Industrial Hemp Research Update

Grain & Fiber

Wisconsin Agribusiness Classic 2020

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Agenda

- Introduction & History
- Hemp Physiology
- Agronomic Research
- Variety Trials
- Herbicide Tolerance Trials
- THC Testing
- Questions

Introduction & History

Introduction

- The 2014 Farm Bill defined industrial hemp as *Cannabis sativa* L. with <0.3% tetrahydrocannabinol (THC) and marijuana as having >0.3% THC (H.R.2642 [2014]).
- The 2018 Farm Bill further defined industrial hemp as an agricultural commodity and removed it from the list of controlled substances (H.R.2 [2018]).
- Interest in industrial hemp cultivation has increased in Wisconsin and across the country.

History of Hemp in Wisconsin

- Wisconsin began producing hemp for research purposes in 1908 (Wright, 1918) and was the leading producer of hemp in the United States from 1920 through the late 1950s (LeCloux, 2019).
- Wisconsin launched its hemp pilot program in 2018 (James, 2019).
- In 2018, the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) issued 247 grower licenses which led to the planting of 1,872 acres (James, 2019).
- In 2019 DATCP received over 2,000 applications for grower licenses, with ~1,200 being issued (James, 2019).

Hemp Physiology

Hemp Physiology

Hemp Physiology - Leaves

Hemp Physiology – Male Flowers

Hemp Physiology – Female Flowers

Agronomic Research

Trial Information

Variety	Seeding Rate (lb/acre)	Nitrogen Rate (lb/acre)
X-59	20	0
CRS-1	30	60
	40	120

Trial Background:

- 2 Locations
  - Arlington ARS
  - Chippewa Falls Co. Farm
- RCBD (4 replications)
- Previous Crop: Soybean
- Planted on 7.5” row spacing

Trial Information

Planting

- June 6th (Arlington) and June 11th (Chippewa Falls)
  - Planting at ½ inch
  - Research Drill

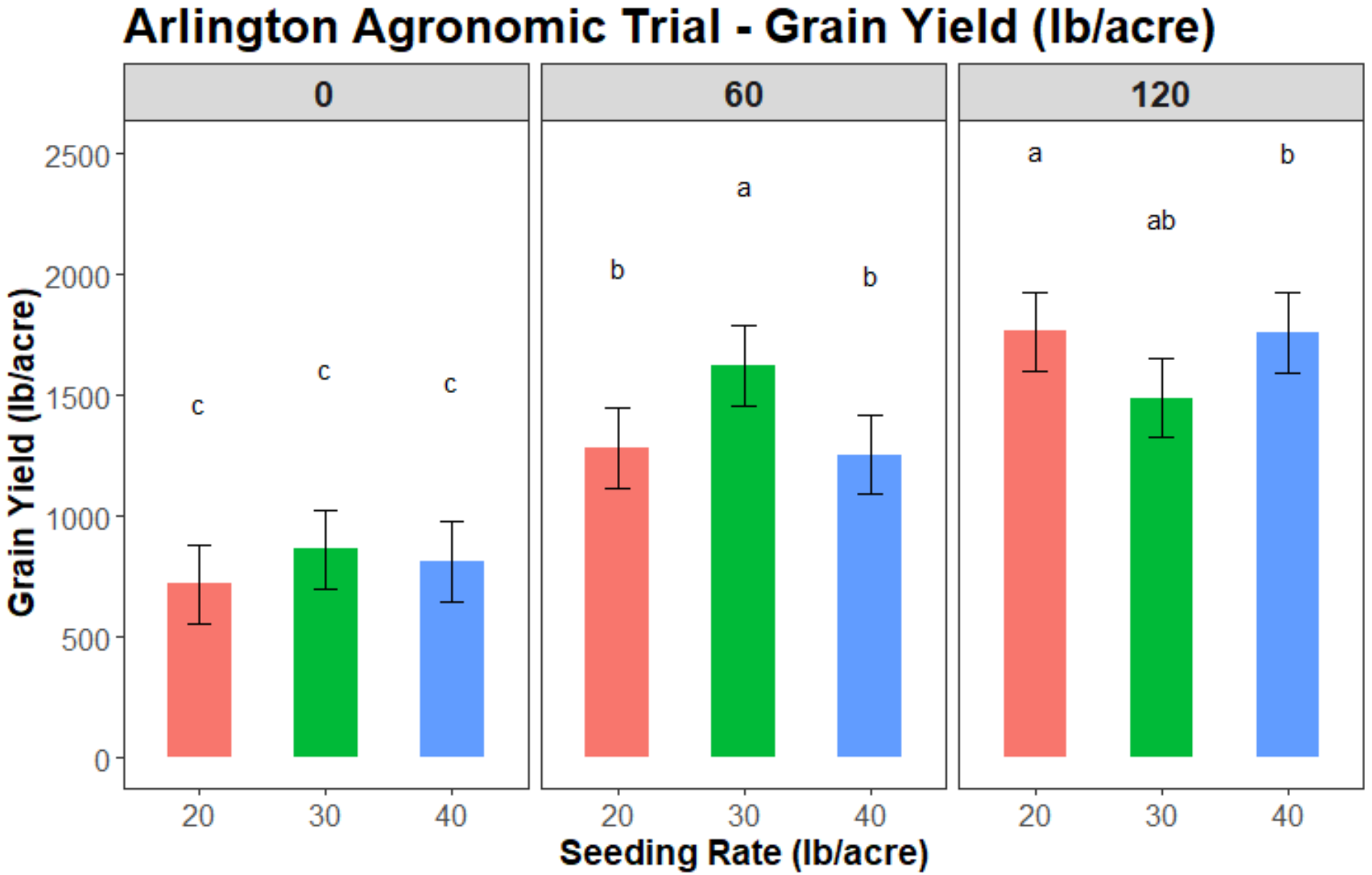
Harvest

- September 9th, 16th (Arlington) and September 13th (Chippewa Falls)
  - Arlington dates were due to differences in maturity
  - Harvested grain and fiber by hand
- Dr. Brian Luck and the Biological Systems Engineering Group is looking at harvest methods

Observations

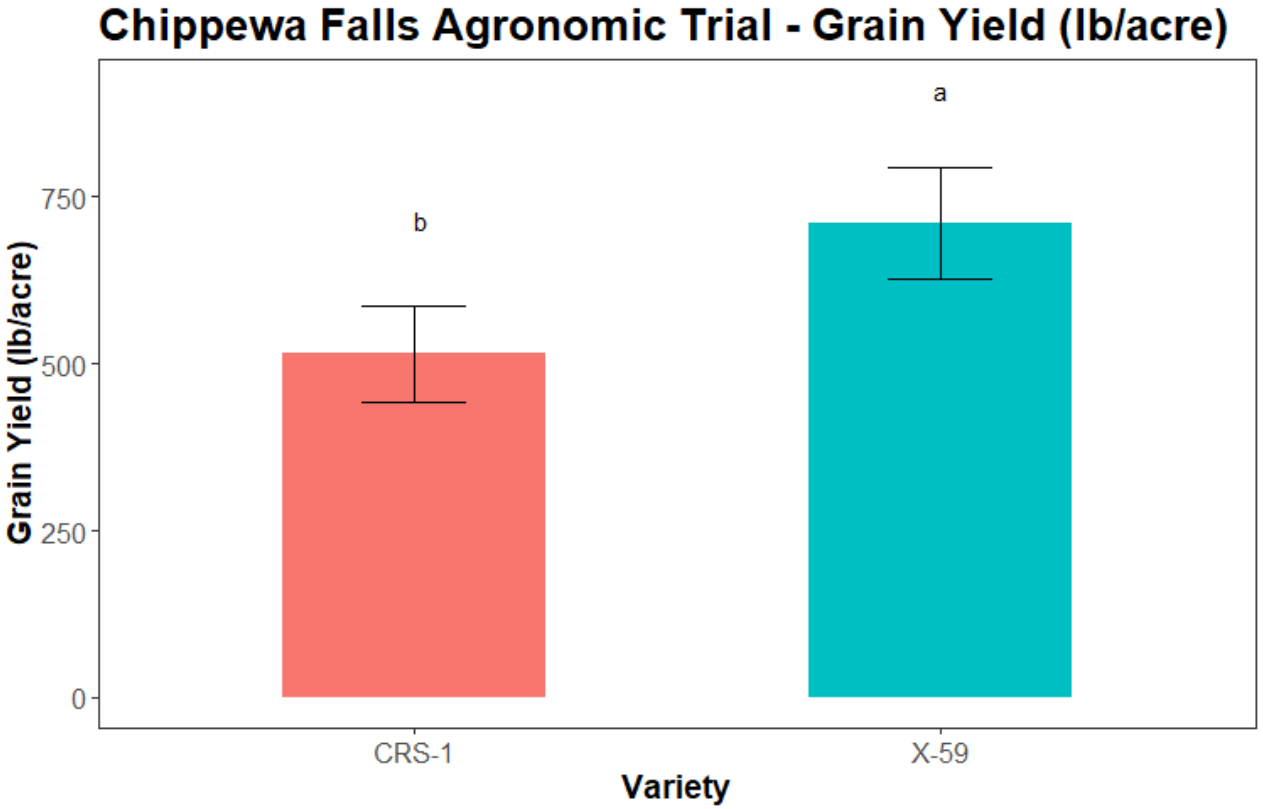
- CRS-1 appeared more vigorous than X-59 throughout most of the growing season
- Plots along the edges of the field appeared weedier than those towards the inside
- Plants grew and flowered much quicker than anticipated
  - Average plot height doubled week to week from 6/24 – 7/15
  - Plots began to flower shortly after the summer solstice (6/21/19)

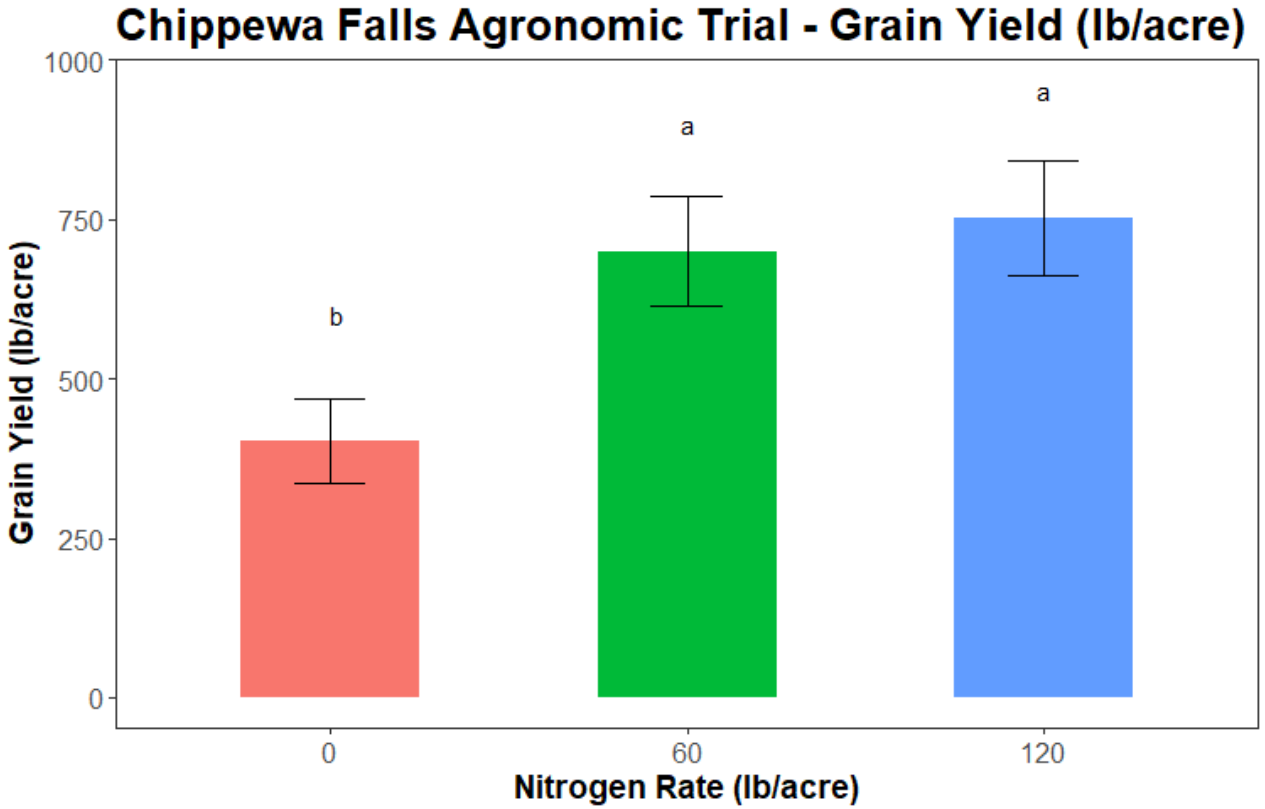
Industrial Hemp Agronomic Trial



Preliminary data – not for publishing

Industrial Hemp Agronomic Trial





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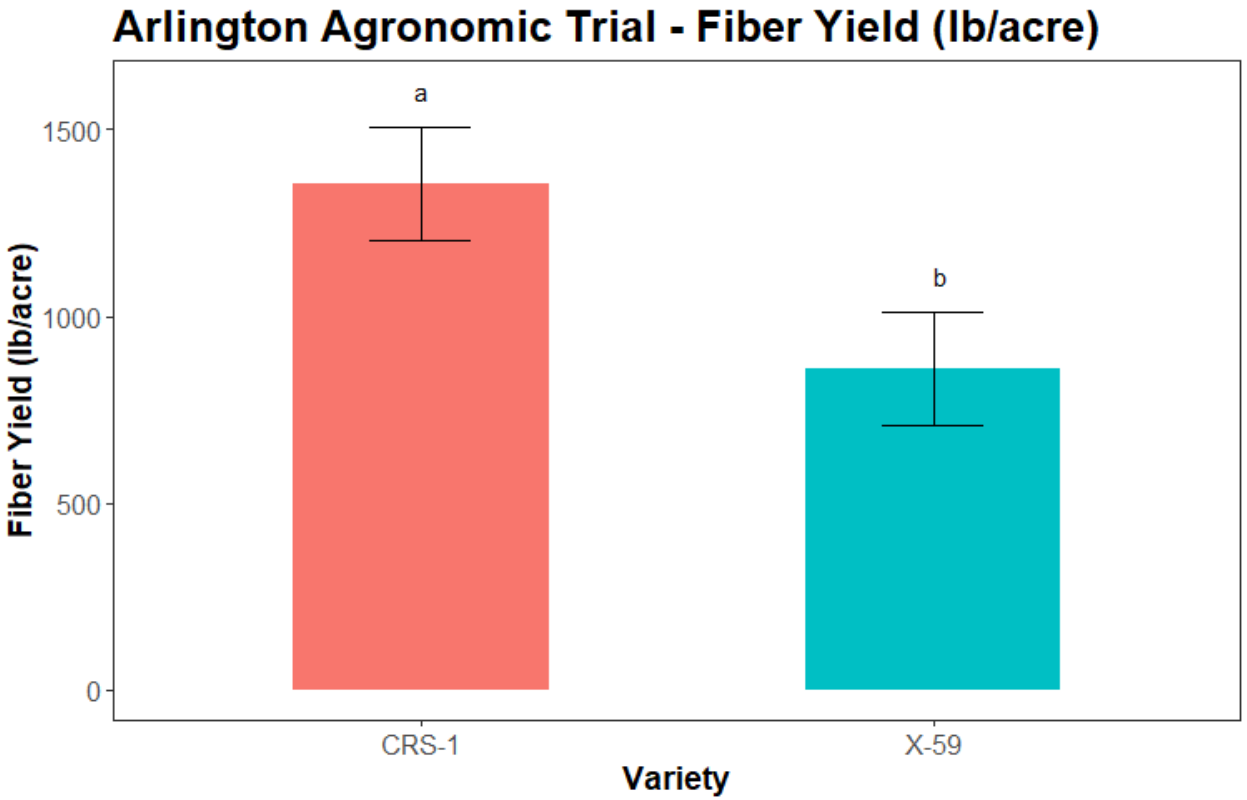

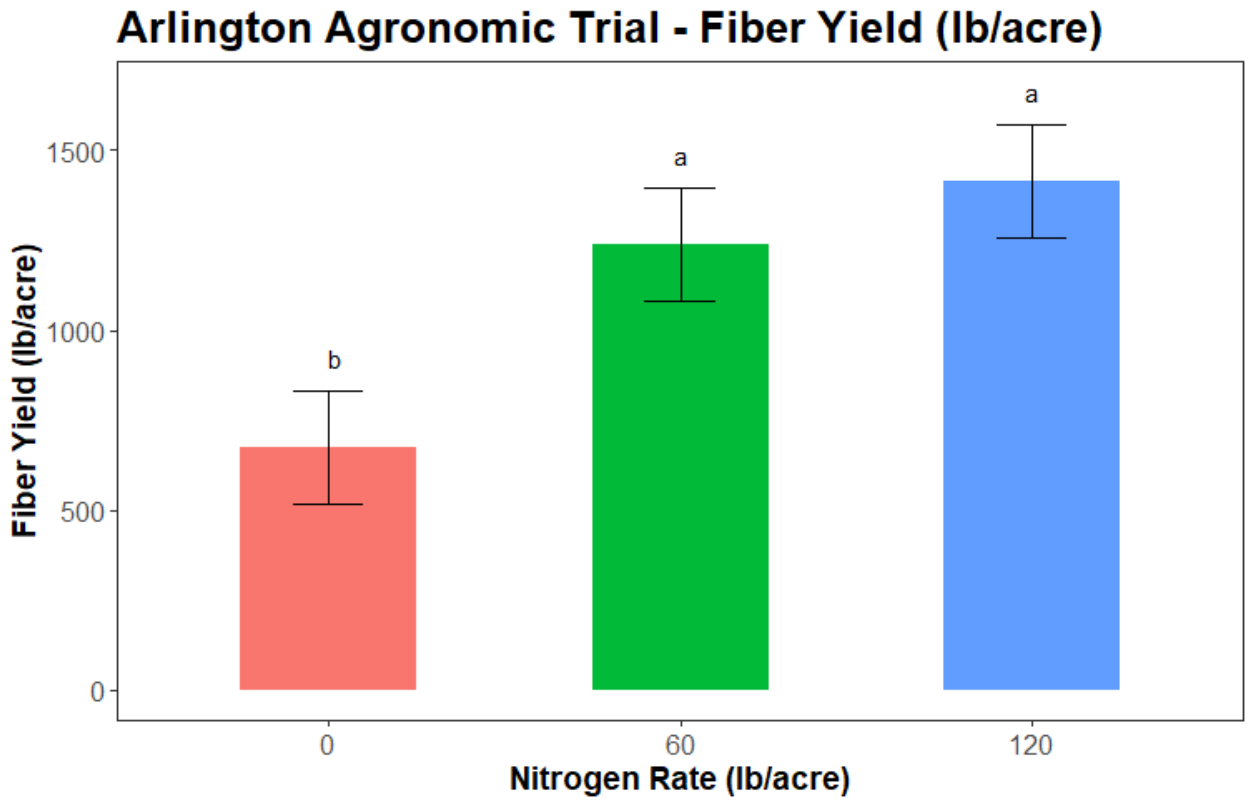

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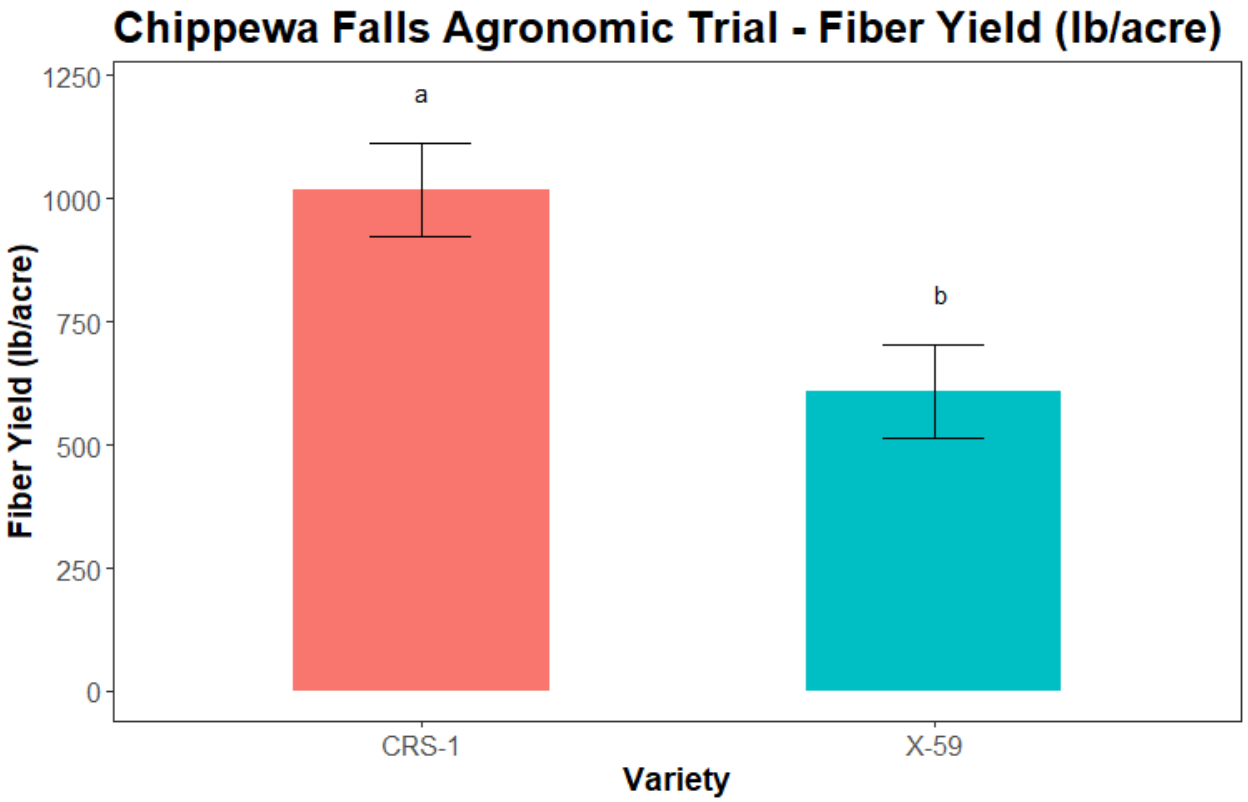

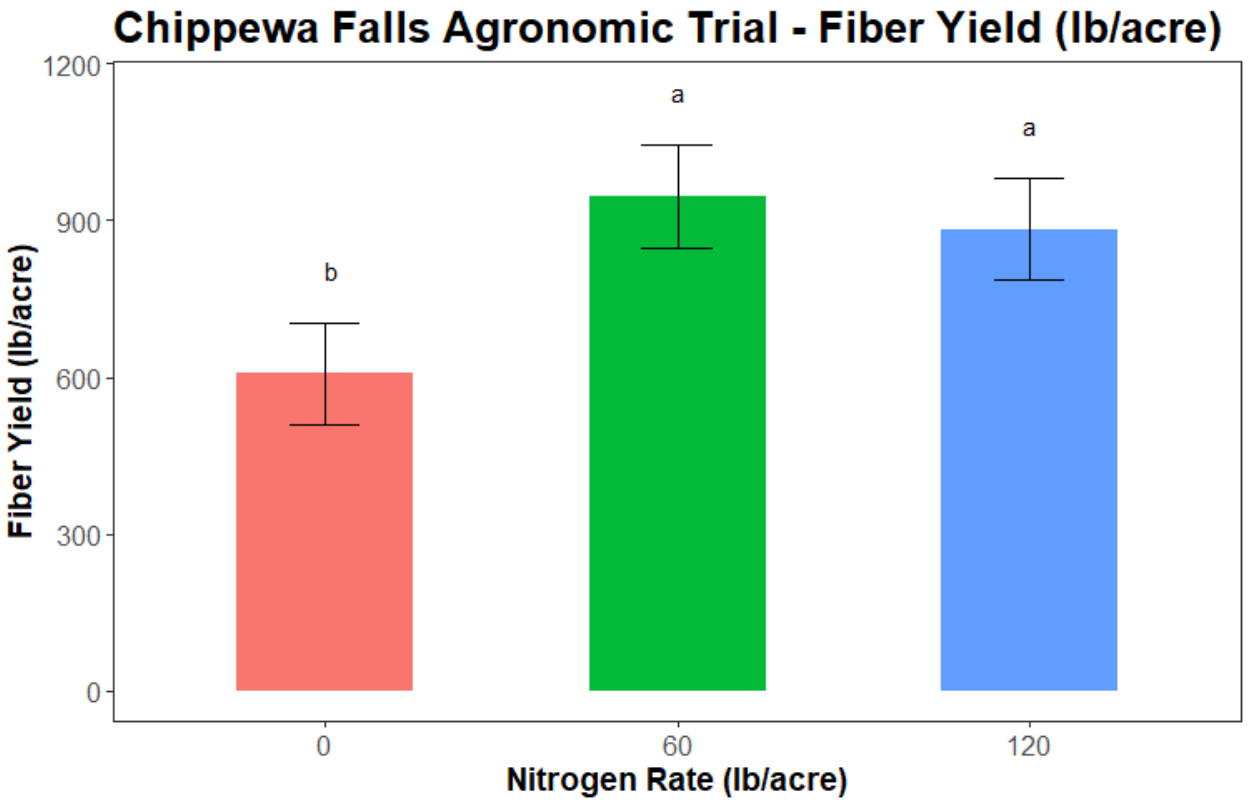

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Variety Trials

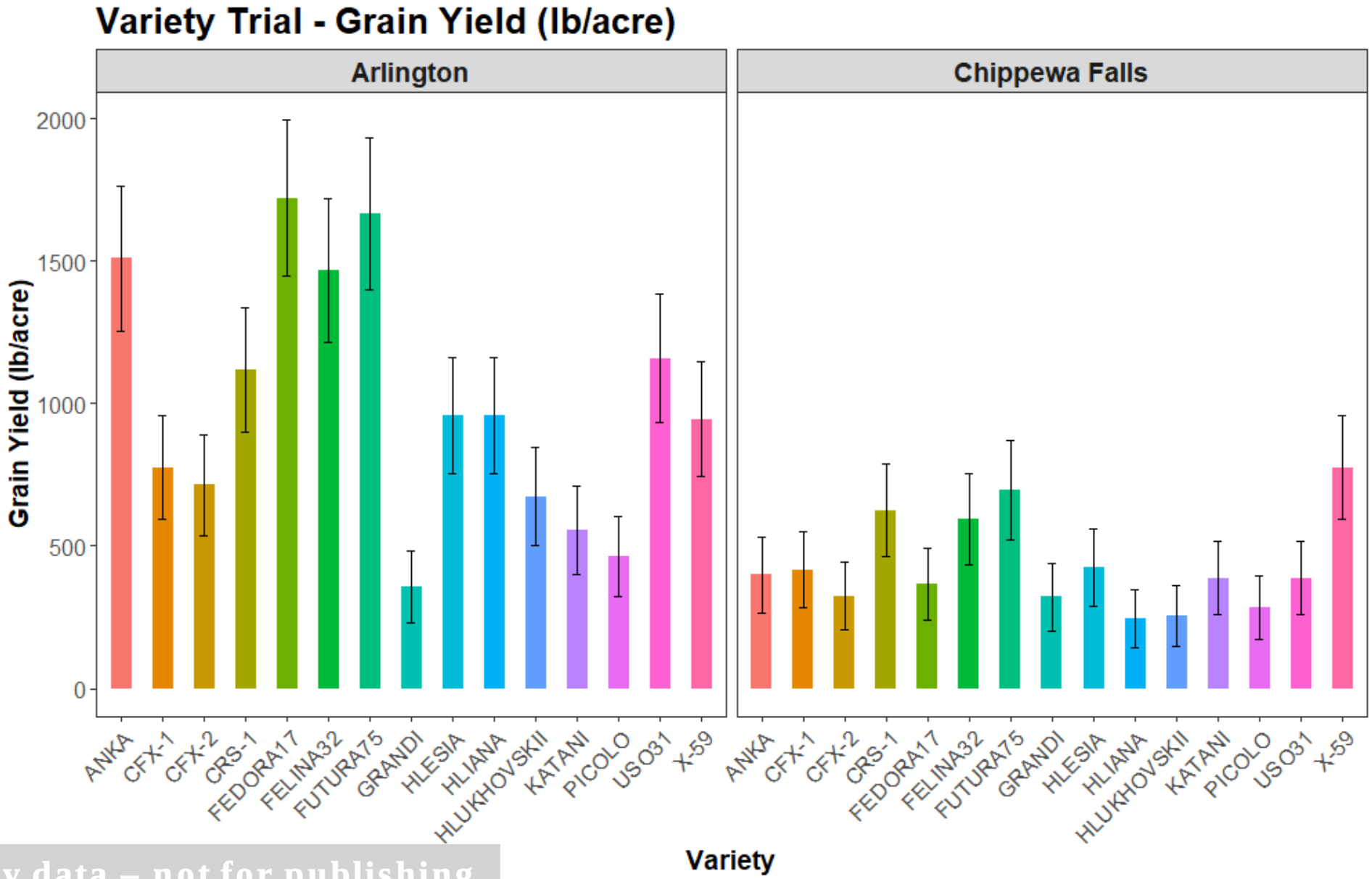
Variety Information

Variety	Average Seeds/acre	Germ Rate %	Average Seeds/lb	Usage	Origin	Cultivar Provider
Anka	942,923	80	27,913	Dual-Use	Canada	Valley Bio
CFX-1	984,194	80	26,219	Grain	Canada	Hemp Genetics International
CFX-2	844,472	85	26,557	Grain	Canada	Hemp Genetics International
CRS-1	910,933	84	26,635	Grain	Canada	Hemp Genetics International
FEDORA 17	770,176	96	25,949	Grain	France	IHemp Farms
FELINA 32	864,762	93	28,799	Grain	Europe	TerresInovia, Thiverval-Grignon
FUTURA 75	943,201	69	24,089	Fiber / CBD	Europe	IHemp Farms
GRANDI	881,852	88	28,708	Grain	Canada	Hemp Genetics International
HLESIA	765,723	84	23,811	Unknown	Ukraine	Unknown
HLIANA	753,319	90	25,088	Unknown	Ukraine	Unknown
HLUKHOVSKII	836,150	85	26,295	Unknown	Ukraine	Unknown
KATANI	935,065	84	29,076	Grain	Canada	Hemp Genetics International
PICOLO	969,408	83	29,783	Grain	Canada	Hemp Genetics International
USO 31	848,598	92	28,261	Grain	Ukraine / Germany	IHemp Farms
X-59	826,675	86	26,295	Grain	Canada / Wisconsin	Legacy Hemp LLC

Trial Background:

- 2 Locations
  - Arlington ARS
  - Chippewa Falls Co. Farm
- 15 Varieties
- RCBD (4 replications)
- Previous Crop: Soybean
- Fertilizer:
  - Broadcast Urea at planting
  - 100 lbs. per acre
- Planted on 7.5” row spacing

Industrial Hemp Variety Trial



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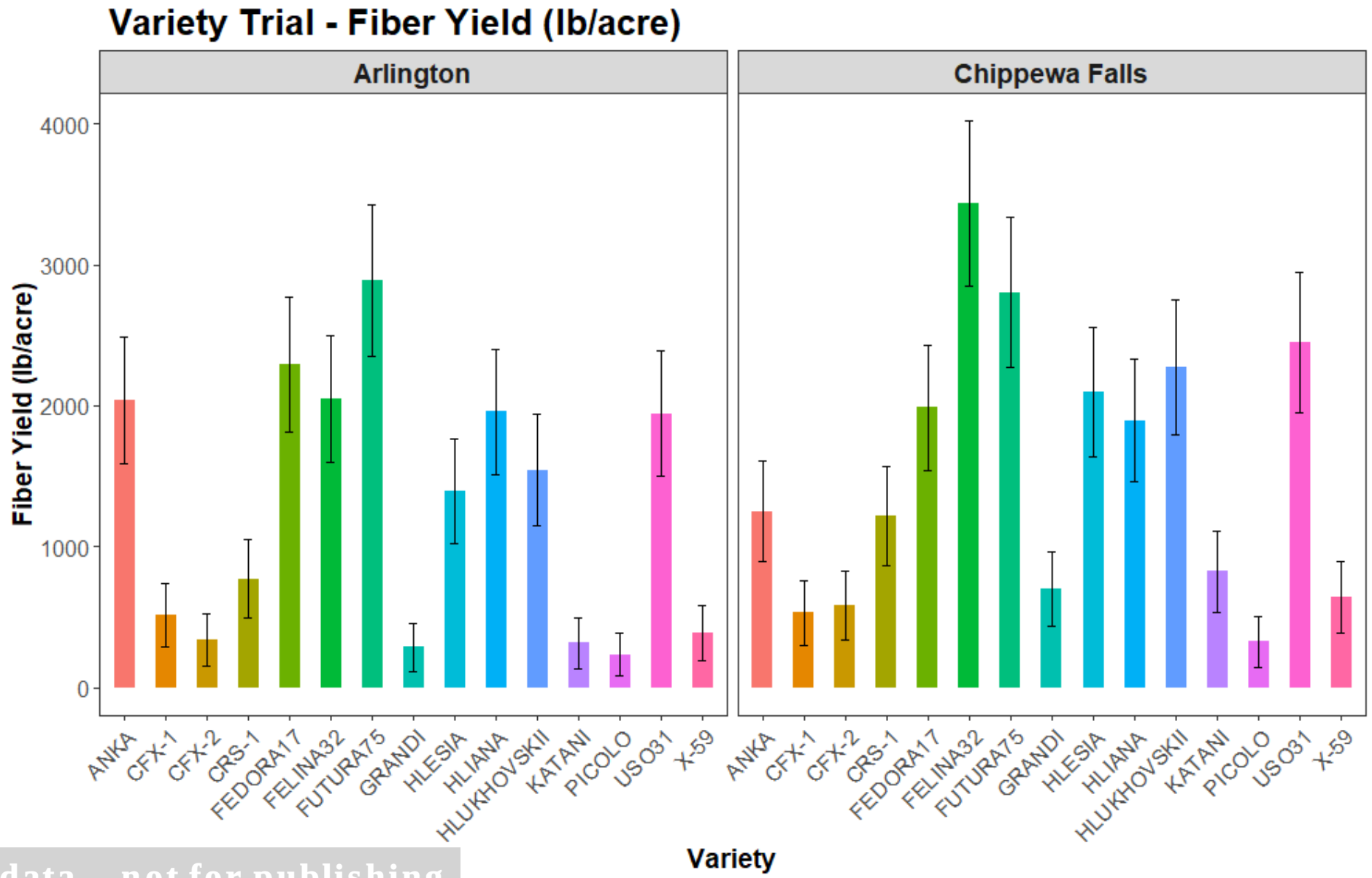


Herbicide Tolerance

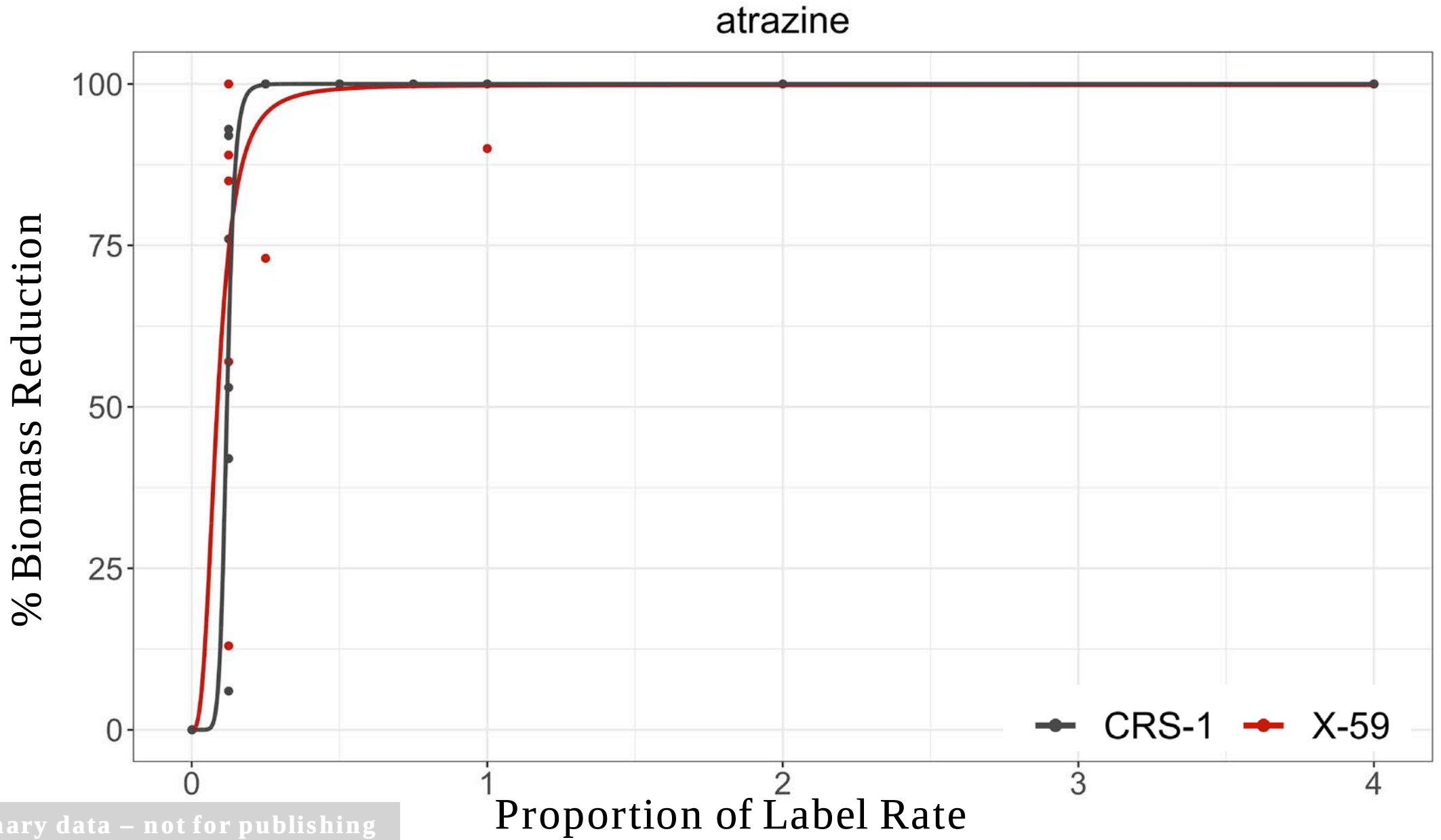
Industrial Hemp Herbicide Tolerance Trial

SOA	Trade Name	Active Ingredient	Label Rate
	PRE-emergence		
2	Pursuit	imazethapyr	4 fl oz ac^{-1}
3	Prowl H2O	pendimethalin	4 pt ac^{-1}
5	Aatrex 4L	atrazine	3 pt ac^{-1}
5	Tricor DF	metribuzin	0.67 lbs. ac^{-1}
14	Sharpen	saflufenacil	1 fl oz ac^{-1}
14	Spartan 4F	sulfentrazone	8 fl oz ac^{-1}
15	Dual II Magnum	S-metolachlor	1.67 pt ac^{-1}
27	Callisto	mesotrione	3 fl oz ac^{-1}
	POST-emergence		
2	Pursuit	imazethapyr	4 fl oz ac^{-1}
5	Aatrex 4L	atrazine	3 pt ac^{-1}
6	Basagran	bentazon	1.5 pt ac^{-1}
6	Buctril	bromoxynil	1.6 pt ac^{-1}
9	Roundup PowerMAX	glyphosate	32 fl oz ac^{-1}
10	Liberty	glufosinate	32 fl oz ac^{-1}
14	Flexstar	fomesafen	1 pt ac^{-1}
27	Callisto	mesotrione	3 fl oz ac^{-1}

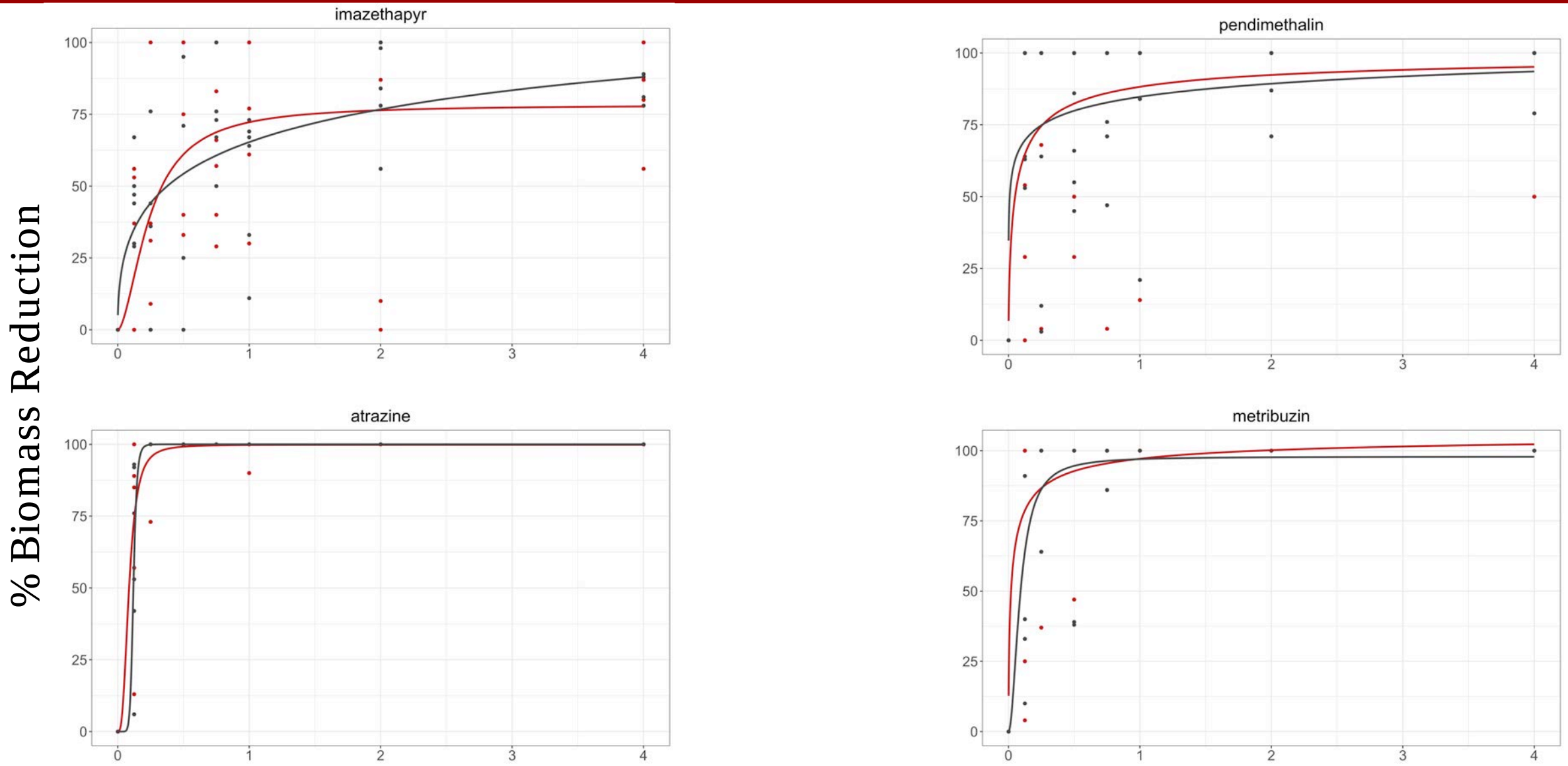
Trial Background:

- Walnut Street Greenhouse
- 2 Varieties
- 23 PRE & 21 POST herbicides (8 of each presented today)
- 7 rates
- RCBD (3 replications and 2 experimental runs)
- Above ground biomass harvested 21 DAT (POST) and 28 DAT (PRE)

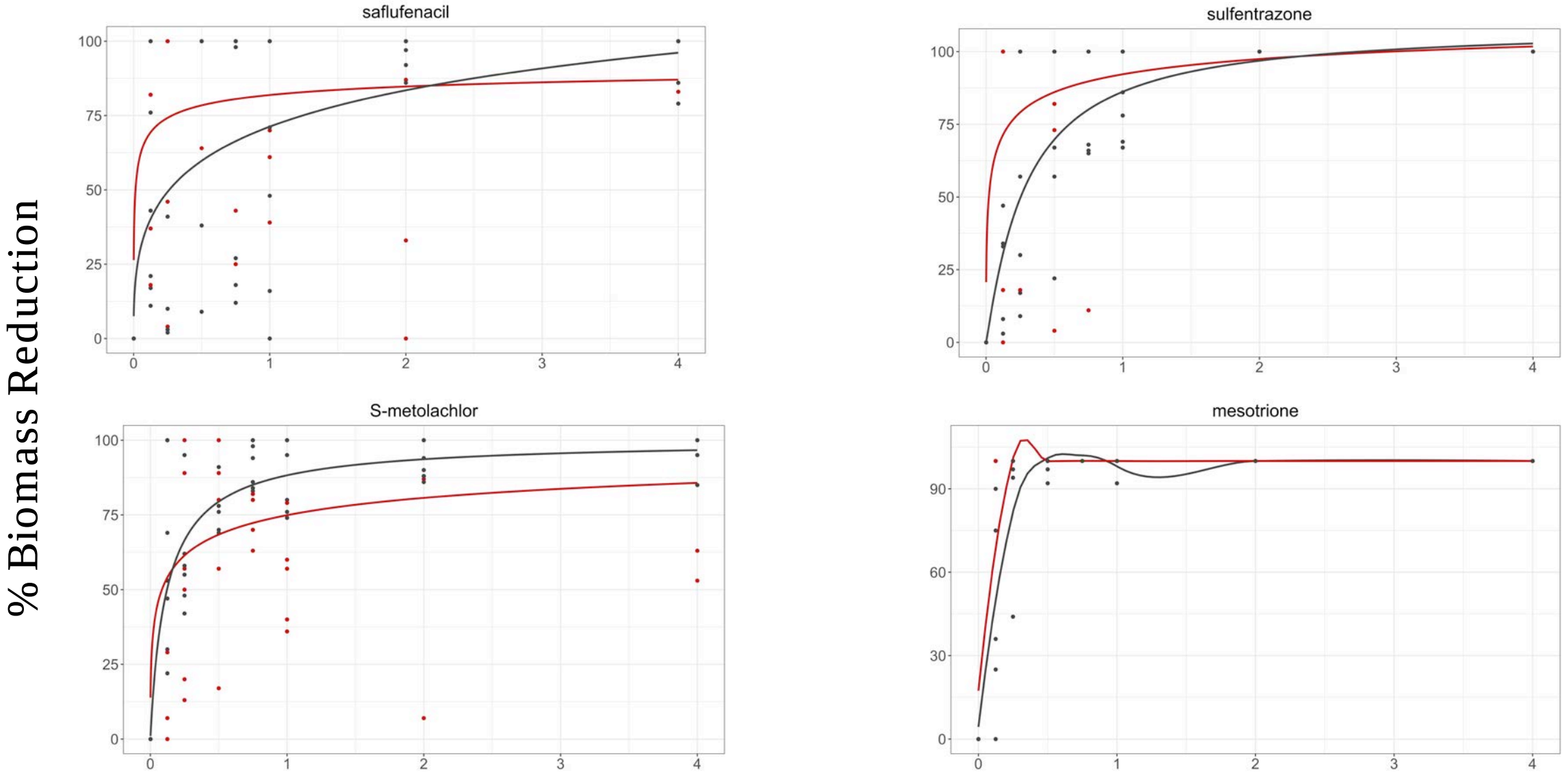
Industrial Hemp Herbicide Tolerance Trial



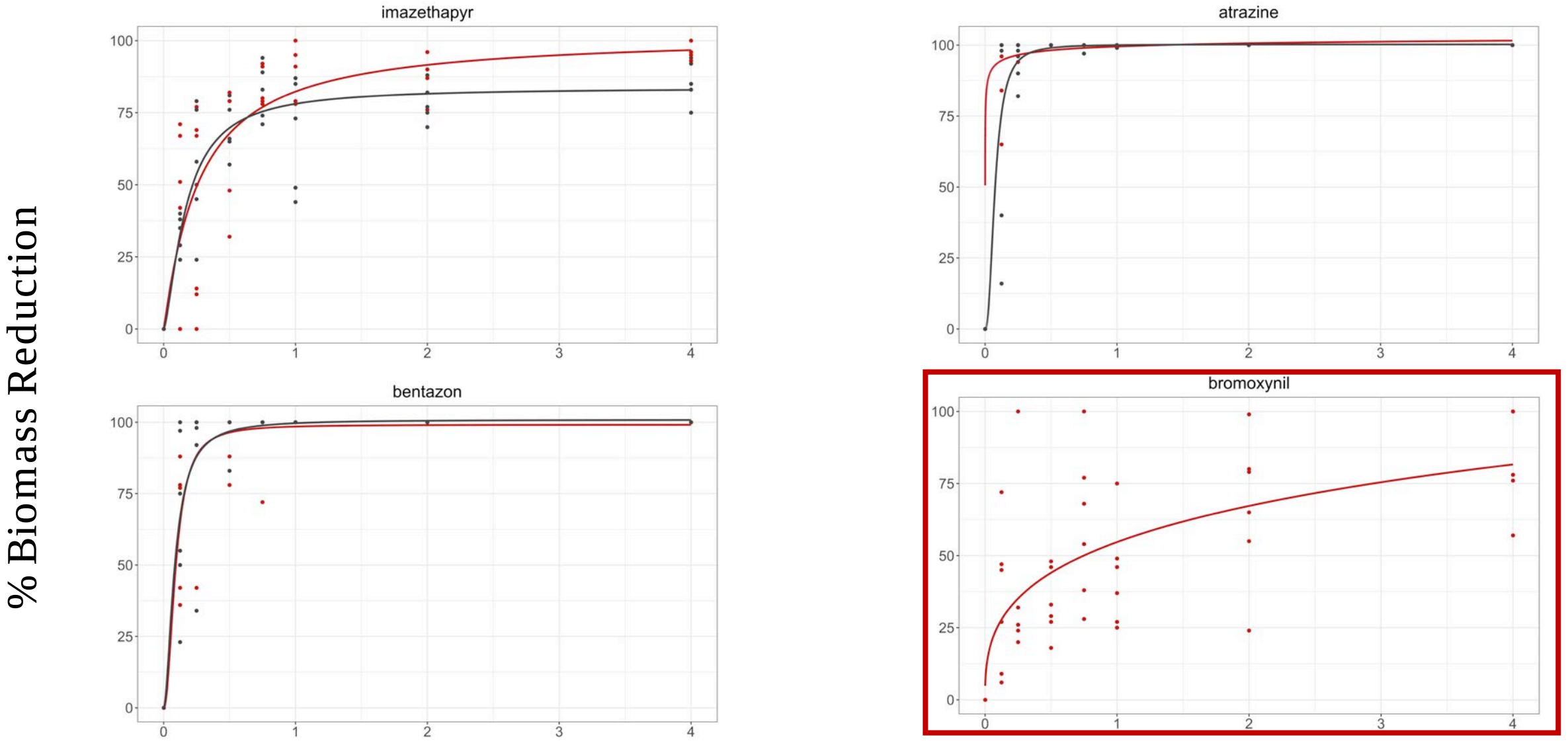
PRE-emergence Herbicides



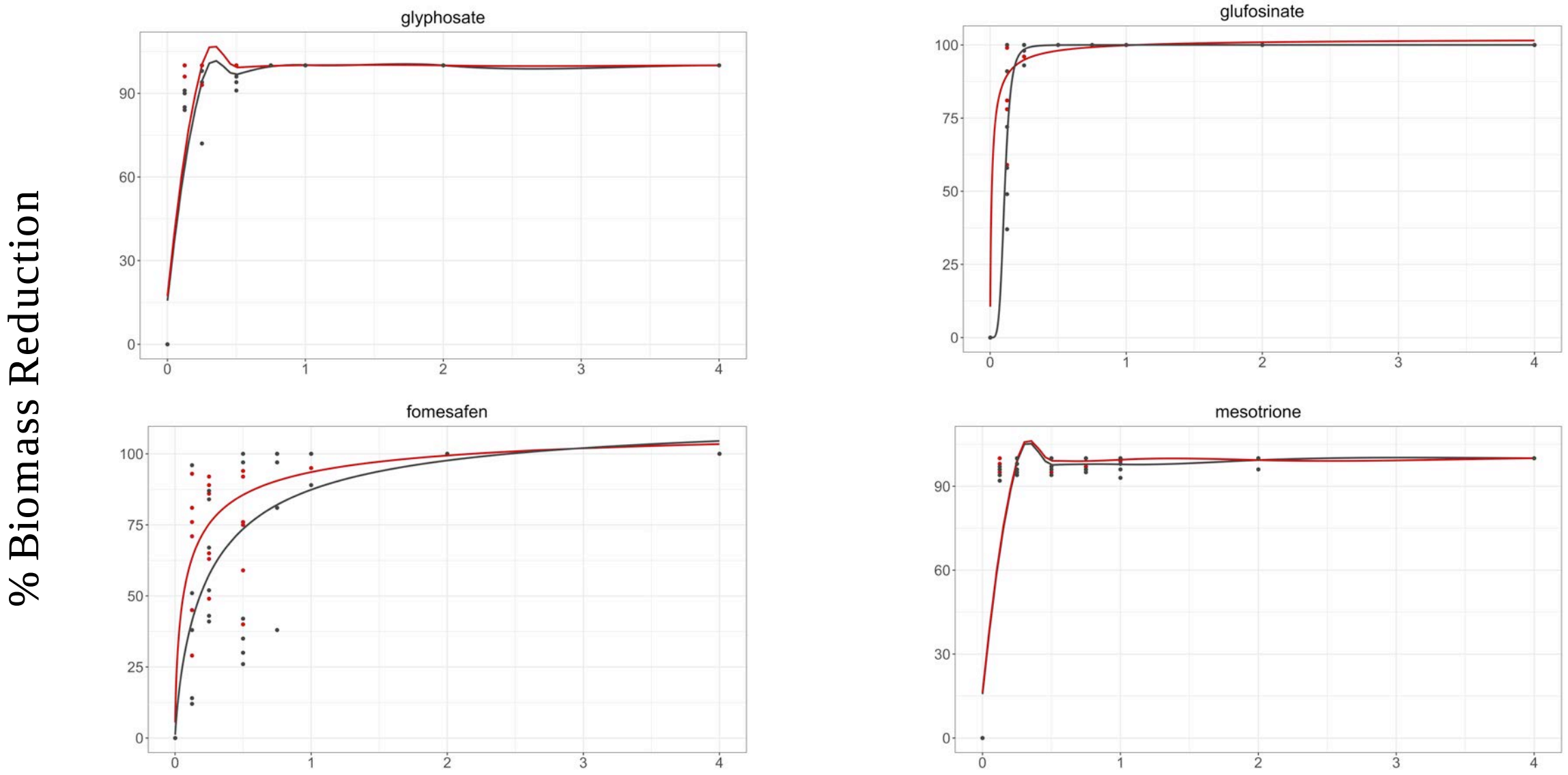
PRE-emergence Herbicides



POST-emergence Herbicides



Industrial Hemp Herbicide Tolerance Trial

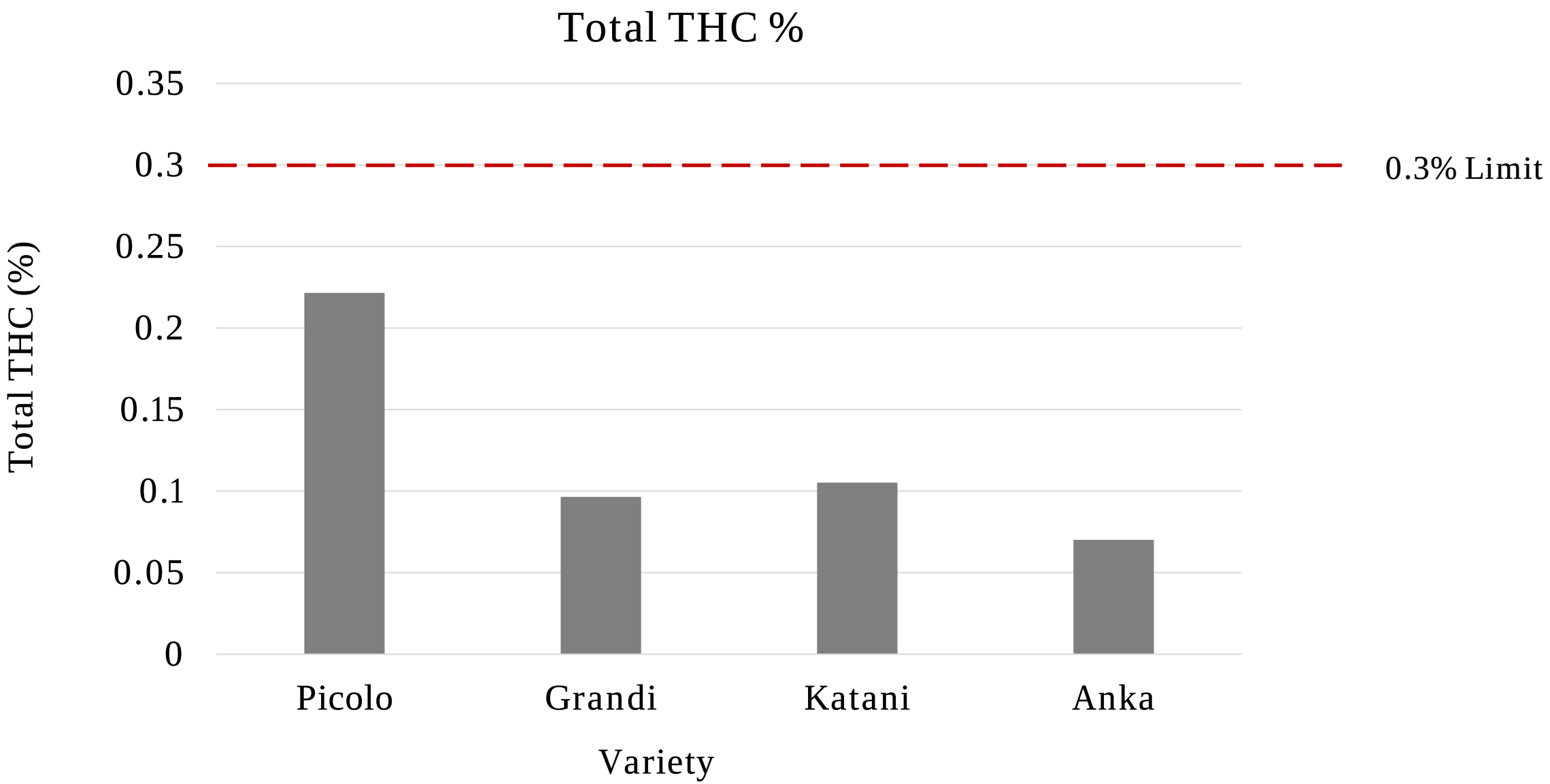


Implications

- Carryover and drift are a concern
- There are rotation restrictions – see WiscWeeds.info for more information
- There are many options for controlling volunteer hemp

THC Testing

Arlington Variety Trial – Total THC %



Take Home Points

Take Home Points & Resources

- We have preliminary data that is helping shape best management practices moving into the next growing season
- fyi.extension.wisc.edu/hemp/ is the best place to find resources and contacts
- There is currently a large supply, but little demand for hemp
  - Legacy Hemp is a resource for grain producers
  - There is potential for many new uses for hemp
- This year's Wisconsin Agricultural Outlook Forum - "The Business of Hemp in Wisconsin" will be on January 28th from 9:30am-4pm
  - Registration can be found at the Renk Agribusiness Institute Website

Acknowledgements

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- Thank you to Legacy Hemp LLC. for donating the X-59 seed used.

References

- References
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  - Agricultural Improvement Act of 2018, H.R.2, 115th Cong. (2018).
  - Wright, A. H. (1918). *Wisconsin's hemp industry* (Vol. 293). Agricultural Experiment Station of the University of Wisconsin.
  - LeCloux, Ryan (2019). Regulating Wisconsin's Hemp Industry. *Wisconsin Policy Project, Volume* 2 (9). 3-7.
  - *Wisconsin Senate Committee on Agriculture, Revenue, and Financial Institutions Hearing on SB188*, 104th WI Senate Session. 12-13 (2019) Testimony of Angela James.
  - Flower Diagram – curaleaf.com

Questions?

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