National Screen of Commercially Available Biological Seed Treatment for Soybean

2022 Annual Summary

Fabiano Colet, Emma Matcham, Laura E. Lindsey

Participants in 2022

State	Number of sites	University	Soybean Specialist
Alabama	2	Auburn University	Eros Francisco
Arkansas	2	University of Arkansas	Jeremy Ross
Illinois	2	University of Illinois Urbana-Champaign	Emerson Nafziger Giovani P. Fontes
Indiana	2	Purdue University	Shaun Casteel
Iowa	1	Iowa State University	Mark Licht
Kentucky	2	University of Kentucky	Chad D. Lee
Louisiana	2	Louisiana State University	David Moseley
Michigan	3	Michigan State University	Maninder Singh
Minnesota	2	University of Minnesota	Seth Naeve
Mississippi	2	Mississippi State University	Trent Irby
North Carolina	4	North Carolina State University	Rachel Vann
North Dakota	1	North Dakota State University	Hans Kandel
Ohio	6	The Ohio State University	Laura E. Lindsey
South Carolina	3	Clemson University	Michael Plumblee
South Dakota	4	South Dakota State University	Jonathan Kleinjan
Virginia	2	Virginia Tech	David Holshouser
Wisconsin	10	University of Wisconsin - Madison	Shawn P. Conley

Introduction

Biological seed treatment is a growing market in the US, and soybean growers are interested in understanding the benefits of applying biological products to the seed. Often, farmers are bombarded with marketing claims about biological seed treatments. And in many cases, there is little or no third-party evidence regarding the ability of these biological seed treatments to improve soybean yield and profitability. Therefore, one of the objectives of this study is to evaluate situations where biological seed treatments improve soybean grain yield.

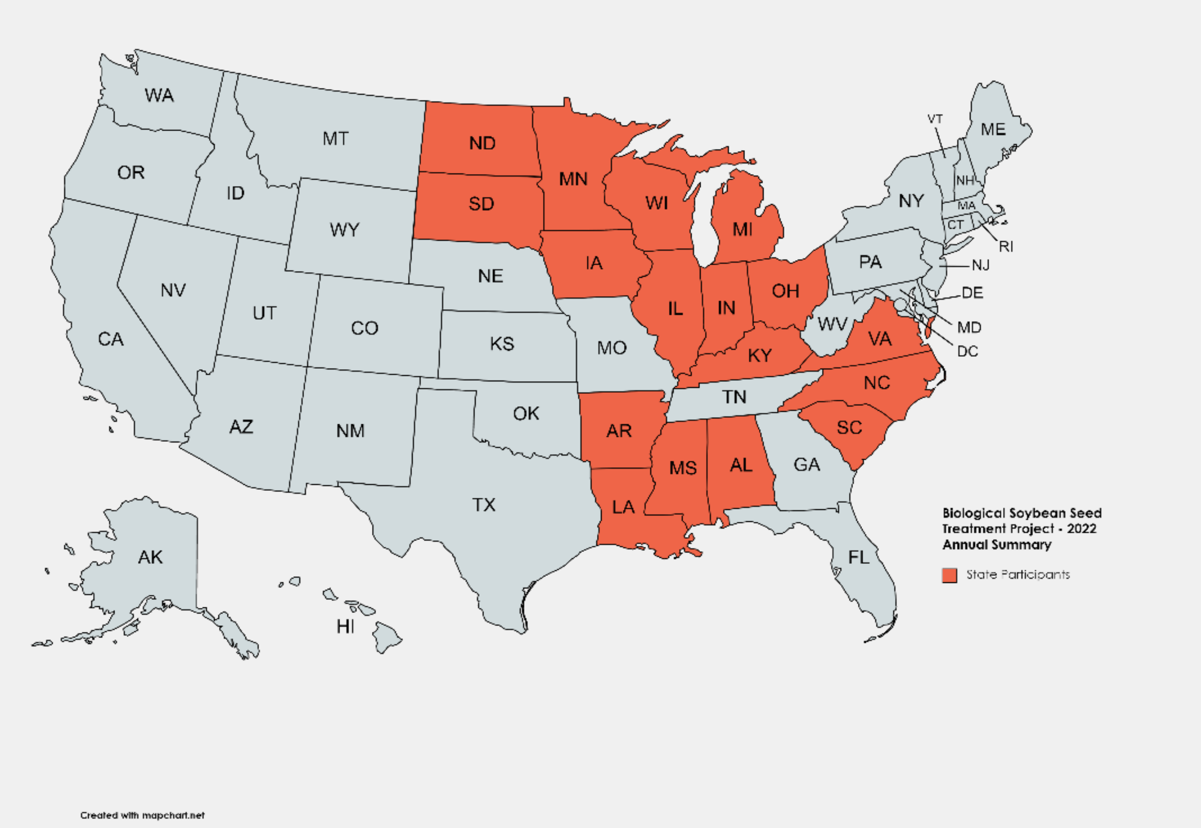


Figure 1. Map of state participants in this project in 2022 (in red).

Methodology

In 2022, we established small plot trials in 50 locations across 17 states (Figure 1). In each location, we evaluated the influence of nine biological soybean seed treatments and one untreated control on grain yield. The experiment design was a randomized complete block design with six to eight replications at all sites. Products were applied to the seeds before planting, and the application protocol used was according to each product's recommendations (labels). Products 5 and 6 were applied only in Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin.

Each state collaborator obtained the soybean varieties recommended for their regions. All seed came treated with fungicide + insecticide to represent practices adopted by farmers. Soybean yield was adjusted to 13% moisture concentration prior to data analysis.

Table 1. List of treatments (products) and active ingredients in each biological product.

Treatment (product)	Active ingredients
1	*Azospirillum brasilense, Bacillus licheniformis, Bacillus amyloliquefaciens, Bacillus subtillis, Pseudomonas fluorescens, Rhizobium*
2	*Trichoderma virens*
3	*Bradyrhizobium spp.*
4	*Bacillus subtillis, Bacillus amyloliquefaciens, Bradyrhizobium japonicum*
5	*Pantoea agglomerans*
6	*Pseudomonas brassicacearum*
7	*Bradyrhizobium elkanii, Delftia acidovorans + Bacillus velezensis*
8	*Bacillus velezensis*
9	*Glomus intraradices, Glomus mosseae, Glomus aggregatum, Glomus etunicatum*
10	Untreated Control

Statistical Procedures

Yield values that fell outside of three standard deviations of each site's average yield were removed from the analysis. The analysis of variance (ANOVA) was performed using the procedure Proc Glimmix in SAS for the response variable of grain yield for each site. When the global F-test ($\alpha = .05$) was significant, means were separated using pairwise comparisons. The treatment product was used as a fixed effect, while replication error was treated as a random effect.

Results

A summary of the average grain yield (in bu/acre) by product at each site is shown in Table 2. In this summary, results from 41 locations across 13 states are presented and will be updated once more data are received. Only four sites- Renner (SD), Arlington (WI), Clinton (WI), and Eau Galle (WI)- had significant results, and a means separation was performed at these locations (Table 2). Figure 2 shows the average grain yield (bu/acre) at each site for each treatment (product) plotted against the average grain yield (bu/acre) of the untreated control (treatment 10) at the same site.

Table 2. Treatment grain yield means (standard error) in bu/acre for each site in 2022. Treatments 5 and 6 were applied only in Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, South Dakota, and Wisconsin. The means separation was performed for sites with statistically significant differences in yield between treatments.

Site	Control	Trt 1	Trt 2	Trt 3	Trt 4	Trt 5	Trt 6	Trt 7	Trt 8	Trt 9
Madison, Alabama[a]	23.5 (1.1)	23.7 (1.1)	25.3 (1.1)	23.7 (1.0)	24.9 (1.1)	-	-	24.1 (1.1)	23.6 (1.0)	25.2 (1.1)
Shorter, Alabama	40.8 (3.4)	38.6 (3.4)	39.7 (3.4)	37.8 (3.4)	40.0 (3.4)	-	-	42.7 (3.4)	40.5 (3.4)	40.6 (3.4)
Colt, Arkansas	60.6 (1.6)	62.8 (1.6)	59.9 (1.6)	59.9 (1.6)	59.7 (1.6)	-	-	60.2 (1.6)	59.3 (1.6)	61.3 (1.6)
Newport, Arkansas	41.0 (2.0)	42.8 (2.0)	42.8 (2.0)	39.2 (2.0)	41.4 (2.0)	-	-	41.4 (2.0)	41.9 (2.0)	44.2 (2.0)
Monmouth, Illinois	79.6 (2.9)	80.3 (2.9)	76.7 (2.9)	78.3 (2.9)	74.0 (2.9)	78.7 (2.9)	72.6 (2.9)	79.4 (2.9)	77.2 (2.9)	78.5 (2.9)
Urbana, Illinois	77.7 (1.9)	78.2 (1.9)	78.8 (1.9)	74.3 (1.9)	79.4 (1.9)	77.2 (1.9)	80.1 (1.9)	77.3 (1.9)	76.3 (1.9)	78.5 (1.9)
Wanatah, Indiana	55.3 (1.3)	56.1 (1.3)	55.6 (1.3)	53.9 (1.3)	55.4 (1.3)	55.1 (1.3)	54.4 (1.3)	54.8 (1.3)	54.4 (1.3)	55.5 (1.3)
West Lafayette, Indiana	64.8 (3.3)	62.9 (3.3)	62.0 (3.3)	64.0 (3.3)	63.7 (3.3)	63.9 (3.3)	63.5 (3.3)	65.0 (3.3)	63.4 (3.3)	65.7 (3.3)
Boone, Iowa	55.2 (3.8)	53.1 (3.8)	50.0 (3.8)	53.3 (3.8)	49.6 (3.8)	-	-	51.1 (3.8)	49.0 (3.8)	54.7 (3.8)
Lexington, Kentucky (Site 1)	42.8 (4.0)	43.3 (4.0)	43.2 (4.2)	41.6 (4.0)	42.6 (4.2)	-	-	38.1 (4.0)	42.2 (4.0)	42.2 (4.0)
Lexington, Kentucky (Site 2)	66.3 (2.8)	67.4 (2.8)	64.0 (2.8)	63.0 (2.8)	63.1 (2.8)	-	-	64.6 (2.8)	62.1 (2.8)	65.0 (2.8)
Alexandria, Louisiana (Site 1)	66.7 (1.2)	66.0 (1.2)	69.0 (1.2)	68.4 (1.2)	68.2 (1.2)	-	-	66.3 (1.2)	66.8 (1.2)	66.7 (1.2)
Alexandria, Louisiana (Site 2)	61.0 (1.5)	61.9 (1.4)	60.4 (1.5)	63.4 (1.4)	62.4 (1.4)	-	-	63.6 (1.5)	62.5 (1.4)	63.8 (1.4)
Britton, Michigan	73.4 (1.6)	76.1 (1.6)	73.3 (1.6)	74.6 (1.6)	74.0 (1.6)	72.8 (1.6)	72.3 (1.6)	72.4 (1.6)	73.3 (1.6)	73.9 (1.6)
Mason[b], Michigan	48.1 (4.3)	47.0 (4.3)	40.5 (4.3)	43.8 (4.3)	50.7 (4.3)	49.9 (4.3)	50.6 (4.3)	46.0 (4.3)	49.1 (4.3)	43.5 (4.3)
Saginaw, Michigan	51.3 (3.9)	49.2 (3.9)	48.3 (3.9)	46.8 (3.9)	53.0 (3.9)	53.2 (3.9)	47.1 (3.9)	46.8 (3.9)	52.9 (3.9)	53.0 (3.9)
St. Paul, Minnesota	62.7 (2.8)	65.1 (2.8)	61.9 (2.8)	66.5 (2.8)	64.0 (2.8)	60.7 (2.8)	63.8 (2.8)	65.2 (2.8)	63.4 (2.8)	63.8 (2.8)
Wells, Minnesota	67.8 (2.4)	66.8 (2.4)	69.6 (2.4)	67.2 (2.4)	67.3 (2.4)	66.4 (2.4)	68.9 (2.4)	63.9 (2.4)	65.9 (2.4)	60.6 (2.4)
Starkville, Mississippi	64.2 (2.4)	62.1 (2.4)	65.6 (2.5)	64.3 (2.4)	63.4 (2.4)	-	-	63.3 (2.4)	63.6 (2.4)	65.0 (2.4)
Stoneville, Mississippi[c]	22.4 (0.8)	25.2 (0.8)	25.7 (0.8)	24.7 (0.8)	24.3 (0.8)	-	-	24.4 (0.8)	23.7 (0.8)	24.3 (0.8)
Beaufort, North Carolina	105.0 (4.0)	98.7 (4.5)	104.0 (4.0)	90.6 (4.0)	94.5 (4.0)	-	-	95.6 (4.9)	102.5 (3.7)	102.6 (4.0)
Camden, North Carolina	67.6 (5.1)	66.7 (5.1)	61.1 (5.1)	71.7 (5.1)	63.7 (5.1)	-	-	65.1 (5.1)	67.9 (5.1)	71.3 (5.1)
Johnston, North Carolina	74.7 (3.9)	66.9 (3.9)	76.2 (3.9)	74.6 (3.9)	73.7 (3.9)	-	-	75.4 (3.9)	82.7 (3.9)	75.6 (3.9)
Salisbury, North Carolina	97.6 (4.2)	90.0 (3.8)	91.5 (4.2)	96.3 (4.2)	97.1 (3.8)	-	-	100.1 (3.8)	103.6 (3.8)	92.8 (3.8)
Fargo, North Dakota	61.1 (1.7)	60.4 (1.7)	60.6 (1.7)	60.1 (1.7)	61.5 (1.7)	61.6 (1.7)	61.3 (1.7)	58.6 (1.7)	58.3 (1.7)	59.1 (1.7)
Celina, Ohio	75.2 (2.5)	73.0 (2.5)	75.4 (2.5)	75.9 (2.7)	75.2 (2.5)	72.8 (2.5)	75.5 (2.5)	77.5 (2.5)	74.1 (2.5)	70.0 (2.5)
Marysville, Ohio	51.4 (3.1)	53.0 (3.1)	51.3 (3.1)	55.0 (3.1)	51.2 (3.1)	56.8 (3.1)	54.4 (3.3)	55.0 (3.1)	51.2 (3.1)	53.2 (3.1)
Holgate, Ohio	87.5 (1.5)	87.3 (1.5)	90.0 (1.5)	88.8 (1.5)	88.4 (1.5)	87.8 (1.5)	88.7 (1.5)	86.8 (1.5)	90.3 (1.5)	91.3 (1.5)
Fremont, Ohio	75.2 (3.1)	78.1 (2.8)	77.4 (2.8)	76.3 (2.8)	79.9 (2.9)	75.1 (2.8)	75.7 (3.5)	73.3 (3.5)	77.5 (3.5)	77.9 (3.5)
West Manchester, Ohio	84.8 (2.9)	78.9 (2.9)	74.9 (2.9)	78.6 (2.9)	76.7 (2.9)	84.5 (2.9)	76.7 (2.9)	81.9 (2.9)	76.9 (2.9)	81.7 (2.9)
Wilmington, Ohio	85.5 (2.2)	85.8 (2.2)	82.4 (2.2)	77.4 (2.2)	81.8 (2.4)	88.5 (2.4)	80.8 (2.2)	83.1 (2.5)	84.3 (2.5)	85.3 (2.5)

Site	Control	Trt 1	Trt 2	Trt 3	Trt 4	Trt 5	Trt 6	Trt 7	Trt 8	Trt 9
Blackville (dryland), South Carolina	53.9 (1.4)	53.8 (1.4)	56.2 (1.4)	56.2 (1.4)	53.1 (1.4)	-	-	55.0 (1.4)	55.6 (1.4)	54.6 (1.4)
Blackville (irrigated), South Carolina	55.6 (3.9)	58.1 (3.9)	56.1 (3.9)	56.1 (3.9)	56.2 (3.9)	-	-	58.0 (3.9)	54.5 (3.9)	56.2 (3.9)
Bath, South Dakota	70.7 (0.9)	68.7 (0.9)	69.1 (0.9)	68.8 (0.9)	69.6 (0.9)	67.5 (0.8)	69.0 (1.0)	67.5 (0.9)	68.4 (0.9)	67.7 (0.9)
Brookings, South Dakota	61.0 (1.7)	60.4 (1.6)	60.4 (1.7)	62.0 (1.7)	60.6 (1.7)	60.5 (1.7)	60.8 (1.7)	61.3 (1.7)	59.7 (1.7)	61.4 (1.7)
Miller, South Dakota	50.6 (1.3)	51.2 (1.3)	52.5 (1.3)	52.2 (1.3)	50.8 (1.3)	50.6 (1.3)	51.6 (1.3)	51.7 (1.3)	49.1 (1.3)	52.0 (1.3)
Renner, South Dakota[d]	53.1 a (1.2)	50.5 c (1.2)	50.1 bc (1.2)	51.6 ab (1.2)	54.2 ab (1.2)	55.0 a (1.2)	53.7 ab (1.2)	51.6 bc (1.2)	55.4 a (1.2)	51.6 bc (1.2)
Caroline County, Virginia	73.0 (1.8)	78.6 (2.6)	76.9 (2.2)	73.7 (1.8)	72.8 (2.2)	-	-	71.5 (2.0)	71.9 (2.0)	70.5 (2.0)
Suffolk, Virginia	46.7 (2.7)	43.2 (2.7)	47.4 (2.7)	45.9 (2.7)	42.5 (2.7)	-	-	43.6 (2.7)	46.5 (2.7)	39.7 (2.7)
Arlington, Wisconsin[d]	77.4 cd (2.2)	73.1 d (2.2)	80.2 abc (2.2)	84.7 a (2.2)	78.1 bcd (2.2)	78.8 bc (2.2)	77.0 cd (2.2)	78.3 bcd (2.2)	83.2 ab (2.2)	76.8 cd (2.2)
Clinton, Wisconsin[d]	55.2 e (2.4)	61.6 cd (2.4)	68.9 ab (2.4)	69.0 a (2.4)	68.2 ab (2.4)	62.7 bcd (2.4)	64.6 bcd (2.4)	66.9 abc (2.4)	59.9 de (2.4)	61.0 cde (2.4)
Cuba City, Wisconsin	94.8 (1.8)	95.8 (1.8)	95.1 (1.8)	95.1 (1.8)	94.9 (1.8)	94.7 (1.8)	95.6 (1.8)	93.8 (1.8)	91.3 (1.9)	92.0 (1.8)
Eau Galle, Wisconsin[d]	45.3 a (1.8)	39.5 bc (1.6)	44.3 a (1.6)	39.3 c (1.6)	37.4 c (1.6)	39.0 c (1.6)	44.0 ab (1.6)	37.9 c (1.6)	39.4 bc (1.6)	39.4 bc (1.6)
Fond du Lac, Wisconsin	60.8 (2.3)	59.4 (2.3)	65.2 (2.3)	62.3 (2.3)	68.7 (2.3)	65.0 (2.3)	61.1 (2.3)	59.4 (2.3)	60.7 (2.3)	60.7 (2.3)
Galesville, Wisconsin	78.6 (2.6)	78.6 (2.6)	81.9 (2.6)	79.1 (2.6)	78.5 (2.6)	73.1 (2.6)	72.4 (2.6)	76.6 (2.6)	76.9 (2.6)	77.7 (2.6)
Hancock, Wisconsin	62.0 (2.3)	56.7 (2.3)	61.4 (2.3)	56.3 (2.3)	57.0 (2.3)	57.5 (2.3)	56.8 (2.3)	59.5 (2.3)	59.5 (2.3)	57.4 (2.3)
Seymour, Wisconsin	74.6 (2.2)	72.0 (2.2)	72.1 (2.2)	74.9 (2.2)	75.9 (2.2)	75.7 (2.2)	72.1 (2.2)	74.1 (2.2)	75.5 (2.2)	71.1 (2.2)
Spooner, Wisconsin	63.3 (1.3)	61.6 (1.3)	61.5 (1.3)	59.7 (1.3)	59.3 (1.3)	61.1 (1.3)	59.5 (1.3)	60.7 (1.3)	61.6 (1.3)	59.6 (1.3)
Stratford, Wisconsin	54.9 (1.5)	52.3 (1.5)	52.8 (1.5)	51.9 (1.5)	54.2 (1.5)	52.6 (1.5)	52.6 (1.5)	53.0 (1.5)	53.5 (1.5)	51.9 (1.5)

[a] Madison, Alabama had low yield values due to drought and high temperatures during summer.
[b] Mason, Michigan had the landscaping (hills) affecting results.
[c] Stoneville, Mississippi had extremely low yield values because of incorrect combine calibration. However, the relative yield differences observed between treatments are correct.
[d] Renner, in South Dakota, and Arlington, Clinton, and Eau Galle, in Wisconsin, had significant yield differences among treatments and a means separation were performed.

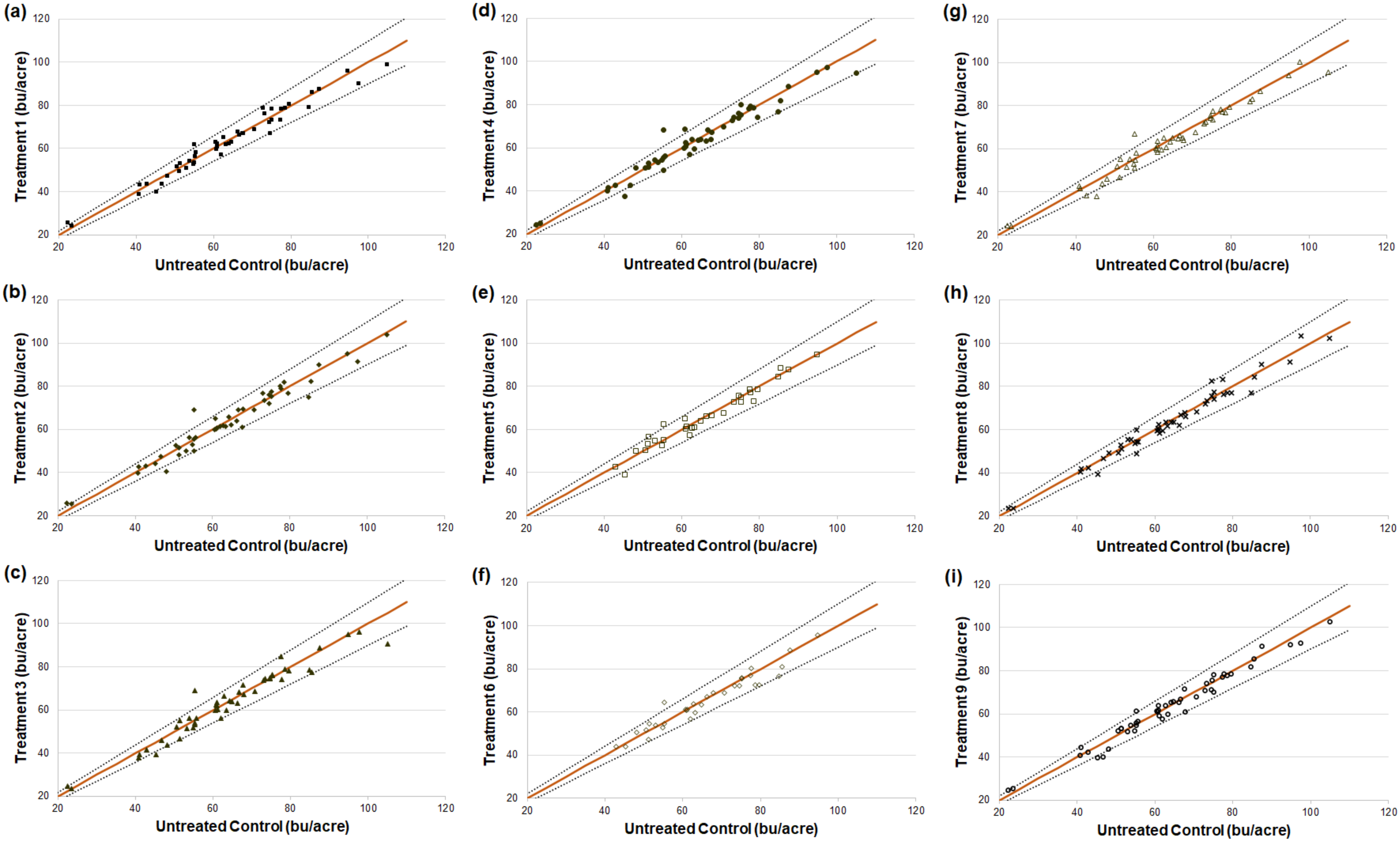
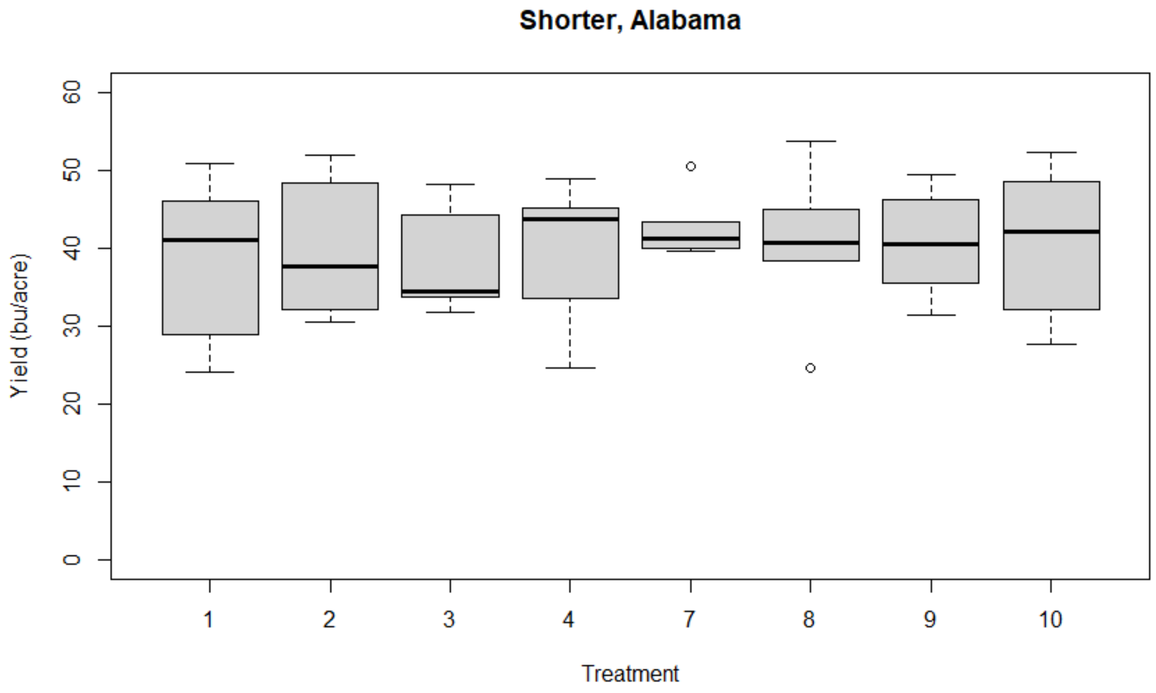
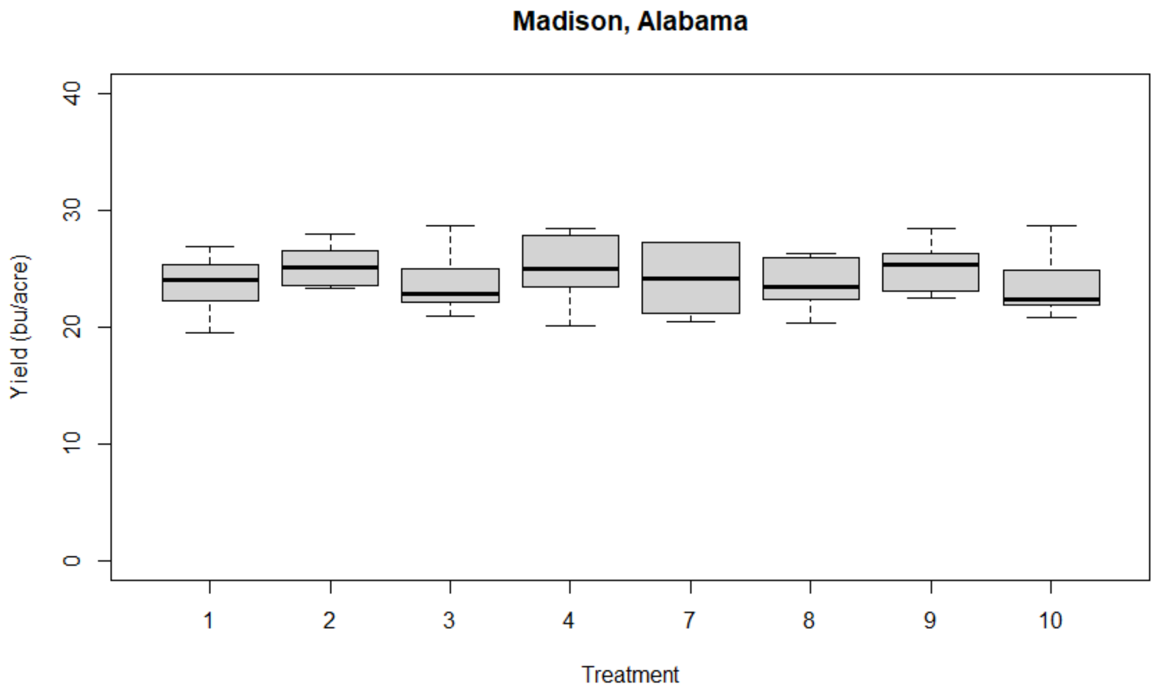


Figure 2. Average grain yield (bu/acre) at each site for each treatment (product) plotted against the average grain yield (bu/acre) of the untreated control (treatment 10) at the same site. Solid red lines represent x = y, and the dashed lines represent ±10% of yield.

Alabama

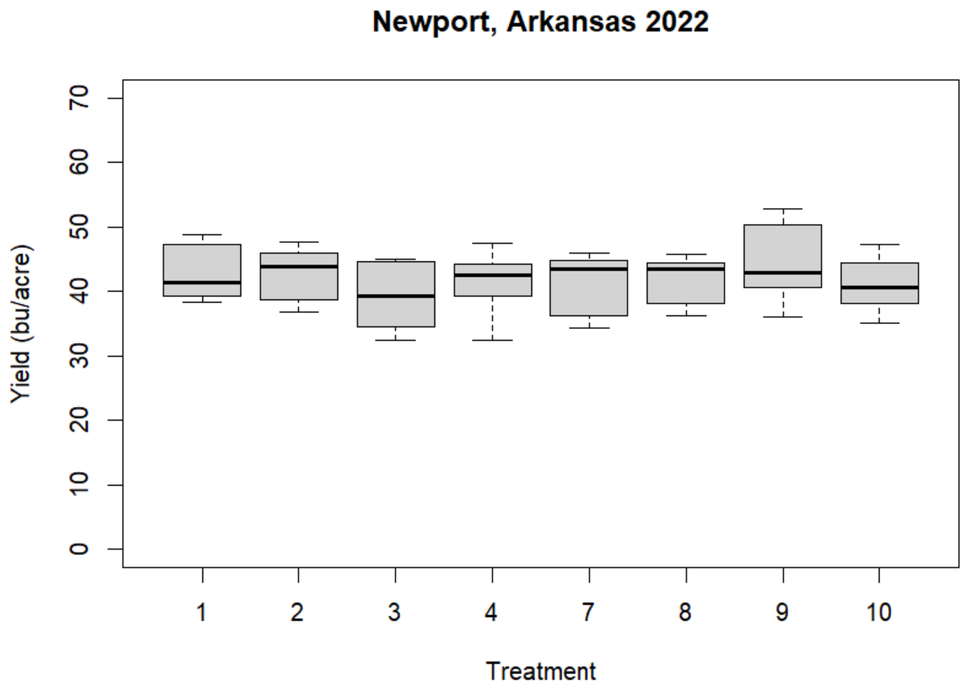


Shorter, Alabama
Yield (bu/acre)
0
10
20
30
40
50
60
1
2
3
4
7
8
9
10
Treatment

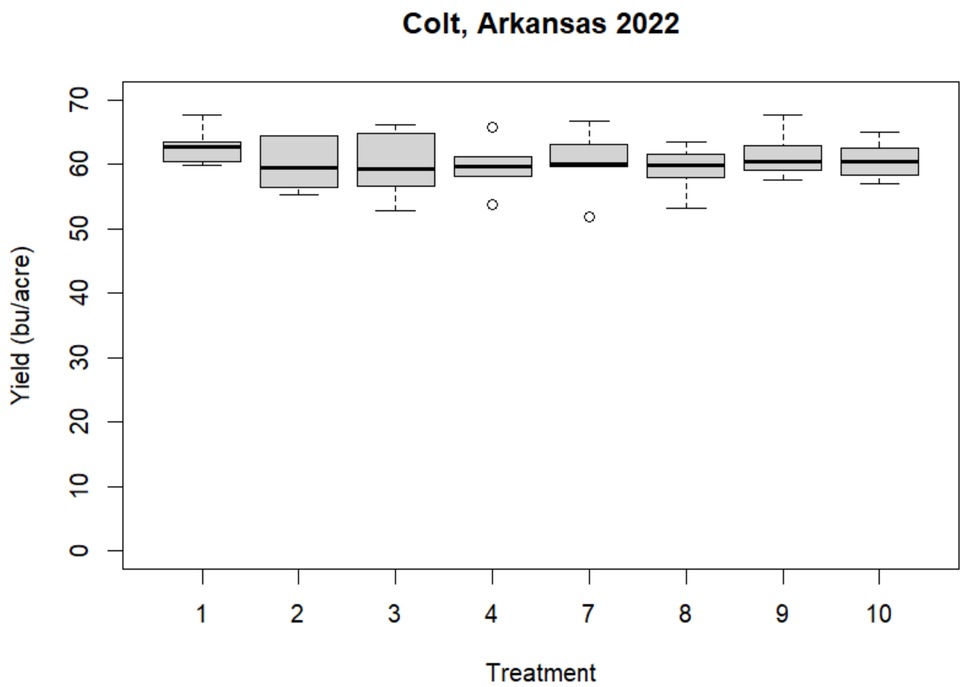


Madison, Alabama
Yield (bu/acre)
0
10
20
30
40
1
2
3
4
7
8
9
10
Treatment

Arkansas

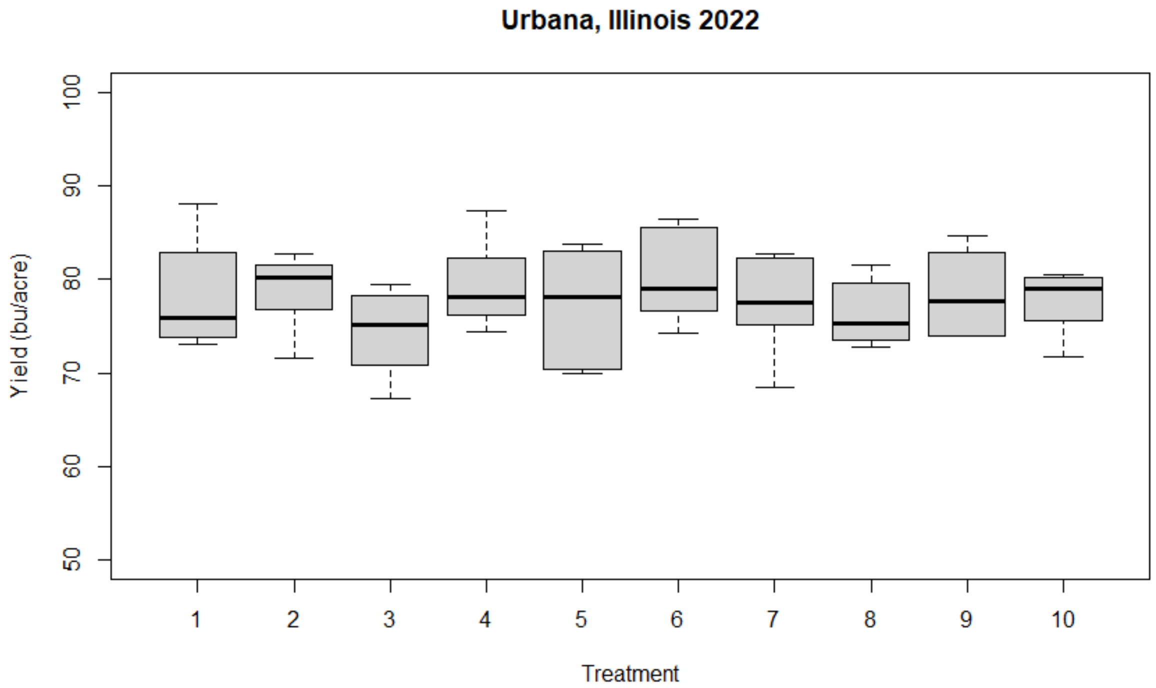


Newport, Arkansas 2022
Yield (bu/acre)
0
10
20
30
40
50
60
70
1
2
3
4
7
8
9
10
Treatment

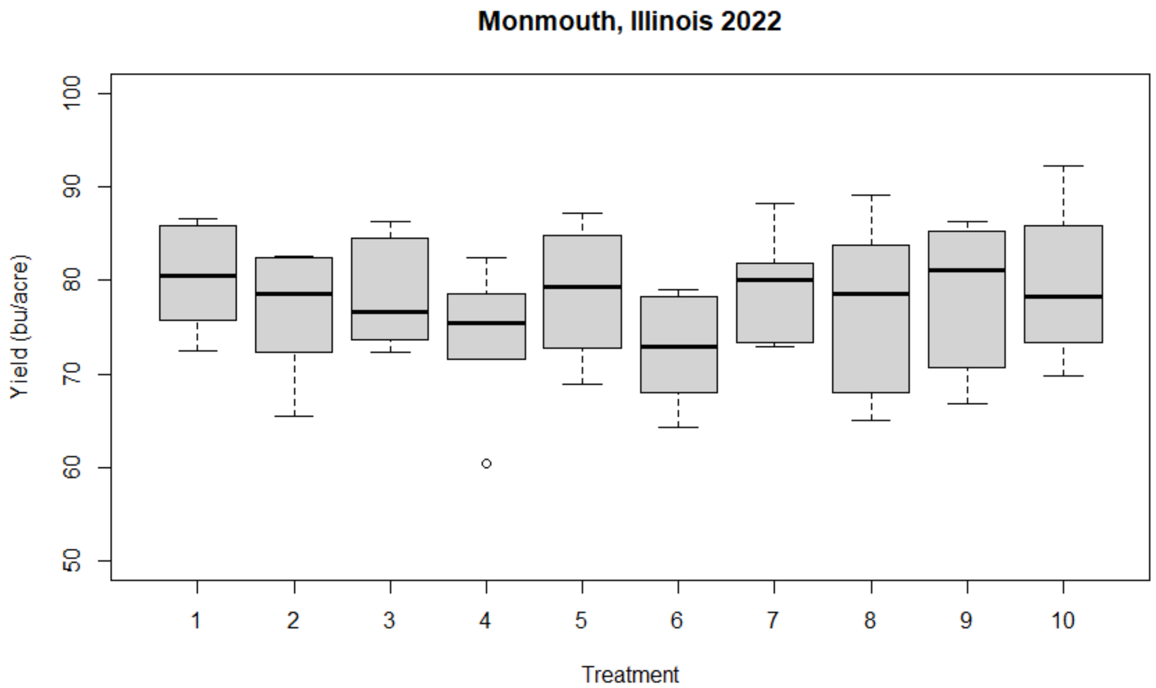


Colt, Arkansas 2022
Yield (bu/acre)
0
10
20
30
40
50
60
70
1
2
3
4
7
8
9
10
Treatment

Illinois

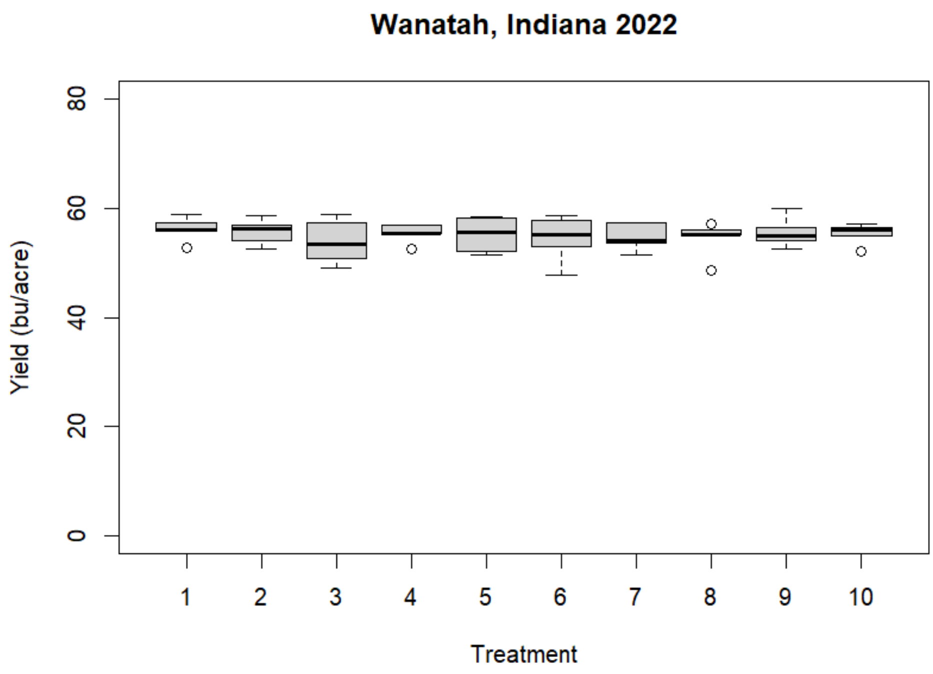


Urbana, Illinois 2022
Yield (bu/acre)
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
Treatment

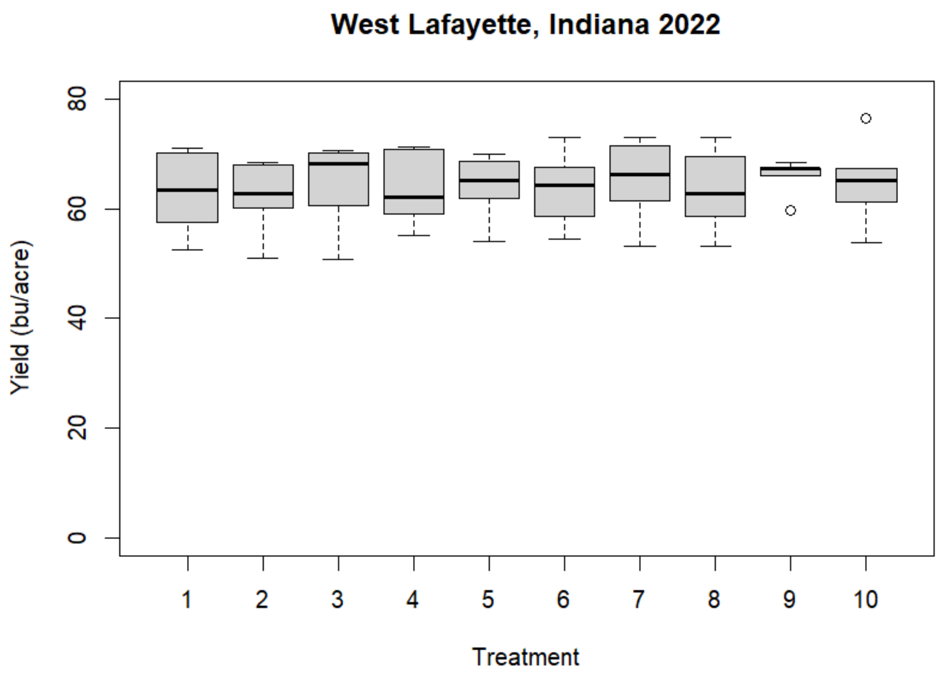


Monmouth, Illinois 2022
Yield (bu/acre)
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
Treatment

Indiana

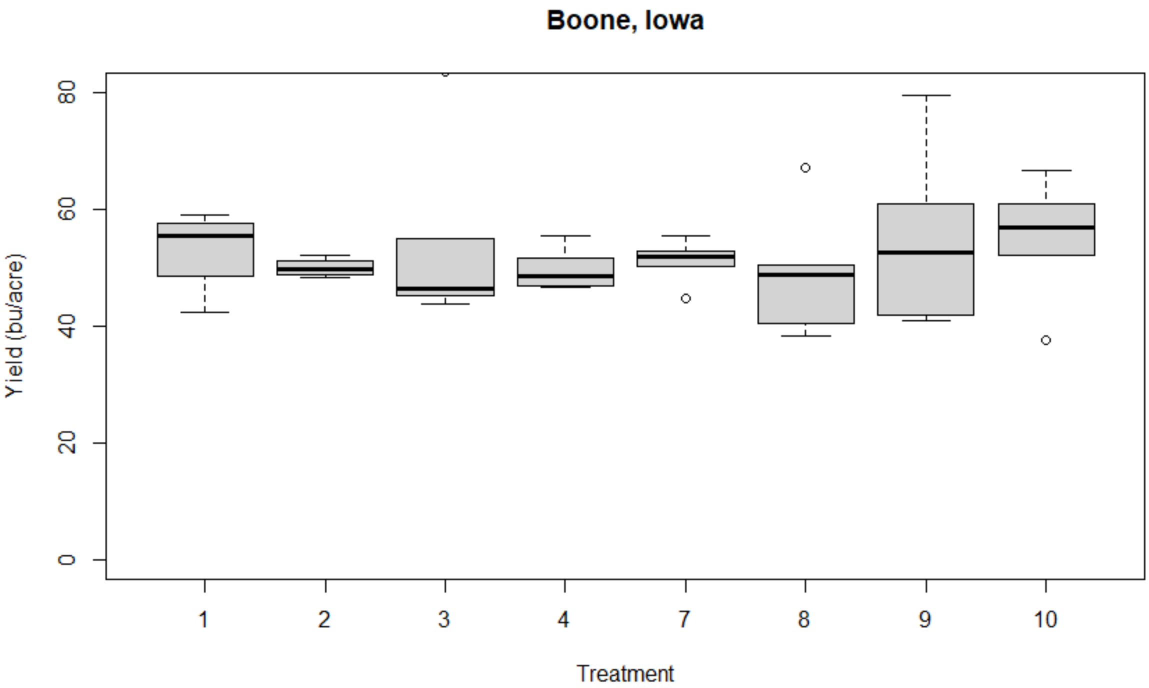


Wanatah, Indiana 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

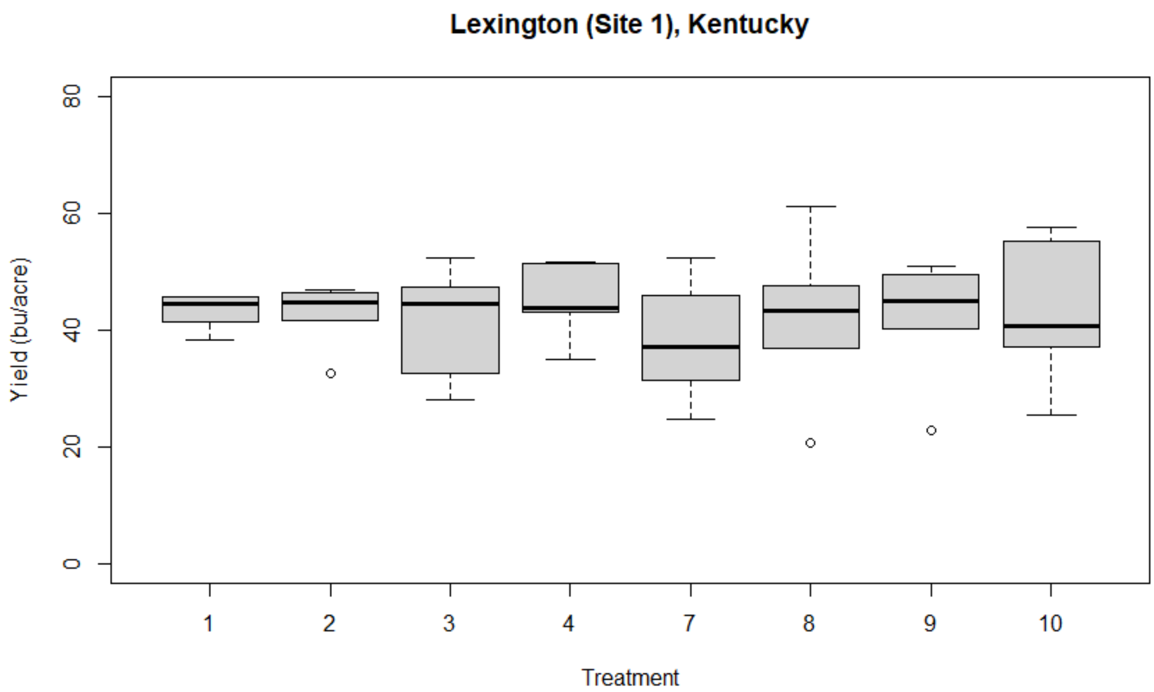


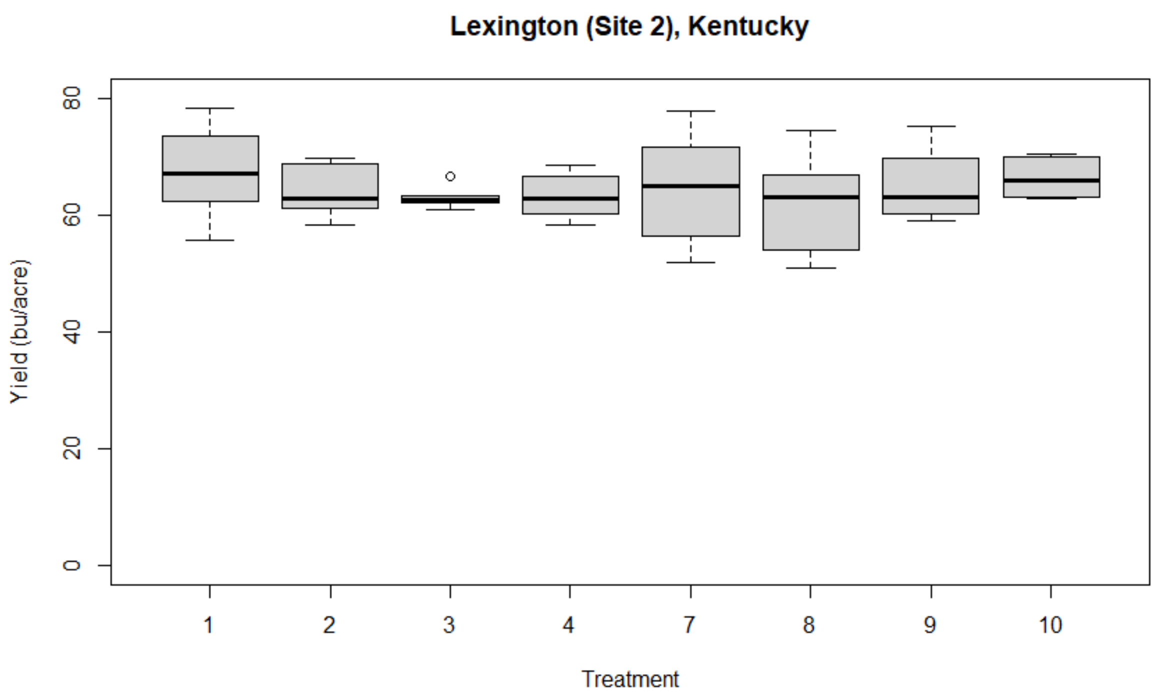
West Lafayette, Indiana 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

Iowa

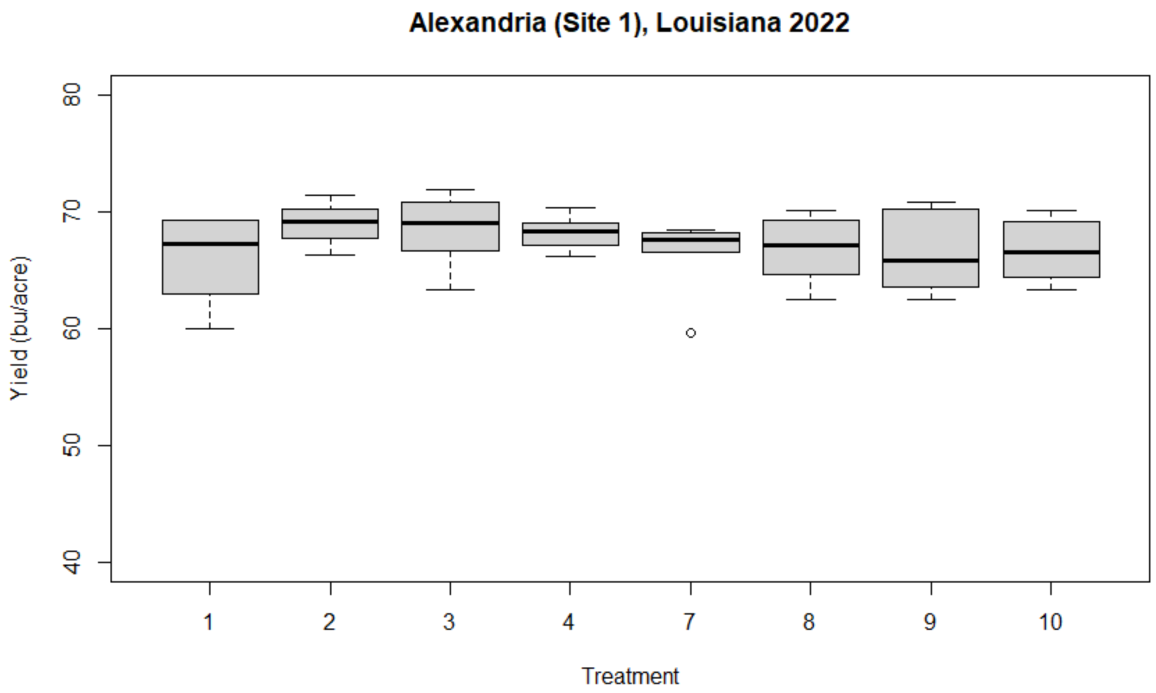


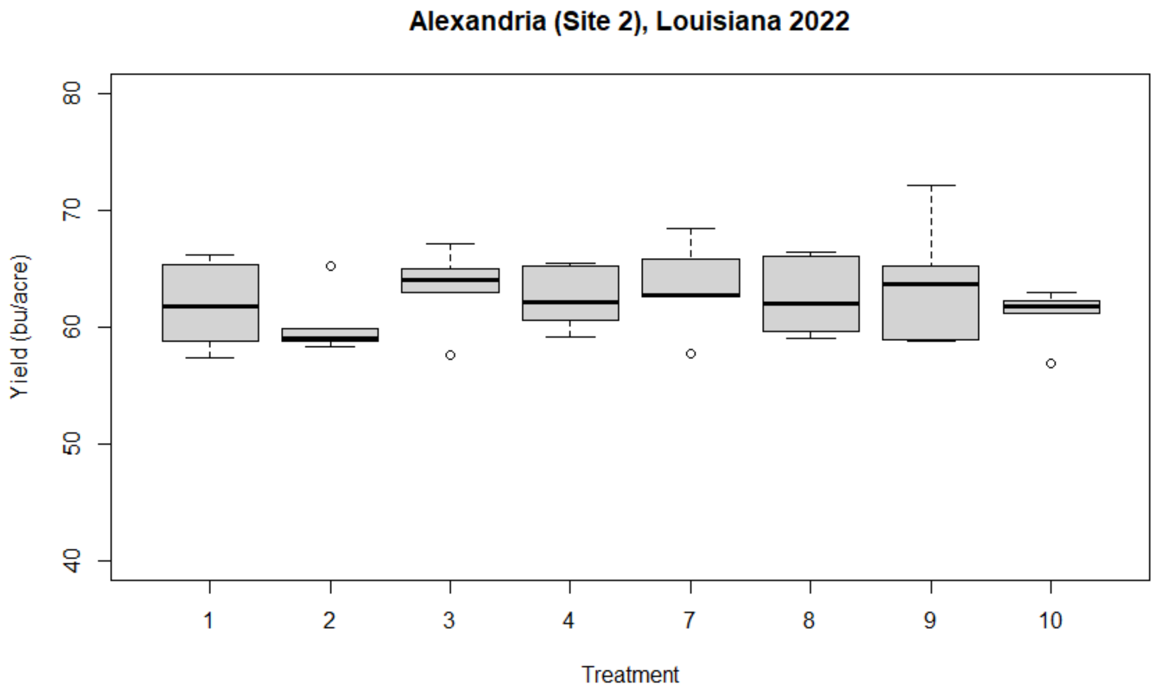
Kentucky


Lexington (Site 1), Kentucky
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
7
8
9
10
Treatment

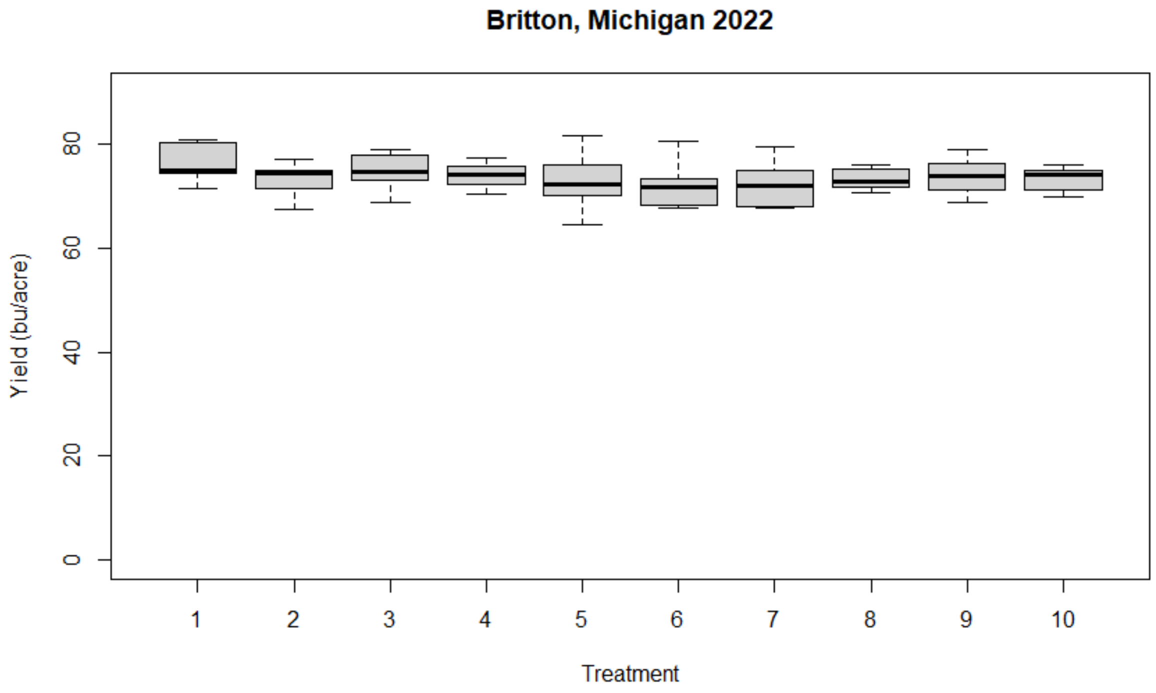

Lexington (Site 2), Kentucky
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
7
8
9
10
Treatment

Louisiana

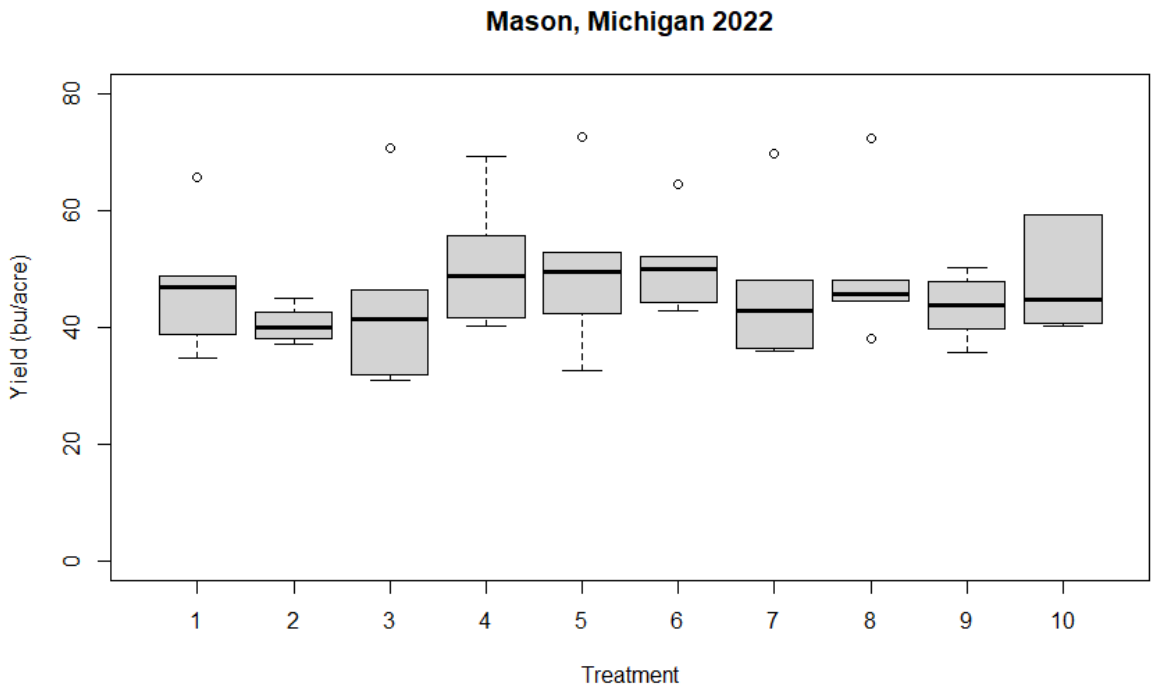

Alexandria (Site 1), Louisiana 2022
Yield (bu/acre)
40
50
60
70
80
1
2
3
4
7
8
9
10
Treatment


Alexandria (Site 2), Louisiana 2022
Yield (bu/acre)
40
50
60
70
80
1
2
3
4
7
8
9
10
Treatment

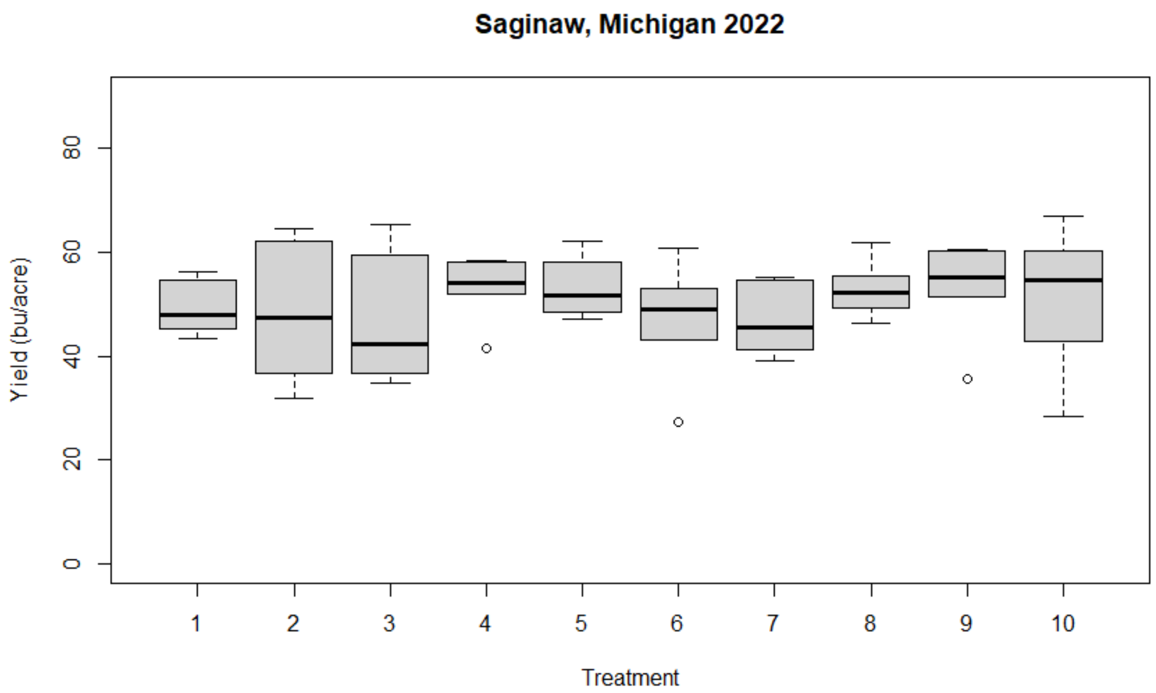
Michigan



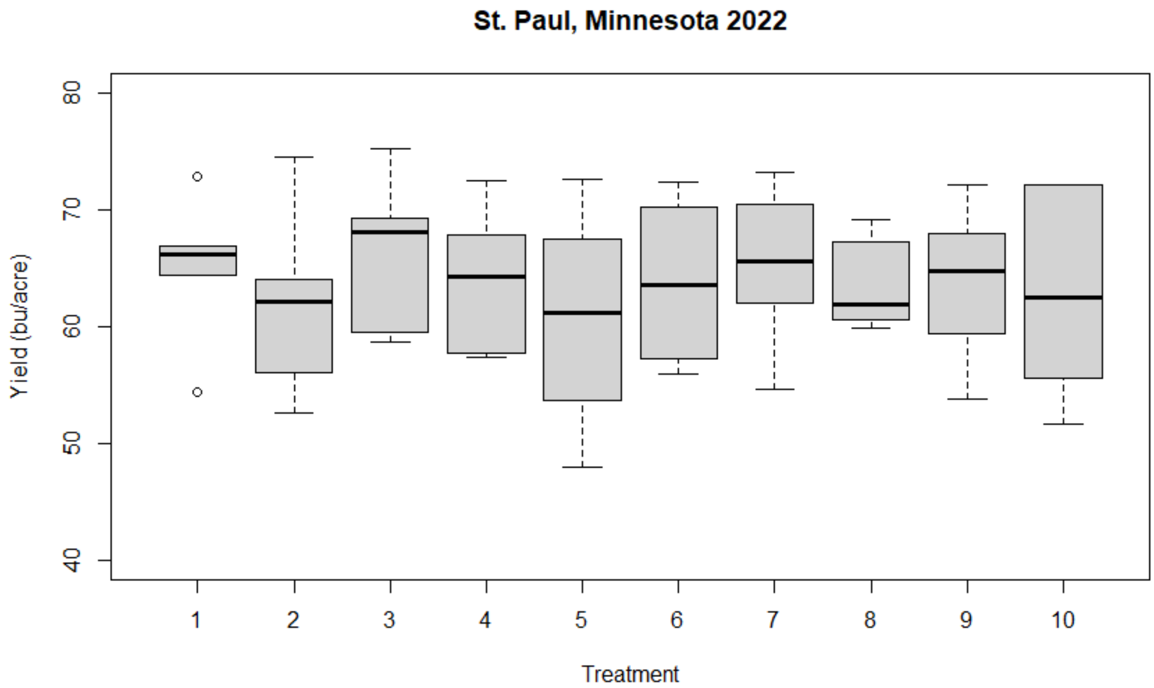
Britton, Michigan 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

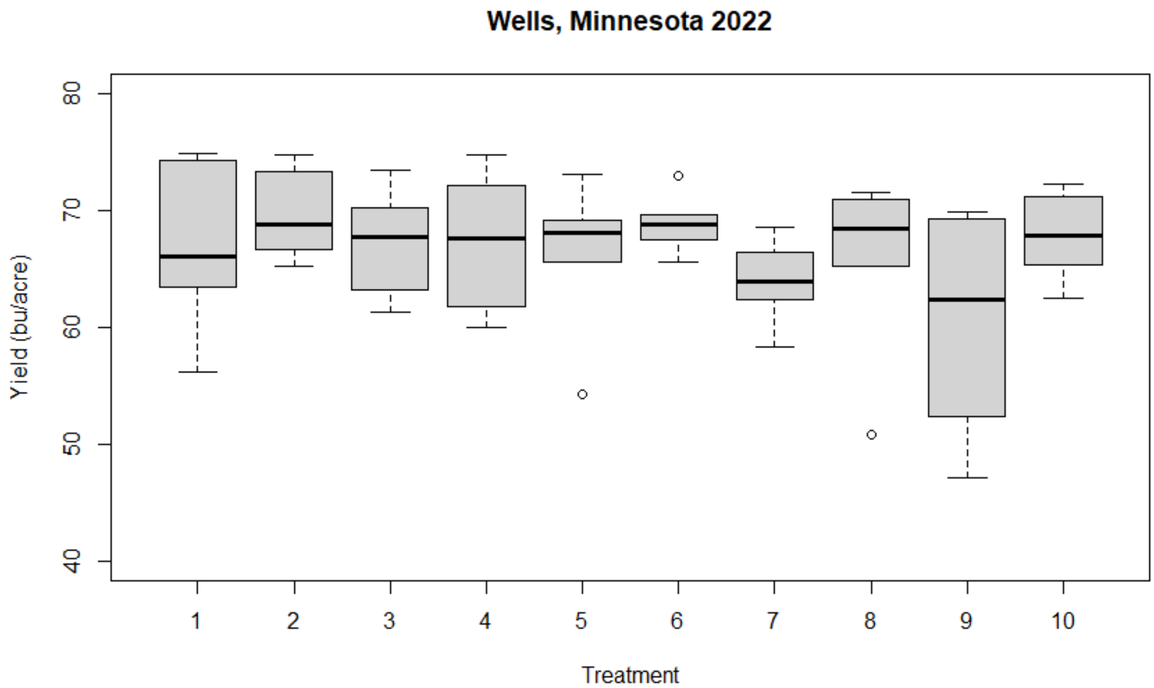


Mason, Michigan 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

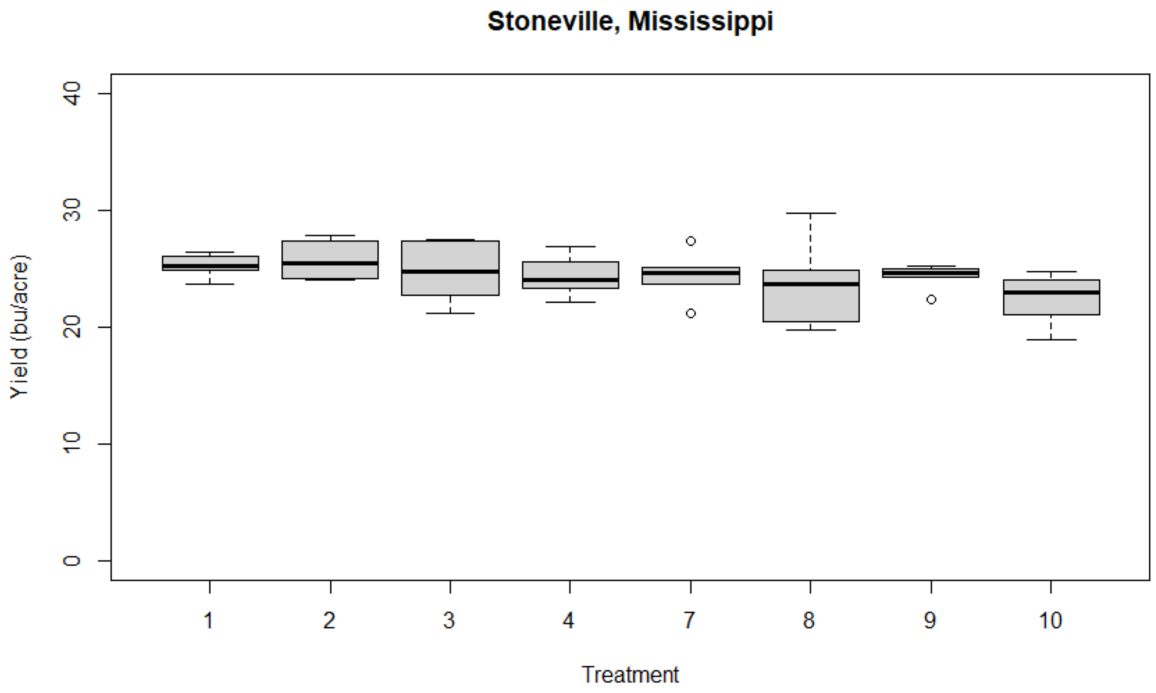

Saginaw, Michigan 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

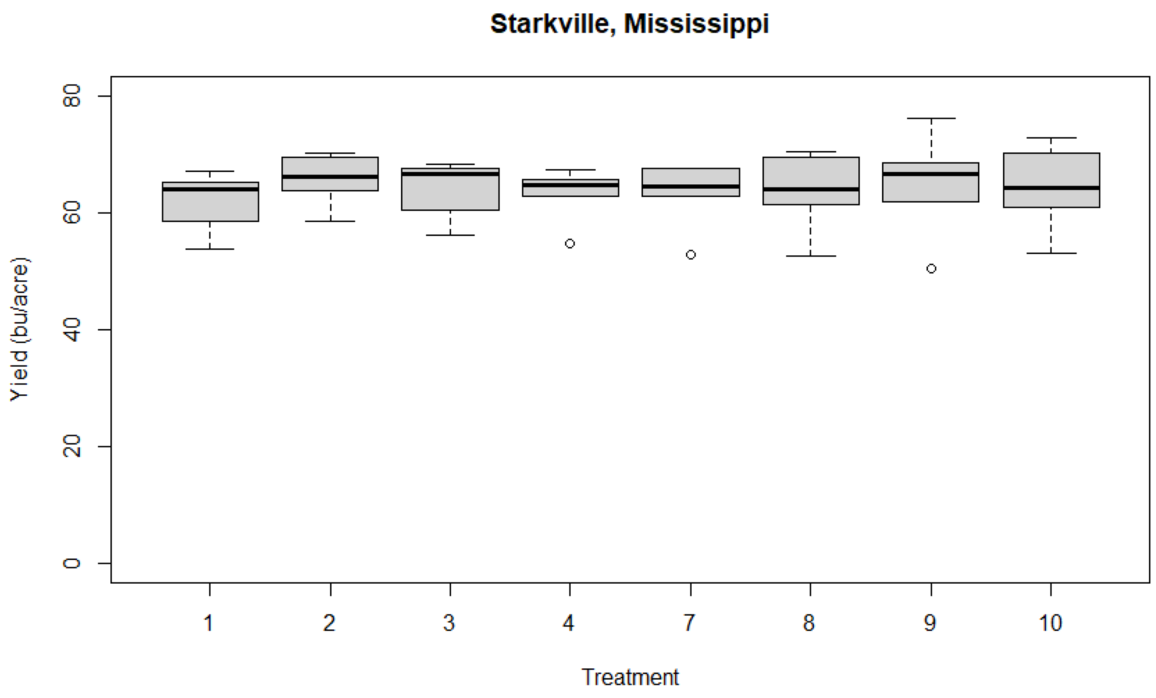
Minnesota


St. Paul, Minnesota 2022
Yield (bu/acre)
40
50
60
70
80
1
2
3
4
5
6
7
8
9
10
Treatment

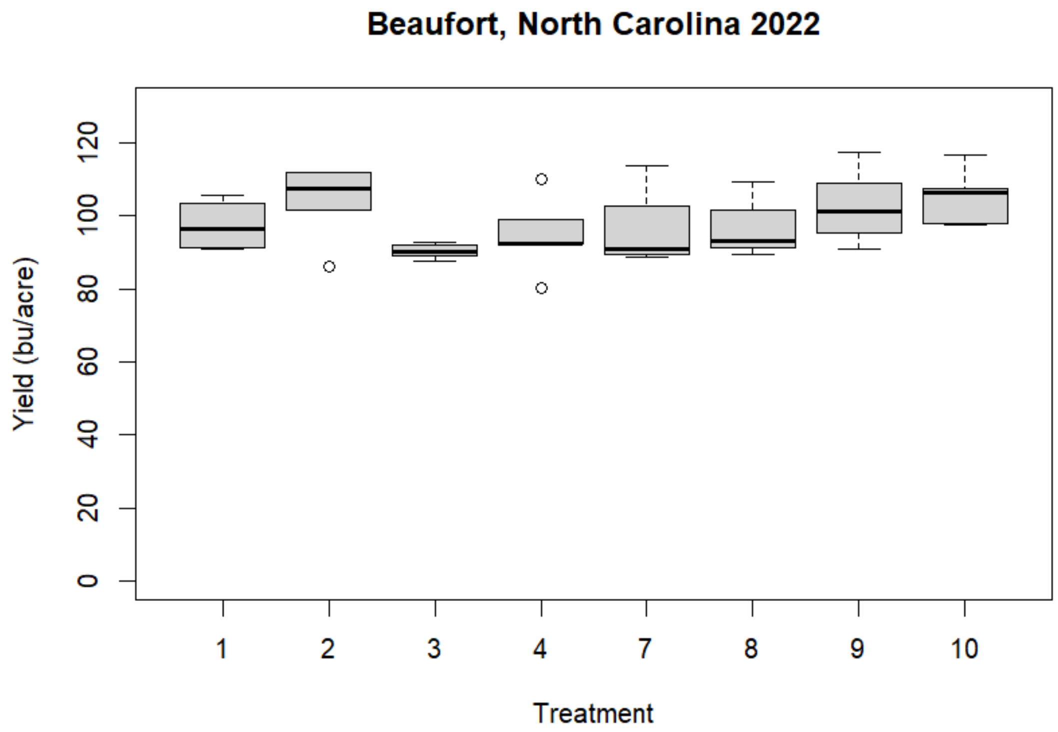

Wells, Minnesota 2022
Yield (bu/acre)
40
50
60
70
80
1
2
3
4
5
6
7
8
9
10
Treatment

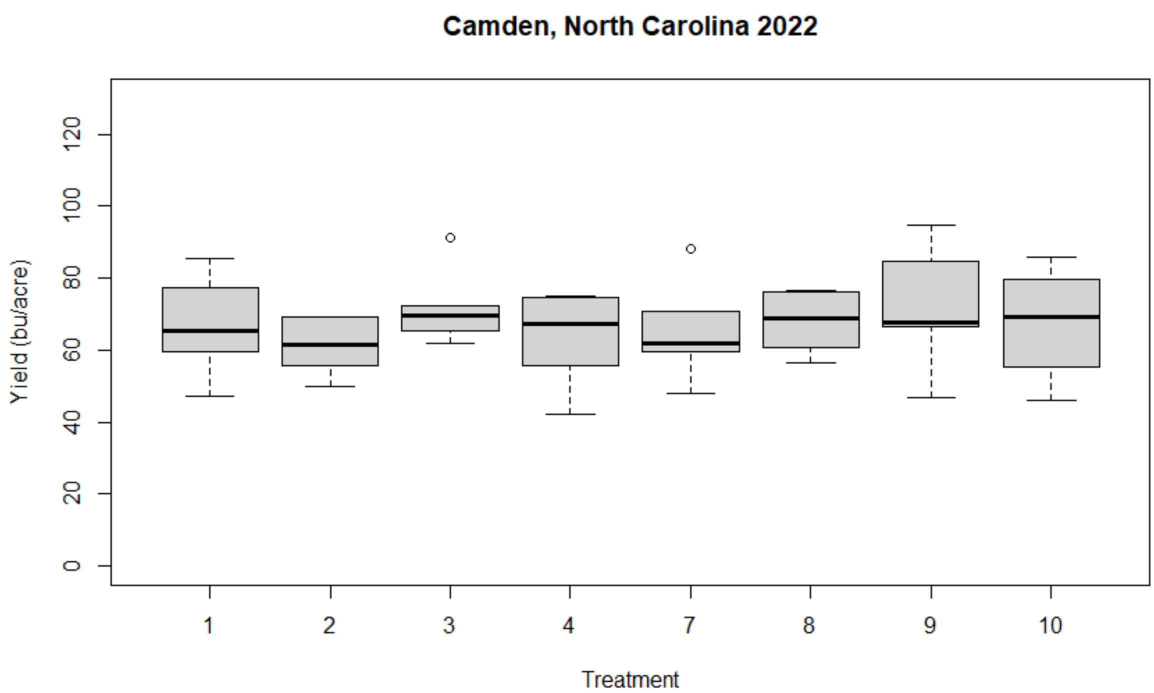
Mississippi



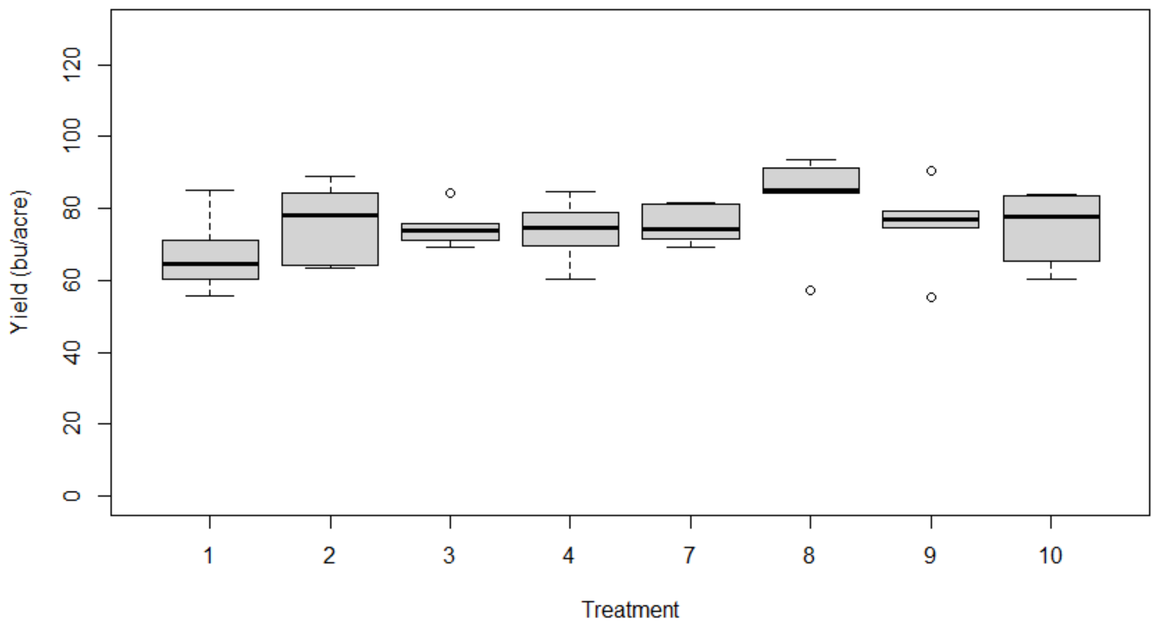


North Carolina

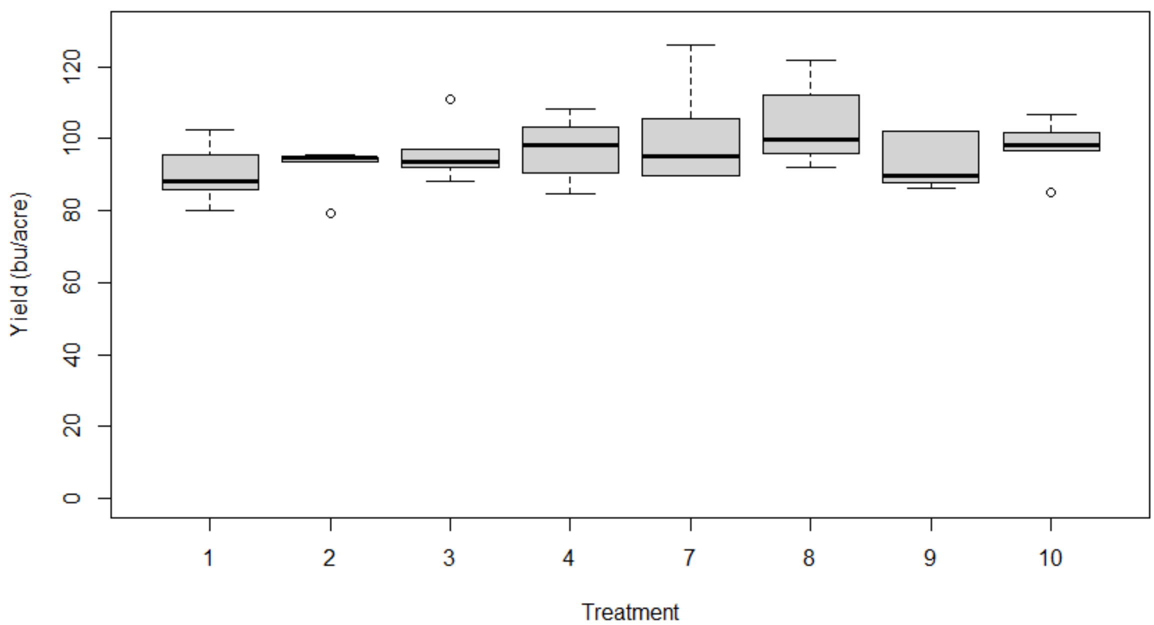




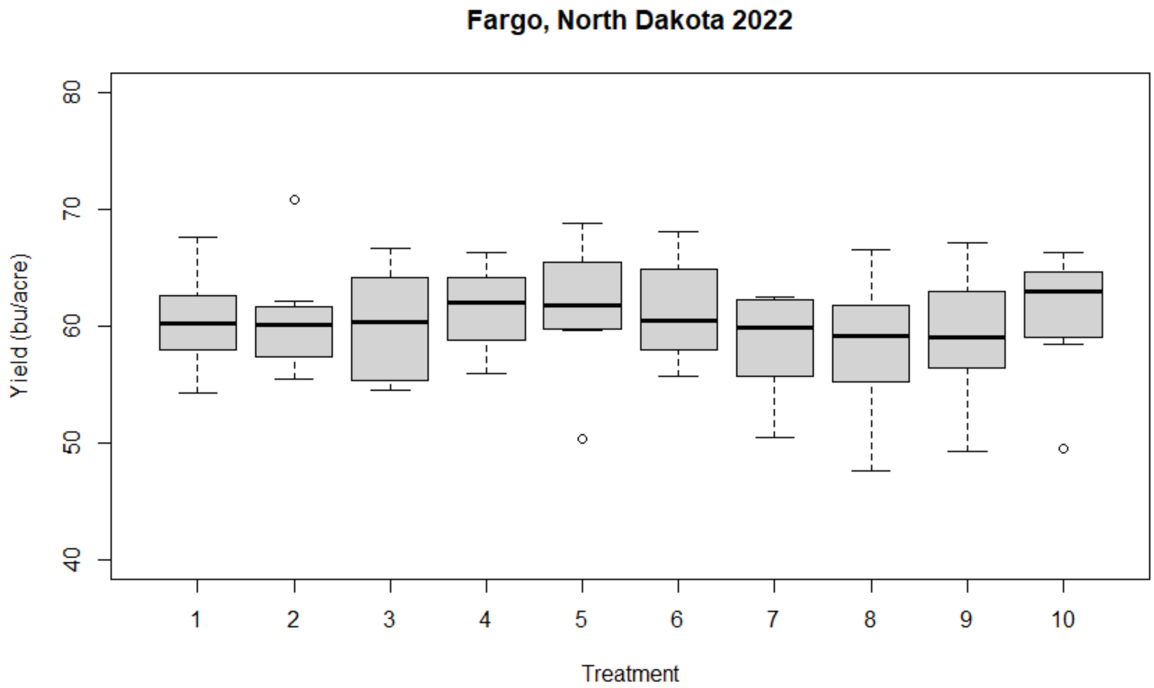
Johnston, North Carolina 2022



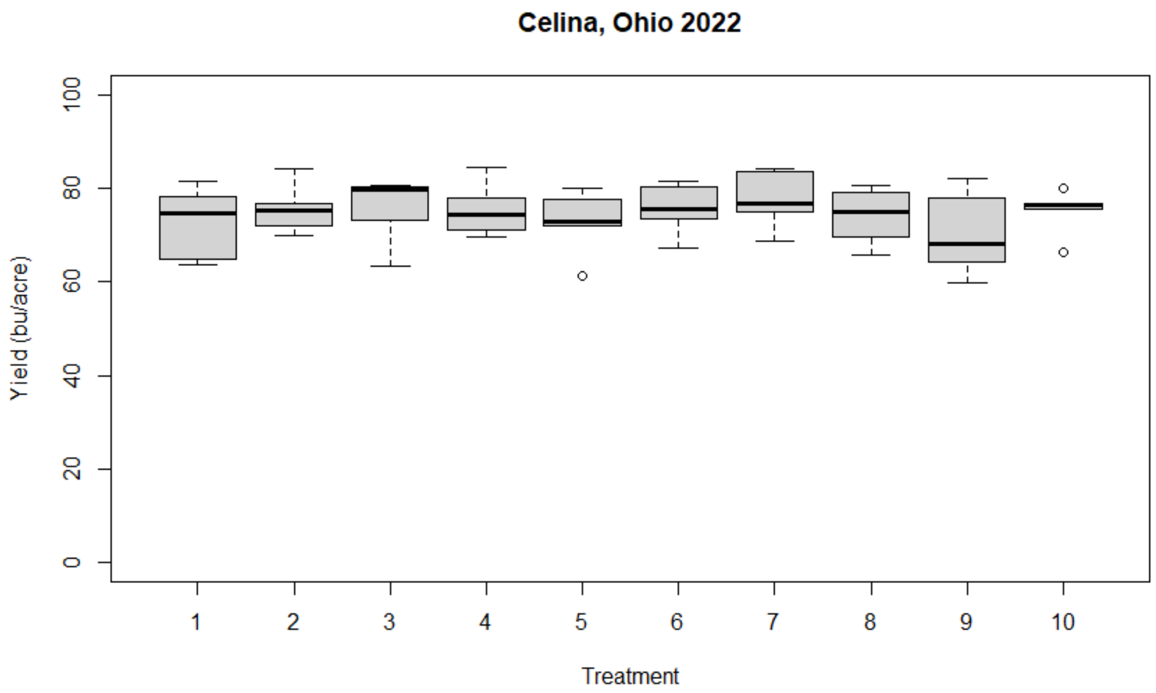
Salisbury, North Carolina 2022



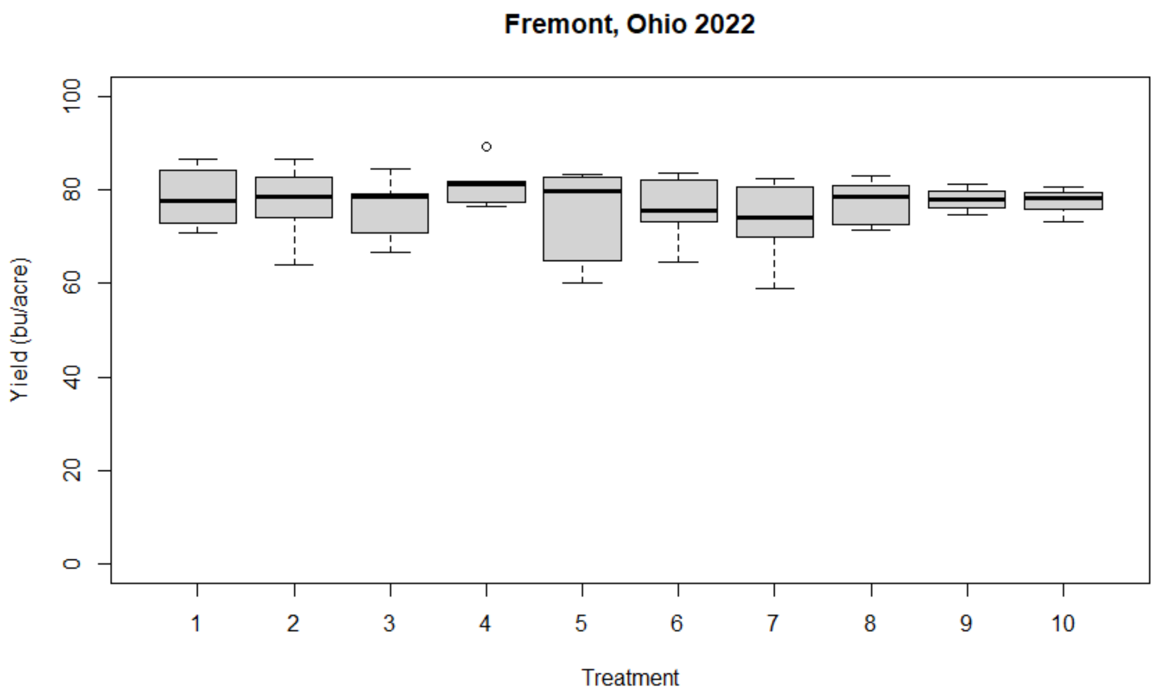
North Dakota



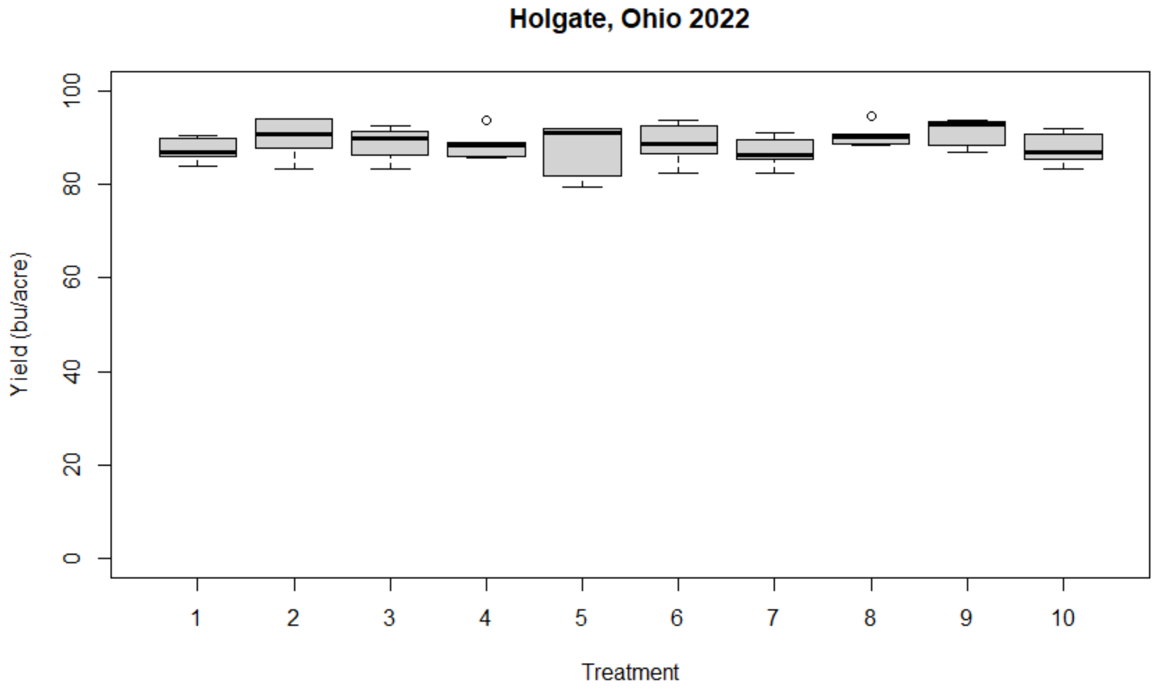
Ohio

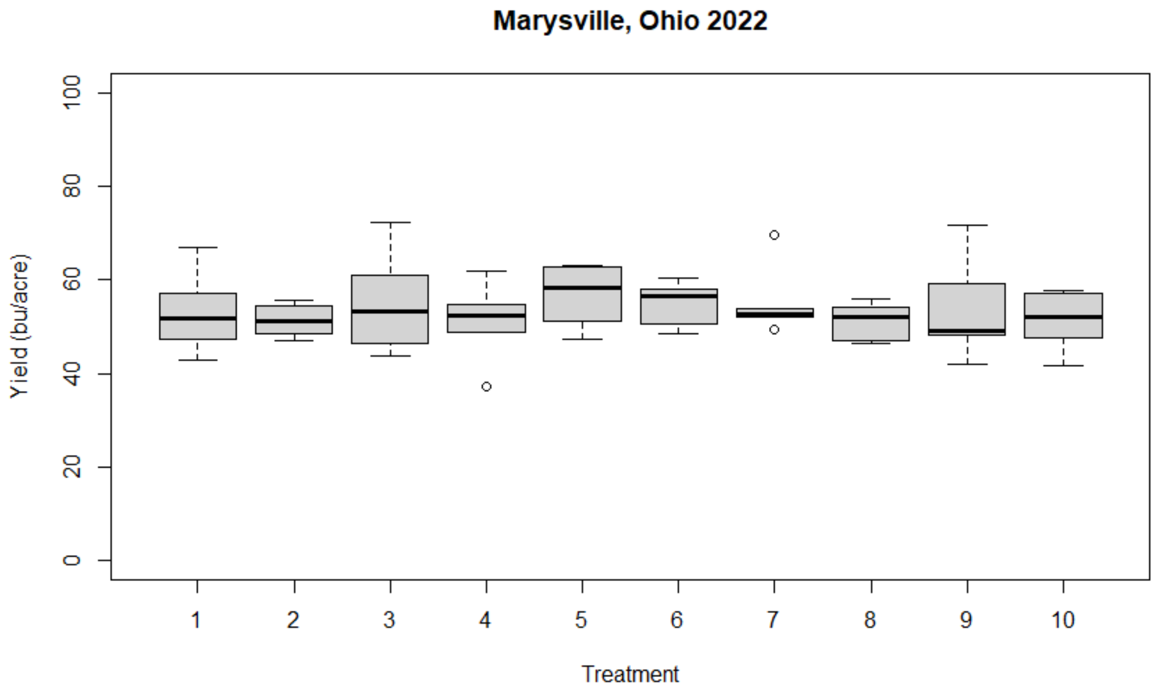


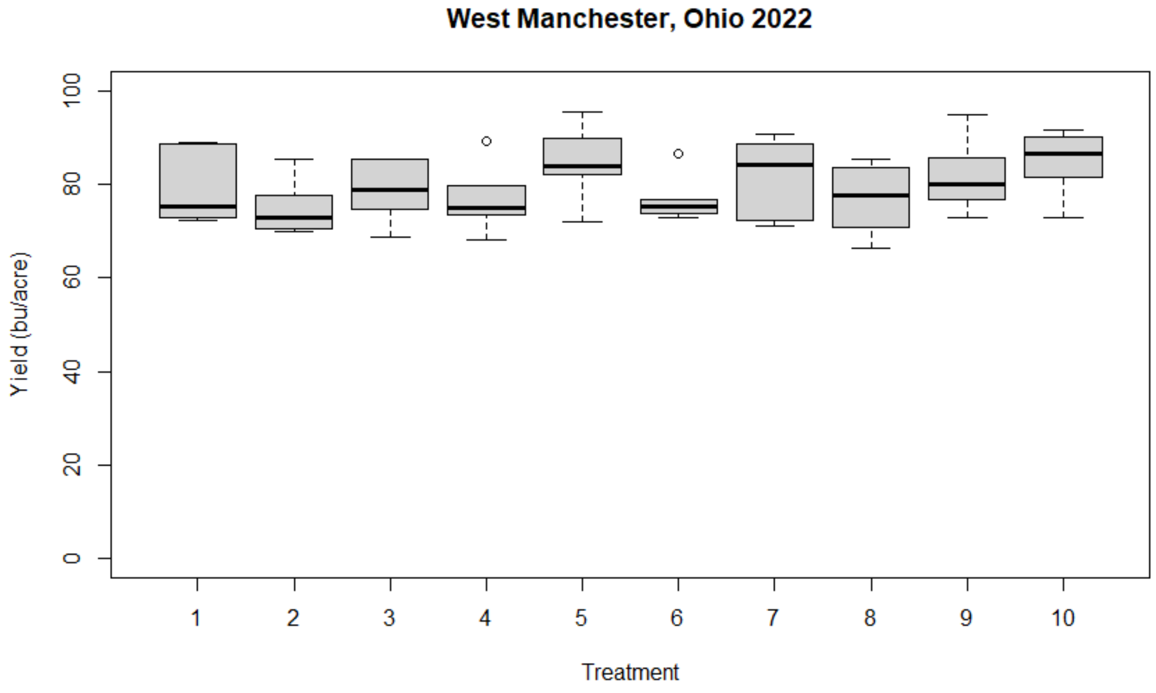
Celina, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

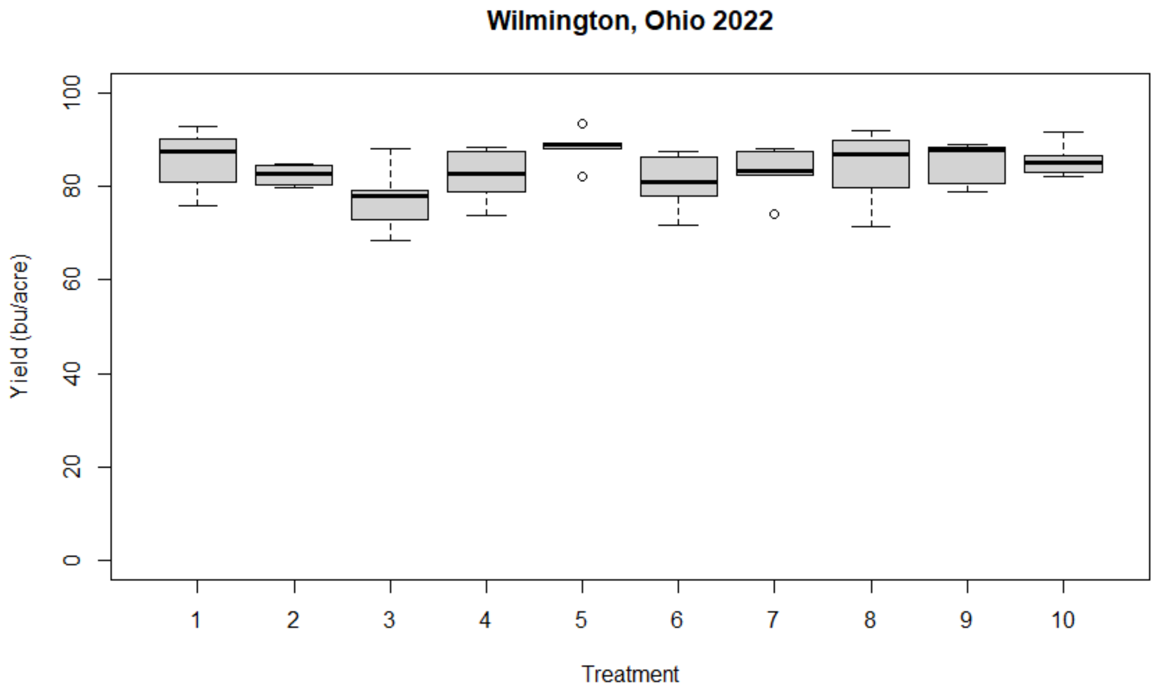


Fremont, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

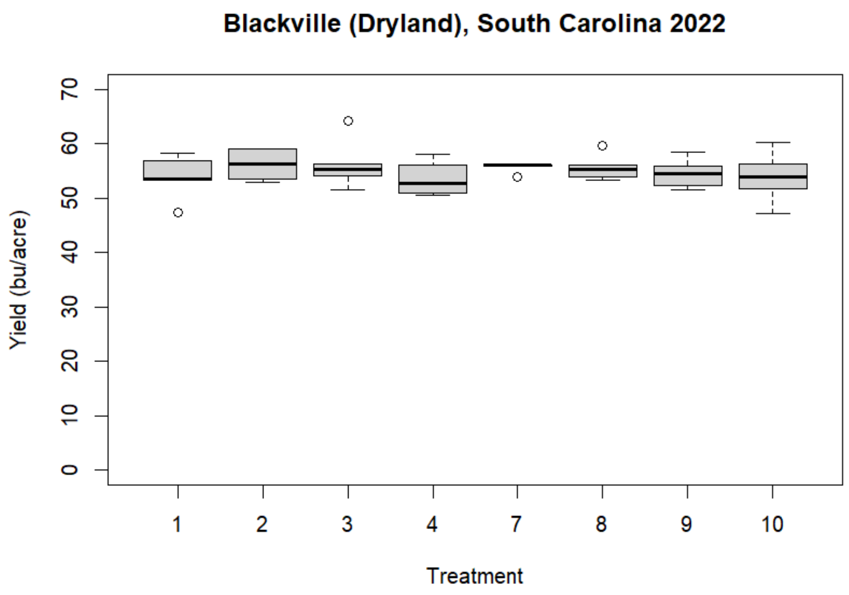

Holgate, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

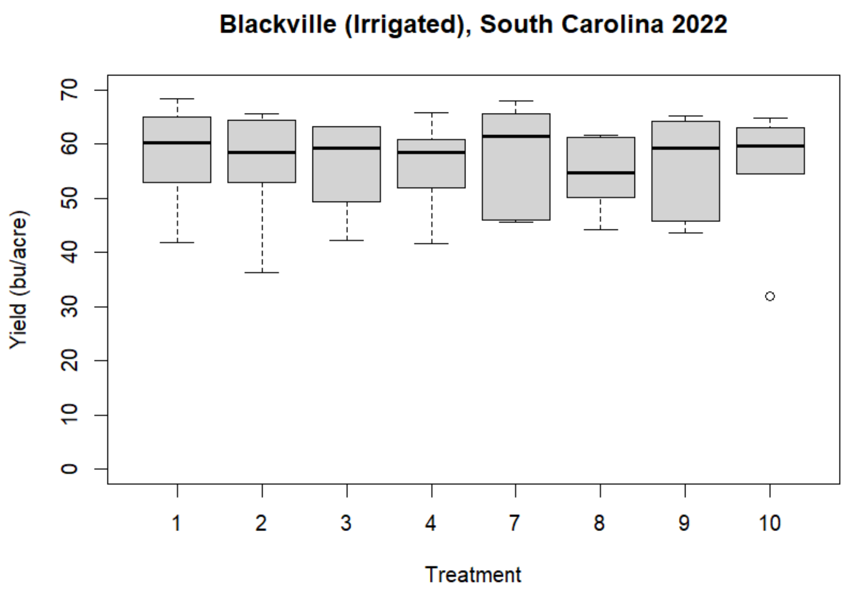

Marysville, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment


West Manchester, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

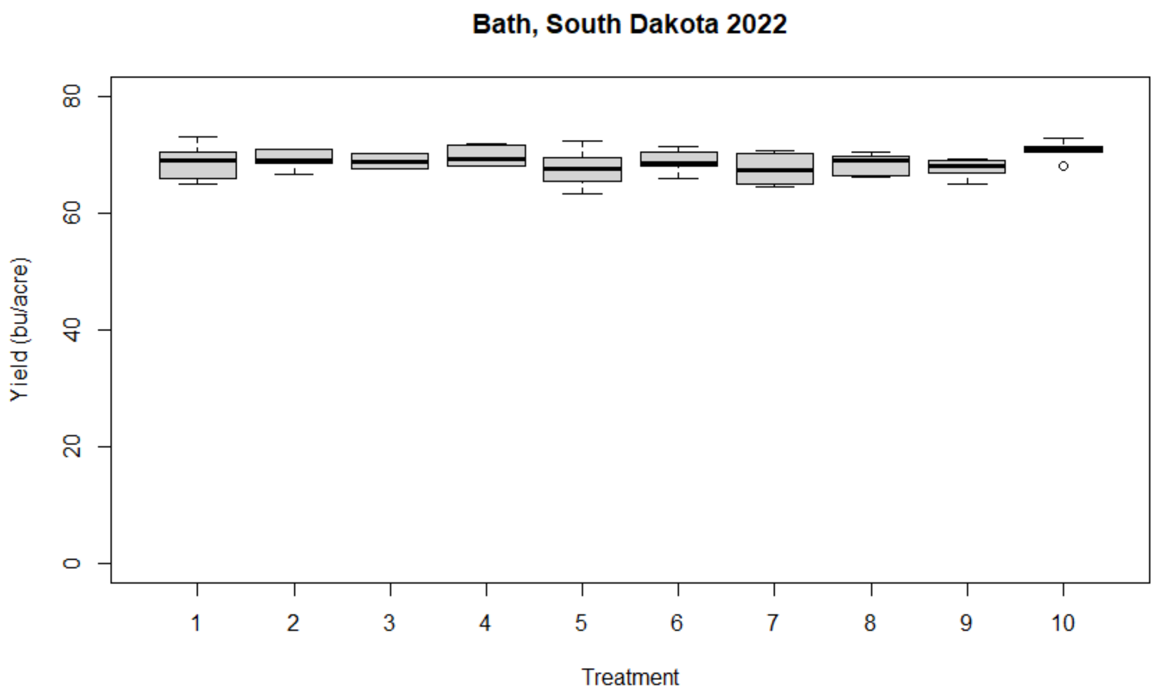

Wilmington, Ohio 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

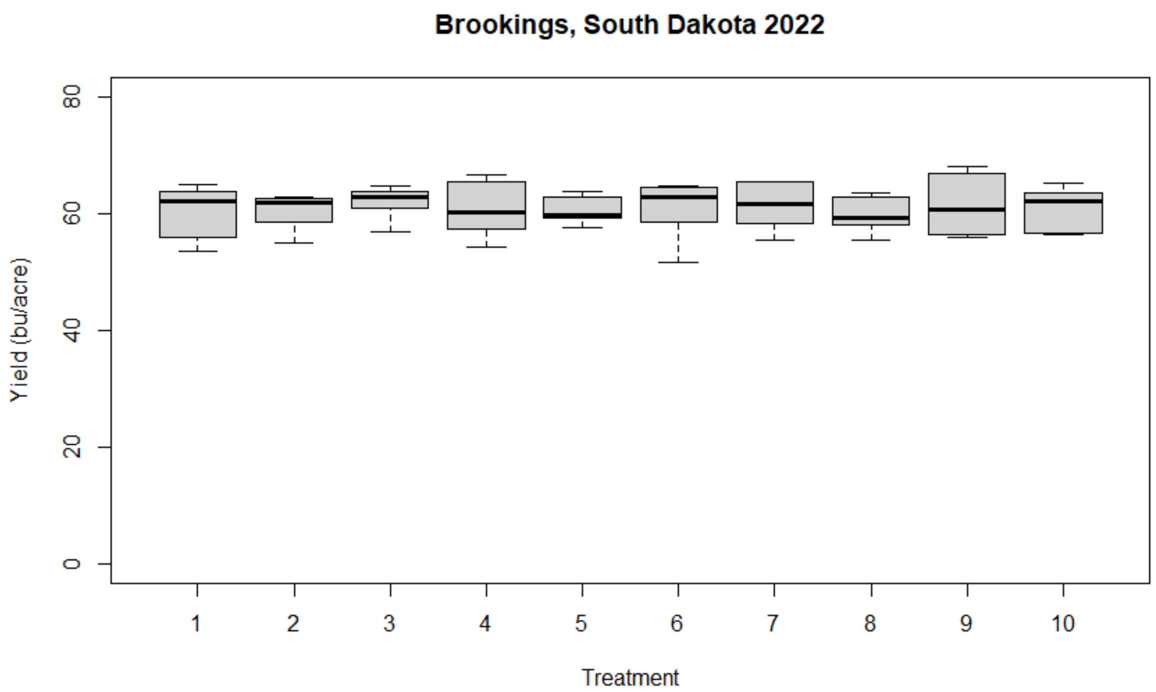
South Carolina

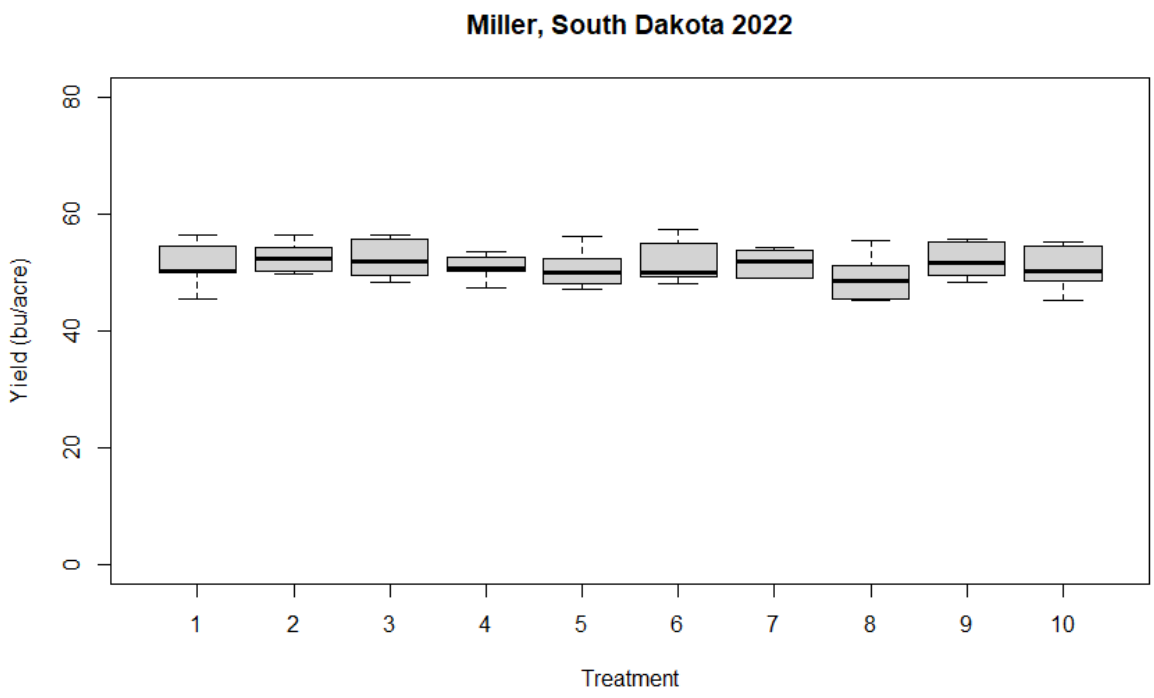


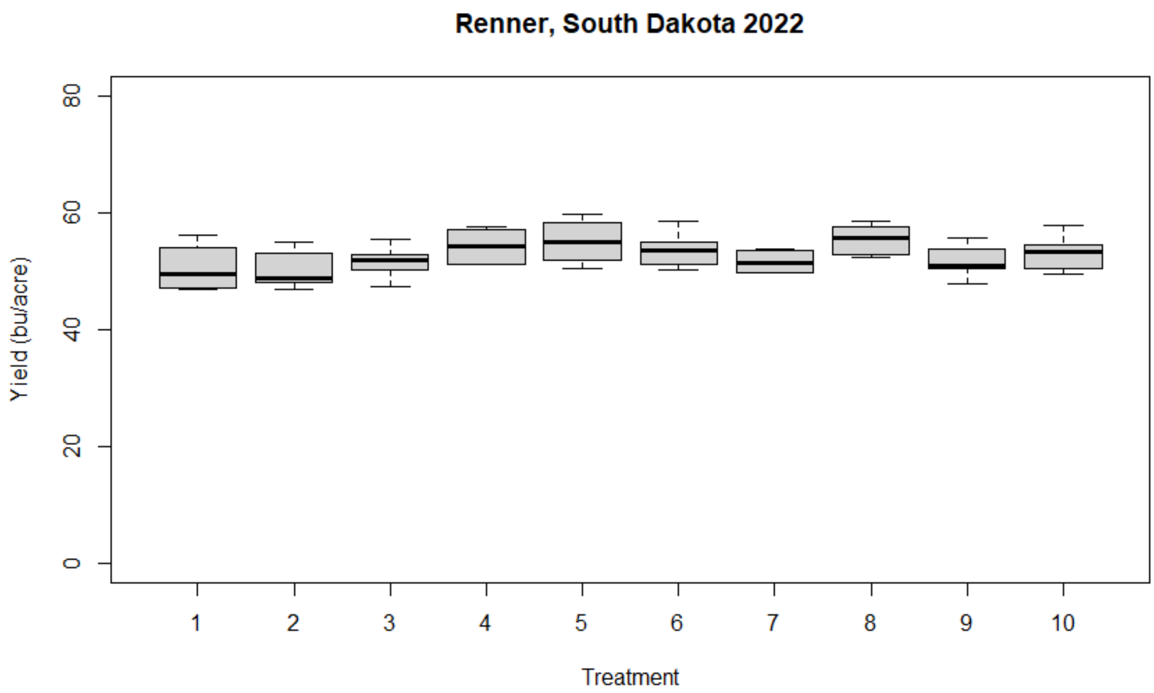


South Dakota

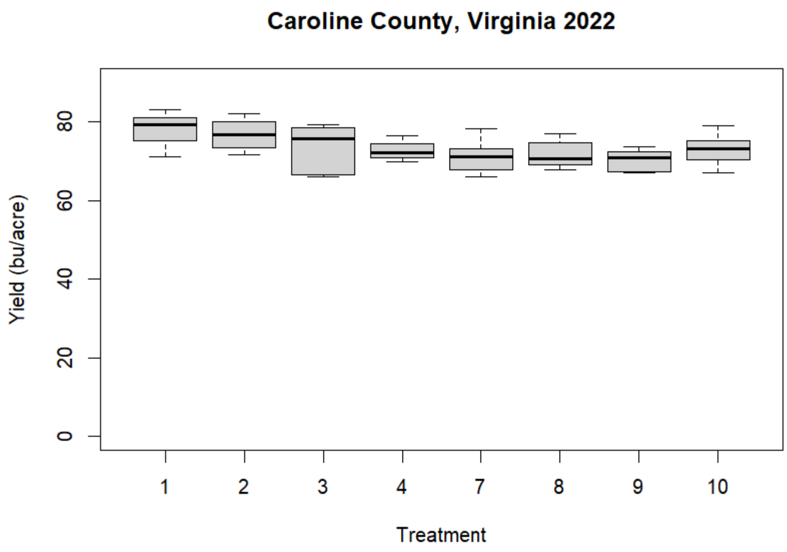


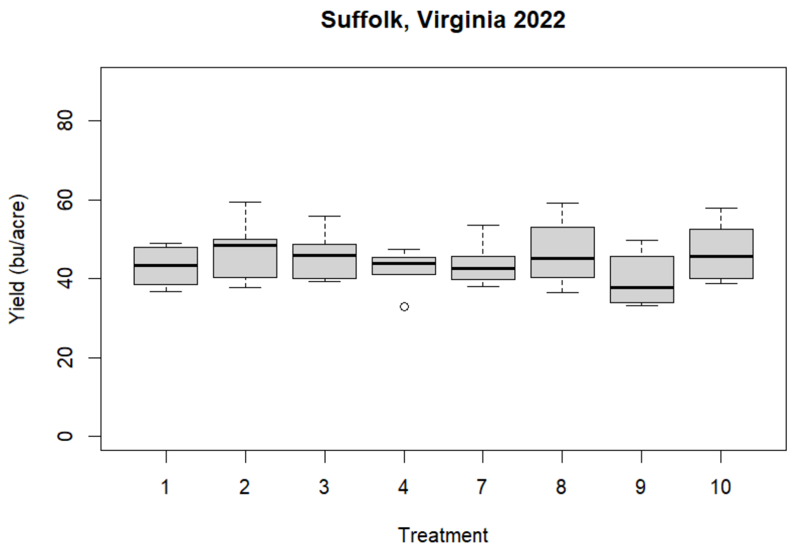



Miller, South Dakota 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

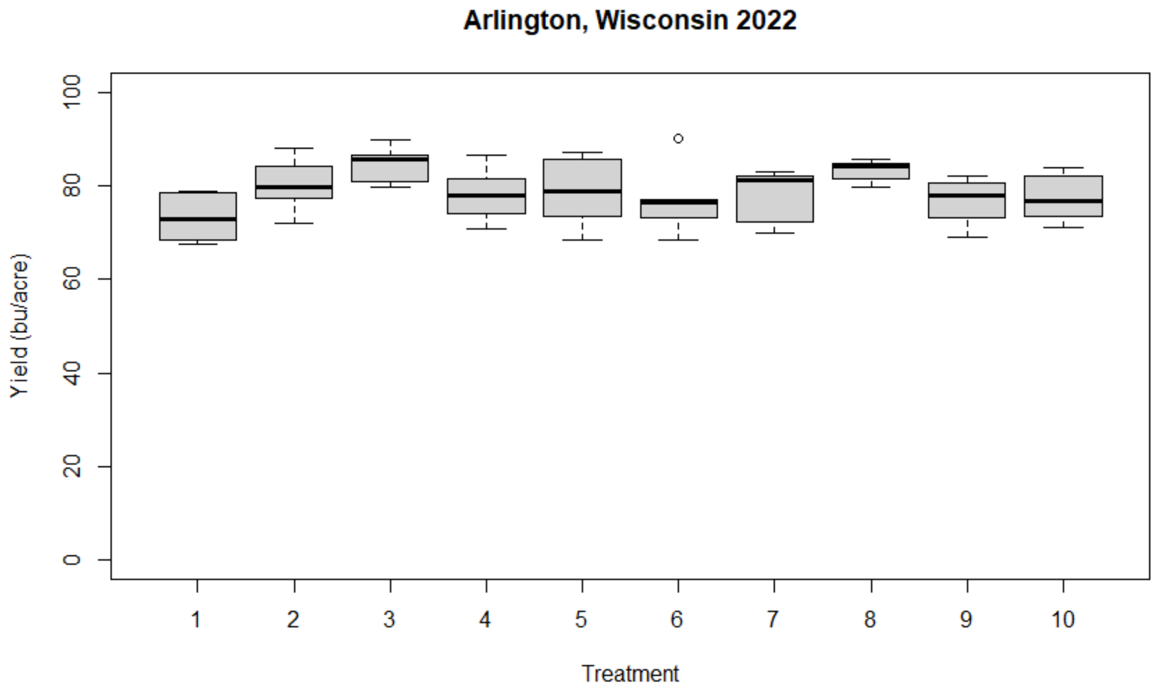

Renner, South Dakota 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
5
6
7
8
9
10
Treatment

Virginia

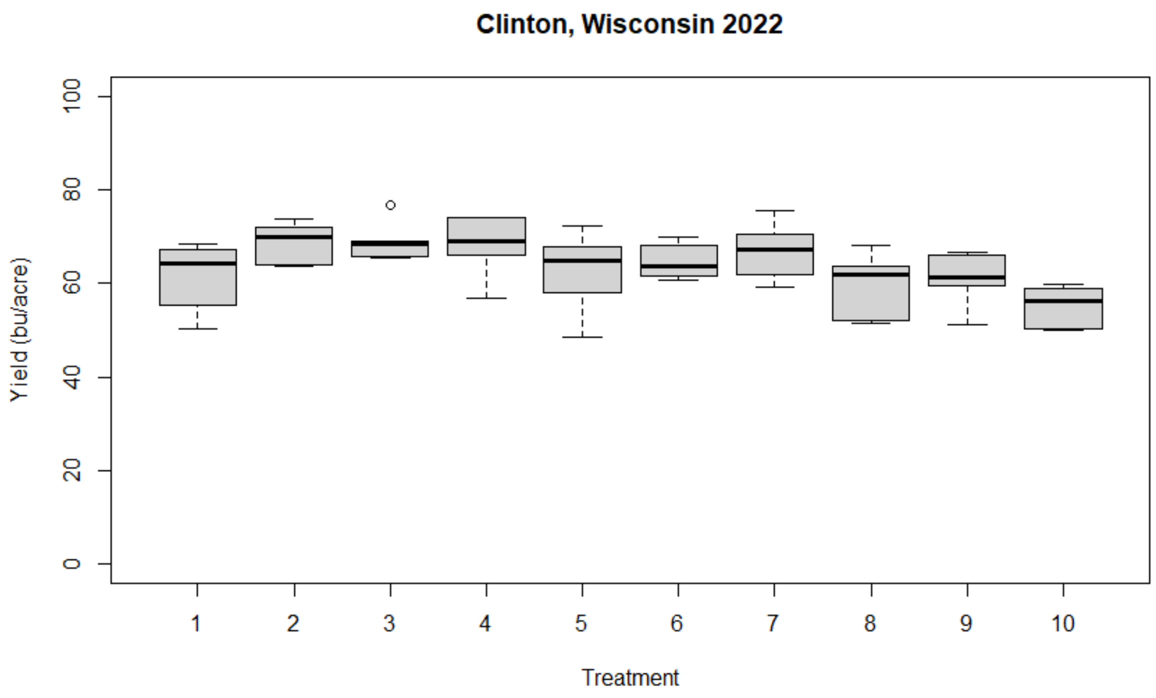

Caroline County, Virginia 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
7
8
9
10
Treatment


Suffolk, Virginia 2022
Yield (bu/acre)
0
20
40
60
80
1
2
3
4
7
8
9
10
Treatment

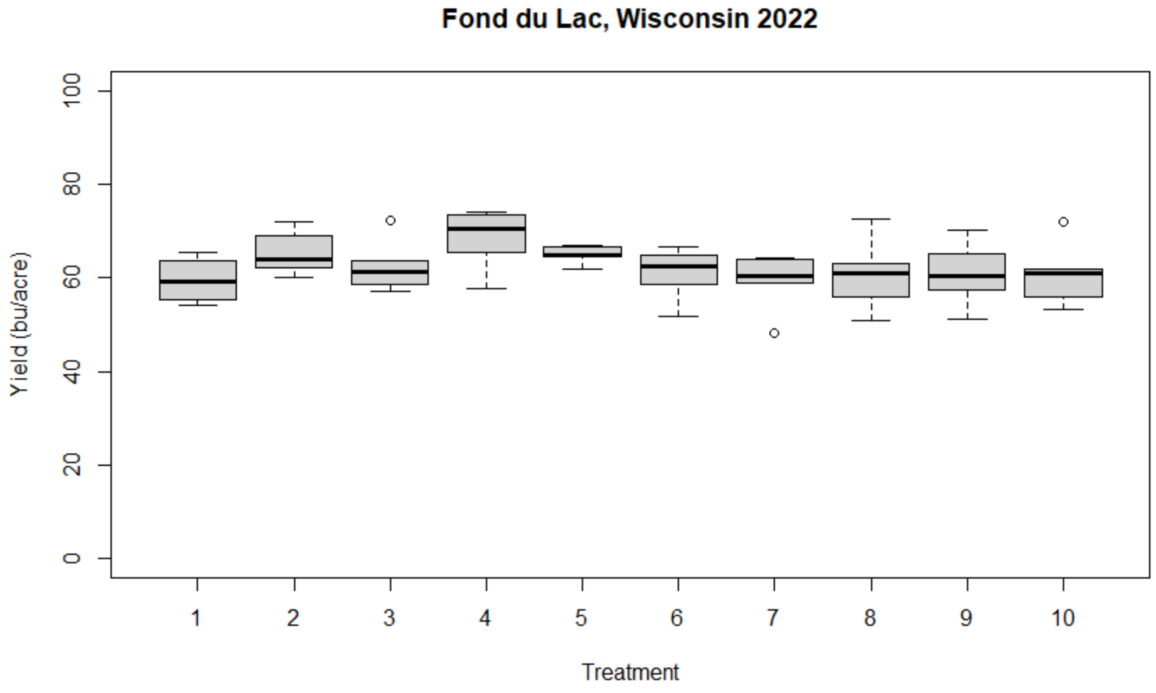
Wisconsin

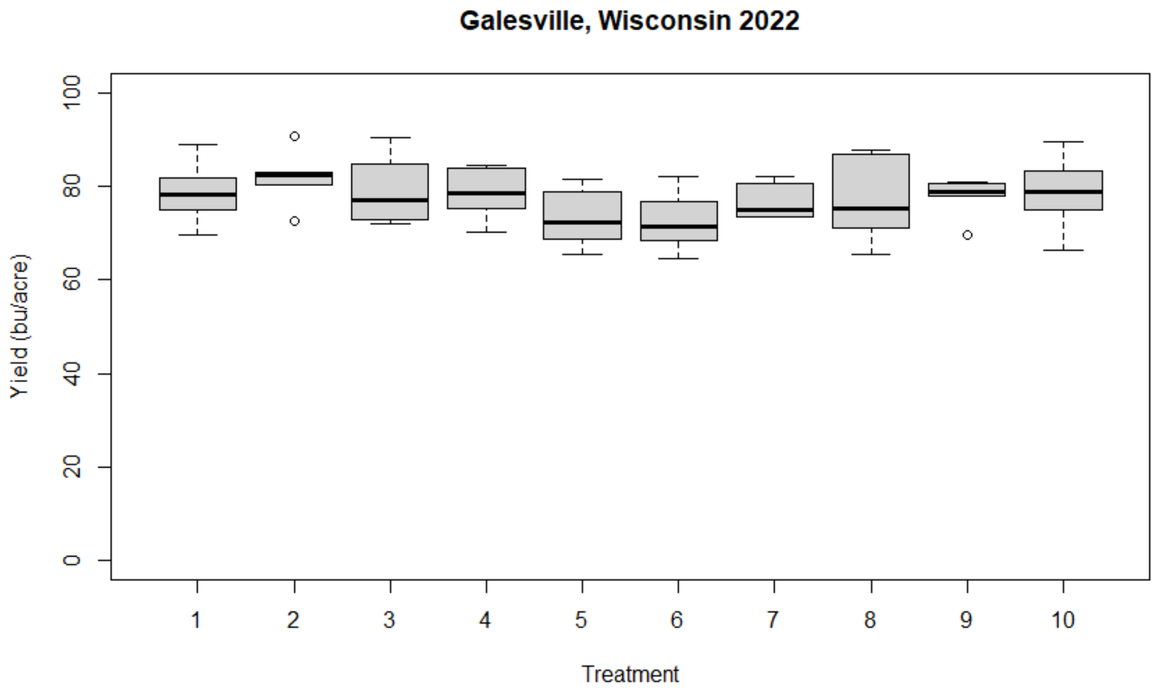


Arlington, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

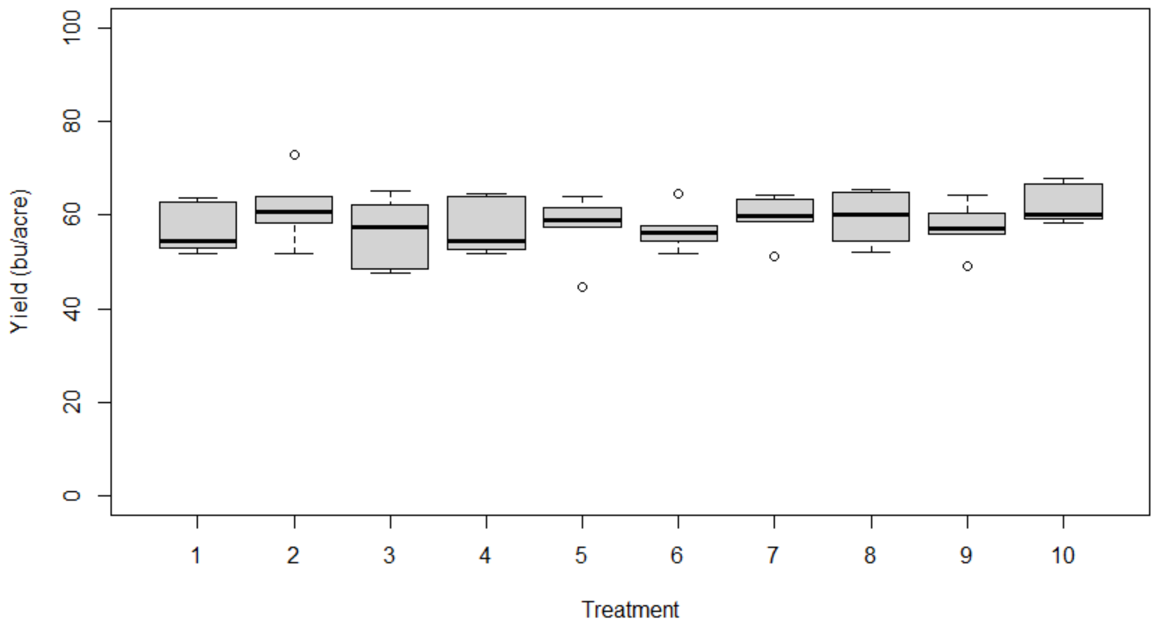


Clinton, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

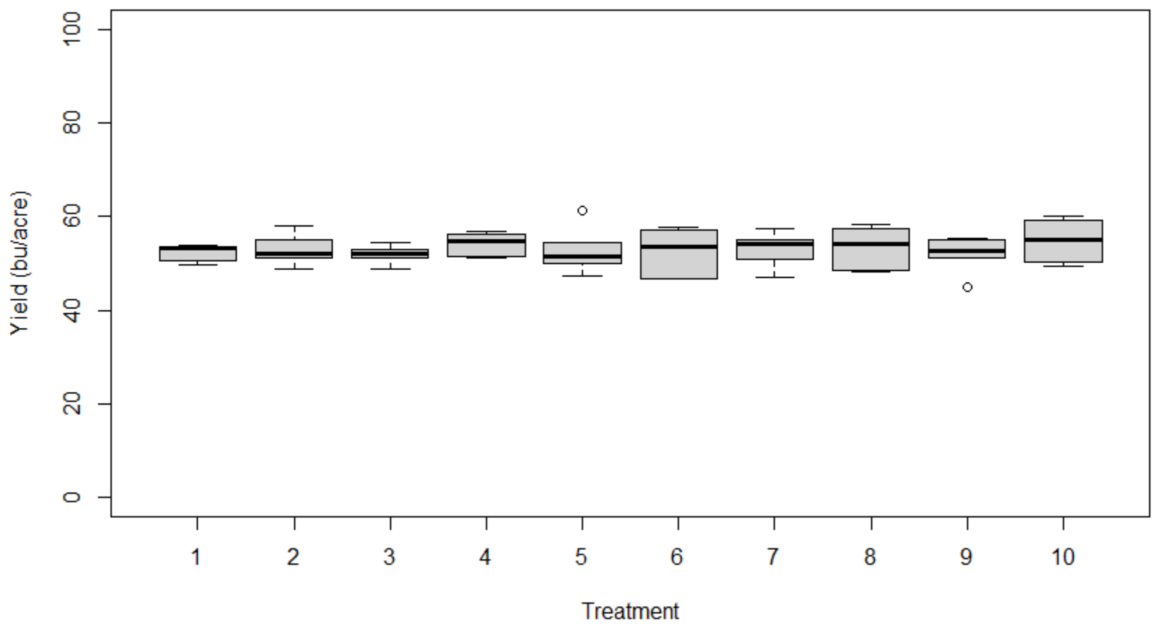

Fond du Lac, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

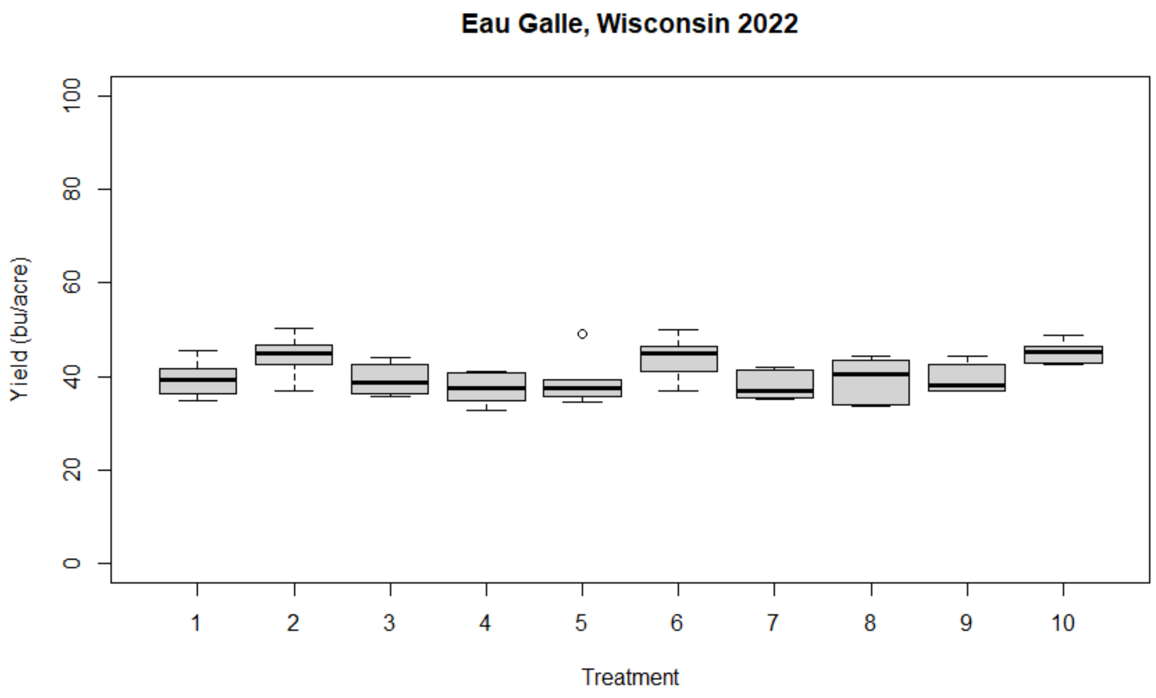

Galesville, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment

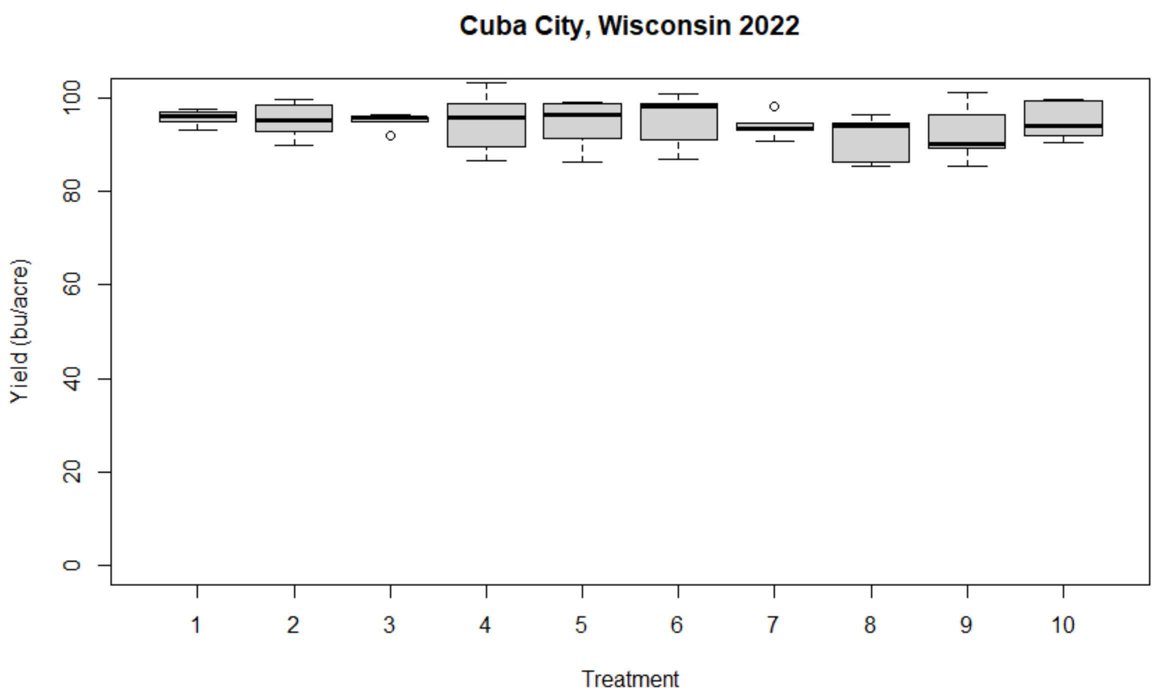
Hancock, Wisconsin 2022

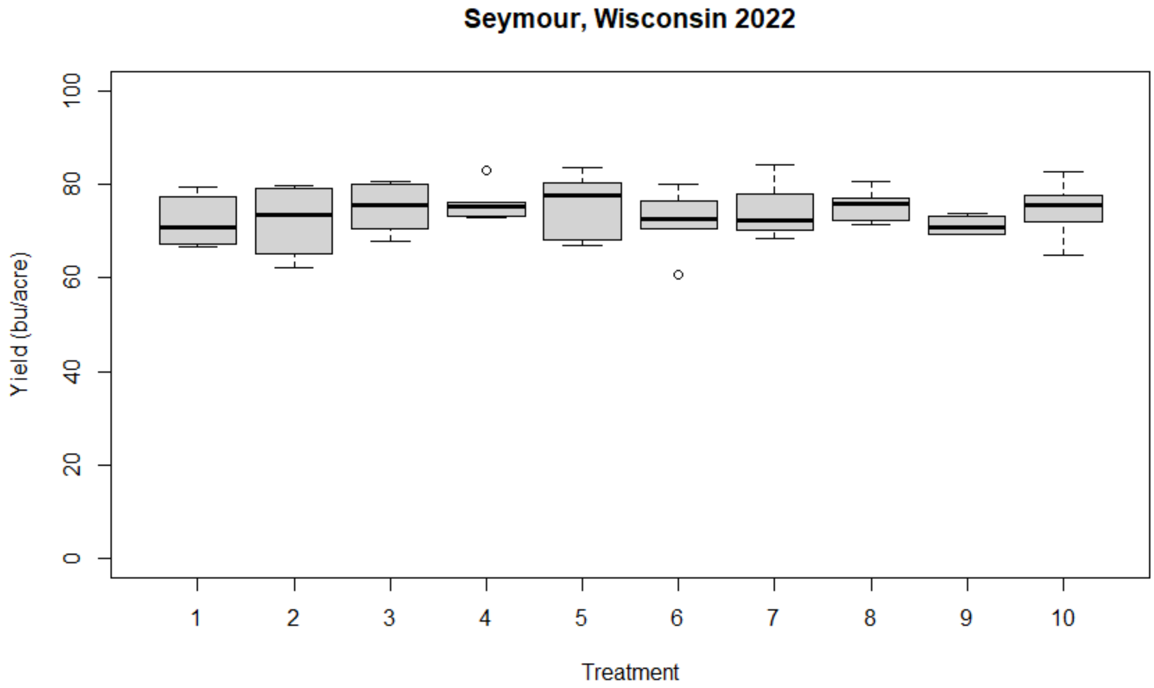


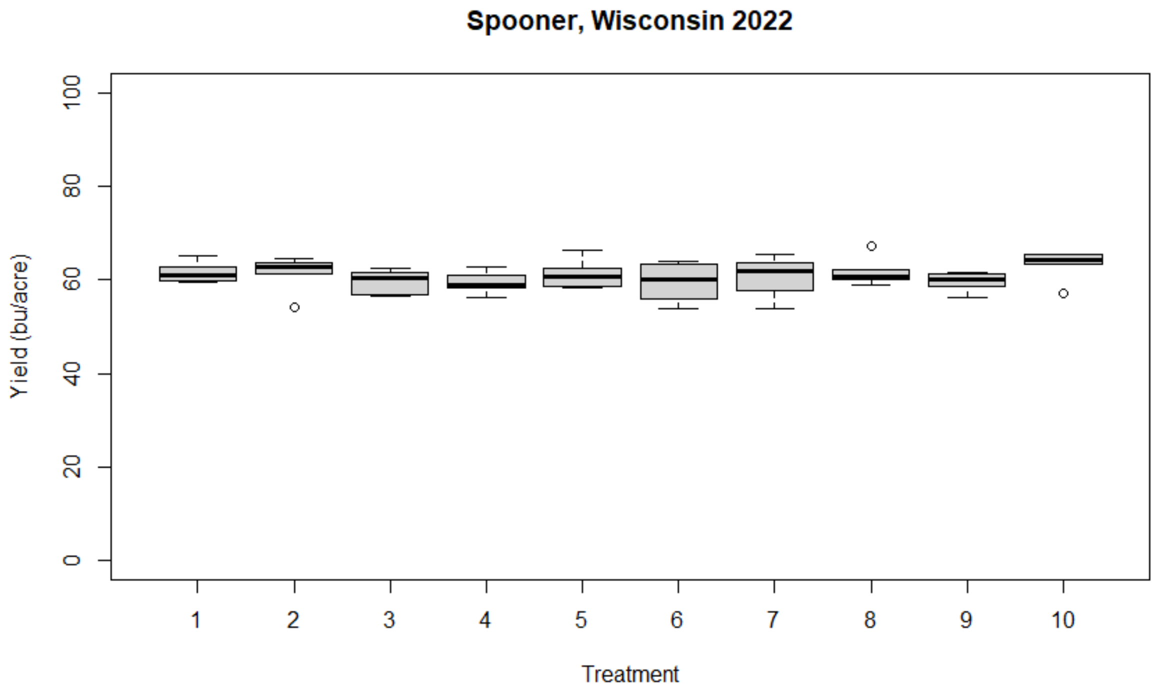
Stratford, Wisconsin 2022




Eau Galle, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment


Cuba City, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment


Seymour, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment


Spooner, Wisconsin 2022
Yield (bu/acre)
0
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
Treatment