

Weather

2017

Alburgh, VT	March	April	May	June
Average temperature (°F)	25.0	47.2	55.6	65.2
Departure from normal	-6.0	2.2	-0.4	-0.8
Precipitation (inches)	1.58	5.22	4.13	5.64
Departure from normal	-0.62	3.02	0.63	1.96
Growing Degree Days (base 50°F)	6.7	111	245	468
Departure from normal	6.7	36	-22	-6

2016

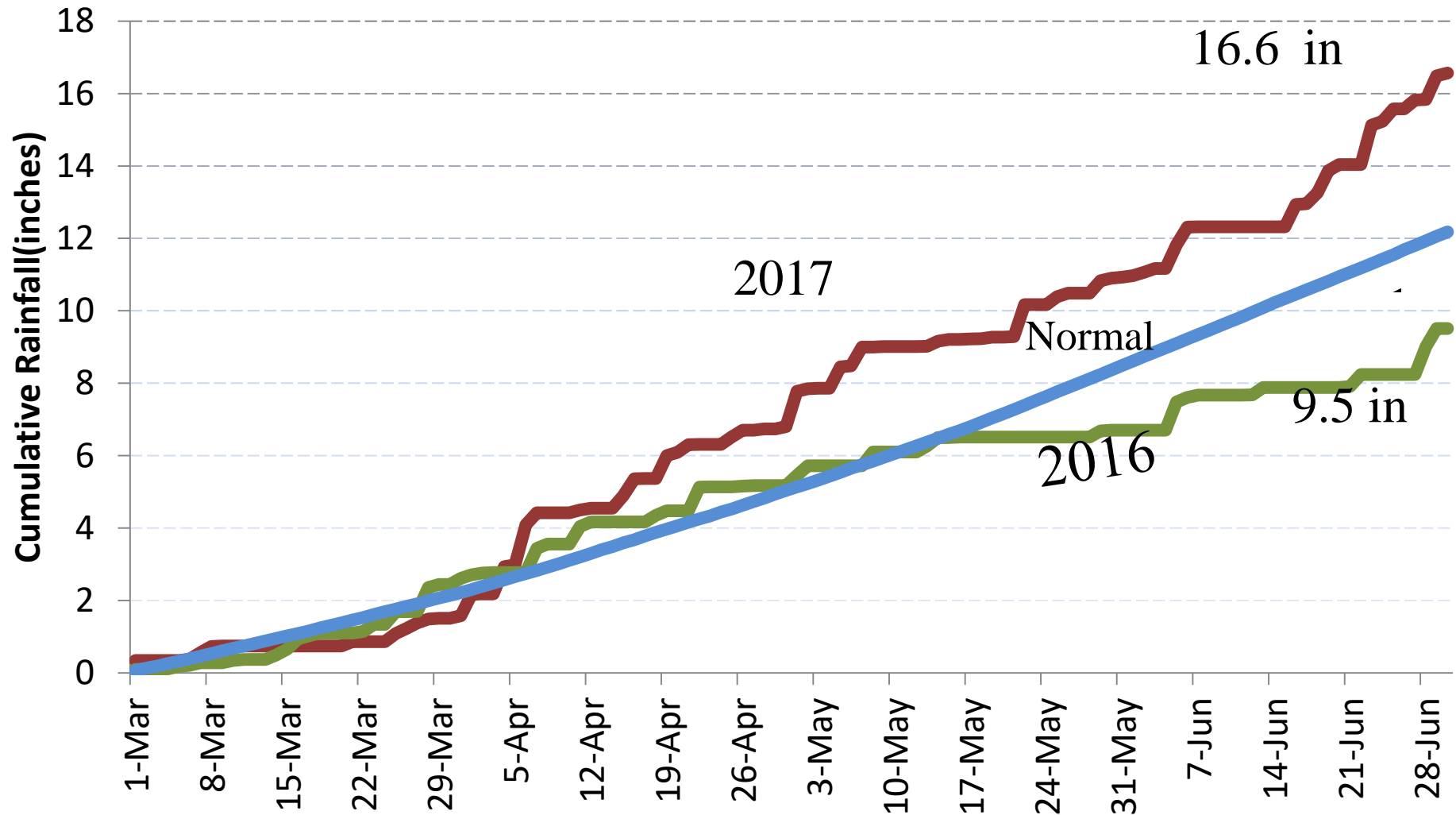
Alburgh, VT	March	April	May	June
Average temperature (°F)	33.9	39.8	58.1	65.8
Departure from normal	2.9	-4.9	1.8	0
Precipitation (inches)	2.50	2.60	1.50	2.80
Departure from normal	0.29	-0.26	-1.92	-0.88
Growing Degree Days (base 50°F)	32	59	340	481
Departure from normal	32	-16	74	7

Summarized weather data for March-June 2016/2017—Alburgh, VT.

Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger.

Historical averages are for 30 years of NOAA data (1981-2010) from Burlington, VT.

Weather, cumulative precipitation, March-June



Vermont **Organic** Farmers Certificate of Compliance

Issued to:	Borderview Research Farm	
	Mailing Address:	Physical Address (if different than mailing address):
	146 Line Road Alburg, Vermont 05440	146 Line Road Alburg, Vermont 05440
Scope: Crops		
Certified Product Types: Grains and Pulses (see certificate addendum)		
Producer Number:	VOF Effective Date:	NOP Effective Date:

Grains and Pulses		
Product Name	Product Type	Date Added
Beans, dry	Crop; Seeds	10/17/2017
Hemp	Crop; Seeds	10/17/2017
Rye, winter	Crop; Seeds	10/17/2017
Wheat	Crop; Seeds	10/17/2017

Variety	2016 Grain	2017 Grain	2017 Fiber
Canda	X	X	
Delores	X	X	
CFX-2	X	X	
CRS-1	X	X	
Grandi	X	X	
Katani	X	X	
Anka	X	X	
Futura 75	X		X
Felina 32	X		X
Fedora 17	X	X	
USO 31	X	X	
Full sun	X	X	
Helena		X	
Tygra		X	
Carmagnola			X
Carmagnola selezionata			X
Fibranova			X
Eletta campana			X
Carmaleonte			X
Beniko			X

Table 1.
Industrial
hemp varieties
grown in the
NWCS
research
program.

2016 & 2017 Grain Variety Trial

- Planting date: 26-May
- Date harvested: 9-Sep (2016) & 13-Sep (2017)
- Target seeding rate: 125 live seeds m⁻²
- Plot size 1.5m x 6.1m
- Fertility – rotational crop red clover & poultry manure

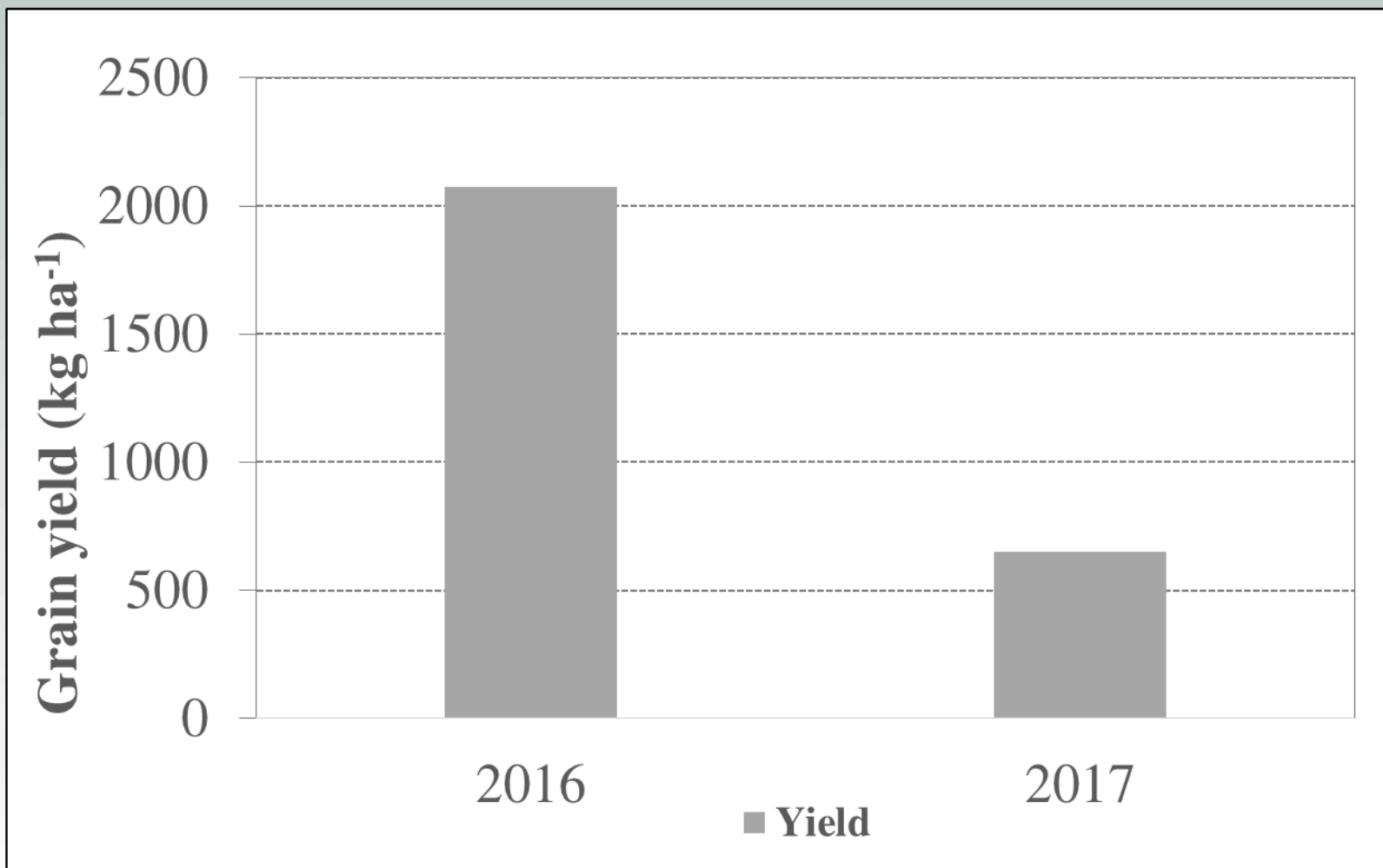


Figure 1. Average hemp grain yield comparisons of the 2016 and 2017 variety trials.

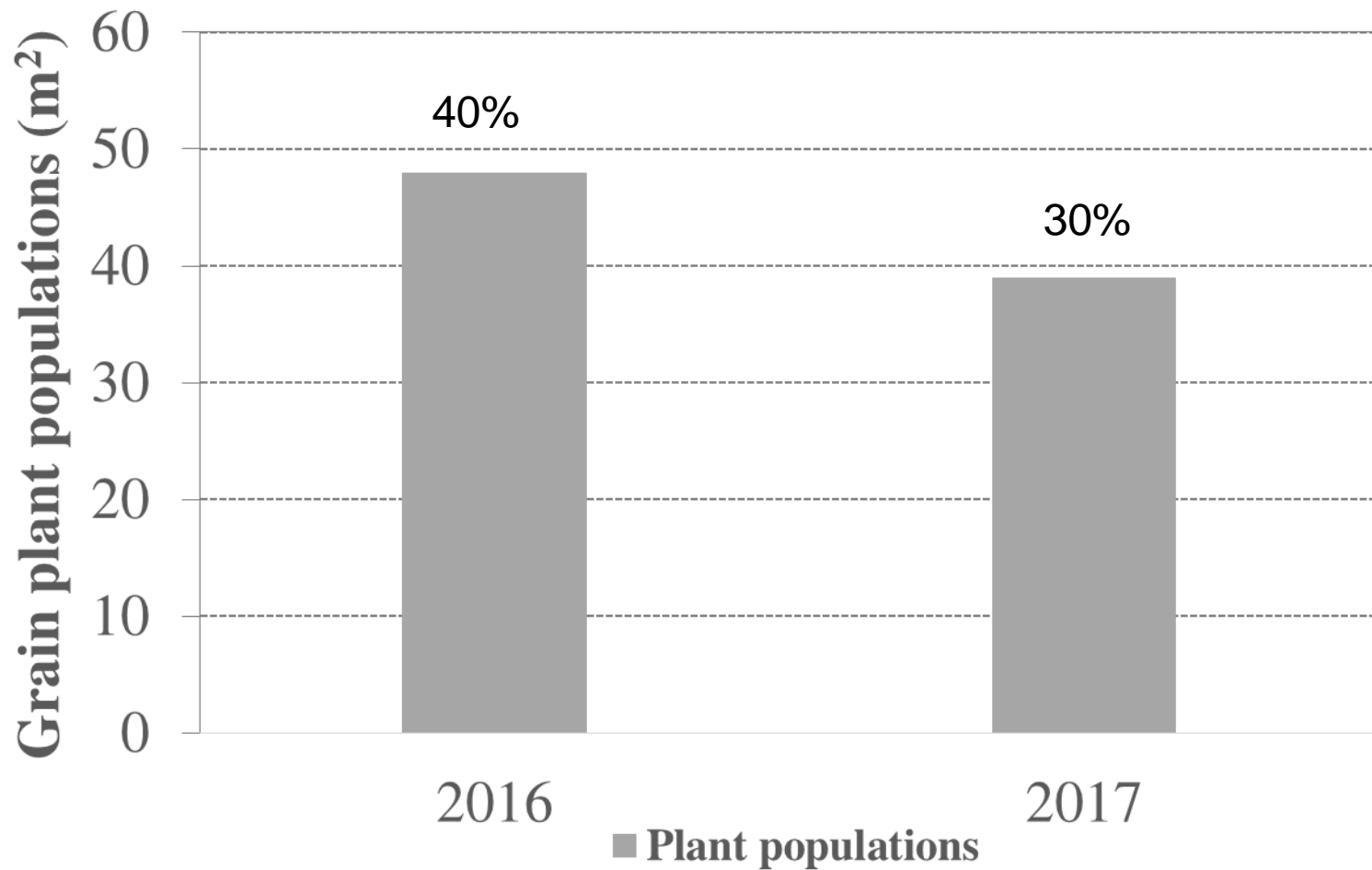


Figure 2. Average hemp grain population comparisons from the 2016 and 2017 variety trials.

Fertility Issues

2016

%N ranged 3.15 to 2.50

2017

%N ranged 3.70 – 0.70



Nitrogen Rate Trial

N-Rate (lb/ac)	Yield (lb/ac)	Height (in)
0	960	39
50	1345	43
100	1770	44
150	1850	46
200	1827	48
Mean	1550	44
LSD(0.1)	136	7

2017 Fiber variety trial

- Planting dates: 26-May
- Date mowed: 24-Aug
- Target seeding rate: 250 live seeds m⁻²
- Plot size 1.5m x 6.1m
- Fertility – rotation crop red clover & poultry manure



2016 Planting date x variety trial

- Planting dates: 26-May, 2-June, 12-June, 17-June
- Harvest dates: 9-Sept- 29-Sept
- Seeding rate: 28 kg ha⁻¹ (25 lbs ac⁻¹)
- Plot size 5'x20'

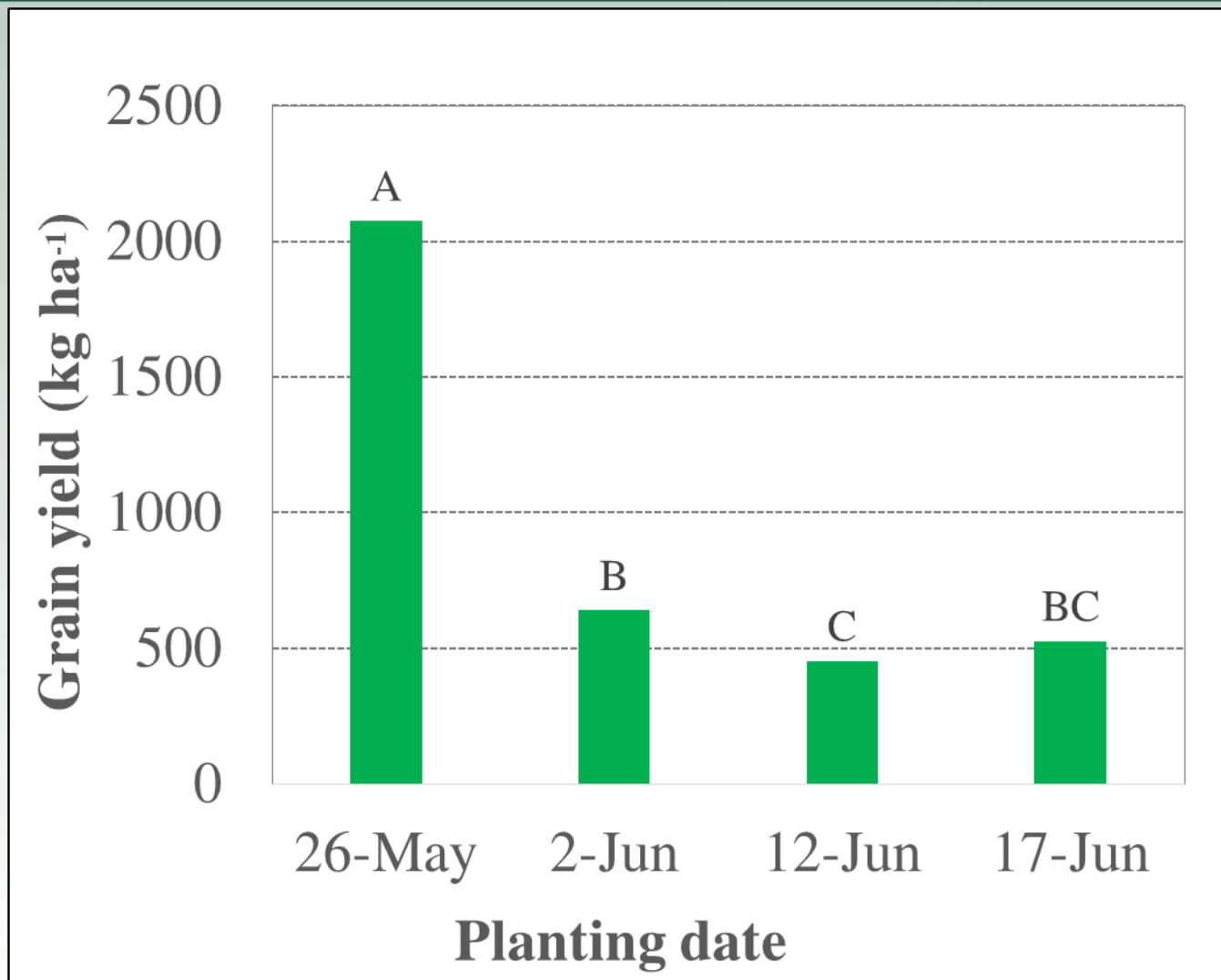


Figure 3. Yield of hemp planted from 26-May to 17-Jun. Columns with the same letter were not significantly different from each other, $p < 0.0001$).

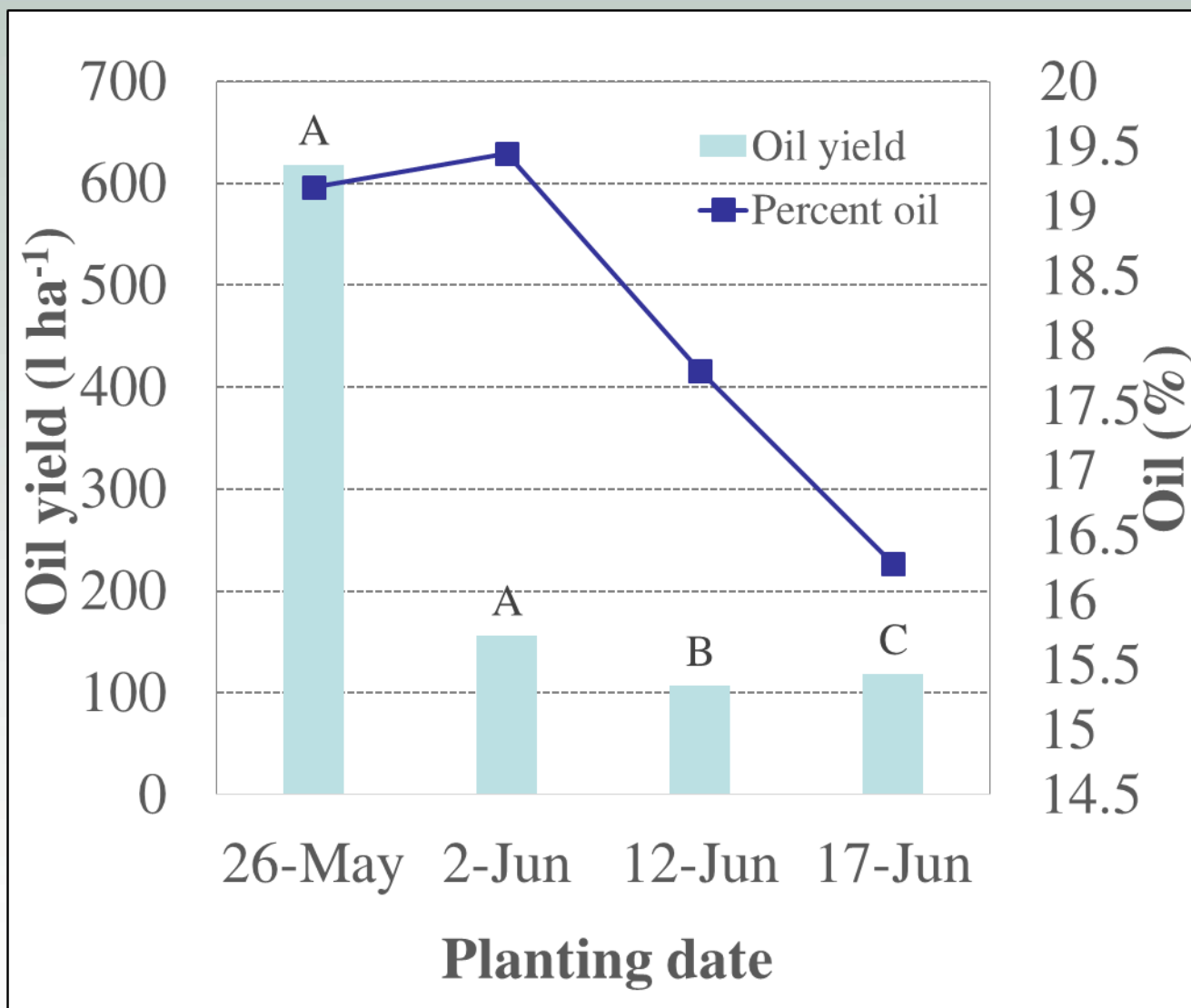


Figure 4. Oil content and oil yield from hemp planted from 26-May to 17-Jun. Columns with the same letter were not significantly different from each other.

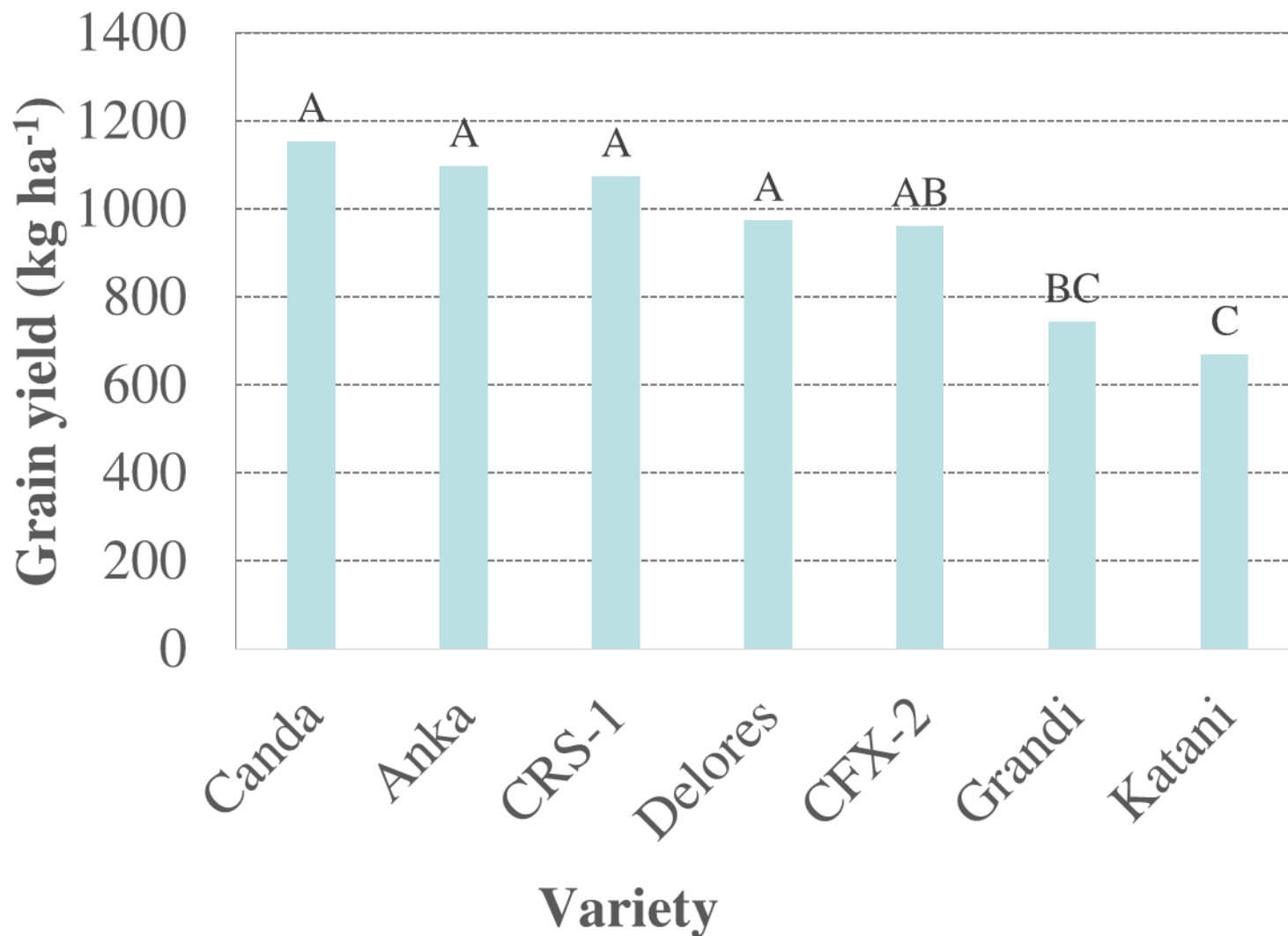


Figure 5. Yield of 7 hemp varieties across planting dates. Columns with the same letter did not differ significantly from each other.

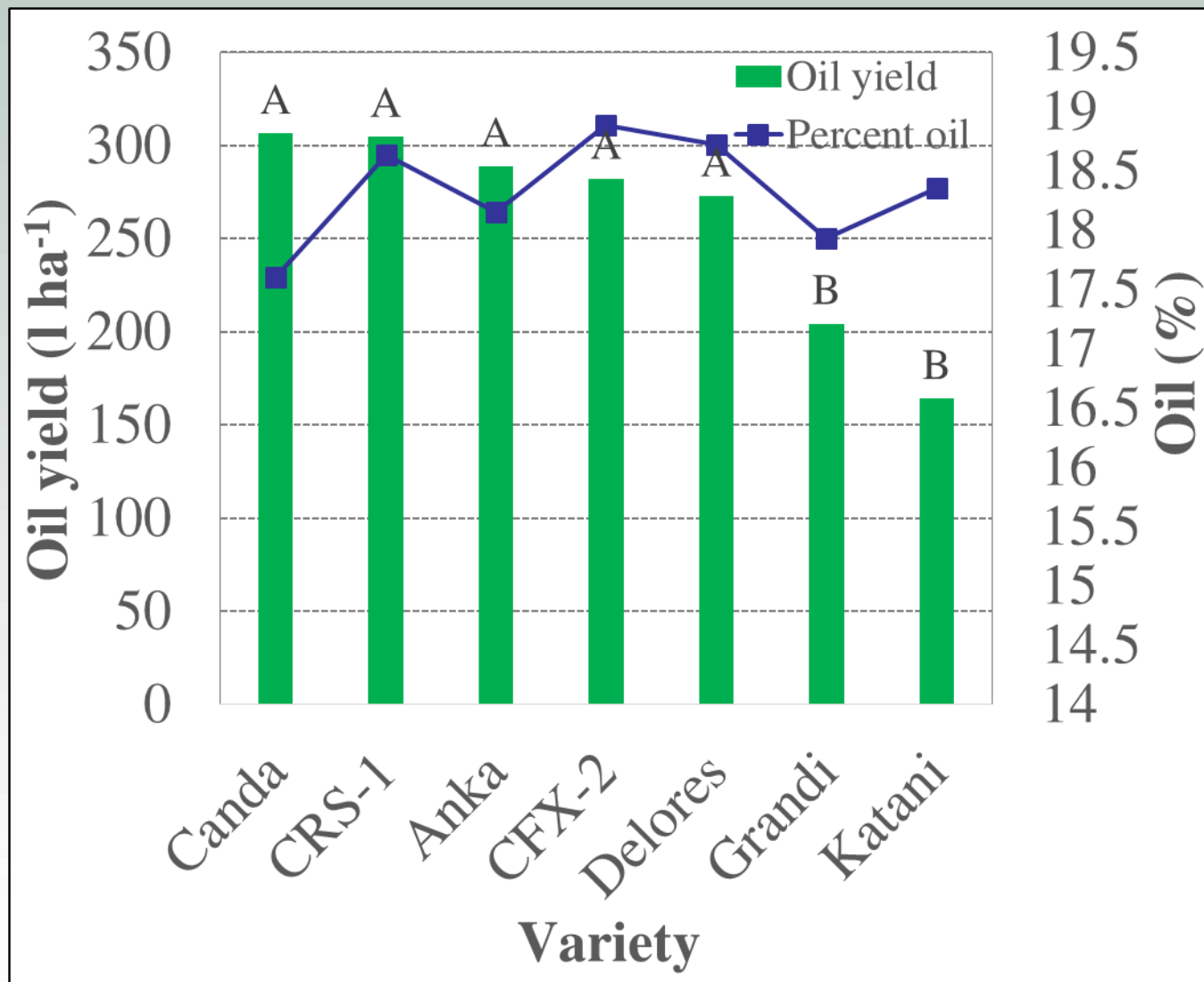


Figure 6. Oil content and yield of 7 hemp varieties across planting dates. Columns with the same letter did not differ significantly from each other.

2017 Grain Planting Date Trial

- Planting dates: 20-May, 29-May, 5-Jun, 12-Jun
- Date harvested: 12-Sep
- Target seeding rate: 125 live seeds m⁻²
- Varieties: Anka, CRS-1, Fedora
- Plot size 1.5m x 6.1m

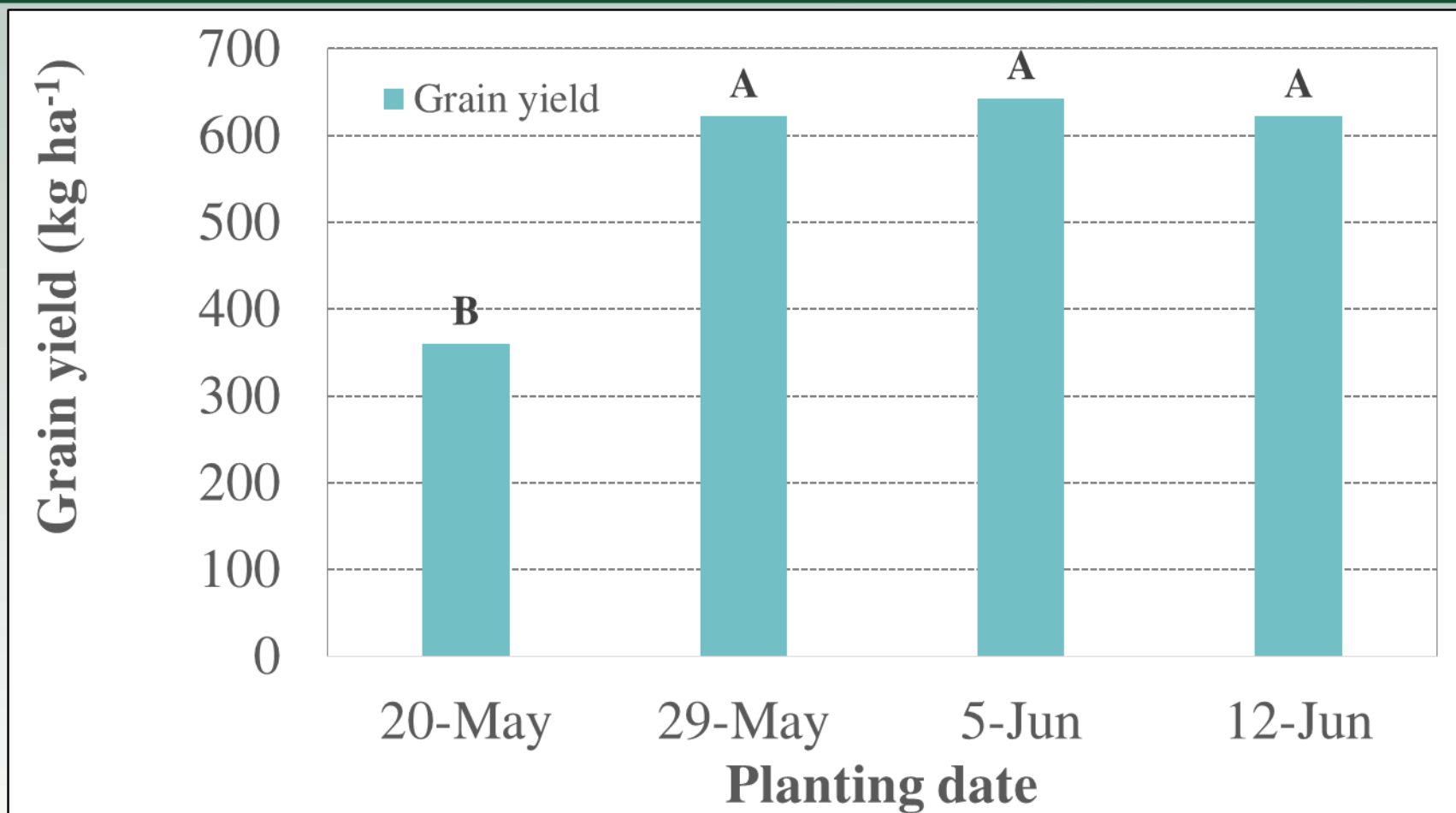


Figure 7. Hemp grain yields from four planting dates. Columns with the same letter are not significantly different from each other, LSD (0.10) = 179, $p = 0.0075$).

2017 Fiber planting date trial

- Planting dates: 20-May, 29-May, 5-Jun, 12-Jun
- Date mowed: 24-Aug
- Target seeding rate: 250 live seeds m⁻²
- Varieties: Beniko and Carmagnola
- Plot size 1.5m x 6.1m

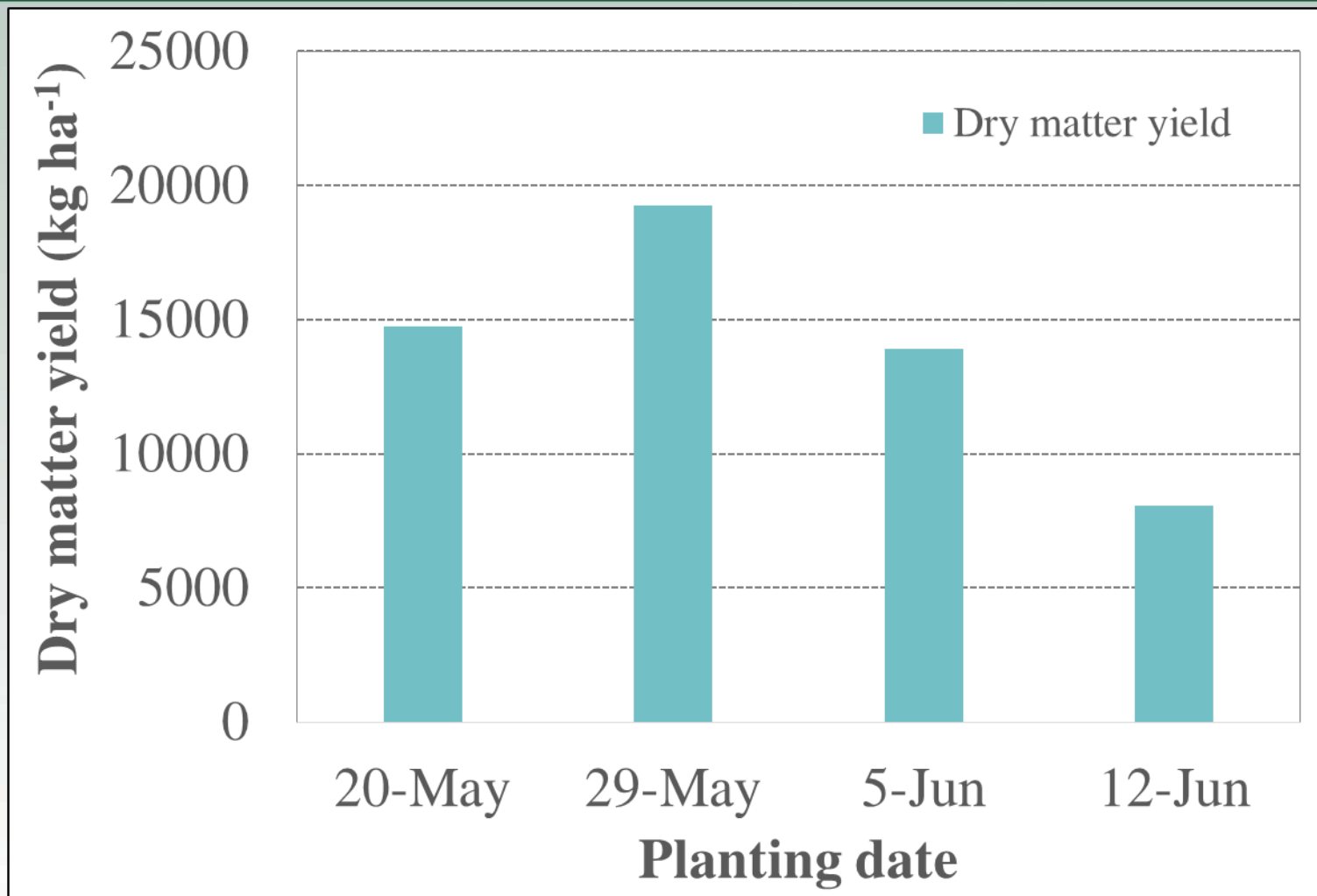
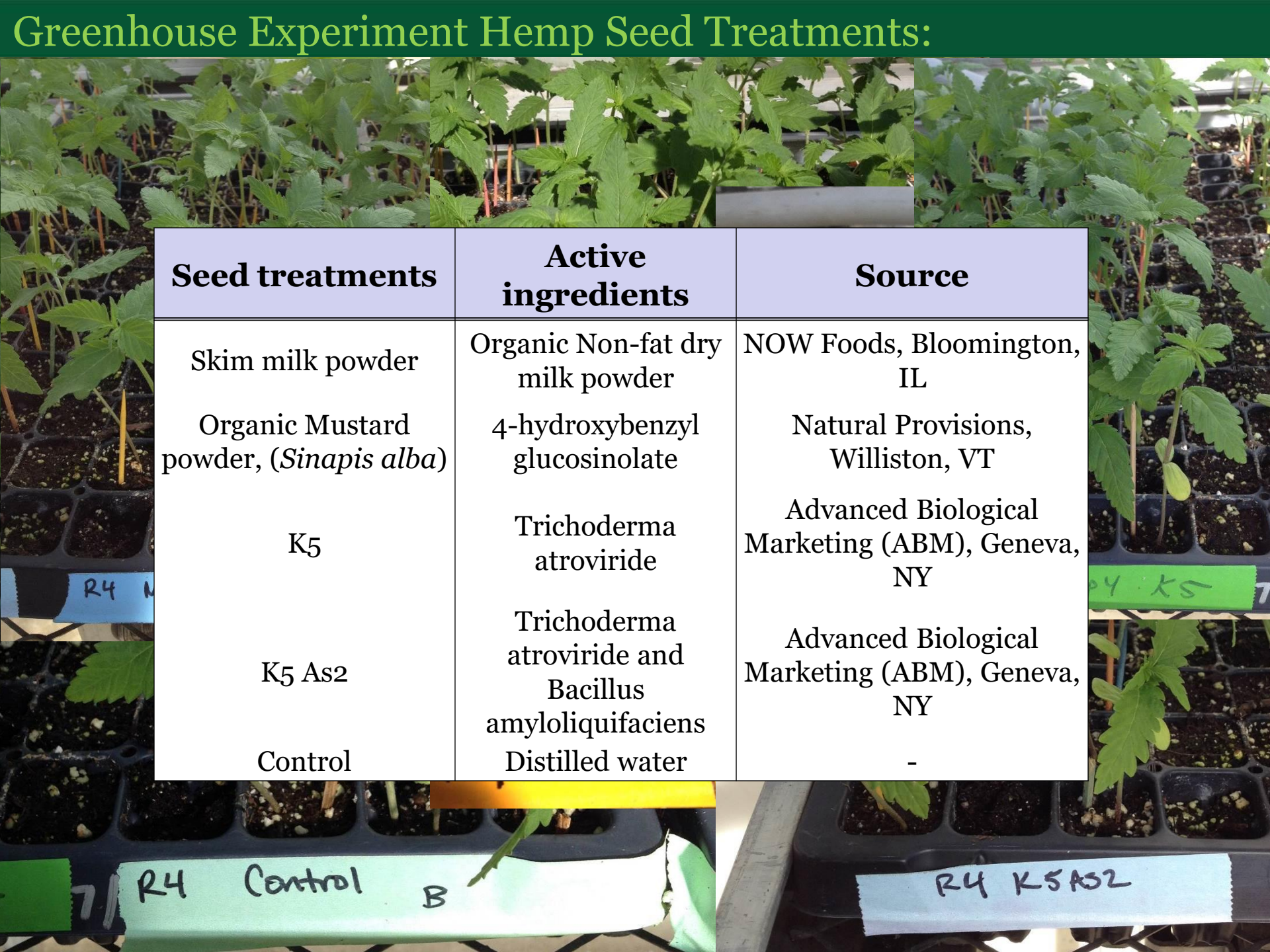


Figure 6. Hemp fiber dry matter yields from four planting dates. No significant difference.

Greenhouse Experiment Hemp Seed Treatments:



Seed treatments	Active ingredients	Source
Skim milk powder	Organic Non-fat dry milk powder	NOW Foods, Bloomington, IL
Organic Mustard powder, (<i>Sinapis alba</i>)	4-hydroxybenzyl glucosinolate	Natural Provisions, Williston, VT
K5	Trichoderma atroviride	Advanced Biological Marketing (ABM), Geneva, NY
K5 As2	Trichoderma atroviride and Bacillus amyloliquifaciens	Advanced Biological Marketing (ABM), Geneva, NY
Control	Distilled water	-

Greenhouse Experiment Hemp Seed Treatment Methods:

METHODS:

- Four replications of 50 hemp seeds per treatment, plus an untreated control.
- Thousand kernel weight was determined to calculate treatment rates.
- Each treatment applied to 10 grams of seed and 10 mls of distilled water
- Placed in Ziploc bag and shaken until all seed evenly coated, control-water only.
- Spread out on trays and allowed to dry for 24 hours.
- Seeds planted in 1 inch, 116 cell trays, using sterile media (Fafard 2).
- Plant emergence recorded daily for 10 days.

Greenhouse Experiment Hemp Seed Treatment Germination Results:

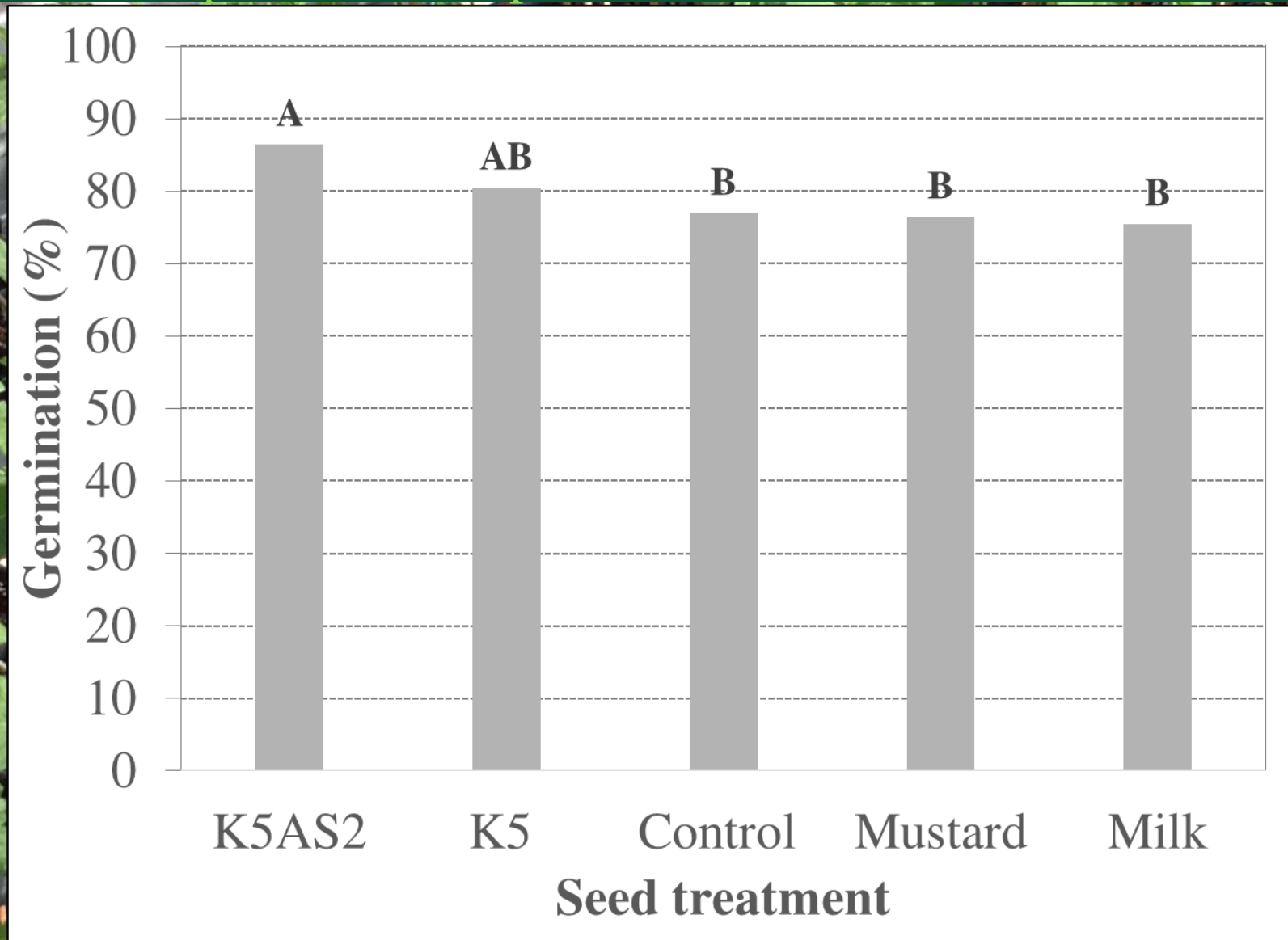


Figure 8. Seed treatment effect on hemp seed germination. Columns with the same letter were not significantly different from each other, LSD ($\alpha = 1\%$) = 2.2, $df = 2, 1$.

Weed control trial



Sunflower grain drill



Kverneland grain drill

- STANDARD: 19cm spacing, Sunflower 9412 no-till grain drill
- WIDE: 23cm spacing, Kverneland grain drill

Row Spacing & Weed Control

- BAND: 13 cm, band, 15 cm between row, custom built seeder made from a 12 row International row crop cultivator using a Gandy and a 6212 air box
 - Parallel linkage units mounted 12” apart and mounted with precision Dutch openers.



Gandy air seeder (left), row cultivator (right)

Weed Control Trial

- Planted: 24-May
- Harvested: 13-Sept
- Variety: Anka
- Seeding rate: 28 kg/ha
- Plot size: 3.0m x 15.2m
- Wide and band treatments cultivated 16-Jun



Banded sowing, 2016

Weed control trial

- Standard row – Average height 177 cm, significantly lower than other treatments.
- Weed cover ranged from 7.03 – 17.1%, no significant differences.
- No significant yield differences, 1444 kg/ha.



Percent weed cover assessment in industrial hemp, Alburgh, VT, 2016

Weed Control trial

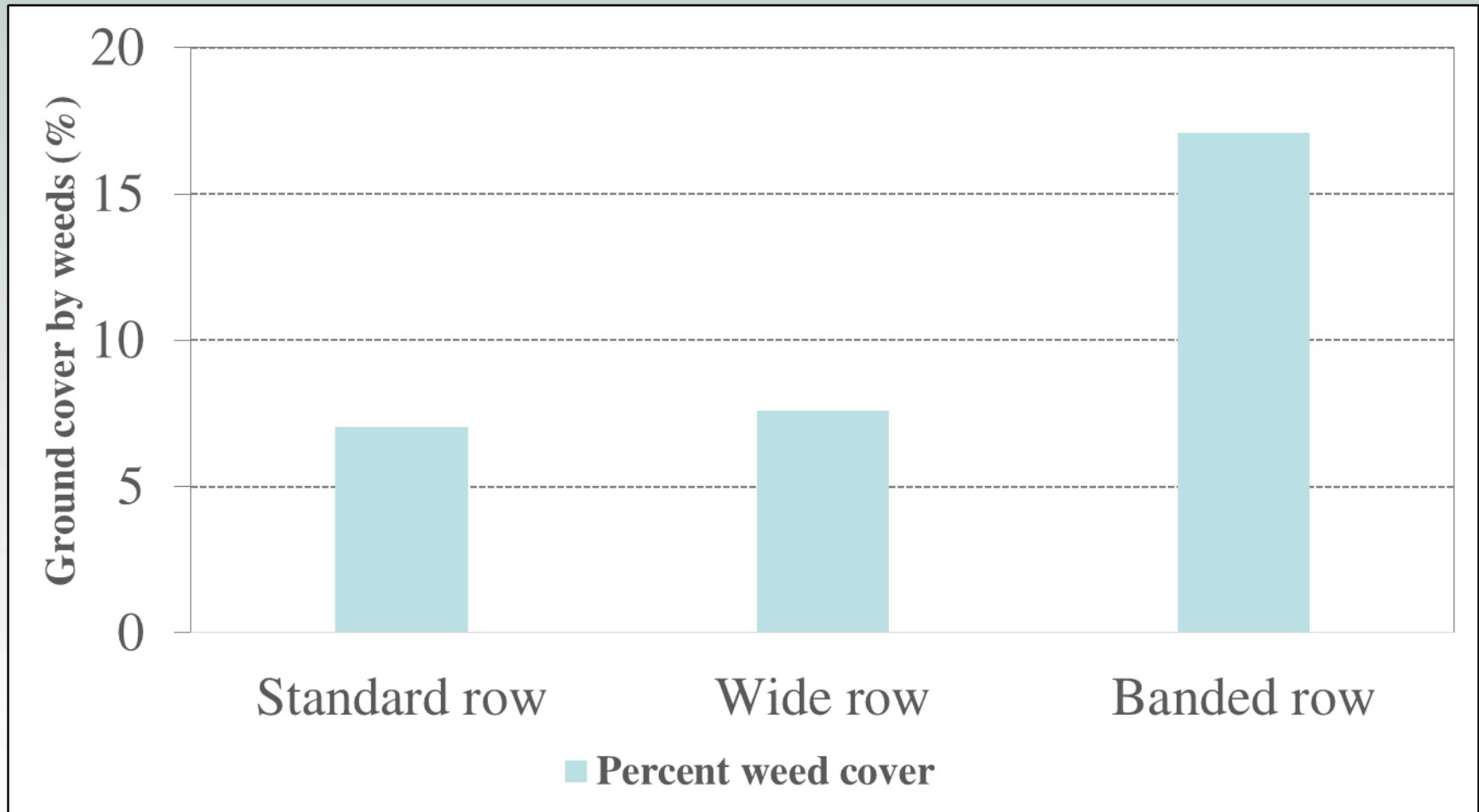
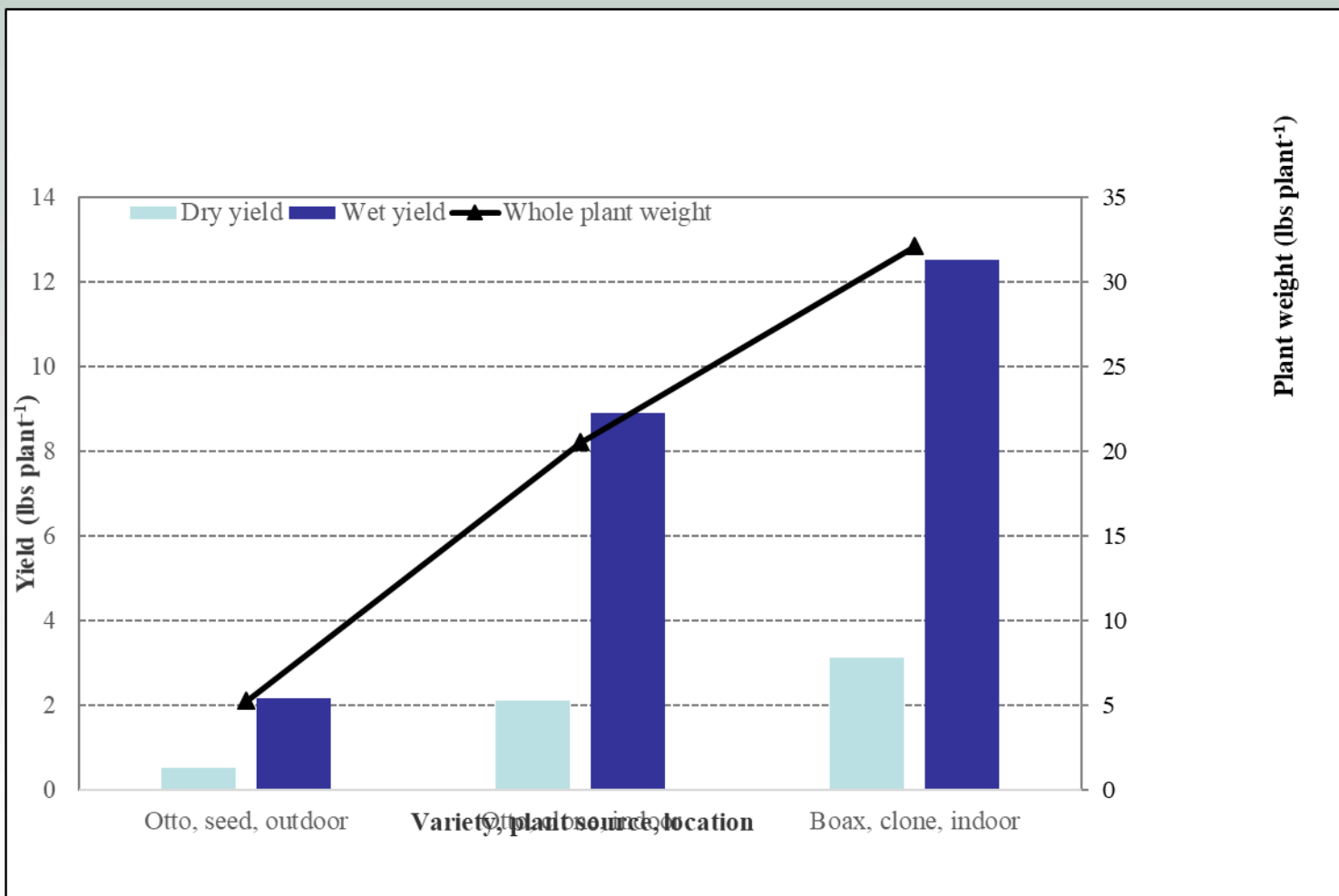


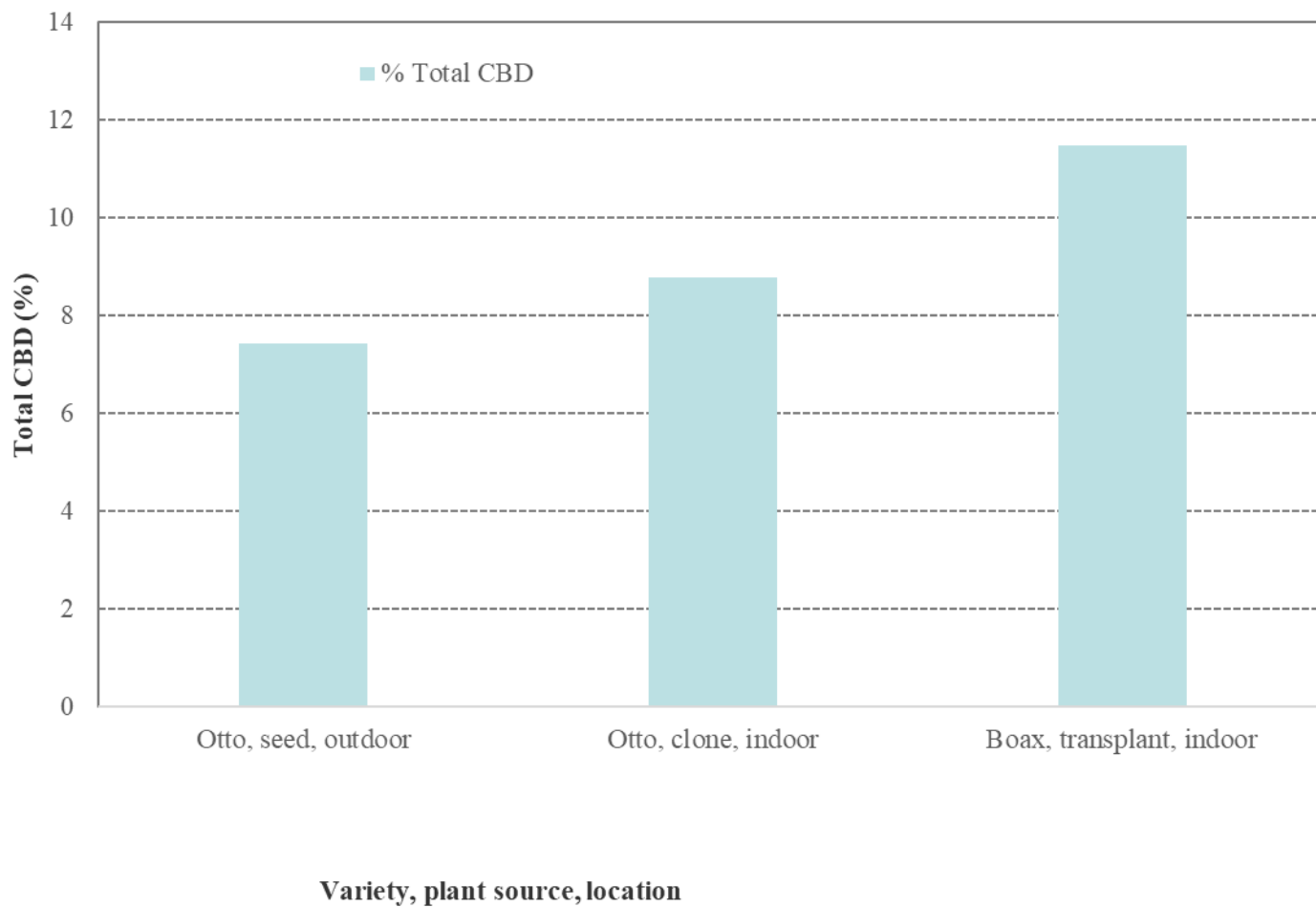
Figure 9. Row spacing effect on percent of ground covered by weeds. No significant difference

2017 CBD trial

- Planting dates:
 - 16-Jun (transplant clones),
 - 26-Jun (seedlings)
- Date harvested: 6-14 Oct
- Plant spacing: 2.0 m x 2.4 m
- Varieties: UVM medical school
- Early clones highest yields







Oil Extraction



- The M70 Agoil press sells for \$8950
- Depending on seed: 700-1500 lbs per 24 hrs.
- The press itself very simple to operate
- New Veri-Die nozzle
 - you only need one for all seed types
- Turn a nut until the meal and oil flows properly.



unfi foundation

