Weed Management Trials in Specialty Crops

High –Value Crops Project, North Dakota State University

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Onion Weed Control Trials

- Continue field trials to evaluate early-season weed control and crop safety.
  - Objective:
    - Determine pendimethalin rate and application timing that consistently does **not** injure onion while providing early-season weed control.

Treatments

- Buctril
- Dacthal
- Goal Tender
- Norton
- Optogen
- Prowl H2O
- RoundUp

- Panted 5/18
- PRE: 5/22
- D PRE: 5/30
- Flag: 6/12
- 2 leaf: 6/22
- 8 leaf: 7/21
  Chateau 1 oz/a

‘Delgado’ onion
‘Legend’ onion

TRT	PRE		Delayed PRE		Flag Leaf		2 Leaf	
1	Dacthal	10 pt/a					Goal Tender	0.3 pt/a
2	Norton/Prowl	1.4/0.8 pt/a					Goal Tender	0.3 pt/a
3	Norton	1.4 pt/a	Prowl H2O	0.8 pt/a			Goal Tender	0.3 pt/a
4	Prowl H2O	0.8 pt/a	Norton	1.4 pt/a			Goal Tender	0.3 pt/a
5	Prowl H2O	1.5 pt/a					Goal Tender	0.3 pt/a
6	Prowl H2O	0.8 pt/a					Goal Tender	0.3 pt/a
7			Prowl H2O	1.5 pt/a			Goal Tender	0.3 pt/a
8			Prowl H2O	0.8 pt/a			Goal Tender	0.3 pt/a
9			Nortron/Prowl	1.4/0.8 pt/a			Goal Tender	0.3 pt/a
10			Prowl/Buctril	1.5/1.0 pt/a			Goal Tender	0.3 pt/a
11			Prowl/RU	1.5/1.4 pt/a			Goal Tender	0.3 pt/a
12					Prowl H2O	1.5 pt/a	Goal Tender	0.3 pt/a
13			Buctril	1 pt/a	Prowl H2O	1.5 pt/a	Goal Tender	0.3 pt/a
14			RoundUp	22 floz/a	Prowl H2O	1.5 pt/a	Goal Tender	0.3 pt/a
15					Prowl/Norton	0.8/1.4 pt/a	Goal Tender	0.3 pt/a
16			Norton	1.4 pt/a			Goal Tender	0.3 pt/a
17			Norton	2.7 pt/a			Goal Tender	0.3 pt/a
18	Weed-free							
19					Norton/Prowl	2.7/0.8 pt/a	Goal Tender	0.3 pt/a
20					Norton	2.7 pt/a	Goal Tender	0.3 pt/a
21			Norton	3 pt/a			Goal Tender	0.3 pt/a
22			Norton	4 pt/a			Goal Tender	0.3 pt/a
23			Norton	5 pt/a			Goal Tender	0.3 pt/a
24			Prowl/RU	2/2 pt/a			Optogen/Buc	0.2/0.8

1 Dacthal 1X pre

2 Nort/Prowl 1/½X pre

3 Nort/Prowl 1/½X pre/dpre

4 Prowl/Nort ½/1X pre/dpre

5 Prowl 1X pre

6 Prowl ½X pre

7 Prowl 1X dpre

8 Prowl ½X dpre

9 Nort/Prowl 1/½X

10 Prowl/Buc 1/1X dpre

11 Prowl/RU 1/1X dpre

12 Prowl 1X flag

13 Buc/Prowl 1/1X dpre/flag

14 RU/Prowl 1/1X dpre/flag

15 Prowl/Nort ½/1X flag

16 Norton 1X dpre

17 Norton 2X dpre

18 Hand - weeded

19 Nort/Prowl 2/½X flag

20 Norton 2X flag

21 Norton 2.2X dpre

22 Norton 3X dpre

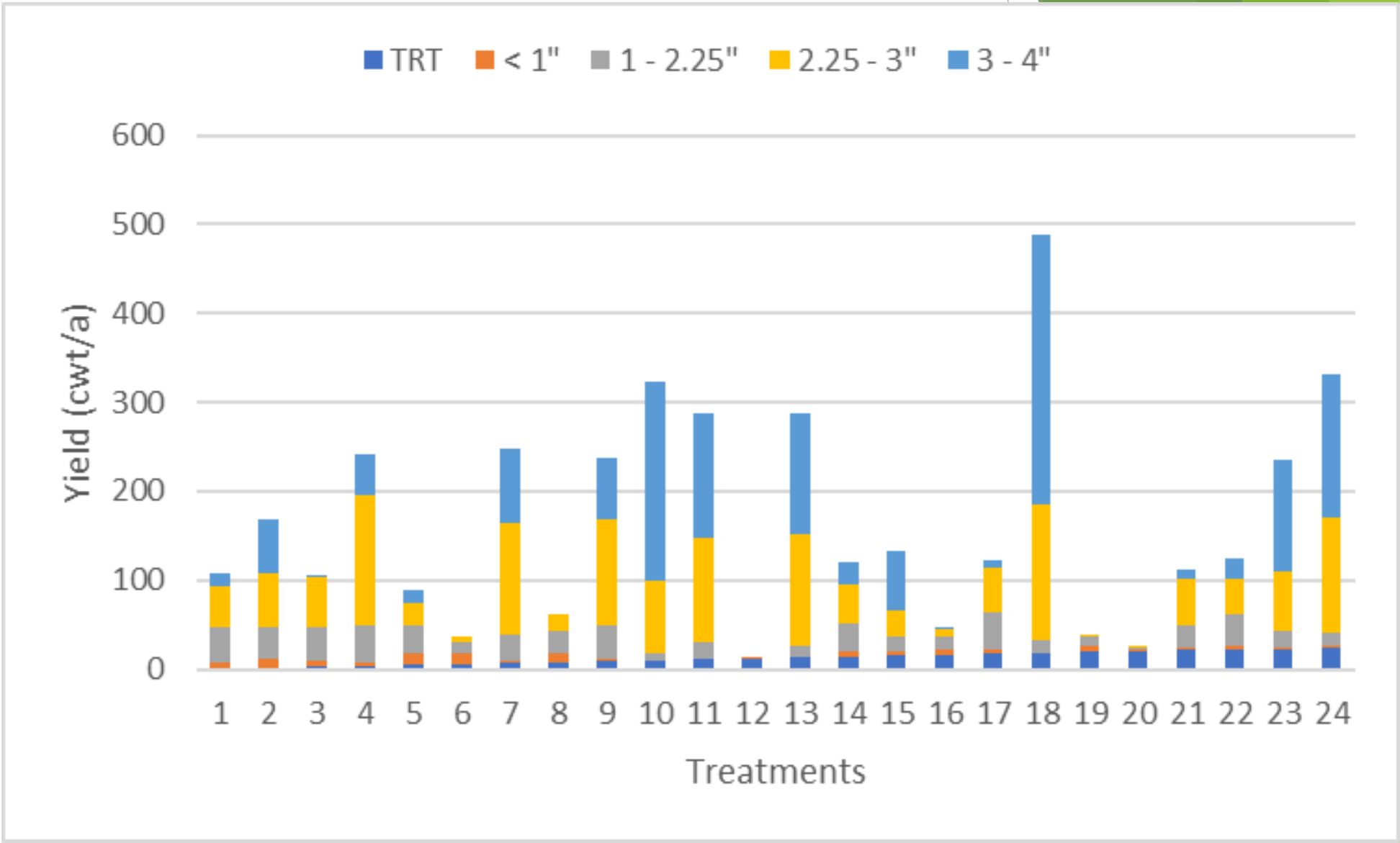
23 Norton 3.7X dpre

24 Prowl/RU 1.3/1.5X dpre (O/B

Yield

Trts 1-6 PRE, 7-11, 13, 14, 16, 17, 21-24 D-PRE, 12, 15, 19,20 Flag Lf

- Treatment 18 was hand-weeded.
- Next highest total yields were:
- Prowl/RU 1.3/1.5X dpre + Opt/Buc ½/½X 2-lf
- Prowl/Buc 1/1X dpre
- Prowl/RU 1/1X dpre
- Buc/Prowl 1/1X dpre/flag



Reducing Chateau Injury to Potato

- Flumioxazin has caused potato injury.
  - Several important potato growing states can't use flumioxazin in potatoes.
  - Label has strict application timings.
- "Be sure a minimum of 2 inches of soil covers the vegetative portion of potato plants."
- Growers primarily rely on metribuzin for broadleaf weed control.
  - Does not control nightshade species.
  - Increasing numbers of triazine resistant weeds.

Treatments

1	Chateau	1.5 oz	After Plant	3 DAP	Chat 1X no hill
2	Chateau	0.75 oz	After Plant	3 DAP	Chat 1/2X no hill
3	Chateau	1.5 oz	Normal Hill	11 DAP	Chat 1X reg hill
4	Chateau	0.75 oz	Normal Hill	11 DAP	Chat 1/2X reg hill
5	Chateau	1.5 oz	After Plant	3 DAP	Chat 1X no hill +
	Boundary	1 pt	Normal Hill	11 DAP	Bndy 1/2X reg hill
6	Chateau	0.75 oz	After Plant	3 DAP	Chat 1/2X no hill +
	Boundary	1 pt	Normal Hill	11 DAP	Bndy 1/2X reg hill
7	Chateau	1.5 oz	After E. Hill	3 DAP	Chat 1X E. hill
8	Chateau	0.75	After E. Hill	3 DAP	Chat 1/2X E. hill
9	Chateau	0.75	After E. Hill	3 DAP	Chat 1/2X E. hill +
	Chateau	0.75	Normal Hill	11 DAP	Chat 1/2X reg hill
10	Boundary	2 pt	Normal Hill	11 DAP	Boundary 1X

Results

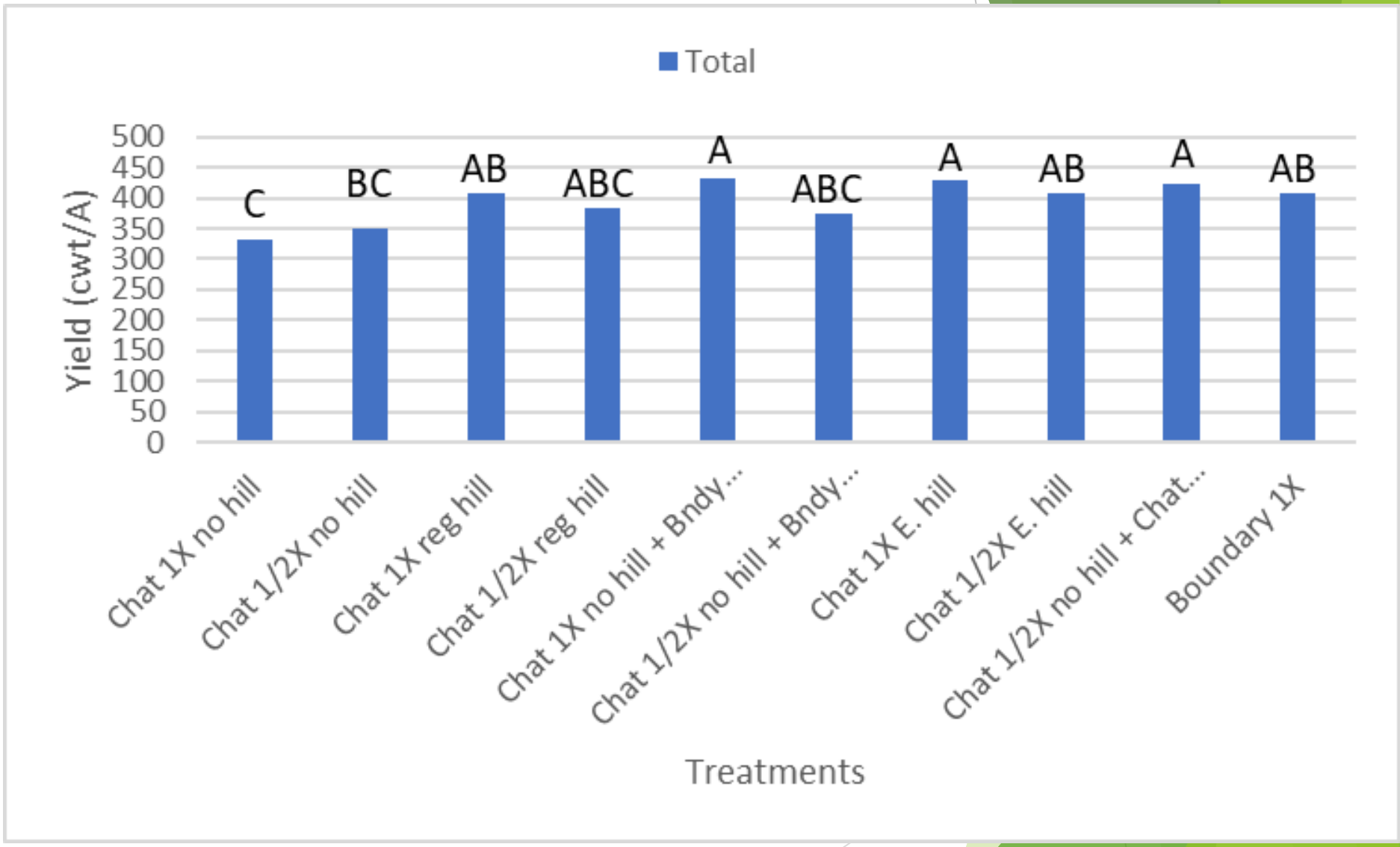
- None of the treatments caused >20% visible potato injury and all treatments provided >85% early-season control of grass and broadleaf annual weeds.

- Plots treated with 1X Chateau and no hilling provided greater potato injury while both 0.5X or 1X Chateau and no hilling provided less C. lambsquarters control(60 and 67.5%) later in the season.

Results 2021
Treatments 7, 8 had greater total yields than treatment 6.

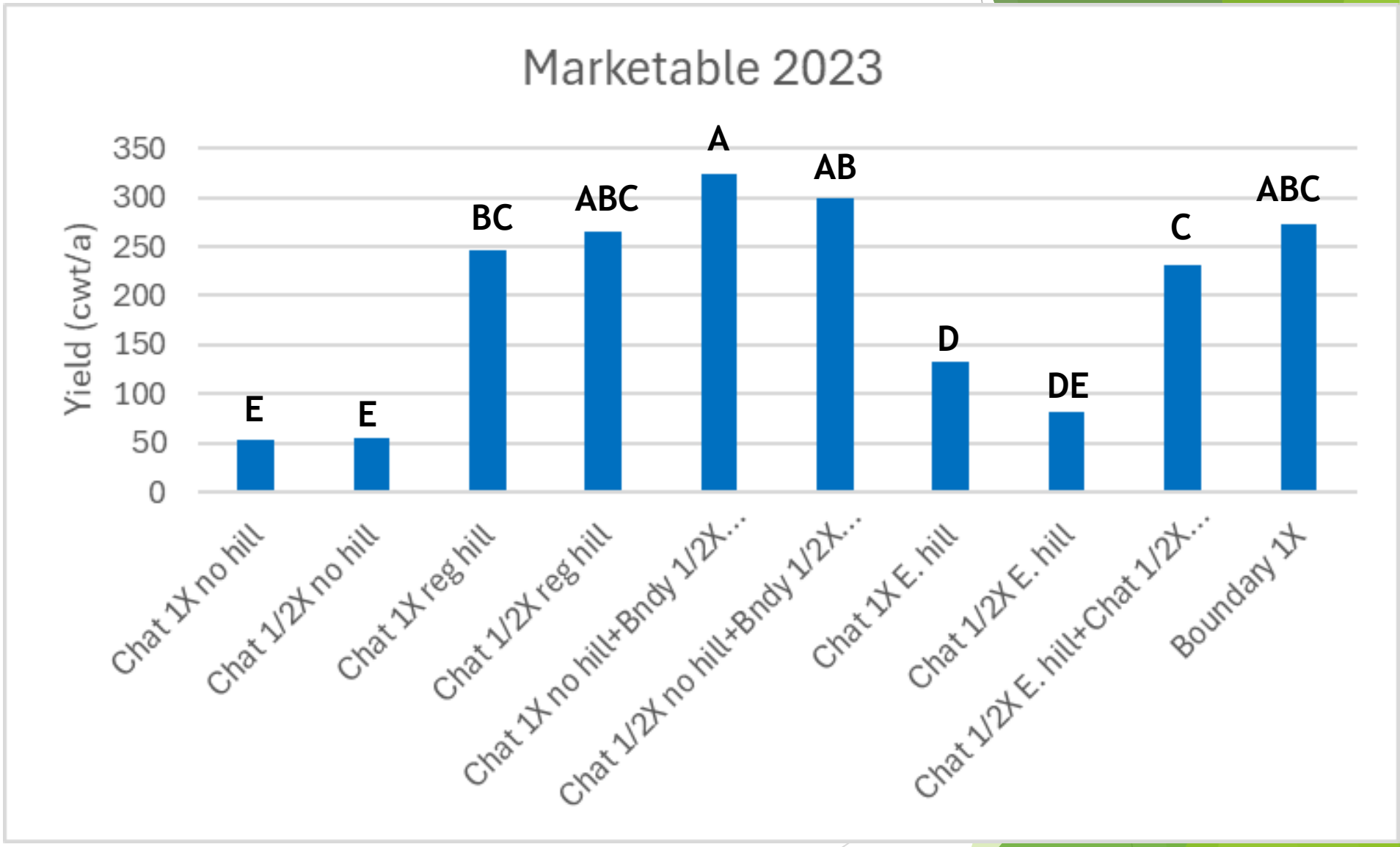
Results 2022

Treatments 5, 7, 9 had greater total yields than treatments 1 and 2.



<u>Results</u>

Treatments 4,5,6,10 had greater marketable than treatments 1 and 2.

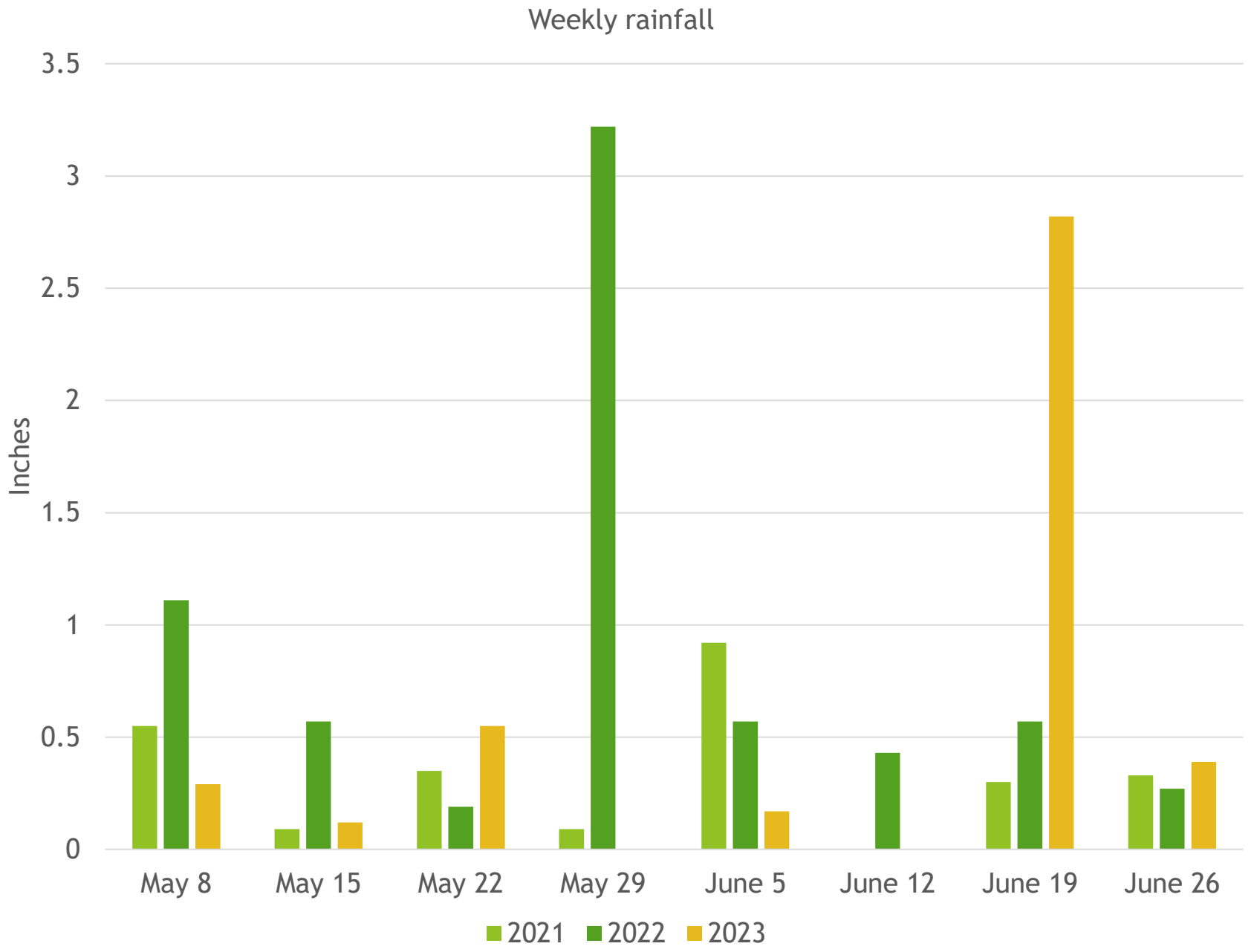


Rainfall Influence

2021 – little rainfall after applications

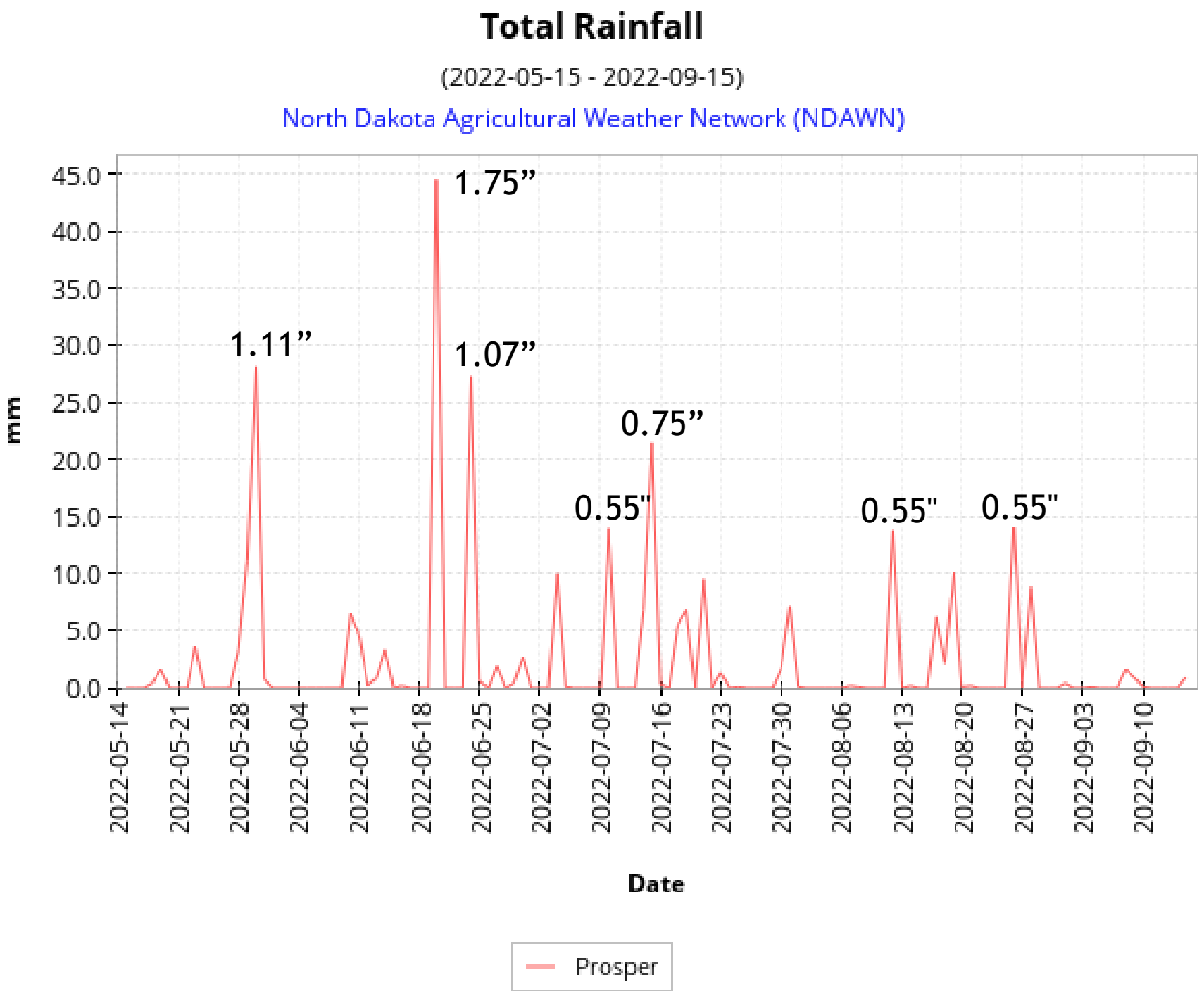
2022 – lots of rainfall after applications

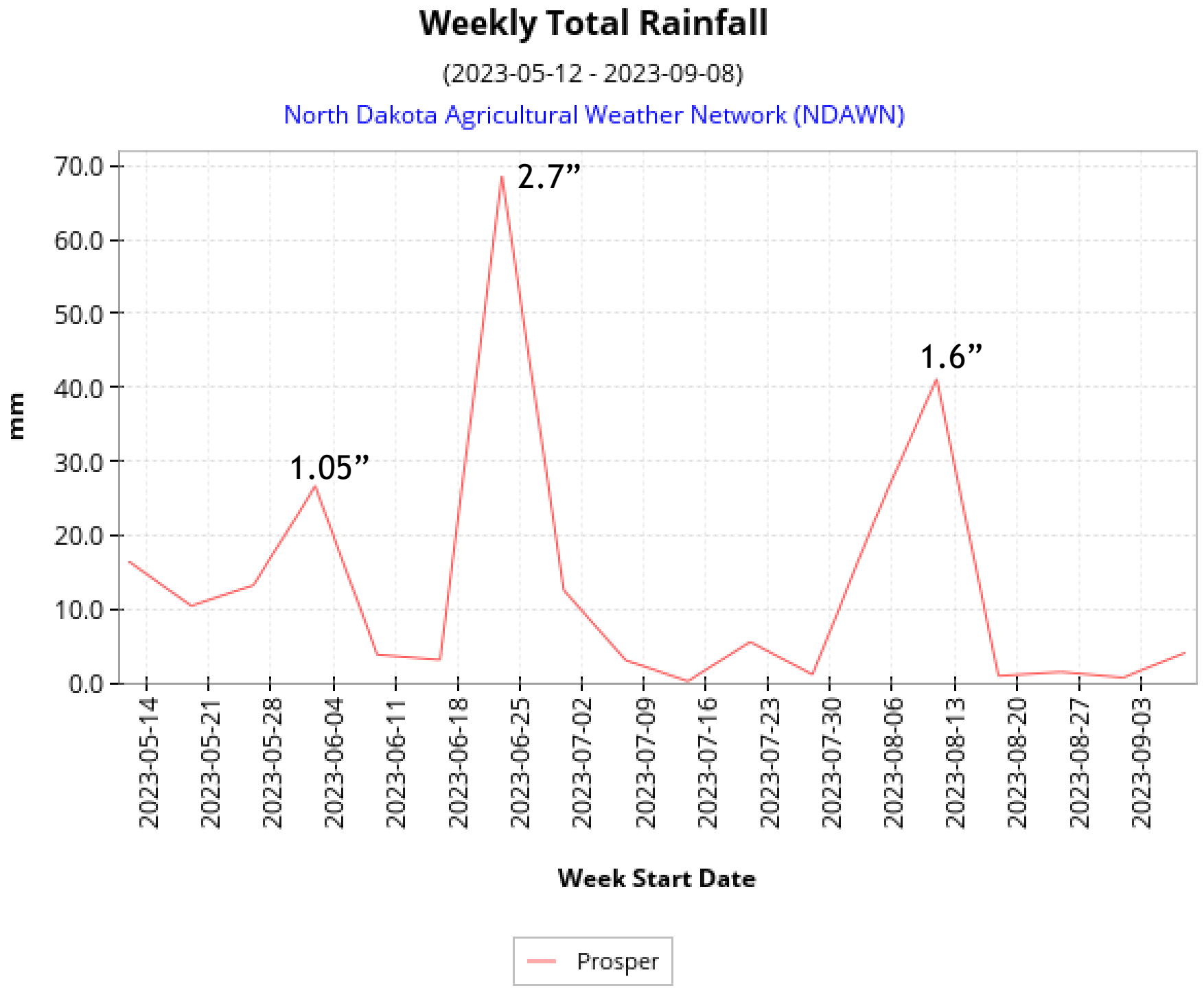
2023 – little rainfall after applications but one big rainfall much later



Is a critical weed free period needed for transplanted floral hemp?

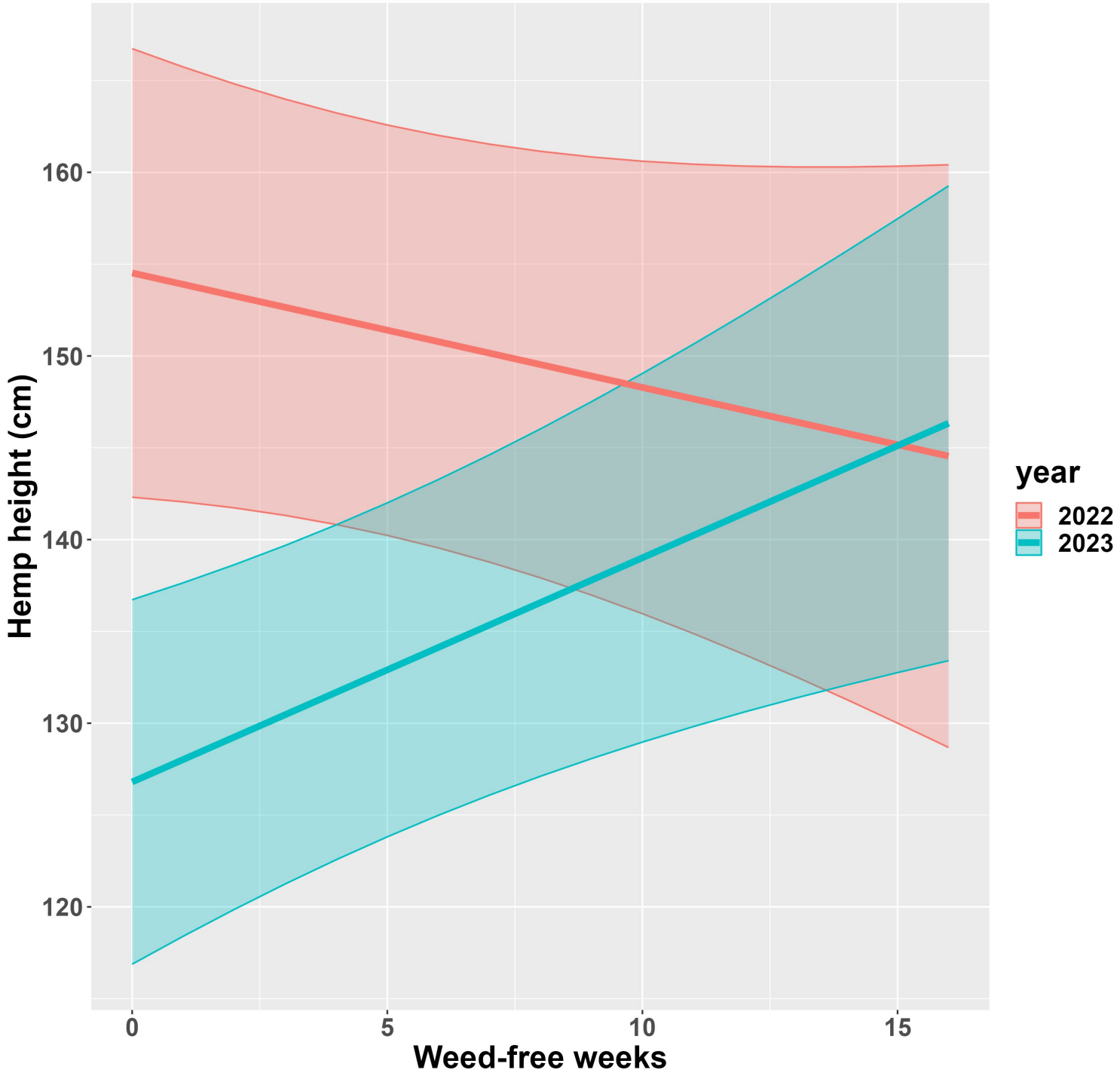
- Multi-state project grant to evaluate weed management practices and to develop recommendations.
- Floral hemp: ND, NY, and SC.
- Grain/fiber hemp: IL and VA
- Objective: To define the critical weed-free period for transplanted floral hemp.
- Weed-free treatments: 0, 1, 2, 4, 6, and weed-free (16 wks).
- Annual weed and perennial weed trials:


Total Rainfall
(2022-05-15 - 2022-09-15)
North Dakota Agricultural Weather Network (NDAWN)
mm
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1.75”
1.11”
1.07”
0.75”
0.55"
0.55"
0.55"
2022-05-14
2022-05-21
2022-05-28
2022-06-04
2022-06-11
2022-06-18
2022-06-25
2022-07-02
2022-07-09
2022-07-16
2022-07-23
2022-07-30
2022-08-06
2022-08-13
2022-08-20
2022-08-27
2022-09-03
2022-09-10
Date
Prosper


Weekly Total Rainfall
(2023-05-12 - 2023-09-08)
North Dakota Agricultural Weather Network (NDAWN)
mm
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2.7”
1.6”
1.05”
2023-05-14
2023-05-21
2023-05-28
2023-06-04
2023-06-11
2023-06-18
2023-06-25
2023-07-02
2023-07-09
2023-07-16
2023-07-23
2023-07-30
2023-08-06
2023-08-13
2023-08-20
2023-08-27
2023-09-03
Week Start Date
Prosper

Results: plant height Number of weed-free weeks by year interaction.

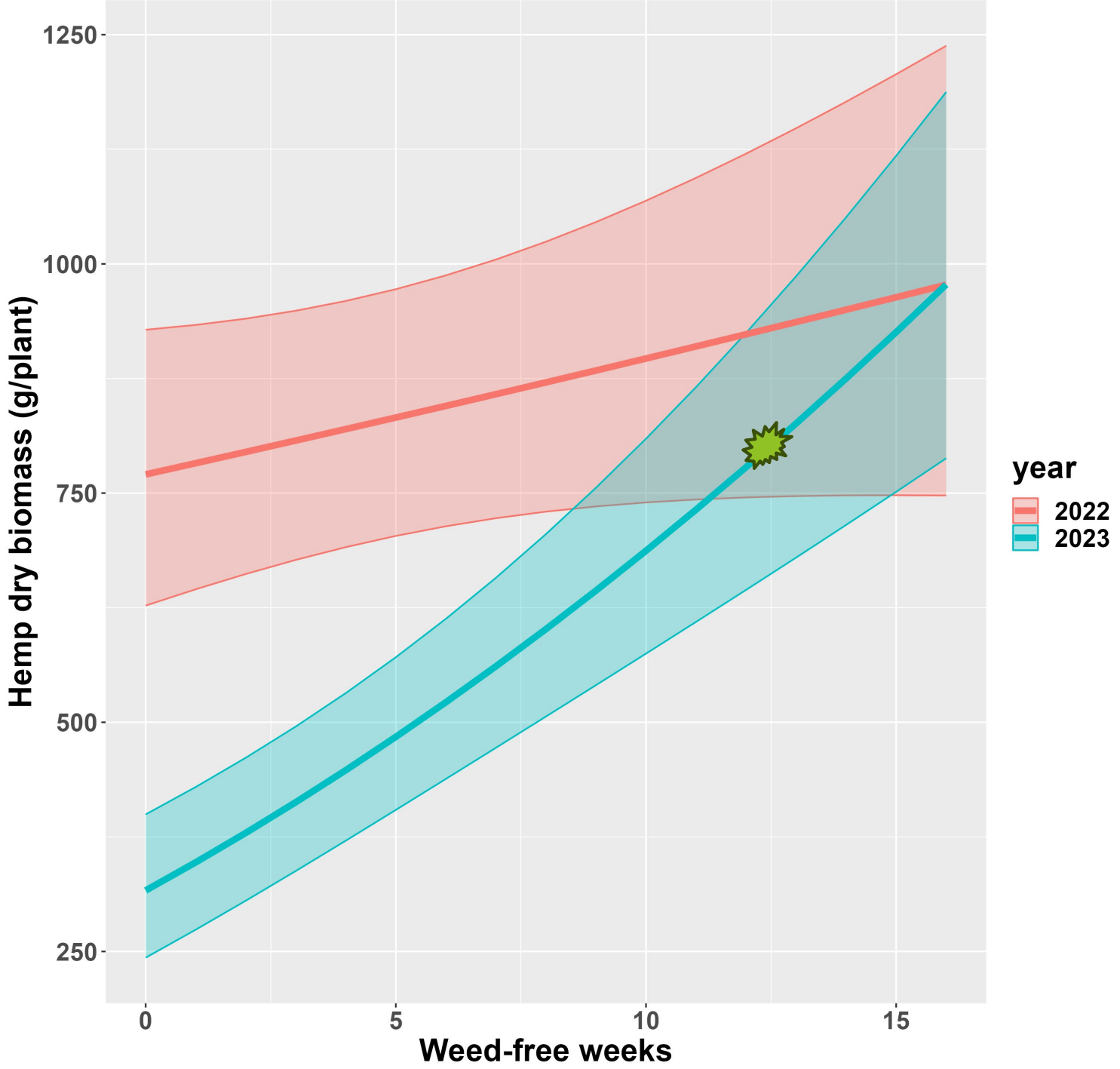
Plant height decreased as the weed-free weeks increased in 2022 and increased as the weed-free weeks increased in 2023.



Results: dry biomass

Number of weed-free weeks by year interaction.

Plant dry biomass increase over the number of weed-free weeks was greater in 2023 compared to 2022.



Questions?