 0.38	0.30 ± 0.00	0.29 ± 0.00	0.29 ± 0.00
Tryptophan	0.05 – 0.12	0.09 ± 0.00	0.09 ± 0.00	0.10 ± 0.00
Threonine	0.29 – 0.39	0.38 ± 0.01	0.35 ± 0.01	0.37 ± 0.01
Isoleucine	0.26 – 0.40	0.37 ± 0.01	0.34 ± 0.01	0.36 ± 0.01
Histidine	0.20 – 0.28	0.29 ± 0.01	0.27 ± 0.01	0.28 ± 0.01
Valine	0.21 – 0.52	0.49 ± 0.01	0.47 ± 0.01	0.47 ± 0.01
Leucine	0.78 – 1.52	1.42 ± 0.05	1.31 ± 0.05	1.33 ± 0.05
Arginine	0.29 – 0.59	0.39 ± 0.01	0.39 ± 0.01	0.39 ± 0.01
Phenylalanine	0.29 – 0.57	0.53 ± 0.01	0.49 ± 0.01	0.50 ± 0.01
Glycine	0.26 – 0.47	0.38 ± 0.01	0.37 ± 0.01	0.37 ± 0.01
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.86 ± 0.02	0.80 ± 0.02	0.80 ± 0.02
Aspartic Acid	0.58 – 0.72	0.74 ± 0.02	0.68 ± 0.02	0.71 ± 0.02
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	2.17 ± 0.07	2.02 ± 0.07	2.03 ± 0.07
Proline	0.66 – 1.03	0.85 ± 0.02	0.80 ± 0.02	0.83 ± 0.02
Serine	0.42 – 0.55	0.53 ± 0.01	0.49 ± 0.01	0.50 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.15 ± 0.01	0.16 ± 0.01	0.16 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 54. Single Site Analysis of Amino Acids in Grain from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
<b>Essential Amino Acids<sup>4</sup></b>				
Methionine	0.10 – 0.21	0.20 ± 0.01	0.18 ± 0.01	0.20 ± 0.01
Cysteine	0.12 – 0.16 0.16 – 0.22 <sup>5</sup>	0.21 ± 0.00	0.20 ± 0.00	0.21 ± 0.00
Lysine	0.20 – 0.38	0.30 ± 0.01	0.29 ± 0.01	0.29 ± 0.01
Tryptophan	0.05 – 0.12	0.10 ± 0.00	0.10 ± 0.00	0.10 ± 0.00
Threonine	0.29 – 0.39	0.36 ± 0.01	0.33 ± 0.01	0.34 ± 0.01
Isoleucine	0.26 – 0.40	0.36 ± 0.01	0.32 ± 0.01	0.33 ± 0.01
Histidine	0.20 – 0.28	0.28 ± 0.01	0.26 ± 0.01	0.26 ± 0.01
Valine	0.21 – 0.52	0.47 ± 0.01	0.44 ± 0.01	0.44 ± 0.01
Leucine	0.78 – 1.52	1.32* ± 0.03	1.17 ± 0.03	1.17 ± 0.03
Arginine	0.29 – 0.59	0.39 ± 0.01	0.36 ± 0.01	0.36 ± 0.01
Phenylalanine	0.29 – 0.57	0.50 ± 0.01	0.45 ± 0.01	0.46 ± 0.01
Glycine	0.26 – 0.47	0.37 ± 0.01	0.35 ± 0.01	0.35 ± 0.01
<b>Nonessential Amino Acids</b>				
Alanine	0.64 – 0.99	0.82 * ± 0.02	0.73 ± 0.02	0.73 ± 0.02
Aspartic Acid	0.58 – 0.72	0.70 ± 0.01	0.64 ± 0.01	0.65 ± 0.01
Glutamic Acid	1.24 – 1.96 0.89 – 2.02 <sup>6</sup>	2.03 * ± 0.04	1.82 ± 0.04	1.81 ± 0.04
Proline	0.66 – 1.03	0.83 ± 0.02	0.77 ± 0.02	0.76 ± 0.02
Serine	0.42 – 0.55	0.50 ± 0.01	0.45 ± 0.01	0.46 ± 0.01
Tyrosine	0.29 – 0.47 0.17 – 0.31 <sup>7</sup>	0.16 ± 0.01	0.14 ± 0.01	0.14 ± 0.01

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Listed in approximate order of decreasing importance in feed formulation (Watson 1982)<sup>5</sup> Iowa Gold Catalog, 1997<sup>6</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>7</sup> Iowa Gold Catalog, 1994

**Table 55. Summary Analysis of Minerals in Grain**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.315 ± 0.005	0.321* ± 0.005	0.304 ± 0.005
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00507 ± 0.00022	0.00574* ± 0.00022	0.00505 ± 0.00022
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00204 ± 0.00014	0.00211 ± 0.00014	0.00240 ± 0.00014
Magnesium	0.09 – 1.0	0.110 ± 0.002	0.110 ± 0.002	0.106 ± 0.002
Manganese	0.00007 – 0.0054	0.000396* ± 0.000009	0.000402* ± 0.000009	0.000436 ± 0.000009
Potassium	0.32 – 0.72	0.453* ± 0.007	0.475* ± 0.007	0.434 ± 0.007
Sodium	0.0 – 0.15	0.000650 ± 0.000097	0.000758 ± 0.000097	0.000719 ± 0.000097
Zinc	0.0012 – 0.0030	0.00204 ± 0.00003	0.00206 ± 0.00003	0.00202 ± 0.00003

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 56. Single Site Analysis of Minerals in Grain from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.292 * ± 0.003	0.292 * ± 0.003	0.274 ± 0.003
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00738 ± 0.00105	0.00987 ± 0.00105	0.00721 ± 0.00105
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00191 ± 0.00076	0.00196 ± 0.00076	0.00356 ± 0.00076
Magnesium	0.09 – 1.0	0.108 ± 0.001	0.108 ± 0.001	0.109 ± 0.001
Manganese	0.00007 – 0.0054	0.000423 ± 0.000012	0.000485 ± 0.000012	0.000449 ± 0.000012
Potassium	0.32 – 0.72	0.606 ± 0.011	0.634 * ± 0.011	0.582 ± 0.011
Sodium	0.0 – 0.15	0.000404 ± 0.000314	0.001051 ± 0.000314	0.000868 ± 0.000314
Zinc	0.0012 – 0.0030	0.00210 ± 0.00005	0.00208 ± 0.00005	0.00207 ± 0.00005

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 57. Single Site Analysis of Minerals in Grain from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.331 ± 0.024	0.356 ± 0.024	0.305 ± 0.024
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00588 * ± 0.00025	0.00599 * ± 0.00025	0.00449 ± 0.00025
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00214 ± 0.00022	0.00204 ± 0.00022	0.00191 ± 0.00022
Magnesium	0.09 – 1.0	0.114 ± 0.008	0.123 ± 0.008	0.106 ± 0.008
Manganese	0.00007 – 0.0054	0.000228 ± 0.000021	0.000251 ± 0.000021	0.000239 ± 0.000021
Potassium	0.32 – 0.72	0.424 ± 0.031	0.492 ± 0.031	0.409 ± 0.031
Sodium	0.0 – 0.15	0.001060 ± 0.000325	0.001071 ± 0.000325	0.000728 ± 0.000325
Zinc	0.0012 – 0.0030	0.00210 ± 0.00014	0.00213 ± 0.00014	0.00188 ± 0.00014

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly (p < 0.05) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 58. Single Site Analysis of Minerals in Grain from Location FR2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.304 ± 0.009	0.309 ± 0.009	0.297 ± 0.009
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00525 ± 0.00022	0.00555 ± 0.00022	0.00557 ± 0.00022
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00203 ± 0.00012	0.00231 ± 0.00012	0.00204 ± 0.00012
Magnesium	0.09 – 1.0	0.106 ± 0.004	0.105 ± 0.004	0.103 ± 0.004
Manganese	0.00007 – 0.0054	0.000361 ± 0.000020	0.000368 ± 0.000020	0.000419 ± 0.000020
Potassium	0.32 – 0.72	0.426 * ± 0.008	0.432 * ± 0.008	0.375 ± 0.008
Sodium	0.0 – 0.15	0.000888 ± 0.000132	0.000532 ± 0.000132	0.001015 ± 0.000132
Zinc	0.0012 – 0.0030	0.00148 ± 0.00008	0.00156 ± 0.00008	0.00149 ± 0.00008

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly (p < 0.05) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 59. Single Site Analysis of Minerals in Grain from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.333 ± 0.011	0.348 ± 0.011	0.349 ± 0.011
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00453 ± 0.00050	0.00484 ± 0.00050	0.00554 ± 0.00050
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00223 ± 0.00021	0.00217 ± 0.00021	0.00240 ± 0.00021
Magnesium	0.09 – 1.0	0.118 ± 0.003	0.120 ± 0.003	0.113 ± 0.003
Manganese	0.00007 – 0.0054	0.000432 ± 0.000025	0.000462 ± 0.000025	0.000495 ± 0.000025
Potassium	0.32 – 0.72	0.422 ± 0.007	0.437 ± 0.007	0.420 ± 0.007
Sodium	0.0 – 0.15	0.000488 ± 0.000178	0.000591 ± 0.000178	0.000626 ± 0.000178
Zinc	0.0012 – 0.0030	0.00218 ± 0.00007	0.00232 ± 0.00007	0.00226 ± 0.00007

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly (p < 0.05) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 60. Single Site Analysis of Minerals in Grain from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.324 * ± 0.001	0.329 * ± 0.001	0.317 ± 0.001
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00352 ± 0.00031	0.00419 ± 0.00031	0.00369 ± 0.00031
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00189 ± 0.00026	0.00211 ± 0.00026	0.00249 ± 0.00026
Magnesium	0.09 – 1.0	0.102 ± 0.001	0.102 ± 0.001	0.102 ± 0.001
Manganese	0.00007 – 0.0054	0.000502 * ± 0.000017	0.000479 * ± 0.000017	0.000571 ± 0.000017
Potassium	0.32 – 0.72	0.427 ± 0.004	0.438 * ± 0.004	0.420 ± 0.004
Sodium	0.0 – 0.15	0.000567 ± 0.000115	0.000831 ± 0.000115	0.000723 ± 0.000115
Zinc	0.0012 – 0.0030	0.00217 ± 0.00005	0.00212 ± 0.00005	0.00222 ± 0.00005

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 61. Single Site Analysis of Minerals in Grain from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Phosphorus	0.26 – 0.75	0.308 * ± 0.006	0.292 ± 0.006	0.281 ± 0.006
Calcium	0.01 – 0.1 0.002 – 0.011 <sup>4</sup>	0.00387 ± 0.00027	0.00400 ± 0.00027	0.00392 ± 0.00027
Copper	0.00009 – 0.0010	<LOQ <sup>5</sup>	<LOQ	<LOQ
Iron	0.0001 – 0.01	0.00204 ± 0.00004	0.00207 ± 0.00004	0.00203 ± 0.00004
Magnesium	0.09 – 1.0	0.112 ± 0.002	0.105 ± 0.002	0.105 ± 0.002
Manganese	0.00007 – 0.0054	0.000428 ± 0.000024	0.000370 ± 0.000024	0.000440 ± 0.000024
Potassium	0.32 – 0.72	0.413 ± 0.011	0.413 ± 0.011	0.395 ± 0.011
Sodium	0.0 – 0.15	0.000494 ± 0.000041	0.000473 ± 0.000041	0.000352 ± 0.000041
Zinc	0.0012 – 0.0030	0.00223 ± 0.00002	0.00212 ± 0.00002	0.00218 ± 0.00002

<sup>1</sup> Percent of dry weight<sup>2</sup> Watson, 1987<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Pioneer Commercial Hybrids: range from 22 commercial Pioneer<sup>®</sup> Brand hybrids<sup>5</sup> <LOQ: below the level of quantitation (2.5 ppm)

**Table 62. Summary Analysis of Vitamins in Grain**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	2.39 ± 0.18	2.68 ± 0.18	2.24 ± 0.18
Vitamin B1	3.0 – 8.6	4.34 ± 0.11	4.31 ± 0.11	4.62 ± 0.11
Vitamin B2	0.25 – 5.6	1.79* ± 0.05	1.72 ± 0.05	1.63 ± 0.05
Folic Acid	0.3 (mean) <sup>5</sup>	0.270 ± 0.015	0.273 ± 0.015	0.283 ± 0.015
Vitamin E <sup>6</sup>	3.0 – 12.1	3.96 ± 0.72	4.81 ± 0.72	5.16 ± 0.72
Tocopherols (total) <sup>7</sup>	42 – 87	48.9 ± 2.3	49.0 ± 2.3	45.3 ± 2.3

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 63. Single Site Analysis of Vitamins in Grain from Location BU1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	1.59 ± 0.11	1.79 ± 0.11	1.47 ± 0.11
Vitamin B1	3.0 – 8.6	4.07 ± 0.14	4.03 ± 0.14	4.47 ± 0.14
Vitamin B2	0.25 – 5.6	2.52 ± 0.14	2.76 ± 0.14	2.24 ± 0.14
Folic Acid	0.3 (mean) <sup>5</sup>	0.412 ± 0.031	0.337 ± 0.031	0.433 ± 0.031
Vitamin E <sup>6</sup>	3.0 – 12.1	3.68 ± 2.31	6.76 ± 2.31	8.48 ± 2.31
Tocopherols (total) <sup>7</sup>	42 – 87	29.1 ± 3.2	26.7 ± 3.2	38.0 ± 3.2

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 64. Single Site Analysis of Vitamins in Grain from Location FR1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	2.63 ± 0.32	3.06 ± 0.32	2.20 ± 0.32
Vitamin B1	3.0 – 8.6	4.73 ± 0.34	4.42 * ± 0.34	5.80 ± 0.34
Vitamin B2	0.25 – 5.6	1.66 ± 0.07	1.65 ± 0.07	1.46 ± 0.07
Folic Acid	0.3 (mean) <sup>5</sup>	0.297 ± 0.009	0.305 ± 0.009	0.287 ± 0.009
Vitamin E <sup>6</sup>	3.0 – 12.1	0.50 ± 0.64	1.21 ± 0.64	1.38 ± 0.64
Tocopherols (total) <sup>7</sup>	42 – 87	38.0 ± 3.9	46.3 ± 3.9	40.4 ± 3.9

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 65. Single Site Analysis of Vitamins in Grain from Location FR2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	2.91 ± 0.63	2.39 ± 0.63	3.45 ± 0.63
Vitamin B1	3.0 – 8.6	4.45 ± 0.23	4.29 ± 0.23	4.28 ± 0.23
Vitamin B2	0.25 – 5.6	1.46 ± 0.03	1.48 ± 0.03	1.55 ± 0.03
Folic Acid	0.3 (mean) <sup>5</sup>	0.247 ± 0.023	0.288 ± 0.023	0.297 ± 0.023
Vitamin E <sup>6</sup>	3.0 – 12.1	2.94 ± 1.36	1.64 ± 1.36	2.15 ± 1.36
Tocopherols (total) <sup>7</sup>	42 – 87	52.0 ± 4.1	38.3 ± 4.1	39.1 ± 4.1

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 66. Single Site Analysis of Vitamins in Grain from Location FR3**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	2.61 ± 0.31	2.66 ± 0.31	2.23 ± 0.31
Vitamin B1	3.0 – 8.6	4.02 ± 0.23	4.07 ± 0.23	4.08 ± 0.23
Vitamin B2	0.25 – 5.6	1.68 ± 0.16	1.38 ± 0.16	1.41 ± 0.16
Folic Acid	0.3 (mean) <sup>5</sup>	0.172 ± 0.024	0.2218 ± 0.024	0.187 ± 0.024
Vitamin E <sup>6</sup>	3.0 – 12.1	2.75 ± 1.34	0.50 ± 1.34	0.76 ± 1.34
Tocopherols (total) <sup>7</sup>	42 – 87	50.0 ± 5.2	42.4 ± 5.2	46.4 ± 5.2

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 67. Single Site Analysis of Vitamins in Grain from Location IT1**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	2.92 ± 0.45	3.63 ± 0.45	2.54 ± 0.45
Vitamin B1	3.0 – 8.6	4.66 ± 0.22	4.01 ± 0.22	4.18 ± 0.22
Vitamin B2	0.25 – 5.6	1.74 ± 0.14	1.46 ± 0.14	1.42 ± 0.14
Folic Acid	0.3 (mean) <sup>5</sup>	0.167 ± 0.023	0.188 ± 0.023	0.201 ± 0.023
Vitamin E <sup>6</sup>	3.0 – 12.1	3.00 ± 1.40	5.42 ± 1.40	5.68 ± 1.40
Tocopherols (total) <sup>7</sup>	42 – 87	41.5 ± 3.1	50.1 ± 3.1	44.7 ± 3.1

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 68. Single Site Analysis of Vitamins in Grain from Location IT2**

Response Variable <sup>1</sup>	Range of Values in Literature <sup>2</sup>	Means <sup>3</sup>		
		1507	1507 Sprayed	Control
Vitamin A <sup>4</sup>	0.3 – 5.4	1.64 ± 0.53	2.53 ± 0.53	1.56 ± 0.53
Vitamin B1	3.0 – 8.6	4.11 ± 0.41	4.70 ± 0.41	4.95 ± 0.41
Vitamin B2	0.25 – 5.6	1.70 ± 0.08	1.58 ± 0.08	1.67 ± 0.08
Folic Acid	0.3 (mean) <sup>5</sup>	0.323 * ± 0.003	0.301 ± 0.003	0.294 ± 0.003
Vitamin E <sup>6</sup>	3.0 – 12.1	10.92 ± 2.72	13.33 ± 2.72	12.53 ± 2.72
Tocopherols (total) <sup>7</sup>	42 – 87	82.9 ± 11.8	90.1 ± 11.8	63.5 ± 11.8

<sup>1</sup> mg/kg dry weight<sup>2</sup> Watson, 1982<sup>3</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>4</sup> Measured as beta-carotene<sup>5</sup> Watson, 1987<sup>6</sup> Measured as  $\alpha$ -tocopherol<sup>7</sup> Sum of  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol and  $\delta$ -tocopherol

**Table 69. Summary Analysis of Secondary Metabolites and Anti-Nutrients in Grain**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.155 ± 0.003	0.153 ± 0.003	0.148 ± 0.003
Raffinose	0.08 – 0.30	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0
Furfural	NR	0.0006* ± 0.0000	0.0009 ± 0.0000	0.0009 ± 0.0000
P-Coumaric Acid	NR	0.032 ± 0.001	0.031* ± 0.001	0.033 ± 0.001
Ferulic Acid	NR	0.295 ± 0.004	0.290 ± 0.004	0.287 ± 0.004
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.698 ± 0.021	0.683 ± 0.021	0.686 ± 0.021
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 70. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location BU1**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.148 ± 0.007	0.124 ± 0.007	0.134 ± 0.007
Raffinose	0.08 – 0.30	0.3 ± 0.0	0.3 ± 0.0	0.3 ± 0.0
Furfural	NR	0.0023 ± 0.0004	0.0037 ± 0.0004	0.0034 ± 0.0004
P-Coumaric Acid	NR	0.026 ± 0.001	0.030 ± 0.001	0.030 ± 0.001
Ferulic Acid	NR	0.329 ± 0.005	0.321 ± 0.005	0.334 ± 0.005
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.350 ± 0.008	0.309 ± 0.008	0.333 ± 0.008
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 71. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location FR1**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.156 ± 0.004	0.161 ± 0.004	0.154 ± 0.004
Raffinose	0.08 – 0.30	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0
Furfural	NR	0.0003 ± 0.0000	0.0003 ± 0.0000	0.0003 ± 0.0000
P-Coumaric Acid	NR	0.034 ± 0.002	0.032 ± 0.002	0.035 ± 0.002
Ferulic Acid	NR	0.289 ± 0.008	0.282 ± 0.008	0.288 ± 0.008
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.713 ± 0.019	0.724 ± 0.019	0.725 ± 0.019
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 72. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location FR2**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.166 ± 0.011	0.155 ± 0.011	0.136 ± 0.011
Raffinose	0.08 – 0.30	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0
Furfural	NR	0.0002 ± 0.0000	0.0002 ± 0.0000	0.0002 ± 0.0000
P-Coumaric Acid	NR	0.030 ± 0.001	0.028 ± 0.001	0.029 ± 0.001
Ferulic Acid	NR	0.277 ± 0.011	0.262 ± 0.011	0.254 ± 0.011
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.785 ± 0.014	0.742 ± 0.014	0.789 ± 0.014
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 73. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location FR3**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.150 ± 0.009	0.167 ± 0.009	0.171 ± 0.009
Raffinose	0.08 – 0.30	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0
Furfural	NR	0.0003 * ± 0.0000	0.0005 ± 0.0000	0.0007 ± 0.0000
P-Coumaric Acid	NR	0.048 ± 0.005	0.038 ± 0.005	0.043 ± 0.005
Ferulic Acid	NR	0.301 ± 0.011	0.291 ± 0.011	0.296 ± 0.011
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.758 ± 0.127	0.847 ± 0.127	0.761 ± 0.127
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 74. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location IT1**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.154 ± 0.008	0.148 ± 0.008	0.151 ± 0.008
Raffinose	0.08 – 0.30	0.3 ± 0.0	0.3 ± 0.0	0.3 ± 0.0
Furfural	NR	0.0004 ± 0.0000	0.0004 ± 0.0000	0.0003 ± 0.0000
P-Coumaric Acid	NR	0.027 ± 0.001	0.026 ± 0.001	0.029 ± 0.001
Ferulic Acid	NR	0.299 ± 0.012	0.297 ± 0.012	0.283 ± 0.012
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.752 ± 0.070	0.690 ± 0.070	0.687 ± 0.070
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**Table 75. Single Site Analysis of Secondary Metabolites and Anti-Nutrients in Grain from Location IT2**

Response Variable <sup>1,2</sup>	Range of Values in Literature <sup>3</sup>	Means <sup>4</sup>		
		1507	1507 Sprayed	Control
<b>Secondary Metabolites</b>				
Inositol	NR <sup>5</sup>	0.157 ± 0.005	0.161 ± 0.005	0.142 ± 0.005
Raffinose	0.08 – 0.30	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0
Furfural	NR	0.0004 ± 0.0000	0.0004 ± 0.0000	0.0003 ± 0.0000
P-Coumaric Acid	NR	0.028 ± 0.002	0.030 ± 0.002	0.034 ± 0.002
Ferulic Acid	NR	0.272 ± 0.005	0.284 ± 0.005	0.266 ± 0.005
<b>Anti-nutrients</b>				
Phytic acid	0.7 – 1.0	0.829 ± 0.022	0.786 ± 0.022	0.822 ± 0.022
Trypsin Inhibitor (TIU/g)	NR	<LOQ <sup>6</sup>	<LOQ	<LOQ

<sup>1</sup> Percent of dry weight<sup>2</sup> Abbreviation: TIU, trypsin inhibitor units<sup>3</sup> Watson, 1982<sup>4</sup> Least square means; values followed by an asterisk are significantly ( $p < 0.05$ ) different from the control<sup>5</sup> NR: Not reported<sup>6</sup> <LOQ: below the level of quantitation (2,000 TIU/g d.w.)

**APPENDIX 4. EXPRESSION ANALYSIS – SUMMARY INFORMATION**

**Calculation method:**

1. The dilution performed to load a constant amount of protein to an ELISA plate well was determined by the following equations:

- a. Convert Bradford concentration units from mg/ml to  $\mu\text{g/ml}$
- b.  $\frac{\text{Bradford in } \mu\text{g/ml}}{\text{Concentration desired in } \mu\text{g/ml}} = \text{dilution factor}$
- c.  $\frac{\mu\text{l volume desired}}{\text{Dilution factor}} = \mu\text{l extract}$
- d.  $\mu\text{l PBST} = \mu\text{l volume desired} - \mu\text{l extract}$

Example calculation using a 1.157 mg/ml TEP Bradford result, 200  $\mu\text{g/ml}$  as the desired final TEP concentration and 500  $\mu\text{l}$  as the desired total volume:

- e.  $1.157 \text{ mg/ml} \times 1000 \mu\text{g/mg} = 1157 \mu\text{g/ml}$
- f.  $\frac{1157 \mu\text{g/ml}}{200 \mu\text{g/ml}} = 5.785 \text{ dilution factor}$
- g.  $\frac{500 \mu\text{l}}{5.785} = 86 \mu\text{l extract}$
- h.  $500 \mu\text{l total volume} - 86 \mu\text{l extract} = 414 \mu\text{l PBST}$

2. The predicted concentration was determined using the coefficients of the curve and OD readings in the quadratic formula. A polynomial regression (fit to the second degree) was used to determine the equation for the curve. The regression equation was applied using Bio-Rad software as follows:

$$y = Cx^2 + Bx + A$$

$$\text{predicted concentration} = \frac{-B + \sqrt{B^2 - 4C * (A - OD)}}{2C}$$

*i.e.*: given curve parameters of  $A = 0.143$ ,  $B = 0.00625$ ,  $C = -0.00000399$  and  $OD = 0.249$

predicted concentration (predpg) =

$$\frac{-0.00625 + \sqrt{0.00625^2 - 4(-0.00000399)(0.143 - 0.249)}}{2(-0.00000399)} = 16.8$$

3. The standard deviation was calculated as follows:

$$SD = \sqrt{\frac{\sum_{i=1}^N (y - \bar{y})^2}{N - 1}}$$

where:  $y$  = individual data values, and  
 $N$  = number of data values

4. The % coefficient of variation was calculated as follows:  $(CV) = \frac{\text{standard deviation}}{\text{mean}} \times 100$

5. The pg/well to ng/ml unit conversion was calculated as follows:  $\frac{\text{pg}}{\text{well}} \times \frac{\text{well}}{0.05 \text{ ml}} \times \frac{1 \text{ ng}}{1000 \text{ pg}}$

**Table 76. Summary of expression Levels of Cry1F Protein (pg/μg TEP) Measured in Tissues Collected from Maize Hybrid line 1507, 1507S and Controls**

Tissue	Mean (pg/μg TEP <sup>1</sup> )	Standard Deviation	Min/Max Range (pg/μg TEP)	Number of Samples <sup>2</sup>
<b>Leaf</b>				
Hybrid 1507	190	64	0 - 317	30/2<LLOQ(25pg/μg )
Hybrid 1507S	214	42	148 - 297	30/0<LLOQ(25pg/μg)
Control	0 <sup>3</sup>	0	0	6/6<LLOQ(25pg/μg)
<b>Grain</b>				
Hybrid 1507	69	26	0 - 128	29/1<LLOQ(25pg/μg)
Hybrid 1507S	74	22	35 - 118	29/0<LLOQ(25pg/μg)
Control	0	0	0	6/6<LLOQ(25pg/μg)
<b>Pollen</b>				
Hybrid 1507	162	18	132 - 208	30/0<LLOQ(25pg/μg)
Hybrid 1507S	167	23	132 - 241	30/0<LLOQ(25pg/μg)
Control	0	0	0	6/6<LLOQ(25pg/μg)
<b>Stalk</b>				
Hybrid 1507	448	114	338 - 744	30/0<LLOQ(25pg/μg)
Hybrid 1507S	395	90	211 - 710	30/0<LLOQ(25pg/μg)
Control	0	0	0	6/6<LLOQ(25pg/μg)
<b>Whole Plant (V9) WPV9</b>				
Hybrid 1507	965	382	478 - 1450	5/0<LLOQ(250pg/μg)
Hybrid 1507S	883	372	495 - 1230	5/0<LLOQ(250pg/μg)
Control	0	0	0	5/5<LLOQ(250pg/μg)
<b>Whole Plant (R1) WPR1</b>				
Hybrid 1507	1310	630	739 - 2190	4/0<LLOQ(250pg/μg)
Hybrid 1507S	1230	498	767 - 1910	4/0<LLOQ(250pg/μg)
Control	0	0	0	5/5<LLOQ(250pg/μg)
<b>Whole Plant (forage) WPF</b>				
Hybrid 1507	515	295	0 - 752	5/1<LLOQ(250pg/μg)
Hybrid 1507S	396	273	0 - 708	5/1<LLOQ(250pg/μg)
Control	0	0	0	5/5<LLOQ(250pg/μg)
<b>Whole Plant (Senescence)</b>				
Hybrid 1507	410	184	255 - 695	5/0<LLOQ(50pg/μg)
Hybrid 1507S	446	231	204 - 803	5/0<LLOQ(50pg/μg)
Control	0	0	0	5/5<LLOQ(50pg/μg)

<sup>1</sup> TEP: Total Extractable Protein<sup>2</sup> Number of Samples: number of samples analyzed/number of samples < sample LLOQ (pg/μg TEP). Sample LLOQ varies based on the amount (μg TEP/well) of tissue type analyzed, with the assay LLOQ remaining constant.<sup>3</sup> For values below sample LLOQ (pg/μg TEP) a value of zero was assigned for calculation purposes

**Table 77. Summary of expression Levels of Cry1F Protein (ng/mg Tissue Dry Weight) Measured in Tissues Collected from Maize Hybrid line 1507, 1507S and Controls**

Tissue	Mean (ng/mg Tissue Dry Weight)	Standard Deviation	Min/Max Range (ng/mg Tissue Dry Weight)	Number of Samples <sup>1</sup>
<b>Leaf</b>				
Hybrid 1507	12.1	6.2	0 - 24	30/2<LLOQ
Hybrid 1507S	14.2	6.9	5.2 - 31.8	30/0<LLOQ
Control	0 <sup>2</sup>	0	0	6/6<LLOQ
<b>Grain</b>				
Hybrid 1507	2.2	0.8	0 - 4	29/1<LLOQ
Hybrid 1507S	2.5	0.9	0.9 - 3.9	29/0<LLOQ
Control	0	0	0	6/6<LLOQ
<b>Pollen</b>				
Hybrid 1507	21.9	2.9	16.4 - 27.2	30/0<LLOQ
Hybrid 1507S	22.4	2.9	17.5 - 30.7	30/0<LLOQ
Control	0	0	0	6/6<LLOQ
<b>Stalk</b>				
Hybrid 1507	5.8	1.7	3.3 - 10.3	30/0<LLOQ
Hybrid 1507S	5.8	1.5	2.9 - 10.3	30/0<LLOQ
Control	0	0	0	6/6<LLOQ
<b>Whole Plant (V9) WPV9</b>				
Hybrid 1507	5.2	1.9	2.6 - 6.8	5/0<LLOQ
Hybrid 1507S	6.0	2.9	3.4 - 10.2	5/0<LLOQ
Control	0	0	0	5/5<LLOQ
<b>Whole Plant (R1) WPR1</b>				
Hybrid 1507	3.6	1.1	2.5 - 4.7	4/0<LLOQ
Hybrid 1507S	3.6	1.4	2.1 - 5.1	4/0<LLOQ
Control	0	0	0	5/5<LLOQ
<b>Whole Plant (forage) WPF</b>				
Hybrid 1507	1.7	1.1	0 - 3.2	5/1<LLOQ
Hybrid 1507S	1.6	1.1	0 - 2.9	5/1<LLOQ
Control	0	0	0	5/5<LLOQ
<b>Whole Plant (Senescence)</b>				
Hybrid 1507	1.6	0.6	0.9 - 2.4	5/0<LLOQ
Hybrid 1507S	1.7	0.6	1 - 2.3	5/0<LLOQ
Control	0	0	0	5/5<LLOQ

<sup>1</sup> Number of Samples: number of samples analyzed/number of samples < sample LLOQ (pg/μg TEP)<sup>2</sup> For values below sample LLOQ (pg/μg TEP) a value of zero was assigned for calculation purposes

**Table 78. Summary of expression Levels of PAT Protein (pg/μg TEP) Measured in Tissues Collected from Maize Hybrid line 1507, 1507S and Controls**

Tissue	Mean (pg/μg TEP <sup>1</sup> )	Standard Deviation	Min/Max Range (pg/μg TEP)	Number of Samples <sup>2</sup>
<b>Leaf</b>				
Hybrid 1507	55.3	33	0 - 164	30/2<LLOQ(12pg/μg)
Hybrid 1507S	81.9	21.9	50 - 135	30/0>LLOQ(12pg/μg)
Control	0 <sup>4</sup>	0	0	6/6<LLOQ(12pg/μg)
<b>Grain</b>				
Hybrid 1507	0	0	0	29/29<LLOQ(12pg/μg)
Hybrid 1507S	0	0	0	29/29<LLOQ(12pg/μg)
Control	0	0	0	6/6<LLOQ(12pg/μg)
<b>Pollen</b>				
Hybrid 1507	0	0	0	30/30<LLOQ(6pg/μg)
Hybrid 1507S	0	0	0	30/30<LLOQ(6pg/μg)
Control	0	0	0	6/6<LLOQ(6pg/μg)
<b>Stalk</b>				
Hybrid 1507	NA <sup>3</sup>	NA	0 - 48.9	30/21<LLOQ(12pg/μg)
Hybrid 1507S	NA	NA	0 - 25.9	30/18<LLOQ(12pg/μg)
Control	0	0	0	6/6<LLOQ(12pg/μg)
<b>Whole Plant (V9) WPV9</b>				
Hybrid 1507	NA	NA	0 - 6.2	5/4<LLOQ(6pg/μg)
Hybrid 1507S	8.6	12.3	0 - 25.9	5/4<LLOQ(6pg/μg)
Control	0	0	0	5/5<LLOQ(6pg/μg)
<b>Whole Plant (R1) WPR1</b>				
Hybrid 1507	NA	NA	0 - 8.9	4/3<LLOQ(6pg/μg)
Hybrid 1507S	9.9	19.9	0 - 39.8	4/3<LLOQ(6pg/μg)
Control	0	0	0	5/5<LLOQ(6pg/μg)
<b>Whole Plant (forage) WPF</b>				
Hybrid 1507	NA	NA	0 - 6.9	5/4<LLOQ(6pg/μg)
Hybrid 1507S	NA	NA	0 - 11.9	5/3<LLOQ(6pg/μg)
Control	0	0	0	5/5<LLOQ(6pg/μg)
<b>Whole Plant (Senescence)</b>				
Hybrid 1507	0	0	0	5/5<LLOQ(6pg/μg)
Hybrid 1507S	NA	NA	0 - 7.4	5/4<LLOQ(6pg/μg)
Control	0	0	0	5/5<LLOQ(6pg/μg)

<sup>1</sup> TEP: Total Extractable Protein<sup>2</sup> Number of Samples: number of samples analyzed/number of samples < sample LLOQ (pg/μg TEP). Sample LLOQ varies based on the amount (μg TEP/well) of tissue type analyzed, with the assay LLOQ remaining constant.<sup>3</sup> NA: Not Applicable – The mean of the sample values was below the LLOQ and was not included in the table<sup>4</sup> For values below sample LLOQ (pg/μg TEP) a value of zero was assigned for calculation purposes

**Table 85. Summary of expression Levels of PAT Protein (ng/mg Tissue Dry Weight) Measured in Tissues Collected from Maize Hybrid line 1507, 1507S and Controls**

Tissue	Mean (ng/mg Tissue Dry Weight)	Standard Deviation	Min/Max Range (ng/mg Tissue Dry Weight)	Number of Samples <sup>1</sup>
<b>Leaf</b>				
Hybrid 1507	3.8	3.0	0 - 10.8	30/2<LLOQ
Hybrid 1507S	5.2	2.6	1.7 - 11.8	30/0>LLOQ
Control	0 <sup>3</sup>	0	0 - 0	6/6<LLOQ
<b>Grain</b>				
Hybrid 1507	0	0	0	29/29<LLOQ
Hybrid 1507S	0	0	0	29/29<LLOQ
Control	0	0	0	6/6<LLOQ
<b>Pollen</b>				
Hybrid 1507	0	0	0	30/30<LLOQ
Hybrid 1507S	0	0	0	30/30<LLOQ
Control	0	0	0	6/6<LLOQ
<b>Stalk</b>				
Hybrid 1507	NA <sup>2</sup>	NA	0 - 0.6	30/21<LLOQ
Hybrid 1507S	NA	NA	0 - 0.3	30/18<LLOQ
Control	0	0	0 - 0	6/6<LLOQ
<b>Whole Plant (V9) WPV9</b>				
Hybrid 1507	NA	NA	0 - 0.03	5/4<LLOQ
Hybrid 1507S	0.05	0.06	0 - 0.12	5/4<LLOQ
Control	0	0	0 - 0	5/5<LLOQ
<b>Whole Plant (R1) WPR1</b>				
Hybrid 1507	NA	NA	0 - 0.03	4/3<LLOQ
Hybrid 1507S	0.04	0.08	0 - 0.16	4/3<LLOQ
Control	0	0	0 - 0	5/5<LLOQ
<b>Whole Plant (forage) WPF</b>				
Hybrid 1507	NA	NA	0 - 0.03	5/4<LLOQ
Hybrid 1507S	NA	NA	0 - 0.07	5/3<LLOQ
Control	0	0	0 - 0	5/5<LLOQ
<b>Whole Plant (Senescence)</b>				
Hybrid 1507	0	0	0 - 0	5/5<LLOQ
Hybrid 1507S	0	0	0 - 0.01	5/4<LLOQ
Control	0	0	0 - 0	5/5<LLOQ

<sup>1</sup> Number of Samples: number of samples analyzed/number of samples < sample LLOQ (pg/μg TEP)<sup>2</sup> NA: Not Applicable – The mean of the sample values was below the LLOQ and was not included in the table.<sup>3</sup> For values below sample LLOQ (pg/μg TEP) a value of zero was assigned for calculation purposes

**APPENDIX 5. INDIVIDUAL DATA: COMPOSITION ANALYSIS**

**Table 80. Individual Data for Proximate and Mineral Analysis of whole Plant Forage (R4)**

Location	Entry	Block	Fat % d.w. <sup>1</sup>	Protein % d.w.	ADF % d.w.	NDF % d.w.	Ash % d.w.	Carbohydrates % d.w.	Calcium % d.w.	Phosphorus % d.w.
FR1	1507 <sup>2</sup>	1	1.50	9.94	33.0	59.8	4.59	84.0	0.511	0.203
FR1	1507	2	2.35	10.5	28.1	51.5	4.85	82.3	0.436	0.238
FR1	1507	3	1.95	10.4	29.0	51.6	3.96	83.7	0.349	0.212
FR1	1507S <sup>3</sup>	1	2.45	9.86	29.9	55.0	4.22	83.5	0.338	0.226
FR1	1507S	2	2.17	10.7	28.2	51.0	4.19	82.9	0.367	0.247
FR1	CH <sup>4</sup>	1	2.29	11.0	29.4	52.7	4.74	82.0	0.410	0.237
FR1	CH	2	1.97	9.58	30.0	54.3	4.54	83.9	0.473	0.214
FR3	1507	2	2.61	9.77	32.5	54.7	5.71	81.9	0.376	0.242
FR3	1507	3	2.52	9.00	31.3	53.8	5.55	82.9	0.252	0.293
FR3	1507S	1	2.32	9.59	26.9	46.8	4.18	83.9	0.232	0.268
FR3	1507S	2	2.19	9.31	32.9	55.3	6.27	82.2	0.324	0.287
FR3	1507S	3	2.44	9.58	31.1	52.3	5.74	82.2	0.314	0.295
FR3	CH	1	2.20	9.90	36.0	59.1	6.18	81.7	0.330	0.252
FR3	CH	2	2.82	8.50	28.7	47.7	4.58	84.1	0.269	0.255
FR3	CH	3	2.57	8.85	30.8	50.4	5.02	83.6	0.342	0.262
IT1	1507	1	2.55	9.62	30.4	50.3	5.56	82.3	0.270	0.263
IT1	1507	3	2.24	9.10	31.4	51.3	5.92	82.7	0.272	0.269
IT1	1507S	1	2.27	9.43	29.4	51.0	5.59	82.7	0.254	0.253
IT1	1507S	2	2.19	8.65	29.1	49.7	5.38	83.8	0.251	0.232
IT1	1507S	3	2.11	9.22	31.6	54.4	5.47	83.2	0.261	0.230
IT1	CH	1	2.56	10.2	28.0	48.3	6.52	80.7	0.267	0.277
IT1	CH	2	3.02	9.13	24.9	44.9	5.59	82.3	0.197	0.219
IT1	CH	3	2.37	10.4	31.3	55.0	5.90	81.3	0.283	0.232
IT2	1507	1	2.06	11.1	28.7	52.9	5.48	81.4	0.372	0.211
IT2	1507	2	2.15	9.62	29.1	51.2	4.83	83.4	0.300	0.168
IT2	1507	3	2.03	11.2	28.9	51.8	5.40	81.4	0.340	0.198
IT2	1507S	1	1.90	10.5	27.9	49.9	4.87	82.7	0.307	0.199
IT2	1507S	2	2.28	10.3	28.1	49.4	5.12	82.3	0.286	0.212
IT2	1507S	3	2.43	10.7	29.8	51.9	6.42	80.5	0.364	0.209
IT2	CH	1	2.26	10.8	30.5	53.1	5.55	81.4	0.294	0.213
IT2	CH	2	2.61	11.0	29.6	52.0	5.07	81.3	0.284	0.189
IT2	CH	3	2.55	11.6	30.9	54.9	6.96	78.9	0.389	0.233
BU1	1507	1	1.68	9.48	29.4	52.4	4.92	83.9	0.307	0.183
BU1	1507	2	1.55	9.85	29.1	52.4	4.91	83.7	0.355	0.174
BU1	1507	3	1.40	9.02	27.9	54.4	4.48	85.1	0.307	0.167
BU1	1507S	1	1.62	10.3	30.1	56.4	5.50	82.6	0.337	0.196
BU1	1507S	2	1.49	9.31	30.1	53.5	5.00	84.2	0.222	0.158
BU1	1507S	3	1.31	9.59	28.2	53.1	4.90	84.2	0.304	0.176
BU1	CH	1	1.95	11.8	33.3	56.7	5.98	80.3	0.359	0.218
BU1	CH	2	1.75	9.89	30.9	54.9	5.03	83.3	0.333	0.186
BU1	CH	3	1.83	11.5	33.9	58.5	5.90	80.8	0.345	0.219

<sup>1</sup> % d.w.: percentage on a dry weight basis<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid

**Table 81. Individual Data for Proximate Analysis of Grain**

Location	Entry	Block	Crude Fat % d.w. <sup>1</sup>	Protein % d.w.	Cr.Fiber % d.w.	ADF % d.w.	NDF % d.w.	Ash % d.w.	Carbohydrates % d.w.
FR1	1507 <sup>2</sup>	1	3.1	11.2	2.8	3.6	11.7	1.63	84.1
FR1	1507	2	3.2	11.7	2.7	3.2	11.3	1.69	83.4
FR1	1507	3	3.4	12.0	2.8	3.5	11.2	1.64	83.0
FR1	1507S <sup>3</sup>	1	3.6	9.94	2.9	4.2	11.3	1.72	84.7
FR1	1507S	2	3.3	10.6	2.8	3.5	12.6	1.75	84.4
FR1	1507S	3	3.0	10.2	2.9	3.4	11.2	1.69	85.1
FR1	CH <sup>4</sup>	1	3.4	10.5	2.3	3.7	11.2	1.69	84.4
FR1	CH	2	3.4	10.7	2.4	3.8	9.9	1.62	84.3
FR1	CH	3	3.4	11.3	2.4	3.5	11.8	1.68	83.6
FR2	1507	1	4.1	10.0	2.4	3.0	10.4	1.62	84.3
FR2	1507	2	4.1	9.55	2.5	3.1	9.0	1.48	84.9
FR2	1507	3	4.0	8.38	2.8	3.3	10.1	1.62	86.0
FR2	1507S	1	3.8	8.57	2.6	3.8	9.6	1.47	86.2
FR2	1507S	2	3.7	9.55	2.4	4.2	9.3	1.63	85.1
FR2	1507S	3	3.5	8.58	2.4	4.0	9.5	1.59	86.3
FR2	CH	1	3.9	8.66	2.7	3.5	9.3	1.64	85.8
FR2	CH	2	3.6	8.41	2.4	3.6	9.2	1.55	86.4
FR2	CH	3	3.4	8.75	2.8	4.1	10.0	1.57	86.3
FR3	1507	1	3.3	10.7	2.6	3.6	10.4	1.75	84.3
FR3	1507	2	3.7	11.6	2.8	3.3	11.3	1.72	83.0
FR3	1507	3	3.8	11.2	2.6	4.4	11.6	1.77	83.2
FR3	1507S	1	3.7	10.1	2.6	3.0	10.3	1.79	84.4
FR3	1507S	2	3.7	11.4	2.7	3.3	10.0	1.73	83.2
FR3	1507S	3	3.6	10.7	2.8	3.4	10.5	1.50	84.2
FR3	CH	1	3.9	10.3	2.5	4.2	9.7	1.64	84.2
FR3	CH	2	3.5	9.62	2.3	3.3	9.6	1.49	85.4
FR3	CH	3	3.4	9.63	2.8	3.3	10.0	1.51	85.5
IT1	1507	1	3.8	12.0	2.4	3.8	10.0	1.61	82.6
IT1	1507	2	3.3	12.2	2.5	4.2	10.4	1.59	82.9
IT1	1507	3	3.6	11.1	2.4	4.2	10.9	1.71	83.6
IT1	1507S	1	3.5	11.8	2.4	4.1	10.0	1.68	83.0
IT1	1507S	2	3.4	10.6	2.3	3.7	9.8	1.53	84.5
IT1	1507S	3	3.5	10.7	2.4	4.0	10.1	1.47	84.3
IT1	CH	1	3.4	11.3	2.3	3.6	11.0	1.51	83.8
IT1	CH	2	3.7	11.3	2.3	3.2	11.5	1.40	83.6
IT1	CH	3	3.8	10.7	2.2	4.4	10.7	1.39	84.1
IT2	1507	1	3.2	10.4	2.0	3.6	8.5	1.42	85.0
IT2	1507	2	3.5	11.1	2.1	3.4	9.1	1.62	83.8
IT2	1507	3	3.7	11.5	2.4	3.8	10.0	1.49	83.3
IT2	1507S	1	3.8	10.0	2.5	3.2	8.8	1.53	84.7
IT2	1507S	2	3.6	10.4	2.5	3.4	9.1	1.46	84.5
IT2	1507S	3	3.4	10.6	2.6	3.9	9.9	1.51	84.5
IT2	CH	1	3.4	10.2	2.6	3.2	9.0	1.45	85.0
IT2	CH	2	3.7	9.73	2.4	3.6	9.5	1.35	85.2
IT2	CH	3	3.4	11.0	2.5	3.1	9.4	1.44	84.2

<sup>1</sup> % d.w.: percentage on a dry weight basis<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid

**Table 81. Individual Data for Proximate Analysis of Grain (cont.)**

Location	Entry	Block	Crude Fat % d.w. <sup>1</sup>	Protein % d.w.	Cr.Fiber % d.w.	ADF % d.w.	NDF % d.w.	Ash % d.w.	Carbohydrates % d.w.
BU1	1507	1	3.5	10.5	2.6	3.5	8.7	1.76	84.2
BU1	1507	2	3.5	10.1	2.6	3.9	8.0	1.70	84.7
BU1	1507	3	3.5	10.7	2.9	3.4	8.8	1.75	84.1
BU1	1507S	1	3.5	10.2	2.8	3.1	9.3	1.88	84.4
BU1	1507S	2	3.4	10.1	2.7	3.4	8.2	1.72	84.8
BU1	1507S	3	3.5	10.4	2.5	3.6	9.1	1.77	84.3
BU1	CH	1	3.4	9.62	2.5	3.4	8.6	1.65	85.3
BU1	CH	2	3.5	9.58	3.1	3.9	9.8	1.54	85.4
BU1	CH	3	3.5	10.1	2.7	3.9	8.4	1.58	84.8

<sup>1</sup> % d.w.: percentage on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

**Table 82. Individual Data for Fatty Acids Analysis of Grain**

Location	Entry	Block	Palmitic acid % <sup>1</sup>	Stearic acid %	Oleic acid %	Linoleic acid %	Linolenic acid %	Arachidic acid %
FR1	1507 <sup>2</sup>	1	11.3	1.77	28.5	56.2	1.28	0.35
FR1	1507	2	12.4	2.26	31.8	49.8	0.97	0.43
FR1	1507	3	10.9	1.58	28.0	57.1	1.37	0.33
FR1	1507S <sup>3</sup>	1	11.0	1.59	28.9	56.3	1.34	0.33
FR1	1507S	2	11.0	1.52	27.4	57.8	1.38	0.32
FR1	1507S	3	10.7	1.60	28.0	57.4	1.30	0.34
FR1	CH <sup>4</sup>	1	10.7	1.60	28.6	56.8	1.32	0.35
FR1	CH	2	11.0	1.90	27.6	57.2	1.29	0.34
FR1	CH	3	11.2	1.68	29.5	55.6	1.20	0.34
FR2	1507	1	10.3	1.49	32.1	53.8	1.27	0.36
FR2	1507	2	10.5	1.50	32.3	53.3	1.31	0.38
FR2	1507	3	10.5	1.52	32.6	53.0	1.27	0.39
FR2	1507S	1	10.3	1.48	33.5	52.5	1.26	0.37
FR2	1507S	2	10.5	1.53	32.0	53.8	1.32	0.36
FR2	1507S	3	10.6	1.47	32.2	53.4	1.28	0.38
FR2	CH	1	10.5	1.53	32.0	53.6	1.23	0.39
FR2	CH	2	10.3	1.74	31.4	53.8	1.30	0.36
FR2	CH	3	10.2	1.50	32.8	53.1	1.31	0.36
FR3	1507	1	10.3	1.56	31.8	54.0	1.30	0.36
FR3	1507	2	10.4	1.56	35.2	50.3	1.27	0.40
FR3	1507	3	10.5	1.56	32.8	52.7	1.27	0.40
FR3	1507S	1	10.7	1.55	30.8	54.5	1.31	0.36
FR3	1507S	2	10.6	1.64	30.9	53.7	1.20	0.39
FR3	1507S	3	11.0	2.14	30.7	53.5	1.25	0.39
FR3	CH	1	10.4	1.50	31.1	54.5	1.32	0.37
FR3	CH	2	10.6	1.60	30.2	55.4	1.29	0.37
FR3	CH	3	10.4	1.62	31.7	53.7	1.29	0.38
IT1	1507	1	10.2	1.53	37.6	47.8	1.33	0.41
IT1	1507	2	10.3	1.66	38.3	47.3	1.30	0.39
IT1	1507	3	10.6	2.02	35.7	49.2	1.27	0.41
IT1	1507S	1	10.3	1.60	36.5	48.9	1.39	0.40
IT1	1507S	2	10.4	1.67	37.1	48.4	1.29	0.40
IT1	1507S	3	10.5	1.54	36.7	48.7	1.31	0.40
IT1	CH	1	10.6	1.63	36.6	48.7	1.21	0.40
IT1	CH	2	10.9	1.99	37.3	47.2	1.23	0.41
IT1	CH	3	10.5	1.52	31.9	53.8	1.24	0.38
IT2	1507	1	10.4	1.56	36.6	48.9	1.27	0.40
IT2	1507	2	10.4	1.57	35.2	50.4	1.32	0.37
IT2	1507	3	10.4	1.60	34.6	50.9	1.31	0.37
IT2	1507S	1	10.3	1.62	34.8	50.9	1.24	0.39
IT2	1507S	2	10.3	1.63	35.9	49.8	1.27	0.40
IT2	1507S	3	10.4	1.68	35.2	50.0	1.30	0.38
IT2	CH	1	10.6	1.93	35.1	49.9	1.16	0.42
IT2	CH	2	10.4	1.66	34.2	50.9	1.25	0.39
IT2	CH	3	10.4	1.66	35.9	49.5	1.21	0.40

<sup>1</sup> Percentage relative of total fatty acids<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid

**Table 82. Individual Data for Fatty Acids Analysis of Grain (cont.)**

Location	Entry	Block	Palmitic acid % <sup>1</sup>	Stearic acid %	Oleic acid %	Linoleic acid %	Linolenic acid %	Arachidic acid %
BU1	1507	1	13.1	1.39	27.8	55.1	1.58	0.35
BU1	1507	2	12.5	1.34	27.9	55.4	1.47	0.34
BU1	1507	3	12.6	1.62	28.0	53.7	1.65	0.34
BU1	1507S	1	13.2	1.31	27.5	55.1	1.61	0.34
BU1	1507S	2	13.7	2.53	27.7	53.3	1.59	0.39
BU1	1507S	3	13.0	2.08	27.5	53.5	1.48	0.37
BU1	CH	1	13.1	1.61	27.4	55.0	1.54	0.35
BU1	CH	2	13.1	1.34	28.2	54.8	1.50	0.35
BU1	CH	3	13.0	1.45	27.2	55.2	1.54	0.33

<sup>1</sup> Percentage relative of total fatty acids

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

**Table 83. Individual Data for Essential Amino Acids Analysis of Grain**

Location	Entry	Block	Methionine % d.w. <sup>1</sup>	Cystine % d.w.	Lysine, Total % d.w.	Tryptophan % d.w.	Threonine % d.w.	Isoleucine % d.w.	Histidine % d.w.	Valine % d.w.	Leucine % d.w.	Arginine % d.w.	Phenylalanine % d.w.	Glycine % d.w.
FR1	1507 <sup>2</sup>	1	0.19	0.20	0.27	0.08	0.34	0.33	0.26	0.45	1.28	0.34	0.47	0.33
FR1	1507	2	0.21	0.21	0.28	0.08	0.37	0.37	0.28	0.49	1.44	0.36	0.52	0.35
FR1	1507	3	0.21	0.22	0.28	0.08	0.39	0.39	0.29	0.51	1.52	0.37	0.55	0.37
FR1	1507S <sup>3</sup>	1	0.20	0.20	0.28	0.08	0.34	0.34	0.25	0.45	1.26	0.32	0.47	0.34
FR1	1507S	2	0.19	0.20	0.27	0.08	0.34	0.34	0.26	0.44	1.25	0.34	0.47	0.34
FR1	1507S	3	0.20	0.20	0.28	0.08	0.36	0.35	0.27	0.48	1.36	0.34	0.50	0.35
FR1	CH <sup>4</sup>	1	0.20	0.20	0.27	0.08	0.34	0.33	0.26	0.45	1.29	0.32	0.47	0.33
FR1	CH	2	0.19	0.19	0.25	0.09	0.34	0.33	0.25	0.45	1.28	0.32	0.48	0.33
FR1	CH	3	0.20	0.20	0.26	0.09	0.36	0.36	0.28	0.48	1.39	0.34	0.51	0.35
FR2	1507	1	0.17	0.20	0.28	0.20	0.33	0.31	0.26	0.43	1.12	0.35	0.43	0.35
FR2	1507	2	0.16	0.18	0.28	0.09	0.31	0.28	0.23	0.39	1.01	0.33	0.39	0.33
FR2	1507	3	0.16	0.19	0.27	0.08	0.30	0.29	0.23	0.40	1.03	0.32	0.40	0.33
FR2	1507S	1	0.15	0.19	0.26	0.08	0.29	0.28	0.23	0.39	1.01	0.33	0.39	0.32
FR2	1507S	2	0.17	0.19	0.28	0.08	0.34	0.32	0.25	0.43	1.19	0.35	0.46	0.34
FR2	1507S	3	0.16	0.19	0.26	0.08	0.29	0.27	0.22	0.38	0.98	0.31	0.38	0.31
FR2	CH	1	0.18	0.19	0.28	0.08	0.31	0.30	0.24	0.40	1.05	0.33	0.40	0.34
FR2	CH	2	0.18	0.19	0.26	0.08	0.30	0.29	0.24	0.39	1.01	0.32	0.39	0.32
FR2	CH	3	0.16	0.19	0.27	0.08	0.32	0.29	0.25	0.41	1.09	0.34	0.41	1.69
FR3	1507	1	0.19	0.22	0.29	0.09	0.38	0.37	0.29	0.51	1.45	0.38	0.54	0.37
FR3	1507	2	0.19	0.22	0.29	0.09	0.40	0.41	0.29	0.53	1.56	0.40	0.58	0.39
FR3	1507	3	0.20	0.21	0.29	0.09	0.39	0.39	0.28	0.52	1.50	0.38	0.55	0.37
FR3	1507S	1	0.19	0.21	0.28	0.09	0.37	0.36	0.27	0.48	1.40	0.36	0.52	0.36
FR3	1507S	2	0.19	0.21	0.29	0.09	0.39	0.40	0.29	0.53	1.56	0.39	0.57	0.37
FR3	1507S	3	0.19	0.21	0.28	0.09	0.37	0.37	0.28	0.50	1.41	0.37	0.52	0.36
FR3	CH	1	0.18	0.20	0.28	0.08	0.34	0.33	0.26	0.45	1.23	0.35	0.46	0.35
FR3	CH	2	0.17	0.19	0.26	0.08	0.31	0.30	0.24	0.41	1.11	0.31	0.41	0.33
FR3	CH	3	0.18	0.19	0.27	0.08	0.34	0.33	0.26	0.44	1.23	0.34	0.46	0.34
IT1	1507	1	0.20	0.22	0.30	0.10	0.39	0.39	0.29	0.51	1.52	0.42	0.56	0.39
IT1	1507	2	0.19	0.22	0.30	0.09	0.39	0.39	0.30	0.50	1.47	0.40	0.55	0.39
IT1	1507	3	0.19	0.22	0.29	0.09	0.35	0.34	0.27	0.46	1.26	0.36	0.48	0.37
IT1	1507S	1	0.20	0.21	0.30	0.09	0.37	0.36	0.28	0.48	1.36	0.41	0.51	0.38
IT1	1507S	2	0.18	0.21	0.29	0.09	0.34	0.33	0.26	0.45	1.26	0.38	0.48	0.35
IT1	1507S	3	0.18	0.21	0.29	0.09	0.35	0.34	0.27	0.47	1.31	0.38	0.49	0.37
IT1	CH	1	0.20	0.22	0.31	0.10	0.37	0.36	0.28	0.48	1.32	0.41	0.50	0.38
IT1	CH	2	0.20	0.21	0.29	0.10	0.37	0.37	0.28	0.48	1.37	0.39	0.51	0.37
IT1	CH	3	0.19	0.21	0.28	0.09	0.36	0.35	0.27	0.46	1.30	0.38	0.49	0.36
IT2	1507	1	0.20	0.21	0.29	0.09	0.34	0.33	0.26	0.44	1.21	0.36	0.46	0.35
IT2	1507	2	0.21	0.22	0.31	0.10	0.37	0.36	0.28	0.48	1.33	0.41	0.50	0.37
IT2	1507	3	0.19	0.21	0.30	0.10	0.38	0.38	0.29	0.50	1.41	0.40	0.53	0.38
IT2	1507S	1	0.18	0.20	0.28	0.09	0.32	0.31	0.26	0.43	1.15	0.36	0.45	0.35
IT2	1507S	2	0.17	0.20	0.28	0.10	0.33	0.32	0.25	0.44	1.16	0.35	0.44	0.34
IT2	1507S	3	0.18	0.21	0.30	0.10	0.35	0.34	0.26	0.46	1.20	0.38	0.47	0.36
IT2	CH	1	0.20	0.21	0.29	0.10	0.34	0.33	0.26	0.45	1.18	0.35	0.46	0.35
IT2	CH	2	0.19	0.20	0.28	0.09	0.33	0.31	0.25	0.42	1.09	0.36	0.43	0.34
IT2	CH	3	0.21	0.22	0.29	0.10	0.35	0.34	0.27	0.46	1.25	0.37	0.48	0.36

<sup>1</sup> % d.w.: percentage on a dry weight basis<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid

**Table 83. Individual Data for Essential Amino Acids Analysis of Grain (cont.)**

Location	Entry	Block	Methionine % d.w. <sup>1</sup>	Cystine % d.w.	Lysine, Total % d.w.	Tryptophan % d.w.	Threonine % d.w.	Isoleucine % d.w.	Histidine % d.w.	Valine % d.w.	Leucine % d.w.	Arginine % d.w.	Phenylalanine % d.w.	Glycine % d.w.
BU1	1507	1	0.19	0.19	0.28	0.09	0.33	0.33	0.24	0.44	1.18	0.28	0.57	0.32
BU1	1507	2	0.19	0.18	0.28	0.09	0.33	0.33	0.24	0.43	1.13	0.29	0.61	0.31
BU1	1507	3	0.19	0.18	0.29	0.09	0.35	0.34	0.25	0.45	1.17	0.29	0.59	0.34
BU1	1507S	1	0.18	0.17	0.28	0.09	0.32	0.30	0.23	0.41	1.06	0.28	0.57	0.31
BU1	1507S	2	0.20	0.18	0.28	0.09	0.34	0.32	0.25	0.44	1.14	0.29	0.56	0.34
BU1	1507S	3	0.19	0.18	0.29	0.09	0.33	0.31	0.24	0.43	1.12	0.28	0.59	0.33
BU1	CH	1	0.19	0.18	0.28	0.08	0.32	0.30	0.23	0.41	1.05	0.28	0.52	0.31
BU1	CH	2	0.20	0.19	0.28	0.09	0.32	0.30	0.23	0.41	1.05	0.28	0.56	0.31
BU1	CH	3	0.18	0.17	0.28	0.09	0.33	0.32	0.24	0.43	1.13	0.29	0.55	0.33

<sup>1</sup> % d.w.: percentage on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

**Table 83. Individual Data for Essential Amino Acids Analysis of Grain (cont.)**

Location	Entry	Block	Alanine % d.w.	Aspartic Acid % d.w.	Glutamic Acid % d.w.	Proline % d.w.	Serine % d.w.	Tyrosine % d.w.
FR1	1507 <sup>2</sup>	1	0.77	0.65	1.89	0.76	0.46	0.17
FR1	1507	2	0.84	0.71	2.18	0.87	0.51	0.19
FR1	1507	3	0.90	0.75	2.27	0.89	0.54	0.19
FR1	1507S <sup>3</sup>	1	0.76	0.66	1.92	0.79	0.46	0.16
FR1	1507S	2	0.76	0.67	1.89	0.78	0.46	0.16
FR1	1507S	3	0.82	0.69	2.05	0.82	0.50	0.19
FR1	CH <sup>4</sup>	1	0.77	0.65	1.95	0.83	0.47	0.18
FR1	CH	2	0.76	0.66	1.93	0.82	0.46	0.15
FR1	CH	3	0.83	0.72	2.10	0.89	0.50	0.18
FR2	1507	1	0.69	0.63	1.73	0.68	0.43	0.13
FR2	1507	2	0.64	0.58	1.55	0.58	0.41	0.14
FR2	1507	3	0.64	0.57	1.62	0.63	0.40	0.11
FR2	1507S	1	0.62	0.56	1.56	0.62	0.39	0.13
FR2	1507S	2	0.72	0.61	1.79	0.68	0.44	0.16
FR2	1507S	3	0.60	0.53	1.52	0.59	0.38	0.13
FR2	CH	1	0.66	0.59	1.65	0.65	0.41	0.12
FR2	CH	2	0.63	0.56	1.57	0.61	0.39	0.13
FR2	CH	3	0.66	0.56	1.69	0.66	0.42	0.14
FR3	1507	1	0.86	0.71	2.17	0.85	0.53	0.18
FR3	1507	2	0.92	0.77	2.37	0.88	0.56	0.19
FR3	1507	3	0.89	0.75	2.22	0.87	0.54	0.19
FR3	1507S	1	0.83	0.72	2.09	0.81	0.51	0.16
FR3	1507S	2	0.91	0.76	2.31	0.87	0.55	0.19
FR3	1507S	3	0.84	0.72	2.12	0.82	0.52	0.17
FR3	CH	1	0.73	0.66	1.85	0.76	0.46	0.12
FR3	CH	2	0.67	0.60	1.73	0.69	0.41	0.14
FR3	CH	3	0.74	0.63	1.88	0.76	0.45	0.15
IT1	1507	1	0.90	0.78	2.29	0.90	0.55	0.18
IT1	1507	2	0.88	0.75	2.25	0.87	0.54	0.17
IT1	1507	3	0.79	0.70	1.97	0.78	0.49	0.11
IT1	1507S	1	0.83	0.71	2.13	0.84	0.52	0.16
IT1	1507S	2	0.77	0.65	1.92	0.76	0.47	0.16
IT1	1507S	3	0.80	0.69	2.02	0.79	0.48	0.16
IT1	CH	1	0.80	0.72	2.01	0.84	0.50	0.17
IT1	CH	2	0.82	0.74	2.12	0.85	0.51	0.16
IT1	CH	3	0.79	0.67	1.97	0.80	0.48	0.16
IT2	1507	1	0.76	0.65	1.89	0.78	0.46	0.14
IT2	1507	2	0.84	0.71	2.07	0.85	0.51	0.16
IT2	1507	3	0.85	0.73	2.14	0.85	0.52	0.18
IT2	1507S	1	0.72	0.63	1.78	0.73	0.45	0.15
IT2	1507S	2	0.72	0.63	1.79	0.80	0.44	0.12
IT2	1507S	3	0.76	0.66	1.89	0.79	0.47	0.15
IT2	CH	1	0.73	0.64	1.82	0.76	0.45	0.12
IT2	CH	2	0.69	0.62	1.70	0.72	0.44	0.14
IT2	CH	3	0.76	0.69	1.90	0.79	0.48	0.15

<sup>1</sup> % d.w.: percentage on a dry weight basis<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid

**Table 83. Individual Data for Essential Amino Acids Analysis of Grain (cont.)**

Location	Entry	Block	Alanine % d.w.	Aspartic Acid % d.w.	Glutamic Acid % d.w.	Proline % d.w.	Serine % d.w.	Tyrosine % d.w.
BU1	1507	1	0.74	0.64	1.78	0.77	0.44	0.12
BU1	1507	2	0.73	0.63	1.71	0.73	0.44	0.16
BU1	1507	3	0.76	0.66	1.80	0.76	0.46	0.13
BU1	1507S	1	0.68	0.60	1.61	0.70	0.42	0.15
BU1	1507S	2	0.74	0.65	1.74	0.75	0.45	0.15
BU1	1507S	3	0.73	0.64	1.70	0.71	0.43	0.15
BU1	CH	1	0.67	0.61	1.62	0.70	0.42	0.13
BU1	CH	2	0.67	0.60	1.59	0.70	0.42	0.14
BU1	CH	3	0.73	0.64	1.73	0.75	0.44	0.14

<sup>1</sup> % d.w.: percentage on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

**Table 84. Individual Data for Minerals Analysis of Grain**

Location	Entry	Block	Calcium % d.w. <sup>1</sup>	Copper % d.w.	Iron % d.w.	Magnesium % d.w.	Manganese % d.w.	Phosphorus % d.w.	Potassium % d.w.	Sodium % d.w.	Zinc % d.w.
FR1	1507 <sup>2</sup>	1	0.00674	<LOQ <sup>5</sup>	0.00208	0.112	0.000199	0.326	0.457	0.000504	0.00220
FR1	1507	2	0.00567	<LOQ	0.00240	0.112	0.000227	0.323	0.377	0.000596	0.00193
FR1	1507	3	0.00522	<LOQ	0.00194	0.119	0.000259	0.344	0.438	0.00208	0.00216
FR1	1507S <sup>3</sup>	1	0.00673	<LOQ	0.00249	0.148	0.000254	0.435	0.598	0.000745	0.00267
FR1	1507S	2	0.00626	<LOQ	0.00177	0.110	0.000186	0.317	0.432	0.000558	0.00190
FR1	1507S	3	0.00498	<LOQ	0.00187	0.110	0.000313	0.317	0.446	0.00191	0.00183
FR1	CH <sup>4</sup>	1	0.00471	<LOQ	0.00177	0.107	0.000197	0.305	0.406	0.00109	0.00192
FR1	CH	2	0.00441	<LOQ	0.00168	0.109	0.000255	0.311	0.426	0.000498	0.00188
FR1	CH	3	0.00436	<LOQ	0.00228	0.102	0.000265	0.300	0.395	0.000596	0.00183
FR2	1507	1	0.00539	<LOQ	0.00213	0.116	0.000401	0.324	0.434	0.000628	0.00158
FR2	1507	2	0.00505	<LOQ	0.00196	0.103	0.000354	0.305	0.431	0.000785	0.00154
FR2	1507	3	0.00531	<LOQ	0.00200	0.0976	0.000328	0.284	0.414	0.00125	0.00131
FR2	1507S	1	0.00549	<LOQ	0.00198	0.104	0.000331	0.295	0.424	0.000346	0.00158
FR2	1507S	2	0.00495	<LOQ	0.00243	0.110	0.000411	0.328	0.436	0.000431	0.00166
FR2	1507S	3	0.00622	<LOQ	0.00251	0.101	0.000361	0.305	0.437	0.000819	0.00144
FR2	CH	1	0.00558	<LOQ	0.00207	0.101	0.000440	0.295	0.376	0.000455	0.00144
FR2	CH	2	0.00565	<LOQ	0.00206	0.104	0.000420	0.298	0.360	0.00134	0.00142
FR2	CH	3	0.00548	<LOQ	0.00199	0.104	0.000396	0.299	0.390	0.00125	0.00162
FR3	1507	1	0.00438	<LOQ	0.00218	0.113	0.000414	0.325	0.432	0.000434	0.00208
FR3	1507	2	0.00460	<LOQ	0.00214	0.119	0.000424	0.333	0.405	0.000383	0.00214
FR3	1507	3	0.00461	<LOQ	0.00238	0.121	0.000459	0.340	0.429	0.000648	0.00231
FR3	1507S	1	0.00463	<LOQ	0.00255	0.121	0.000422	0.355	0.457	0.000457	0.00231
FR3	1507S	2	0.00527	<LOQ	0.00200	0.126	0.000503	0.354	0.425	0.000947	0.00238
FR3	1507S	3	0.00463	<LOQ	0.00197	0.112	0.000460	0.334	0.429	0.000370	0.00226
FR3	CH	1	0.00443	<LOQ	0.00197	0.114	0.000518	0.333	0.426	0.000827	0.00234
FR3	CH	2	0.00738	<LOQ	0.00263	0.114	0.000438	0.386	0.426	0.000316	0.00211
FR3	CH	3	0.00447	<LOQ	0.00260	0.112	0.000529	0.327	0.407	0.000734	0.00234
IT1	1507	1	0.00361	<LOQ	0.00183	0.105	0.000476	0.332	0.427	0.000525	0.00215
IT1	1507	2	0.00347	<LOQ	0.00179	0.104	0.000512	0.320	0.428	0.000536	0.00222
IT1	1507	3	0.00349	<LOQ	0.00204	0.0975	0.000518	0.321	0.427	0.000640	0.00214
IT1	1507S	1	0.00367	<LOQ	0.00187	0.104	0.000504	0.336	0.429	0.00124	0.00225
IT1	1507S	2	0.00372	<LOQ	0.00170	0.102	0.000470	0.328	0.444	0.000559	0.00206
IT1	1507S	3	0.00517	<LOQ	0.00277	0.100	0.000463	0.322	0.442	0.000693	0.00206
IT1	CH	1	0.00401	<LOQ	0.00290	0.104	0.000546	0.322	0.420	0.000983	0.00219
IT1	CH	2	0.00345	<LOQ	0.00244	0.105	0.000607	0.316	0.410	0.000549	0.00224
IT1	CH	3	0.00362	<LOQ	0.00212	0.0960	0.000560	0.314	0.430	0.000637	0.00224
IT2	1507	1	0.00369	<LOQ	0.00207	0.109	0.000370	0.295	0.397	0.000690	0.00226
IT2	1507	2	0.00343	<LOQ	0.00208	0.114	0.000439	0.309	0.413	0.000379	0.00227
IT2	1507	3	0.00450	<LOQ	0.00197	0.114	0.000476	0.321	0.428	0.000412	0.00216
IT2	1507S	1	0.00402	<LOQ	0.00223	0.102	0.000349	0.290	0.418	0.000581	0.00213
IT2	1507S	2	0.00433	<LOQ	0.00200	0.104	0.000396	0.293	0.410	0.000370	0.00212
IT2	1507S	3	0.00364	<LOQ	0.00198	0.109	0.000366	0.294	0.412	0.000467	0.00210
IT2	CH	1	0.00379	<LOQ	0.00208	0.110	0.000450	0.291	0.422	0.000402	0.00221
IT2	CH	2	0.00410	<LOQ	0.00206	0.102	0.000392	0.269	0.385	0.000250	0.00227
IT2	CH	3	0.00388	<LOQ	0.00194	0.104	0.000479	0.283	0.379	0.000403	0.00211

<sup>1</sup> % d.w.: percentage on a dry weight basis<sup>2</sup> 1507: test entry hybrid TC1507<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> CH: control hybrid<sup>5</sup> All values for copper were below the LOQ (0.000250%)

**Table 84. Individual Data for Minerals Analysis of Grain (cont.)**

Location	Entry	Block	Calcium % d.w. <sup>1</sup>	Copper % d.w.	Iron % d.w.	Magnesium % d.w.	Manganese % d.w.	Phosphorus % d.w.	Potassium % d.w.	Sodium % d.w.	Zinc % d.w.
BU1	1507	1	0.00842	<LOQ	0.00205	0.110	0.000436	0.294	0.610	0.000426	0.00213
BU1	1507	2	0.00720	<LOQ	0.00175	0.108	0.000408	0.283	0.578	0.000283	0.00202
BU1	1507	3	0.00651	<LOQ	0.00192	0.107	0.000425	0.298	0.631	0.000502	0.00214
BU1	1507S	1	0.00824	<LOQ	0.00205	0.109	0.000473	0.288	0.616	0.00188	0.00212
BU1	1507S	2	0.00826	<LOQ	0.00180	0.106	0.000489	0.292	0.646	0.000512	0.00209
BU1	1507S	3	0.0131	<LOQ	0.00204	0.109	0.000493	0.295	0.641	0.000761	0.00203
BU1	CH	1	0.00670	<LOQ	0.00219	0.107	0.000430	0.274	0.583	0.000556	0.00200
BU1	CH	2	0.00677	<LOQ	0.00227	0.109	0.000427	0.273	0.561	0.000568	0.00205
BU1	CH	3	0.00815	<LOQ	0.00623	0.111	0.000491	0.276	0.603	0.00148	0.00216

<sup>1</sup> % d.w.: percentage on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

<sup>5</sup> All values for copper were below the LOQ (0.000250%)

**Table 85. Individual Data for Vitamin Analysis of Grain**

Location	Entry	Block	Beta Carotene ppm d.w. <sup>1</sup>	Vitamin B1 ppm d.w.	Vitamin B2 ppm d.w.	Folic Acid ppm d.w.	Alpha Tocopherol <sup>5</sup> ppm d.w.	Tocopherols, Total ppm d.w.
FR1	1507 <sup>2</sup>	1	2.25	5.07	1.54	0.300	0.50	31.3
FR1	1507	2	2.95	4.41	1.90	0.318	0.50	39.8
FR1	1507	3	2.70	4.71	1.55	0.272	0.50	42.8
FR1	1507S <sup>3</sup>	1	2.08	4.86	1.68	0.280	1.77	44.4
FR1	1507S	2	3.05	3.77	1.77	0.329	0.50	50.8
FR1	1507S	3	4.05	4.62	1.49	0.305	1.36	43.7
FR1	CH <sup>4</sup>	1	2.25	5.59	1.54	0.281	0.50	42.6
FR1	CH	2	1.99	4.79	1.44	0.319	3.13	48.7
FR1	CH	3	2.35	7.03	1.41	0.262	0.50	29.8
FR2	1507	1	2.82	4.69	1.47	0.205	1.48	55.7
FR2	1507	2	3.57	4.42	1.46	0.343	0.50	40.0
FR2	1507	3	2.35	4.23	1.46	0.192	6.84	60.2
FR2	1507S	1	2.24	3.83	1.43	0.200	3.91	51.3
FR2	1507S	2	3.27	4.87	1.56	0.410	0.50	30.5
FR2	1507S	3	1.66	4.17	1.45	0.255	0.50	33.2
FR2	CH	1	1.44	4.11	1.45	0.207	1.37	39.5
FR2	CH	2	4.23	4.23	1.62	0.473	0.50	32.6
FR2	CH	3	4.69	4.51	1.59	0.213	4.58	45.1
FR3	1507	1	2.74	3.63	1.90	0.152	7.25	61.1
FR3	1507	2	2.57	4.32	1.51	0.182	0.50	50.0
FR3	1507	3	2.51	4.10	1.63	0.183	0.50	38.8
FR3	1507S	1	2.62	4.19	1.11	0.189	0.50	45.2
FR3	1507S	2	2.42	4.10	1.28	0.284	0.50	39.2
FR3	1507S	3	2.94	4.93	1.76	0.181	0.50	42.8
FR3	CH	1	2.30	4.30	1.14	0.218	0.50	38.9
FR3	CH	2	2.95	4.01	1.57	0.170	1.28	55.1
FR3	CH	3	1.43	3.94	1.53	0.173	0.50	45.3
IT1	1507	1	3.86	4.72	1.96	0.163	3.50	40.7
IT1	1507	2	3.42	4.41	2.03	0.162	3.42	38.1
IT1	1507	3	1.48	4.85	1.23	0.177	2.07	45.7
IT1	1507S	1	3.72	3.72	1.48	0.176	7.11	46.3
IT1	1507S	2	3.87	4.14	1.48	0.154	4.51	52.8
IT1	1507S	3	3.30	4.17	1.43	0.234	4.65	51.2
IT1	CH	1	2.10	3.42	1.44	0.149	3.96	37.7
IT1	CH	2	2.78	4.54	1.44	0.154	10.1	53.7
IT1	CH	3	2.73	4.59	1.37	0.301	2.98	42.7
IT2	1507	1	1.68	3.49	1.62	0.330	19.5	106
IT2	1507	2	1.82	4.38	1.73	0.330	6.83	69.5
IT2	1507	3	1.43	4.46	1.75	0.309	6.43	73.3
IT2	1507S	1	1.38	4.63	1.67	0.315	12.3	77.4
IT2	1507S	2	1.97	4.33	1.38	0.311	15.7	106
IT2	1507S	3	4.24	5.15	1.69	0.278	12.0	86.9
IT2	CH	1	1.47	5.49	1.62	0.307	12.2	71.5
IT2	CH	2	1.66	5.25	1.78	0.301	13.4	42.8
IT2	CH	3	1.56	4.11	1.60	0.274	12.0	76.3

<sup>1</sup> ppm d.w.: parts per million on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

<sup>5</sup> For calculation purposes, alpha tocopherol values that were below the LOQ (Level of Quantitation; 1.00) were assigned a value of ½ LOQ (0.50)

**Table 85. Individual Data for Vitamin Analysis of Grain (cont.)**

Location	Entry	Block	Beta Carotene ppm d.w. <sup>1</sup>	Vitamin B1 ppm d.w.	Vitamin B2 ppm d.w.	Folic Acid ppm d.w.	Alpha Tocopherol <sup>5</sup> ppm d.w.	Tocopherols, Total ppm d.w.
BU1	1507	1	1.53	3.92	2.56	0.432	5.42	34.8
BU1	1507	2	1.53	4.24	2.11	0.326	2.22	21.0
BU1	1507	3	1.72	4.04	2.88	0.478	3.39	31.4
BU1	1507S	1	1.76	4.01	2.99	0.369	5.28	30.8
BU1	1507S	2	2.08	3.73	2.66	0.228	0.50	19.3
BU1	1507S	3	1.54	4.34	2.64	0.415	14.5	30.0
BU1	CH	1	1.28	4.38	2.25	0.387	8.98	40.8
BU1	CH	2	1.58	4.55	2.21	0.438	7.81	40.6
BU1	CH	3	1.51	4.38	2.25	0.473	8.66	32.5

<sup>1</sup> ppm d.w.: parts per million on a dry weight basis

<sup>2</sup> 1507: test entry hybrid TC1507

<sup>3</sup> 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> CH: control hybrid

<sup>5</sup> For calculation purposes, alpha tocopherol values that were below the LOQ (Level of Quantitation; 1.00) were assigned a value of ½ LOQ (0.50 ppm)

**Table 86. Individual Data for Secondary Metabolite and Anti-Nutrient Analysis of Grain**

Location	Entry	Block	Inositol % d.w. <sup>1</sup>	Raffinose <sup>5</sup> % d.w.	Furfural % d.w.	p-Coumaric Acid % d.w.	Ferulic Acid % d.w.	Phytic Acid % d.w.	Trypsin Inhibitor TIU d.w.
FR1	1507 <sup>2</sup>	1	0.166	0.05	0.0004	0.032	0.275	0.700	<LOQ <sup>6</sup>
FR1	1507	2	0.153	0.1	0.0002	0.034	0.293	0.686	<LOQ
FR1	1507	3	0.148	0.1	0.0002	0.037	0.299	0.753	<LOQ
FR1	1507S <sup>3</sup>	1	0.162	0.1	0.0002	0.034	0.297	0.744	<LOQ
FR1	1507S	2	0.172	0.1	0.0004	0.033	0.286	0.669	<LOQ
FR1	1507S	3	0.149	0.05	0.0002	0.029	0.264	0.759	<LOQ
FR1	CH <sup>4</sup>	1	0.157	0.1	0.0003	0.034	0.288	0.760	<LOQ
FR1	CH	2	0.152	0.1	0.0003	0.037	0.294	0.711	<LOQ
FR1	CH	3	0.152	0.1	0.0002	0.034	0.281	0.703	<LOQ
FR2	1507	1	0.160	0.3	0.0002	0.027	0.251	0.791	<LOQ
FR2	1507	2	0.178	0.1	0.0002	0.033	0.287	0.781	<LOQ
FR2	1507	3	0.160	0.2	0.0002	0.029	0.293	0.783	<LOQ
FR2	1507S	1	0.167	0.2	0.0002	0.026	0.255	0.719	<LOQ
FR2	1507S	2	0.177	0.1	0.0002	0.029	0.272	0.754	<LOQ
FR2	1507S	3	0.121	0.2	0.0002	0.028	0.258	0.753	<LOQ
FR2	CH	1	0.158	0.2	0.0002	0.030	0.265	0.802	<LOQ
FR2	CH	2	0.122	0.1	0.0002	0.030	0.263	0.750	<LOQ
FR2	CH	3	0.128	0.2	0.0002	0.027	0.233	0.816	<LOQ
FR3	1507	1	0.177	0.2	0.0002	0.041	0.283	0.886	<LOQ
FR3	1507	2	0.152	0.2	0.0003	0.043	0.307	0.890	<LOQ
FR3	1507	3	0.122	0.1	0.0003	0.061	0.313	0.499	<LOQ
FR3	1507S	1	0.163	0.3	0.0003	0.045	0.312	0.738	<LOQ
FR3	1507S	2	0.172	0.2	0.0006	0.037	0.290	0.857	<LOQ
FR3	1507S	3	0.166	0.2	0.0007	0.033	0.270	0.947	<LOQ
FR3	CH	1	0.172	0.2	0.0007	0.047	0.308	0.832	<LOQ
FR3	CH	2	0.171	0.2	0.0007	0.041	0.298	0.540	<LOQ
FR3	CH	3	0.170	0.2	0.0007	0.042	0.282	0.911	<LOQ
IT1	1507	1	0.169	0.2	0.0003	0.028	0.309	0.648	<LOQ
IT1	1507	2	0.149	0.3	0.0003	0.025	0.284	0.753	<LOQ
IT1	1507	3	0.145	0.3	0.0005	0.027	0.304	0.854	<LOQ
IT1	1507S	1	0.154	0.3	0.0005	0.027	0.287	0.741	<LOQ
IT1	1507S	2	0.145	0.3	0.0005	0.025	0.300	0.758	<LOQ
IT1	1507S	3	0.145	0.3	0.0003	0.025	0.304	0.571	<LOQ
IT1	CH	1	0.136	0.3	0.0004	0.034	0.305	0.790	<LOQ
IT1	CH	2	0.156	0.3	0.0003	0.029	0.291	0.607	<LOQ
IT1	CH	3	0.161	0.3	0.0003	0.025	0.253	0.664	<LOQ
IT2	1507	1	0.159	0.2	0.0003	0.024	0.256	0.779	<LOQ
IT2	1507	2	0.152	0.2	0.0004	0.030	0.279	0.802	<LOQ
IT2	1507	3	0.160	0.2	0.0004	0.030	0.282	0.905	<LOQ
IT2	1507S	1	0.180	0.2	0.0004	0.031	0.279	0.719	<LOQ
IT2	1507S	2	0.144	0.2	0.0004	0.030	0.276	0.822	<LOQ
IT2	1507S	3	0.159	0.2	0.0003	0.028	0.298	0.818	<LOQ
IT2	CH	1	0.144	0.2	0.0003	0.032	0.268	0.812	<LOQ
IT2	CH	2	0.140	0.2	0.0003	0.032	0.262	0.818	<LOQ
IT2	CH	3	0.142	0.2	0.0003	0.037	0.269	0.836	<LOQ

<sup>1</sup> – % d.w.: percentage on a dry weight basis<sup>2</sup> – 1507: test entry hybrid TC1507<sup>3</sup> – 1507S: test entry sprayed hybrid TC1507S<sup>4</sup> – CH: control hybrid<sup>5</sup> – For calculation purposes, raffinose values that were below the LOQ (Level of Quantitation; 0.1) were assigned a value of ½ LOQ (0.05)<sup>6</sup> – All values for trypsin inhibitor were below the LOQ of 2,000

**Table 86. Individual Data for Secondary Metabolite and Anti-Nutrient Analysis of Grain (cont.)**

Location	Entry	Block	Inositol % d.w. <sup>1</sup>	Raffinose <sup>5</sup> % d.w.	Furfural % d.w.	p-Coumaric Acid % d.w.	Ferulic Acid % d.w.	Phytic Acid % d.w.	Trypsin Inhibitor TIU d.w. <sup>6</sup>
BU1	1507	1	0.141	0.3	0.0024	0.026	0.319	0.352	<LOQ
BU1	1507	2	0.168	0.3	0.0022	0.026	0.317	0.366	<LOQ
BU1	1507	3	0.134	0.3	0.0023	0.027	0.351	0.331	<LOQ
BU1	1507S	1	0.123	0.3	0.0025	0.029	0.327	0.303	<LOQ
BU1	1507S	2	0.128	0.3	0.0042	0.027	0.313	0.302	<LOQ
BU1	1507S	3	0.121	0.3	0.0044	0.034	0.324	0.321	<LOQ
BU1	CH	1	0.122	0.3	0.0038	0.032	0.335	0.336	<LOQ
BU1	CH	2	0.135	0.3	0.0031	0.027	0.324	0.334	<LOQ
BU1	CH	3	0.145	0.3	0.0034	0.032	0.342	0.330	<LOQ

<sup>1</sup> – % d.w.: percentage on a dry weight basis

<sup>2</sup> – 1507: test entry hybrid TC1507

<sup>3</sup> – 1507S: test entry sprayed hybrid TC1507S

<sup>4</sup> – CH: control hybrid

<sup>5</sup> – For calculation purposes, raffinose values that were below the LOQ (Level of Quantitation; 0.1) were assigned a value of ½ LOQ (0.05)

<sup>6</sup> – All values for trypsin inhibitor were below the LOQ of 2,000

**APPENDIX 6. INDIVIDUAL DATA: PROTEIN EXPRESSION ANALYSIS**

**Table 87. Individual Values for Cry1F Expression in Leaf Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-L9	3/21/2001	10.3	17.2	1.008	1.0	0.000	0.000	0.0
22	FR1-CH-1-1-L9	3/21/2001	10.6	17.7	1.615	1.0	0.000	0.000	0.0
33	FR2-CH-1-1-L9	3/21/2001	10.3	17.2	1.075	1.0	0.000	0.000	0.0
44	FR3-CH-1-1-L9	3/21/2001	10.1	16.8	0.612	1.0	0.000	0.000	0.0
55	IT1-CH-1-1-L9	3/21/2001	9.9	16.5	1.581	1.0	0.000	0.000	0.0
66	IT2-CH-1-1-L9	3/21/2001	9.7	16.2	0.715	1.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (25)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 90. Individual Values for Cry1F Expression in Grain Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-G	3/28/2001	20.1	33.5	0.618	1.0	0.000	0.000	0.0
22	FR1-CH-1-1-G	3/28/2001	19.6	32.7	0.933	1.0	0.000	0.000	0.0
33	FR2-CH-1-1-G	3/28/2001	20.2	33.7	0.866	1.0	0.000	0.000	0.0
44	FR3-CH-1-1-G	3/28/2001	20.1	33.5	1.529	1.0	0.000	0.000	0.0
55	IT1-CH-1-1-G	3/28/2001	20.7	34.5	1.618	1.0	0.000	0.000	0.0
66	IT2-CH-1-1-G	3/28/2001	20.7	34.5	1.376	1.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (25)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 93. Individual Values for Cry1F Expression in Pollen Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-P	4/17/2001	5.6	9.3	1.158	1.0	0.000	0.000	0.0
22	FR1-CH-1-1-P	4/17/2001	5.0	8.3	1.217	1.0	0.000	0.000	0.0
33	FR2-CH-1-1-P	4/17/2001	5.4	9.0	1.317	1.0	0.000	0.000	0.0
44	FR3-CH-1-1-P	4/17/2001	4.8	8.0	0.967	1.0	0.000	0.000	0.0
55	IT1-CH-1-1-P	4/17/2001	5.3	8.8	1.32	1.0	0.000	0.000	0.0
66	IT2-CH-1-1-P	4/17/2001	5.0	8.3	1.118	1.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (25)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 96. Individual Values for Cry1F Expression in Stalk Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-ST	4/3/2001	74.8	124.667	2.056	1	0.000	0.000	0.0
22	FR1-CH-1-1-ST	4/3/2001	75.1	125.167	2.063	1	0.000	0.000	0.0
33	FR2-CH-1-1-ST	4/3/2001	75.5	125.833	1.588	1	0.000	0.000	0.0
44	FR3-CH-1-1-ST	4/3/2001	75.3	125.500	2.018	1	0.000	0.000	0.0
55	IT1-CH-1-1-ST	4/3/2001	74.6	124.333	1.49	1	0.000	0.000	0.0
66	IT2-CH-1-1-ST	4/3/2001	75.7	126.167	2.208	1	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (25)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 99. Individual Values for Cry1F Expression in WPV9 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-W9	4/17/2001	75.2	125.3	0.942	0.1	0.000	0.000	0.0
6	FR1-CH-1-1-W9	4/17/2001	75.5	125.8	0.583	0.1	0.000	0.000	0.0
12	FR3-CH-1-1-W9	4/17/2001	75.7	126.2	0.649	0.1	0.000	0.000	0.0
15	IT1-CH-1-1-W9	4/17/2001	75.5	125.8	0.522	0.1	0.000	0.000	0.0
18	IT2-CH-1-1-W9	4/17/2001	75.2	125.3	0.537	0.1	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 100. Individual Values for Cry1F Expression WPV9 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-W9	4/17/2001	74.6	124.3	0.88	0.1	959.525	844.382	6.7
4	FR1-1507-1-1-W9	4/17/2001	75.2	125.3	0.623	0.1	733.371	456.890	3.6
10	FR3-1507-1-1-W9	4/17/2001	74.6	124.3	0.673	0.1	477.984	321.683	2.5
13	IT1-1507-1-1-W9	4/17/2001	75.2	125.3	0.68	0.1	1206.16	820.190	6.5
16	IT2-1507-1-1-W9	4/17/2001	75.6	126.0	0.568	0.1	1449.18	823.136	6.5
						Mean	965.245		5.220
						Std dev	381.922		1.959
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 101. Individual Values for Cry1F Expression in WPV9 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution (µg TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-W9	4/17/2001	75.1	125.2	0.863	0.1	495.374	427.508	3.4
11	FR3-1507S-1-1-W9	4/17/2001	75.5	125.8	0.955	0.1	634.140	605.604	4.8
14	IT1-1507S-1-1-W9	4/17/2001	75.1	125.2	1.084	0.1	1174.08	1272.70	10.1
17	IT2-1507S-1-1-W9	4/17/2001	75.1	125.2	0.591	0.1	1227.55	725.483	5.7
						Mean	882.787		6.048
						Std dev	372.214		2.915
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 102. Individual Values for Cry1F Expression in WPR1 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-W1	4/10/2001	75.1	125.167	0.281	0.1	0.000	0.000	0.0
6	FR1-CH-1-1-W1	4/10/2001	74.9	124.833	0.541	0.1	0.000	0.000	0.0
12	FR3-CH-1-1-W1	4/10/2001	74.9	124.833	0.259	0.1	0.000	0.000	0.0
15	IT1-CH-1-1-W1	4/10/2001	75.4	125.667	0.163	0.1	0.000	0.000	0.0
18	IT2-CH-1-1-W1	4/10/2001	75.8	126.333	0.41	0.1	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 103. Individual Values for Cry1F Expression in WPR1 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-W1	4/10/2001	74.8	124.667	0.255	0.1	2189.21	558.249	4.4
10	FR3-1507-1-1-W1	4/10/2001	75.5	125.833	0.313	0.1	1010.45	316.271	2.5
13	IT1-1507-1-1-W1	4/10/2001	75.2	125.333	0.463	0.1	738.750	342.041	2.7
16	IT2-1507-1-1-W1	4/10/2001	75.6	126.000	0.451	0.1	1308.43	590.102	4.6
						Mean	1311.71		3.601
						Std dev	629.566		1.138
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 104. Individual Values for Cry1F Expression in WPR1 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-W1	4/10/2001	74.7	124.500	0.281	0.1	1910.82	536.940	4.3
11	FR3-1507S-1-1-W1	4/10/2001	74.8	124.667	0.346	0.1	766.982	265.376	2.1
14	IT1-1507S-1-1-W1	4/10/2001	74.6	124.333	0.336	0.1	977.095	328.304	2.6
17	IT2-1507S-1-1-W1	4/10/2001	74.6	124.333	0.504	0.1	1267.96	639.050	5.1
						Mean	1230.71		3.56
						Std dev	497.76		1.41
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 105. Individual Values for Cry1F Expression in WPR4 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-F	4/17/2001	75.1	125.167	0.498	0.1	0.000	0.000	0.0
6	FR1-CH-1-1-F	4/17/2001	74.8	124.667	0.42	0.1	0.000	0.000	0.0
12	FR3-CH-1-1-F	4/17/2001	74.6	124.333	0.667	0.1	0.000	0.000	0.0
15	IT1-CH-1-1-F	4/17/2001	74.6	124.333	0.393	0.1	0.000	0.000	0.0
18	IT2-CH-1-1-F	4/17/2001	74.6	124.333	0.552	0.1	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 106. Individual Values for Cry1F Expression in WPR4 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-F	4/17/2001	74.8	124.667	0.28	0.1	752.068	210.579	1.69
4	FR1-1507-1-1-F	4/17/2001	74.9	124.833	0.311	0.1	612.270	190.416	1.52
10	FR3-1507-1-1-F	4/17/2001	74.9	124.833	0.413	0.1	594.373	245.476	1.97
13	IT1-1507-1-1-F	4/17/2001	75.4	125.667	0.482	0.1	0.000	0.000	0.0
16	IT2-1507-1-1-F	4/17/2001	75.8	126.333	0.652	0.1	618.539	403.287	3.19
						Mean	515.450		1.67
						Std dev	294.918		1.14
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 107. Individual Values for Cry1F Expression in WPR4 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-F	4/17/2001	74.7	124.500	0.267	0.1	707.722	188.962	1.52
5	FR1-1507S-1-1-F	4/17/2001	75.5	125.833	0.538	0.1	492.283	264.848	2.11
11	FR3-1507S-1-1-F	4/17/2001	75.2	125.333	0.601	0.1	259.699	156.079	1.24
14	IT1-1507S-1-1-F	4/17/2001	75.6	126.000	0.352	0.1	0.000	0.000	0.0
17	IT2-1507S-1-1-F	4/17/2001	74.7	124.500	0.703	0.1	520.122	365.646	2.94
						Mean	395.965		1.56
						Std dev	272.599		1.09
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (250)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 108. Individual Values for Cry1F Expression in Whole Plant (senescent) Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-WS	4/24/2001	75	125.000	0.19	0.5	0.000	0.000	0.0
9	FR2-CH-1-1-WS	4/24/2001	74.9	124.833	0.876	0.5	0.000	0.000	0.0
12	FR3-CH-1-1-WS	4/24/2001	74.7	124.500	0.583	0.5	0.000	0.000	0.0
15	IT1-CH-1-1-WS	4/24/2001	75.5	125.833	0.551	0.5	0.000	0.000	0.0
18	IT2-CH-1-1-WS	4/24/2001	74.8	124.667	0.848	0.5	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (50)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 109. Individual Values for Cry1F Expression in Whole Plant (senescent) Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-WS	4/24/2001	74.8	124.667	0.17	0.5	694.850	118.125	0.9
7	FR2-1507-1-1-WS	4/24/2001	74.5	124.167	0.831	0.5	256.178	212.884	1.7
10	FR3-1507-1-1-WS	4/24/2001	74.8	124.667	0.582	0.5	255.443	148.668	1.1
13	IT1-1507-1-1-WS	4/24/2001	75.1	125.167	0.504	0.5	474.987	239.393	1.9
16	IT2-1507-1-1-WS	4/24/2001	75.1	125.167	0.809	0.5	368.229	297.897	2.3
						Mean	409.937		1.629
						Std dev	183.478		0.572
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (50)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 110. Individual Values for Cry1F Expression in Whole Plant (senescent) Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-WS	4/24/2001	74.9	124.833	0.228	0.5	802.648	183.004	1.4
8	FR2-1507S-1-1-WS	4/24/2001	75	125.000	0.619	0.5	204.212	126.407	1.0
11	FR3-1507S-1-1-WS	4/24/2001	75.6	126.000	0.478	0.5	330.564	158.010	1.2
14	IT1-1507S-1-1-WS	4/24/2001	75.1	125.167	0.523	0.5	527.614	275.942	2.2
17	IT2-1507S-1-1-WS	4/24/2001	74.9	124.833	0.798	0.5	362.783	289.501	2.3
						Mean	445.564		1.651
						Std dev	230.526		0.582
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (50)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 111. Individual Values for PAT Expression in Leaf Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-L9	3/21/2001	10.3	17.2	1.008	1.0	0.000	0.000	0.0
22	FR1-CH-1-1-L9	3/21/2001	10.6	17.7	1.615	1.0	0.000	0.000	0.0
33	FR2-CH-1-1-L9	3/21/2001	10.3	17.2	1.075	1.0	0.000	0.000	0.0
44	FR3-CH-1-1-L9	3/21/2001	10.1	16.8	0.612	1.0	0.000	0.000	0.0
55	IT1-CH-1-1-L9	3/21/2001	9.9	16.5	1.581	1.0	0.000	0.000	0.0
66	IT2-CH-1-1-L9	3/21/2001	9.7	16.2	0.715	1.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (30)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 114. Individual Values for PAT Expression in Grain Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-G	3/28/2001	20.1	33.5	0.618	2.5	0.000	0.000	0.0
22	FR1-CH-1-1-G	3/28/2001	19.6	32.7	0.933	2.5	0.000	0.000	0.0
33	FR2-CH-1-1-G	3/28/2001	20.2	33.7	0.866	2.5	0.000	0.000	0.0
44	FR3-CH-1-1-G	3/28/2001	20.1	33.5	1.529	2.5	0.000	0.000	0.0
55	IT1-CH-1-1-G	3/28/2001	20.7	34.5	1.618	2.5	0.000	0.000	0.0
66	IT2-CH-1-1-G	3/28/2001	20.7	34.5	1.376	2.5	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (12)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 117. Individual Values for PAT Expression in Pollen Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-P	4/17/2001	5.6	9.3	1.158	5.0	0.000	0.000	0.0
22	FR1-CH-1-1-P	4/17/2001	5.0	8.3	1.217	5.0	0.000	0.000	0.0
33	FR2-CH-1-1-P	4/17/2001	5.4	9.0	1.317	5.0	0.000	0.000	0.0
44	FR3-CH-1-1-P	4/17/2001	4.8	8.0	0.967	5.0	0.000	0.000	0.0
55	IT1-CH-1-1-P	4/17/2001	5.3	8.8	1.32	5.0	0.000	0.000	0.0
66	IT2-CH-1-1-P	4/17/2001	5.0	8.3	1.118	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 120. Individual Values for PAT Expression in Stalk Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
11	BU1-CH-1-1-ST	4/3/2001	74.8	124.7	2.056	2.5	0.000	0.000	0.0
22	FR1-CH-1-1-ST	4/3/2001	75.1	125.2	2.063	2.5	0.000	0.000	0.0
33	FR2-CH-1-1-ST	4/3/2001	75.5	125.8	1.588	2.5	0.000	0.000	0.0
44	FR3-CH-1-1-ST	4/3/2001	75.3	125.5	2.018	2.5	0.000	0.000	0.0
55	IT1-CH-1-1-ST	4/3/2001	74.6	124.3	1.49	2.5	0.000	0.000	0.0
66	IT2-CH-1-1-ST	4/10/2001	50.3	83.8	1.427	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (12)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									





**Table 123. Individual Values for PAT Expression in WPV9 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-W9	4/10/2001	75.2	125.333	0.942	5.0	0.000	0.000	0.0
6	FR1-CH-1-1-W9	4/10/2001	75.5	125.833	0.583	5.0	0.000	0.000	0.0
12	FR3-CH-1-1-W9	4/10/2001	75.7	126.167	0.649	5.0	0.000	0.000	0.0
15	IT1-CH-1-1-W9	4/10/2001	75.5	125.833	0.522	5.0	0.000	0.000	0.0
18	IT2-CH-1-1-W9	4/10/2001	75.2	125.333	0.537	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 124. Individual Values for PAT Expression in WPV9 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-W9	4/10/2001	74.6	124.333	0.88	5.0	0.000	0.000	0.0
4	FR1-1507-1-1-W9	4/10/2001	75.2	125.333	0.623	5.0	0.000	0.000	0.0
10	FR3-1507-1-1-W9	4/10/2001	74.6	124.333	0.673	5.0	0.000	0.000	0.0
13	IT1-1507-1-1-W9	4/10/2001	75.2	125.333	0.68	5.0	0.000	0.000	0.0
16	IT2-1507-1-1-W9	4/10/2001	75.6	126.000	0.568	5.0	6.210	3.527	0.0
						Mean	1.242		0.006
						Std dev	2.777		0.013
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 125. Individual Values for PAT Expression in WPV9 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution (µg TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-W9	4/10/2001	75.1	125.167	0.863	5.0	0.000	0.000	0.0
11	FR3-1507S-1-1-W9	4/10/2001	75.5	125.833	0.955	5.0	0.000	0.000	0.0
14	IT1-1507S-1-1-W9	4/10/2001	75.1	125.167	1.084	5.0	8.200	8.889	0.0
17	IT2-1507S-1-1-W9	4/10/2001	75.1	125.167	0.591	5.0	25.983	15.356	0.1
						Mean	8.546		0.048
						Std dev	12.251		0.060
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 126. Individual Values for PAT Expression in WPR1 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution (TEP =10 µg/well)	Result ng/mg TEP *	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-W1	4/10/2001	75.1	125.167	0.281	5.0	0.000	0.000	0.0
6	FR1-CH-1-1-W1	4/10/2001	74.9	124.833	0.541	5.0	0.000	0.000	0.0
12	FR3-CH-1-1-W1	4/10/2001	74.9	124.833	0.259	5.0	0.000	0.000	0.0
15	IT1-CH-1-1-W1	4/10/2001	75.4	125.667	0.163	5.0	0.000	0.000	0.0
18	IT2-CH-1-1-W1	4/10/2001	75.8	126.333	0.41	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 127. Individual Values for PAT Expression in WPR1 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution (TEP =10 µg/well)	Result ng/mg TEP *	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-W1	36991	74.8	124.67	0.26	5	0.00	0.00	0.0
10	FR3-1507-1-1-W1	36991	75.5	125.83	0.31	5	0.00	0.00	0.0
13	IT1-1507-1-1-W1	36991	0	0.00	0.46	5	0.00	0.00	0.0
16	IT2-1507-1-1-W1	36991	75.6	126.00	0.45	5	8.94	4.03	0.0
						Mean	2.235		0.008
						Std dev	4.470		0.016
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 128. Individual Values for PAT Expression in WPR1 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution (TEP =10 µg/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-W1	4/10/2001	74.7	124.500	0.281	5.0	0.000	0.000	0.0
11	FR3-1507S-1-1-W1	4/10/2001	74.8	124.667	0.346	5.0	0.000	0.000	0.0
14	IT1-1507S-1-1-W1	4/10/2001	74.6	124.333	0.336	5.0	0.000	0.000	0.0
17	IT2-1507S-1-1-W1	4/10/2001	74.6	124.333	0.504	5.0	39.768	20.043	0.1
						Mean	9.942		0.040
						Std dev	19.884		0.081
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 129. Individual Values for PAT Expression in Whole Plant (senescent) Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-WS	4/24/2001	75	125.000	0.19	5.0	0.000	0.000	0.0
9	FR2-CH-1-1-WS	4/24/2001	74.9	124.833	0.876	5.0	0.000	0.000	0.0
12	FR3-CH-1-1-WS	4/24/2001	74.7	124.500	0.583	5.0	0.000	0.000	0.0
15	IT1-CH-1-1-WS	4/24/2001	75.5	125.833	0.551	5.0	0.000	0.000	0.0
18	IT2-CH-1-1-WS	4/24/2001	74.8	124.667	0.848	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 130. Individual Values for PAT Expression in Whole Plant (senescent) Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-WS	4/24/2001	74.8	124.667	0.17	5.0	0.000	0.000	0.0
7	FR2-1507-1-1-WS	4/24/2001	74.5	124.167	0.831	5.0	0.000	0.000	0.0
10	FR3-1507-1-1-WS	4/24/2001	74.8	124.667	0.582	5.0	0.000	0.000	0.0
13	IT1-1507-1-1-WS	4/24/2001	75.1	125.167	0.504	5.0	0.000	0.000	0.0
16	IT2-1507-1-1-WS	4/24/2001	75.1	125.167	0.809	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 131. Individual Values for PAT Expression in Whole Plant (senescent) Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-WS	4/24/2001	74.9	124.833	0.228	5.0	7.436	1.695	0.0
8	FR2-1507S-1-1-WS	4/24/2001	75	125.000	0.619	5.0	0.000	0.000	0.0
11	FR3-1507S-1-1-WS	4/24/2001	75.6	126.000	0.478	5.0	0.000	0.000	0.0
14	IT1-1507S-1-1-WS	4/24/2001	75.1	125.167	0.523	5.0	0.000	0.000	0.0
17	IT2-1507S-1-1-WS	4/24/2001	74.9	124.833	0.798	5.0	0.000	0.000	0.0
						Mean	1.487		0.003
						Std dev	3.325		0.006
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 132. Individual Values for PAT Expression in WPR4 Tissue: Control**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
3	BU1-CH-1-1-F	4/17/2001	75.1	125.167	0.498	5.0	0.000	0.000	0.0
6	FR1-CH-1-1-F	4/17/2001	74.8	124.667	0.42	5.0	0.000	0.000	0.0
12	FR3-CH-1-1-F	4/17/2001	74.6	124.333	0.667	5.0	0.000	0.000	0.0
15	IT1-CH-1-1-F	4/17/2001	74.6	124.333	0.393	5.0	0.000	0.000	0.0
18	IT2-CH-1-1-F	4/17/2001	74.6	124.333	0.552	5.0	0.000	0.000	0.0
						Mean	0.000		0.000
						Std dev	0.000		0.000
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 133. Individual Values for PAT Expression in WPR4 Tissue: Hybrid 1507**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
1	BU1-1507-1-1-F	4/17/2001	74.8	124.667	0.28	5.0	0.000	0.000	0.0
4	FR1-1507-1-1-F	4/17/2001	74.9	124.833	0.311	5.0	0.000	0.000	0.0
10	FR3-1507-1-1-F	4/17/2001	74.9	124.833	0.413	5.0	0.000	0.000	0.0
13	IT1-1507-1-1-F	4/17/2001	75.4	125.667	0.482	5.0	6.900	3.326	0.0
16	IT2-1507-1-1-F	4/17/2001	75.8	126.333	0.652	5.0	0.000	0.000	0.0
						Mean	1.380		0.005
						Std dev	3.086		0.012
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									

**Table 134. Individual Values for PAT Expression in WPR4 Tissue: Hybrid 1507S**

Sample #	Sample ID	Date of Analysis	Sample Weight (mg)	Method Factor (Weight mg/0.6ml)	Bradford (mg TEP/ml)	Dilution ( $\mu$ g TEP/well)	Result ng/mg TEP*	Value** (ng/ml)	Result ng/mg tissue dry weight***
2	BU1-1507S-1-1-F	4/17/2001	74.7	124.500	0.267	5.0	0.000	0.000	0.0
5	FR1-1507S-1-1-F	4/17/2001	75.5	125.833	0.538	5.0	10.722	5.768	0.0
11	FR3-1507S-1-1-F	4/17/2001	75.2	125.333	0.601	5.0	0.000	0.000	0.0
14	IT1-1507S-1-1-F	4/17/2001	75.6	126.000	0.352	5.0	0.000	0.000	0.0
17	IT2-1507S-1-1-F	4/17/2001	74.7	124.500	0.703	5.0	11.963	8.410	0.1
						Mean	4.537		0.023
						Std dev	6.228		0.032
* Result ng/mg TEP (Total Extractable Protein) = 0 if < sample LLOQ (6)									
**ng/ml Value = Result ng/mg TEP x Bradford									
*** Result ng/mg tissue dry weight = Value/Method Factor									