

Title: Evaluation of Abscisic Acid in Sprout Susceptible Spring Wheat - 2015

Objective: To evaluate foliar applications of abscisic acid (ABA), at three different growth stages and four use rates on two susceptible spring wheat varieties, for prevention of pre-harvest sprout.

Materials and Methods:

A commercial formulation of ABA was applied at three growth stages (boot, anthesis and soft dough), at four use rates (0.0, 0.5, 1.0, and 4.0 times the labeled rate) to two sprout-susceptible spring wheat varieties: Treasure soft white spring wheat and Vida hard red spring wheat. The experimental design was a split plot with four replications. Treasure and Vida were the whole plot treatments, while ABA rate and timing combinations were the sub-plot effects. The study was irrigated when the plants reached physiological maturity to enhance preharvest sprout. Approximately 0.30 inches of water was applied by hand-lines on August 7, 10, 11, and 13.

Results:

Significant difference were observed for the two spring wheat varieties (Table 4). Treasure was later to mature and was shorter than Vida. Treasure also produced the highest grain yield, but had lower protein, test weight, thousand kernel weight, and falling number values.

ABA had minimal effect on plant growth, yield or grain quality. Heading occurred later as application timing was delayed (Table 2). In addition, protein increased as ABA rate increased (Table 3). However, ABA did not impact falling number.

Summary:

Applications of ABA had minimal impact on wheat growth and development and failed to have any effect on falling number.

Table 1. Materials and Methods - Evaluation of Abscisic Acid in Sprout Susceptible Spring Wheat - 2015

Seeding Date:	4/21/2015	Harvest Date:	8/14/2015
Julian Date:	111	Julian Date:	226
Previous Crop:	Canola	Fertilizer:	250-40-90
Tillage:	Conventional	Herbicide:	Huskie Complete 13.7oz/A
Soil Type:	Creston SiL	Insecticide:	Warrior II 1.92 floz/A
Soil Test:	144-12-222	Fungicide:	Quadris 6 floz/A

Table 2. Main effect of application timing on the agronomic performance of spring wheat - 2015

Timing	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Flag Leaf	170.6	34.0	0.0	123.8	12.0	61.1	39.8	324.6
Anthesis	171.0	33.7	0.3	122.9	12.0	61.3	39.6	325.0
Soft Dough	171.7	33.4	0.8	121.8	12.0	61.2	39.3	329.1
LSD	0.8	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.0484	0.4970	0.4219	0.9088	0.9111	0.8503	0.8687	0.7609

Table 3. Main effect of application rate on the agronomic performance of spring wheat - 2015

Rate of ConTego lb ai/A	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Check	171.3	33.9	1.3	122.3	11.9	61.3	39.5	325.9
0.078	171.1	33.5	0.0	122.2	11.9	61.2	39.3	324.5
0.156	171.1	33.9	0.2	125.4	12.0	61.2	39.7	324.6
0.624	170.9	33.5	0.0	121.5	12.1	61.2	39.9	330.0
LSD	ns	ns	ns	ns	0.2	ns	ns	ns
Pr>F	0.4812	0.5206	0.2350	0.3450	0.0431	0.5965	0.3448	0.3809

Table 4. Main effect of variety on the agronomic performance of spring wheat -2015

Variety	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Vida	169.3	34.5	0.1	118.9	13.5	61.4	39.8	341.7
Treasure	172.9	32.9	0.6	126.8	10.5	61.0	39.4	310.8
LSD	0.4	0.5	ns	1.5	0.1	0.1	0.4	6.1
Pr>F	0.0001	0.0001	0.2825	0.0001	0.0001	0.0001	0.0266	0.0001

HD: heading date, HT: height, LOD: lodging, YLD: yield, PRO: protein, TWT: test weight, TKW: thousand kernel weight, FN: falling number

¹ adjusted to 13% moisture, ² adjusted to 12% moisture

Table 5. Effect of application timing and rate on the agronomic performance of spring wheat -2015

Timing	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Check								
Flag Leaf	171.1	34.0	0.0	123.4	12.0	61.1	39.4	324.4
Anthesis	171.1	34.3	1.3	124.4	11.7	61.4	39.6	330.3
Soft Dough	171.8	33.4	2.5	119.3	11.9	61.3	39.5	322.8
0.078 lbai/A								
Flag Leaf	170.5	34.3	0.0	126.9	11.9	61.1	39.7	325.3
Anthesis	170.9	33.1	0.0	120.4	11.9	61.3	39.3	321.6
Soft Dough	172.0	33.1	0.0	119.2	11.8	61.3	39.0	326.6
0.156 lbai/A								
Flag Leaf	170.6	34.0	0.0	126.3	12.0	61.1	39.8	322.0
Anthesis	170.9	33.8	0.0	125.8	12.2	61.2	40.0	321.7
Soft Dough	171.8	33.9	0.6	124.1	11.9	61.2	39.3	330.0
0.624 lbai/A								
Flag Leaf	170.3	33.9	0.0	118.8	12.1	61.3	40.4	326.7
Anthesis	171.0	33.6	0.0	120.9	12.2	61.2	39.6	326.3
Soft Dough	171.4	33.1	0.0	124.8	12.1	61.0	39.5	337.1
LSD	ns	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.8455	0.6349	0.8008	0.2762	0.5693	0.4385	0.7145	0.4526

Table 6. Effect of variety and application timing on the agronomic performance of spring wheat -2015

Timing	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Vida								
Flag Leaf	168.8	34.9	0.0	119.3	13.5	61.4	40.2	339.3
Anthesis	169.3	34.5	0.0	117.8	13.5	61.5	39.5	342.0
Soft Dough	169.9	34.1	0.3	119.7	13.4	61.5	39.8	343.7
Treasure								
Flag Leaf	172.5	33.1	0.0	128.4	10.5	60.9	39.5	309.9
Anthesis	172.6	32.9	0.6	127.9	10.5	61.1	39.7	307.9
Soft Dough	173.6	32.6	1.3	124.0	10.5	60.9	38.9	314.5
LSD	ns	ns	ns	2.6	ns	ns	ns	ns
Pr>F	0.6482	0.8530	0.7187	0.0057	0.6432	0.2928	0.0791	0.7592

HD: heading date, HT: height, LOD: lodging, YLD: yield, PRO: protein, TWT: test weight, TKW: thousand kernel weight, FN: falling number

¹ adjusted to 13% moisture, ² adjusted to 12% moisture

Table 7. Effect of variety and application rate on the agronomic performance of spring wheat -2015

Rate of ConTego lb ai/A	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Vida								
Check	169.6	35.0	0.0	118.6	13.4	61.5	39.7	340.3
0.078	169.1	34.3	0.0	117.3	13.3	61.4	39.3	337.6
0.156	169.3	34.5	0.4	121.4	13.5	61.4	40.1	340.0
0.624	169.3	34.3	0.0	118.4	13.6	61.4	40.2	348.9
Treasure								
Check	173.1	32.8	2.5	126.1	10.4	61.0	39.3	311.4
0.078	173.2	32.8	0.0	127.1	10.4	61.0	39.3	311.4
0.156	172.8	33.3	0.0	129.4	10.6	60.9	39.3	309.2
0.624	172.5	32.8	0.0	124.6	10.6	61.0	39.5	311.1
LSD	ns	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.5382	0.4594	0.1386	0.4064	0.9948	0.8455	0.4985	0.5713

HD: heading date, HT: height, LOD: lodging, YLD: yield, PRO: protein, TWT: test weight, TKW: thousand kernel weight, FN: falling number

¹ adjusted to 13% moisture, ² adjusted to 12% moisture

Table 8. Effect of variety, timing, and application rate on the agronomic performance of spring wheat -2015

Rate of ConTego lb ai/A	HD Julian	HT in	LOD %	YLD ¹ bu/A	PRO ² %	TWT ¹ lb/bu	TKW ¹ g	FN sec
Vida & Flag leaf								
Check	169.3	35.3	0.0	120.6	13.5	61.3	39.5	338.1
0.078	168.3	35.3	0.0	121.2	13.4	61.3	39.7	340.0
0.156	169.0	34.3	0.0	120.6	13.6	61.4	40.3	334.2
0.624	168.5	35.0	0.0	114.8	13.6	61.5	41.2	345.1
Vida & Anthesis								
Check	169.5	35.5	0.0	117.6	13.2	61.6	39.7	346.7
0.078	169.0	33.8	0.0	115.1	13.3	61.4	38.9	336.6
0.156	169.5	34.5	0.0	120.1	13.6	61.4	40.0	337.0
0.624	169.3	34.3	0.0	118.5	13.7	61.4	39.6	347.9
Vida & Soft Dough								
Check	170.0	34.3	0.0	117.5	13.4	61.7	39.9	336.3
0.078	170.0	33.8	0.0	115.8	13.3	61.5	39.3	336.2
0.156	169.5	34.8	1.3	123.4	13.4	61.4	39.9	348.6
0.624	170.0	33.8	0.0	122.0	13.5	61.3	40.0	353.9
Treasure & Flag leaf								
Check	173.0	32.8	0.0	126.1	10.5	60.9	39.3	310.8
0.078	172.8	33.3	0.0	132.7	10.4	60.9	39.6	310.7
0.156	172.3	33.8	0.0	131.9	10.5	60.8	39.2	309.8
0.624	172.0	32.8	0.0	122.9	10.6	61.1	39.7	308.3
Treasure & Anthesis								
Check	172.8	33.0	2.5	131.1	10.3	61.3	39.6	314.0
0.078	172.8	32.5	0.0	125.8	10.5	61.1	39.7	306.7
0.156	172.3	33.0	0.0	131.5	10.8	61.0	40.0	306.3
0.624	172.8	33.0	0.0	123.3	10.6	61.1	39.7	304.7
Treasure & Soft Dough								
Check	173.5	32.5	5.0	121.1	10.4	60.9	39.2	309.4
0.078	174.0	32.5	0.0	122.7	10.3	61.0	38.7	316.9
0.156	174.0	33.0	0.0	124.7	10.5	61.0	38.8	311.4
0.624	172.8	32.5	0.0	127.6	10.7	60.8	39.1	320.3
LSD	ns	ns	ns	ns	ns	ns	ns	ns
Pr>F	0.6953	0.7567	0.6404	0.1486	0.9565	0.9192	0.9437	0.9582

HD: heading date, HT: height, LOD: lodging, YLD: yield, PRO: protein, TWT: test weight, TKW: thousand kernel weight, FN: falling number

¹ adjusted to 13% moisture, ² adjusted to 12% moisture