ANNUAL REPORT
ISCDA MULTI-LOCATION SWEET CORN SEED TREATMENT TRIAL – 2015

INTRODUCTION

The Seed Treatment Committee of the International Sweet Corn Development Association (ISCDA) organizes a trial every year to evaluate seed treatments for sweet corn planted in various environments. The committee set up a comparison of 14 seed treatments on two supersweet hybrids for 2015.

METHODS

A non-treated control and 14 seed treatments were evaluated in 2015. Most of the seed treatments were mixtures of fungicide products, and some of the treatments included insecticides and seed enhancement products. A list of the seed treatments is provided in Table 1 on pages 8 & 9. The seed treatments were submitted by: Albaugh LLC.; BASF Corporation; Heads Up Plant Protectants, Inc.; The McGregor Company; Nufarm Americas, Inc.; Syngenta Crop Protection, LLC; and Valent USA Corporation. Additionally, two standard seed treatment mixtures were selected by the committee. The treatments were applied to two supersweet (*sh2*) hybrids, Super Sweet Jubilee Plus and Marquette. Standard germination rates at the time of treatment were 89% for the SS Jubilee Plus seed and 96% for the Marquette seed. Treatments were applied to the seeds at a facility owned and operated by The McGregor Company. Sets of the treated seeds were packaged and sent to cooperating researchers at nine locations in six states (ID, IL, MN, NY, OR, and WA) for planting and evaluation. A list of locations, planting dates, and cooperating researchers is on page 10 of this report. The experimental design at each location varied, but all sites established randomized plots with at least four replications. Planting dates ranged from early April to the end of May. Stand counts, weak plant counts, and vigor ratings were recorded in each plot, usually at the 5-6 leaf stage. 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).

ANALYSIS: 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 from the data set. Results for each hybrid at each location were subjected to analysis of variance (ANOVA) and a pairwise comparison of treatment means using the Fisher's protected least significant difference method, LSD (P=0.05). It can be difficult to draw conclusions from a large data set, so the results were also summarized and compared across trial locations examining each hybrid alone, and then both hybrids together, to identify general trends. The combined results were analyzed with ANOVA to evaluate treatment effects, and location x treatment interactions. Data were analyzed using ARM 9 and ARM ST 8 software from Gylling Data Management, Inc.

RESULTS

A short summary of the results is provided on page 7 of this report and is followed by tables and charts showing all results.

RESULTS - % STAND

The treatment means for % stand at each location and for both hybrids are shown in Table 2 a-c. The % stand results summarized across locations are shown in Table 3. There are also three box and whisker graphs showing the distribution of treatment means for % stand across locations for both hybrids, for SS Jubilee Plus, and for Marquette (Figures 1-3).

LOCATIONS: Five locations resulted in significant treatment effects for % stand with both the SS Jubilee Plus and Marquette seeds (ID-1, ID-2, IL-1, IL-2 and MN-1). There were significant hybrid x treatment interactions when the results for both hybrids were paired in an ANOVA at individual locations (not shown). This indicates that SS Jubilee Plus and Marquette responded differently to some of the treatments despite being planted at the same location. The differences are likely due to the presence of different pathogens in and on the seed, and may also be explained by hybrid differences in susceptibility to pathogens. Most of the locations had reasonably small variation in the data sets for % stand (i.e., coefficients of variation (CV) were less than 15%). The locations with the most variable % stand results were NY-1 and WA-1.

BOTH HYBRIDS: Overall, the treatments with the lowest % stand when averaged across nine locations and both hybrids were the non-treated control and Treatments 6 and 11, with 59%, 60%, and 61% stands respectively. Treatment 6 included only one product, a plant activator that has been shown to inhibit pathogens by activating plant defense mechanisms (a process known as System Acquired Resistance or SAR). Treatment 11 included a mixture of insecticides, but no fungicide products. This treatment would not be expected to control seed rot or seedling blights caused by fungal pathogens, which were the primary agents of stand loss in this trial. Treatment 13 was the highest ranking treatment for % stand in the summary across all locations with both hybrids (74%). This treatment included four fungicides (six active ingredients) and an insecticide entered by Syngenta Crop Protection, LLC. It was the only treatment that resulted in stand counts that were significantly higher than those of the two standard treatments (Treatments 2 and 3) when averaged across all locations and two hybrids. The two standards averaged 71% and 70% stands across locations and hybrids, and resulted in similar % stand results at all but one of the locations. With the exception of Treatments 6, 11 and 13, the other seed treatments resulted in combined treatment means for % stand that were similar to the two standard treatments.

SS JUBILEE PLUS: Grand means for % stand ranged from 44% (WA-1) to 79% (OR-1), and averaged 63%. The ANOVA indicated significant treatment effects for % stand at seven of nine locations planted with SS Jubilee Plus. The ID-1 and IL-1 locations showed the greatest range in results, with non-treated seed resulting in ≈ 30% stands and the highest ranking seed treatment with ≈ 75% stands.

The non-treated control resulted in the smallest stand count for SS Jubilee Plus when analyzed across nine locations (46%). Treatments 6 and 11 were the lowest ranking seed treatments for % stand at most locations, with stands averaging only 53% and 52% respectively in the summary across locations for SS Jubilee Plus. These results were a significant improvement over the non-treated control, but were lower than the stands for the other treatments at most locations. Treatment 13 resulted in the largest

stand count in the combined results for SS Jubilee Plus (70%), but it was comparable to several other treatments that averaged 65% to 69% stands in the summary across locations, including one of the standard treatments (Treatment 2). The two standard seed treatments resulted in combined treatment means for % stand of 66% and 63% and were not significantly different from each other.

MARQUETTE: Grand means for % stand ranged from 55% (WA-1) to 87% (ID-4), and averaged 76%. The ANOVA indicated significant treatment effects for % stand at five of nine locations planted with Marquette. The IL-1 location showed the greatest range in results, with non-treated seed resulting in 67% stands and the highest ranking seed treatment with 89% stands.

The non-treated control and Treatments 6 and 11 resulted in the smallest stand counts for Marquette when averaged across nine locations, 71%, 68%, and 71% respectively. These stands were lower than stands for all other treatments in the summary across locations except for Treatment 14, which had a 75% stand across locations with Marquette. Treatments 5 and 8 resulted in the largest stand counts (both 82%) in the combined results for Marquette. They were the only treatments in the summary across locations with stand counts that were significantly higher than those of the two standard treatments. The two standard seed treatments resulted in combined treatment means for % stand of 76% and 77% and were not significantly different from each other.

RESULTS - % SLOWS

Weak plant assessments were intended to account for plants that emerged, but probably would not produce useable ears. Table 4 a-c presents the treatment means for % slows at each location for both hybrids. The % slows results summarized across locations are shown in Table 5. Weak plants were not assessed at the NY-1 location.

BOTH HYBRIDS: SS Jubilee Plus and Marquette both averaged 14% slows in the summary across locations. The ANOVA for the entire data set of % slows results showed no treatment effects. However, there was a significant location x treatment interaction affecting the % slows results. Only four of eight locations with SS Jubilee Plus and two of eight locations with Marquette had significant treatment differences for % slows. All of the locations had a lot of variation within the data sets for % slows, which was indicated by CVs that were all > 15%.

SS JUBILEE PLUS: Grand means for % slows at the eight locations with SS Jubilee Plus ranged from 3% (ID-2) to 20% (IL-1), and averaged 14%. The ID-1, ID-2, IL-1, and MN-1 locations had significant treatment differences for % slows with SS Jubilee Plud. The combined results for % slows across eight locations, or just the four locations that had the significant treatment differences (not shown), showed no treatment effects in the ANOVAs. There were, however, significant interactions for location x treatment in the ANOVAs, indicating that treatment effects on % slows at different locations were not the same.

MARQUETTE: Grand means for % slows at the eight locations with Marquette ranged from 2% (ID-2) to 13% (ID-3), and averaged 14%. Only the IL-1 and OR-1 locations had significant treatment differences for % slows with Marquette. The ANOVA for % slows results grouped for the eight locations planted with Marquette, or just the two locations that had significant treatment differences for % slows (not shown), indicated no treatment differences, and significant location x treatment interactions.

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 not likely to produce usable ears. Table 6 a-c presents the treatment means for adjusted % stand for each treatment at each location for both hybrids. Combined treatment means for adjusted % stand in various groupings of the results across locations are shown in Table 7. The NY-1 location did not report % slows, so adjusted % stand could not be calculated.

BOTH HYBRIDS: Most of the stand problems were due to poor emergence rather than weak plants. The treatments that resulted in the lowest stand counts generally had the lowest adjusted stand counts. The non-treated control and Treatments 6 and 11 had the lowest adjusted % stand results at most locations, with 47%, 50%, and 48% adjusted stands respectively in the summary across locations and hybrids. All of the other treatments were similar to each other, with adjusted stand counts ranging 58% to 61% in the summary across locations and hybrids.

SS JUBILEE PLUS: Grand means for adjusted % stand at the eight locations ranged from 31% (WA-1) to 75% (OR-1), and averaged 52%. Accounting for weak plants decreased the grand means for adjusted % stand of SS Jubilee Plus by 2% to 13% at different locations, and by an average of 7% across locations. The only locations that resulted in no significant treatment differences for adjusted % stand with the SS Jubilee Plus seed were ID-3, OR-1, and WA-1.

The non-treated control resulted in the lowest adjusted % stand for SS Jubilee Plus when averaged across eight locations (39%). Treatments 6 and 11 were the lowest ranking seed treatments for adjusted % stand in the summary across locations (both with adjusted stands of 43%), and were not significantly different from the non-treated control in SS Jubilee Plus plots. Treatment 15 resulted in the largest adjusted stand counts in the summary across locations (58%). The treatment means for adjusted % stand in the two standard treatment plots averaged 54% and 53% across locations, and were not significantly different from each other. With the exception of Treatments 6 and 11, the rest of the seed treatments resulted in combined treatment means for adjusted % stand that were similar to one or both of the standards in the SS Jubilee Plus plots.

MARQUETTE: Grand means for adjusted % stand at the eight locations ranged from 54% (WA-1) to 79% (ID-3), and averaged 58%. Accounting for weak plants decreased the grand means for adjusted % stand of Marquette by 1% to 8% at different locations, and by an average of 4% across locations. WA-1 was the only location that did not have significant treatment effects for adjusted stands in the trials with Marquette. Treatments 6 and 11 resulted in the smallest adjusted stand counts for Marquette when averaged across eight locations, 58% and 54% respectively. The non-treated control averaged an adjusted stand of 59% across locations, which was significantly better than that of Treatment 11, but similar to Treatment 6. Treatment 8 had the highest ranking adjusted stand count in the summary across locations for Marquette (68%).

RESULTS – VIGOR

The treatment means for vigor at each location for each hybrid are shown in Table 8 a-d. Combined treatment means for vigor in several groupings of results across locations are presented in Table 9. There are also three box and whisker graphs showing the distribution of treatment means for vigor across locations for both hybrids, for SS Jubilee Plus, and for Marquette (Figures 4-6). The ID-3 and NY-1 locations did not report vigor results.

BOTH HYBRIDS: In general, SS Jubilee Plus seedlings were rated as slightly less vigorous than Marquette seedlings, with grand means for vigor of 3.30 and 3.84 respectively. The ANOVA for individual locations indicated significant treatment effects for vigor at all seven locations with SS Jubilee Plus, but only one of seven locations with Marquette seeds.

The treatments with the lowest vigor when averaged across seven locations and both hybrids were the non-treated control and Treatments 6 and 11, with ratings of 3.05, 2.99 and 3.14 respectively. The highest ranking treatment for vigor in the summary across locations with both hybrids was Treatment 10 (3.85). This treatment included five fungicides entered by Albaugh, LLC. With the exception of Treatments 6 and 11, the other seed treatments resulted in combined treatment means for vigor that were similar to the two standard treatments. The two standards resulted in similar vigor results at all of the locations, and averaged vigor ratings of 3.67 and 3.69 in the summary across locations and hybrids.

SS JUBILEE PLUS: Grand means for vigor at the seven locations with SS Jubilee Plus ranged from 2.9 (IL-1) to 4.2 (WA-1), and averaged 3.3. All of the locations showed treatment differences for vigor with the SS Jubilee seed lot.

The non-treated control and Treatments 6 and 11 resulted in the lowest vigor ratings in the summary across locations for SS Jubilee Plus, with ratings of 2.54, 2.48, and 2.70 respectively. Treatments 4 and 10 resulted in the best vigor ratings in the summary across locations, 3.67 and 3.58 respectively. These ratings were significantly better than those resulting from the non-treated control and Treatments 5, 6, and 11, but were not significantly different from the rest of the treatments in the summary for SS Jubilee Plus locations.

MARQUETTE: Grand means for vigor at the seven locations with Marquette ranged from 3.1 (OR-1) to 4.9 (WA-1), and averaged 3.8. Only the IL-1 location had treatment differences for vigor with the Marquette seed lot.

Treatment 6 resulted in the lowest vigor rating in the summary across seven locations with Marquette (3.49), but it was not significantly different from the ratings resulting from the non-treated control and Treatments 11 and 15. All of the other treatments resulted in vigor ratings that were similar to those of one or both of the standard treatments. The two standards averaged vigor ratings of 3.83 and 3.99 in the summary across locations with Marquette.

RESULTS –TREATMENT COMPARISONS

Valent 1 vs. Valent 2: Treatment 5 resulted in a significantly larger stand count compared to Treatment 4 in the summary across locations and hybrids; these treatments were the same except that Treatment 5 added Signet (thiram) to the mixture. The differences between these treatments were not as significant for the adjusted stand counts or vigor ratings.

Non-treated Control vs. Heads Up 1: Treatment 6 and the non-treated control resulted in similar stand counts, adjusted stand counts, and vigor ratings in the summary across locations and hybrids. Treatment 6 is a plant extract that has been shown to activate a SAR response in the plant. Treatment 6 resulted in a better stand count than the non-treated control in the summary across locations for SS Jubilee Plus, but not for Marquette, or when both hybrids were analyzed together. The same can be said of Treatment 11 that included a mixture of insecticide products.

Standard 1 vs. Heads Up 2: Treatment 7 added the plant extract to Treatment 2. There were no significant differences between these treatments in the summary across locations for SS Jubilee Plus or Marquette.

Nufarm 1 vs. Nufarm 2: Treatment 9 added NUP-14044, an experimental product, to Treatment 8. Treatment 9 resulted in a significantly larger stand count compared to Treatment 8 in the summary across locations for SS Jubilee Plus, but not for Marquette. The differences were not significant, but Treatment 9 tended to result in higher vigor ratings compared to Treatment 8 in the summaries for SS Jubilee Plus, Marquette, and both hybrids.

Syngenta 1 vs. Syngenta 2: Treatments 12 and 13 compare several fungicide active ingredients. The differences were not significant, but Treatment 13 resulted in higher stand counts, adjusted stand counts, and vigor ratings compared to Treatment 12 in the summaries across locations for SS Jubilee Plus, Marquette, and both hybrids.

Standard 2 vs. McGregor 1: Treatment 15 added a seed enhancement to Treatment 3. Treatment 15 resulted in a higher stand count compared to Treatment 3 in the summary across locations and hybrids. It also resulted in a higher adjusted stand count in the summary across locations for SS Jubilee Plus. The vigor ratings did not differ in the summaries.

RESULTS SUMMARY

- SS JUBILEE PLUS vs. MARQUETTE: In general, SS Jubilee Plus resulted in lower stand counts and slightly lower adjusted stand counts and vigor ratings compared to Marquette, but similar weak plant counts.

- % STAND: While not all locations had treatment differences for % stand, some trends were apparent when locations were grouped and analyzed. The non-treated control and Treatments 6 and 11 resulted in the smallest stand counts when averaged across locations and hybrids. Treatment 13 resulted in the largest stand count when averaged across locations and hybrids. With the exception of Treatments 6, 11 and 13, the rest of the seed treatments resulted in combined treatment means for % stand that were similar to the two standards. SS Jubilee Plus and Marquette responded differently to some of the treatments despite being planted at the same locations.

- % SLOWS: SS Jubilee Plus and Marquette both averaged 14% slows in the summary across locations. There were no treatment differences for % slows results in the summary across locations for both hybrids or each hybrid analyzed separately, but there were significant treatment x location interactions. So, there were no discernable trends.

- ADJUSTED % STAND: Accounting for slows reduced adjusted stand counts for SS Jubilee Plus by 2% to 13% at different locations, or by 7% on average. They reduced adjusted stand counts for Marquette by 1% to 8% at different locations, or by 4% on average. Most of the stand problems were due to poor emergence rather than weak plants. In general, the treatments that resulted in the lowest stand counts also had the lowest adjusted stand counts. All of the other treatments had similar adjusted % stands on average.

- VIGOR: The non-treated control and Treatments 6 and 11 had lower vigor ratings compared to the other seed treatments in the summary across all locations and both hybrids. The highest ranking treatment for vigor was Treatment 10. With the exception of Treatments 6 and 11, all of the other seed treatments resulted in combined treatment means for vigor that were similar to the two standard treatments.

- This trial includes several comparisons of seed treatments that either substituted products, added products, and/or modified rates of products in the mixtures. Many of these comparisons were not discussed in this report beyond some general trends, but the data for each location are presented in the tables. A close inspection of the results should provide useful information to seed treatment formulators and other sweet corn industry personnel.

- For more information about the 2015 ISCDA Seed Treatment Trial, or about participation in future trials contact Carrie Wohleb at cwohleb@wsu.edu or (509) 754-2011 x.4367.

TABLE 1: 2015 ISCDA Seed Treatments				
No.	**Name**	**Treatment**	**Active Ingredients**	**Rate**
1	Control	No Treatment	none	
2	Standard 1	Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34	difenoconazole+mefenoxam mefenoxam fludioxonil carboxin	2.00 oz/cwt 0.38 oz/cwt 0.08 oz/cwt 3.50 oz/cwt
3	Standard 2	Captan 4 Flowable Thiram 480DP Dividend Extreme Apron XL Vitavax 34	captan thiram difenoconazole+mefenoxam mefenoxam carboxin	2.50 oz/cwt 2.50 oz/cwt 5.00 oz/cwt 0.32 oz/cwt 4.00 oz/cwt
4	Valent 1	Metlock Rizolex Sebring 318 FS Intego Solo Nipsit Inside	metconazole tolclofos-methyl metalaxyl ethaboxam clothianidin	0.052 oz/cwt 0.300 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.250 mg ai/seed
5	Valent 2	Metlock Rizolex Signet 480 FS Sebring 318 FS Intego Solo Nipsit Inside	metconazole tolclofos-methyl thiram metalaxyl ethaboxam clothianidin	0.052 oz/cwt 0.300 oz/cwt 2.500 oz/cwt 0.375 oz/cwt 0.300 oz/cwt 0.250 mg ai/seed
6	Heads Up 1	Heads Up	plant activator	0.56 g ai/cwt
7	Heads Up 2	Dividend Extreme Apron XL LS Maxim 4FS Vitavax 34 Heads Up	difenoconazole+mefenoxam mefenoxam fludioxonil carboxin plant activator	2.00 oz/cwt 0.38 oz/cwt 0.08 oz/cwt 3.50 oz/cwt 0.56 g ai/cwt
8	Nufarm 1	Spirato 480 FS Signet 480 FS Sebring 480 FS Sativa 309 FS Senator 600 FS	fludioxonil thiram metalaxyl tebuconazole imidicloprid	0.08 oz/cwt 2.50 oz/cwt 0.50 oz/cwt 0.74 oz/cwt 6.00 oz/cwt
9	Nufarm 2	Spirato 480 FS Signet 480 FS Sebring 480 FS Sativa 309 FS Senator 600 FS NUP-14044	fludioxonil thiram metalaxyl tebuconazole imidacloprid experimental product	0.08 oz/cwt 2.50 oz/cwt 0.50 oz/cwt 0.74 oz/cwt 6.00 oz/cwt 0.60 oz/cwt

TABLE 1: 2015 ISCDA Seed Treatments continued…				
No.	**Name**	**Treatment**	**Active Ingredients**	**Rate**
10	Albaugh 1	Metalaxyl 4L Difenaconazole 3L Thibendazole 4L TebuStar 250 ST Rizolex polymer ALB 100 ST	metalaxyl difenoconazole thiabendazole tebuconazole tolclofos-methyl seed coating	0.750 oz/cwt 2.000 oz/cwt 0.640 oz/cwt 0.740 oz/cwt 0.300 oz/cwt 0.050 oz/cwt
11	Albaugh 2	Tandem ST Aegis ST Condor ST	thiamethoxam+ lambda-cyhalothrin cyromazine *Bt kurstaki* strain EG2348	1.00 oz/cwt 2.00 oz/80,000 seed 0.10 oz/80,000 seed
12	Syngenta 1	Maxim 4 FS Apron XL Cruiser Vibrance Dividend Extreme Vitavax 34	fludioxonil mefenoxam thiamethoxam sedaxane difenoconazole+mefenoxam carboxin	0.08 oz/cwt 0.38 oz/cwt 0.30 g ai/ 100 kg seed 0.16 oz/cwt 2.00 oz/cwt 3.50 oz/cwt
13	Syngenta 2	Maxim Quattro Apron XL Cruiser Dividend Extreme Vibrance	fludioxonil+mefenoxam+ azoxystrobin+thiabendazole mefenoxam thiamethoxam difenoconazole+mefenoxam sedaxane	0.064 mg ai/seed 6.900 g ai/100 kg seed 0.300 g ai/ 100 kg seed 2.00 oz/cwt 0.16 oz/cwt
14	BASF 1	Stamina Integral Flo Rite 1197 Acquire Captan 400 Cruiser 5FS	pyraclostrobin *Bt* strain MBI 600 seed coating metalaxyl captan thiamethoxam	1.60 oz/cwt 0.37 oz/cwt 2.00 oz/cwt 1.50 oz/cwt 4.000 oz/cwt 0.80 mg ai/seed
15	McGregor 1	Captan 4 Flowable Thiram 480DP Dividend Extreme Apron XL Vitavax 34 Seed Start	captan thiram difenoconazole+mefenoxam mefenoxam carboxin	2.50 oz/cwt 2.50 oz/cwt 5.00 oz/cwt 0.32 oz/cwt 4.00 oz/cwt 10.0 oz/cwt

2015 ISCDA Seed Treatment Committee Chairs

Mike Erickson, Co-Chair, The McGregor Company, Filer, ID
Ron Baker, Co-Chair, HM Clause Inc., Nampa, ID
Carrie Wohleb, Research Coordinator, Washington State University, Moses Lake, WA

Trial	Locations	Planting Dates	Participating Researchers or Contacts
ID-1	Nampa, ID	Apr. 9, 2015	Justin Minor, Syngenta Seeds Inc., Nampa, ID
ID-2	Huston, ID	Apr. 15, 2015	Don Ogawa, Crookham Company, Caldwell, ID
ID-4	Nampa, ID	May 23, 2015	Ron Baker, HM Clause Inc., Nampa, ID
IL-1	Tolono, IL	April 18, 2015	Charlie Thompson, IFSI, Champaign, IL and Selena Virden, IFSI, Meridian, ID
IL-2	Mendota, IL	May 14, 2015	Steve Otto, Del Monte Foods, Rochelle, IL
MN-1	Stanton, MN	April 29, 2015	Justin Minor, Syngenta Seeds Inc., Nampa, ID
NY-1	Aurora, NY	May 29, 2015	Margaret Smith, Cornell University, Ithaca, NY and Sherrie Norman, Cornell University, Ithaca, NY
OR-1	Monroe, OR	May 23, 2015	Ed Peachey, Oregon State University, Corvallis, OR
WA-1	Quincy, WA	Apr. 8, 2015	Carrie Wohleb, Washington State University, Moses Lake, WA

TABLE 2a. 2015 ISCDA Seed Treatment Trial - % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	ID-1 *Apr-9-15*		ID-2 *Apr-15-15*		ID-3 *May-23-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	30.5 e	70.3 cd	56.0 d	76.3 a-e	65.0 d	81.2
2	62.8 bc	87.0 a	77.1 a	77.4 a-e	77.5 ab	88.8
3	67.5 ab	88.5 a	72.0 ab	75.8 b-e	77.0 ab	90.5
4	63.3 bc	76.5 bc	73.5 ab	76.3 a-e	80.8 a	89.0
5	62.8 bc	83.5 a	76.8 a	82.8 a	79.5 ab	91.8
6	43.3 d	67.8 d	63.3 c	65.8 f	66.8 cd	83.0
7	67.0 ab	84.5 a	69.0 bc	78.3 a-d	74.8 abc	91.3
8	58.5 c	85.0 a	75.3 ab	79.8 a-d	73.8 abc	87.5
9	67.5 ab	85.3 a	74.8 ab	81.0 ab	76.3 ab	82.8
10	69.3 ab	88.5 a	72.8 ab	74.8 b-e	75.3 abc	88.8
11	47.0 d	72.0 cd	64.5 c	71.0 ef	71.8 bcd	85.3
12	66.0 abc	83.3 ab	73.8 ab	80.3 abc	74.3 abc	81.0
13	73.5 a	84.0 a	74.5 ab	80.0 a-d	78.5 ab	90.3
14	65.5 bc	84.0 a	76.5 a	73.5 de	74.5 abc	85.8
15	64.9 bc	82.3 ab	75.8 a	74.3 cde	81.3 a	87.5
GRAND MEAN	**60.6**	**81.5**	**72.0**	**76.5**	**75.1**	**87.0**
ANOVA: TRT	0.0001	0.0001	0.0001	0.0009	0.0206	NS
LSD (P=0.05)	*7.7*	*7.0*	*6.7*	*6.6*	*8.7*	*8.0*
CV	8.9	6.0	6.6	6.0	8.1	6.5

TABLE 2b. 2015 ISCDA Seed Treatment Trial - % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	IL-1 *Apr-18-15*		IL-2 *May-14-15*		MN-1 *Apr-29-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	27.8 f	67.0 f	53.8 e	74.3 bc	36.5 e	68.5 de
2	67.0 b	70.5 ef	66.5 abc	72.8 bcd	64.2 abc	76.8 abc
3	53.8 d	73.0 def	65.5 bc	74.6 bc	61.8 a-d	76.3 abc
4	71.8 ab	82.0 abc	68.8 ab	67.5 d	56.5 cd	76.8 abc
5	69.8 ab	89.2 a	68.3 abc	76.8 ab	55.3 d	79.0 ab
6	35.3 ef	69.3 ef	58.8 de	70.5 bcd	38.8 e	64.3 e
7	64.7 bc	85.8 abc	59.3 de	72.8 bcd	54.8 d	71.5 cd
8	66.3 bc	83.5 abc	66.0 abc	75.0 abc	59.0 a-d	80.5 a
9	70.5 ab	80.8 a-d	71.5 a	76.8 ab	65.5 a	79.5 ab
10	66.0 bc	83.5 abc	66.8 abc	76.8 ab	60.5 a-d	79.3 ab
11	42.8 e	65.0 f	56.5 e	71.8 bcd	40.5 e	67.3 de
12	71.8 ab	84.3 abc	62.5 cd	75.0 abc	60.5 a-d	75.5 abc
13	75.5 a	88.5 ab	66.3 abc	81.3 a	61.3 a-d	75.3 abc
14	69.3 ab	80.3 bcd	70.3 ab	73.3 bcd	57.3 bcd	73.5 bcd
15	58.8 cd	78.0 cde	67.5 abc	70.0 cd	64.3 ab	73.5 bcd
GRAND MEAN	**60.7**	**78.7**	**64.5**	**73.8**	**55.8**	**74.5**
ANOVA: TRT	0.0001	0.0001	0.0001	0.0328	0.0001	0.0001
LSD (P=0.05)	*7.9*	*8.8*	*5.9*	*6.6*	*7.8*	*6.5*
CV	9.2	7.8	6.4	6.2	9.7	6.1

TABLE 2c. 2015 ISCDA Seed Treatment Trial - % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	NY-1 *May-29-15*		OR-1 *Apr-23-15*		WA-1 *Apr-8-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	56.0 abc	70.3	72.5	84.3	30.5	50.0
2	52.0 bcd	75.3	77.3	84.3	50.0	54.5
3	53.5 abc	73.3	77.3	87.7	42.8	54.5
4	51.8 bcd	78.8	80.7	83.7	38.5	57.3
5	68.8 ab	84.5	80.0	84.5	36.3	62.3
6	45.0 cd	60.8	76.5	83.0	42.3	53.5
7	63.3 abc	79.5	76.7	71.0	51.8	53.3
8	54.3 abc	89.0	80.0	87.3	45.3	64.2
9	66.8 ab	86.5	87.0	86.0	53.0	57.8
10	62.5 abc	81.8	80.3	77.7	52.5	57.8
11	34.3 d	80.3	80.0	74.0	33.5	49.8
12	59.3 abc	84.3	85.0	76.7	42.0	49.5
13	70.9 a	79.5	80.3	83.7	47.0	50.5
14	61.5 abc	82.3	78.5	78.3	42.5	45.3
15	60.5 abc	82.3	78.0	80.7	57.0	62.3
GRAND MEAN	**57.3**	**79.2**	**79.3**	**81.5**	**44.3**	**54.8**
ANOVA: TRT	0.0382	NS	NS	NS	NS	NS
LSD (P=0.05)	*18.7*	*17.7*	*8.4*	*14.3*	*19.7*	*14.5*
CV	22.8	15.7	7.3	12.0	31.0	18.6

TABLE 3. 2015 ISCDA Seed Treatment Trial - % STAND – SUMMARY ACROSS LOCATIONS.
Treatment means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	9 + 9 LOCATIONS BOTH HYBRIDS	9 LOCATIONS JUBILEE	9 LOCATIONS MARQUETTE
1	59.0 d	46.3 e	71.2 de
2	70.9 bc	65.5 abc	76.1 bc
3	70.0 c	63.1 c	76.9 bc
4	70.4 c	64.6 abc	76.2 bc
5	74.1 ab	67.3 abc	81.6 a
6	60.4 d	52.5 d	68.2 e
7	70.5 c	64.3 bc	76.7 bc
8	72.6 abc	63.8 c	81.6 a
9	74.3 ab	69.3 ab	79.2 ab
10	73.1 abc	67.1 abc	78.8 abc
11	61.0 d	51.5 d	71.3 de
12	71.1 abc	65.6 abc	76.5 bc
13	74.3 a	69.6 a	79.0 ab
14	70.5 c	66.2 abc	75.0 cd
15	72.3 abc	67.5 abc	77.1 bc
GRAND MEAN	**69.6**	**62.9**	**76.4**
LOCATION	0.0001	0.0001	0.0001
TREATMENT	0.0001	0.0001	0.0001
TRT x LOC	0.0001	0.0001	NS

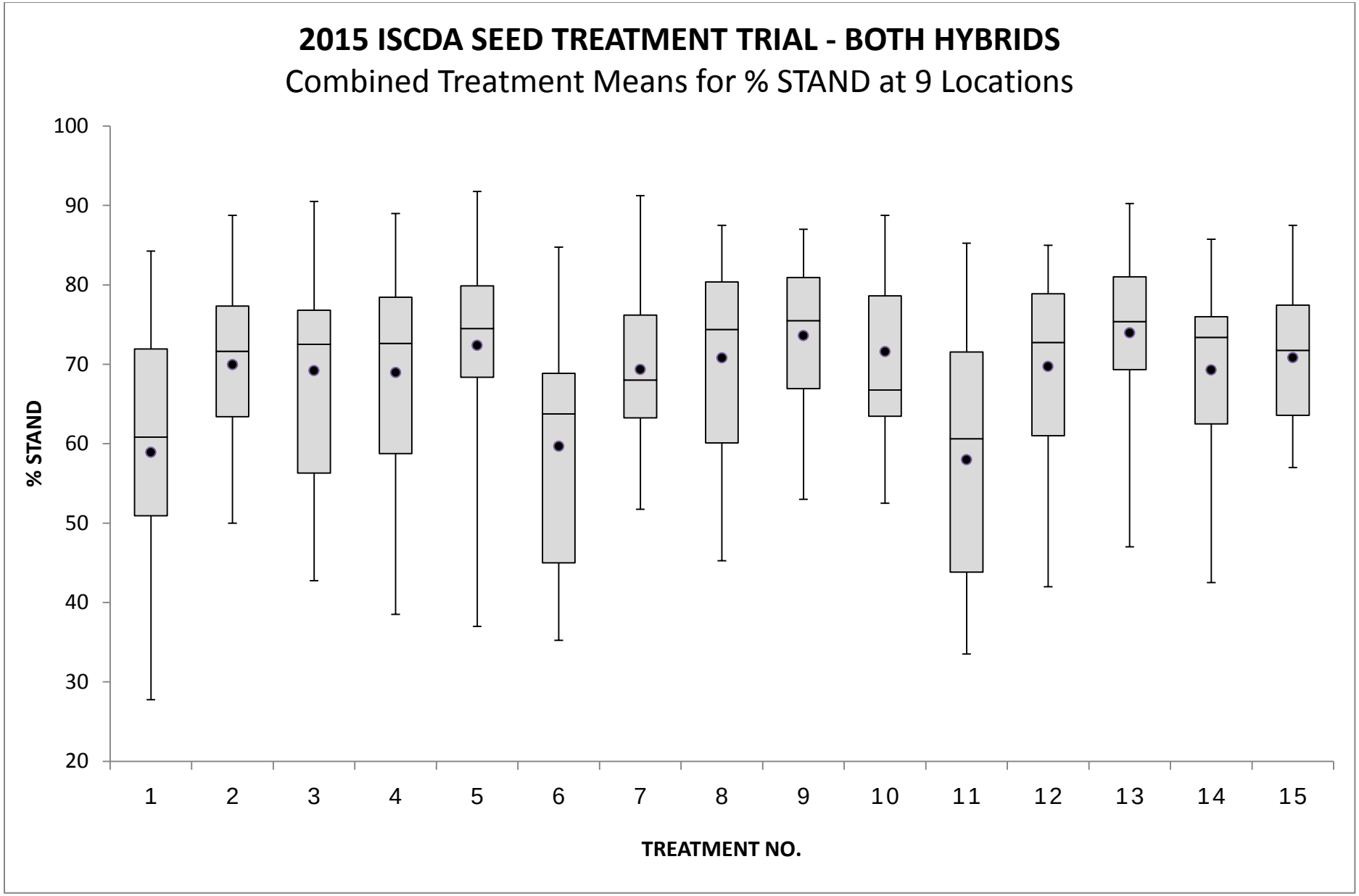

FIGURE 1. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for % STAND for BOTH HYBRIDS at 9 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

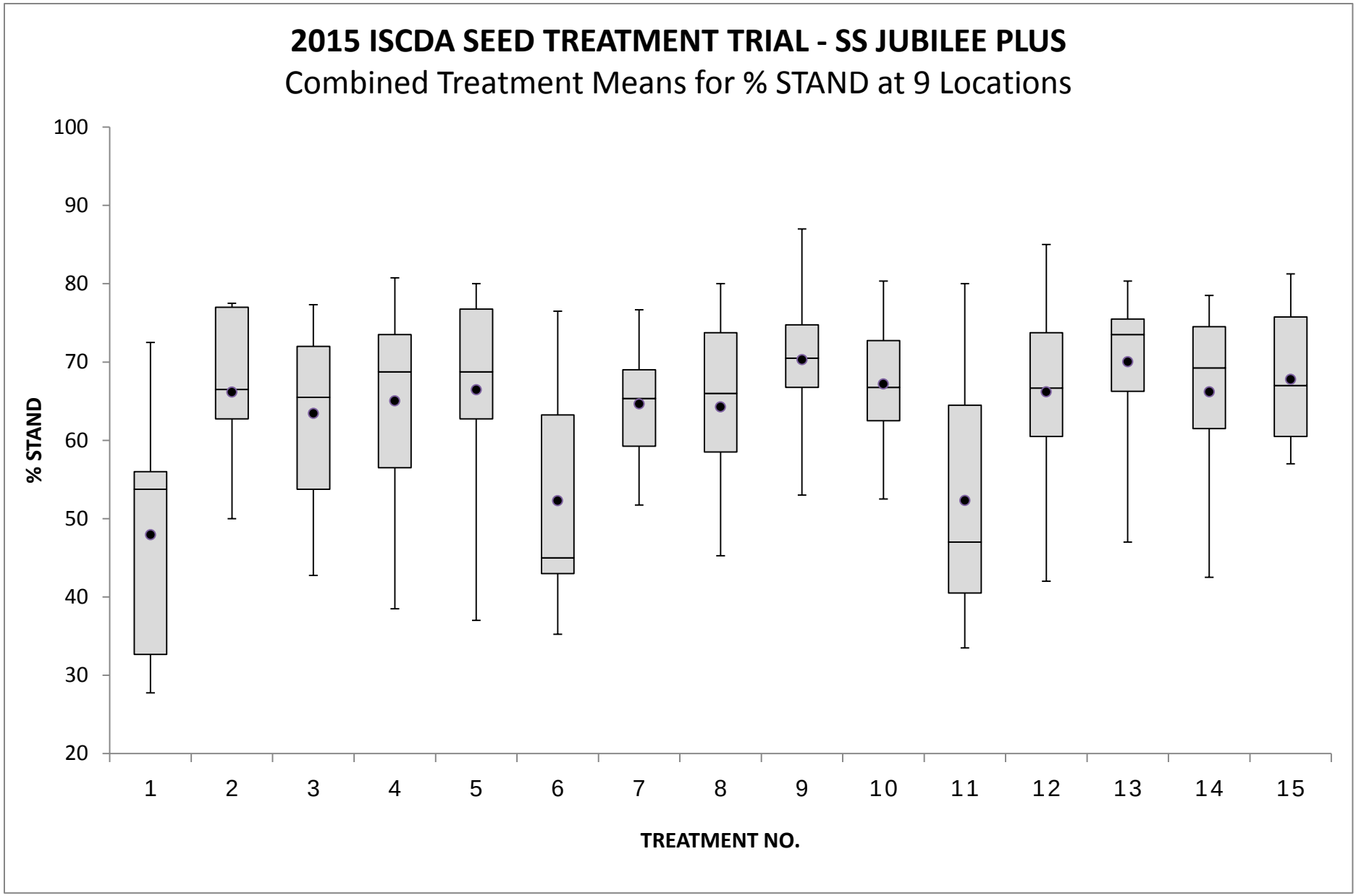

FIGURE 2. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for % STAND for SS JUBILEE PLUS at 9 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

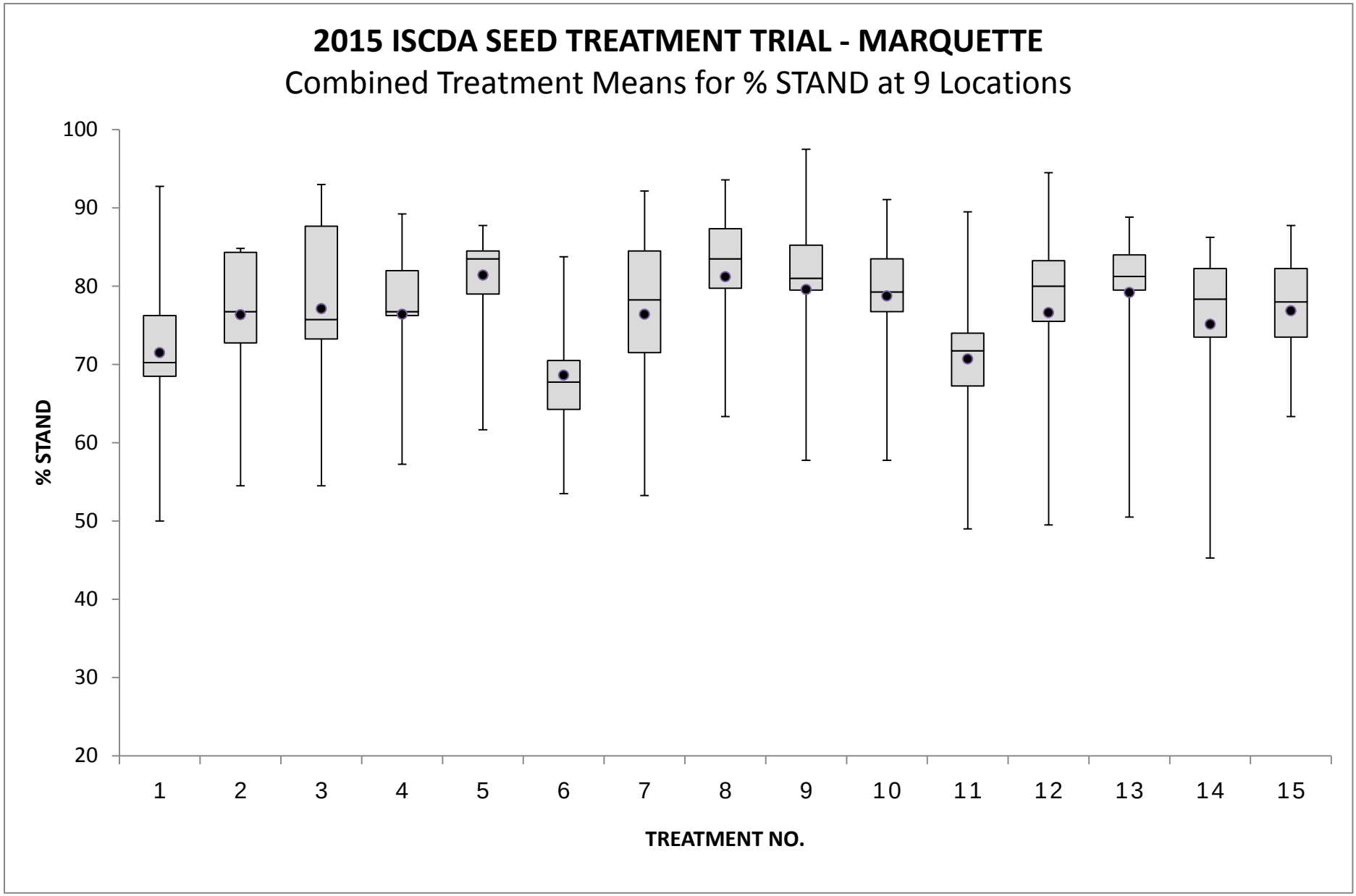

FIGURE 3. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for % STAND for MARQUETTE at 9 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

TABLE 4a. 2015 ISCDA Seed Treatment Trial - % SLOWS – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	ID-1 *Apr-9-15*		ID-2 *Apr-15-15*		ID-3 *May-23-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	4.8 de	5.5	4.0	1.5	9.8	11.4
2	7.0 ab	3.5	2.5	1.3	13.8	7.3
3	6.0 bcd	3.3	2.0	2.0	7.0	7.3
4	6.5 abc	4.5	1.5	5.8	11.0	8.3
5	6.5 abc	2.5	2.5	0.8	11.5	7.3
6	4.5 e	5.0	7.8	1.3	13.0	7.8
7	7.5 a	5.0	2.8	2.8	10.5	7.5
8	5.5 cde	4.3	2.5	3.0	13.3	5.0
9	7.0 ab	4.3	2.0	1.8	10.0	7.5
10	7.5 a	2.5	3.3	2.0	9.3	7.8
11	5.5 cde	4.8	3.5	0.8	11.5	10.3
12	6.0 abc	4.5	1.5	1.4	10.3	8.3
13	7.0 ab	5.5	3.3	0.8	11.3	6.5
14	6.0 bcd	4.5	2.3	3.3	9.0	6.8
15	6.5 abc	2.5	3.5	2.0	9.3	9.3
GRAND MEAN	**6.3**	**4.1**	**3.0**	**2.0**	**10.7**	**13.4**
ANOVA: TRT	0.0001	NS	NS	NS	NS	NS
LSD (P=0.05)	*1.5*	*2.6*	*3.5*	*3.0*	*3.8*	*4.4*
CV	16.6	43.8	81.1	105.1	24.9	39.2

TABLE 4b. 2015 ISCDA Seed Treatment Trial - % SLOWS – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	IL-1 *Apr-18-15*		IL-2 *May-14-15*		MN-1 *Apr-29-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	34.5 a	20.8 a	12.8 a	3.4	11.8 abc	1.5
2	19.3 bc	8.0 bcd	3.5 b	3.8	4.6 de	2.5
3	15.5 bc	5.3 d	4.0 b	2.0	5.3 cde	2.0
4	18.8 bc	3.0 d	4.3 b	2.3	11.0 a-d	4.0
5	19.8 bc	3.2 d	5.3 b	2.5	5.8 cde	2.5
6	33.0 a	12.8 bc	5.8 b	2.0	15.8 ab	5.3
7	21.9 b	5.5 d	3.8 b	2.0	5.0 cde	2.8
8	15.0 bc	5.8 d	5.3 b	2.0	5.8 cde	2.0
9	14.5 bc	7.0 cd	3.8 b	3.5	10.5 b-e	2.8
10	12.3 c	2.3 d	5.5 b	2.0	7.3 cde	3.3
11	38.0 a	13.2 b	11.0 a	1.6	18.0 a	2.8
12	14.5 bc	5.8 d	4.3 b	2.5	7.8 cde	2.8
13	11.5 c	4.0 d	4.3 b	1.8	3.5 e	2.5
14	12.3 c	4.3 d	6.0 b	2.0	6.0 cde	2.3
15	13.0 bc	7.5 bcd	4.0 b	1.8	7.3 cde	2.3
GRAND MEAN	**19.6**	**7.2**	**5.6**	**2.3**	**8.4**	**2.7**
ANOVA: TRT	0.0001	0.0001	0.0004	NS	0.0036	NS
LSD (P=0.05)	*9.5*	*5.9*	*4.0*	*2.3*	7.0	*3.6*
CV	33.8	56.9	50.2	70.0	*58.8*	91.8

TABLE 4c. 2015 ISCDA Seed Treatment Trial - % SLOWS – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	NY-1 *May-29-15*		OR-1 *Apr-23-15*		WA-1 *Apr-8-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1			6.5	2.8 bcd	4.0	5.7
2			5.0	2.7 bcd	5.1	2.4
3			7.0	2.7 bcd	4.1	3.9
4			4.3	6.0 bcd	2.3	2.1
5			3.0	2.5 bcd	2.0	2.4
6			7.5	5.7 bcd	7.9	2.9
7			6.0	8.5 b	2.5	1.9
8			5.3	1.3 cd	2.7	0.4
9			5.5	0.5 d	2.8	2.2
10			9.0	8.0 bc	5.5	2.7
11			6.3	26.0 a	4.0	3.3
12			3.3	6.0 bcd	1.8	2.8
13			9.3	3.7 bcd	5.2	2.2
14			5.8	7.0 bcd	2.4	2.5
15			2.3	6.7 bcd	3.1	1.3
GRAND MEAN			**5.8**	**6.0**	**3.7**	**2.6**
ANOVA: TRT			NS	0.0001	NS	NS
LSD (P=0.05)			*6.3*	*6.7*	*3.9*	*4.2*
CV			75.5	76.1	73.8	112.6

TABLE 5. 2015 ISCDA Seed Treatment Trial - % SLOWS – SUMMARY ACROSS LOCATIONS.
Treatment means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	8 + 8 LOCATIONS BOTH HYBRIDS	8 LOCATIONS JUBILEE	8 LOCATIONS MARQUETTE
1	14.3	14.2	14.4
2	14.9	15.2	14.7
3	14.3	14.0	14.6
4	13.8	14.4	13.3
5	14.0	13.8	14.2
6	14.7	16.4	13.0
7	14.4	14.5	14.3
8	13.3	13.1	13.4
9	14.3	14.5	14.2
10	14.8	15.3	14.4
11	16.9	17.2	16.5
12	13.2	12.1	14.3
13	14.0	14.7	13.3
14	13.3	13.0	13.7
15	13.2	12.0	14.5
GRAND MEAN	**14.2**	**14.3**	**14.2**
LOCATION	0.0001	0.0001	0.0001
TREATMENT	NS	NS	NS
TRT x LOC	0.0001	0.0001	0.0001

TABLE 6a. 2015 ISCDA Seed Treatment Trial - ADJUSTED % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	ID-1 *Apr-9-15*		ID-2 *Apr-15-15*		ID-3 *May-23-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	28.1 e	66.5 cd	53.8 e	75.0 bcd	60.3	69.8 d
2	60.0 bc	83.8 a	74.9 a	76.3 a-d	63.8	81.5 abc
3	63.5 ab	85.5 a	70.5 ab	74.0 b-e	70.0	83.3 ab
4	59.8 bc	73.0 bc	72.3 ab	72.0 de	69.8	81.0 abc
5	58.0 bc	81.3 a	75.0 a	82.0 a	68.0	84.5 a
6	38.8 d	64.3 d	58.5 de	65.0 f	53.8	75.3 bcd
7	63.0 ab	80.3 a	67.0 bc	76.0 a-d	64.3	83.8 ab
8	53.0 c	81.5 a	73.5 ab	77.5 a-d	60.5	82.5 ab
9	62.3 ab	81.5 a	73.0 ab	79.5 ab	66.3	75.3 bcd
10	64.8 ab	86.0 a	70.5 ab	73.3 b-e	66.0	81.0 abc
11	42.5 d	68.8 cd	62.3 cd	68.0 ef	60.3	75.0 bcd
12	63.2 ab	79.5 ab	72.5 ab	79.2 abc	64.3	72.8 cd
13	67.8 a	79.5 ab	72.0 ab	79.6 ab	67.5	83.8 ab
14	60.3 bc	80.0 a	74.8 a	71.0 def	65.5	79.0 abc
15	61.8 ab	80.0 a	73.3 ab	72.8 cde	72.0	78.3 a-d
GRAND MEAN	**56.4**	**78.1**	**69.6**	**74.8**	**64.8**	**79.1**
ANOVA: TRT	0.0001	0.0001	0.0001	0.0004	NS	0.0312
LSD (P=0.05)	*7.4*	*6.7*	*7.3*	*6.7*	*10.4*	*8.9*
CV	9.1	6.0	7.3	6.3	11.2	7.9

TABLE 6b. 2015 ISCDA Seed Treatment Trial - ADJUSTED % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	IL-1 *Apr-18-15*		IL-2 *May-14-15*		MN-1 *Apr-29-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	18.0 f	52.9 h	47.0 f	71.9 bc	32.3 d	67.5 cde
2	54.3 b-e	65.0 efg	64.3 ab	70.0 bc	61.4 a	75.0 abc
3	45.3 e	69.5 def	62.8 abc	73.0 ab	58.5 abc	74.8 abc
4	58.3 a-d	79.5 a-d	66.0 ab	66.0 c	50.5 c	73.5 abc
5	55.8 bcd	86.0 a	64.8 ab	75.0 ab	52.3 bc	77.3 ab
6	23.8 f	60.5 fgh	55.3 de	69.0 bc	33.3 d	61.0 e
7	50.6 de	81.0 abc	57.0 cd	71.3 bc	52.0 bc	69.5 bcd
8	57.0 bcd	78.8 a-d	62.5 abc	73.5 ab	55.8 abc	78.8 a
9	60.3 abc	75.3 b-e	68.8 a	74.0 ab	58.8 abc	77.5 a
10	57.6 a-d	81.8 abc	63.0 abc	75.0 ab	56.0 abc	76.8 ab
11	26.5 f	56.5 gh	50.3 ef	69.7 bc	33.8 d	65.3 de
12	61.3 ab	79.5 a-d	60.0 bcd	73.0 ab	55.8 abc	73.5 abc
13	66.3 a	85.0 ab	63.5 ab	79.5 a	59.3 abc	73.3 abc
14	61.0 ab	76.8 a-d	66.0 ab	71.8 bc	53.8 abc	72.0 a-d
15	51.3 cde	72.3 cde	64.8 ab	68.8 bc	59.8 ab	71.8 a-d
GRAND MEAN	**49.8**	**73.3**	**61.1**	**72.1**	**51.5**	**72.5**
ANOVA: TRT	0.0001	0.0001	0.0001	0.0489	0.0001	0.0017
LSD (P=0.05)	*9.0*	*10.7*	*6.4*	*6.6*	*8.8*	*7.8*
CV	12.7	10.2	7.3	6.4	12.0	7.6

TABLE 6c. 2015 ISCDA Seed Treatment Trial - ADJUSTED % STAND – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	NY-1 *May-29-15*		OR-1 *Apr-23-15*		WA-1 *Apr-8-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1			68.0	81.8 a	29.3	47.8
2			73.7	82.0 a	47.3	53.3
3			72.0	85.3 a	41.0	52.8
4			77.0	79.0 ab	37.5	56.0
5			77.5	82.5 a	39.8	60.8
6			71.3	78.3 ab	36.8	52.0
7			72.0	64.5 b	50.5	52.3
8			75.7	86.0 a	44.0	63.9
9			82.5	85.5 a	51.5	56.5
10			73.3	71.7 ab	49.8	56.3
11			75.0	40.0 c	32.0	48.2
12			82.3	72.7 ab	41.0	48.3
13			72.7	80.7 a	44.5	49.3
14			74.3	73.0 ab	41.5	44.3
15			76.0	75.7 ab	55.3	61.5
GRAND MEAN			**74.9**	**75.9**	**30.8**	**53.5**
ANOVA: TRT			NS	0.0006	NS	NS
LSD (P=0.05)			*10.6*	*15.9*	*18.8*	*15.1*
CV			9.8	14.3	30.8	19.7

TABLE 7. 2015 ISCDA Seed Treatment Trial – ADJUSTED % STAND – SUMMARY ACROSS LOCATIONS.
Treatment means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	8 + 8 LOCATIONS BOTH HYBRIDS	8 LOCATIONS JUBILEE	8 LOCATIONS MARQUETTE
1	48.6 b	38.7 c	58.6 ef
2	58.3 a	54.1 ab	62.3 c-f
3	58.0 a	52.5 b	63.5 a-d
4	58.7 a	53.9 ab	63.5 a-d
5	60.8 a	55.1 ab	67.4 ab
6	50.1 b	42.9 c	57.6 fg
7	57.4 a	51.9 b	62.8 b-e
8	60.8 a	54.1 ab	67.6 a
9	60.8 a	57.0 ab	64.7 a-d
10	59.7 a	54.4 ab	64.5 a-d
11	47.6 b	42.6 c	53.8 g
12	59.0 a	55.9 ab	62.0 c-f
13	61.1 a	56.3 ab	66.1 abc
14	58.3 a	55.6 ab	61.2 def
15	60.5 a	58.2 a	62.7 b-e
GRAND MEAN	**57.3**	**52.2**	**58.3**
LOCATION	0.0001	0.0001	0.0001
TREATMENT	0.0001	0.0001	0.0001
TRT x LOC	0.0001	0.0001	0.0001

TABLE 8a. 2015 ISCDA Seed Treatment Trial - VIGOR – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	ID-1 *Apr-9-15*		ID-2 *Apr-15-15*		ID-3 *May-23-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	2.37 de	3.50	2.88 de	3.25		
2	3.05 ab	3.75	3.58 ab	3.58		
3	3.00 bcd	4.00	3.44 ab	3.44		
4	3.25 abc	3.50	3.31 abc	3.44		
5	3.25 abc	3.50	3.50 ab	3.63		
6	2.25 e	3.50	3.00 cde	3.44		
7	3.75 a	4.00	3.31 abc	3.67		
8	2.75 cde	3.88	3.25 bcd	3.81		
9	3.50 ab	3.75	3.25 bcd	3.69		
10	3.75 a	4.00	3.31 abc	3.63		
11	2.75 cde	3.75	2.81 e	3.45		
12	3.00 bcd	3.75	3.56 ab	3.51		
13	3.50 ab	3.75	3.56 ab	3.68		
14	3.00 bcd	4.00	3.56 ab	3.69		
15	3.25 abc	4.00	3.69 a	3.50		
GRAND MEAN	**3.13**	**3.78**	**3.33**	**3.56**		
ANOVA: TRT	0.0016	NS	0.0004	NS		
LSD (P=0.05)	*0.72*	*0.57*	*0.39*	*0.39*		
CV	16.2	10.6	8.2	7.7		

TABLE 8b. 2015 ISCDA Seed Treatment Trial - VIGOR – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	IL-1 *Apr-18-15*		IL-2 *May-14-15*		MN-1 *Apr-29-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1	1.0 e	3.4 d	1.8 d	3.0	2.75 f	3.88 ab
2	3.0 bc	3.8 bcd	3.3 a	3.0	4.32 a	4.13 ab
3	3.0 bc	4.3 abc	3.0 ab	3.0	3.77 abc	4.25 a
4	3.0 bc	4.3 abc	3.3 a	3.0	3.38 cde	4.00 ab
5	2.8 c	4.7 a	2.3 bcd	3.5	3.13 def	4.25 a
6	1.8 d	3.5 cd	2.0 cd	3.0	2.75 f	3.25 c
7	3.3 abc	4.8 a	2.8 abc	3.3	3.75 abc	4.13 ab
8	3.8 a	4.5 ab	3.0 ab	3.0	3.63 bcd	4.13 ab
9	3.0 bc	4.5 ab	3.3 a	3.3	3.75 abc	4.00 ab
10	3.7 a	5.0 a	3.3 a	3.3	4.11 ab	4.25 a
11	1.2 d	3.4 d	2.3 bcd	3.0	2.88 ef	3.75 b
12	3.3 abc	4.3 abc	3.0 ab	3.0	3.75 abc	4.00 ab
13	3.3 abc	4.5 ab	3.0 ab	3.5	3.88 abc	4.25 a
14	3.5 ab	4.5 ab	2.8 abc	3.5	3.38 cde	4.00 ab
15	2.8 c	3.8 bcd	3.0 ab	3.3	3.75 abc	4.25 a
GRAND MEAN	**2.9**	**4.2**	**2.8**	**3.2**	**3.53**	**4.0**
ANOVA: TRT	0.0001	0.0004	0.0011	NS	0.0001	NS
LSD (P=0.05)	*0.6*	*0.8*	*0.8*	*0.6*	*0.60*	*0.4*
CV	15.0	12.8	19.1	13.8	11.8	7.3

TABLE 8c. 2015 ISCDA Seed Treatment Trial - VIGOR – SS JUBILEE PLUS and MARQUETTE.
Planting date in italics. Means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	NY-1 *May-29-15*		OR-1 *Apr-23-15*		WA-1 *Apr-8-15*	
	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE	JUBILEE	MARQUETTE
1			4.0 ab	3.3	3.63 cd	4.38
2			3.0 cd	3.3	4.00 bc	5.00
3			3.0 cd	3.7	4.50 ab	5.00
4			4.3 a	3.7	4.75 a	4.88
5			3.3 bcd	3.5	4.61 ab	4.98
6			2.5 d	3.0	3.28 d	4.63
7			3.3 bc	2.5	4.32 ab	4.75
8			3.3 bc	3.7	4.63 ab	5.00
9			4.0 ab	4.0	4.49 ab	5.00
10			3.3 bc	2.7	4.38 ab	5.00
11			3.3 bc	3.0	3.60 d	5.00
12			4.0 ab	3.0	4.28 ab	5.00
13			3.0 cd	2.3	4.38 ab	4.75
14			3.5 bc	2.7	4.28 ab	4.88
15			3.7 abc	2.7	4.25 abc	4.99
GRAND MEAN			**3.4**	**3.1**	**4.22**	**4.88**
ANOVA: TRT			0.0042	NS	0.0029	NS
LSD (P=0.05)			*0.8*	*1.3*	*0.68*	*0.4*
CV			15.9	28.3	11.2	5.7

TABLE 9. 2015 ISCDA Seed Treatment Trial –VIGOR – SUMMARY ACROSS LOCATIONS.
Treatment means in columns followed by the same letter are not significantly different (P=0.05).

TREATMENT NO.	7 + 7 LOCATIONS BOTH HYBRIDS	7 LOCATIONS JUBILEE	7 LOCATIONS MARQUETTE
1	3.05 c	2.54 c	3.54 cd
2	3.67 ab	3.50 ab	3.83 abc
3	3.69 ab	3.39 ab	3.99 a
4	3.70 ab	3.58 a	3.82 abc
5	3.57 b	3.20 b	3.98 a
6	2.99 c	2.48 c	3.49 d
7	3.74 ab	3.49 ab	3.97 a
8	3.72 ab	3.48 ab	3.91 a
9	3.79 ab	3.54 ab	4.03 a
10	3.85 a	3.67 a	4.02 a
11	3.14 c	2.70 c	3.62 bcd
12	3.67 ab	3.51 ab	3.83 abc
13	3.70 ab	3.53 ab	3.89 ab
14	3.67 ab	3.40 ab	3.94 a
15	3.62 ab	3.47 ab	3.77 a-d
GRAND MEAN	**3.57**	**3.30**	**3.84**
LOCATION	0.0001	0.0001	0.0001
TREATMENT	0.0001	0.0001	0.0026
TRT x LOC	0.0001	0.0001	0.0037

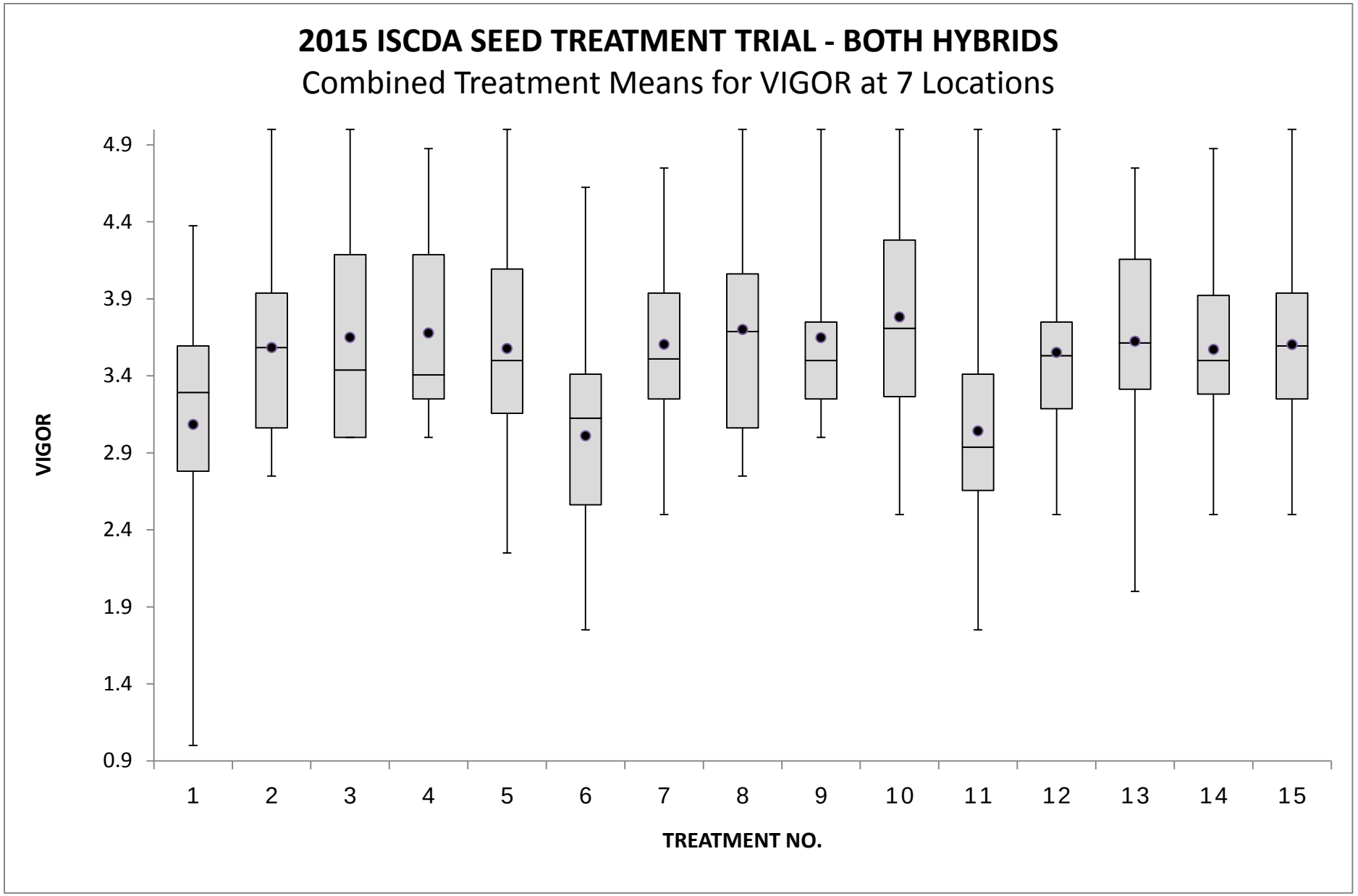

FIGURE 4. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for VIGOR for BOTH HYBRIDS at 7 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

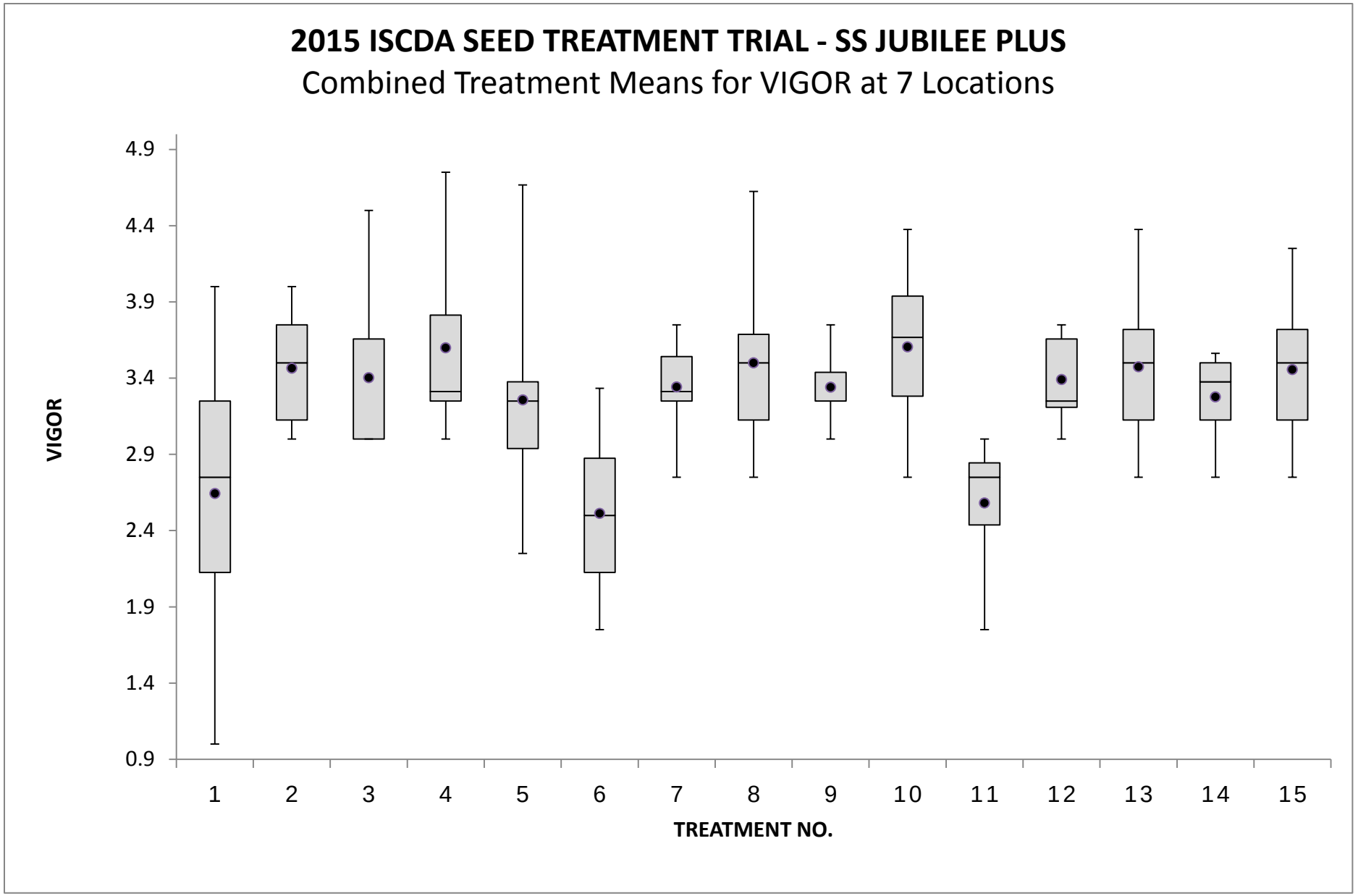

FIGURE 5. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for VIGOR for SS JUBILEE PLUS at 7 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.

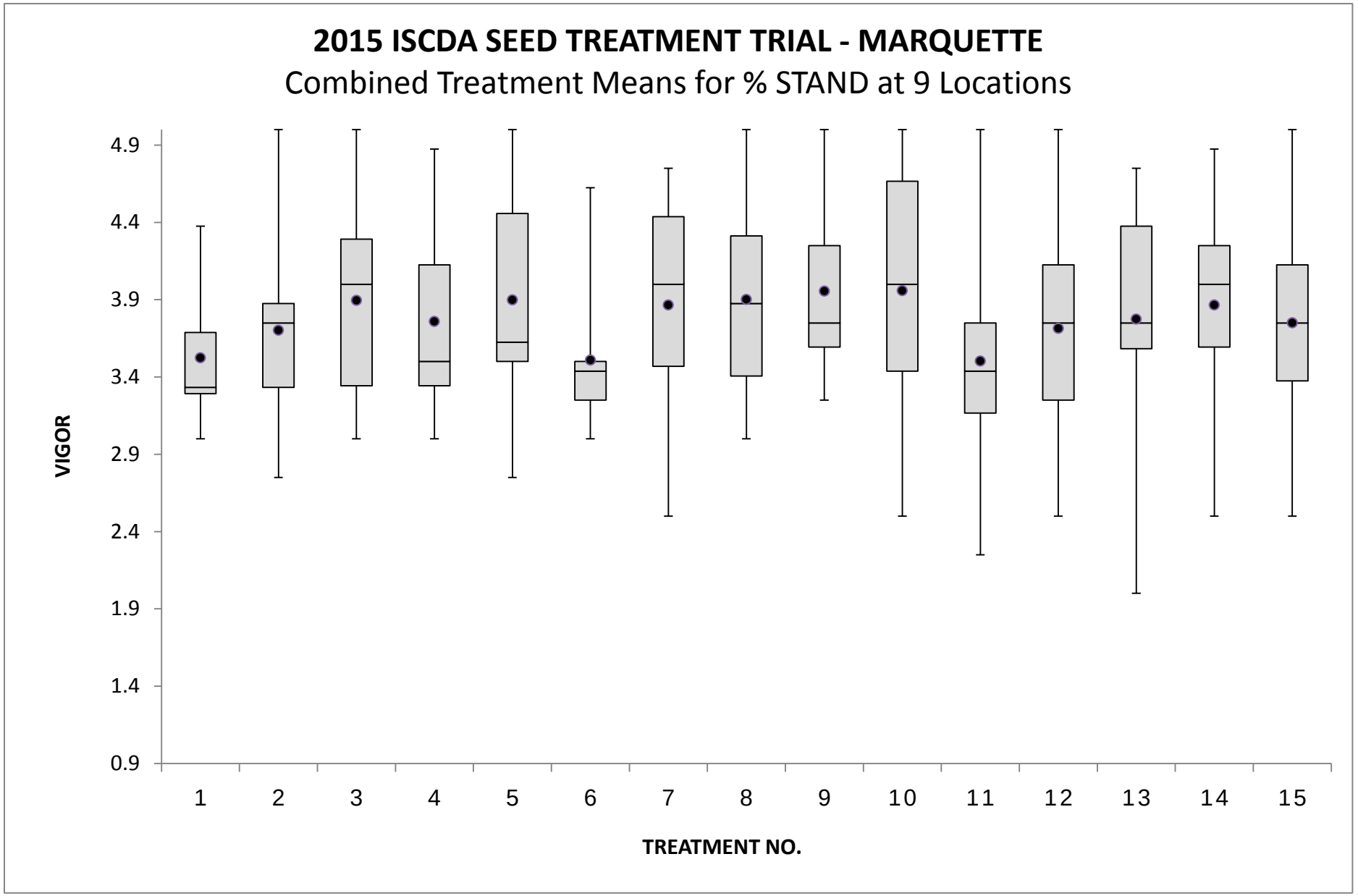

FIGURE 6. 2015 ISCDA Seed Treatment Trial – Box and whisker plot of combined treatment means for VIGOR for MARQUETTE at 7 locations. The mean for each treatment is indicated by • . The box indicates the interquartile range for results (divided by the median), and the whiskers span to the minimum and maximum results for each treatment.