SUMMARY

(In accordance with 40 CFR part 152, this summary is available for public release after registration)

REPORT TITLE

Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

DATA REQUIREMENTS

Not Applicable

AUTHOR(S)

M. D. Lepping

REPORT COMPLETED ON

28-JUL-2011

PERFORMING LABORATORY

Regulatory Sciences and Government Affairs—Indianapolis Lab
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268-1054

LABORATORY STUDY ID

101104.01

Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

SUMMARY

Field trials with DAS-444Ø6-6 soybean, a non-transgenic control, and reference lines were conducted in 2010 at ten sites located in Georgia, Iowa (2 sites), Illinois (2 sites), Indiana, Michigan, Missouri, and Nebraska (2 sites). This report summarizes planting, sampling, maintenance data from the field locations, and the results of agronomic evaluations from the control, reference, and DAS-444Ø6-6 soybean (unsprayed or sprayed with 2,4-D, glyphosate, glufosinate, or all three herbicides).

Evaluations of agronomic characteristics were conducted to investigate the equivalency of DAS-444Ø6-6 soybean (with or without herbicide treatments) to non-transgenic soybean. No agronomically meaningful unintended differences were observed between the non-transgenic near-isogenic control and DAS-444Ø6-6 soybean plots. Results from this study demonstrate agronomic equivalence between event DAS-444Ø6-6 (unsprayed and sprayed) and non-transgenic soybean.

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DATA REQUIREMENTS

Not Applicable

AUTHOR(S)

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REPORT COMPLETED ON

28-JUL-2011

PERFORMING LABORATORY

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Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268-1054

LABORATORY STUDY ID

101104.01

STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS

Compound: DAS-444Ø6-6

Title: Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

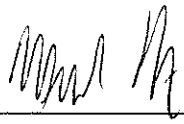
- STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS:

No claim of confidentiality, on any basis whatsoever, is made for any information contained in this document. I acknowledge that information not designated as within the scope of FIFRA sec. 10(d)(1)(A), (B), or (C) and which pertains to a registered or previously registered pesticide is not entitled to confidential treatment and may be released to the public, subject to the provisions regarding disclosure to multinational entities under FIFRA sec. 10(g).

Company: Dow AgroSciences LLC

Company Agent: M. S. Krieger

Title: Regulatory Manager

Signature: 

Date: 25 July 2011

THIS DATA MAY BE CONSIDERED CONFIDENTIAL IN COUNTRIES OUTSIDE THE UNITED STATES.

STATEMENT OF COMPLIANCE WITH GOOD LABORATORY PRACTICE STANDARDS

Title: Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

Study Initiation Date: 29-April-2010

This report represents data generated after the effective date of the EPA FIFRA Good Laboratory Practice Standards.

United States Environmental Protection Agency
Title 40 Code of Federal Regulations Part 160
FEDERAL REGISTER, August 17, 1989

Organisation for Economic Co-Operation and Development
ENV/MC/CHEM(98)17, Paris January 26, 1998

All aspects of this study were conducted in accordance with the requirements for Good Laboratory Practice Standards, 40 CFR 160, except for the following: for certain sites documentation is incomplete by GLP standards for climatological data, irrigation data, field history, pesticide maintenance, sample weights, soil property and crop information. The test substance was characterized during the study, but not prior to study initiation. The statistical analysis of the data was conducted using SAS software, version 9.2, which was not validated according to GLP.

M. S. Krieger
Sponsor
Dow AgroSciences LLC

25 July 2011
Date

M. S. Krieger
Submitter
Dow AgroSciences LLC

25 July 2011
Date

M. D. Lepping
Study Director
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28-JUL-2011
Report Completion Date

Dow AgroSciences Quality Assurance Unit
Good Laboratory Practice Statement Page

Study ID: 101104.01

Title: Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-44406-6

Study Initiation Date: 29-April-2010 **Report Completion Date:** 28-July-2011

GLP Quality Assurance Inspections

Date of GLP Inspection(s)	Date Reported to the Study Director and to Management	Phases of the Study which received a GLP Inspection by the Quality Assurance Unit
28-April-2010	29-April-2010	Protocol Review
29-June-2010	07-July-2010	Planting (Site 101104IA1)
14-July-2010	14-July-2010	V5 Leaf Sampling (Site 101104IL2)
23-July-2010	27-July-2010	Application 7 (Site 101104MO)
11-August-2010	05-November-2010	R3 Forage & Root Sampling (Site 101104NE1)
12-August-2010	12-August-2010	Harvest (Site 101104IN)
18-August-2010	22/23-November-2010	R3 Composition Forage Sampling (Site 101104NE2)
28-August-2010	30-August-2010	Calibration (Site 101104MI)
13-October-2010	05-November-2010	R8 Grain Sampling (Site 101104IA2)
19-October-2010	21-October-2010	Grain Sampling (Site 101104IL1)
20-October-2010	24-October-2010	Sampling (Seeds) (Site 101104GA)
01-03-December-2010	06-December-2010	Final data review (Site 101104IL2)
14-December-2010	17-December-2010	Notebook (Site 101104IN)

15-December-2010	23-December-2010	Field trial notebook, supporting data, and Excel spreadsheet (Site 101104IA1)
15-December-2010	15-December-2010	FTN Review (Site 101104IA2)
18-20-December-2010	23-December-2010	Final data review (Site 101104IL1)
21-December-2010	22-December-2010	Notebook (Site 101104MO)
04-07-February-2011	08-February-2011	FTNB (Site 101104GA)
19-21-February-2011	21-February-2011	FTNB (Site 101104MI)
08-March-2011	08-March-2011	Field Notebook and Summary Audit (Site 101104NE2)
10-March-2011	10-March-2011	Field Notebook and Summary Audit (Site 101104NE1)
06-10, 13-16, & 20-June-2011	20-June-2011	Agronomics Raw Data & Report Review

QUALITY ASSURANCE STATEMENT:

The Quality Assurance Unit has reviewed the final study report and has determined that the report reflects the raw data generated during the conduct of this study.

Val Gartner

28-July-2011

Val Gartner, RQAP-GLP
Dow AgroSciences, Quality Assurance

Date

SIGNATURE PAGE

6-JUN-2011

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Dow AgroSciences LLC

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26-May-2011

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Reviewer
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1-June-2011

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27 May 2011

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STUDY PERSONNEL

Title: Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

Study Director: Miles D. Lepping

Principal Field Investigators:

Site	Field Investigator	Site Location
101104GA	Chris Cromer, Ag Research Associates	Sycamore, GA
101104IA1	David Bennett, Bennett Agricultural Research Corporation	Richland, IA
101104IA2	Dan Easton, Easton Agri-Consulting, Inc.	Bagley, IA
101104IL1	Tim Boeker, SGS Alvey Ag Research	Carlyle, IL
101104IL2	Sue Dorsey, SGS Alvey Ag Research	Wyoming, IL
101104IN	Fritz Koppatschek, ABG Ag Services	Sheridan, IN
101104MI	Chad Harris, Ag Research Associates	Deerfield, MI
101104MO	Nathan Goldschmidt, Shoffner Farm Research, Inc.	Fisk, MO
101104NE1	Eric Ehlers, Ag Research Associates	Brunswick, NE
101104NE2	Matt Krause, Ag Research Associates	York, NE

Statistical Analysis: Miles D. Lepping

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Field Production and Agronomic Characteristics of a Transformed Soybean Cultivar Containing Aryloxyalkanoate Dioxygenase-12 (AAD-12), Double Mutant Maize EPSPS Gene (2mEPSPS), and Phosphinothricin Acetyltransferase (PAT) - Event DAS-444Ø6-6

ABSTRACT

Field trials with DAS-444Ø6-6 soybean, a non-transgenic control, and reference lines were conducted in 2010 at ten sites located in Georgia, Iowa (2 sites), Illinois (2 sites), Indiana, Michigan, Missouri, and Nebraska (2 sites). This report summarizes planting, sampling, maintenance data from the field locations, and the results of agronomic evaluations from the control, reference, and DAS-444Ø6-6 soybean (unsprayed or sprayed with 2,4-D, glyphosate, glufosinate, or all three herbicides).

Evaluations of agronomic characteristics were conducted to investigate the equivalency of DAS-444Ø6-6 soybean (with or without herbicide treatments) to non-transgenic soybean. No agronomically meaningful unintended differences were observed between the non-transgenic near-isogenic control and DAS-444Ø6-6 soybean plots. Results from this study demonstrate agronomic equivalence between event DAS-444Ø6-6 (unsprayed and sprayed) and non-transgenic soybean.

INTRODUCTION

The purpose of this study was to produce field tissues for analysis and evaluate the agronomic characteristics of DAS-444Ø6-6 (AAD-12 + 2mEPSPS + PAT) soybean compared with a near-isogenic non-transgenic soybean line and ranges from non-transgenic reference lines included in the study.

Field trials were conducted at ten test sites that are located within the major soybean-producing regions of the U.S. and represent regions of diverse agronomic practices and environmental conditions. The trials were located in Georgia, Iowa (2 sites), Illinois (2 sites), Indiana, Michigan, Missouri, and Nebraska (2 sites). Study amendments and deviations related to this report are listed in Appendix A, Table 1.

MATERIALS AND METHODS

Test Substance

The test substance was seed containing the DAS-444Ø6-6 event. The test substance, treatments, and test substance characterization reference are listed in Table 1. This study also included additional test entries (5-9, 15-24) that are not presented in this report as these entries included other transformation events.

Table 1. Test substances.

Test Entry	Source ID Number	Test Entry Description	Reference
10	YX09KX950434	DAS-444Ø6-6 Unsprayed	BIOT10-262920 [1]
11	YX09KX950434	DAS-444Ø6-6 Sprayed with 2,4-D	BIOT10-262920 [1]
12	YX09KX950434	DAS-444Ø6-6 Sprayed with glufosinate	BIOT10-262920 [1]
13	YX09KX950434	DAS-444Ø6-6 Sprayed with glyphosate	BIOT10-262920 [1]
14	YX09KX950434	DAS-444Ø6-6 Sprayed with 2,4-D, glufosinate, and glyphosate	BIOT10-262920 [1]

Control and Reference Substances

The control substance (variety: Maverick) was non-transgenic seed of the same genetic background as the test substance line, but did not contain AAD-12, 2mEPSPS, or PAT proteins expressed in event DAS-444Ø6-6. The near-isogenic non-transgenic control substance (hereafter referred to as isoline) used for this study is listed in Table 2.

Table 2. Control substance.

Test Entry	ID Number	Description	Reference
1	YX09KX540002	Non-transgenic Control	BIOT10-262920 [1]

Six different non-transgenic soybean lines were used as reference substances in this study (Table 3). Reference lines were of a similar maturity to the control and test substance. Reference lines were randomized across sites in a balanced incomplete-block (BIB) design with three references at each site (entry numbers 2, 3, and 4) and each reference line present at five sites.

Table 3. Reference substances.

Reference Lines
Dairyland Seed (DSR) 75213-72
Dairyland Seed (DSR) 98860-71
Dairyland Seed (DSR) 99914N
Dairyland Seed (DSR) 99915
Porter 75148
Williams 82

Test System

The test system for this study was soybean plants produced from the genetically modified, control, and reference soybean seed grown at locations within the major soybean growing regions of the U.S. The ten field testing facilities were located near Sycamore, GA; Richland, IA; Bagley, IA; Carlyle, IL; Wyoming, IL; Sheridan, IN; Deerfield, MI; Fisk, MO; Brunswick, NE; and York, NE (referred to as GA, IA1, IA2, IL1, IL2, IN, MI, MO, NE1, and NE2), and represent regions of diverse agronomic practices and environmental conditions for soybean (Table 4).

Table 4. Field site information.

Site	Field Investigator	Site Location	Soil Type
101104GA	Chris Cromer, Ag Research Associates	Sycamore, GA	Tifton Loamy Sand
101104IA1	David Bennett, Bennett Agricultural Research Corporation	Richland, IA	Taintor Silty Clay Loam
101104IA2	Dan Easton, Easton Agri-Consulting, Inc.	Bagley, IA	Clarion Loam
101104IL1	Tim Boeker, SGS Alvey Ag Research	Carlyle, IL	Hoyleton Darmstadt Complex Silt Loam
101104IL2	Sue Dorsey, SGS Alvey Ag Research	Wyoming, IL	Plano Silt Loam
101104IN	Fritz Koppatschek, ABG Ag Services	Sheridan, IN	Crosby Silt Loam
101104MI	Chad Harris, Ag Research Associates	Deerfield, MI	Lenawee Silty Clay Loam
101104MO	Nathan Goldschmidt, Shoffner Farm Research, Inc.	Fisk, MO	Amagon Silt Loam / Bulltown Fine Sand
101104NE1	Eric Ehlers, Ag Research Associates	Brunswick, NE	Ovina Loamy Fine Sand
101104NE2	Matthew Krause Ag Research Associates	York, NE	Hastings Silt Loam

The test, control, and reference soybean seed was planted at a seeding rate of approximately 125 seeds per row with seed spacing within each row of approximately 2.4 inches (6 cm). At each site, 4 replicate plots of each treatment were established, with each plot consisting of four 25 ft rows. Each soybean plot was bordered by 2 rows of a non-transgenic soybean cultivar of similar maturity. Plots were arranged in a randomized complete block (RCB) design, with a unique randomization at each site. The entire trial site was surrounded by a minimum of 4 rows (or 10 ft) of a non-transgenic soybean cultivar of similar maturity.

Appropriate insect, weed, and disease control practices were applied to produce an agronomically acceptable crop. Table 5 lists the maintenance chemicals used at each site. Average monthly maximum and minimum temperatures along with rainfall and irrigation are shown in Table 6. During the field portion of this study, temperatures and rainfall were in the ranges typically encountered in soybean production, with the following exceptions. The month of June had higher than normal rainfall at sites IA1, IA2, IL2, NE1, and NE; higher than normal rainfall did not adversely impact the study.

Table 5. Maintenance chemical use.

Site	Chemical	Date	Rate	Units	Purpose
101104GA	Brigade 2 EC	7-Jul-10	6	oz/A prod	Insecticide
	Brigade 2 EC	9-Jul-10	6	oz/A prod	Insecticide
	Micropac	9-Jul-10	2	qt/A prod	Fertilizer
	Micropac	15-Jul-10	1	qt/A prod	Fertilizer
	Brigade 2 EC	15-Jul-10	6	oz/A prod	Insecticide
	Folicur 3.6 F	15-Jul-10	5	oz/A prod	Fungicide
	Headline	15-Jul-10	6	oz/A prod	Fungicide
	Steward	16-Jul-10	11	oz/A prod	Insecticide
	Mustang Max	20-Jul-10	4	oz/A prod	Insecticide
	10-10-10	22-Jul-10	150	lb/A prod	Fertilizer
	Brigade 2 EC	23-Jul-10	6	oz/A prod	Insecticide
	Headline	23-Jul-10	6	oz/A prod	Fungicide
	Steward	30-Jul-10	11	oz/A prod	Insecticide
	Headline	30-Jul-10	6	oz/A prod	Fungicide
	Folicur 3.6 F	30-Jul-10	7	oz/A prod	Fungicide
	Micropac	30-Jul-10	1	qt/A prod	Fertilizer
	Brigade 2 EC	5-Aug-10	6	oz/A prod	Insecticide
	Headline	5-Aug-10	6	oz/A prod	Fungicide
	Brigade 2 EC	11-Aug-10	6	oz/A prod	Insecticide
	Folicur 3.6 F	11-Aug-10	7	oz/A prod	Fungicide
	Headline	11-Aug-10	6	oz/A prod	Fungicide
	Brigade 2 EC	18-Aug-10	6	oz/A prod	Insecticide
	Steward	18-Aug-10	11	oz/A prod	Insecticide
	Steward	25-Aug-10	11	oz/A prod	Insecticide
	Micropac	25-Aug-10	1	qt/A prod	Fertilizer
	Steward	30-Aug-10	11	oz/A prod	Insecticide
	Micropac	30-Aug-10	1	qt/A prod	Fertilizer
	Steward	2-Sep-10	11	oz/A prod	Insecticide
	Folicur 3.6 F	2-Sep-10	7	oz/A prod	Fungicide
	Headline	2-Sep-10	6	oz/A prod	Fungicide
	Micropac	2-Sep-10	1	qt/A prod	Fertilizer
101104IA1	Gramoxone Inteon	30-Jun-10	1	qt/A	Herbicide
	Dual II Magnum	30-Jun-10	1	qt/A	Herbicide
	Dimetric 75D F	30-Jun-10	1	lb/A	Herbicide

Table 5 (Cont.). Maintenance chemical use.

Site	Chemical	Date	Rate	Units	Purpose
101104IA2	Boundary	7-Jun-10	2	pt/A	Herbicide
	Bassagran	7-Aug-10	2	pt/A	Herbicide
101104IL1	Boundary	23-Jun-10	2	pt/A	Herbicide
	Sonic	23-Jun-10	4	oz/A	herbicide
101104IL2	Boundary 6.5 EC	10-Jun-10	2.1	pt/A	Herbicide
	Gramoxone Inteon	10-Jun-10	2.5	pt/A	Herbicide
101104IN	Dual II Magnum	2-Jul-10	1.3	pt/A	Herbicide
	Pursuit 2EC	2-Jul-10	4	oz/A	Herbicide
101104MI	No maintenance	N/A	N/A	N/A	N/A
101104MO	0-0-60	11-Apr-10	100	lb/A	Fertilizer
	Glyfos Xtra	18-May-10	32	fl oz/A	Herbicide
	Arrow	25-Jun-10	8	fl oz/A	Herbicide
	Basagran	28-Jun-10	32	fl oz/A	Herbicide
	Me-too-lachlor II	28-Jun-10	16	fl oz/A	Herbicide
	Rhythm	28-Jun-10	16	fl oz/A	Herbicide
	Select Max	30-Jul-10	24	fl oz/A	Herbicide
	Flexstar	24-Aug-10	24	fl oz/A	Herbicide
	Karate	24-Aug-10	2	fl oz/A	Insecticide
	Steward	24-Aug-10	6	fl oz/A	Insecticide
101104NE1	Pursuit	10-Jun-10	1.44	oz/A	Herbicide
101104NE2	Dual II Magnum	18-Jun-10	1.27	lb ai/A	Herbicide
	Authority MTZ	18-Jun-10	0.39	lb ai/A	Herbicide

Table 6. Climatological data for each site from month of planting through month of final sampling.

Site	Month 2010	Temperature, °F		Historical Temp., °F[a]		Rainfall	Irrig.	Historical Rainfall[a]
		Max	Min	Max	Min	inches	inches	inches
101104GA	June	93.3	72.9	89.6	78.7	2.18	3.4	4.80
	July	94.3	73.8	91.4	81.0	2.90	3.4	4.61
	August	93.1	74.9	90.7	80.0	7.89	1.2	4.23
	September	91.2	67.8	86.7	75.8	1.74	0.9	3.66
	October	82.2	55.1	78.6	66.1	0.87	0.0	2.41
101104IA1	June	83.4	64.0	81.9	61	14.6	0.0	5.71
	July	78.7	74.4	85.8	64.7	6.82	0.0	4.11
	August	86.0	66.1	84.7	63.2	8.29	0.0	5.18
	September	75.4	54.6	78.4	53.7	9.26	0.0	2.96
	October	69.2	42.4	63.8	42.5	2.04	0.0	3.95
101104IA2	June	80.1	60.5	81.4	58.5	9.47	0.0	4.98
	July	82.3	64.2	84.8	62.9	7.35	0.0	3.39
	August	84.1	63.9	82.9	61.0	5.79	0.0	4.24
	September	74.1	51.5	76.0	49.9	4.10	0.0	2.44
	October	69.4	38.9	62.0	39.4	0.18	0.0	2.43
101104IL1	June	87.3	69.7	82.7	63.9	6.3	0.0	4.31
	July	89.5	71.4	85.7	67.5	4.9	0.0	4.34
	August	90.5	68.5	85.9	66.4	3.2	0.0	3.43
	September	79.7	57.3	80.1	58.8	2.9	0.0	3.35
	October	73.0	44.0	66.7	46.5	0.6	0.0	4.40
101104IL2	June	83.1	62.9	81.8	61.6	9.52	0.0	3.47
	July	86.9	65.0	85.1	65.5	4.01	0.0	3.01
	August	86.2	62.9	83.9	64.5	3.03	0.0	3.23
	September	77.5	52.0	78.1	56.2	3.83	0.0	3.31
	October	69.0	36.5	63.9	44.2	1.81	0.0	3.02

Table 6 (Cont.). Climatological data for each site from month of planting through month of final sampling.

Site	Month 2010	Temperature, °F		Historical Temp., °F[a]		Rainfall inches	Irrig. inches	Historical Rainfall[a] inches
		Max	Min	Max	Min			
101104IN	July	85.3	66.1	83.1	62.6	7.66	0.0	4.30
	August	86.0	64.7	82.7	61.9	1.76	0.0	3.00
	September	78.7	55.0	78.0	53.7	1.95	0.0	2.60
	October	70.5	41.8	64.8	43.2	0.34	0.0	2.90
101104MI	June	81.3	60.9	80.0	55.0	3.11	0.0	3.77
	July	88.3	63.9	84.0	59.2	4.20	0.0	3.05
	August	85.6	62.2	81.7	57.2	1.27	0.0	3.78
	September	75.2	53.0	74.1	49.4	2.05	0.0	3.50
	October	66.2	42.1	61.7	38.4	1.16	0.0	2.51
	November	51.4	30.2	48.0	29.9	3.10	0.0	2.88
101104MO	June	94.0	74.0	87.0	65.0	0.07	3	3.37
	July	93.0	74.0	89.0	69.0	3.31	1.5	4.95
	August	97.0	73.0	90.0	69.0	1.67	6	3.88
	September	88.0	64.0	82.0	59.0	2.25	1.5	3.02
	October	81.0	51.0	70.0	48.0	1.35	0.0	4.79
101104NE1	June	83.0	59.0	82.0	59.0	9.43	0.0	3.35
	July	86.0	62.0	88.0	64.0	4.70	2.8	2.50
	August	84.0	61.0	86.0	61.0	6.75	4	3.37
	September	76.0	48.0	77.0	52.0	4.43	2	3.01
	October	68.0	37.0	63.0	39.0	2.00	0.0	2.52
	November	48.0	24.0	49.0	26.0	0.71	0.0	1.21
101104NE2	June	84.0	63.0	84.0	61.0	7.38	1	3.31
	July	85.0	67.0	89.0	67.0	6.37	3	2.55
	August	87.0	66.0	87.0	64.0	2.14	4	2.94
	September	79.0	53.0	80.0	54.0	1.48	1	2.65
	October	71.0	42.0	66.0	42.0	0.46	0.0	2.83

[a] Historical Data are 10 year averages for IA1, IA2, IL1, IL2, MO, NE1, NE2.
Historical Data is a 15 year average for IN.
Historical Data are 30 year averages for GA and MI.

Herbicide Applications

Herbicides were applied in a spray volume of approximately 20 gallons per acre (187 L/ha). Herbicide applications included approximately 2% v/v Ammonium sulfate (AMS) for Weedar 64, Durango DMA, and Liberty (Table 7).

Table 7. Herbicide specifications.

Herbicide	Test Substance Number (TSN)	Concentration
Weedar 64	026491-0010	39.1 % w/w, 454 g ae/L[a]
Durango DMA	016429-0044	40.5 % w/w, 490 g ae/L[a]
Liberty	022582-0012	18 % w/w, 200 g ai/L[b]

[a] ae = acid equivalent.
[b] ai = active ingredient.

2,4-D only Treatment – Entry 11: 2,4-D (Weedar 64) was applied as three broadcast applications to DAS-444Ø6-6 in Test Entry 11. Application timing was at planting / pre-emergence, and approximately V3 and R2 stages (Applications 1, 4, and 9, respectively). Individual target application rates were 1.0 lb ae (acid equivalent)/A for Weedar 64, or 1120 g ae/ha. Actual application rates ranged from 1091 – 1178 g ae/A (Table 8).

Glufosinate Treatment – Entry 12: Glufosinate (Liberty) was applied as two broadcast applications to DAS-444Ø6-6 in Test Entry 12. Application timing was at approximately V5 and R1 stages (Applications 7 and 8, respectively). The target application rate for application 7 was 0.33 lb ai/A for Liberty, or 374 g ai/ha. Actual application rates for the application 7 ranged from 364 – 393 g ai/ha (Table 8). The target application rate for application 8 was 0.41 lb ai/A for Liberty, or 454 g ai/ha. Actual application rates for the application 8 ranged from 444 – 472 g ai/ha (Table 8).

Glyphosate only Treatment – Entry 13: Glyphosate (Durango DMA) was applied as three broadcast applications to DAS-444Ø6-6 in Test Entry 13. Individual applications were at planting / pre-emergence, and approximately V3 and R2 stages (Applications 2, 5, and 10, respectively). Individual target application rates were 1.1 lb ae/A for Durango DMA, or 1260 g ae/ha. Actual application rates ranged from 1211 – 1316 g ae/A (Table 8).

2,4-D + Glufosinate + Glyphosate Treatment – Entry 14: 2,4-D (Weedar 64) + Glyphosate (Durango DMA) as a tank mixture was applied as three broadcast applications to DAS-444Ø6-6 in Test Entry 14. Individual applications were at planting / pre-emergence, and approximately V3 and R2 stages (Applications 3, 6, and 11, respectively). Individual target application rates were 1.0 lb ae/A for Weedar 64, or 1120 g ae/ha. Actual application rates ranged from 1083 – 1172 g ae/A (Table 8). Individual target application rates were 1.1 lb ae/A for Durango DMA, or 1260 g ae/ha. Actual application rates ranged from 1134 – 1337 g ae/ha (Table 8). Glufosinate (Liberty) was also applied as two broadcast applications to DAS-444Ø6-6 in Test Entry 14. Application timing was at approximately V5 and R1 stages (Applications 7 and 8, respectively). The target application rate for application 7 was 0.33 lb ai/A for Liberty, or 374 g ai/ha. Actual application rates for application 7 ranged from 373 – 393 g ai/ha (Table 8). The target application rate for application 8 was 0.41 lb ai/A for Liberty, or 454 g ai/ha. Actual application rates for application 8 ranged from 432 – 475 g ai/ha (Table 8).

Table 8. Herbicide application rate and timing.

Site	Herbicide	Application No.	Rate of Application (g ae/ha) or (g ai/ha)[abc]	Date	Approximate Crop Stage
101104GA	Weedar 64	1	1126	10-Jun-10	Pre-emergence
	Durango DMA	2	1234	10-Jun-10	Pre-emergence
	Weedar 64	3	1114	10-Jun-10	Pre-emergence
	Durango DMA	3	1227	10-Jun-10	Pre-emergence
	Weedar 64	4	1122	9-Jul-10	V3
	Durango DMA	5	1226	9-Jul-10	V3
	Weedar 64	6	1109	9-Jul-10	V3
	Durango DMA	6	1220	9-Jul-10	V3
	Liberty	7	381, 386	26-Jul-10	V6
	Liberty	8	457, 466	14-Jul-10	R1
	Weedar 64	9	1154	30-Jul-10	R2
	Durango DMA	10	1223	30-Jul-10	R2
	Weedar 64	11	1148	30-Jul-10	R2
	Durango DMA	11	1263	30-Jul-10	R2
101104IA1	Weedar 64	1	1133	1-Jul-10	Pre-emergence
	Durango DMA	2	1313	1-Jul-10	Pre-emergence
	Weedar 64	3	1132	1-Jul-10	Pre-emergence
	Durango DMA	3	1285	1-Jul-10	Pre-emergence
	Weedar 64	4	1102	26-Jul-10	V4
	Durango DMA	5	1299	26-Jul-10	V4
	Weedar 64	6	1165	26-Jul-10	V4
	Durango DMA	6	1332	26-Jul-10	V4
	Liberty	7	364, 375	2-Aug-10	V5-V6
	Liberty	8	445, 432	10-Aug-10	R1
	Weedar 64	9	1091	12-Aug-10	R2
	Durango DMA	10	1233	12-Aug-10	R2
	Weedar 64	11	1119	12-Aug-10	R2
	Durango DMA	11	1207	12-Aug-10	R2

Table 8 (Cont.). Herbicide application rate and timing.

Site	Herbicide	Application No.	Rate of Application (g ae/ha) or (g ai/ha)[abc]	Date	Approximate Crop Stage
101104IA2	Weedar 64	1	1110	11-Jun-10	Pre-emergence
	Durango DMA	2	1299	11-Jun-10	Pre-emergence
	Weedar 64	3	1083	11-Jun-10	Pre-emergence
	Durango DMA	3	1238	11-Jun-10	Pre-emergence
	Weedar 64	4	1124	6-Jul-10	V3
	Durango DMA	5	1295	6-Jul-10	V3
	Weedar 64	6	1136	6-Jul-10	V3
	Durango DMA	6	1297	6-Jul-10	V3
	Liberty	7	393	16-Jul-10	V5
	Liberty	8	470	23-Jul-10	R1
	Weedar 64	9	1139	5-Aug-10	R2
	Durango DMA	10	1310	5-Aug-10	R2
	Weedar 64	11	1168	5-Aug-10	R2
	Durango DMA	11	1337	5-Aug-10	R2
101104IL1	Weedar 64	1	1117	26-Jun-10	Pre-emergence
	Durango DMA	2	1263	26-Jun-10	Pre-emergence
	Weedar 64	3	1123	26-Jun-10	Pre-emergence
	Durango DMA	3	1257	26-Jun-10	Pre-emergence
	Weedar 64	4	1128	19-Jul-10	V3
	Durango DMA	5	1247	19-Jul-10	V3
	Weedar 64	6	1119	19-Jul-10	V3
	Durango DMA	6	1257	19-Jul-10	V3
	Liberty	7	377, 378	27-Jul-10	V5
	Liberty	8	455, 449	3-Aug-10	R1
	Weedar 64	9	1120	6-Aug-10	R2
	Durango DMA	10	1269	6-Aug-10	R2
	Weedar 64	11	1122	6-Aug-10	R2
	Durango DMA	11	1266	6-Aug-10	R2

Table 8 (Cont.). Herbicide application rate and timing.

Site	Herbicide	Application No.	Rate of Application (g ae/ha) or (g ai/ha)[abc]	Date	Approximate Crop Stage
101104IL2	Weedar 64	1	1094	12-Jun-10	Pre-emergence
	Durango DMA	2	1211	12-Jun-10	Pre-emergence
	Weedar 64	3	1101	12-Jun-10	Pre-emergence
	Durango DMA	3	1238	12-Jun-10	Pre-emergence
	Weedar 64	4	1103	8-Jul-10	V3
	Durango DMA	5	1248	8-Jul-10	V3
	Weedar 64	6	1151	8-Jul-10	V3
	Durango DMA	6	1295	8-Jul-10	V3
	Liberty	7	376, 376	15-Jul-10	V5
	Liberty	8	444, 451	26-Jul-10	R1
	Weedar 64	9	1130	29-Jul-10	R2
	Durango DMA	10	1279	29-Jul-10	R2
	Weedar 64	11	1154	29-Jul-10	R2
	Durango DMA	11	1297	29-Jul-10	R2
101104IN	Weedar 64	1	1130	3-Jul-10	Pre-emergence
	Durango DMA	2	1285	3-Jul-10	Pre-emergence
	Weedar 64	3	1121	3-Jul-10	Pre-emergence
	Durango DMA	3	1260	3-Jul-10	Pre-emergence
	Weedar 64	4	1128	23-Jul-10	V3
	Durango DMA	5	1263	23-Jul-10	V3
	Weedar 64	6	1128	23-Jul-10	V3
	Durango DMA	6	1268	23-Jul-10	V3
	Liberty	7	387, 373	30-Jul-10	V5
	Liberty	8	456, 475	9-Aug-10	R1
	Weedar 64	9	1123	16-Aug-10	R2
	Durango DMA	10	1269	16-Aug-10	R2
	Weedar 64	11	1114	16-Aug-10	R2
	Durango DMA	11	1254	16-Aug-10	R2

Table 8 (Cont.). Herbicide application rate and timing.

Site	Herbicide	Application No.	Rate of Application (g ae/ha) or (g ai/ha)[abc]	Date	Approximate Crop Stage
101104MI	Weedar 64	1	1139	16-Jun-10	Pre-emergence
	Durango DMA	2	1275	16-Jun-10	Pre-emergence
	Weedar 64	3	1135	16-Jun-10	Pre-emergence
	Durango DMA	3	1134	16-Jun-10	Pre-emergence
	Weedar 64	4	1131	15-Jul-10	V3
	Durango DMA	5	1284	15-Jul-10	V3
	Weedar 64	6	1144	15-Jul-10	V3
	Durango DMA	6	1141	15-Jul-10	V3
	Liberty	7	383, 386	30-Jul-10	V5-V6
	Liberty	8	460, 460	16-Aug-10	R1-R2
	Weedar 64	9	1143	27-Aug-10	R2
	Durango DMA	10	1288	27-Aug-10	R2
	Weedar 64	11	1148	27-Aug-10	R2
	Durango DMA	11	1137	27-Aug-10	R2
101104MO	Weedar 64	1	1101	19-Jun-10	Pre-emergence
	Durango DMA	2	1266	19-Jun-10	Pre-emergence
	Weedar 64	3	1110	19-Jun-10	Pre-emergence
	Durango DMA	3	1250	19-Jun-10	Pre-emergence
	Weedar 64	4	1116	15-Jul-10	V3
	Durango DMA	5	1255	15-Jul-10	V3
	Weedar 64	6	1116	15-Jul-10	V3
	Durango DMA	6	1256	15-Jul-10	V3
	Liberty	7	372, 377	23-Jul-10	V5
	Liberty	8	452, 454	26-Jul-10	V7 - R1
	Weedar 64	9	1130	2-Aug-10	R2
	Durango DMA	10	1253	2-Aug-10	R2
	Weedar 64	11	1122	2-Aug-10	R2
	Durango DMA	11	1263	2-Aug-10	R2

Table 8 (Cont.). Herbicide application rate and timing.

Site	Herbicide	Application No.	Rate of Application (g ae/ha) or (g ai/ha)[abc]	Date	Approximate Crop Stage
101104NE1	Weedar 64	1	1173	15-Jun-10	Pre-emergence
	Durango DMA	2	1313	15-Jun-10	Pre-emergence
	Weedar 64	3	1170	15-Jun-10	Pre-emergence
	Durango DMA	3	1310	15-Jun-10	Pre-emergence
	Weedar 64	4	1124	8-Jul-10	V2-V3
	Durango DMA	5	1253	8-Jul-10	V2-V3
	Weedar 64	6	1102	8-Jul-10	V2-V3
	Durango DMA	6	1233	8-Jul-10	V2-V3
	Liberty	7	390, 390	22-Jul-10	V5
	Liberty	8	472, 473	30-Jul-10	R1
	Weedar 64	9	1178	6-Aug-10	R2
	Durango DMA	10	1316	6-Aug-10	R2
	Weedar 64	11	1172	6-Aug-10	R2
	Durango DMA	11	1313	6-Aug-10	R2
101104NE2	Weedar 64	1	1123	18-Jun-10	Pre-emergence
	Durango DMA	2	1244	18-Jun-10	Pre-emergence
	Weedar 64	3	1114	18-Jun-10	Pre-emergence
	Durango DMA	3	1246	18-Jun-10	Pre-emergence
	Weedar 64	4	1109	16-Jul-10	V3
	Durango DMA	5	1267	16-Jul-10	V3
	Weedar 64	6	1099	16-Jul-10	V3
	Durango DMA	6	1253	16-Jul-10	V3
	Liberty	7	368, 377	28-Jul-10	V5
	Liberty	8	453, 459	7-Aug-10	R1
	Weedar 64	9	1106	13-Aug-10	R2
	Durango DMA	10	1269	13-Aug-10	R2
	Weedar 64	11	1124	13-Aug-10	R2
	Durango DMA	11	1258	13-Aug-10	R2

[a] Units for Weedar 64 and Durango DMA = g ae/ha; Units for Liberty = g ai/ha.

[b] Weedar 64 - Target application rate of 1120 g ae/ha;
Durango DMA - target application rate of 1260 g ae/ha;
Liberty - Application 7 target application rate of 374 g ai/ha;
- Application 8 target application rate of 454 g ai/ha.

[c] Where two rates appear they apply to entries 12 and 14, respectively.

Agronomic Data Collection

The following agronomic characteristics were measured and recorded for all test entries at each location (Table 9).

Table 9. Agronomic characteristics.

Trait	Evaluation Timing	Description of Data	Scale
Early Population (Stand Count)	≈V2	Number of plants in a representative 1 meter section of one row per plot	Number of emerged plants in 1 meter
Seedling Vigor	≈V2	Visual estimate of average vigor of plants in each plot	1-9 Rating Scale, 5 = average, 9 = high vigor; e.g. 1 = short plants with small, thin leaves; 9 = tall plants with large, robust leaves; Not based on growth of the control entries; Germination/ emergence (stand count) not considered
Herbicide Injury	7-14 days after each application	Visual estimate of injury due to herbicide application	0-100%; Estimated % plant tissue/leaf area injured over all plants in plot; Did not record % of plants in plot that had detectable injury; 100% = complete death; Type of injury noted: chlorosis, necrosis, epinasty, etc.
Days to 50% Flowering	≈R1/R2	Date at which ≈50% of plants were flowering	Date recorded when ≈50% of the plants in each plot were flowering; Days since planting calculated
Disease Incidence	≈R6	Visual estimate of disease incidence	0-100%; Estimated % plant tissue/leaf area diseased over all plants in plot; Did not record % of plants in plot that had detectable disease; 100% = all plant tissues in plot were diseased; Recorded type of disease if incidence was greater than 30%
Insect Damage	≈R6	Visual estimate of insect damage	0-100%; Estimated % plant tissue/leaf area damaged over all plants in plot; Did not record % of plants in plot that had detectable damage; 100% = all plant tissues had feeding damage; Recorded type of damage, e.g. chewing, stippling, distortion if damage was greater than 30%; Recorded type of insect(s) if present
Days to Maturity	≈R8	Date at which ≈95% of plants had reached physiological maturity/dry down color	Recorded the date when ≈95% of the plants in each plot reached physiological maturity/dry down color; Days since planting calculated
Lodging	≈R8	Visual estimate of lodging severity	0-100%; Estimated % of plants lodged in plot; 100% = all plants in plot were lodged

Table 9 (Cont.). Agronomic characteristics.

Trait	Evaluation Timing	Description of Data	Scale
Plant Height	≈R8	Average plant height: from soil surface to growing tip (at senescence / after leaf shed)	Recorded the average height of all plants in plot (stand) in centimeters (cm); One value for each plot; If plot was lodged, a representative group of plants was held up to obtain a measurement
Final Population (Stand Count)	≈R8	Number of plants in a representative 1 meter section of one row per plot	Number of plants in 1 meter; Did not sample a section where plants were removed during previous sampling
Plant Morphology	≈R8 (prior to harvest)	Number of pods and seeds from 5 plants collected from each plot	Recorded the number of pods and seeds present on 5 plants collected from each plot
Shattering	≈R8 (prior to harvest)	Visual estimate of pod shattering	0-100%; Estimated % of shattered pods for each plot; 100% = all pods shattered
Yield	≈R8	Weight of grain harvested from each plot	Recorded the weight in grams of grain harvested from each plot
100 seed weight	≈R8	Weight in grams for 100 representative seeds from bulk yield sample	Recorded the weight in grams for 100 representative seeds taken from the bulk yield sample

Sample Collection for Expression, Composition, and Residue Analysis

Sample collection for expression, composition, and residue analysis is presented in Table 10; sampling dates for each site are presented in Table 11. Analytical results are not presented in this report.

Table 10. Plant tissues sampled.

Sample Type	Tissue	Growth Stage[a]	Sample Size	No. of Samples per Plot	No. of Samples per Entry
Expression (Entries 1, 5-24)	Leaf	V5	8 trifoliate leaves	1	4
	Leaf	V10-12	8 trifoliate leaves	1	4
	Forage	R3	3 plants[b]	1	4
	Root	R3	3 plants[b]	1	4
	Grain	R8-Maturity	500 g	1	4
Composition (All Entries)	Forage	R3	300 g (or 3 plants if available)	1	4
	Grain	R8-Maturity	500 g (1000 g max)	1	4
Residue (Entries 5, 9, 10, 14, 15, 19, 20, 24)	Grain	R8-Maturity	500 g (1000 g max)	1	4

[a] See Reference [2] for a description of growth stages.
[b] Plants chopped and combined (pooled).

Table 11. Plant tissue sampling, shipping, and receipt dates.

Site	Planting Date	Sampling Date	Shipping Date	Receipt Date[a]	SGN[b]	Tissue Type
101104GA	9-Jun-10	20-Jul-10	20-Jul-10	21-Jul-10	001	V5-Leaf
		4-Aug-10	4-Aug-10	5-Aug-10	002	V10-12 Leaf
		3-Aug-10	4-Aug-10	5-Aug-10	003	R3 Forage
		3-Aug-10	4-Aug-10	6-Aug-10	004	R3 Root
		22-Oct-10	26-Oct-10	28-Oct-10	005	Expression Grain
		3-Aug-10	7-Sep-10	20-Sep-10	051	R3 Comp Forage[c]
		22-Oct-10	29-Nov-10	8-Dec-10	052	Comp Grain[c]
		22-Oct-10	26-Oct-10	28-Oct-10	071	Residue Grain
101104IA1	29-Jun-10	2-Aug-10	3-Aug-10	4-Aug-10	006	V5-Leaf
		16-Aug-10	17-Aug-10	18-Aug-10	007	V10-12 Leaf
		30-Aug-10	31-Aug & 1-Sep-10	1 & 2-Sep-10	008	R3 Forage
		30-Aug-10	31-Aug & 1-Sep-10	1 & 2-Sep-10	009	R3 Root
		28-Oct-10	1-Nov-10	2-Nov-10	010	Expression Grain
		30-Aug-10	16-Sep-10	22-Sep-10	053	R3 Comp Forage[c]
		28-Oct-10	1-Nov-10	4-Nov-10	054	Comp Grain[c]
		28-Oct-10	1-Nov-10	3-Nov-10	072	Residue Grain
101104IA2	7-Jun-10	21-Jul-10	21-Jul-10	22-Jul-10	011	V5-Leaf
		3-Aug-10	4-Aug-10	5-Aug-10	012	V10-12 Leaf
		16-Aug-10	17-Aug-10	18-Aug-10	013	R3 Forage
		16-Aug-10	17-Aug-10	18-Aug-10	014	R3 Root
		13-Oct-10	20-Oct-10	21-Oct-10	015	Expression Grain
		12-Aug-10	26-Aug-10	30-Aug-10	055	R3 Comp Forage[c]
		13-Oct-10	28-Oct-10	29-Oct-10	056	Comp Grain[c]
		13-Oct-10	28-Oct-10	3-Nov-10	073	Residue Grain

Table 11 (Cont.). Plant tissue sampling, shipping, and receipt dates.

Site	Planting Date	Sampling Date	Shipping Date	Receipt Date[a]	SGN[b]	Tissue Type
101104IL1	24-Jun-10	26-Jul-10	27-Jul-10	28-Jul-10	016	V5-Leaf
		6-Aug-10	9-Aug-10	10-Aug-10	017	V10-12 Leaf
		9-Aug-10	10-Aug-10	11-Aug-10	018	R3 Forage
		9-Aug-10	10-Aug-10	11-Aug-10	019	R3 Root
		19-Oct-10	20-Oct-10	21-Oct-10	020	Expression Grain
		9-Aug-10	11-Aug-10	19-Aug-10	057	R3 Comp Forage[c]
		19-Oct-10	16-Nov-10	7-Dec-10	058	Comp Grain[c]
		19-Oct-10	20-Oct-10	21-Oct-10	074	Residue Grain
101104IL2	10-Jun-10	14-Jul-10	14-Jul-10	15-Jul-10	021	V5-Leaf
		28-Jul-10	28-Jul-10	29-Jul-10	022	V10-12 Leaf
		11-Aug-10	11-Aug-10	12-Aug-10	023	R3 Forage
		11-Aug-10	11-Aug-10	12-Aug-10	024	R3 Root
		19 & 20-Oct-10	20-Oct-10	21-Oct-10	025	Expression Grain
		11-Aug-10	18-Aug-10	19-Aug-10	059	R3 Comp Forage[c]
		19 & 20-Oct-10	26-Oct-10	27-Oct-10	060	Comp Grain[c]
		19 & 20-Oct-10	20-Oct-10	21-Oct-10	075	Residue Grain
101104IN	2-Jul-10	29-Jul-10	29-Jul-10	29-Jul-10	026	V5-Leaf
		12-Aug-10	12-Aug-10	12-Aug-10	027	V10-12 Leaf
		27-Aug-10	27-Aug-10	27-Aug-10	028	R3 Forage
		27-Aug-10	27-Aug-10	27-Aug-10	029	R3 Root
		20 & 21-Oct-10	21 & 22-Oct-10	21 & 22-Oct-10	030	Expression Grain
		27-Aug-10	13-Sep-10	22-Sep-10	061	R3 Comp Forage[c]
		20 & 21-Oct-10	3-Nov-10	4-Nov-10	062	Comp Grain[c]
		20-Oct-10	21-Oct-10	21-Oct-10	076	Residue Grain

Table 11 (Cont.). Plant tissue sampling, shipping, and receipt dates.

Site	Planting Date	Sampling Date	Shipping Date	Receipt Date[a]	SGN[b]	Tissue Type
101104MI	14-Jun-10	27-Jul-10	27-Jul-10	28-Jul-10	031	V5-Leaf
		13-Aug-10	16-Aug-10	17-Aug-10	032	V10-12 Leaf
		23-Aug-10	23-Aug-10	24-Aug-10	033	R3 Forage
		23-Aug-10	23-Aug-10	24-Aug-10	034	R3 Root
		4-Nov-10	9-Nov-10	10-Nov-10	035	Expression Grain
		23-Aug-10	22-Sep-10	20-Oct-10	063	R3 Comp Forage[c]
		4-Nov-10	30-Nov-10	8-Dec-10	064	Comp Grain[c]
		4-Nov-10	9-Nov-10	10-Nov-10	077	Residue Grain
101104MO	18-Jun-10	23-Jul-10	26-Jul-10	27-Jul-10	036	V5-Leaf
		3-Aug-10	3-Aug-10	4-Aug-10	037	V10-12 Leaf
		9-Aug-10	10-Aug-10	11-Aug-10	038	R3 Forage
		9-Aug-10	10-Aug-10	11-Aug-10	039	R3 Root
		6-Oct-10	12-Oct-10	13-Oct-10	040	Expression Grain
		9-Aug-10	27-Aug-10	30-Aug-10	065	R3 Comp Forage[c]
		6-Oct-10	26-Oct-10	29-Oct-10	066	Comp Grain[c]
		6-Oct-10	26-Oct-10	3-Nov-10	078	Residue Grain
101104NE1	9-Jun-10	16-Jul-10	21-Jul-10	22-Jul-10	041	V5-Leaf
		30-Jul-10	3-Aug-10	5-Aug-10	042	V10-12 Leaf
		11-Aug-10	16-Aug-10	17-Aug-10	043	R3 Forage
		11-Aug-10	16-Aug-10	17-Aug-10	044	R3 Root
		8 & 18-Nov-10	9 & 29-Nov-10	10 & 30-Nov-10	045	Expression Grain
		12-Aug-10	18-Aug-10	20-Aug-10	067	R3 Comp Forage[c]
		8-Nov-10	6-Dec-10	8-Dec-10	068	Comp Grain[c]
		8-Nov-10	6-Dec-10	9-Dec-10	079	Residue Grain

Table 11 (Cont.). Plant tissue sampling, shipping, and receipt dates.

Site	Planting Date	Sampling Date	Shipping Date	Receipt Date[a]	SGN[b]	Tissue Type
101104NE2	17-Jun-10	23-Jul-10	3-Aug-10	4-Aug-10	046	V5-Leaf
		3-Aug-10	3-Aug-10	4-Aug-10	047	V10-12 Leaf
		25-Aug-10	25-Aug-10	26-Aug-10	048	R3 Forage
		25-Aug-10	25-Aug-10	26-Aug-10	049	R3 Root
		25-Oct-10	27-Oct-10	28-Oct-10	050	Expression Grain
		18-Aug-10	14-Sep-10	20-Sep-10	069	R3 Comp Forage[c]
		25-Oct-10	6-Dec-10	8-Dec-10	070	Comp Grain[c]
		25-Oct-10	6-Dec-10	9-Dec-10	080	Residue Grain

[a] Receipt date at Dow AgroSciences for expression and residue samples;
Receipt date at Covance for composition (Comp) samples.

[b] SGN = Sample Group Number.

[c] Samples for composition analysis were shipped directly to Covance.

Field Sample Shipping and Storage

Each plant tissue sample was assigned a unique sample number that was used for identification and tracking. Samples were grouped together according to site, growth stage, and tissue type, which corresponded to a single sample group number (SGN). All expression samples were shipped frozen to Dow AgroSciences by overnight shipping. All composition samples were shipped frozen to Covance Laboratories (Madison, WI), by freezer truck or overnight shipping. Table 11 contains sample group identifiers along with dates of sampling, shipping, and receipt of samples at Dow AgroSciences (DAS) for expression and residue, and Covance for composition.

Upon receipt at Dow AgroSciences, samples were inspected for physical condition and were found to be either cold or frozen and in good condition. Samples were logged into an electronic Regulatory Laboratories Information Management System (RLIMS). All expression and residue samples were stored in temperature-monitored freezers at approximately -80 °C, being removed only for required sample preparation and analysis.

Statistical Treatment of Agronomic Data

Prior to statistical analysis, the unit of measure was converted for select data using the formula presented in Table 12.

Table 12. Unit of measurement conversions.

Analytical Component	From Unit	To Unit	Formula[a]	Conversion Factor
Yield	grams per plot	bushels per acre (bu./A)	(X g/125 ft^2 plot) × (43560 ft^2/A) × (bu./27.2155 kg) × (kg/1000 g)	1.60056

[a] X is the individual sample value.

Analysis of variance was conducted across field sites (combined-site analysis) for agronomic data using a mixed model (SAS Version 9.2; SAS Institute 2009 [3]). Entry was considered a fixed effect, and location, block within location, and location-by-entry, were designated as random effects. Significant differences were declared at the 95% confidence level. Data were not rounded off for statistical analysis. The significance of an overall treatment effect was estimated using an F-test. Paired contrasts were made between DAS-444Ø6-6 (sprayed or unsprayed) entries and the control entry using t-tests.

Due to the large number of contrasts made in this study, multiplicity was an issue. Multiplicity is an issue when a large number of comparisons are made in a single study to look for unexpected effects. Under these conditions, the probability of falsely declaring differences based on comparison-wise P-values is very high ($1-0.95^{\text{number of comparisons}}$). In this study there were five comparisons per analyte (14 analyzed observation types for agronomics), resulting in 70 comparisons made in the combined-site agronomic analysis. Therefore, the probability of declaring one or more false differences based on unadjusted P-values was >97% for agronomics ($1-0.95^{70}$).

One method to account for multiplicity is to adjust P-values to control the experiment-wise error rate, but when many comparisons are made in a study, the power for detecting specific effects can be reduced significantly. An alternative with much greater power is to adjust P-values to control the probability that each declared difference is significant. This can be accomplished using False Discovery Rate (FDR) control procedures [4]; FDR methods are commonly applied in studies examining transgenic crops [5, 6, 7, 8, 9, 10]. Therefore, the P-values from the agronomics evaluations were each adjusted using the FDR method to improve discrimination of true differences among treatments from random effects (false positives). Differences were considered significant if the FDR-adjusted P-value was less than 0.05.

RESULTS AND DISCUSSION

Agronomic Results

A statistical analysis of the agronomic data collected from the non-transgenic near-isogenic, unsprayed DAS-444Ø6-6 and sprayed DAS-444Ø6-6 entries was conducted. Results from herbicide injury ratings after each application were not included in the statistical analysis or reported since no injury was detected. For each agronomic character and entry, the least square means, standard error, and minimum and maximum sample values are reported. Also for comparison, the minimum and maximum values from reference lines across all sites (reference ranges) for each agronomic character are reported. Each minimum and maximum value is an individual data point reported for a single test plot.

For the combined-site analysis (Table 13), no statistically significant differences were observed following False Discovery Rate (FDR) adjustment of P-values for all of the agronomic characteristics evaluated: early population, seedling vigor, days to flowering, disease incidence, insect damage, days to maturity, lodging, plant height, final population, number of pods per five plants, number of seeds per five plants, shattering, yield, and 100 seed weight. Unadjusted P-values were significant at the 0.05 level for paired t-tests for one comparison each for seedling vigor, lodging, final population, and number of pods per five plants. For each significant unadjusted P-value, mean differences between transgenic and control entries were negligible and transgenic means were within the range observed for reference varieties included in the study. Results from this study demonstrate agronomic equivalence between event DAS-444Ø6-6 (unsprayed and sprayed) and non-transgenic soybean.

Table 13. Combined-site analysis: summary of agronomic characteristics.

Agronomic Component (Units)[a]	Overall Trt Effect (Pr > F)[b]	Isoline Mean ± SE Min - Max	DAS-444Ø6-6 unsprayed Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ 2,4-D Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Glufosinate Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Glyphosate Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Three Herbicides Mean ± SE Min - Max (P-value, Adj.P)[c]	Reference Range Min - Max
Early Population - V2 (number of plants in a 1 m section of row)	0.556	14 ± 1 6 - 22	13 ± 1 3 - 19 (0.202, 0.692)	13 ± 1 1 - 19 (0.596, 0.817)	13 ± 1 3 - 20 (0.189, 0.692)	14 ± 1 3 - 24 (1.000, 1.000)	14 ± 1 3 - 23 (0.940, 1.000)	2 - 27
Seedling Vigor - V2 (1-9 scale 1 = low vigor, 9 = high vigor)	0.269	6.2 ± 0.3 5 - 8	6.0 ± 0.3 4 - 8 (0.408, 0.746)	5.9 ± 0.3 3 - 8 (0.102, 0.682)	6.0 ± 0.3 4 - 8 (0.249, 0.692)	6.1 ± 0.3 4 - 8 (0.508, 0.781)	5.8 ± 0.3 3 - 8 (**0.024**, 0.669)	3 - 9
Days to Flowering - R1/R2 (days since planting)	0.664	42 ± 3 22 - 54	43 ± 3 22 - 56 (0.317, 0.692)	42 ± 3 24 - 56 (0.859, 0.986)	43 ± 3 28 - 56 (0.317, 0.692)	42 ± 3 22 - 55 (0.953, 1.000)	42 ± 3 22 - 54 (0.859, 0.986)	22 - 57
Disease Incidence - R6 (0-100% scale, 0% = no disease 100% = all plants diseased)	0.661	5 ± 2 0 - 20	5 ± 2 0 - 25 (0.968, 1.000)	4 ± 2 0 - 15 (0.400, 0.746)	5 ± 2 0 - 15 (0.574, 0.817)	5 ± 2 0 - 20 (0.422, 0.746)	5 ± 2 0 - 15 (1.000, 1.000)	0 - 20
Insect Damage - R6 (0-100% scale, 0% = no damage 100% = all plants damaged)	0.664	12 ± 8 0 - 80	14 ± 8 0 - 90 (0.136, 0.692)	13 ± 8 0 - 80 (0.524, 0.781)	13 ± 8 0 - 90 (0.326, 0.692)	13 ± 8 0 - 80 (0.299, 0.692)	14 ± 8 0 - 90 (0.144, 0.692)	0 - 90
Days to Maturity - R8 (days since planting)	0.323	115 ± 5 97 - 143	114 ± 5 95 - 143 (0.293, 0.692)	114 ± 5 96 - 143 (0.139, 0.692)	115 ± 5 97 - 143 (0.660, 0.839)	114 ± 5 97 - 143 (0.255, 0.692)	115 ± 5 97 - 143 (0.895, 0.999)	96 - 143
Lodging - R8 (0-100% scale, 0% = no lodging 100% = all plants lodged)	0.428	10 ± 4 0 - 30	12 ± 4 0 - 60 (0.437, 0.746)	16 ± 4 0 - 70 (**0.038**, 0.669)	12 ± 4 0 - 70 (0.431, 0.746)	12 ± 4 0 - 50 (0.614, 0.817)	13 ± 4 0 - 50 (0.367, 0.739)	0 - 35
Plant Height - R8 (cm)	0.242	94 ± 4 58 - 122	96 ± 4 70 - 123 (0.218, 0.692)	94 ± 4 48 - 123 (1.000, 1.000)	95 ± 4 68 - 120 (0.478, 0.781)	93 ± 4 61 - 120 (0.641, 0.831)	91 ± 4 64 - 116 (0.266, 0.692)	22 - 112

[a] Unit of measure was not converted prior to analysis.

[b] Overall treatment effect estimated using an F-test.

[c] Comparison to the control using t-tests (P-value); P-values adjusted (Adj. P) using a False Discovery Rate (FDR) procedure; P-values < 0.05 were considered significant.

Table 13 (Cont.). Combined-site analysis: summary of agronomic characteristics: combined-site analysis.

Agronomic Component (Units)[a]	Overall Trt Effect (Pr > F)[b]	Isoline Mean ± SE Min - Max	DAS-444Ø6-6 unsprayed Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ 2,4-D Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Glufosinate Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Glyphosate Mean ± SE Min - Max (P-value, Adj.P)[c]	DAS-444Ø6-6 sprayed w/ Three Herbicides Mean ± SE Min - Max (P-value, Adj.P)[c]	Reference Range Min - Max
Final Population - R8 (number of plants in a 1 m section of row)	0.317	13 ± 1 4 - 20	13 ± 1 5 - 20 (0.220, 0.692)	12 ± 1 4 - 18 (0.150, 0.692)	12 ± 1 3 - 18 (**0.027**, 0.669)	12 ± 1 4 - 19 (0.081, 0.682)	12 ± 1 3 - 18 (0.083, 0.682)	2 - 20
Number of Pods - R8 (number of pods on 5 plants)	0.298	361 ± 42 176 - 743	384 ± 42 197 - 698 (0.265, 0.692)	364 ± 42 151 - 683 (0.899, 0.999)	387 ± 42 184 - 786 (0.199, 0.692)	404 ± 42 188 - 1163 (**0.038**, 0.669)	379 ± 42 189 - 765 (0.370, 0.739)	133 - 1008
Number of Seeds - R8 (number of seeds from 5 plants)	0.170	802 ± 81 295 - 1187	826 ± 81 407 - 1183 (0.588, 0.817)	771 ± 81 390 - 1329 (0.499, 0.781)	815 ± 81 380 - 1472 (0.774, 0.939)	881 ± 81 152 - 1824 (0.086, 0.682)	772 ± 82 319 - 1416 (0.514, 0.781)	258 - 1882
Shattering - R8 (0-100% scale, 0% = no shattering 100% = all pods shattered)	0.801	3 ± 3 0 - 30	4 ± 3 0 - 35 (0.318, 0.692)	4 ± 3 0 - 50 (0.318, 0.692)	3 ± 3 0 - 45 (0.948, 1.000)	4 ± 3 0 - 75 (0.500, 0.781)	3 ± 3 0 - 50 (0.760, 0.939)	0 - 60
Yield - R8 (bushels per acre)	0.423	33 ± 3 1.15 - 53.78	30 ± 3 2.05 - 41.87 (0.106, 0.682)	32 ± 3 3.59 - 49.94 (0.433, 0.746)	30 ± 3 2.05 - 52.95 (0.063, 0.682)	31 ± 3 8.45 - 52.5 (0.187, 0.692)	30 ± 3 4.1 - 49.94 (0.107, 0.682)	4.99 - 55.44
100 Seed Weight - R8 (grams)	0.507	13.5 ± 0.4 9.4 - 16.3	13.2 ± 0.4 10.85 - 16.3 (0.241, 0.692)	13.5 ± 0.4 10.17 - 15.2 (0.818, 0.971)	13.6 ± 0.4 11.3 - 16.4 (0.619, 0.817)	13.6 ± 0.4 10.3 - 15.6 (0.575, 0.817)	13.5 ± 0.4 10.76 - 16.2 (0.778, 0.939)	9.4 - 20.7

[a] Unit of measure for yield was converted from grams per plot to bushels per acre prior to analysis; conversion formula:
(X g/125 ft^2 plot) × (43560 ft^2/A) × (bu./27.2155 kg) × (kg/1000 g), where X is the individual sample value.

[b] Overall treatment effect estimated using an F-test.

[c] Comparison to the control using t-tests (P-value); P-values adjusted (Adj. P) using a False Discovery Rate (FDR) procedure; P-values < 0.05 were considered significant.

CONCLUSIONS

Field agronomic characteristics of DAS-444Ø6-6 (unsprayed or sprayed with 2,4-D, glyphosate, glufosinate, or all three herbicides) were evaluated in field trials in 2010. DAS-444Ø6-6 (AAD-12 + 2mEPSPS + PAT) agronomic results were all statistically indistinguishable from the control and/or within reference ranges for non-transgenic soybean, indicating that no unintended agronomic effects were observed for DAS-444Ø6-6 soybean. Results from this study demonstrate agronomic equivalence between event DAS-444Ø6-6 and non-transgenic soybean.

ARCHIVING

The final report and all raw data (including verified and signed copies) associated with this study will be filed in the Dow AgroSciences facility archives, Indianapolis, Indiana upon issuing the final report.

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Appendix A— Study Protocol Amendments and Deviations

Appendix A. Table 1. Study Amendments and Deviations.

Description	
Protocol	**Amendment**
	• Added Source ID numbers for seed. • Modified sampling requirements due to stochastic weather events in trial 101104IL2. • Supplied details for expression sample receipt and preparation. • Supplied details for shipping of composition samples and for the compositional analysis to be conducted at Covance Laboratories, Inc. • Provided additional details for expression sample preparation, and allow for expression samples to be stored at -20 °C. • Modified sampling requirements due to stochastic weather events in trial 101104IA2. • Directed discontinuation of entries comprising events removed from study. • Supplied details of reserve sampling conducted to supplement or replace samples for trial 101104NE1. • Supplied detail on addition of an analyte for seed composition analysis. • Supplied details for expression analysis. • Directed discontinuation of additional entries comprising events removed from study. • Supplied details for statistical analysis of composition and agronomic data. • Supplied details for the reporting template.
Protocol	**Deviation**
	• Expression sample for a cancelled event was disposed of prior to lyophilization. • Email notification prior to shipping was not always provided. Sampling requirements for the protocol were not always met. • Building and FAX number reassignment for the study director.
Field Site	**Deviation**
GA	A chain of custody form was sent separately from samples.
GA	Sample sizes for some samples were below quantities requested.
GA	Herbicide application timing for Liberty was at V6 instead of the V5 growth stage.
GA	Grain moisture for two samples was slightly above requested level.
IA1	Overspray of a treated plot resulted in the death of a reference substance plot.
IA1	A sample was shipped to Covance instead of Dow AgroSciences.
IA1	Number of sprayer nozzles was greater than requested.
IA1	Herbicide injury rating was taken prior to requested observation time period.
IA2	Number of sprayer nozzles was greater than requested.
IA2	Reduced amount of additive was included for application 2.
IA2	Sample sizes for some expression and composition samples were below quantities requested.
IA2	Number of shipping cartons was not included in shipping notification.
IA2	Control entry plots were harvested after test entry plots.
IL1	A sample was lost to the ground during harvest.
IL1	Sample size for a residue sample was below the quantity requested.
IL1	Sample labels switched for identical sample type.

Appendix A. Table 1 (Cont.). Study Amendments and Deviations.

	Description
Field Site	**Deviation**
IL2	Herbicide application rate was slightly below target range for application 1.
IL2	Herbicide injury rating was taken prior to requested observation time period.
IL2	Email notification prior to shipping was not provided.
IL2	Samples collected over a two day period as opposed to a one day period.
IN	Samples sizes for some residue samples were below quantities requested.
IN	Samples collected over a two day period as opposed to a one day period.
MI	Number of sprayer nozzles was greater than requested.
MI	V10-12 leaf samples collected during late vegetative / early reproductive stages.
MO	Herbicide injury rating was taken after the requested observation time period.
MO	Root samples were not cut into pieces for a sampling event as requested.
MO	Number of sprayer nozzles was greater than requested.
NE1	Number of sprayer nozzles was greater than requested.
NE1	Sample sizes for some expression samples were below quantities requested.
NE1	Sample sizes for some composition samples were below quantities requested.
NE2	Number of sprayer nozzles was greater than requested.
NE2	Sample sizes for some composition samples were below quantities requested.
NE2	Sample sizes for some residue samples were below quantities requested.