

**USDA/GIPSA Proficiency Program**  
**Testing for the Presence of Biotechnology Events in Corn and Soybeans**  
**April 2011 Sample Distribution Results**

**Purpose of USDA/GIPSA Proficiency Program**

Through the USDA/GIPSA Proficiency Program, USDA seeks to improve the overall performance of testing for biotechnology-derived grains and oil seeds. The USDA/GIPSA Proficiency Program helps organizations identify areas of concern and take corrective actions to improve testing accuracy, capability and reliability.

**Program Description and Assessment of Results**

In this round of the USDA/GIPSA Proficiency Program sample distribution, one set of samples was used for both qualitative and quantitative analyses. The samples were fortified with various combinations and concentrations of transgenic traits, and participants had the choice of providing qualitative and/or quantitative results. Scoring of the participant's qualitative results was done by computing the "percentage of correctly reported transgenic traits" in the samples (Tables 1 through 39 and Figure 1 for DNA-based analysis and Tables 40 to 47 for protein-based analysis). The "percentage false positive" and "percentage false negative" were calculated by dividing the number of incorrectly reported results by the number of "provided negatives" or "provided positives" that were distributed to the participants. It should be noted that trait specific, DNA-based testing can discern between different traits that express the same protein, (e.g. Roundup Ready (RUR) and Roundup Ready II (RUR II)), whereas construct-specific DNA-based testing or protein-based testing cannot.

To assess accuracy of individual participant's submitted quantitative results, for a specified transgenic event, z-scores (based on: reported value – fortification value / standard deviation) were computed for each reported quantification result (Tables 48 to 64). Tests for outliers and z-scores assume a normal distribution. At the 0.0 or 0.1% fortification levels, and on tables with a limited number of results, the distributions are not likely normal and are probably skewed. A false positive on a 0.0% spike level is considered an outlier. At the 0.1% fortification level, outlier tests will likely declare more outliers than should be declared. Some judgment will be necessary when interpreting data at these low levels. For levels higher than 0.1%, outliers were not included in the standard deviation used to compute the z-scores. Z-scores that are > 2 should be scrutinized by the participating lab. Those that are > 3 are clearly suspect and action should be taken by the participating laboratory. Prior to computing the z-scores, outliers in the distribution of values were eliminated by use of the "Grubb's Test for Outliers." To evaluate the performance as a group (i.e., inter-laboratory variation), a summary table (Table 67) was prepared to show the accuracy and precision of the composite quantification results at each fortification level for the various transgenic events.

**Sample Composition**

The corn samples contained various combinations and concentrations of the following transgenic traits: T-25, CBH351, MON810, GA21, Bt-176, Bt-11, NK603, Herculex, MON863, Herculex RW, MIR 604 (Agrisure RW<sup>TM</sup>), Event 3272, MON 88017, MON 89034; or, no events (i.e., negative corn sample). The various transgenic concentration levels were produced on a percentage weight-weight basis (%w/w). A calculated amount of ground transgenic corn was blended to homogeneity with a calculated amount of non-transgenic corn to produce concentrations ranging from 0.1 to 2.0% of a specified event. The soybean samples were non-

transgenic soybeans, or fortified soybean samples containing 0.1 to 1.5% of the transgenic glyphosate-tolerant soybeans (Roundup Ready®), the glufosinate ammonium tolerant soybeans (A2704-12), and/or the transgenic glyphosate-tolerant soybeans (Roundup ReadyII®). Each participant received six corn and four soybean samples. Each sample contained approximately 15 grams of ground material.

### **Program Participants**

Participants included organizations from Africa, Asia, Europe, North America, and South America. Each participant received a study description and a data report form by electronic mail, and included with the samples. Participants submitted results by electronic mail. No analytical methodologies were specified, and organizations used both DNA- and protein-based testing technologies. Sixty-eight (68) organizations received samples in the April 2011 round of proficiency testing, and sixty-five (65) organizations submitted results.

- Twenty-four (24) participants submitted **qualitative** results only,
- Seven (7) submitted **quantitative** results only,
- Thirty (30) participants submitted a combination of **qualitative** and **quantitative** results (of these 30, three (3) participants performed a combination of DNA and protein based testing), and
- Four (4) participants submitted **protein** based results, using Lateral Flow Strip (LFS) qualitative and/or Enzyme-linked Immunosorbent Assay (ELISA) quantitative analyses.

In this report, participating organizations are identified by a confidential “Participant Identification Number.” Appendix I identifies those organizations who gave GIPSA permission to list them as participants in the USDA/GIPSA Proficiency Program; some listed organizations requested that their identity remain anonymous.

### **Data Summary Results**

Data submitted by the participants is summarized in this report primarily in tables and figures. Participants reported their results on a qualitative basis, quantitative basis, or a combination of both qualitative and quantitative bases. Qualitative results were reported as the presence or absence of a particular event in each sample. Quantitative results were reported as the concentration (% w/w) of a particular event in the sample. Due to the complexity of the data, this report summarizes the data as follows:

**Qualitative Data Summaries.** This section summarizes qualitative sample analysis data:

#### DNA Based Testing

- Table 1: Qualitative results for corn fortified with 35S for all participants (DNA-based assays).
- Table 2: Percentages of correct results, false negatives, and false positives in qualitative reports for 35S for all participants.
- Table 3: Qualitative results for corn fortified with NOS for all participants (DNA-based assays).

- Table 4: Percentages of correct results, false negatives, and false positives in qualitative reports for NOS for all participants.
- Table 5: Qualitative results for corn fortified with T-25 for all participants (DNA-based assays).
- Table 6: Percentages of correct results, false negatives, and false positives in qualitative reports for T-25 for all participants.
- Table 7: Qualitative results for corn fortified CBH351 with for all participants (DNA-based assays).
- Table 8: Percentages of correct results, false negatives, and false positives in qualitative reports for CBH351 for all participants.
- Table 9: Qualitative results for corn fortified with MON810 for all participants (DNA-based assays).
- Table 10: Percentages of correct results, false negatives, and false positives in qualitative reports for MON810 for all participants.
- Table 11: Qualitative results for corn fortified with GA21 for all participants (DNA-based assays).
- Table 12: Percentages of correct results, false negatives, and false positives in qualitative reports for GA21 for all participants.
- Table 13: Qualitative results for corn fortified with Bt176 for all participants (DNA-based assays).
- Table 14: Percentages of correct results, false negatives, and false positives in qualitative reports for Bt176 for all participants.
- Table 15: Qualitative results for corn fortified with Bt-11 for all participants (DNA-based assays).
- Table 16: Percentages of correct results, false negatives, and false positives in qualitative reports for Bt-11 for all participants.
- Table 17: Qualitative results for corn fortified with NK603 for all participants. (DNA-based assays).
- Table 18: Percentages of correct results, false negatives, and false positives in qualitative reports for NK603 for all participants.
- Table 19: Qualitative results for corn fortified with Herculex for all participants (DNA-based assays).

- Table 20: Percentages of correct results, false negatives, and false positives in qualitative reports for Herculex for all participants.
- Table 21: Qualitative results for corn fortified with MON863 for all participants (DNA-based assays).
- Table 22: Percentages of correct results, false negatives, and false positives in qualitative reports for MON863 for all participants.
- Table 23: Qualitative results for corn fortified with Herculex RW for all participants (DNA-based assays).
- Table 24: Percentages of correct results, false negatives, and false positives in qualitative reports for Herculex RW for all participants.
- Table 25: Qualitative results for corn fortified with MIR604 for all participants (DNA-based assays).
- Table 26: Percentages of correct results, false negatives, and false positives in qualitative reports for MIR604 for all participants.
- Table 27: Qualitative results for corn fortified with Event 3272 for all participants (DNA-based assays).
- Table 28: Percentages of correct results, false negatives, and false positives in qualitative reports for Event 3272 for all participants.
- Table 29: Qualitative results for corn fortified with MON 88017 for all participants (DNA-based assays).
- Table 30: Percentages of correct results, false negatives, and false positives in qualitative reports for MON 88017 for all participants.
- Table 31: Qualitative results for corn fortified with MON 89034 for all participants (DNA-based assays).
- Table 32: Percentages of correct results, false negatives, and false positives in qualitative reports for MON 89034 for all participants.
- Table 33: Qualitative results for soybeans fortified with CP4 EPSPS (Roundup Ready) for all participants (DNA-based assays).
- Table 34: Percentages of correct results, false negatives, and false positives in qualitative reports for CP4 EPSPS for all participants.
- Table 35: Qualitative results for soybeans fortified with A2704-12 (Liberty Link) for all participants (DNA-based assays).

- Table 36: Percentages of correct results, false negatives, and false positives in qualitative reports for A2704-12 for all participants.
- Table 37: Qualitative results for soybeans fortified with Roundup Ready II for all participants (DNA-based assays).
- Table 38: Percentages of correct results, false negatives, and false positives in qualitative reports for Roundup Ready II for all participants.
- Table 39: Composite percentages of correct results, false negatives, and false positives in qualitative reports for each transgenic event for all participants (DNA-based assays).
- Figure 1: Group average of percentage correct for Qualitative reports on each event (DNA-based assays).

**Protein Based Data Summaries.** This section summarizes protein based sample analysis data:

- Table 40: Results for the detection of transgenic events in corn using Lateral Flow Strip (LFS) Testing (Protein-based testing).
- Table 41: Percentage of correct results, false negatives, and false positives in qualitative reports for transgenic events in corn using Lateral Flow Strip (LFS) Testing.
- Table 42: Results for soybeans fortified with CP4EPSPS and A2704-12 for participants using Lateral Flow Strip (LFS) Testing.
- Table 43: Percentage of correct results in qualitative reports for CP4EPSPS and A2704-12 for participants using Lateral Flow Strip (LFS) Testing.
- Table 44: Results for the detection of transgenic events in corn using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).
- Table 45: Percentage of correct results in the detection of transgenic events in corn using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).
- Table 46: Qualitative results for soybeans fortified with CP4EPSPS using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing) for participant #2817 (only this participant submitted results).
- Table 47: Percentage of correct results in qualitative reports for CP4EPSPS using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing) for participant #2817.

**Quantitative Data Summaries.** This section summarizes quantitative sample analysis data: z-scores were purposefully left blank on non-fortified (0.0%) samples since a z-score assumes a normal distribution and the interpretation will be distorted.

**DNA Based Testing**

- Table 48: Quantitative results and z-scores for corn fortified with T-25 for all participants (DNA-based assays).
- Table 49: Quantitative results and z-scores for corn fortified with CBH351 for all participants (DNA-based assays).
- Table 50: Quantitative results and z-scores for corn fortified with MON810 for all participants (DNA-based assays).
- Table 51: Quantitative results and z-scores for corn fortified with GA21 for all participants (DNA-based assays).
- Table 52: Quantitative results and z-scores for corn fortified with Bt176 for all participants (DNA-based assays).
- Table 53: Quantitative results and z-scores for corn fortified with Bt11 for all participants (DNA-based assays).
- Table 54: Quantitative results and z-scores for corn fortified with NK603 for all participants (DNA-based assays).
- Table 55: Quantitative results and z-scores for corn fortified with Herculex for all participants (DNA-based assays).
- Table 56: Quantitative results and z-scores for corn fortified with MON863 for all participants (DNA-based assays).
- Table 57: Quantitative results and z-scores for corn fortified with Herculex RW for all participants (DNA-based assays).
- Table 58: Quantitative results and z-scores for corn fortified with MIR604 for all participants (DNA-based assays).
- Table 59: Quantitative results and z-scores for corn fortified with Event 3272 for all participants (DNA-based assays).
- Table 60: Quantitative results and z-scores for corn fortified with MON 88017 for all participants (DNA-based assays).
- Table 61: Quantitative results and z-scores for corn fortified with MON 89034 for all participants (DNA-based assays).

- Table 62: Quantitative results and z-scores for soybeans fortified with CP4 EPSPS (Roundup Ready) for all participants (DNA-based assays).
- Table 63: Quantitative results and z-scores for soybeans fortified with A2704-12 for all participants (DNA-based assays).
- Table 64: Quantitative results and z-scores for soybeans fortified with Roundup Ready II for all participants (DNA-based assays).
- Table 65: Quantitative results for 35S and NOS in corn (DNA based assay).
- Table 66: Results for 35S and NOS in soybeans (DNA based assay)
- Table 67: Descriptive statistics for participants reported quantifications relative to GIPSA fortification levels using DNA-based assays.

#### Protein Based Testing

- Table 68: Quantitative results for soybeans fortified with CP4EPSPS (RUR and RUR II) using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).
- Appendix I: List of organizations who wished to be identified as a participant in the GIPSA April 2011 Proficiency Program.

**Table 1: Qualitative results for corn fortified with 35S for all participants (DNA-based assays)**  
(N = negative; P = positive; Incorrect results are shown in boldface).

35S	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	P	P	N	P	P	P
1754	P	P	N	P	P	P
1755	P	P	N	P	P	P
1764	P	P	N	P	P	P
1773	P	P	N	P	P	P
1844	P	P	N	P	P	P
1854	P	P	N	P	P	P
1858	P	P	N	P	P	P
1859	P	P	N	P	P	P
1862	P	P	N	P	P	P
1870	P	P	N	P	P	P
1871	P	P	N	P	P	P
1875	P	P	N	P	P	P
1891	P	P	N	P	P	P
1892	P	P	N	P	P	P
1893	P	P	N	P	P	P
1895	P	P	N	P	P	P
2032	P	P	N	P	P	P
2054	P	P	N	P	P	P
2057	P	P	N	P	P	P
2076	P	P	N	P	P	P
2100	P	P	N	P	P	P
2112	P	P	N	P	P	P
2123	P	P	N	P	P	P
2126	P	P	N	P	P	P
2131	P	P	N	P	P	P
2132	P	P	N	P	P	P
2560	P	P	N	P	P	P
2692	P	P	N	P	P	P
2716	P	P	N	P	P	P
2720	P	P	N	P	P	P
2721	P	P	N	P	P	P
2725	P	<b>N</b>	N	P	P	P
2727	P	P	N	P	P	P
2822	P	P	N	P	P	P
2829	P	P	N	P	P	P
2830	P	P	N	P	P	P
3095	P	P	N	P	P	P
3928	P	P	N	P	P	P
3929	P	P	N	P	P	P
4901	P	P	N	P	P	P
4932	P	P	N	P	P	P
4933	P	P	N	P	<b>N</b>	P
4934	P	P	N	P	P	P
4935	P	P	N	P	P	P
4936	P	P	N	P	P	P
4937	P	P	N	P	P	P
4938	P	P	N	P	P	P



<b>N, Results</b>	47	47	47	47	47	47
<b># Negative</b>	0	1	47	0	1	0
<b># Positive</b>	47	46	0	47	46	47
<b>% Correct</b>	100%	97.9%	100%	100.0%	97.9%	100%
<b>% Incorrect</b>	0.0%	2.1%	0.0%	0.0%	2.1%	0.0%

**Table 2: Percentages of correct results, false negatives, and false positives in qualitative reports for 35S for all participants.**

<b>Total # Reported results</b>	282
<b># Incorrect</b>	2
<b>% Correct</b>	99.3%
<b># Provided Positives (P)</b>	233
<b># False Negative</b>	2
<b>% False Negative</b>	0.9%
<b># Provided Negatives (N)</b>	47
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 3: Qualitative results for corn fortified with NOS for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

<b>NOS</b>	<b>Sample 1</b>	<b>Sample 2</b>	<b>Sample 3</b>	<b>Sample 4</b>	<b>Sample 5</b>	<b>Sample 6</b>
<b>Participant Number</b>	<b>P</b>	<b>P</b>	<b>N</b>	<b>P</b>	<b>P</b>	<b>P</b>
1754	P	P	N	P	P	P
1755	P	P	N	P	P	P
1764	P	P	N	P	P	P
1773	P	P	N	P	P	P
1785	P	P	N	P	P	P
1844	P	P	N	P	P	P
1854	P	P	N	P	P	P
1858	P	P	N	P	P	P
1859	P	P	N	P	P	P
1870	P	P	N	P	P	P
1871	P	P	N	P	P	P
1875	P	P	N	P	P	P
1891	P	P	N	P	P	P
1892	P	P	N	P	P	P
1893	P	P	N	P	P	P
1895	P	P	N	P	P	P
2032	P	P	N	P	P	P
2057	P	P	N	P	P	P
2076	P	P	N	P	P	P
2112	P	P	N	P	P	P
2123	P	P	N	P	P	<b>N</b>
2126	P	P	N	P	P	P
2131	P	P	N	P	P	P
2132	P	P	N	P	P	P
2560	P	P	N	P	P	P
2692	P	P	N	P	P	P

2716	P	P	N	P	P	P
2720	P	P	N	P	P	P
2721	P	P	N	P	P	P
2727	P	P	N	P	P	P
2822	P	P	N	P	P	P
2829	P	P	N	P	P	P
2830	P	P	N	P	P	P
3095	P	P	N	P	P	P
3928	P	P	N	P	P	P
3929	P	P	N	P	P	P
4901	P	P	N	P	P	P
4932	P	P	N	P	P	P
4933	N	P	N	P	P	P
4934	P	P	N	P	P	P
4935	P	P	N	P	P	P
4936	P	P	N	P	P	P
4937	P	P	N	P	P	P
4938	P	P	N	P	P	P
<b>N, Results</b>	44	44	44	44	44	44
<b># Negative</b>	1	0	44	0	0	1
<b># Positive</b>	43	44	0	44	44	43
<b>% Correct</b>	97.7%	100.0%	0.0%	100%	100%	97.7%
<b>% Incorrect</b>	2.3%	0.0%	100.0%	0.0%	0.0%	2.3%

**Table 4: Percentages of correct results, false negatives, and false positives in qualitative reports for NOS for all participants.**

<b>Total # Reported results</b>	264
<b># Incorrect</b>	2
<b>% Correct</b>	99.2%
<b># Provided Positives (P)</b>	218
<b># False Negative</b>	2
<b>% False Negative</b>	0.9%
<b># Provided Negatives (N)</b>	44
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 5: Qualitative results for corn fortified with T-25 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

T25	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	2.0%	0.0%	0.0%	0.0%	1.0%
1769	N	P	N	N	N	P
1773	N	P	N	N	N	P
1785	N	P	N	N	N	P
1788	<b>P</b>	P	N	N	N	P
1844	N	P	N	N	N	P
1854	<b>P</b>	P	N	N	N	P
1859	N	P	N	N	N	P
1862	N	P	N	N	N	P
1871	N	P	N	<b>P</b>	<b>P</b>	P
1892	<b>P</b>	P	N	N	N	P
1893	N	P	N	N	N	P
2054	N	P	N	N	N	P
2057	N	P	N	N	N	P
2060	<b>P</b>	P	N	N	N	P
2089	N	P	N	N	N	P
2112	N	P	N	N	N	P
2126	N	P	N	N	N	P
2131	N	P	N	N	N	P
2132	<b>P</b>	P	N	N	N	P
2560	N	P	N	N	N	P
2692	N	P	N	N	N	P
2721	N	<b>N</b>	N	N	N	<b>N</b>
2732	N	P	N	N	N	P
2822	N	P	N	N	N	P
2830	<b>P</b>	P	N	N	N	P
3929	N	P	N	N	N	P
4500	N	P	N	N	N	P
4901	N	P	N	N	N	P
4937	N	P	N	N	N	P
<b>N, Results</b>	29	29	29	29	29	29
<b># Negative</b>	23	1	29	28	28	1
<b># Positive</b>	6	28	0	1	1	28
<b>% Correct</b>	79.3%	100%	100%	96.6%	96.6%	96.6%
<b>% Incorrect</b>	20.7%	0.0%	0.0%	3.4%	3.4%	3.4%

**Table 6: Percentages of correct results, false negatives, and false positives in qualitative reports for T-25 for all participants.**

Total # Reported results	174
# Incorrect	10
% Correct	94.3%
# Provided Positives	58
# False Negative	2
% False Negative	3.5%
# Provided Negatives	116
# False Positive	8
% False Positive	6.9%

**Table 7: Qualitative results for corn fortified CBH351 with for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

CBH351	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	0.1%	0.0%	0.0%	0.0%	1.0%
1773	N	P	N	N	N	P
1785	N	P	N	N	N	P
1788	N	P	N	N	N	P
1844	N	P	N	N	N	P
1854	<b>P</b>	< 0.5% *	N	<b>P</b>	<b>P</b>	P
1859	N	P	N	N	N	P
1875	N	P	N	N	N	P
1891	N	P	N	N	N	P
1892	N	P	N	N	N	P
1893	N	P	N	N	N	P
2057	N	P	N	N	N	P
2131	N	P	N	N	N	P
2692	N	P	N	N	N	P
2732	N	P	N	N	N	P
3095	N	P	N	N	N	P
4901	N	P	N	N	N	P
4932	N	P	N	N	N	P
<b>N, Results</b>						
	17	17	17	17	17	17
<b># Negative</b>						
	16	1*	17	16	16	0
<b># Positive</b>						
	1	16	0	1	1	17
<b>% Correct</b>						
	94.1%	100.0%	5.9%	94.1%	94.1%	0.0%
<b>% Incorrect</b>						
	5.9%	0.0%	0.0%	5.9%	5.9%	100.0%

\* - Fortification level below participants' LOD, assessed as provided negative

**Table 8: Percentages of correct results, false negatives, and false positives in qualitative reports for CBH351 for all participants.**

Total # Reported results	102
# Incorrect	3
% Correct	97.1%
# Provided Positives	33
# False Negative	0
% False Negative	0.0%
# Provided Negatives	69
# False Positive	3
% False Positive	4.3%

**Table 9: Qualitative results for corn fortified with MON810 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

MON810	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.1%	1.2%	0.0%	0.3%	0.3%	0.6%
1773	P	P	N	P	P	P
1788	P	P	N	P	P	P
1844	P	P	N	P	P	P
1854	< 0.5% *	P	N	< 0.5% *	P	<b>N</b>
1858	P	P	N	P	P	P
1859	P	P	N	P	P	P
1862	P	P	N	P	P	P
1871	P	P	N	P	P	P
1892	P	P	N	P	P	P
1893	P	P	N	P	P	P
2054	P	P	N	P	P	P
2057	P	P	N	P	P	P
2060	P	P	N	P	P	P
2089	P	P	N	P	P	P
2126	P	P	N	P	P	P
2131	P	P	N	P	P	P
2132	P	P	N	P	P	P
2560	P	P	N	P	P	P
2720	P	P	N	P	P	P
2721	P	P	N	P	P	P
2822	P	P	N	P	P	P
2830	P	P	N	P	P	P
3095	P	P	N	P	P	P
3929	P	P	N	P	P	P
4901	P	P	N	P	P	P
4934	P	P	N	P	P	P
4937	P	P	N	P	P	P
<b>N, Results</b>	27	27	27	27	27	27
<b># Negative</b>	1 *	0	27	1 *	0	1
<b># Positive</b>	26	27	0	26	27	26
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	100.0%	3.7%

\* - Fortification level below participants' LOD, assessed as provided negative

**Table 10: Percentages of correct results, false negatives, and false positives in qualitative reports for MON810 for all participants.**

Total # Reported results	162
# Incorrect	1
% Correct	99.4%
# Provided Positives	133
# False Negative	1
% False Negative	0.8%
# Provided Negatives	29
# False Positive	0
% False Positive	100.0%

**Table 11: Qualitative results for corn fortified with GA21 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

GA21	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	0.0%	0.0%	0.8%	0.2%	0.1%
1773	N	N	N	P	P	P
1788	N	N	N	P	P	P
1844	N	N	N	P	P	P
1854	N	N	N	P	P	P
1858	N	N	N	P	P	P
1859	N	N	N	P	P	P
1862	N	N	N	P	P	P
1871	N	N	N	P	P	P
1892	N	N	N	P	P	P
1893	N	N	N	P	P	P
2057	N	N	N	P	P	P
2060	N	N	N	P	P	P
2089	N	N	N	P	P	P
2112	N	N	N	P	<b>N</b>	P
2126	N	N	N	P	P	P
2131	N	N	N	P	P	P
2560	N	N	N	P	P	P
2720	N	N	N	P	P	P
2721	N	N	N	P	P	P
2822	N	N	N	P	P	P
2830	N	N	N	P	P	P
3095	N	N	N	P	P	P
3929	N	N	N	P	P	P
4901	N	N	N	P	P	P
4936	N	N	N	P	P	P
4937	N	N	N	P	P	P
<b>N, Results</b>	26	26	26	26	26	26
<b># Negative</b>	26	26	26	0	1	0
<b># Positive</b>	0	0	0	26	25	26
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%	3.8%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	96.2%	0.0%

Table 12: Percentages of correct results, false negatives, and false positives in qualitative reports for GA21 for all participants.

Total # Reported results	156
# Incorrect	1
% Correct	99.4%
# Provided Positives	78
# False Negative	1
% False Negative	1.3%
# Provided Negatives	78
# False Positive	0
% False Positive	0.0%

Table 13: Qualitative results for corn fortified with Bt176 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).

Bt176	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	1.5%	0.0%	0.0%	0.5%	0.1%
1769	N	P	N	N	<b>N</b>	P
1773	N	P	N	N	P	P
1785	N	P	N	N	P	P
1788	N	P	N	N	P	P
1844	N	P	N	N	P	P
1854	N	P	N	N	P	P
1858	N	P	N	N	P	P
1859	N	P	N	N	P	P
1862	N	P	N	N	P	P
1892	N	P	N	N	P	P
1893	N	P	N	N	P	P
2054	N	P	N	N	P	P
2057	N	P	N	N	P	P
2060	N	P	N	N	P	P
2112	N	P	N	N	P	P
2126	N	P	N	N	P	P
2131	N	P	N	N	P	P
2132	N	P	N	N	P	P
2720	N	P	N	N	P	P
2721	N	P	N	N	P	P
2822	N	P	N	N	P	P
3095	N	P	N	N	P	P
3929	N	P	N	N	P	P
4901	N	P	N	N	P	P
4935	N	P	N	N	P	P
4937	N	P	N	N	P	P
<b>N, Results</b>	26	26	26	26	26	26
<b># Negative</b>	26	0	26	26	1	0
<b># Positive</b>	0	26	0	0	25	26
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%	96.2%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%

**Table 14: Percentages of correct results, false negatives, and false positives in qualitative reports for Bt176 for all participants.**

Total # Reported results	156
# Incorrect	1
% Correct	99.4%
# Provided Positives	78
# False Negative	1
% False Negative	1.3%
# Provided Negatives	78
# False Positive	0
% False Positive	0.0%

**Table 15: Qualitative results for corn fortified with Bt11 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface.)**

Bt11	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.5%	0.1%	0.0%	0.0%	0.8%	0.0%
1769	P	P	N	N	P	N
1773	P	P	N	N	P	N
1788	P	P	N	N	P	N
1844	P	P	N	N	P	N
1854	P	P	N	N	P	<b>P</b>
1858	P	P	N	N	P	N
1859	P	P	N	N	P	N
1862	P	P	N	N	P	N
1871	P	P	N	N	P	N
1892	P	P	N	N	P	N
1893	P	P	N	N	P	N
1895	<1.0*	P	N	N	<1.0*	N
2054	P	P	N	N	P	N
2057	P	P	N	N	P	N
2060	P	P	N	N	P	N
2089	P	P	N	N	P	N
2112	P	P	N	N	P	N
2126	P	P	N	N	P	N
2131	P	P	N	N	P	N
2132	P	P	N	N	P	N
2560	P	P	N	N	P	N
2721	P	P	N	N	P	N
2822	P	<b>N</b>	N	N	P	N
2830	P	P	N	N	P	N
3095	P	P	N	N	P	N
3929	P	P	N	N	P	N
4901	P	P	N	N	P	N
4936	P	P	N	<b>P</b>	P	<b>P</b>
4937	P	P	N	N	P	N
N, Results	29	29	29	29	29	29
# Negative	1*	1	29	28	1*	27
# Positive	28	28	0	1	28	2
% Correct	100.0%	96.6%	0.0%	7%	100.0%	93.1%
% Incorrect	0.0%	3.4%	100.0%	93%	0.0%	7.4%

\* - Fortification Level below LOD, counted as Provided Negative



Table 16: Percentages of correct results, false negatives, and false positives in qualitative reports for Bt11 for all participants.

Total # Reported results	174
# Incorrect	4
% Correct	97.7%
# Provided Positives	85
# False Negative	1
% False Negative	1.2%
# Provided Negatives	89
# False Positive	3
% False Positive	3.4%

Table 17: Qualitative results for corn fortified with NK603 for all participants. (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).

NK603	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	0.65%	0.0%	0.5%	0.0%	1.3%
1773	N	P	N	P	N	P
1788	N	P	N	P	<b>P</b>	P
1844	N	P	N	P	N	P
1854	<b>P</b>	<b>N</b>	N	P	N	<b>N</b>
1858	N	P	N	P	N	P
1859	N	P	N	P	N	P
1862	N	P	N	P	N	P
1871	N	P	N	P	N	P
1893	N	P	N	P	N	P
1895	<b>P</b>	P	N	<1.0*	N	P
2057	N	P	N	P	N	P
2060	N	P	N	P	N	P
2089	N	P	N	P	N	P
2126	N	P	N	P	N	P
2131	N	P	N	P	N	P
2132	N	P	N	P	N	P
2560	N	P	N	P	N	P
2720	N	P	N	P	N	P
2721	N	P	N	P	N	P
2822	N	P	N	P	N	P
2830	N	P	N	P	N	P
3929	N	P	N	P	N	P
4901	N	P	N	P	N	P
4936	N	P	N	P	N	P
4937	N	P	N	P	N	P
<b>N, Results</b>	25	25	25	25	25	25
<b># Negative</b>	23	1	25	1*	24	1
<b># Positive</b>	2	24	0	24	1	24
<b>% Correct</b>	92.0%	96.0%	100.0%	100.0%	96.0%	96.0%
<b>% Incorrect</b>	8.0%	4.0%	0.0%	0.0%	4.0%	4.0%

\* - Fortification Level below LOD, counted as Provided Negative

**Table 18: Percentages of correct results, false negatives, and false positives in qualitative reports for NK603 for all participants.**

<b>Total # Reported results</b>	168
<b># Incorrect</b>	2
<b>% Correct</b>	98.8%
<b># Provided Positives</b>	84
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	84
<b># False Positive</b>	2
<b>% False Positive</b>	2.4%

**Table 19: Qualitative results for corn fortified with Herculex for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

<b>Herculex</b>	<b>Sample 1</b>	<b>Sample 2</b>	<b>Sample 3</b>	<b>Sample 4</b>	<b>Sample 5</b>	<b>Sample 6</b>
<b>Participant Number</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.1%</b>
1769	N	N	N	N	N	P
1773	N	N	N	N	N	P
1785	N	N	N	N	N	P
1844	N	N	N	N	N	P
1854	N	N	N	N	N	P
1859	N	N	N	N	N	P
1862	N	N	N	N	N	P
1871	N	N	N	N	N	P
1891	N	N	N	N	N	P
1893	N	N	N	N	N	P
2032	N	N	N	N	N	P
2057	N	N	N	N	N	P
2060	N	N	N	N	N	P
2089	N	N	N	N	N	P
2126	N	N	N	N	N	P
2131	N	N	N	N	N	P
2560	N	N	N	N	N	P
2720	N	N	N	N	N	P
2721	N	N	N	N	N	P
2822	N	N	N	N	N	P
3929	N	N	N	N	N	P
4500	N	N	N	N	N	P
4901	N	N	N	N	N	P
4936	N	N	N	N	<b>P</b>	P
4937	N	N	N	N	N	P
<b>N, Results</b>	25	25	25	25	25	25
<b># Negative</b>	25	25	25	25	24	0
<b># Positive</b>	0	0	0	0	1	25
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%	96.0%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%

**Table 20: Percentages of correct results, false negatives, and false positives in qualitative reports for Herculex for all participants.**

Total # Reported results	150
# Incorrect	1
% Correct	99.3%
# Provided Positives	25
# False Negative	0
% False Negative	0.0%
# Provided Negatives	125
# False Positive	1
% False Positive	0.8%

**Table 21: Qualitative results for corn fortified with MON863 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

MON863	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	1.5%	0.0%	0.0%	0.5%	0.0%	0.0%
1769	P	N	N	P	N	N
1773	P	N	N	P	N	N
1785	P	N	N	P	N	N
1788	P	N	N	P	N	N
1844	P	N	N	P	N	N
1854	<b>N</b>	<b>P</b>	N	P	N	<b>P</b>
1859	P	N	N	P	N	N
1893	P	N	N	P	N	N
2057	P	N	N	P	N	N
2060	P	N	N	P	N	N
2089	P	N	N	P	N	N
2126	P	N	N	P	N	N
2131	P	N	N	P	N	N
2560	P	N	N	P	N	N
2720	P	N	N	P	N	N
2721	P	N	N	P	N	N
2822	P	<b>P</b>	N	P	<b>P</b>	<b>P</b>
3095	P	N	N	P	N	N
3929	P	N	N	P	N	N
4901	P	N	N	P	N	N
4936	P	N	N	P	N	N
4937	P	N	N	P	N	N
<b>N, Results</b>	22	22	22	22	22	22
<b># Negative</b>	1	20	22	0	21	20
<b># Positive</b>	21	2	0	22	1	2
<b>% Correct</b>	95.5%	90.9%	100.0%	100.0%	95.5%	90.9%
<b>% Incorrect</b>	4.5%	9.1%	0.0%	0.0%	4.5%	9.1%

**Table 22: Percentages of correct results, false negatives, and false positives in qualitative reports for MON863 for all participants.**

<b>Total # Reported results</b>	132
<b># Incorrect</b>	6
<b>% Correct</b>	95.5%
<b># Provided Positives</b>	44
<b># False Negative</b>	1
<b>% False Negative</b>	2.3%
<b># Provided Negatives</b>	88
<b># False Positive</b>	5
<b>% False Positive</b>	5.7%

**Table 23: Qualitative results for corn fortified with Herculex RW for all participants (DNA-based assays) (N = negative; P = positive).**

<b>Herculex RW</b>	<b>Sample 1</b>	<b>Sample 2</b>	<b>Sample 3</b>	<b>Sample 4</b>	<b>Sample 5</b>	<b>Sample 6</b>
<b>Participant Number</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.5%</b>
1773	P	N	N	N	N	P
1785	P	N	N	N	N	P
1844	P	N	N	N	N	P
1859	P	N	N	N	N	P
1893	P	N	N	N	N	P
2057	P	N	N	N	N	P
2060	P	N	N	N	N	P
2089	P	N	N	N	N	P
2112	P	N	N	N	N	P
2126	P	N	N	N	N	P
2131	P	N	N	N	N	P
2560	P	N	N	N	N	P
2822	P	N	N	N	N	P
3929	P	N	N	N	N	P
4901	P	N	N	N	N	P
4937	P	N	N	N	N	P
<b>N, Results</b>	16	16	16	16	16	16
<b># Negative</b>	0	16	16	16	16	0
<b># Positive</b>	16	0	0	0	0	16
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**Table 24: Percentages of correct results, false negatives, and false positives in qualitative reports for Herculex RW for all participants.**

<b>Total # Reported results</b>	96
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	32
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	64
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 25: Qualitative results for corn fortified with MIR604 for all participants (DNA-based assays). (N = negative; P = positive; Incorrect results are shown in boldface).**

MIR604	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.0%	0.0%	0.0%	0.2%	0.6%	0.4%
1769	<b>P</b>	<b>P</b>	N	P	P	P
1785	N	N	N	P	P	P
1844	N	N	N	P	P	P
1854	N	N	N	P	P	P
1859	N	N	N	P	P	P
1871	N	N	N	P	P	P
1893	N	N	N	P	P	P
2057	N	N	N	P	P	P
2060	N	N	N	P	P	P
2089	N	N	N	P	P	P
2112	N	N	N	P	P	P
2126	N	N	N	P	P	P
2131	N	N	N	P	P	P
2560	N	N	N	P	P	P
2692	N	N	N	P	P	P
2720	N	N	N	P	P	P
2721	N	N	N	P	P	P
2822	N	N	N	P	P	P
3929	N	N	<b>P</b>	P	P	P
4901	N	N	N	P	P	P
4936	N	N	N	P	P	P
4937	N	N	N	P	P	P
<b>N, Results</b>	22	22	22	22	22	22
<b># Negative</b>	21	21	21	0	0	0
<b># Positive</b>	1	1	1	22	22	22
<b>% Correct</b>	95.5%	95.5%	95.5%	100.0%	100.0%	100.0%
<b>% Incorrect</b>	4.5%	4.5%	4.5%	0.0%	0.0%	0.0%

**Table 26: Percentages of correct results, false negatives, and false positives in qualitative reports for MIR604 for all participants.**

<b># Reported results</b>	132
<b># Incorrect</b>	3
<b>% Correct</b>	97.7%
<b># Provided Positives</b>	66
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	66
<b># False Positive</b>	3
<b>% False Positive</b>	4.5%

**Table 27: Qualitative results for corn fortified with Event 3272 for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

Event 3272	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.8%	0.5%	0.0%	0.0%	0.2%	0.1%
1769	P	P	N	N	P	P
1773	P	P	N	N	P	P
1785	P	P	N	N	P	P
1844	P	P	N	N	P	P
1854	P	P	N	N	P	<b>N</b>
1859	P	P	N	N	P	P
1893	P	P	N	N	P	P
2032	P	P	N	N	P	P
2057	P	P	N	N	P	P
2131	P	P	N	N	P	P
2692	P	P	N	N	P	P
2716	P	P	N	N	P	P
2721	P	P	N	N	P	P
2822	P	P	N	N	P	P
4901	P	P	N	N	P	P
4937	P	P	N	N	P	P
<b>N, Results</b>	16	16	16	16	16	16
<b># Negative</b>	0	0	16	16	0	1
<b># Positive</b>	16	16	0	0	16	15
<b>% Correct</b>	100.0%	100.0%	100%	100%	100.0%	93.8%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%

**Table 28: Percentages of correct results, false negatives, and false positives in qualitative reports for Event 3272 for all participants.**

<b># Reported results</b>	96
<b># Incorrect</b>	1
<b>% Correct</b>	99.0%
<b># Provided Positives</b>	64
<b># False Negative</b>	1
<b>% False Negative</b>	1.6%
<b># Provided Negatives</b>	32
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 29: Qualitative results for Corn fortified with MON 88017 for all participants (DNA-based assays) (N = negative; P = positive).**

MON 88017	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	1.0%	0.0%	0.0%	0.5%	0.0%	0.0%
1769	P	N	N	P	N	N
1785	P	N	N	P	N	N
1844	P	N	N	P	N	N
1862	P	N	N	P	N	N
1870	P	N	N	P	N	N
1871	P	N	N	P	N	N
1875	P	N	N	P	N	N
1893	P	N	N	P	N	N
2032	P	N	N	P	N	N
2057	P	N	N	P	N	N
2060	P	N	N	P	N	N
2089	P	N	N	P	N	N
2126	P	N	N	P	N	N
2131	P	N	N	P	N	N
2560	P	N	N	P	N	N
2692	P	N	N	P	N	N
2716	P	N	N	P	N	N
2721	P	N	N	P	N	N
4901	P	N	N	P	N	N
4934	P	N	N	P	N	N
4936	P	N	N	P	N	N
<b>N, Results</b>	21	21	21	21	21	21
<b># Negative</b>	0	21	21	0	21	21
<b># Positive</b>	21	0	0	21	0	0
<b>% Correct</b>	100.0%	100%	100%	100.0%	100%	100%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**Table 30: Percentages of correct results, false negatives, and false positives in qualitative reports for MON 88017 for all participants.**

<b># Reported results</b>	126
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	42
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	84
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 31: Qualitative results for corn fortified with MON 89034 for all participants (DNA-based assays) (N = negative; P = positive).**

MON 89034	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Participant Number	0.3%	0.0%	0.0%	0.5%	0.0%	0.0%
1769	P	N	N	P	N	N
1785	P	N	N	P	N	N
1844	P	N	N	P	N	N
1862	P	N	N	P	N	N
1870	P	N	N	P	N	N
1891	P	N	N	P	N	N
1893	P	N	N	P	N	N
2032	P	N	N	P	N	N
2057	P	N	N	P	N	N
2060	P	N	N	P	N	N
2089	P	N	N	P	N	N
2126	P	N	N	P	N	N
2131	P	N	N	P	N	N
2560	P	N	N	P	N	N
4500	P	N	N	P	N	N
4901	P	N	N	P	N	N
4935	P	N	N	P	N	N
4936	P	N	N	P	N	N
<b>N, Results</b>	18	18	18	18	18	18
<b># Negative</b>	0	18	18	0	18	18
<b># Positive</b>	18	0	0	18	0	0
<b>% Correct</b>	100.0%	100%	100%	100.0%	100%	100%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**Table 32: Percentages of correct results, false negatives, and false positives in qualitative reports for MON 89034 for all participants.**

<b># Reported results</b>	108
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	36
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	72
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%



**Table 33: Qualitative results for soybeans fortified with CP4 EPSPS (Roundup Ready) for all participants (DNA-based assays) (N = negative; P = positive; Incorrect results are shown in boldface).**

CP4 EPSPS	Sample 1	Sample 2	Sample 3	Sample 4
Participant Number	0.8%	0.0%	0.0%	0.2%
1788	P	N	N	P
1844	P	N	N	P
1851	P	N	N	P
1854	P	N	<b>P</b>	P
1859	P	N	N	P
1871	P	N	N	P
1892	P	N	N	P
2032	P	N	N	P
2054	P	N	N	<b>N</b>
2076	P	N	N	P
2100	P	N	N	P
2131	P	N	N	P
2132	P	N	N	P
2560	P	N	N	P
2720	P	N	N	P
2721	P	N	N	P
2822	P	N	N	P
2830	P	N	N	P
3931	P	N	N	P
4935	P	N	N *	P
4937	P	N	N	P
<b>N, Results</b>	21	21	21	21
<b># Negative</b>	0	21	19	1
<b># Positive</b>	21	0	1	20
<b>% Correct</b>	100.0%	100.0%	95.2%	95.2%
<b>% Incorrect</b>	0.0%	0.0%	4.8%	4.8%

\* - very low levels of RUR reported, assessed as below LOD. The sample is scored as correct.

**Table 34: Percentages of correct results, false negatives, and false positives in qualitative reports for CP4 EPSPS (Roundup Ready) for all participants.**

<b>Total # Reported results</b>	84
<b># Incorrect</b>	2
<b>% Correct</b>	97.6%
<b># Provided Positives</b>	42
<b># False Negative</b>	1
<b>% False Negative</b>	2.4%
<b># Provided Negatives</b>	42
<b># False Positive</b>	1
<b>% False Positive</b>	2.4%

**Table 35: Qualitative results for soybeans fortified with A2704-12 (Liberty Link Soy) for all participants (DNA-based assays) (N = negative; P = positive).**

A2704-12	Sample 1	Sample 2	Sample 3	Sample 4
Participant Number	0.0%	0.0%	0.1%	0.2%
1844	N	N	P	P
1851	N	N	P	P
1854	N	N	P	P
1859	N	N	P	P
1893	N	N	P	P
2032	N	N	P	P
2060	N	N	P	P
2112	N	N	P	P
2131	N	N	P	P
2132	N	N	P	P
2560	N	N	P	P
2716	N	N	P	P
2721	N	N	P	P
3095	N	N	P	P
4901	N	N	P	P
4934	N	N	P	P
<b>N, Results</b>	16	16	16	16
<b># Negative</b>	16	16	0	0
<b># Positive</b>	0	0	16	16
<b>% Correct</b>	0.0%	0.0%	0.0%	0.0%
<b>% Incorrect</b>	100.0%	100.0%	100.0%	100.0%

**Table 36: Percentages of correct results, false negatives, and false positives in qualitative reports for A2704-12 (Liberty Link Soy) for all participants.**

<b>Total # Reported results</b>	64
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	32
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	32
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 37: Qualitative results for soybeans fortified with CP4 EPSPS (Roundup Ready II) for all participants (DNA-based assays) (N = negative; P = positive)**

RUR II	Sample 1	Sample 2	Sample 3	Sample 4
Participant Number	0.5%	0.0%	0.0%	0.0%
1844	P	N	N	N
1851	P	N	N	N
1859	P	N	N	N
1870	P	N	N	N
1871	P	N	N	N
1875	P	N	N	N
2032	P	N	N	N
2060	P	N	N	N
2112	P	N	N	N
2131	P	N	N	N
2560	P	N	N	N
2716	P	N	N	N
2721	P	N	N	N
4901	P	N	N	N
4934	P	N	N	N
4935	P	N	N	N
4937	P	N	N	N
<b>N, Results</b>	16	16	16	16
<b># Negative</b>	0	16	16	16
<b># Positive</b>	16	0	0	0
<b>% Correct</b>	100.0%	100.0%	100.0%	100.0%
<b>% Incorrect</b>	0.0%	0.0%	0.0%	0.0%

**Table 38: Percentages of correct results, false negatives, and false positives in qualitative reports for CP4 EPSPS (Roundup Ready II) for all participants.**

<b>Total # Reported results</b>	64
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	16
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	48
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 39: Composite percentages of correct results, false negatives, and false positives in qualitative reports for each transgenic event for all participants (DNA-based assays).**

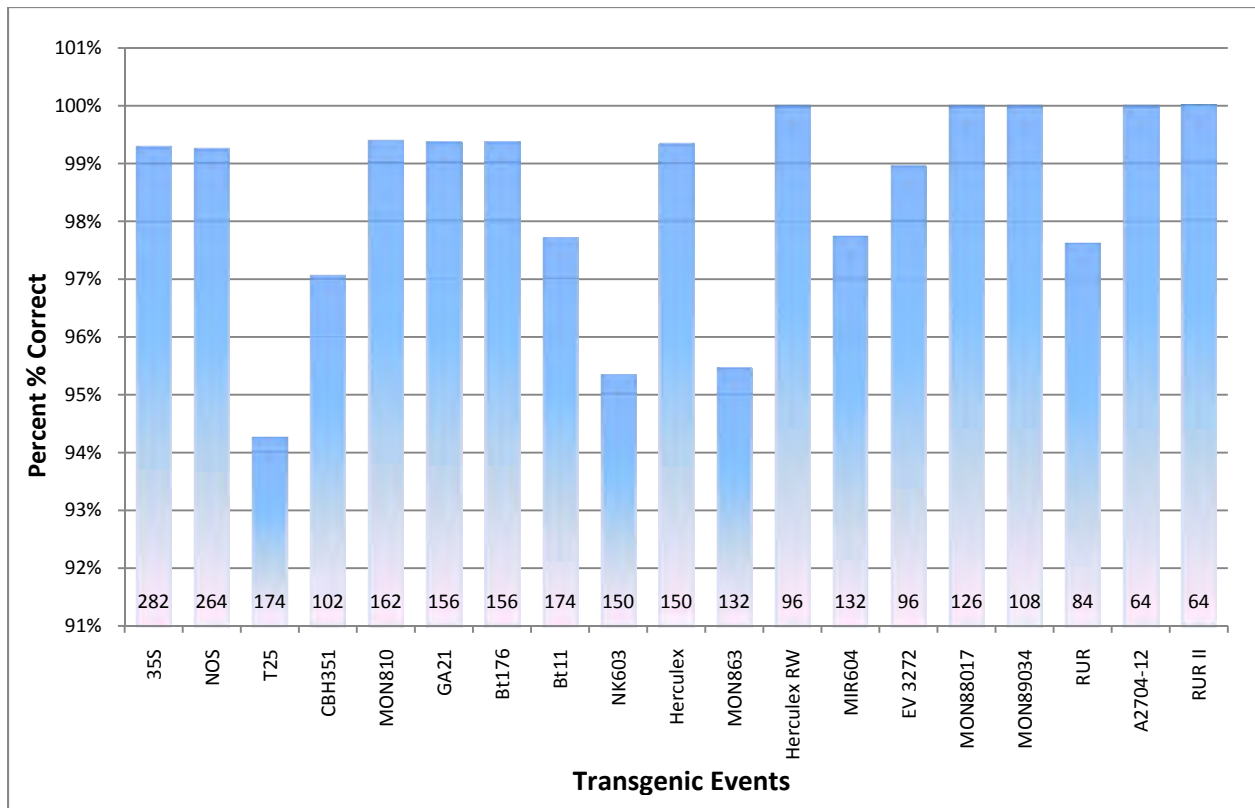
N = total number of results submitted for an event; % False Negative = [# False Negatives / # Provided Positives] x 100; % False Positives = [#False Positives / # Provided Negatives] x100.

Event	355	NOS	T25	CBH351	MON810	GA21	Bt176
N, Results	282	264	174	102	162	156	156
Reported Incorrect	2	2	10	3	1	1	1
% Correct	99.3%	99.2%	94.3%	97.1%	99.4%	99.4%	99.4%
N, Provided Positives	233	218	58	33	133	78	78
N, False Negatives	2	2	2	0	1	1	1
% False Negative	0.9%	0.9%	3.4%	0.0%	0.8%	1.3%	1.3%
N, Provided Negatives	47	44	116	69	29	78	78
N, False Positives	0	0	8	3	0	0	0
% False Positives	0.0%	0.0%	6.9%	4.3%	100.0%	0.0%	0.0%

Event	Bt11	NK603	Herculex	MON863	HerculexRW	MIR604	EV3272
N, Results	174	150	150	132	96	132	96
Reported Incorrect	4	7	1	6	0	3	1
% Correct	97.7%	95.3%	99.3%	95.5%	100%	97.7%	99.0%
N, Provided Positives	85	74	25	44	32	66	64
N, False Negatives	1	3	0	1	0	0	1
% False Negative	1.2%	4.1%	0.0%	2.3%	0.0%	0.0%	1.6%
N, Provided Negatives	89	76	125	88	64	66	32
N, False Positives	3	4	1	5	0	3	0
% False Positives	3.4%	5.3%	0.8%	5.7%	0.0%	4.5%	0.0%

Event	MON88017	MON89034	RUR	A2704-12	RUR II
N, Results	126	108	84	64	64
Reported Incorrect	0.0%	0	2	0	0
% Correct	100.0%	100.0%	97.6%	100.0%	100%
N, Provided Positives	42	36	42	32	16
N, False Negatives	0	0	1	0	0
% False Negative	0.0%	0.0%	2.4%	0.0%	0.0%
N, Provided Negatives	84	72	42	32	48
N, False Positives	0	0	1	0	0
% False Positives	0.0%	0.0%	2.4%	0.0%	0.0%

**Figure 1: Group average of percentage correct for Qualitative reports on each event (DNA-based assays).** Embedded numbers represent the total number of reported results for that event. Data are shown on a composite basis (i.e., all participants results combined) extracted from the percentage correct scores in Table 33.



**Table 40: Lateral Flow Strip (LFS) Testing (Protein-based testing) results for the detection of transgenic events in corn (N = negative; P = positive; NR = no result submitted; Incorrect results are shown in boldface).**

Participant Number	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	LOD
<b>T 25</b>	<b>0.0%</b>	<b>2.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.0%</b>	
1843	N	P	NR	NR	N	<b>N</b>	0.5%
1895	N	P	N	N	N	P	0.9%
4936	N	P	N	N	N	P	0.25%
<b>CBH 351</b>	<b>0.0%</b>	<b>0.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.0%</b>	
4936	N	P	N	N	N	P	0.13%
<b>EPSPS †</b>	<b>1.0%</b>	<b>0.7%</b>	<b>0.0%</b>	<b>0.5%</b>	<b>0.0%</b>	<b>1.3%</b>	
1843	1.1	0.78	NR	NR	0.0	1.5	0.5%
1895	P	P	N	P	<b>P</b>	P	0.1%
3931	P	P	N	P	N	P	0.5%
4936	<b>N</b>	P	N	P	N	P	0.5%
<b>Cry1Ab</b>	<b>0.7%</b>	<b>3.6%</b>	<b>0.0%</b>	<b>0.5%</b>	<b>1.8%</b>	<b>1.1%</b>	
1843	2.2	1.3	NR	NR	2.2	0.93	0.8%
1895	P	P	N	N *	P	P	1.0%
3931	P	P	N	P	P	P	0.1%
4936	P	P	N	P	P	P	0.8%
<b>Herculex</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.1%</b>	
1843	N	N	NR	NR	N	N *	0.5%
1895	N	N	N	N	N	N *	0.5%
3931	N	N	N	<b>P</b>	N	P	0.1%
4936	N	N	N	N	N	N *	0.5%
<b>MON 863</b>	<b>1.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.5%</b>	<b>0.0%</b>	<b>0.0%</b>	
1843	4.6	0.0	NR	NR	0.0	0.0	0.5%
1895	P	N	N	P	N	N	1.0%
4936	P	N	N	P	N	N	0.5%
<b>Hclx RW</b>	<b>0.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.0%</b>	
1843	1.2	0.0	NR	NR	0.0	3.5	0.5%
1895	P	N	N	N	N	P	0.5%
4936	P	N	N	N	N	P	0.5%
<b>MIR 604</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.2%</b>	<b>0.8%</b>	<b>0.5%</b>	
1843	0.0	0.0	NR	NR	2.1	1.3	1.0%
1895	N	N	N	<b>N</b>	P	<b>N</b>	Not Provided
4936	<b>P</b>	N	N	P	P	P	1.0%
<b>MON 89034</b>	<b>0.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.0%</b>	<b>0.0%</b>	<b>0.0%</b>	
1895	P	N	N	P	N	N	Not Provided

\* Fortification below LOD, assessed as a provided negative sample.

† Protein results for the EPSPS protein show positive for both MON 88017 and NK603, as both traits contain this protein. Sample #1 is fortified with MON 88017 but not NK 603.

**Table 41: Percentage of correct results, false negatives, and false positives in reports for transgenic events in corn using Lateral Flow Strip (LFS) Testing.**

Event	T25	CBH 351	EPSPS	Cry1Ab	Herculex
Total # Reported Results	16	6	22	22	22
# Incorrect	1	0	2	0	1
% Correct	93.8%	100.0%	90.9%	100.0%	95.5%
# Provided Positives	6	2	15	18	1
# False Negatives	1	0	1	0	0
% False Negatives	16.7%	0.0%	6.7%	0.0%	0.0%
# Provided Negatives	10	4	7	4	21
# False Positives	0	0	1	0	1
% False Positive	0.0%	0.0%	14.3%	0.0%	4.8%

Event	Mon863	Hclx RW	MIR 604	MON 89034
Total # Reported Results	16	16	16	6
# Incorrect	0	0	0	0
% Correct	100.0%	100.0%	100.0%	100.0%
# Provided Positives	5	6	8	2
# False Negatives	0	0	2	0
% False Negatives	0.0%	0.0%	25.0%	0.0%
# Provided Negatives	11	10	8	4
# False Positives	0	0	1	0
% False Positive	0.0%	0.0%	12.5%	0.0%

**Table 42: Results for soybeans fortified with CP4EPSPS (RUR) and A2704-12 (LL) for all participants using Lateral Flow Strip (LFS) Testing (N = negative; P = positive; (Incorrect results are shown in boldface).**

CP4 EPSPS (RUR)	Sample 1	Sample 2	Sample 3	Sample 4	
Participant Number	0.8%	0.0%	0.0%	0.2%	LOD
<b>1764</b>	P	N	N	P	0.1%
<b>1782</b>	P	N	N	P	Not Provided
<b>1843</b>	2.0	0.0	0.0	0.51	0.25%
<b>1895</b>	P	N	N	P	0.1%
<b>2126</b>	P	N	N	P	Not Provided

<b>N, Results</b>	5	5	5	5
<b># Negative</b>	0	5	5	0
<b># Positive</b>	5	0	0	5
<b>% Correct</b>	0.0%	0.0%	0.0%	0.0%
<b>% Incorrect</b>	100.0%	100.0%	100.0%	100.0%

<b>A2704-12 (Liberty Link)</b>	0.0%	0.0%	0.1%	0.2%	LOD
<b>1895</b>	N	N	<b>N</b>	<b>N</b>	0.10%
<b>1843</b>	0.0	0.0	0.28	0.27	Not Provided

**Table 43: Percentage of correct results in qualitative reports for CP4EPSPS and A2704-12 for all participants using Lateral Flow Strip (LFS) Testing.**

Event	RUR	LL
Total # Reported results	20	8
# Incorrect	0	2
% Correct	100.0%	75.0%
# Provided Positives	10	4
# False Negative	0	2
% False Negative	0.0%	50.0%
# Provided Negatives	10	4
# False Positive	0	0
% False Positive	0.0%	0.0%

**Table 44: Results for the detection of transgenic events in corn using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).**

Participant	1	2	3	4	5	6	LOD
EPSPS †	1.0%	0.7%	0.0%	0.5%	0.0%	1.3%	
3931	P	P	N	P	N	P	0.10%
Cry1 Ab	0.7%	3.6%	0.0%	0.5%	1.8%	1.1%	
1895	P	P	N	N	P	P	Not Provided
3931	P	P	N	P	P	P	0.10%
Herculex	0.0%	0.0%	0.0%	0.0%	0.0%	0.10%	
1895	N	N	N	N	N	P	Not Provided
3931	N	N	N	N	N	P	0.10%
CBH 351	0.0%	0.1%	0.0%	0.0%	0.0%	1.0%	
1754	0	0.1	0	0	0	>.25	0.1%
1895	N	P	N	N	N	P	0.25%
MON 863	1.5%	0.0%	0.0%	0.5%	0.0%	0.0%	
1895	P	N	N	P	N	N	Not Provided
Herculex RW	0.5%	0.0%	0.0%	0.0%	0.0%	2.0%	
1895	P	N	N	N	N	P	Not Provided
MIR 604	0.0%	0.0%	0.0%	0.2%	0.8%	0.5%	
1895	N	N	N	N	P	P	Not Provided
MON 89034	0.5%	0.0%	0.0%	1.0%	0.0%	0.0%	
1895	P	N	N	P	N	N	Not Provided

† Protein results for the EPSPS protein show positive for both MON 88017 and NK603, as both traits contain this protein. Sample #1 is fortified with MON 88017 but not NK 603.



**Table 45: Percentage of correct results in the detection of transgenic events in corn using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).**

	EPSPS	Cry1 Ab	Herculex	CBH 351	MON 863	Hx RW	MIR 604	MON 89034
<b>Total # Reported results</b>	6	12	12	12	6	6	6	6
<b># Incorrect</b>	0	1	0	0	0	0	1	0
<b>% Correct</b>	100.0%	91.7%	100.0%	100.0%	100.0%	100.0%	83.3%	100.0%
<b># Provided Positives</b>	3	6	2	4	2	2	3	2
<b># False Negative</b>	0	1	0	0	0	0	1	0
<b>% False Negative</b>	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	33.3%	0.0%
<b># Provided Negatives</b>	3	6	10	8	4	4	3	4
<b># False Positive</b>	0	0	0	0	0	0	0	0
<b>% False Positive</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**Table 46: Qualitative results for soybeans fortified with CP4EPSPS for participant using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).**

CP4 EPSPS (RUR)	Sample 1	Sample 2	Sample 3	Sample 4	
<b>Participant Number</b>	0.8%	0.0%	0.0%	0.2%	LOD
<b>2817</b>	P	N	N	N *	0.3%

\* - Fortification Level Below LOD

**Table 47: Percentage of correct results in qualitative reports for CP4EPSPS for participant using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing).**

<b>Total # Reported results</b>	4
<b># Incorrect</b>	0
<b>% Correct</b>	100.0%
<b># Provided Positives</b>	4
<b># False Negative</b>	0
<b>% False Negative</b>	0.0%
<b># Provided Negatives</b>	4
<b># False Positive</b>	0
<b>% False Positive</b>	0.0%

**Table 48: Quantitative results and z-scores for corn fortified with T-25 for all participants (DNA-based assays).** Quantification marked in red indicates value determined to be either: (1) a positive value for a non-fortified sample (i.e. a false positive result); or (2) a negative value for a fortified sample (i.e. a false negative). No values were determined to be outliers by the Grubb's Test for Outliers in this data set. Z-scores outside of the expected range of  $z > 2$  were not observed in this data set.

Event: T-25								
%w/w Fortification Level	0.0%	2.0%		0.0%	0.0%	0.0%	1.0%	
Participant Number	Result	Result	z-score	Result	Result	Result	Result	z-score
1754	0.00	1.90	-0.13	0.00	0.00	0.00	0.00	
1755	0.70	0.80	-1.51	0.00	0.00	0.10	2.40	1.96
1764	0.30	1.00	-1.26	0.00	0.00	0.00	2.10	1.54
1780	0.00	1.51	-0.62	0.00	0.00	0.00	0.69	-0.43
1783	0.00	3.41	1.77	0.00	0.00	0.00	1.52	0.73
1870	0.00	1.80	-0.25	0.00	0.00	0.00	0.80	-0.28
1875	0.00	0.95	-1.32	0.00	0.00	0.00	0.44	-0.78
1891	0.00	1.50	-0.63	0.00	0.00	0.00	0.85	-0.21
2051	0.00	1.97	-0.04	0.00	0.00	0.00	1.15	0.21
2716	0.00	2.50	0.63	0.00	0.00	0.00	1.30	0.42
4932	0.00	0.84	-1.46	0.00	0.00	0.00	0.62	-0.53

**Table 49: Quantitative results and z-scores for corn fortified with CBH351 for all participants (DNA-based assays).** Z-scores outside of the expected range of  $z > 2$  were not observed in this data set. No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: CBH351								
%w/w Fortification Level	0.0%	0.1%		0.0%	0.0%	0.0%	1.0%	
Participant Number	Result	Result	z-score	Result	Result	Result	Result	z-score
1754	0.00	0.10	0.00	0.00	0.00	0.00	0.70	-1.13
1755	0.00	0.10	0.00	0.00	0.00	0.00	1.30	1.13
1870	0.00	0.10	0.00	0.00	0.00	0.00	0.80	-0.76
2051	0.00	0.09	-2.00	0.00	0.00	0.00	0.87	-0.49

**Table 50: Quantitative results and z-scores for corn fortified with MON810 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in red indicate values determined to outliers by the “Grubb’s Test for Outliers”.

Event: MON810											
%w/w Fortification Level	0.2%		1.2%		0.0%	0.3%		0.3%		0.6%	
Participant Number	Result	z-score	Result	z-score	Result	Result	z-score	Result	z-score	Result	z-score
1754	0.10	-1.33	1.40	0.55	0.00	0.40	0.79	0.20	-1.54	0.80	1.06
1755	0.20	0.00	1.60	1.09	0.00	0.30	0.00	0.20	-1.54	1.60	5.32
1764	0.10	-1.33	1.30	0.27	0.00	0.40	0.79	0.20	-1.54	0.90	1.59
1769	0.09	-1.46	0.74	-1.26	0.00	0.19	-0.87	0.16	-2.16	0.33	-1.44
1780	0.20	0.00	1.34	0.38	0.00	0.39	0.71	0.30	0.00	0.63	0.16
1783	0.10	-1.33	0.68	-1.42	0.00	0.25	-0.40	0.13	-2.62	0.30	-1.59
1785	0.28	1.06	2.10	2.46	0.00	0.65	2.77	0.33	0.46	0.89	1.54
1788	<0.1		0.44	-2.08	0.00	0.44	1.11	0.14	-2.47	0.41	-1.01
1847	0.52	4.24	1.07	-0.36	0.00	0.92	4.90	0.21	-1.39	0.49	-0.58
1870	0.08	-1.59	0.90	-0.82	0.00	0.25	-0.40	0.20	-1.54	0.40	-1.06
1875	0.06	-1.86	1.27	0.19	0.00	0.22	-0.63	0.21	-1.39	0.47	-0.69
1891	0.10	-1.33	1.10	-0.27	0.00	0.23	-0.55	0.22	-1.23	0.46	-0.74
2051	0.09	-1.46	1.03	-0.46	0.00	0.26	-0.32	0.23	-1.08	0.56	-0.21
2692	<0.1		1.00	-0.55	0.00	0.35	0.40	0.15	-2.31	0.38	-1.17
2716	0.30	1.33	1.00	-0.55	0.00	0.50	1.58	0.20	-1.54	0.40	-1.06
2727	0.23	0.40	0.93	-0.74	0.00	0.22	-0.63	0.38	1.23	0.71	0.58
3927	0.10	-1.33	1.28	0.22	0.00	0.19	-0.87	0.13	-2.62	0.32	-1.49
3929	P*		0.94	-0.71	0.00	0.34	0.32	P*		0.62	0.11
4500	0.12	-1.06	1.32	0.33	0.00	0.13	-1.34	0.22	-1.23	0.43	-0.90
4932	0.09	-1.46	0.68	-1.42	0.00	0.24	-0.47	0.20	-1.54	0.36	-1.28
4934	0.48	3.71	8.13	18.93	0.00	1.84	12.17	1.33	15.88	3.29	14.30
4936	0.07	-1.72	0.79	-1.12	0.00	0.20	-0.79	0.15	-2.31	0.35	-1.33

\* - Qualitative data only, see Qualitative Table #9

**Table 51: Quantitative results and z-scores for corn fortified with GA21 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in red indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a negative value for a fortified sample (i.e. a false negative result).

Event: GA21									
%w/w Fortification Level	0.0%	0.0%	0.0%	0.8%		0.2%		0.1%	
Participant Number	Result	Result	Result	Result	z-score	Result	z-score	Result	z-score
1754	0.00	0.00	0.00	0.20	-2.99	0.10	-1.63	0.10	0.00
1755	0.00	0.00	0.00	0.30	-2.49	0.10	-1.63	0.10	0.00
1764	0.00	0.00	0.00	0.60	-1.00	0.20	0.00	0.20	1.81
1769	0.00	0.00	0.00	0.59	-1.05	0.12	-1.31	0.16	1.09
1780	0.00	0.00	0.00	0.81	0.05	0.23	0.49	0.20	1.81
1783	0.00	0.00	0.00	0.63	-0.85	0.08	-1.96	0.15	0.91
1785	0.00	0.00	0.00	0.52	-1.39	0.08	-1.96	0.11	0.18
1870	0.00	0.00	0.00	0.60	-1.00	0.10	-1.63	0.15	0.91
1875	0.00	0.00	0.00	0.58	-1.10	0.14	-0.98	0.16	1.09
1891	0.00	0.00	0.00	0.53	-1.34	0.12	-1.31	0.25	2.72
1895	0.00	0.00	0.00	1	1.00	0		1	16.29
2051	0.00	0.00	0.00	0.72	-0.40	0.19	-0.16	0.23	2.35
2692	0.00	0.00	0.00	0.63	-0.85	<0.1		0.15	0.91
2716	0.00	0.00	0.00	0.80	0.00	0.20	0.00	0.30	3.62
2727	0.00	0.00	0.00	0.98	0.90	0.29	1.47	0.19	1.63
3927	0.00	0.00	0.00	0.53	-1.34	0.11	-1.47	0.13	0.54
4500	0.00	0.00	0.00	0.98	0.90	0.20	0.00	0.23	2.35
4932	0.00	0.00	0.00	0.63	-0.85	0.17	-0.49	0.16	1.09

**Table 52: Quantitative results and z-scores for corn fortified with Bt176 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . No values were determined to be outliers by the Grubb’s Test for Outliers in this data set.

Event: Bt176									
%w/w Fortification Level	0.0%	1.5%		0.0%	0.0%	0.5%		0.1%	
Participant Number	Result	Result	Z-score	Result	Result	Result	Z-score	Result	Z-score
1754	0.00	1.80	0.55	0.00	0.00	0.30	-1.27	0.10	0.00
1755	0.00	0.40	-2.01	0.00	0.00	0.10	-2.54	0.03	-2.53
1764	0.00	1.20	-0.55	0.00	0.00	0.20	-1.91	0.10	0.00
1780	0.00	0.72	-1.43	0.00	0.00	0.22	-1.78	0.10	0.00
1783	0.00	1.28	-0.40	0.00	0.00	0.39	-0.70	0.10	0.00
1788	0.00	0.67	-1.52	0.00	0.00	0.21	-1.84	<0.1	
1870	0.00	1.40	-0.18	0.00	0.00	0.30	-1.27	0.08	-0.72
1871	0.00	1.10	-0.73	0.00	0.00	0.30	-1.27	0.09	-0.36
1875	0.00	0.90	-1.10	0.00	0.00	0.32	-1.14	0.08	-0.72
1891	0.00	0.96	-0.99	0.00	0.00	0.29	-1.33	<0.1	
2051	0.00	0.83	-1.23	0.00	0.00	0.25	-1.59	0.04	-2.17
2692	0.00	2.02	0.95	0.00	0.00	0.47	-0.19	<0.1	
2716	0.00	1.70	0.37	0.00	0.00	0.70	1.27	0.10	0.00
2727	0.00	1.70	0.37	0.00	0.00	0.61	0.70	0.18	2.89
4500	0.00	1.25	-0.46	0.00	0.00	0.33	-1.08	0.09	-0.36
4932	0.00	2.44	1.72	0.00	0.00	0.50	0.00	0.09	-0.36

**Table 53: Quantitative results and z-scores for corn fortified with Bt11 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in red indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a negative value for a fortified sample (i.e. a false negative result).

Event: Bt11									
%w/w Fortification Level	0.5%		0.1%		0.0%	0.0%	0.8%		0.0%
Participant Number	Result	z-score	Result	z-score	Result	Result	Result	z-score	Result
1754	0.70	0.82	0.10	0.00	0.00	0.00	0.60	-1.26	0.00
1755	0.80	1.22	0.10	0.00	0.00	0.00	0.80	0.00	0.00
1764	0.60	0.41	0.10	0.00	0.00	0.00	0.50	-1.89	0.00
1780	0.54	0.16	0.10	0.00	0.00	0.00	0.77	-0.19	0.00
1783	0.63	0.53	0.07	-0.51	0.00	0.00	0.65	-0.95	0.00
1785	0.64	0.57	0.11	0.17	0.00	0.00	0.90	0.63	0.00
1788	0.27	-0.94	<0.1		0.00	0.00	0.50	-1.89	0.00
1870	0.55	0.20	0.10	0.00	0.00	0.00	0.80	0.00	0.00
1875	0.50	0.00	0.15	0.85	0.00	0.00	0.71	-0.57	0.00
1891	0.49	-0.04	<0.1		0.00	0.00	0.73	-0.44	0.00
2051	0.12	-1.55	0.00		0.00	0.00	0.21	-3.72	0.00
2692	1.02	2.12	0.19	1.54	0.00	0.00	1.71	5.73	0.00
2716	0.60	0.41	0.10	0.00	0.00	0.00	0.80	0.00	0.00
3927	1.13	2.57	0.20	1.71	0.00	0.00	1.09	1.83	0.00
4500	0.51	0.04	0.23	2.22	0.00	0.00	0.79	-0.06	0.00
4932	0.47	-0.12	0.09	-0.17	0.00	0.00	0.59	-1.32	0.00

**Table 54: Quantitative results and z-scores for corn fortified with NK603 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in red indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a negative value for a fortified sample (i.e. a false negative result).

Event: NK603									
%w/w Fortification Level	0.0%	0.7%		0.0%	0.5%		0.0%	1.3%	
Participant Number	Result	Result	z-score	Result	Result	z-score	Result	Result	z-score
1754	0.00	0.60	-0.35	0.00	0.30	-1.05	0.00	1.00	-1.99
1755	0.00	0.50	-1.06	0.00	0.10	-2.10	0.00	1.30	0.00
1764	0.10	0.40	-1.76	0.00	0.50	0.00	0.00	2.10	5.31
1769	0.00	0.64	-0.07	0.00	0.35	-0.79	0.00	1.09	-1.39
1780	0.00	0.68	0.21	0.00	0.40	-0.52	0.00	1.32	0.13
1783	0.00	0.28	-2.61	0.00	0.23	-1.42	0.00	0.50	-5.31
1785	0.00	0.56	-0.64	0.00	0.34	-0.84	0.00	1.10	-1.33
1847	0.00	0.86	1.48	0.00	0.40	-0.52	0.00	1.42	0.80
1870	1.30	0.80	1.06	0.00	0.90	2.10	0.00	1.20	-0.66
1875	0.99	0.53	-0.85	0.00	0.83	1.73	0.00	1.23	-0.46
1891	0.00	0.52	-0.92	0.00	0.53	0.16	0.00	1.37	0.46
2051	0.00	0.69	0.28	0.00	0.41	-0.47	0.00	1.05	-1.66
2692	0.00	0.42	-1.62	0.00	0.22	-1.47	0.00	1.02	-1.86
2716	0.00	0.70	0.35	0.00	0.50	0.00	0.00	1.00	-1.99
2727	0.00	0.57	-0.56	0.00	0.33	-0.89	0.00	1.40	0.66
3095	0.00	0.60	-0.35	0.00	0.45	-0.26	0.00	1.00	-1.99
3928	0.00	0.56	-0.64	0.00	0.40	-0.52	0.00	1.19	-0.73
4500	0.00	0.76	0.78	0.00	0.33	-0.89	0.00	1.18	-0.80
4932	0.00	0.54	-0.78	0.00	0.32	-0.94	0.00	1.00	-1.99

**Table 55: Quantitative results and z-scores for corn fortified with Herculex for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: Herculex							
%w/w Fortification Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	
Participant Number	Result	Result	Result	Result	Result	Result	z-score
1754	0.00	0.00	0.00	0.00	0.00	0.10	0.00
1755	0.00	0.00	0.00	0.00	0.00	0.10	0.00
1780	0.00	0.00	0.00	0.00	0.00	0.09	-0.30
1783	0.00	0.00	0.00	0.00	0.00	0.02	-2.42
1847	0.00	0.00	0.00	0.00	0.00	0.06	-1.21
1875	0.00	0.00	0.00	0.00	0.00	0.02	-2.42
1891	0.00	0.00	0.00	0.00	0.00	<0.05	
2032	0.00	0.00	0.00	0.00	0.00	0.10	0.00
2051	0.00	0.00	0.00	0.00	0.00	<0.1	
2692	0.00	0.00	0.00	0.00	0.00	<0.1	
2716	0.00	0.00	0.00	0.00	0.00	0.10	0.00
2727	0.00	0.00	0.00	0.00	0.00	0.03	-2.12
3927	0.00	0.00	0.00	0.00	0.00	0.06	-1.21
4932	0.00	0.00	0.00	0.00	0.00	0.08	-0.61

**Table 56: Quantitative results and z-scores for corn fortified with MON863 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . The quantification marked in red indicate values determined an outlier by the “Grubb's Test for Outliers”.

Event: MON863								
%w/w Fortification Level	1.5%		0.0%	0.0%	0.5%		0.0%	0.0%
Participant Number	Result	z-score	Result	Result	Result	z-score	Result	Result
1754	1.20	-1.31	0.00	0.00	0.30	-1.52	0.00	0.00
1755	1.30	-0.87	0.00	0.00	0.10	-3.05	0.00	0.00
1764	1.10	-1.75	0.00	0.00	0.20	-2.29	0.00	0.00
1780	1.30	-0.87	0.00	0.00	0.35	-1.14	0.00	0.00
1783	1.38	-0.52	0.00	0.00	0.39	-0.84	0.00	0.00
1870	0.90	-2.62	0.00	0.00	0.30	-1.52	0.00	0.00
1871	1.30	-0.87	0.00	0.00	0.40	-0.76	0.00	0.00
1875	1.17	-1.44	0.00	0.00	0.34	-1.22	0.00	0.00
1891	1.07	-1.88	0.00	0.00	0.31	-1.45	0.00	0.00
2051	0.31	-5.20	0.00	0.00	0.11	-2.97	0.00	0.00
2692	1.57	0.31	0.00	0.00	0.41	-0.69	0.00	0.00
2716	1.20	-1.31	0.00	0.00	0.30	-1.52	0.00	0.00
2727	1.70	0.87	0.00	0.00	0.47	-0.23	0.00	0.00
4500	1.55	0.22	0.00	0.00	0.19	-2.36	0.00	0.00
4932	1.60	0.44	0.00	0.00	0.59	0.69	0.00	0.00

**Table 57: Quantitative results and z-scores for corn fortified with Herculex RW for all participants (DNA-based assays).** Z-scores outside of the expected range of  $z > 2$  were not observed in this data set. No values were determined to be outliers by the Grubb’s Test for Outliers in this data set.

Event: Herculex RW								
%w/w Fortification Level	0.8%		0.0%	0.0%	0.0%	0.0%	2.6%	
Participant Number	Result	z-score	Result	Result	Result	Result	Result	z-score
1754	0.70	-0.72	0.00	0.00	0.00	0.00	2.20	-0.56
1755	0.80	-0.20	0.00	0.00	0.00	0.00	2.70	0.14
1780	0.90	0.31	0.00	0.00	0.00	0.00	2.44	-0.23
1783	0.52	-1.64	0.00	0.00	0.00	0.00	1.50	-1.55
1847	0.59	-1.28	0.00	0.00	0.00	0.00	2.79	0.27
1870	1.10	1.33	0.00	0.00	0.00	0.00	3.70	1.55
1871	1.20	1.84	0.00	0.00	0.00	0.00	3.90	1.83
1875	0.85	0.05	0.00	0.00	0.00	0.00	2.71	0.16
1891	0.72	-0.61	0.00	0.00	0.00	0.00	2.10	-0.70
2051	0.82	-0.10	0.00	0.00	0.00	0.00	3.28	0.96
2716	0.70	-0.72	0.00	0.00	0.00	0.00	1.50	-1.55
2727	0.99	0.77	0.00	0.00	0.00	0.00	3.10	0.70
4500	1.07	1.18	0.00	0.00	0.00	0.00	2.65	0.07
4932	0.82	-0.10	0.00	0.00	0.00	0.00	2.41	-0.27

**Table 58: Quantitative results and z-scores for corn fortified with MIR604 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in red indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a negative value for a fortified sample (i.e. a false negative result).

Event: MIR604									
%w/w Fortification Level	0.0%	0.0%	0.0%	0.2%		0.6%		0.4%	
Participant Number	Result	Result	Result	Result	z-score	Result	z-score	Result	z-score
1754	0.00	0.00	0.00	0.10	-1.73	0.50	-0.67	0.40	0.00
1755	0.00	0.00	0.00	0.50	5.19	0.80	1.34	0.50	0.87
1773	0.00	0.00	0.00	0.15	-0.86	0.60	0.00	0.30	-0.87
1780	0.00	0.00	0.00	0.16	-0.69	0.51	-0.60	0.33	-0.61
1870	0.00	0.00	0.00	0.10	-1.73	0.40	-1.34	0.30	-0.87
1875	0.00	0.00	0.00	0.17	-0.52	0.39	-1.41	0.44	0.35
1891	0.00	0.00	0.00	0.14	-1.04	0.35	-1.67	0.35	-0.44
1895	0.00	0.00	0.00	0.00		1	2.68	1	5.23
2051	0.00	0.00	0.00	0.11	-1.56	0.48	-0.80	0.33	-0.61
2716	0.00	0.00	0.00	0.20	0.00	0.50	-0.67	0.40	0.00
2727	0.00	0.00	0.00	0.04	-2.77	0.35	-1.67	0.21	-1.66
4500	0.00	0.00	0.00	0.15	-0.86	0.56	-0.27	0.49	0.78
4932	0.00	0.00	0.00	0.26	1.04	0.78	1.20	0.64	2.09



**Table 59: Quantitative results and z-scores for corn fortified with Event 3272 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: Event 3272										
%w/w Fortification Level	0.8%		0.5%		0.0%	0.0%	0.2%		0.1%	
Participant Number	Result	z-score	Result	z-score	Result	Result	Result	z-score	Result	z-score
1754	0.60	-0.73	0.30	1.40	0.00	0.00	0.10	-2.44	0.10	0.00
1755	1.10	1.10	0.60	0.70	0.00	0.00	0.20	0.00	0.10	0.00
1780	1.05	0.91	0.44	0.42	0.00	0.00	0.10	-2.44	0.09	-0.53
1870	1.00	0.73	0.50	0.00	0.00	0.00	0.13	-1.71	0.13	1.59
1875	0.52	-1.02	0.47	0.21	0.00	0.00	0.11	-2.19	0.08	-1.06
1891	1.00	0.73	0.23	1.89	0.00	0.00	<0.1		<0.1	
2051	0.92	0.44	0.54	0.28	0.00	0.00	0.17	-0.73	0.09	-0.53
4500	0.84	0.15	0.50	0.00	0.00	0.00	0.08	-2.92	0.09	-0.53
4932	1.44	2.34	0.70	1.40	0.00	0.00	0.10	-2.44	0.13	1.59

**Table 60: Quantitative results and z-scores for corn fortified with MON 88017 for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: MON 88017									
%w/w Fortification Level	1.0%		0.0%	0.0%	0.5%		0.0%	0.0%	
Participant Number	Result	z-score	Result	Result	Result	z-score	Result	Result	Result
1754	0.80	-0.48	0.00	0.00	0.30	-1.08	0.00	0.00	0.00
1755	1.90	2.17	0.00	0.00	0.50	0.00	0.00	0.00	0.00
1773	0.70	-0.72	0.00	0.00	0.30	-1.08	0.00	0.00	0.00
1780	0.63	-0.89	0.00	0.00	0.29	-1.14	0.00	0.00	0.00
1891	1.54	1.30	0.00	0.00	0.85	1.89	0.00	0.00	0.00
1895	1.00	0.00	0.00	0.00	1.00	2.71	0.00	0.00	0.00
2051	1.14	0.34	0.00	0.00	0.59	0.49	0.00	0.00	0.00
4500	0.82	-0.43	0.00	0.00	0.44	-0.32	0.00	0.00	0.00
4932	1.03	0.07	0.00	0.00	0.42	-0.43	0.00	0.00	0.00
4934	1.08	0.19	0.00	0.00	0.31	-1.03	0.00	0.00	0.00

**Table 61: Quantitative results and z-scores for corn fortified with MON 89034 for all participants (DNA-based assays).** Z-scores outside of the expected range of  $z > 2$  were not observed in this data set. No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: MON 89034								
%w/w Fortification Level	0.3%		0.0%	0.0%	0.5%		0.0%	0.0%
Participant Number	Result	z-score	Result	Result	Result	z-score	Result	Result
1754	0.30	0.00	0.00	0.00	0.60	0.62	0.00	0.00
1773	0.20	-1.03	0.00	0.00	0.30	-1.24	0.00	0.00
1780	0.36	0.62	0.00	0.00	0.63	0.80	0.00	0.00
1871	0.14	-1.65	0.00	0.00	0.60	0.62	0.00	0.00
2051	0.27	-0.31	0.00	0.00	0.56	0.37	0.00	0.00
4500	P *		0.00	0.00	0.64	0.87	0.00	0.00
4932	0.11	-1.96	0.00	0.00	0.26	-1.49	0.00	0.00

\* Qualitative data only, see Qualitative Table #31



**Table 62: Quantitative results and z-scores for soybeans fortified with CP4 EPSPS (RUR) for all participants (DNA-based assays).** The value highlighted in **yellow** indicates a z-score outside of expected range, i.e.,  $z > +2$  or  $z < -2$ . Quantifications marked in **red** indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a negative value for a fortified sample (i.e. a false negative result).

Event: RUR						
%w/w Fortification Level	0.8%		0.0%	0.0%	0.2%	
Participant Number	Result	z-score	Result	Result	Result	z-score
1754	0.60	-0.79	0.00	0.00	0.20	0.00
1755	0.50	-1.18	0.00	0.00	0.20	0.00
1764	0.40	-1.58	0.00	0.00	0.10	-1.04
1769	0.49	-1.22	0.00	0.00	0.19	-0.10
1773	0.60	-0.79	0.00	0.00	0.20	0.00
1780	0.48	-1.26	0.00	0.00	0.21	0.10
1785	0.48	-1.26	0.00	0.00	0.35	1.55
1788	0.52	-1.10	0.00	0.00	0.20	0.00
1847	0.52	-1.10	0.00	0.00	0.14	-0.62
1858	2.11	5.16	0.00	0.00	0.46	2.69
1870	1.20	1.58	0.00	<0.0008 *	0.40	2.07
1875	0.27	-2.09	0.00	0.00	0.10	-1.04
1891	0.67	-0.51	0.00	<0.02 *	0.19	-0.10
1892	0.80	0.00	0.00	0.00	0.10	-1.04
1893	0.60	-0.79	0.00	0.00	0.20	0.00
1895	3.00	8.66	0.00	0.00	5.00	49.73
2032	0.50	-1.18	0.00	0.00	0.20	0.00
2051	0.83	0.12	0.00	<0.1*	0.26	0.62
2054	0.45	-1.38	0.00	0.00	0.00	-2.07
2060	0.57	-0.91	0.00	0.00	0.17	-0.31
2112	0.61	-0.75	0.00	0.00	0.18	-0.21
2716	0.80	0.00	0.00	0.00	0.30	1.04
2725	1.29	1.93	0.00	0.00	0.12	-0.83
2727	1.10	1.18	0.00	0.04*	0.18	-0.21
3095	0.85	0.20	0.00	0.00	0.40	2.07
3927	0.56	-0.95	0.00	0.00	0.12	-0.83
3928	0.63	-0.67	0.00	0.00	0.17	-0.31
4500	1.20	1.58	0.00	0.00	0.34	1.45
4901	0.50	-1.18	0.00	0.00	0.21	0.10
4932	0.75	-0.20	0.00	0.00	0.35	1.55
4934	0.54	-1.02	0.00	0.00	0.24	0.41

\* - If reported value is below the participant’s LOD, the sample was scored as correct.

**Table 63: Quantitative results and z-scores for soybeans fortified with A2704-12 (Liberty Link) for all participants (DNA-based assays).** Values highlighted in yellow indicate z-scores outside of the expected range, i.e.,  $z > +2$  or  $z < -2$ . No values were determined to be outliers by the Grubb's Test for Outliers in this data set.

Event: A2704-12						
%w/w Fortification Level	0.0%	0.0%	0.1%		0.2%	
Participant Number	Result	Result	Result	z-score	Result	z-score
1754	0.00	0.00	0.10	0.00	0.20	0.00
1755	0.00	0.00	0.10	0.00	0.20	0.00
1769	0.00	0.00	0.15	1.38	0.16	-0.68
1773	0.00	0.00	0.20	2.76	0.20	0.00
1780	0.00	0.00	0.12	0.55	0.22	0.34
1785	0.00	0.00	0.07	-0.83	0.10	-1.70
1847	0.00	0.00	0.11	0.28	0.27	1.19
1870	0.00	0.00	0.07	-0.83	0.14	-1.02
1871	0.00	0.00	0.14	1.10	0.11	-1.53
1875	0.00	0.00	0.06	-1.10	0.17	-0.51
1891	0.00	0.00	0.15	1.38	0.25	0.85
2051	0.00	0.00	0.11	0.28	0.19	-0.17
4500	0.00	0.00	0.12	0.55	0.13	-1.19
4932	0.00	0.00	0.13	0.83	0.26	1.02
4934	0.00	0.00	0.10	0.00	0.08	-2.05

**Table 64: Quantitative results and z-scores for soybeans fortified with Roundup Ready II (CP4 EPSPS) for all participants (DNA-based assays).** Z-scores outside of the expected range of  $z > 2$  were not observed in this data set. Quantifications marked in red indicate values determined to be either: (1) outliers by the “Grubb’s Test for Outliers”; or (2) a quantitative value for a non-fortified sample (i.e. a false positive result).

Event: RUR II					
%w/w Fortification Level	0.3%		0.0%	0.0%	0.0%
Participant Number	Result	z-score	Result	Result	Result
1754	0.30	-0.38	0.00	0.00	0.00
1755	0.30	-0.38	0.00	0.00	0.00
1769	0.27	-0.67	0.00	0.00	0.00
1773	0.30	-0.38	0.00	0.00	0.00
1780	0.30	-0.38	0.00	0.00	0.00
1785	0.16	-1.72	0.00	0.00	0.00
1891	0.43	0.86	0.00	0.00	0.00
1893	0.30	-0.38	0.00	0.00	0.00
1895	2.00	15.84	0.00	0.00	0.10
2032	0.40	0.57	0.00	0.00	0.00
2051	0.22	-1.15	0.00	0.00	0.00
4500	0.24	-0.95	0.00	0.00	0.00
4932	0.19	-1.43	0.00	0.00	0.00
4934	0.55	2.00	0.00	0.00	0.00

**Table 65: Quantitative results for 35S and NOS in corn (DNA based assay)**

Event: 35S						
GIPSA Estimated %w/w Fortification Level	6.2%	7.3%	0.0%	2.8%	2.9%	7.7%
Participant Number	Result	Result	Result	Result	Result	Result
1785	2.70	1.60	0.00	1.30	1.30	3.90
1847	3.05	4.72	0.00	2.24	1.66	7.08
2565	3.49	3.43	0.00	1.36	1.38	6.47
4500	2.81	3.39	0.00	1.75	1.03	4.52

Event: NOS						
GIPSA Estimated %w/w Fortification Level	4.0%	1.6%	0.0%	3.7%	3.4%	4.7%
Participant Number	Result	Result	Result	Result	Result	Result
1847	1.71	0.79	0.00	2.13	1.13	2.71
4500	2.41	1.31	0.00	2.57	1.69	3.25

Note: Levels cited as %w/w fortification level are total genetic event fortification of events containing these promoters and terminators. A more thorough quantification is not yet in the scope of this program.

**Table 66: Results for 35S and NOS in soybeans (DNA based assay)**

Event: 35S Soy				
GIPSA Estimated %w/w Fortification Level	0.8%	0.0%	0.1%	0.4%
Participant Number	Result	Result	Result	Result
1862	P	N	P	P
2123	P	N	P	P
2560	P	N	P	P
2565	0.59	0.00	0.14	0.64
4933	P	N	P	P
4935	P	N	P	P

Event: NOS Soy				
GIPSA Estimated %w/w Fortification Level	0.8%	0.0%	0.0%	0.2%
Participant Number	Result	Result	Result	Result
2123	P	N	N	N
2560	P	N	N	P
4933	P	N	P	P
4935	P	N	N *	P

\* - very low levels of NOS reported, assessed as below LOD. The sample is scored as correct.

Note: As 35S accompanies both RUR and LL genetic modification events, its presence is equivalent to the sum of these events in the sample. The NOS trait serves as a terminator in RUR only in this list of events.

**Table 67: Descriptive statistics for participants reported quantifications relative to GIPSA fortification levels using DNA-based assays.** % Relative standard deviation ( $\%RSD_R$ ) = [standard deviation/mean value x 100]; % Relative error = [reported value – fortified value/fortified value x 100]. Outliers were determined by the Grubb’s Test for Outliers and **excluded** from calculations involving reported mean, standard deviation, % relative deviation, and % relative error but were **included** in the range of results.

<b>Transgenic Event</b>	<b>Reported Results (N)</b>	<b>Fortification (%w/w)</b>	<b>Reported Mean</b>	<b>Standard Deviation</b>	<b>% Relative Standard Deviation</b>	<b>% Relative Error</b>	<b>Range of Results (%)</b>
<b>T25</b>	11	1.0	1.08	0.71	66.2	7.9	0.00 - 2.40
<b>T25</b>	11	2.0	1.65	0.80	48.2	-17.4	0.80 - 3.41
<b>CBH351</b>	4	0.1	0.10	0.01	5.1	-2.5	0.09 - 0.10
<b>CBH351</b>	4	1.0	0.92	0.26	28.8	-8.3	0.70 - 1.30
<b>MON810</b>	22	0.2	0.17	0.08	43.3	-12.9	< 0.10 - 0.52
<b>MON810</b>	22	0.3	0.41	0.13	30.5	38.3	0.13 - 1.84
<b>MON810</b>	22	0.3	0.27	0.06	30.5	38.3	0.13 - 1.33
<b>MON810</b>	22	0.6	0.70	0.19	26.8	17.1	0.30 - 3.29
<b>MON810</b>	22	1.2	1.44	0.37	25.4	20.0	0.44 - 8.13
<b>GA21</b>	18	0.1	0.17	0.06	31.6	74.7	0.10 - 1
<b>GA21</b>	18	0.2	0.15	0.06	40.3	-24.1	0.0 - 0.29
<b>GA21</b>	18	0.8	0.63	0.20	32.1	-21.8	0.20 - 1
<b>Bt176</b>	16	0.1	0.08	0.03	35.7	-22.5	< 0.1 - 0.18
<b>Bt176</b>	16	0.5	0.34	0.16	45.9	-31.4	0.10 - 0.70
<b>Bt176</b>	16	1.5	1.27	0.55	42.9	-15.1	0.40 - 2.44
<b>Bt11</b>	16	0.1	0.12	0.06	49.9	17.1	0.0 - 0.23
<b>Bt11</b>	16	0.5	0.60	0.25	41.0	19.6	0.12 - 1.13
<b>Bt11</b>	16	1.5	0.76	0.16	20.9	-49.4	0.21 - 1.71
<b>NK603</b>	19	0.5	0.41	0.19	46.2	-17.5	0.10 - 0.90
<b>NK603</b>	19	0.65	0.59	0.14	24.0	-9.2	0.28 - 0.86
<b>NK603</b>	19	1.3	1.18	0.15	12.7	-9.0	0.50 - 2.10
<b>Herculex</b>	14	0.1	0.07	0.03	47.8	-30.9	<0.05 - 0.10
<b>MON863</b>	15	0.5	0.32	0.13	41.4	-36.5	0.10 - 0.59
<b>MON863</b>	15	1.5	1.24	0.23	18.4	-17.1	0.31 - 1.70
<b>HerculexRW</b>	14	0.8	0.84	0.20	23.2	5.2	0.52 - 1.20
<b>HerculexRW</b>	14	2.6	2.64	0.71	26.9	1.6	1.50 - 3.90
<b>MIR604</b>	13	0.15	0.17	0.06	33.4	15.6	0.0 - 0.50
<b>MIR604</b>	13	0.38	0.39	0.11	29.3	2.9	0.21 - 1
<b>MIR604</b>	13	0.60	0.52	0.15	28.8	-13.6	0.35 - 1

Transgenic Event	Reported Results (N)	Fortification (%w/w)	Reported Mean	Standard Deviation	% Relative Standard Deviation	% Relative Error	Range of Results (%)
EV3272	9	0.1	0.10	0.02	18.6	1.2	<0.1 - 0.13
EV3272	9	0.2	0.12	0.04	33.2	-38.1	<0.1 - 0.20
EV3272	9	0.5	0.48	0.14	30.1	-4.9	0.23 - 0.70
EV3272	8	0.8	0.94	0.27	29.0	17.6	0.52 - 1.44
MON88017	10	0.5	0.44	0.18	41.6	-11.1	0.29 - 1.00
MON88017	10	1.0	1.07	0.42	38.8	7.1	0.63 - 1.90
MON89034	7	0.3	0.23	0.10	42.1	-23.3	0.11 - 0.36
MON89034	7	0.5	0.51	0.16	31.5	2.6	0.26 - 0.64
RUR	31	0.2	0.22	0.10	43.0	12.1	0.0 - 5.00
RUR	31	0.8	0.67	0.25	38.1	-16.8	0.27 - 3.00
A2704-12	15	0.1	0.12	0.04	31.4	15.3	0.06 - 0.20
A2704-12	15	0.2	0.18	0.06	32.8	-10.7	0.08 - 0.27
RUR II	14	0.5	0.30	0.10	34.4	-39.1	0.16 - 2.00

**Table 68: Quantitative results for soybeans fortified with CP4EPSPS (RUR and RUR II) using Enzyme-Linked Immunosorbent Assay (ELISA) (Protein-based testing)**

Event: RUR					
%w/w Fortification Level	0.8%	0.0%	0.0%	0.2%	
Participant Number	Result	Result	Result	Result	LOD
1754	0.40	0.00	0.00	0.20	0.1%
1782	0.50	0.00	0.00	0.10	Not Provided

Event: RUR II				
%w/w Fortification Level	0.5%	0.0%	0.0%	0.0%
Participant Number	Result	Result	Result	Result
1782	0.50	0.00	0.00	0.10

## Summary of Findings

It is recognized that some organizations participate in this program to retain their ISO accreditation. Long-time, certified participants tend to show consistent and reliable results. For others, participation serves to provide a verification of current laboratory practices and points to areas for improvement. These factors should be considered when reviewing the following analyses.

- **Qualitative Sample Analysis**

**DNA-based Testing.** The typical method of DNA-based testing for the qualitative determination of events is by a conventional polymerase chain reaction assay (PCR) which generally has a sensitivity of 0.01% w/w transgenic event. This level is consistent with what has been reported by Lipp et al. and represents the lowest concentration of genetic material that can be reliably detected by qualitative PCR.

The lowest fortification level in this round of proficiency testing was 0.1% w/w; therefore, if the event was present it should be detectable by a laboratory that employs conventional PCR. As evidenced by the summary of performance scores (**Table 39** and **Figure 1**), all of the nineteen transgenic events were correctly detected with greater than or equal to 90% reliability, and eighteen of the nineteen transgenic events were correctly detected with greater than or equal to 95% reliability. The event that tested with less than 95% reliability was T-25. The reliability of detecting T-25 might be affected by the presence of the phosphinothricin N-acetyltransferase (*pat*) trait also produced in the event Bt11. The Bt11 event is present in sample #1, whereas the T-25 event is not. Construct-specific DNA or protein-based testing for the *pat* gene/protein will not differentiate between these two events, resulting in false positive results for T-25. The false positive observations for the NK 603 event in Table 17 could also be explained by this phenomenon. The 5-enolpyruvylshikimate-3-phosphate synthase (*EPSPS*) enzyme in corn is expressed in both NK603 and in the newly added event, MON 88017. Characteristic testing for the *EPSPS* enzyme will not differentiate between these events, resulting in a false positive result. The MON 88017 event is present in sample #1 and the NK603 event is not. Trait specific, DNA-based testing will discern between these traits, whereas construct-specific or protein-based testing will not.

In laboratories using qualitative DNA methods to detect RUR soy, one of forty-two (2.4%) test results generated a false positive result, and one test result generated a very low positive; four of sixty-two test results generated a positive value below the Level of Detection (LOD) using quantitative DNA detection methods on the RUR trait. These latter results were assessed as correct when generating this report. The possibility of low level contamination of RUR in the event-free samples, below 0.01%, should be considered as plausible.

The MON 88017 and MON 89034 transgenic events for corn are new in this sample dissemination. All participants testing for these traits identified their presence correctly in samples fortified with MON 88017 and MON 89034.

Six participants submitted results for the 35S genome in soybeans and four submitted results for the NOS genome in soy (**Table 66**). There was one false positive in this data set. There

was a very low positive detect in a non-fortified NOS sample indicating a low presence of the RUR trait. This result was assessed as correct, for the same reasons as previously described.

- **Protein-based Testing.** The principle methods of protein-based testing were lateral flow strip (LFS) and enzyme-linked immunosorbent assay (ELISA). The LFS test has a sensitivity ranging between 0.125 – 1.0% w/w for corn events and 0.1% w/w for soybean event RUR according to Strategic Diagnostics Inc. (2001 & 2003). Generally, ELISA has a sensitivity of 0.1 - 1% w/w for corn and soy events (Ahmed, 2004) and laboratories demonstrated good proficiency when using protein-based methods to detect the presence of biotechnology-derived traits in maize and soybean that were fortified above their reported LOD's (see **Tables 40 through 47**). The test results for NK603 and MON 898034 were combined because both traits express the *EPSPS* enzyme, and protein-based testing cannot distinguish between the two traits. See the discussion in “Qualitative Sample Analysis”.
- **Quantitative Sample Analysis**

**DNA-based Testing.** The typical method of DNA-based testing for the quantitative determination of transgenic events is by real-time quantitative PCR. This analytical method has a limit of detection (LOD) of 0.01% w/w and a limit of quantification (LOQ) of approximately 0.1% w/w for a specified event (Ahmed, 2004; Lipp et al., 2005).

**Composite Performance Assessment.** These data combined the participants' reported quantifications and evaluated the group's performance by considering the mean value of “reported results” of all participants (**Table 67**). Because test samples were fortified ranging from 0.1 – 2.0% w/w of a particular event, it was expected that quantitative PCR (qPCR) technologies would detect the traits in all of the fortified samples but not in non-fortified samples. Low instances of false positive results when using qPCR to detect the presence of GE traits in these proficiency samples were observed.

The occurrence of false negative results is significantly lower in this sample dissemination as compared with previous disseminations, (three (3) false negatives compared with thirteen (13) in October 2010).

Four (4) participants submitted quantitative results for 35S, and two (2) participants submitted quantitative results for NOS in corn (**Table 65**). One laboratory submitted quantitative results using qPCR (DNA-based testing) for the 35S genome in Soy (**Table 66**). The %w/w fortification levels assumed for these traits is the sum of all traits fortified in the sample. Validated methods to quantify for the presence of 35S and NOS, in combined samples, is beyond the scope of the program at this time. The ability to critically evaluate the usefulness of these data can be challenging and should be considered on an individual laboratory basis only.

Historical results show lower reported concentrations compared with gravimetric fortification of prepared proficiency samples. The trend of generating lower than expected reported values is possibly due to zygosity in the corn and soy samples. GIPSA in-house validated methods reflect similar observations compared with historical results of participants.

Notably, The composite averages for MON810 were about half the %w/w fortified levels; conversely, Herculex RW composite averages were higher than the %w/w fortifications.

The MON 88017 and MON 89034 transgenic events for corn are new in this sample dissemination. Ten (10) participants measuring MON 88017 and seven (7) participants measuring MON 89034 all identified these traits correctly.

In this round of proficiency testing, there were forty-two (42) trials of inter-laboratory quantifications (i.e., total number of events at the total number of fortification levels). In thirty-three (33/42) of those trials the **inter-laboratory relative error** was observed to be  $\leq 25\%$  (**Table 67**). This compares to twenty-six of forty-four (26/44) in October 2010, and twenty-one of forty-five trials (21/44) in April 2009 that were observed to be  $\leq 25\%$ . Results with a relative error  $\leq 25\%$  meet the acceptance criteria for trueness as established by the Joint Research Council/ENGL. Furthermore, reported quantifications were under-estimated (low bias) in approximately 57% of the trials (**Table 67**). Historically, low bias results were 67% in November 2009, 54% in April 2010, and 73% in October 2010. Quantitative data from previous rounds of our proficiency sample distributions can be found at:

<http://www.gipsa.usda.gov/GIPSA/webapp?area=home&subject=grpi&topic=iws-prof-rep>.

**Individual Performance Assessment.** The performance of each participating laboratory for quantifying transgenic events in the proficiency samples can be observed by inspecting Tables 48 through 67. To assess the accuracy of their reported quantifications z-scores were computed. Laboratories with z-scores above +2 or below -2 were noted and highlighted in yellow because their result was greater than two standard deviations from the expected value. Interpretation of z-scores assumes that the data have a normal distribution. Data from samples with lower fortification levels (e.g., 0.1% w/w) and from tables with low numbers of results may not be normally distributed and caution should be used when interpreting their z-scores.

In this round of inter-laboratory proficiency testing, the  $\%RSD_R$  for several of the transgenic events was greater than 35% for samples that were fortified above 0.1% (**Table 67**). This observation could be due to numerous confounders including: zygoty, lack of standardization, the presence of inhibitors in the reaction mix, etc. Monitoring and improving the performance of laboratories that use PCR technologies for the detection and/or quantification of transgenic events in corn and soybeans will improve the reliability of testing methods and the marketing of these commodities. The USDA/GIPSA proficiency testing program should be a complement to other quality assurance measures that laboratories use to improve their analytical capabilities.

**Protein-based Testing.** Two laboratories submitted quantitative results using a protein-based method (i.e. ELISA). The traits RUR and RUR II were quantified and values similar to what was observed with DNA based methods were reported (**see Table 68**). A greater number of reported results are needed before any conclusions can be drawn from these observations and further studies should be considered. There was one false positive result in this data.

**Note:** The transgenic seed or grain used to prepare these samples was made available to GIPSA by the Life Science Organizations. Care was taken to ensure the transgenic material was either essentially 100% positive for the event, or adjusted accordingly. The fortified samples were prepared using a process that has been verified to produce homogenous mixes, and representative samples were analyzed to ensure proper fortification and homogeneity. Reference standards are now commercially available for



**all transgenic traits used in this proficiency program and GIPSA encourages the use of these reference materials when developing internal validated methods.**

To obtain additional information on the USDA/GIPSA Proficiency Program, contact Dr. Tandace Scholdberg, USDA/GIPSA Proficiency Program Manager, at US 816-891-0459, or by e-mail at [Tandace.A.Scholdberg@usda.gov](mailto:Tandace.A.Scholdberg@usda.gov).

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