

# ANNUAL REPORT

## ISCDA MULTI-LOCATION SWEET CORN SEED TREATMENT TRIAL – 2013

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**INTRODUCTION:** The Seed Treatment Committee of the International Sweet Corn Development Association (ISCDA) organizes a multi-location seed treatment trial every year. Researchers at locations across the U.S. evaluate the selected set of seed treatments for their effect on seedling stand and vigor.

**METHODS:** A nontreated control and 24 seed treatments were evaluated at multiple locations using one seed lot of the sweet corn hybrid, Super Sweet Jubilee (*sh2*), with a germination rate of 92%. The seed treatments are listed in Table 1. They consisted of mixtures of conventional and experimental fungicide products, and many of the treatments had seed enhancements and insecticides. Seed treatments were sponsored by Heads Up Plant Protectants, Inc.; Nufarm Americas, Inc.; Syngenta Crop Protection, LLC; TJ Technologies, Inc.; and Valent USA Corporation. Additionally, six standard seed treatment mixtures were selected by the committee. Treatments were applied to seeds by participating companies, or by Mike Erickson (The McGregor Co.). Sets of treated seeds were packaged and sent to cooperating researchers for planting and evaluation. Results from trials conducted at 15 locations in seven states (FL, ID, IL, MN, NY, WA, and WI) are reported herein. A list of locations, planting dates, and cooperating researchers is on page 4 of this report. Trial set up varied at different locations; most planted 100 seeds in 4 replicate plots, but one trial was planted using 25 seeds in 16 replicate plots. Most trials were randomized complete block designs, but two were completely randomized designs. Planting methods also varied from hand-planting to mechanical planters, and planting dates ranged from February to July. Stand counts, weak plant counts, and vigor ratings were recorded in each plot, usually at the 5-6 leaf stage. The WI-1 trial did not report weak plants counts. Weak plants were defined as plants that were two or more leaves behind the average seedlings in the plot, and are reported as the % slows, which was calculated by dividing the number of weak plants by the number of emerged plants. An adjusted % stand was also calculated by subtracting the number of weak plants from the number of emerged plants. Vigor ratings were on a qualitative visual scale of 1-5 (1=extremely weak, 2=weak, 3=fair, 4=vigorous, 5=very vigorous). Data from individual plots where the % stand results were less than or greater than 1.5 times the interquartile range were considered extreme outliers, and were excluded. Results from each location were subjected to analysis of variance (ANOVA) and pairwise comparison of treatment means using the Duncan's Multiple Range test, LSD ( $P=0.05$ ). Data from each of the locations were then combined in a summary across trial locations, and analyzed with ANOVA and a comparison of the combined treatment means. Data were analyzed using ARM 9 and ARM ST 8 software from Gylling Data Management, Inc.

**RESULTS - % STAND:** The treatments means for % stand at each location, and the combined treatment means for % stand across 15 locations are presented in Table 2. A chart showing the

distribution of treatment means for % stand across 15 locations is provided in Figure 1. The nontreated control and Treatments 9 and 19 resulted in the smallest stand counts when averaged across 15 locations, 55%, 58%, and 55% respectively. Treatments 9 and 19 were the lowest ranking treatments for % stand at most locations, but it should be noted that both of these treatments consisted of a seed enhancement product without fungicides. The six standard treatments (Treatments 2-7) had combined treatment means ranging from 72% to 77% in the summary across 15 locations, and were not significantly different. With the exception of Treatments 9 and 19, the rest of the seed treatments resulted in combined treatment means that were similar to those of the standards in the summary across locations. The treatments resulting in the largest stands in the summary across locations were Treatments 3 and 12. These were not significantly different from stands in most other plots, but were significantly greater than stands resulting with Treatments 8, 9, 19, 22, and 24 in the summary across locations. Treatments 8, 22, and 24 resulted in stands that were significantly better than the nontreated control in the summary across 15 locations, but not as good as those for seven other treatments.

The only location that resulted in no significant differences in stand for any of the treatments was FL-1. Most of the locations had reasonably small variation in the data sets for % stand (i.e. coefficients of variation (CV) less than 15%). The locations with the most variable % stand results were ID-1, with a CV of 25%, and WI-2, with a CV of 17%. These two locations also had much smaller stand counts in general compared to the other locations. Grand means for % stand at the 15 locations ranged from 46% at ID-1 to 82% at ID-5; interestingly, these were early and late trials conducted in the same area by the same researcher. The grand mean for % stand in the summary across locations was 70%.

**RESULTS - % SLOWS:** Weak plant assessments in this trial were intended to account for plants that emerged, but probably would not produce useable ears if the trial was continued to harvest. Table 3 presents the treatment means for % slows at each location, and the combined treatment means for % slows across 14 locations (no data for WI-2). Figure 2 is a chart showing the distribution of treatment means for % slows across 14 locations. The nontreated control and the treatments that resulted in the smallest stand counts also tended to have higher % slows compared to other treatments. Treatments 9 and 19 resulted in the highest % slows compared to the other treatments in the summary across 14 locations (18% and 17% respectively).

Six out of 14 locations that recorded weak plants did not demonstrate any treatment differences for % slows. All of the locations had a lot of variation within the data sets for % slows, which was indicated by CVs in the range of 21-99%. The grand means for % slows also ranged a lot, from 3% at MN-1 to 31% at NY-1, and averaged 12%.

**RESULTS - % ADJUSTED STAND:** The adjusted % stand in each plot was calculated to account for seeds that did not emerge and seedlings that were weak and were not likely to produce usable ears. Table 4 presents the treatment means for adjusted % stand for each treatment at each location, and the combined treatment means for adjusted % stand across 14 locations. Figure 3 is a chart showing the distribution of treatment means for adjusted % stand across 14 locations. The nontreated control and Treatments 9 and 19 resulted in the smallest

adjusted stand counts in the summary across locations. Treatments 3, 6, 7, 12, and 16 resulted in the largest adjusted stand counts in the summary across locations, but they were not significantly different from 15 out of the 24 treatments. Treatment differences for adjusted % stand were very similar to treatment differences for % stand, in part because accounting for weak plants did not greatly increase the stand loss, i.e. most of the stand loss was due to poor emergence or seedlings that did not survive to the evaluation date.

Two out of 14 locations, FL-1 and IL-2, did not result in any treatment differences for adjusted % stand. Accounting for weak plants decreased the grand means for % stand at different locations from 2% to 27%, and by an average of 8%. Grand means for adjusted % stand at the 14 locations ranged from 44% at ID-1 to 71% at ID-2, and averaged 62%.

**RESULTS – VIGOR:** The treatment means for vigor at each location, and the combined treatment means for vigor across 15 locations are presented in Table 5. Figure 4 is a chart showing the distribution of treatment means for vigor across 15 locations. The nontreated control and Treatments 9 and 19 resulted in the lowest vigor ratings in the summary across locations (all rating 3.0). The best vigor ratings in the summary across locations were given to Treatments 12, 14, and 15 (vigor ratings of 3.9, 4.0, and 3.9 respectively), which were significantly better than four of the 24 treatments and the nontreated control, but they were not significantly better than the ratings for most treatments.

Four locations, FL-1, IL-2, MN-2, and WI-1, resulted in no significant differences in vigor among treatments. The grand means for vigor at the different locations ranged from 2.8 (WI-2) to 4.4 (ID-3), and averaged 3.8.

## SUMMARY

- The two seed treatments that were seed enhancements without added fungicides (Treatments 9 and 19) resulted in smaller stand counts, higher % slows, and lower vigor ratings compared to the other seed treatments at most locations. These treatments performed comparably to the nontreated control.
- Of the six standard treatments (Treatments 2-7), Treatment 3 resulted in the largest stand count, largest adjusted stand count, and highest vigor rating in the summary across locations, but its performance was not significantly better than the other standards.
- With the exception of Treatments 8, 9, 19, 22, and 24, the performances of all other seed treatments were similar to those of the six standards when combined treatment means for each assessment (% stand, % slows, % adjusted stand, vigor) were compared across locations.
- The treatments with the smallest stand counts also tended to have higher % slows, while treatments with larger stand counts tended to have a lower % slows. However, there were many locations where the treatment differences were not significant.

- Accounting for slows reduced adjusted stand counts by 2-27%, or 8% on average. Treatment differences for % adjusted stand were very similar to treatment differences for % stand, probably because most of the stand loss in the adjusted stand counts was due to poor emergence rather than weak plants.
- This trial includes a number of seed treatments that either substituted products, added products, and/or increased rates of products in the mixtures. These were not discussed in this report, but the data are presented in the tables. A close inspection of the results should provide significant information to seed treatment formulators and other sweet corn industry personnel.
- For more information about the 2013 ISCDA Seed Treatment Trial, or about participation in future trials contact Carrie Wohleb at [cwohleb@wsu.edu](mailto:cwohleb@wsu.edu) or (509) 754-2011 x.413.

#### **DISCLAIMER**

Not all compounds mentioned in this report are currently registered by the EPA for use as seed treatments on sweet corn. Do not use unregistered compounds. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by the U.S. Food and Drug Administration or by your State's agriculture agency. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.

## 2013 ISCDA Seed Treatment Committee

Mike Erickson, Co-Chair, The McGregor Company, Filer, ID

Ron Baker, Co-Chair, Harris Moran Seed Company, Nampa, ID

Carrie Wohleb, Research Coordinator, Washington State University Extension, Ephrata, WA

<b>Trial</b>	<b>Locations</b>	<b>Planting Dates</b>	<b>Experimental Design</b>	<b>Participating Researchers</b>
FL-1	Naples, FL	Feb. 28, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
ID-1	Nampa, ID	Apr. 11, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
ID-2	Huston, ID	Apr. 26, 2013	CRD – 16 replications	Don Ogawa, Crookham Company, Caldwell, ID
ID-3	Kimberly, ID	May 9, 2013	CRD – 4 replications	Steve Hines, University of Idaho Extension, Kimberly, ID
ID-4	Nampa, ID	May 21, 2013	RCB – 4 replications	Ron Baker, Harris Moran Seed Company, Nampa, ID
ID-5	Nampa, ID	Jun. 20, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
IL-1	Mendota, IL	May 8, 2013	RCB – 4 replications	Steve Otto, Del Monte Foods, Rochelle, IL
IL-2	Champaign, IL	May 13, 2013	RCB – 4 replications	Charlie Thompson, Illinois Foundation Seeds, Champaign, IL Selena Virden, Illinois Foundation Seeds, Meridian, ID
MN-1	Stanton, MN	May 8, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
MN-2	Stanton, MN	June 14, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
NY-1	Geneva, NY	May 17, 2013	RCB – 4 replications	Stephen Reiners, Cornell University, Geneva, NY & James Ballerstein, Cornell University, Geneva, NY
WA-1	Ephrata, WA	Apr. 25, 2013	RCB – 4 replications	Carrie Wohleb, Washington State University, Ephrata, WA
WA-2	Ephrata, WA	Jul. 6, 2013	RCB – 4 replications	Carrie Wohleb, Washington State University, Ephrata, WA
WI-1	Plainfield, WI	Apr. 30, 2013	RCB – 4 replications	Justin Minor, Syngenta Seeds Inc., Nampa, ID
WI-2	DeForrest, WI	May 10, 2013	RCB – 4 replications	Tim Gustafson, Monsanto Vegetable Seeds, DeForrest, WI

**TABLE 1: 2013 ISFDA Seed Treatments**

No.		Treatment	Rate
1	Control	No Treatment	
2	Standard 1	Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34	2.00 oz/cwt 0.38 oz/cwt 0.08 oz/cwt 3.50 oz/cwt
3	Standard 2	Captan 4 Flowable Thiram 42S Dividend Extreme Apron XL Vitavax 34	2.50 oz/cwt 2.50 oz/cwt 5.00 oz/cwt 0.32 oz/cwt 4.00 oz/cwt
4	Standard 1 (w/o Vitavax)	Dividend Extreme Apron XL LS Maxim 4FS	2.00 oz/cwt 0.38 oz/cwt 0.08 oz/cwt
5	Standard 2 (w/o Vitavax)	Captan 4 Flowable Thiram 42S Dividend Extreme Apron XL	2.50 oz/cwt 2.50 oz/cwt 5.00 oz/cwt 0.32 oz/cwt
6	Standard 3	Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34	5.00 oz/cwt 0.19 oz/cwt 0.08 oz/cwt 3.50 oz/cwt
7	Standard 4	Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34	2.00 oz/cwt 0.51 oz/cwt 0.08 oz/cwt 3.50 oz/cwt
8	Heads Up Plant Protectants 1	Heads Up Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34	0.57 g/cwt 2.00 oz/cwt 0.38 oz/cwt 0.08 oz/cwt 3.50 oz/cwt
9	Heads Up Plant Protectants 2	Heads Up	0.57 g/cwt
10	Nufarm 1	Spirato 480 FS Signet 480 FS Sativa 309 FS Sebring 318 FS Senator 600 FS	0.08 oz/cwt 2.50 oz/cwt 0.74 oz/cwt 0.75 oz/cwt 6.00 oz/cwt

**TABLE 1: 2013 ISDA Seed Treatments (continued)**

No.		Treatment	Rate
11	Nufarm 2	Spirato 480 FS Signet 480 FS Sebring 318 FS Senator 600 FS	0.08 oz/cwt 2.50 oz/cwt 0.75 oz/cwt 6.00 oz/cwt
12	Syngenta 1	Maxim Quattro Apron XL Cruiser 5 FS	0.064 mg ai/seed 2.000 g ai/100 kg 0.300 mg ai/seed
13	Syngenta 2	Maxim Quattro Apron XL Avicta Duo Corn	0.064 mg ai/seed 2.000 g ai/100 kg 0.720 mg ai/seed
14	Syngenta 3	Maxim Quattro Apron XL Avicta Duo Corn Vibrance	0.064 mg ai/seed 2.000 g ai/100 kg 0.720 mg ai/seed 5.000 g ai/100 kg
15	TJ Technologies 1	Quick Roots Corn WP Metlock Sebring 318 FS ethaboxam Rizolex Signet 480 Captan 4 Flowable Nipsit Inside	7.200 g/80,000 seeds 0.052 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed
16	TJ Technologies 2	A3WHB2T Metlock Sebring 318 FS ethaboxam Rizolex Signet 480 Captan 4 Flowable Nipsit Inside	1.000 ml/kg 0.052 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed
17	TJ Technologies 3	A3WA5G7 Metlock Sebring 318 FS ethaboxam Rizolex Signet 480 Captan 4 Flowable Nipsit Inside	8.000 g/80,000 seeds 0.052 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed

**TABLE 1: 2013 ISDA Seed Treatments (continued)**

No.		Treatment	Rate
18	TJ Technologies 4	A3WHB2TX2 Metlock Sebring 318 FS ethaboxam Rizolex Signet 480 Captan 4 Flowable Nipsit Inside	14.400 g/80,000 seeds 0.052 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed
19	TJ Technologies 5	Organic Quickroots WP	6.000 g/80,000 seeds
20	Valent 1	Metlock Sebring 318 ethaboxam Rizolex	0.052 oz/cwt 0.750 oz/cwt 0.300 oz/cwt 0.300 oz/cwt
21	Valent 2	Metlock Rizolex Flowable Sebring 318 ethaboxam Signet 480 Captan 4 Flowable	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt
22	Valent 3	Metlock Rizolex Flowable Sebring 318 ethaboxam Signet 480 Captan 4 Flowable Release LC	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 1.000 oz/cwt
23	Valent 4	Metlock Rizolex Flowable Sebring 318 ethaboxam Signet 480 Captan 4 Flowable Nipsit Inside	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed
24	Valent 5	Metlock Rizolex Flowable Sebring 318 ethaboxam Signet 480 Captan 4 Flowable Nipsit Inside Release LC	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed 1.000 oz/cwt
25	Valent 6	Metlock Rizolex Flowable Sebring 318 ethaboxam Signet 480 Captan 4 Flowable Senator 600FS	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 2.500 oz/cwt 0.250 mg ai/seed



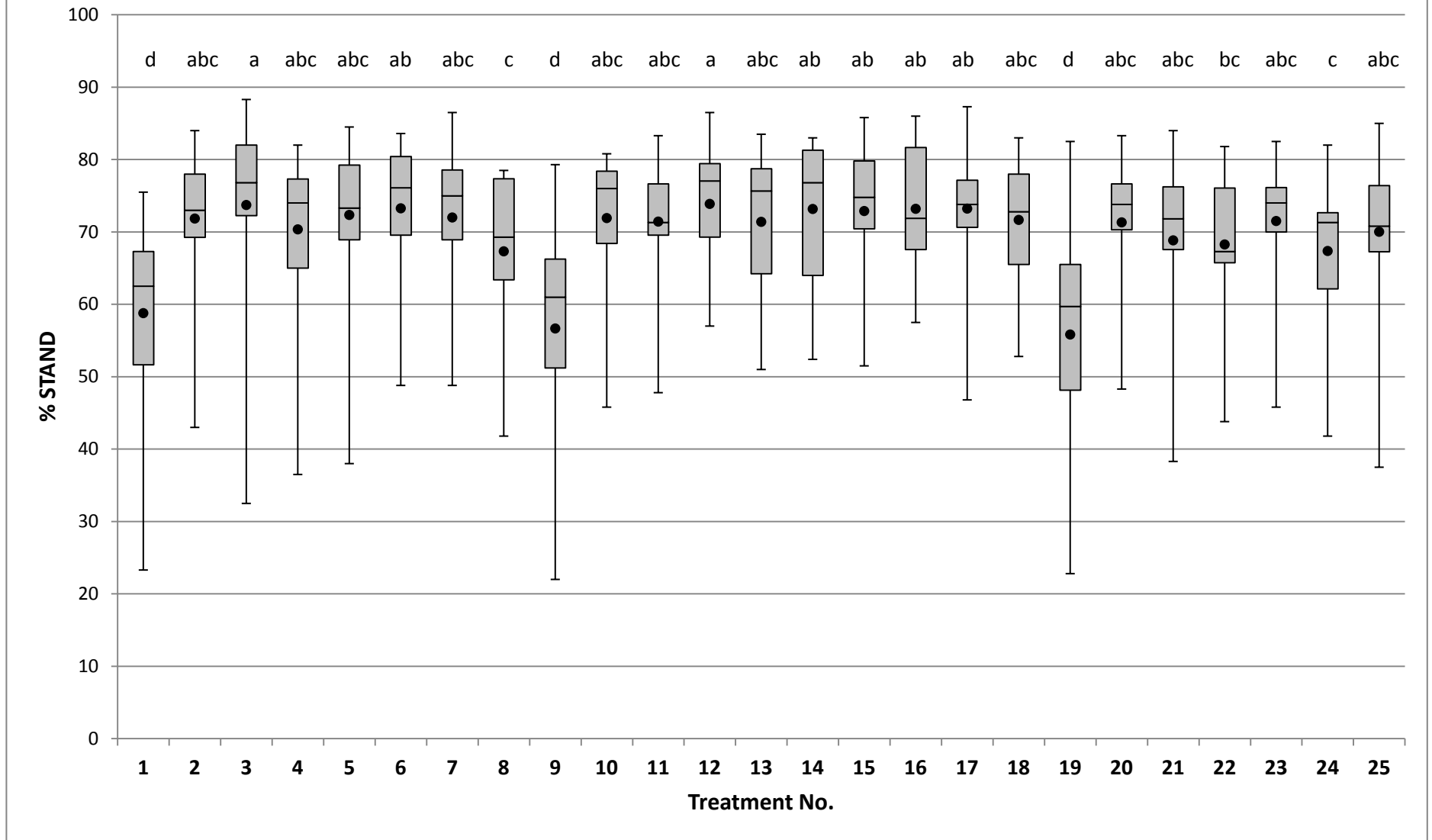
**TABLE 2. 2013 ISCDA Seed Treatment Trial - % STAND.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different ( $P=0.05$ ). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	FL-1 <i>Feb-28-13</i>	ID-1 <i>Apr-11-13</i>	ID-2 <i>Apr-26-13</i>	ID-3 <i>May-9-13</i>	ID-4 <i>May-21-13</i>	ID-5 <i>Jun-20-13</i>	IL-1 <i>May-8-13</i>	IL-2 <i>May-13-13</i>	MN-1 <i>May-8-13</i>
1	56.7*	23.3* hi	48.0 e	54.0 e	62.0 de	75.0* cd	62.5 h	69.3 cde	45.5 f
2	66.5	58.5 ab	84.0 abc	73.8 abc	72.7* a-d	82.8 abc	77.5 a-e	81.3* abc	71.5 a-e
3	56.0	32.5 f-i	88.3 a	79.0* abc	79.0 a	84.8 abc	84.3 ab	83.5 a	73.0* a-d
4	65.5	59.8 ab	81.3 abc	78.3 abc	64.5 cde	79.5 a-d	76.3 a-f	74.8 a-e	73.8 a-d
5	64.5	38.0 d-i	84.5 abc	74.3* abc	78.0 ab	82.8 abc	83.5 abc	70.5 b-e	67.3 a-e
6	61.5	57.8 abc	80.3 abc	70.8 bcd	76.0 abc	82.3* abc	81.8 abc	76.0 a-d	83.0* a
7	66.0	49.5 a-f	78.8 bc	75.0 abc	76.7* ab	86.5 a	73.3 c-g	78.0 a-d	79.3 ab
8	64.0	45.0 a-g	77.8 bc	77.3* abc	76.7* ab	77.8 a-d	67.8 e-h	63.0 e	78.5 ab
9	59.5	22.0 i	59.5 d	62.0* de	62.3* de	79.3 a-d	67.0 fgh	67.0 de	47.0* f
10	57.0	45.8 a-g	80.8 abc	79.8 ab	66.5 bcd	78.0 a-d	79.3 abc	70.3 b-e	78.8 ab
11	66.0	47.8 a-g	83.3 abc	76.3 abc	71.3 a-d	81.8 a-d	77.0 a-f	70.5* b-e	74.0 a-d
12	65.3*	57.0 a-e	76.8 bc	79.3 abc	69.3 a-d	86.5 a	79.5 abc	72.3 a-e	79.5 ab
13	61.5	52.0 a-e	78.8 bc	78.8 abc	63.3 de	83.5 abc	82.0* abc	75.8 a-d	75.5 a-d
14	57.5	64.0 a	76.0 c	81.3 a	61.8 de	83.0 abc	78.0* a-e	82.8 ab	80.8 ab
15	58.5	51.5 a-f	83.0 abc	74.8 abc	75.3 abc	83.0 abc	81.3 abc	72.7* a-e	72.5 a-d
16	64.5	57.5 a-d	82.5 abc	71.0 bcd	67.8 a-d	86.0 ab	83.3 abc	67.3 de	76.8 abc
17	65.0	46.8 a-g	85.3 ab	73.8 abc	71.7* a-d	87.3 a	86.0 a	69.5 cde	74.8 a-d
18	60.0	52.8 a-e	81.8 abc	69.5 cd	75.5 abc	83.0 abc	82.8 abc	76.5 a-d	61.5 de
19	64.0	28.8 ghi	49.5 e	60.7* e	55.0 e	82.5 abc	64.3 gh	65.5 de	46.8 f
20	68.5	48.3 a-f	83.3 abc	69.8 cd	74.8 abc	79.3 a-d	76.5 a-f	73.8 a-e	74.3 a-d
21	61.0	38.3 c-i	81.0 abc	71.8 abc	78.0 ab	84.0 abc	68.8 d-h	67.8 de	72.3 a-d
22	66.0	46.5 a-g	81.8 abc	76.3 abc	79.0 a	76.3 bcd	74.5 b-f	66.8 de	62.5 cde
23	57.5	45.8 a-g	82.5 abc	72.5 abc	73.0 a-d	75.3 cd	81.5 abc	68.5 de	71.5 a-e
24	49.3*	41.8 b-h	82.0 abc	71.8 abc	78.0 ab	72.5 d	78.5 a-d	71.5 a-e	57.8 ef
25	70.5	37.5 e-i	85.0 ab	70.8 bcd	72.3 a-d	84.3 abc	79.8 abc	66.3 de	67.0 b-e
<b>GRAND MEAN</b>	<b>62.1</b>	<b>45.9</b>	<b>78.2</b>	<b>72.8</b>	<b>71.1</b>	<b>81.5</b>	<b>77.1</b>	<b>72.0</b>	<b>69.8</b>
<i>LSD (P=0.05)</i>	<i>11.07</i>	<i>16.13</i>	<i>7.16</i>	<i>7.98</i>	<i>9.60</i>	<i>8.07</i>	<i>8.78</i>	<i>10.41</i>	<i>12.57</i>
CV	13	25	13	8	10	7	8	10	13

**TABLE 2 cont. 2013 ISCDA Seed Treatment Trial - % STAND.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different (P=0.05). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	MN-2 <i>Jun-14-13</i>	NY-1 <i>May-17-13</i>	WA-1 <i>Apr-25-13</i>	WA-2 <i>Jul-6-13</i>	WI-1 <i>Apr-30-13</i>	WI-2 <i>May-10-13</i>		SUMMARY ACROSS TRIALS (15 LOCATIONS)	
1	64.0 d-g	70.3 c-f	49.3 cd	73.3 a-d	63.0 de	35.3 ghi		55.4 d	
2	68.5 a-e	76.0 bcd	73.0 a	78.5 ab	70.0 bcd	43.0 fg		73.8 abc	
3	72.0 a-d	79.8 ab	69.0 a	83.8 a	76.8 ab	72.5 a		76.6 a	
4	71.3 a-d	82.0 ab	62.0 abc	74.0 a-d	75.8 abc	36.5 gh		72.1 abc	
5	75.8 ab	80.5 ab	71.3 a	73.0 a-d	78.0 ab	64.3 abc		74.4 abc	
6	68.3 a-e	80.5 ab	76.1 a	77.5 abc	77.3 ab	48.8 d-g		74.1 ab	
7	67.5 b-f	74.5 b-e	70.3 a	78.3 abc	78.8 ab	48.8 d-g		73.1 abc	
8	60.5 efg	69.3 def	63.8 ab	78.0 abc	70.3 bcd	41.8 fg		68.9 c	
9	56.3 g	73.3 b-f	45.3* d	65.5 d	61.0 e	26.5 hi		57.5 d	
10	76.0 ab	76.3 bcd	73.2 a	77.5 abc	74.0 abc	65.5 abc		73.4 abc	
11	71.0 a-d	78.5 abc	68.6 a	70.8 bcd	75.3 abc	59.3 a-e		73.5 abc	
12	77.3 ab	78.5 abc	64.0* ab		80.0 a	69.3 ab		74.7 a	
13	74.5 abc	78.5 abc	51.0 bcd		76.8 ab	67.0 ab		72.5 abc	
14	76.8 ab	82.0 ab	52.4 bcd		74.3 abc			73.6 ab	
15	78.3 a	85.8 a	72.0 a	74.8 a-d	69.8 bcd	61.0 a-d		74.6 ab	
16	72.5 a-d	81.3 ab	71.9 a	82.0 a	71.8 a-d	61.8 a-d		74.7 ab	
17	73.8 a-d	79.5 ab	71.8 a	74.3 a-d	71.0* a-d	66.3 abc		75.2 ab	
18	72.8 a-d	79.5 ab	71.0 a	74.8 a-d	72.5 abc	61.0 a-d		73.3 abc	
19	58.3 fg	65.5 f	40.3 d	67.5 bcd	67.0 cde	22.8 i		54.7 d	
20	72.0 a-d	78.8 abc	71.1 a	76.8 abc	70.8 a-d	51.8 c-f		73.3 abc	
21	68.8 a-e	80.5 ab	72.5 a	67.3 cd	74.5 abc	46.0 efg		70.8 abc	
22	65.5 c-g	67.0 ef	75.0 a	67.3 cd	75.8 abc	43.8 fg		70.5 bc	
23	77.0 ab	78.5 abc	75.1 a	74.0 a-d	74.5 abc	65.5 abc		73.3 abc	
24	71.3 a-d	69.5 def	70.2 a	65.5 d	72.7* abc	58.8 a-e		70.2 c	
25	67.5 b-f	76.0 bcd	68.3 a	76.8 abc	73.5 abc	54.8 b-f		72.5 abc	
<b>GRAND MEAN</b>	<b>70.3</b>	<b>76.9</b>	<b>65.9</b>	<b>74.1</b>	<b>73.0</b>	<b>53.0</b>		<b>69.7</b>	
LSD (P=0.05)	8.43	7.26	12.19	9.11	7.89	12.42		4.3	
CV	9	7	13	9	8	17		2	

**2013 ISCDA SEED TREATMENT TRIAL**  
**Combined Treatment Means for % STAND at 15 Locations**



**FIGURE 1. 2013 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for % STAND at 15 locations.** The mean for each treatment is indicated by •. The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

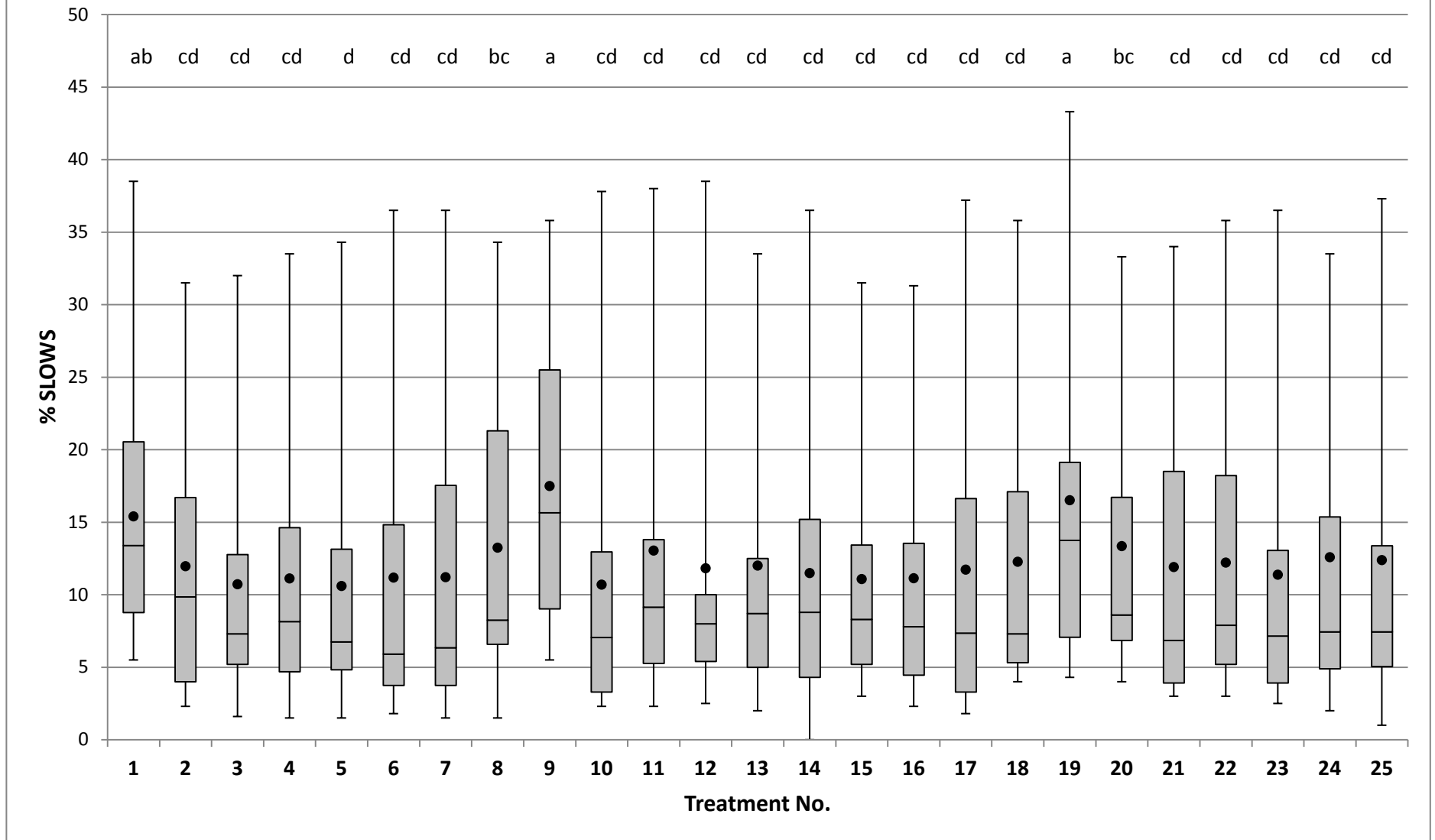
**TABLE 3. 2013 ISCDA Seed Treatment Trial - % SLOWS.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different (P=0.05). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	FL-1 <i>Feb-28-13</i>	ID-1 <i>Apr-11-13</i>	ID-2 <i>Apr-26-13</i>	ID-3 <i>May-9-13</i>	ID-4 <i>May-21-13</i>	ID-5 <i>Jun-20-13</i>	IL-1 <i>May-8-13</i>	IL-2 <i>May-13-13</i>	MN-1 <i>May-8-13</i>
1	8.0*	13.0* ab	14.0 bc	21.8 b	25.0	9.0*	21.8 a	16.8	5.5 bc
2	2.3	3.5 cd	11.9 cd	21.3 b	26.7*	7.8	12.8 b-e	18.0*	3.5 b-e
3	4.8	7.5 bcd	7.1 d	13.0* bcd	26.3	5.0	9.3 de	13.8	1.7* de
4	4.3	1.5 d	8.4 cd	8.5 d	28.5	5.3	16.5 a-d	18.5	3.0 cde
5	1.5	5.8 cd	10.9 cd	12.3* bcd	25.0	5.5	8.3 e	19.3	7.0 ab
6	4.5	2.8 d	11.0 cd	23.0 b	25.8	6.0*	12.8 b-e	15.5	1.7* de
7	1.5	1.8 d	6.9 d	18.3 bcd	29.7*	5.5	15.3 a-e	19.3	1.5 de
8	6.5	3.5 cd	9.2 cd	19.7* bc	28.3*	7.0	22.0 a	25.3	1.5 de
9	5.5	17.3 a	17.8 ab	33.3* a	34.0*	8.8	19.5 ab	27.5	9.7* a
10	3.3	2.3 d	9.0 cd	12.8 bcd	22.8	3.3	9.0 de	22.0	2.3 cde
11	3.3	5.8 cd	10.1 cd	13.8 bcd	34.5	4.8	9.5 de	25.5*	2.3 cde
12	4.7*	5.8 cd	9.7 cd	9.3 cd	26.8	6.3	10.0 de	21.5	2.5 cde
13	6.5	2.0 d	8.3 d	12.5 bcd	32.0	4.5	8.3* e	22.3	2.5 cde
14	5.3	1.0 d	6.8 d	9.5 cd	25.0	4.0	12.3* b-e	20.3	0.0 e
15	7.8	5.8 cd	9.9 cd	14.5 bcd	30.0	4.0	8.8 de	14.3*	3.0 cde
16	4.3	2.3 d	7.9 d	15.3 bcd	31.3	3.8	7.8 e	25.3	3.3 cde
17	2.5	1.8 d	8.2 d	18.3 bcd	36.0*	2.8	9.3 de	23.3	3.3 cde
18	5.0	4.0 cd	9.9 cd	19.5 bc	32.5	6.0	9.0 de	20.5	5.3 bcd
19	7.3	10.5 bc	20.6 a	17.0* bcd	42.0	6.5	15.3 a-e	19.3	7.0 ab
20	7.0	7.0 bcd	10.2 cd	17.8 bcd	31.0	7.0	12.0 b-e	27.8	4.0 bcd
21	3.0	3.8 cd	9.8 cd	17.0 bcd	25.5	6.5	19.0 abc	23.3	3.3 cde
22	5.0	4.0 cd	6.8 d	13.5 bcd	25.0	6.0	19.8 ab	23.8	3.0 cde
23	4.5	3.3 cd	9.8 cd	12.3 bcd	26.5	3.5	13.3 b-e	22.3	4.3 bcd
24	5.0*	5.5 cd	7.6 d	16.0 bcd	30.8	3.0	13.5 b-e	29.8	2.0 cde
25	4.0	1.0 d	6.9 d	13.5 bcd	37.3	8.0	11.3 cde	21.0	5.8 bc
<b>GRAND MEAN</b>	<b>4.6</b>	<b>4.9</b>	<b>9.9</b>	<b>16.2</b>	<b>29.3</b>	<b>5.6</b>	<b>13.1</b>	<b>21.6</b>	<b>3.4</b>
<i>LSD (P=0.05)</i>	6.53	6.05	4.64	8.86	10.33	4.05	6.69	11.63	3.08
CV	99	88	68	38	24	51	36	22	62

**TABLE 3** (continued). **2013 ISCDA Seed Treatment Trial - % SLOWS.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different ( $P=0.05$ ). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	MN-2 <i>Jun-14-13</i>	NY-1 <i>May-17-13</i>	WA-1 <i>Apr-25-13</i>	WA-2 <i>Jul-6-13</i>	WI-1 <i>Apr-30-13</i>	WI-2 <i>May-10-13</i>		SUMMARY ACROSS TRIALS (14 LOCATIONS)	
1	8.3	38.5	17.3 a	11.3 ab	9.3			15.6 ab	
2	5.8	31.5	5.8 cd	3.5 c	12.0			11.5 cd	
3	5.5	32.0	6.0 cd	7.0 bc	13.0			10.3 cd	
4	4.5	33.5	8.5 bcd	6.3 bc	9.0			10.7 cd	
5	2.5	34.3	5.0 cd	3.3 c	6.5			10.5 d	
6	4.5	36.5	3.5 d	3.5 c	6.0			11.4 cd	
7	5.8	36.5	3.3 d	3.5 c	7.8			10.1 cd	
8	6.8	34.3	5.5 cd	7.3 bc	11.8			12.4 bc	
9	5.5	35.8	9.0 bcd	14.0 a	11.5			17.5 a	
10	4.5	37.8	7.8 bcd	2.5 c	13.0			10.5 cd	
11	7.3	38.0	6.0 cd	8.8 abc	13.8			12.2 cd	
12	4.8	38.5	7.3 bcd		8.0			11.7 cd	
13	5.0	33.5	10.0 bc		9.3			11.4 cd	
14	4.3	36.5	15.3 a		8.8			10.5 cd	
15	5.0	31.5	7.3 bcd	3.5 c	10.8			10.9 cd	
16	5.3	28.3	6.3 cd	7.8 abc	8.3			10.6 cd	
17	3.3	32.5	3.8 d	6.5 bc	9.3*			10.5 cd	
18	4.3	35.8	5.8 cd	7.8 abc	6.8			11.9 cd	
19	6.3	43.3	12.5 ab	4.3 c	18.0			17.1 a	
20	5.5	33.3	4.3 cd	6.8 bc	13.5			12.8 bc	
21	4.3	34.0	7.0 bcd	3.5 c	7.0			11.5 cd	
22	5.8	35.8	4.3 cd	9.0 abc	9.3			11.2 cd	
23	2.5	36.5	4.5 cd	3.8 c	12.3			11.1 cd	
24	4.0	33.5	8.3 bcd	7.0 bc	12.0*			12.1 cd	
25	4.8	37.3	8.3 bcd	3.0 c	13.0			11.5 cd	
<b>GRAND MEAN</b>	<b>5.0</b>	<b>35.1</b>	<b>7.3</b>	<b>6.1</b>	<b>10.5</b>			<b>11.9</b>	
<i>LSD (P=0.05)</i>	4.30	10.65	4.82	5.72	7.53			2.20	
CV	61	22	41	67	50			5	

**2013 ISCDA SEED TREATMENT TRIAL**  
**Combined Treatment Means for % SLOWS at 14 Locations**



**FIGURE 2. 2013 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for % SLOWS at 14 locations.** The mean for each treatment is indicated by •. The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

**TABLE 4. 2013 ISCDA Seed Treatment Trial - ADJUSTED % STAND.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different (P=0.05). Means in columns followed by \* indicate that an outlier was excluded.

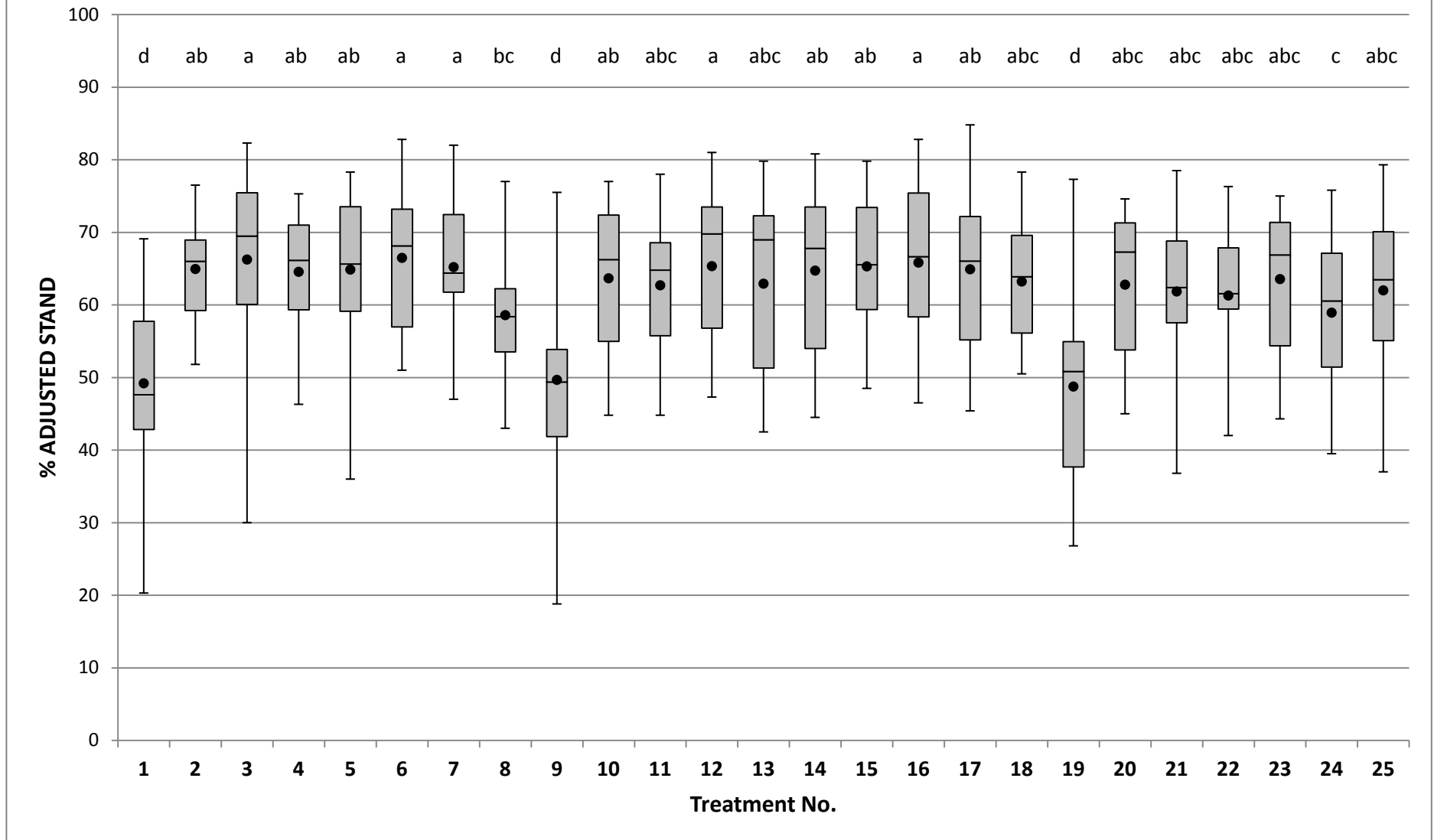
TREATMENT NO.	FL-1 <i>Feb-28-13</i>	ID-1 <i>Apr-11-13</i>	ID-2 <i>Apr-26-13</i>	ID-3 <i>May-9-13</i>	ID-4 <i>May-21-13</i>	ID-5 <i>Jun-20-13</i>	IL-1 <i>May-8-13</i>	IL-2 <i>May-13-13</i>	MN-1 <i>May-8-13</i>
1	53.3*	20.3* g	41.3 e	42.8 g	46.3 a-d	68.3* e	49.0 g	58.0	43.0 g
2	65.0	56.5 ab	74.0 abc	58.3 def	53.0* a-d	76.5 a-e	67.8 a-e	67.0*	69.0 a-f
3	53.0	30.0 efg	82.3 a	69.0* a-d	58.5 ab	80.5 a-d	76.5 ab	72.3	71.7* a-e
4	62.5	58.8 ab	74.5 abc	71.8 ab	46.3 a-d	75.3 a-e	64.0 b-f	61.0	71.5 a-e
5	63.5	36.0 d-g	75.5 abc	65.0* a-e	58.0 ab	78.3 a-e	76.5 ab	57.3	62.5 c-f
6	59.0	56.3 abc	71.5 bc	55.0 ef	56.0 ab	77.7* a-e	71.3 a-d	64.0	81.7* a
7	65.0	48.8 a-e	73.3 abc	61.5 b-e	54.0* a-d	82.0 abc	62.5 c-f	63.8	78.0 a
8	60.0	43.0 b-f	70.5 bc	62.0* b-e	55.0* abc	72.5 b-e	52.8 fg	47.3	77.0 abc
9	56.5	18.8 g	49.5 d	41.3* g	41.3* de	72.5 b-e	54.0 fg	49.3	42.7* g
10	55.0	44.8 a-f	73.8 abc	69.5 abc	51.3 a-d	75.8 a-e	72.0 a-d	55.0	77.0 abc
11	64.0	44.8 a-f	75.3 abc	65.5 a-e	47.0 a-d	78.0 a-e	69.5 a-e	53.0*	72.3 a-e
12	62.7*	53.8 a-d	69.8 c	72.0 ab	50.8 a-d	81.0 a-d	71.5 a-d	56.8	77.5 ab
13	57.5	50.8 a-d	72.3 bc	69.0 a-d	42.5 cde	79.8 a-d	75.3* abc	59.0	73.8 a-d
14	54.0	63.3 a	71.0 bc	73.8 a	46.5 a-d	79.8 a-d	68.3* a-e	66.0	80.8 a
15	53.5	48.5 a-e	75.0 abc	64.3 a-e	52.8 a-d	79.8 a-d	74.0 abc	62.3*	70.5 a-f
16	62.0	56.3 abc	76.0 abc	60.0 c-f	46.5 a-d	82.8 ab	76.8 ab	51.5	74.3 a-d
17	63.5	46.0 a-e	78.5 abc	60.3 c-f	46.0* a-d	84.8 a	78.0 a	53.3	72.5 a-e
18	56.5	51.0 a-d	73.8 abc	56.0 ef	51.3 a-d	78.3 a-e	75.3 abc	61.0	58.3 ef
19	60.0	26.8 fg	39.8 e	50.3* fg	32.5 e	77.3 a-e	54.8 fg	53.3	43.5 g
20	64.0	45.0 a-f	74.6 abc	57.5 ef	51.3 a-d	73.8 b-e	67.3 a-e	53.8	71.3 a-e
21	59.0	36.8 d-g	73.3 abc	59.8 c-f	58.3 ab	78.5 a-e	57.3 efg	52.8	70.0 a-f
22	63.0	44.5 a-f	76.3 abc	66.0 a-e	59.3 a	71.8 cde	59.8 d-g	51.5	60.5 def
23	55.5	44.3 a-f	74.8 abc	63.5 a-e	53.3 a-d	72.8 b-e	71.0 a-d	54.0	68.5 a-f
24	46.0*	39.5 b-f	75.8 abc	60.3 c-f	54.3 a-d	70.3 de	68.0 a-e	50.5	56.5 f
25	68.0	37.0 c-g	79.3 ab	61.3 b-e	45.5 bcd	77.8 a-e	70.8 a-d	53.0	63.0 b-f
<b>GRAND MEAN</b>	<b>59.3</b>	<b>44.0</b>	<b>70.9</b>	<b>61.3</b>	<b>50.3</b>	<b>77.1</b>	<b>67.4</b>	<b>56.7</b>	<b>67.5</b>
<i>LSD (P=0.05)</i>	11.75	15.95	7.56	9.09	10.77	8.77	10.74	14.20	12.19
CV	14	26	15	10	15	8	11	18	13

**TABLE 4** (continued). **2013 ISCDA Seed Treatment Trial - ADJUSTED % STAND.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different (P=0.05). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	MN-2 <i>Jun-14-13</i>	NY-1 <i>May-17-13</i>	WA-1 <i>Apr-25-13</i>	WA-2 <i>Jul-6-13</i>	WI-1 <i>Apr-30-13</i>	WI-2 <i>May-10-13</i>		SUMMARY ACROSS TRIALS (14 LOCATIONS)	
1	58.8 e-h	43.0 cde	42.0 d	65.0 b-e	57.0 bcd			47.8 d	
2	64.5 a-g	51.8 a-d	68.8 ab	75.8 ab	62.0 a-d			66.8 ab	
3	68.0 a-e	54.0 a-d	64.8 ab	78.0 a	66.8 ab			68.9 a	
4	68.3 a-e	54.5 abc	56.8 bc	69.5 a-d	69.0 a			66.3 ab	
5	73.8 abc	52.8 a-d	67.8 ab	70.5 a-d	72.8 a			66.9 ab	
6	65.0 a-g	51.0 a-d	73.5 a	74.8 ab	72.3 a			66.9 a	
7	63.5 c-g	47.0 a-e	68.0 ab	75.8 ab	72.3 a			67.0 a	
8	56.8 fgh	43.5 cde	60.0 ab	72.5 abc	62.3 a-d			61.8 bc	
9	53.0 h	46.8 a-e	41.3* d	56.8 e	53.5 d			49.0 d	
10	72.5 abc	47.3 a-e	67.5 ab	75.5 ab	65.0 a-d			66.1 ab	
11	65.8 a-f	48.5 a-e	64.5 ab	64.8 b-e	64.8 a-d			65.3 abc	
12	73.5 abc	47.3 a-e	59.3* ab		73.5 a			66.3 a	
13	70.8 a-d	51.3 a-d	45.8 cd		69.8 a			64.5 abc	
14	73.5 abc	51.8 a-d	44.5 cd		67.8 ab			65.8 ab	
15	74.5 ab	58.5 a	66.8 ab	71.8 a-d	62.0 a-d			67.1 ab	
16	68.5 a-e	57.8 ab	67.3 ab	75.8 ab	66.0 ab			67.6 a	
17	71.3 a-d	53.5 a-d	68.5 ab	69.5 a-d	64.3* a-d			67.7 ab	
18	69.8 a-d	50.5 a-d	66.8 ab	69.0 a-d	67.5 ab			65.1 abc	
19	55.0 gh	37.0 e	35.3 d	64.5 b-e	54.3 cd			47.2 d	
20	68.0 a-e	52.3 a-d	68.0 ab	71.5 a-d	61.8 a-d			64.9 abc	
21	66.0 a-f	52.5 a-d	67.3 ab	65.0 b-e	69.3 a			63.8 abc	
22	61.8 d-h	42.0 de	71.8 ab	61.3 cde	68.5 ab			63.9 abc	
23	75.0 a	49.3 a-d	71.5 ab	71.0 a-d	65.3 abc			65.5 abc	
24	68.3 a-e	46.3 b-e	64.5 ab	60.8 de	64.0* a-d			62.2 c	
25	64.3 b-g	47.0 a-e	62.5 ab	74.5 ab	64.0 a-d			65.0 abc	
<b>GRAND MEAN</b>	<b>66.8</b>	<b>49.5</b>	<b>61.3</b>	<b>69.7</b>	<b>65.4</b>			<b>61.9</b>	
<i>LSD (P=0.05)</i>	8.77	9.92	12.36	9.55	9.76			4.5	
CV	9	14	14	10	11			2	



**2013 ISCDA SEED TREATMENT TRIAL**  
**Combined Treatment Means for ADJUSTED % STAND at 14 Locations**



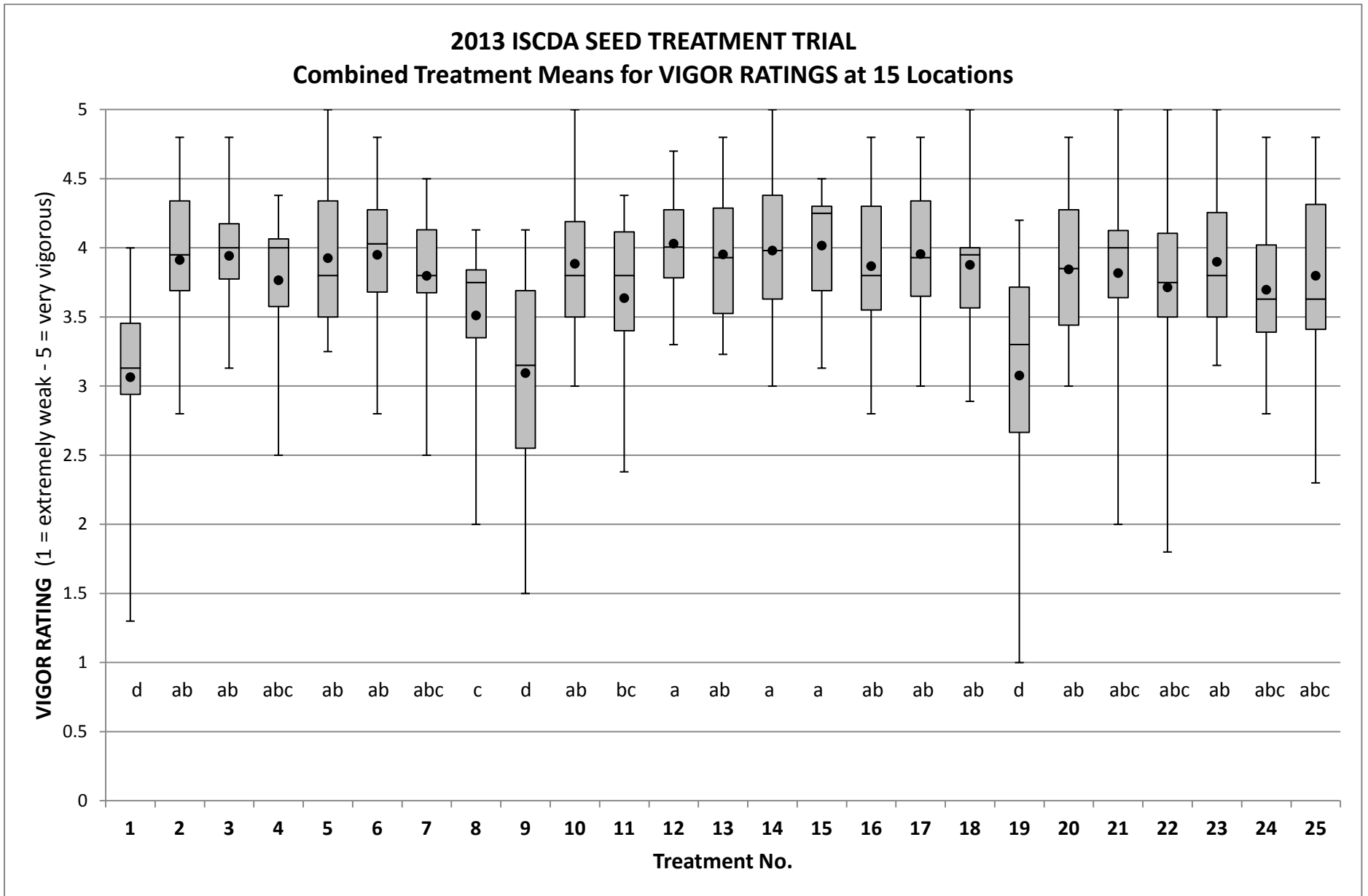
**FIGURE 3. 2013 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for ADJUSTED % STAND at 14 locations.** The mean for each treatment is indicated by •. The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

**TABLE 5. 2013 ISCDA Seed Treatment Trial - VIGOR.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different ( $P=0.05$ ). Means in columns followed by \* indicate that an outlier was excluded.

TREATMENT NO.	FL-1 <i>Feb-28-13</i>	ID-1 <i>Apr-11-13</i>	ID-2 <i>Apr-26-13</i>	ID-3 <i>May-9-13</i>	ID-4 <i>May-21-13</i>	ID-5 <i>Jun-20-13</i>	IL-1 <i>May-8-13</i>	IL-2 <i>May-13-13</i>	MN-1 <i>May-8-13</i>
1	3.83*	2.50* de	2.9 de	4.0 bcd	2.98 c-g	3.50* f	1.8 e	3.3	3.00 e
2	4.05	3.75 abc	3.4 abc	4.8 ab	3.97* ab	4.00 b-f	3.0 a-d	4.3*	3.63 abc
3	4.10	3.13 cd	3.8 ab	4.3* abc	3.33 a-g	4.25 a-d	3.8 ab	4.0	3.50* bcd
4	4.00	4.00 ab	3.4 abc	4.0 bcd	2.80 efg	3.88 c-f	3.3 abc	4.0	3.75 abc
5	3.98	3.25 c	3.4 abc	4.7* abc	3.50 a-f	4.13 b-e	3.8 ab	3.3	3.50 bcd
6	4.00	4.13 a	3.4 abc	4.5 abc	3.67 a-e	4.00* b-f	3.3 abc	4.3	3.66* abc
7	4.00	3.75 abc	3.6 abc	3.8 cd	3.03* c-g	4.13 b-e	2.8 b-e	3.8	3.75 abc
8	3.95	3.75 abc	3.2 cd	3.3* d	3.78* a-d	3.88 c-f	3.0 a-d	2.8	3.50 bcd
9	3.98	2.32 e	2.6 e	4.0* bcd	2.57* g	3.75 def	2.5 cde	3.0	3.17* de
10	3.73	3.13 cd	3.5 abc	3.8 cd	3.68 a-e	4.13 b-e	4.0 ab	3.0	3.88 ab
11	3.98	2.38 e	3.6 abc	3.8 cd	3.50 a-f	4.38 abc	3.3 abc	2.5*	3.50 bcd
12	4.00*	3.75 abc	3.4 abc	4.3 abc	4.20 a	4.13 b-e	4.0 ab	3.3	3.88 ab
13	3.98	3.50 abc	3.6 abc	4.8 ab	3.23 a-g	4.75 a	4.0* ab	3.3	3.75 abc
14	3.98	3.63 abc	3.4 abc	5.0 a	3.68 a-e	4.38 abc	3.0* a-d	4.5	4.00 a
15	4.03	3.13 cd	3.7 ab	4.3 abc	3.68 a-e	4.25 a-d	4.3 a	4.3*	3.63 abc
16	3.98	3.38 bc	3.6 abc	4.3 abc	3.68 a-e	4.50 ab	3.8 ab	3.0	3.50 bcd
17	4.03	3.25 c	3.8 ab	4.3 abc	3.97* ab	4.25 a-d	3.8 ab	3.0	3.50 bcd
18	3.95	3.63 abc	3.5 abc	4.8 ab	2.89 d-g	3.88 c-f	4.0 ab	4.0	3.38 cde
19	3.90	2.50 de	2.7 e	4.2* abc	2.63 fg	3.63 ef	1.8 e	2.8	3.38 cde
20	4.00	3.63 abc	3.3 bc	4.3 abc	3.85 abc	3.88 c-f	3.3 abc	3.8	3.50 bcd
21	4.00	3.75 abc	3.6 abc	4.0 bcd	3.68 a-e	4.00 b-f	2.0 de	4.0	3.38 cde
22	4.08	3.50 abc	3.8 a	4.5 abc	4.03 ab	4.13 b-e	2.5 cde	3.5	3.50 bcd
23	3.98	3.25 c	3.7 ab	4.5 abc	3.15 b-g	4.13 b-e	3.8 ab	3.5	3.50 bcd
24	3.90*	3.25 c	3.5 abc	4.8 ab	3.68 a-e	4.13 b-e	2.8 b-e	2.8	3.33 cde
25	4.08	3.32 bc	3.6 abc	4.5 abc	3.06 c-g	4.38 abc	3.5 abc	3.3	3.63 abc
<b>GRAND MEAN</b>	<b>3.98</b>	<b>3.34</b>	<b>3.43</b>	<b>4.28</b>	<b>3.45</b>	<b>4.10</b>	<b>3.23</b>	<b>3.45</b>	<b>3.55</b>
<i>LSD (P=0.05)</i>	0.183	0.595	0.36	0.76	0.741	0.497	1.03	1.41	0.348
CV	3	13	3	12	15	9	22	29	7

**TABLE 5** (continued). **2013 ISCDA Seed Treatment Trial - VIGOR.** *Planting date in italics.* Means in columns followed by the same letter are not significantly different ( $P=0.05$ ). Means in columns followed by \* indicate that an outlier was excluded.

<b>TREATMENT NO.</b>	<b>MN-2</b> <i>Jun-14-13</i>	<b>NY-1</b> <i>May-17-13</i>	<b>WA-1</b> <i>Apr-25-13</i>	<b>WA-2</b> <i>Jul-6-13</i>	<b>WI-1</b> <i>Apr-30-13</i>	<b>WI-2</b> <i>May-10-13</i>		<b>SUMMARY ACROSS TRIALS (15 LOCATIONS)</b>	
1	4.00	3.13 e	3.0 d	3.3 ef	3.38	1.3 hi		3.01 d	
2	4.38	3.75 cde	4.5 ab	4.5 abc	3.88	2.8 b-g		3.81 ab	
3	4.38	4.00 a-d	4.8 a	4.0 b-e	3.75	4.0 ab		3.90 ab	
4	4.38	4.13 a-d	4.3 abc	4.3 a-d	3.75	2.5 c-h		3.69 abc	
5	4.38	4.50 ab	5.0 a	4.3 a-d	3.75	3.5 a-d		3.83 ab	
6	4.13	4.25 a-d	4.5 ab	4.8 ab	3.75	2.8 b-g		3.84 ab	
7	4.50	4.13 a-d	4.5 ab	4.5 abc	4.13	2.5 c-h		3.77 abc	
8	4.13	3.63 de	3.8 bcd	4.0 b-e	3.75	2.0 e-i		3.44 c	
9	4.13	3.63 de	3.3* d	2.5 f	3.25	1.5 ghi		3.00 d	
10	4.38	4.25 a-d	4.8 a	5.0 a	3.50	3.5 a-d		3.81 ab	
11	4.25	3.88 bcd	4.3 abc	4.3 a-d	3.88	3.0 a-f		3.64 bc	
12	4.38	4.63 a	4.7* a		3.75	4.0 ab		3.89 a	
13	4.50	4.25 a-d	3.5 cd		3.88	4.3 a		3.89 ab	
14	4.50	4.25 a-d	3.8 bcd		3.63			3.89 a	
15	4.25	4.50 ab	4.3 abc	4.5 abc	3.88	3.5 a-d		3.94 a	
16	4.13	4.50 ab	4.8 a	4.3 a-d	3.75	2.8 b-g		3.81 ab	
17	4.50	4.38 abc	4.8 a	4.5 abc	3.50*	3.8 abc		3.91 ab	
18	4.50	4.00 a-d	5.0 a	4.0 b-e	3.63	3.0 a-f		3.81 ab	
19	4.00	3.63 de	3.3 d	3.8 cde	2.88	1.0 i		2.99 d	
20	4.38	4.25 a-d	4.8 a	4.3 a-d	3.38	3.0 a-f		3.74 ab	
21	4.25	4.63 a	5.0 a	4.3 a-d	3.88	2.8 b-g		3.77 abc	
22	4.38	3.75 cde	5.0 a	3.5 de	3.75	1.8 f-i		3.73 abc	
23	4.38	4.00 a-d	5.0 a	4.8 ab	3.50	3.3 a-e		3.85 ab	
24	4.38	3.63 de	4.5 ab	3.5 de	3.50*	3.8 abc		3.66 abc	
25	4.25	4.13 a-d	4.5 ab	4.8 ab	3.63	2.3 d-i		3.76 abc	
<b>GRAND MEAN</b>	<b>4.31</b>	<b>4.07</b>	<b>4.38</b>	<b>4.15</b>	<b>3.65</b>	<b>2.84</b>		<b>3.76</b>	
<i>LSD (P=0.05)</i>	<i>0.370</i>	<i>0.562</i>	<i>0.70</i>	<i>0.75</i>	<i>0.683</i>	<i>1.15</i>		<i>0.278</i>	
CV	6	10	11	13	13	27		2	



**FIGURE 4. 2013 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for VIGOR at 15 locations.** The mean for each treatment is indicated by •. The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.