

Exploring Crabgrass Varieties as Innovative New England Forage Crops

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Background

As the effects of climate change are felt in New England farming, new forage crops are needed to withstand this extreme weather. Upright crabgrass (*Digitaria* sp.) has the desirable drought and heat tolerance to produce even in hot, dry summers. Crabgrass production has been successful in the southern U.S., but little studied farther north. Investigation on how to cultivate crabgrass, including fertility treatments and varieties, is needed to develop regional production methods.

Methods

What:

The effect of variety and fertility on yield (lb/acre)

- **4 different varieties:**
 - Mojo
 - Dal's Big River
 - Quick N Big
 - Quick N Big Spreader
- **3 fertility treatments of nitrogen:**
 - High: 100 lb/acre at planting
 - Split: 50 lbs/acre twice (100 lbs/acre total)
 - Low: 50 lb/ acre once
 - None: 0 added nitrogen (only Quick N Big in 2022)
- **4 replications of each variety with each fertility treatment**



Natalie Wadsworth harvesting crabgrass within a quadrat.

When:

- Planting date **2022:** June 2
- Planting date **2023:** June 1
- Grass harvested at boot stage and/or leaf collar stage of growth
- First Harvest Dates **2022:** July 21st and 30th
- First Harvest Date **2023:** July 25th

How:

- Grass was harvested knife in a ¼ square meter quadrat

Where:

- UMass Crop and Animal Research and Education Farm in South Deerfield, MA
- **Field Organization:**
 - 8 beds
 - 2 beds per replication of the experiment
 - 8 plots per bed

Data 2022

- **Highest Yield by variety:** Quick N Big at 2666 lb/acre
- **Lowest Yield by Variety:** Dals Big River at 2102 lb/acre
- **Highest Yield by fertility treatments:** High (100 lb/acre) at 2684 lb/acre
- **Lowest Yield by fertility treatment:** No fertilizer at 1,229 lb/acre, **across all varieties:** split treatment at 2298 lb/acre
- **Highest yield by fertility and variety:** Quick N Big variety, with high fertility at 3,117 lb/acre on average

Effect of Fertility Treatments Across All Varieties		
Year	Fertility Treatment	Average Yield lb/acre
2022	High	2684
2022	Split	2298
2022	Low	2372
2022	None*	1229

*none was only tested with Quick N Big in 2022

Table 1 provides averages of each fertility treatment for 2022.

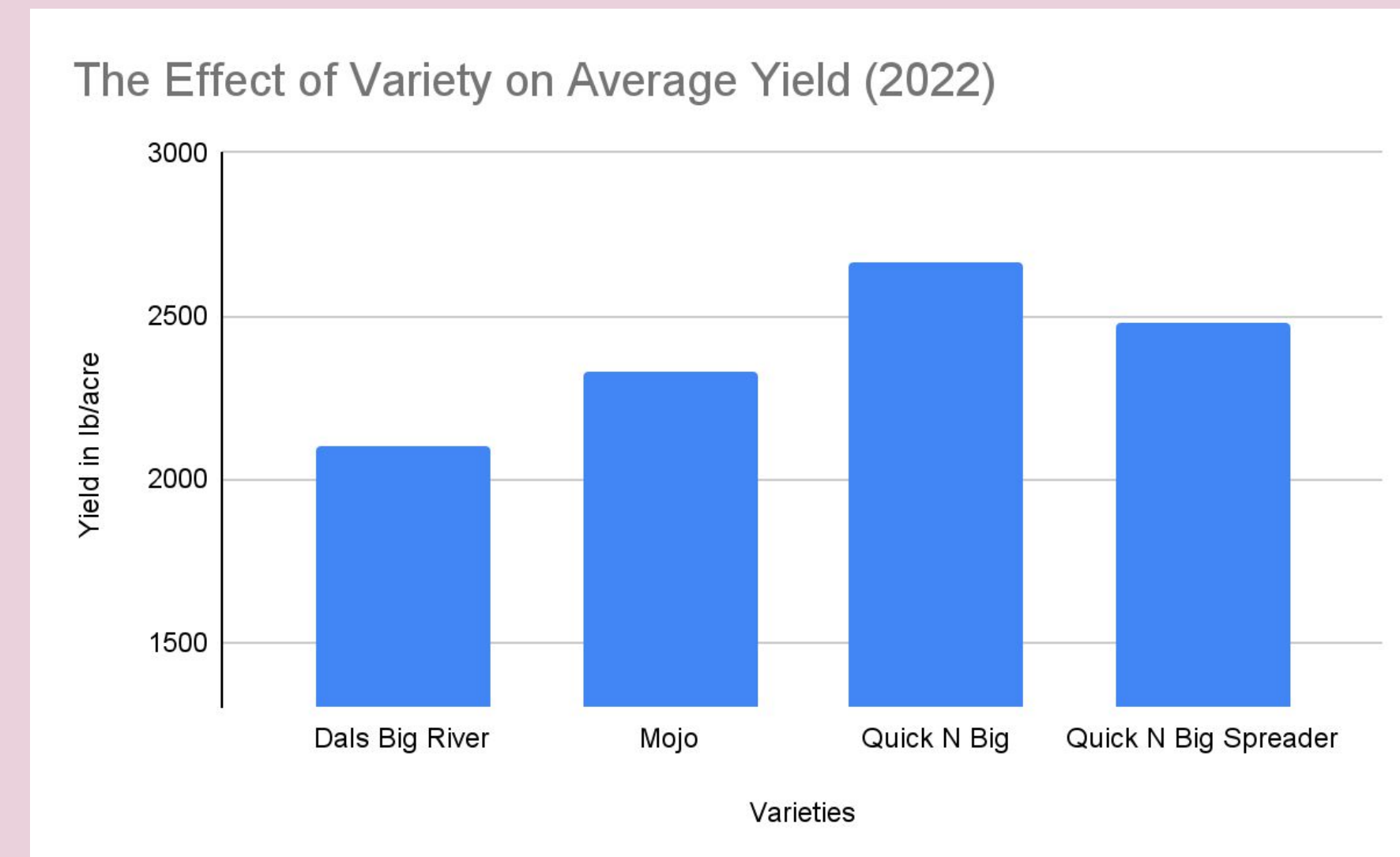


Figure 1 compares crabgrass yield between varieties for 2022.

Weather Data

- 0.89 more inches of rain in June of 2023 than in June of 2022
- 9.95 more inches of rain in July of 2023 than July of 2022

Data 2023

- **Highest Yield by variety:** Dal's Big River at 2205 lb/acre
- **Lowest Yield by variety:** Mojo at 1727 lb/acre
- **Highest Yield by fertility treatments:** Low at 2308 lb/acre
- **Lowest Yield by fertility:** No fertilizer at 1660 lb/acre
- **Highest yield by fertility and variety:** Quick N Big Spreader, with split fertility yielded 2613 lb/acre

Effect of Fertility Treatments Across All Varieties		
Year	Fertility Treatment	Average Yield lb/acre
2023	High	1832
2023	Split	2230
2023	Low	2308
2023	None	1660

Table 2 provides averages of each fertility treatment for 2023.

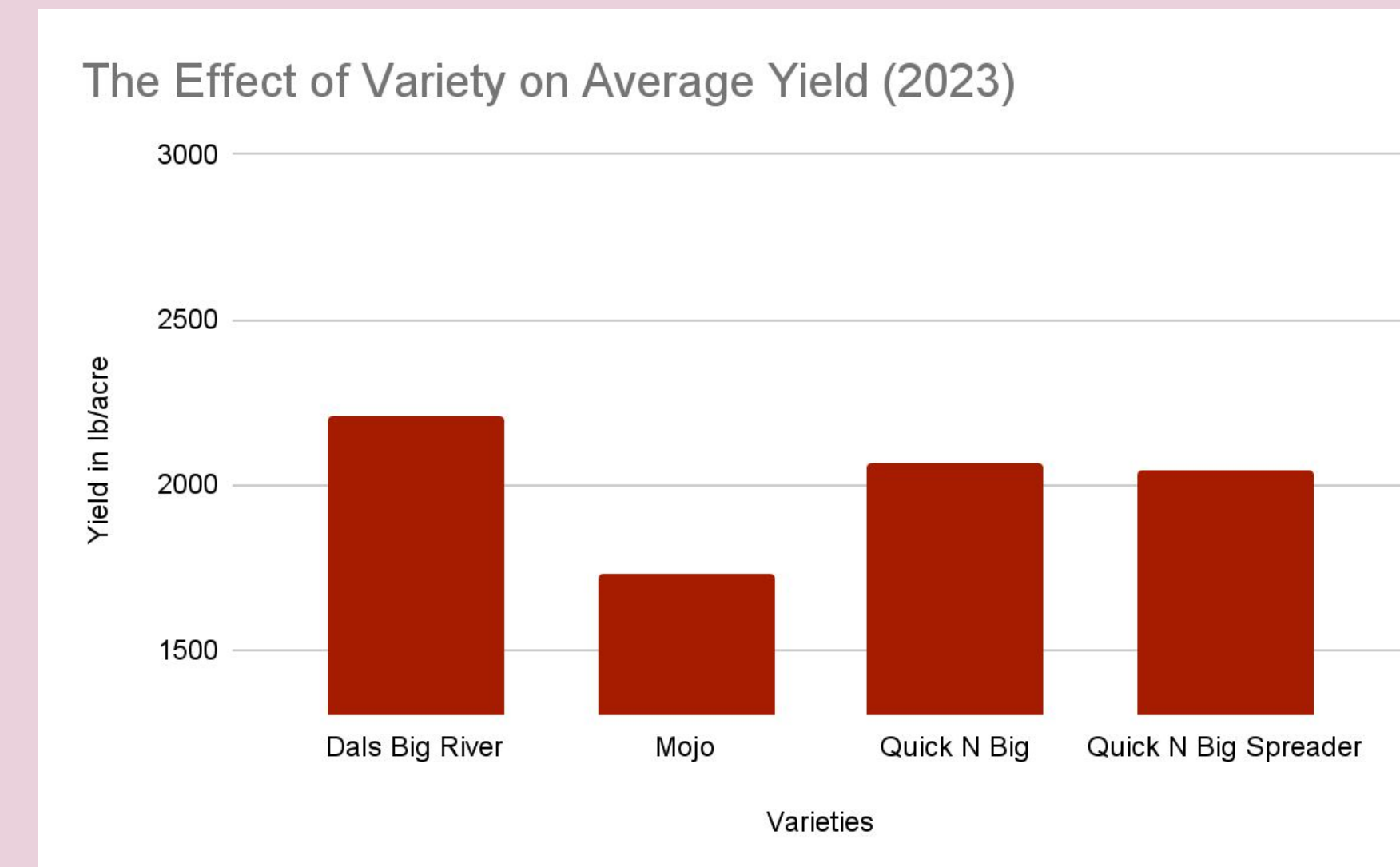


Figure 2 compares crabgrass yield between varieties for 2023.

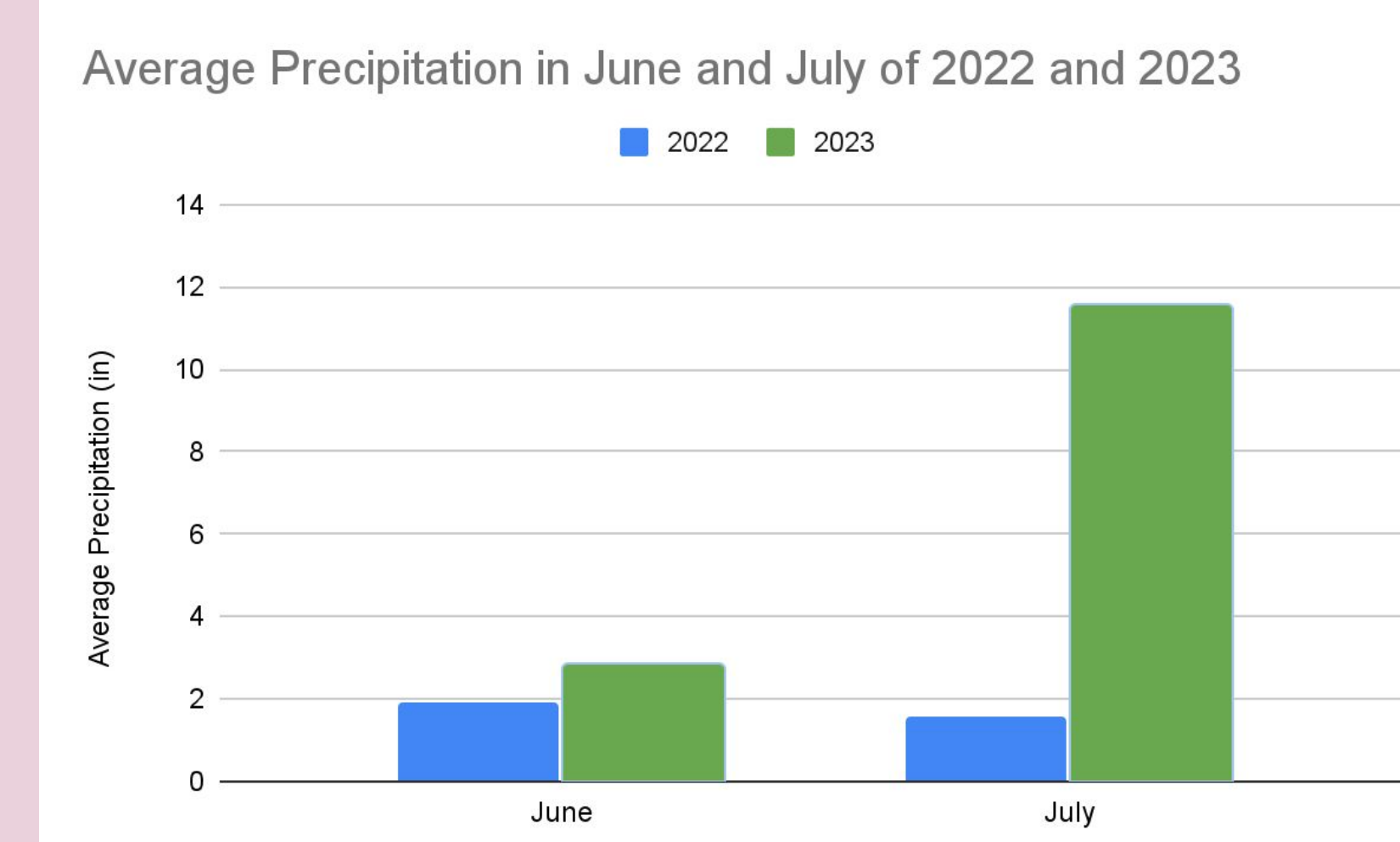


Figure 3 compares average precipitation in June and July of 2022 and 2023

References

- Newman, Y. 2019. Forage crabgrass finds the road north. Hay and Forage Grower. Fort Atkinson, WI. November 2019:32-33. <https://hayandforage.com/article-2770-forage-crabgrass-finds-the-road-north.html>
- Rocateli, A. and L.F. Abreu. 2020. Oklahoma crabgrass variety performance tests: 2018-2019 forage years. OSU Extension. Stillwater, OK. <https://extension.okstate.edu/fact-sheets/oklahoma-crabgrass-variety-performance-tests-2018-2019-forage-years.html>

Analysis

- **Variety improved yield in 2022**
 - Difference between highest and lowest variety was 564 lb/acre and between fertility treatments was 386 lb/acre
- **Variety and fertility had similar effect on Crabgrass yield in 2023**
 - Difference between highest and lowest variety was 477 lb/acre and between fertility treatments was 476 lb/acre
- Low yield with high fertility could be due to less crabgrass growth from wetter conditions and weed benefit from fertilizer
- Dal's Big River's yield was highest at 2358 lb/acre possibly from higher wet tolerance

Comparing the Two Years:

- **Less crabgrass growth in 2023:** average crabgrass yield was 2,123 lb/acre in 2023 and 2,451 lb/acre in 2022 in all crabgrass that received nitrogen fertilizer.



Photo of crabgrass growing in South Deerfield (2023).

Conclusion:

This variety trial spanned over two very different summers, this year, 2023, being significantly wetter than 2022. Varieties like Quick N Big yielded more grass in dryer conditions, whereas Dal's Big River yielded the highest with more rain. Results from 2022 point to higher fertility treatments for improved yield, but both a split and low treatments improved yield in 2023. The weather differences between the two summers, would seem to be the biggest contributing factors to these contradicting results. Although more trials would be ideal, this experiment shows crabgrass as a good option for dryer years, but may perform best in a forage mix during wetter years.