

Getting the Season Off to a Great Start

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University of Vermont**



COMMUNITY



4-H & YOUTH



ENVIRONMENT



AGRICULTURE



FOOD

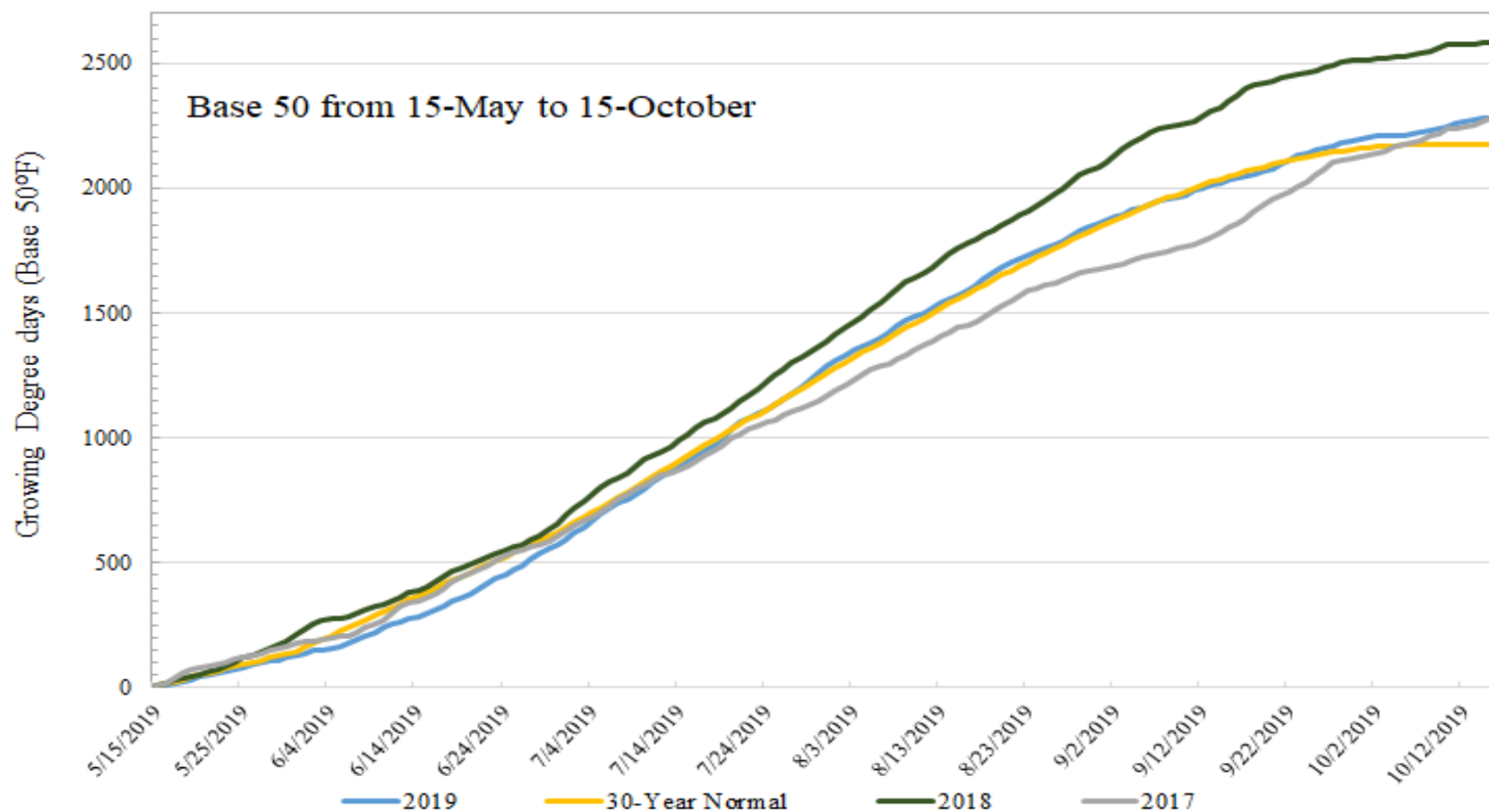


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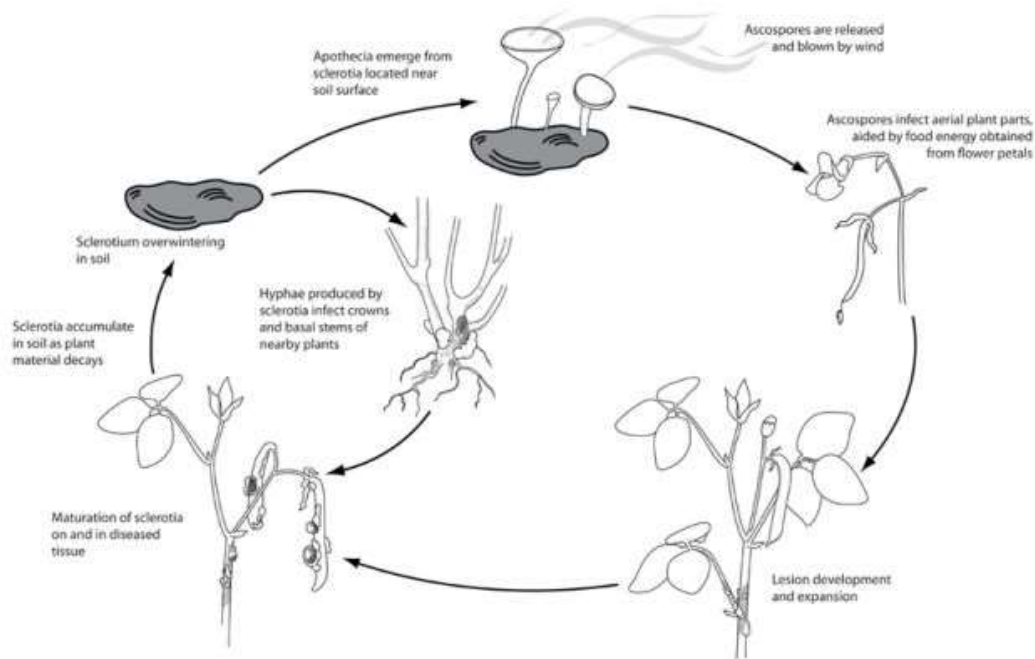
CULTIVATING HEALTHY COMMUNITIES



Crop Rotation

- Hemp is susceptible to many diseases.
- Hemp should be rotated ideally to a new spot every 1 to 2 years.
- To minimize disease build-up would recommend a 4 to 6 year rotation.

SCLEROTINIA WHITE MOLD



Lifecycle of white mold (*Sclerotinia*)

(provided by the American Phytopathological Society (APS) 2012)



Sclerotinia sclerotiorum on hemp.
Alburgh, VT.



Soil Limitations

- Grows best on sandy loams.
- 40% or more clay not generally good.
- Does not tolerate water logged soils.
- Adequate pH – over 6.0 (requires calcium).





Fertility Requirements

Nitrogen (3.0 to 4.0%)

Potassium (2.0 to 3.0%)

65 – 70 lbs per acre

Phosphorus (0.5 – 0.6%)

50 to 70 lbs per acre



Prepared For:

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Consultant:

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Sample Information:

Order #: 4513
Lab ID: S17-02002
Heath's

Received: 6/26/2017

Reported: 7/10/2017

VT County: Franklin

Results

Nutrient	Low	Medium	Optimum	High or Excessive
Phosphorus (P):	<div></div>			
Potassium (K):	<div></div>			
Magnesium (Mg):	<div></div>	<div></div>		

Analysis	Value Found	Optimum Range (or Average *)	Analysis	Value Found	Optimum Range (or Average *)
Soil pH (2:1, water)	5.8		Boron (B)	0.2	0.3*
Modified Morgan extractable, ppm			Copper (Cu)	0.2	0.3*
Macronutrients			Zinc (Zn)	0.8	2.0*
Phosphorus (P)	0.7	4-10	Sodium (Na)	52.0	20*
Potassium (K)	34	100-160	Aluminum (Al)	51	35*
Calcium (Ca)	1630	**	Soil Organic Matter %	5.8	**
Magnesium (Mg)	58	50-120	Effective CEC, meq/100g	8.7	**
Sulfur (S)	6.0	11*	Base Saturation, %		
Micronutrients			Calcium Saturation	69.2	40-80
Iron (Fe)	13.1	7.0*	Potassium Saturation	0.7	2.0-7.0
Manganese (Mn)	12.2	8.0*	Magnesium Saturation	4.1	10-30

* Micronutrient and S deficiencies are rare in Vermont and optimum ranges are not defined; thus average values in Vermont soils are shown instead.

** Ranges for Calcium, Organic Matter, and Effective CEC vary with soil type and crop.

Recommendations for Corn for Silage (3A)

Limestone (Target pH of 6.2)	Nitrogen, N	Phosphate, P ₂ O ₅	Potash, K ₂ O
tons / Acre 1.5	lbs / Acre 120	lbs / Acre 95	lbs / Acre 140

Comments:

Default Yield Goal: 20. tons / Acre

Estimate nutrients supplied by manure - consult UVM Extension or Nutrient Recommendations for Field Crops in Vermont.
Add 10-20 lb/acre extra N in excessively drained (droughty) soils OR in somewhat poorly to poorly drained soils. Consult Extension Agronomists or References to estimate N credits from a grass or legume crop plowed down within the past 2 years.
Band most if not all phosphorus at planting. Do not band more than 60-80 lbs per acre combined N plus K₂O.
See the 2016 Addendum to Nutrient Recommendations for updated information on nitrogen recommendations.

References:

2016 Addendum to Nutrient Recommendations

http://pss.uvm.edu/vtcrops/articles/2016_Soil_Test_addendum_UVMExt.pdf

Hemp Nitrogen Fertility

- High N can stimulate the formation of male flowers.
- Split applications of N are best to minimize over feeding at any one single stage.
- A deficiency of N causes the entire hemp plant to turn yellow (chlorosis).
- With deficiency growth and flowering are slowed, and the plants will be mostly male.



Whole Plant Analysis

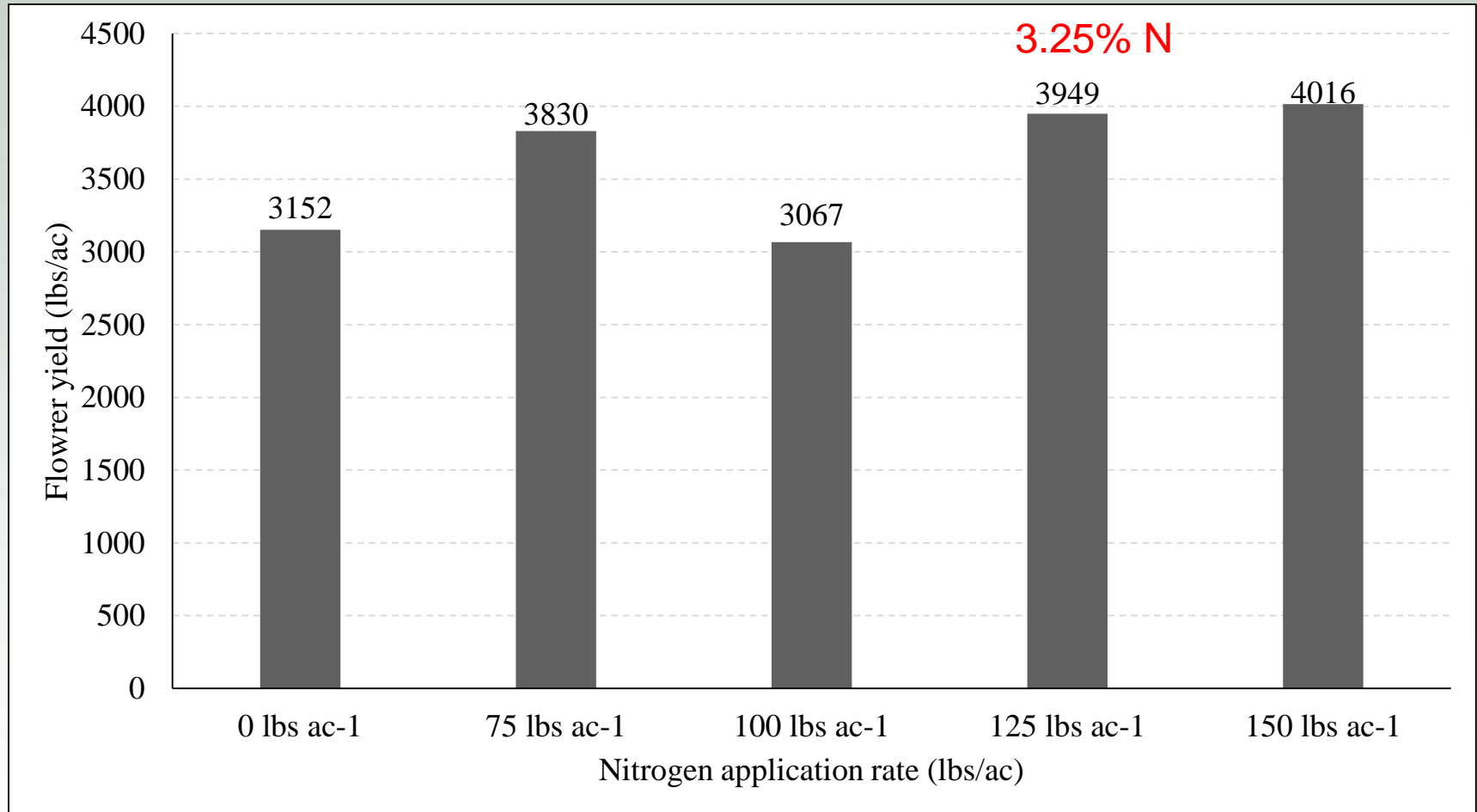
Treatment	Nitrogen	Calcium	Phosphorus	Magnesium	Potassium
lbs N ac ⁻¹	%	%	%	%	%
0	2.47 b	2.35 bc	0.625	0.238 c	2.21
75	2.63 b	2.10 c	0.540	0.258 bc	1.96
100	2.66 b	2.38 bc	0.610	0.283 ab	1.93
125	3.25 a	2.83 a	0.620	0.303 a	2.09
150	3.04 a	2.67 ab	0.548	0.308 a	2.10
LSD (<0.10) ‡	0.378	0.355	NS ¥	0.044	NS
Trial mean	2.81	2.47	0.589	0.278	2.06

†Within a column treatments marked with the same letter were statistically similar (p=0.10). Top performers are in **bold**.

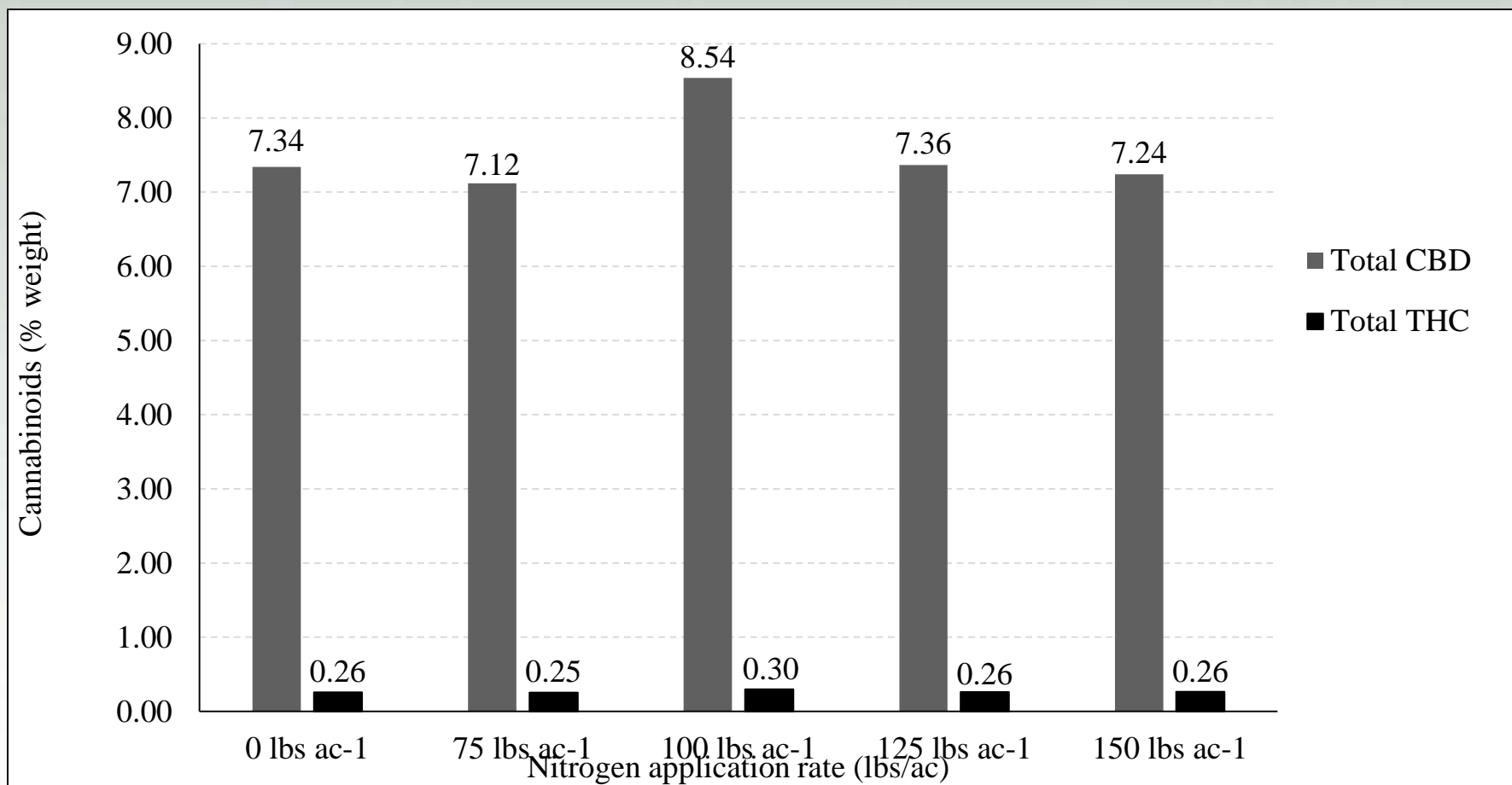
‡LSD – Least significant difference at p=0.10.

¥NS – No significant difference between treatments.

CBD Nitrogen Fertility - Yields



CBD Nitrogen Fertility – Total CBD & Total THC



How Many Seeds/Plants

- $5 \times 5 = 1,742$
- $6 \times 6 = 1,260$
- $4 \times 4 = 2,723$
- $2 \times 2 = 10,890$

Genetics & Planting Stock – Large Expense

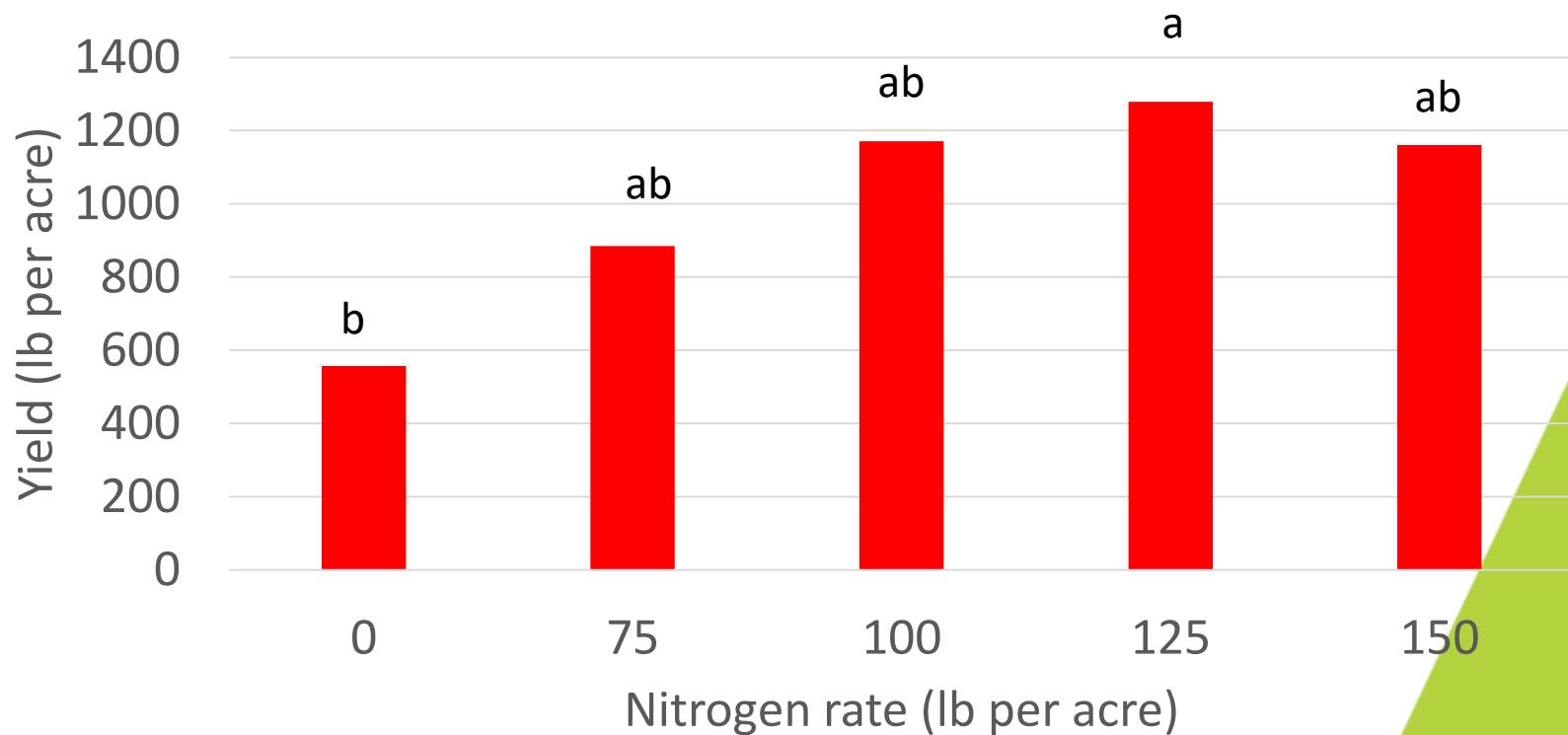
\$1 to \$2 per seed = \$1,890/A

\$ 3 to \$8 per plant = \$5,040/A

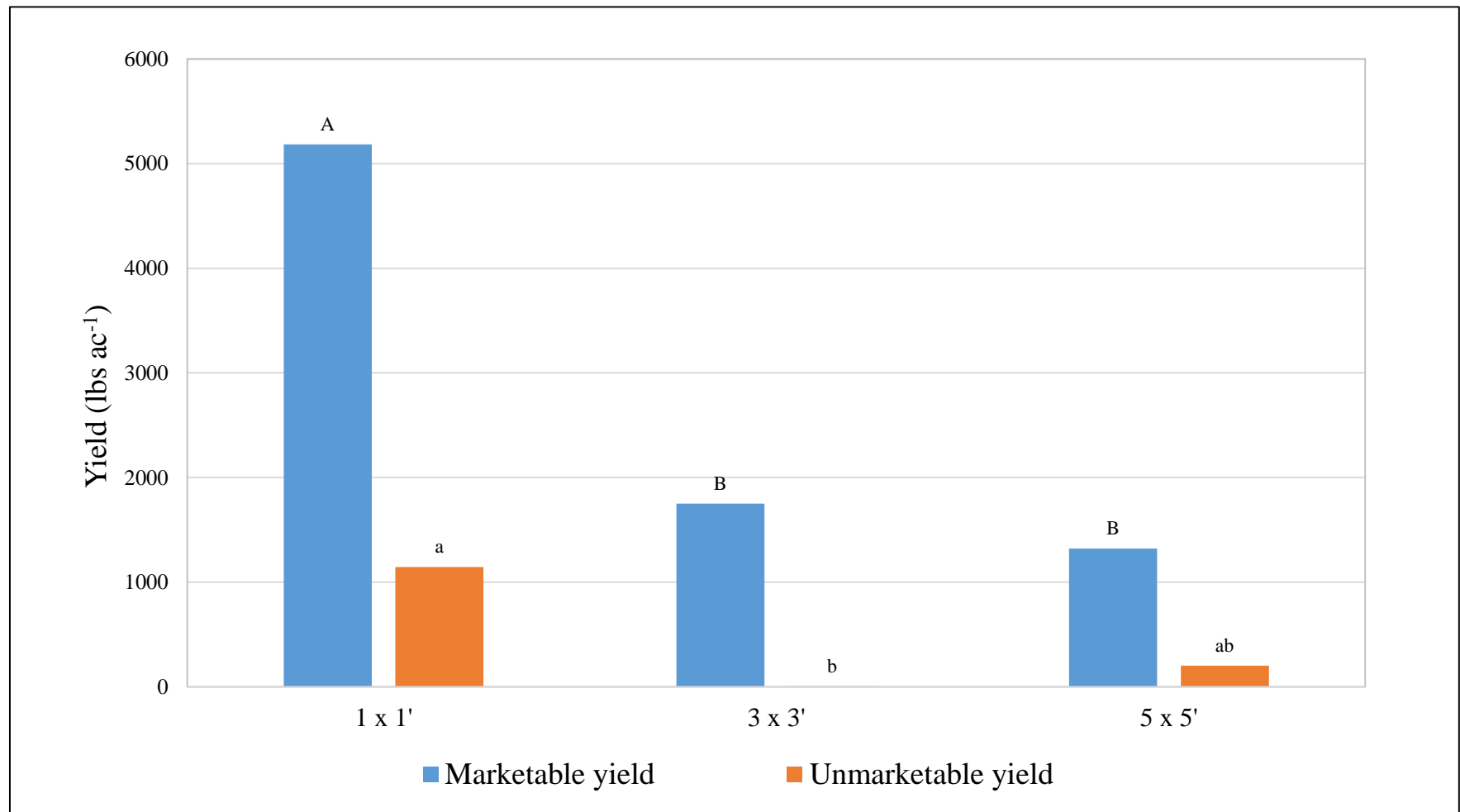
\$ 4 to \$8 per clone = \$7,560/A



Nitrogen Fertility and Grain Hemp



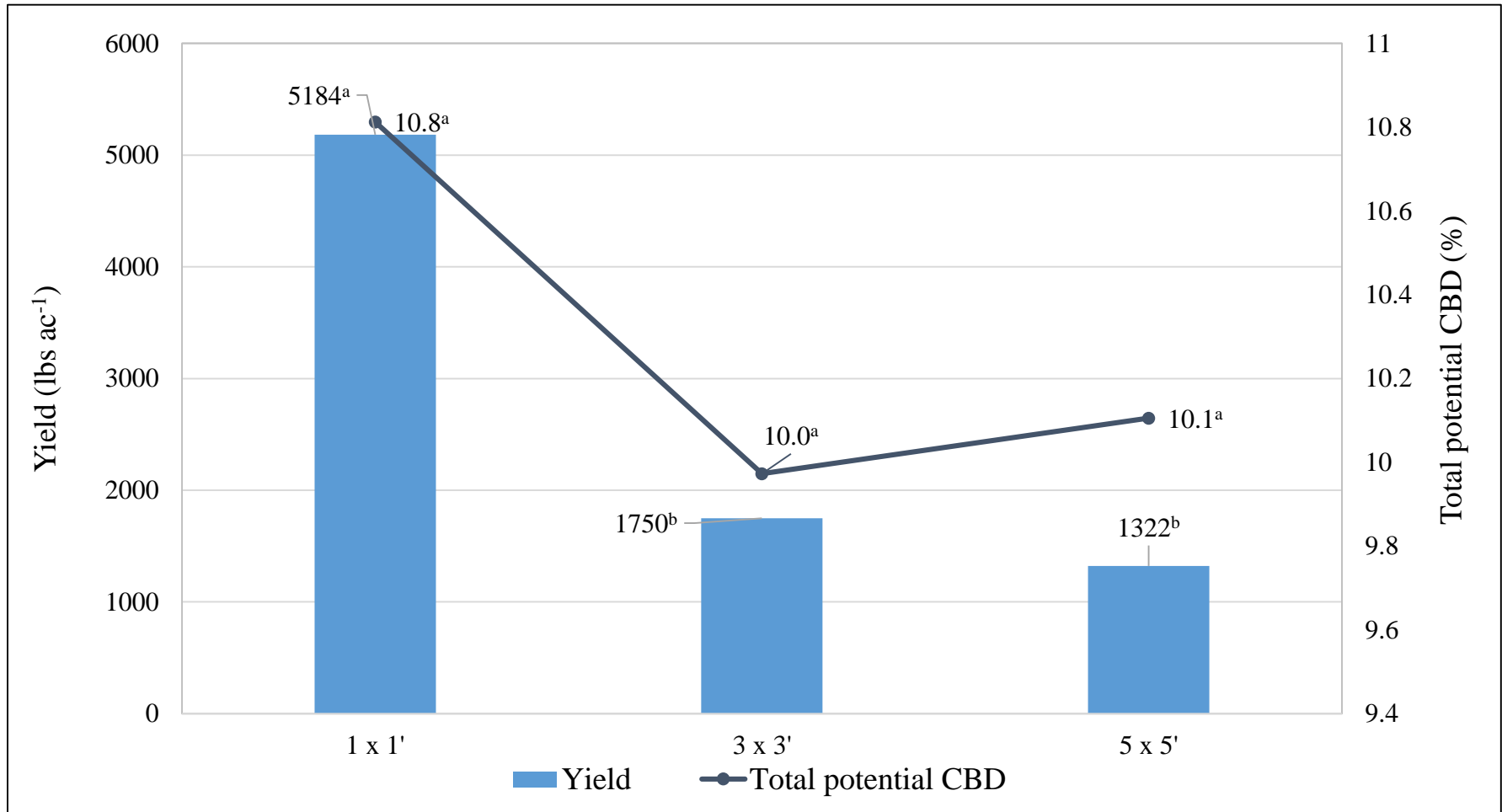
Marketable and unmarketable flower yields by spacing: per acre basis



Treatments with the same letter are statistically similar at the 0.10 level.

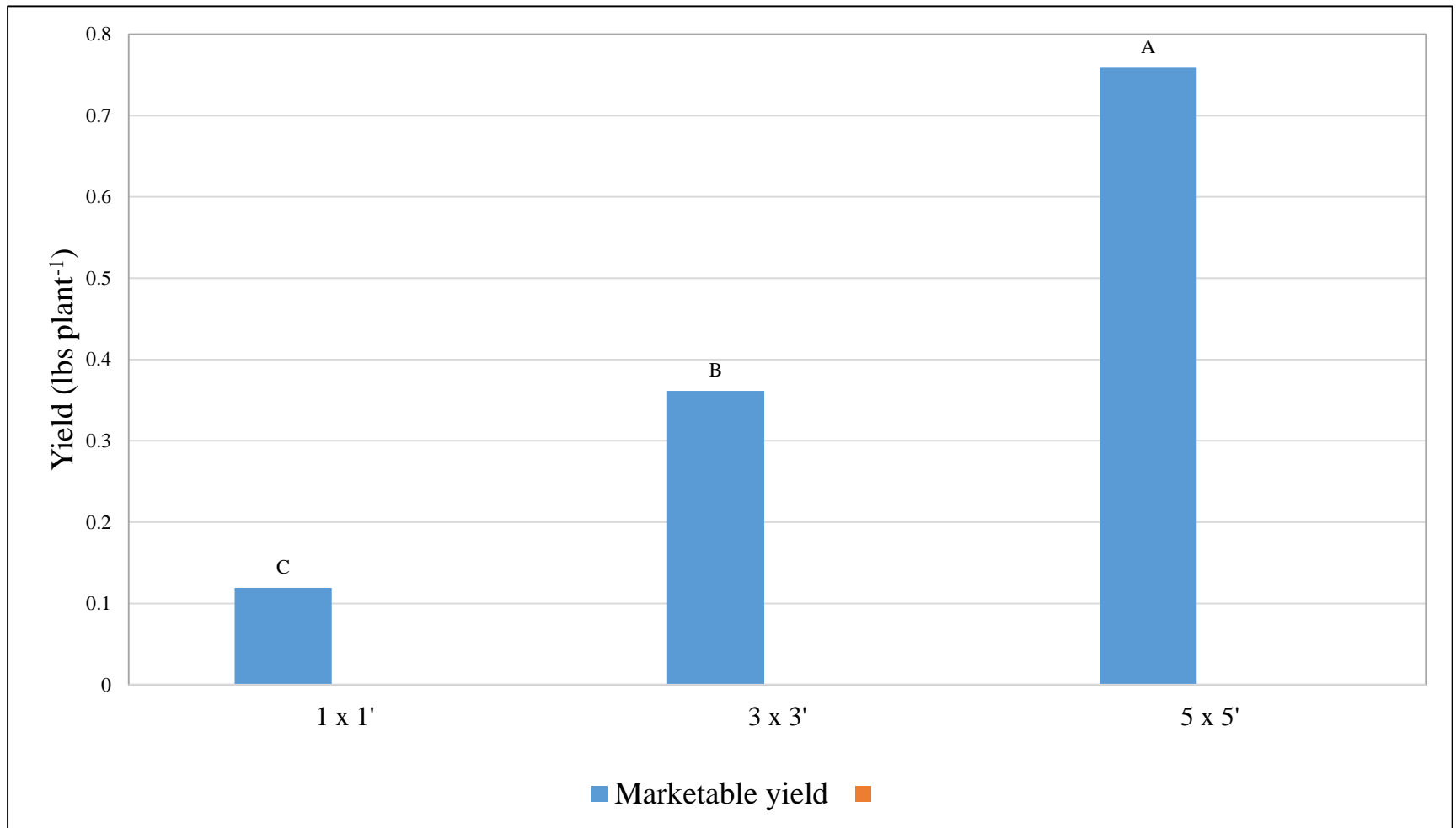
CBD Plant Spacing x Planting Date Trial (var. Ceiba)

Flower dry matter yields and total potential CBD by plant spacing



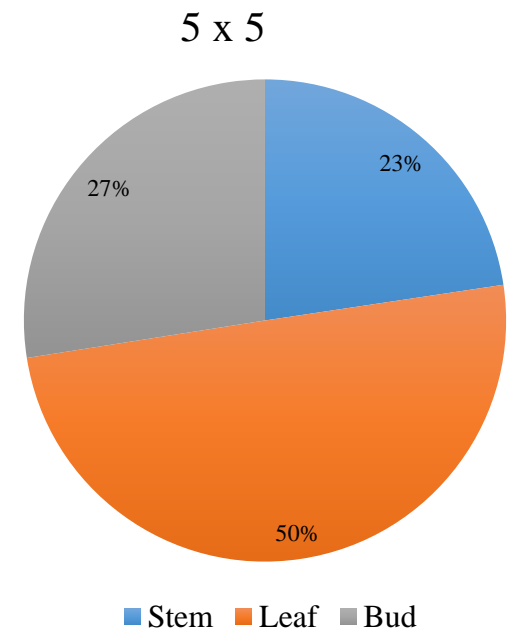
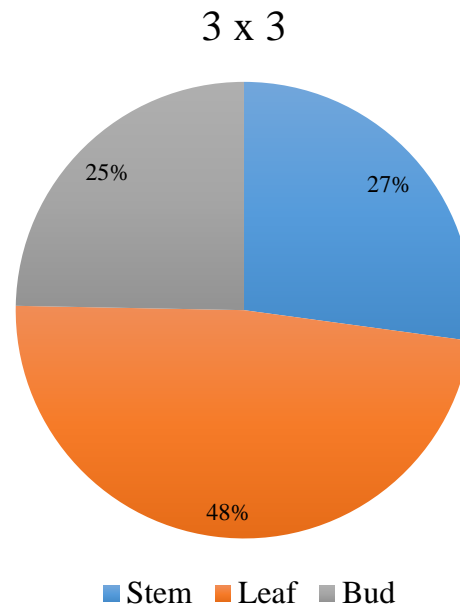
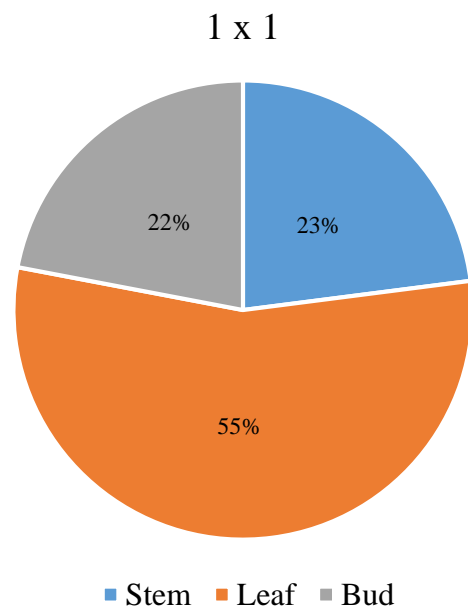
Treatments with the same letter are statistically similar at the 0.10 level.

Marketable and unmarketable flower yields by spacing: per plant basis



Treatments with the same letter are statistically similar at the 0.10 level.

Biomass percentages by plant spacing





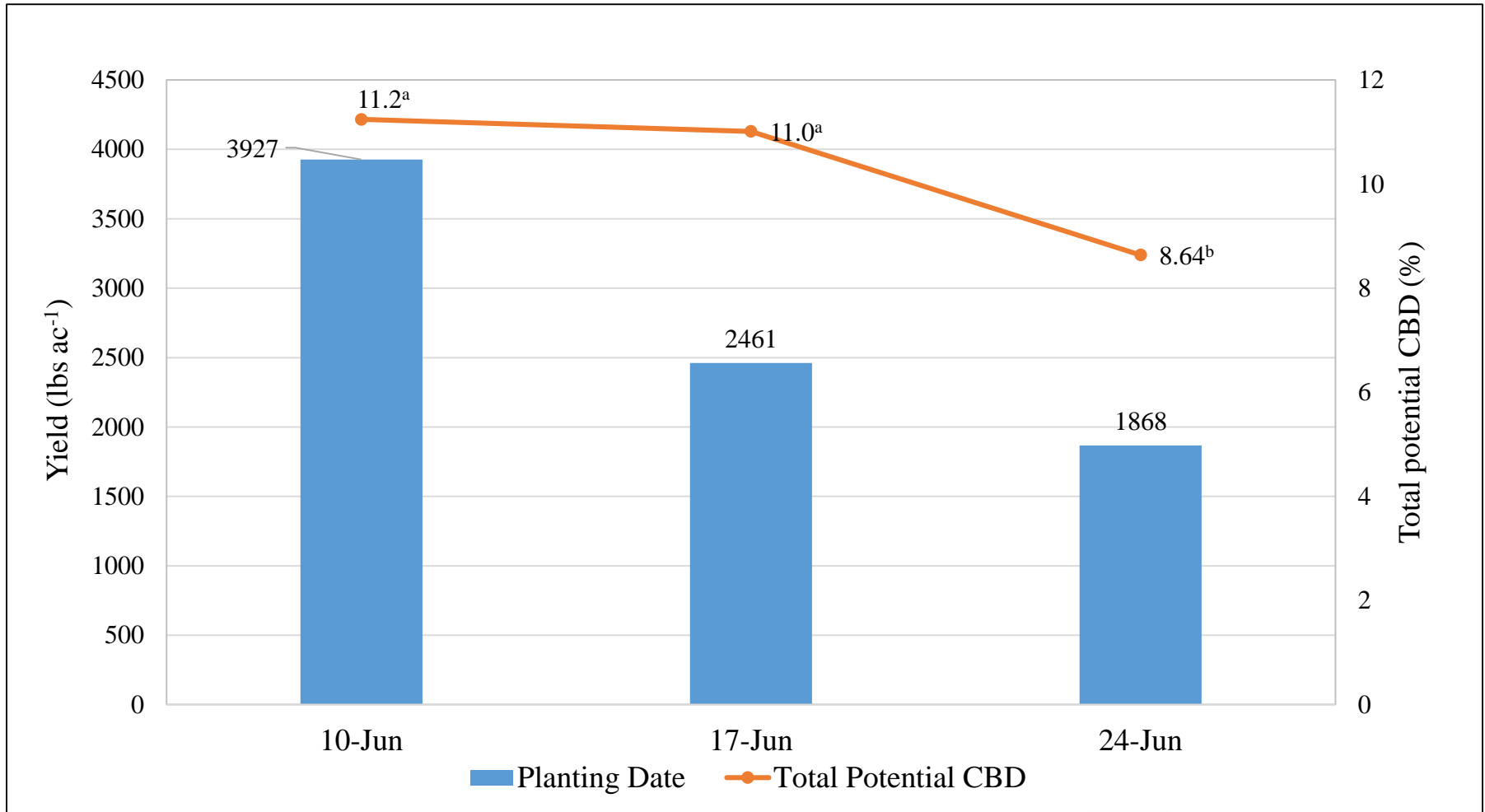
Powdery mildew on a
1 x 1 spacing plant



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CBD Plant Spacing x Planting Date Trial (var. Ceiba)

Flower dry matter yields and total potential CBD by planting date



Treatments with the same letter are statistically similar at the 0.10 level.

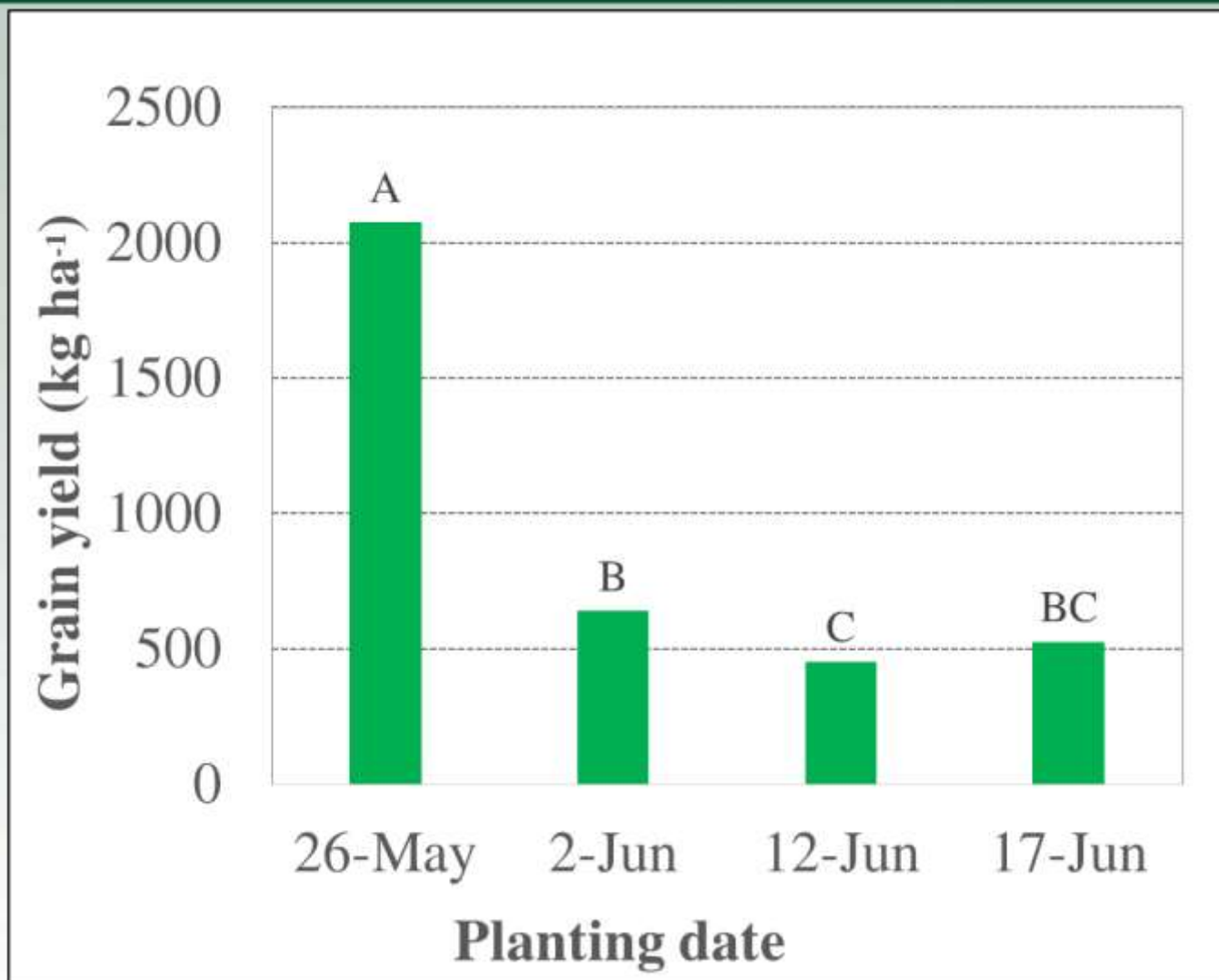


Figure 3. Yield of hemp planted from 26-May to 17-Jun. Columns with the same letter were not significantly different from each other, $p < 0.0001$).

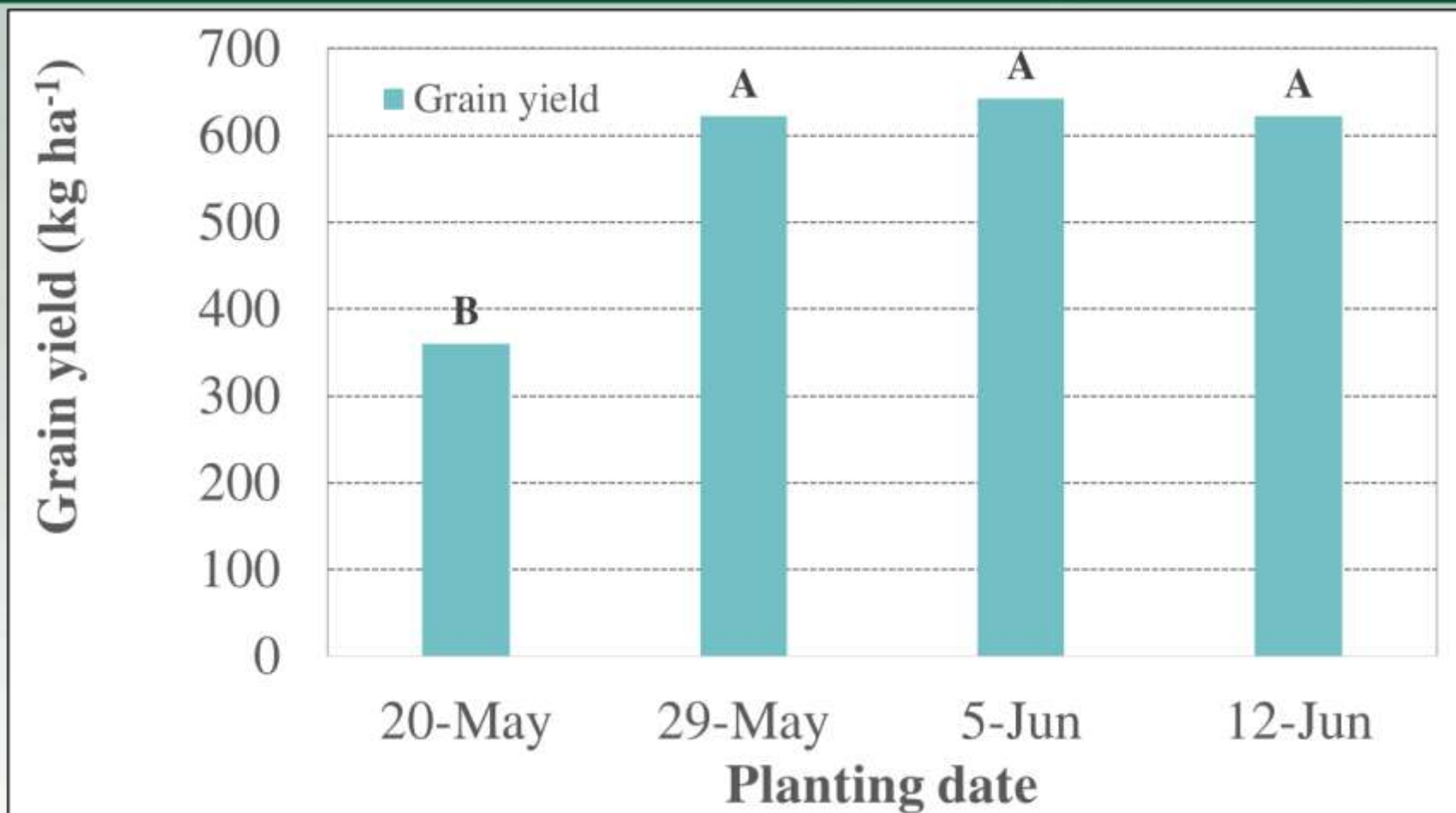


Figure 7. Hemp grain yields from four planting dates. Columns with the same letter are not significantly different from each other, LSD (0.10) = 179, $p = 0.0075$).

Water Requirements

- Hemp requires at least 20-30 inches of rainfall during the growing period
- Abundant moisture is needed during the germination period.
- The absorption of water increases until flowering begins. First 6 - 8 weeks of growth.
- Then the uptake of water decreases considerably, with a slight increase at late flowering and during seed formation.

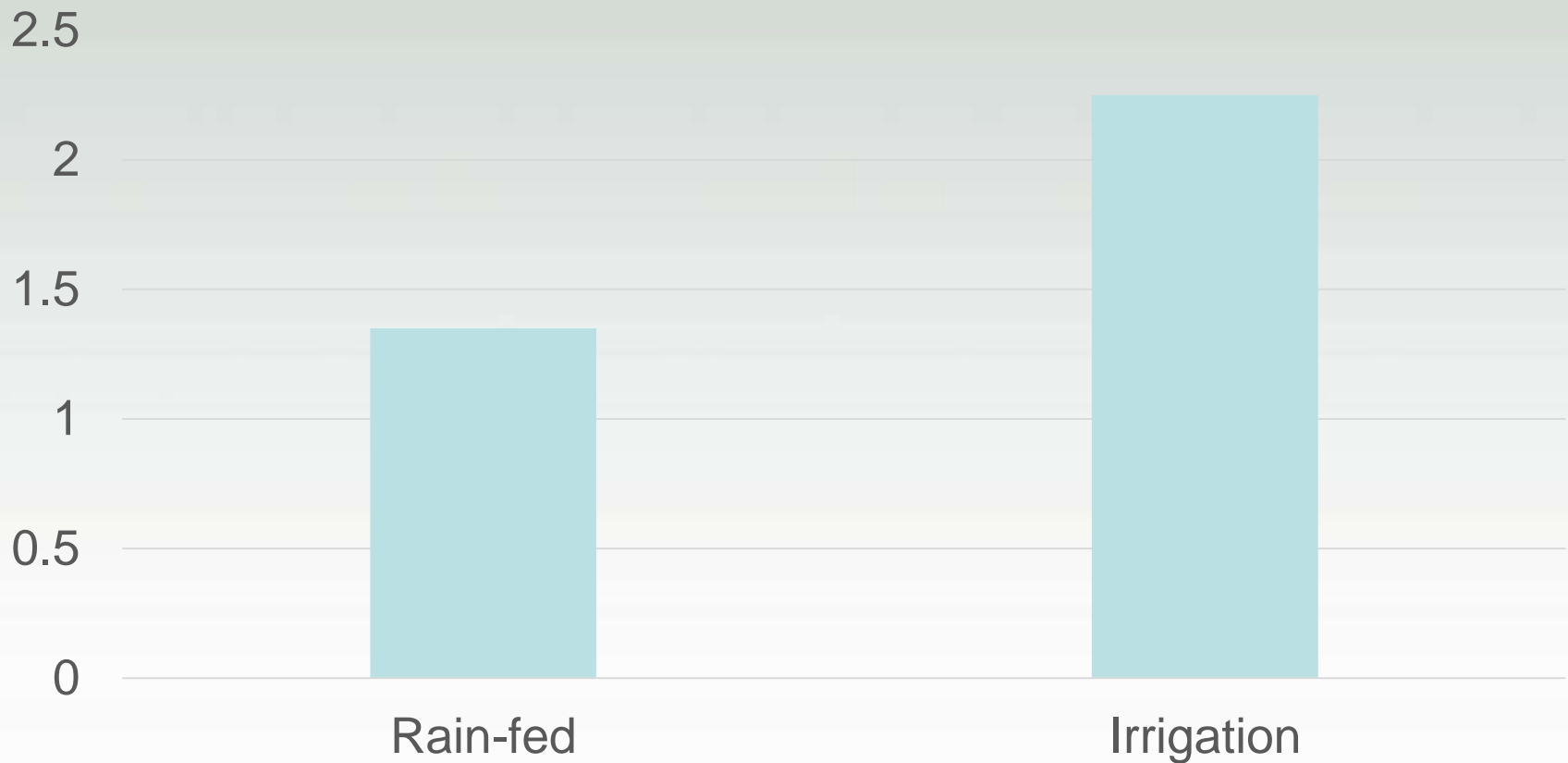


We Should Water Because We Have Irrigation?



Irrigation?

Impact of Irrigation on Bud Yield



Monthly Average Potential Evapotranspiration (PET) Estimates (inches)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug	Sept.	Oct.	Nov.	Dec.
Boston, MA	0.37	0.57	1.15	1.95	3.09	3.58	4.02	3.49	2.29	1.36	0.63	0.37
Bridgeport, CT	0.44	0.63	1.31	2.21	3.41	3.90	4.38	3.76	2.52	1.54	0.74	0.44
Buffalo, NY	0.24	0.40	0.99	1.92	3.26	3.74	4.05	3.43	2.23	1.18	0.47	0.24
Burlington, VT	0.24	0.42	0.97	1.96	3.26	3.74	4.13	3.47	2.18	1.13	0.45	0.23
Caribou, ME	0.17	0.30	0.73	1.51	2.88	3.39	3.64	3.07	1.84	0.89	0.31	0.16

Below is the weekly irrigation amount without precipitation in different months

September: 10.79 gallons of water/ week for one hemp plant

August: 16.63 gallons of water/ week for one hemp plant

July: 19.79 gallons of water/ week for one hemp plant

June: 18.52 gallons of water/ week for one hemp plant

May: 15.62 gallons of water/ week for one hemp plant

19.79 gallons of water July - $(1.03 \text{ inches rain/acre} * 27154 \text{ gallons of water/ inch} * 0.00055894918 \text{ acre/hemp}) = 4.16 \text{ gallons of water/ hemp plant per week.}$



COVER CROPS



Corn Borer



- 2 flights per year
- June little damage
- July/August more damage
- Traps
 - Pheremone traps
- Beneficial release
 - Trichogramma wasps
- Sprays

CORN BORER



ECB found in hemp; Left-ECB in grain hemp (Photo credit: Marguerite Bolt, Purdue Extension, 8-Aug 2019) Right- ECB in CBD hemp (Alburgh, VT, 2019)

ECB damage in corn



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Scentry Large Plastic Delta Trap

This Work-Horse Trap Will Last & Last!

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Pack of 5
SKU: 1230435

\$35.00

1

Pack of 10
SKU: 1230436

\$66.50

1

5 Replacement Liners
SKU: 1230505

\$7.00

1

10 Replacement Liners
SKU: 1230510

\$11.50

1

DESCRIPTION

SHIPPING INFO

DOCS

REVIEWS

Designed to last, the Large Plastic Delta Trap (LPD) is the most utilized and dependable insect trap available. Use with pheromone lures to attract, trap and monitor pest species.

These traps help to disrupt the mating cycle of the pest insects and allow you to easily monitor and determine pest populations. They are rugged and highly resistant to harsh conditions. Easy to assemble, easy to use, they are re-usable and collapse flat for storage.

Each LPD ships with 2 liners that slide in for use and are easily removed once used. Replace when full of bugs or after dust storms.



Get to the Field!

