
Oilseed Update
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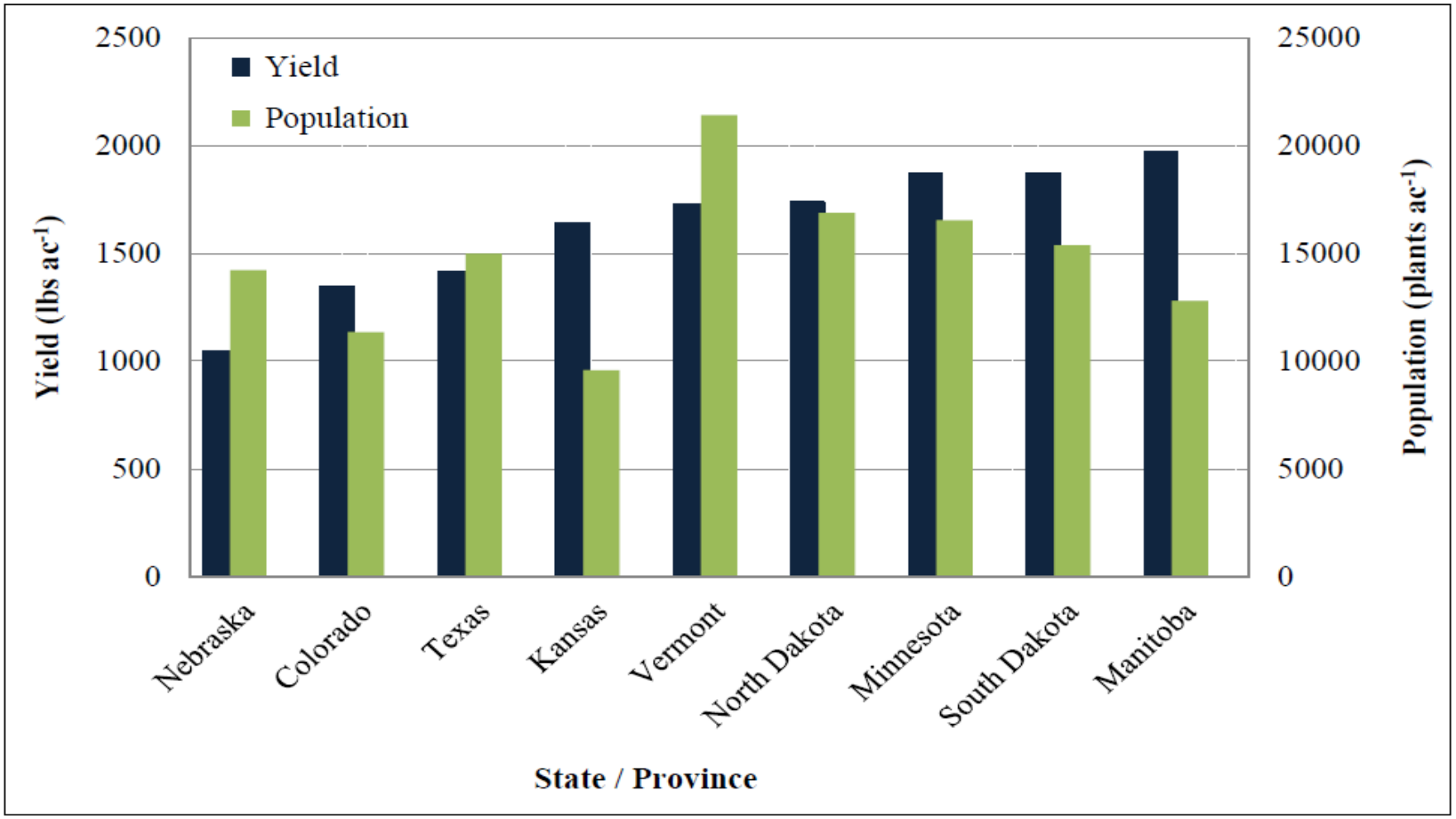
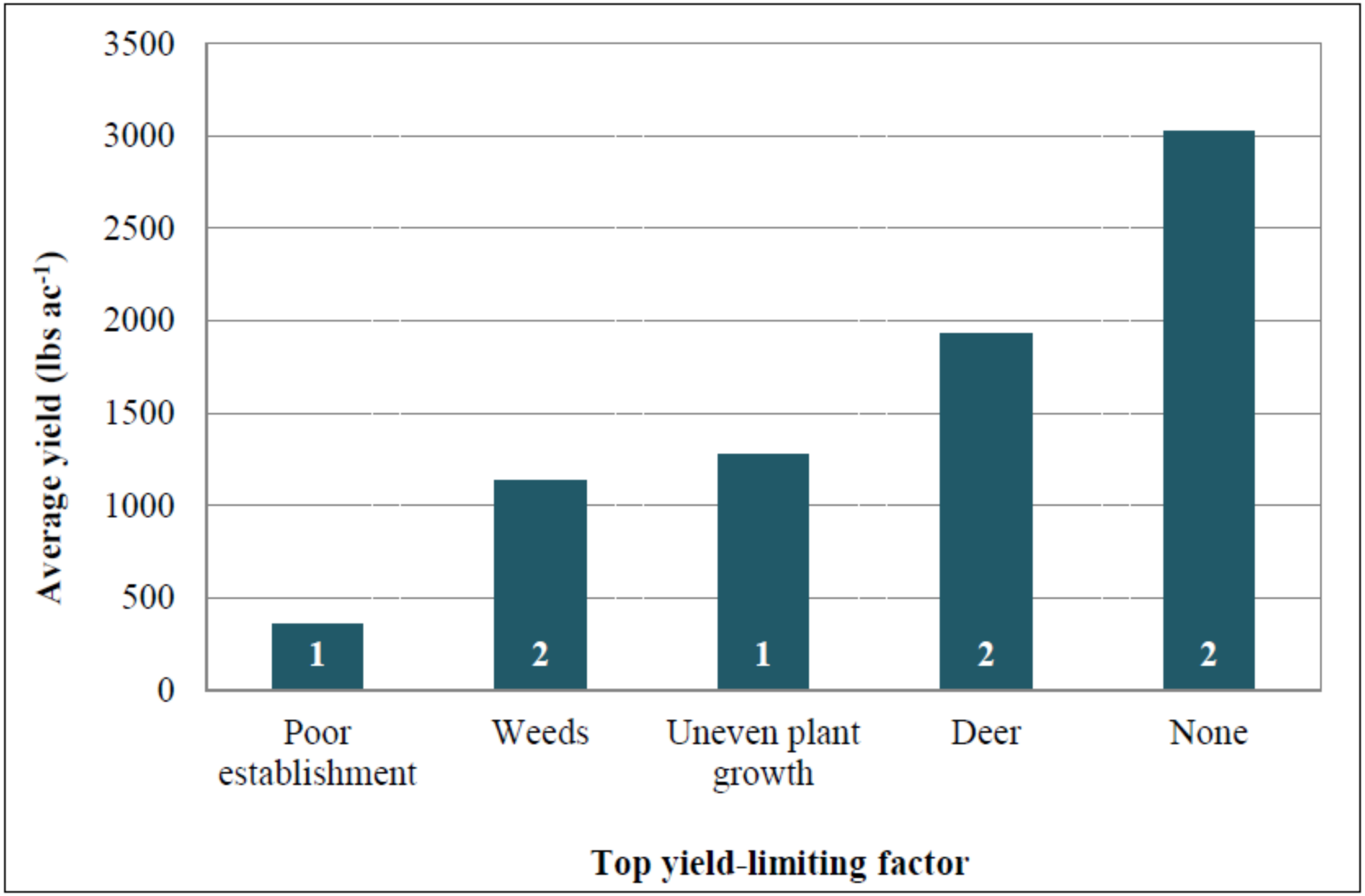
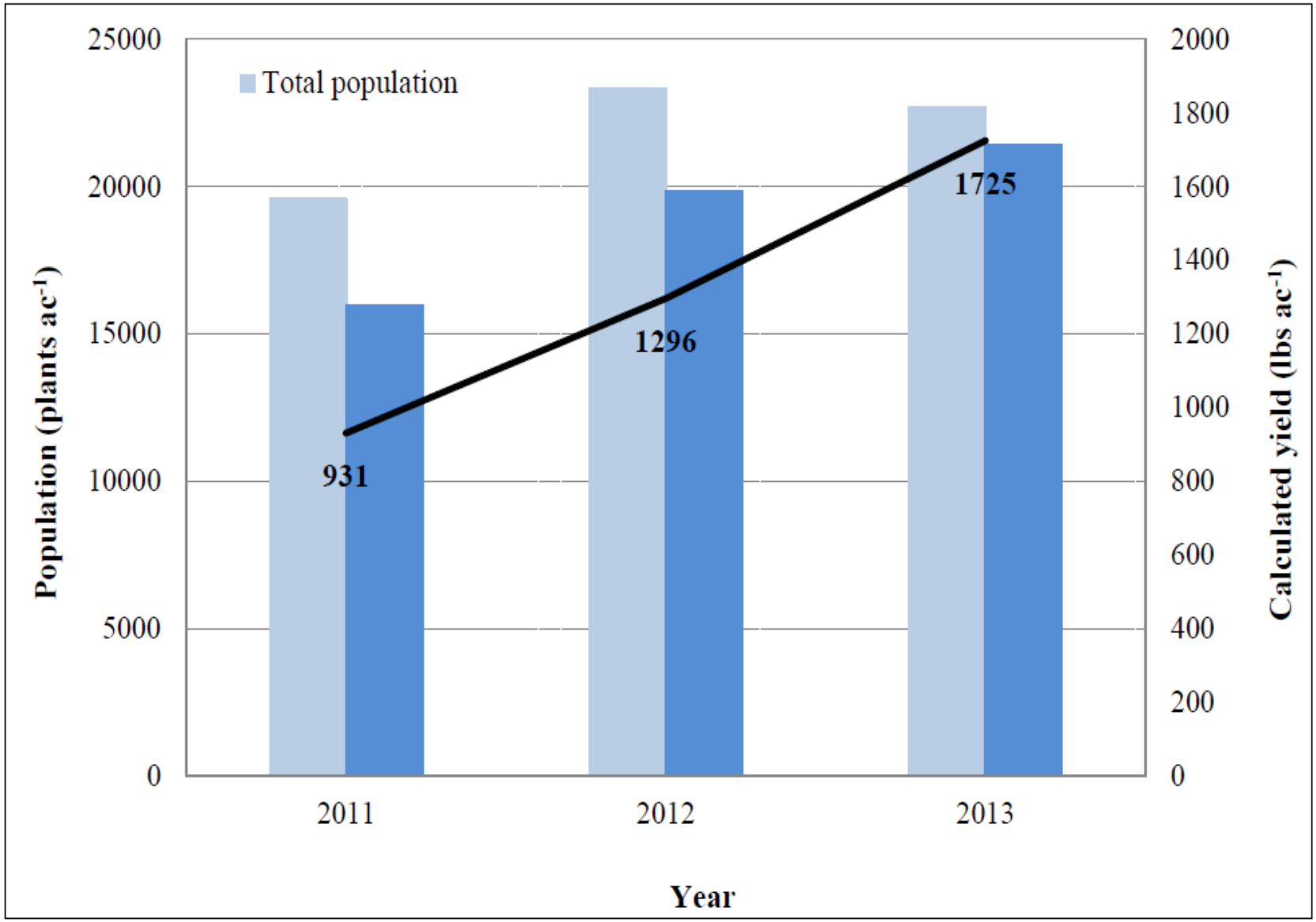
UVM Extension

National Sunflower Survey




3500
3000
2500
2000
1500
1000
500
0
Average yield (lbs ac-1)
1
2
1
2
2
Poor establishment
Weeds
Uneven plant growth
Deer
None
Top yield-limiting factor


Total population
25000
20000
15000
10000
5000
0
2000
1800
1600
1400
1200
1000
800
600
400
200
0
931
1296
1725
2011
2012
2013
Year
Population (plants ac-1)
Calculated yield (lbs ac-1)

Scouting & Pests

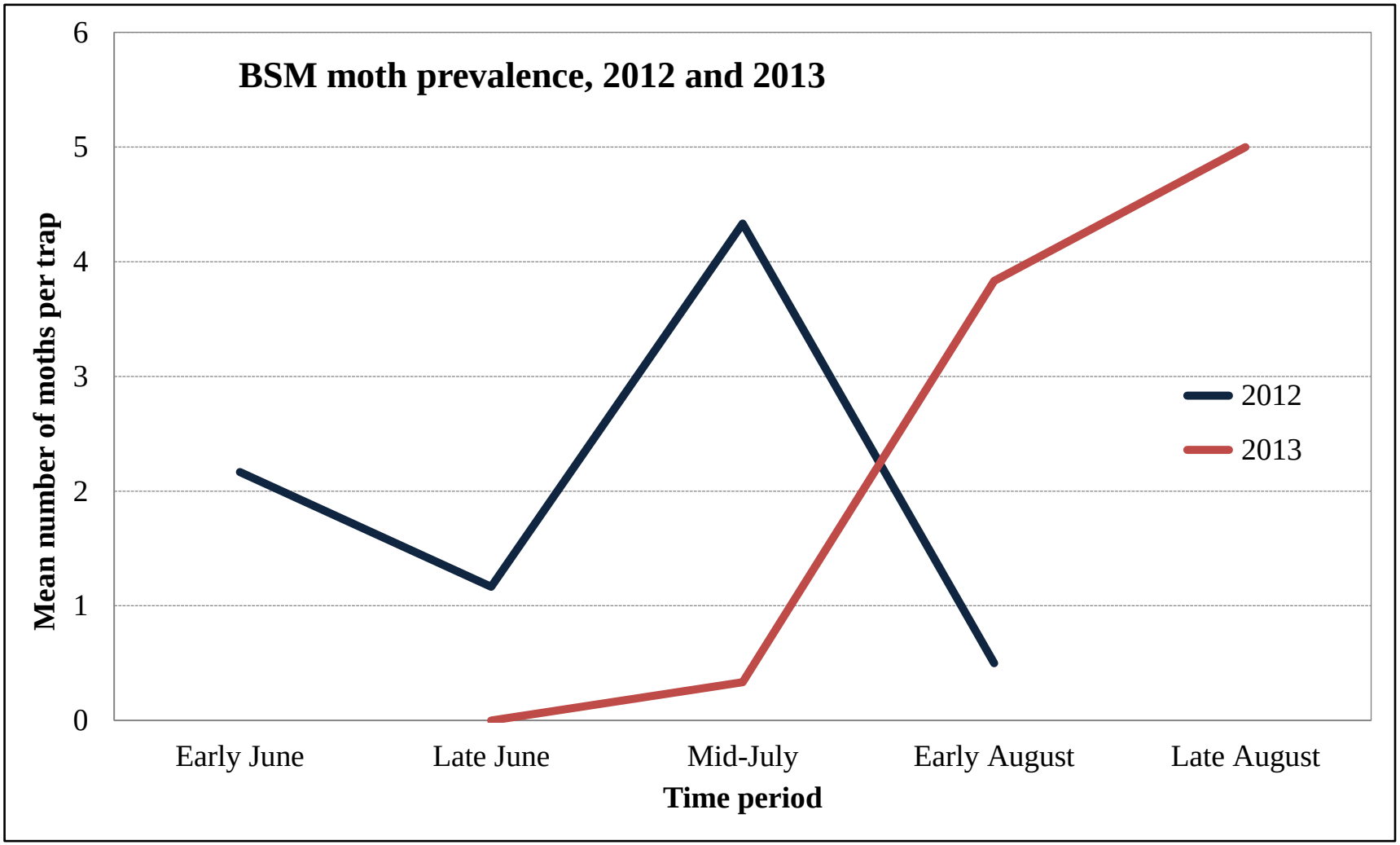
Figure 2. Locations of BSM traps, 2013.

Figure 1. BSM adult.

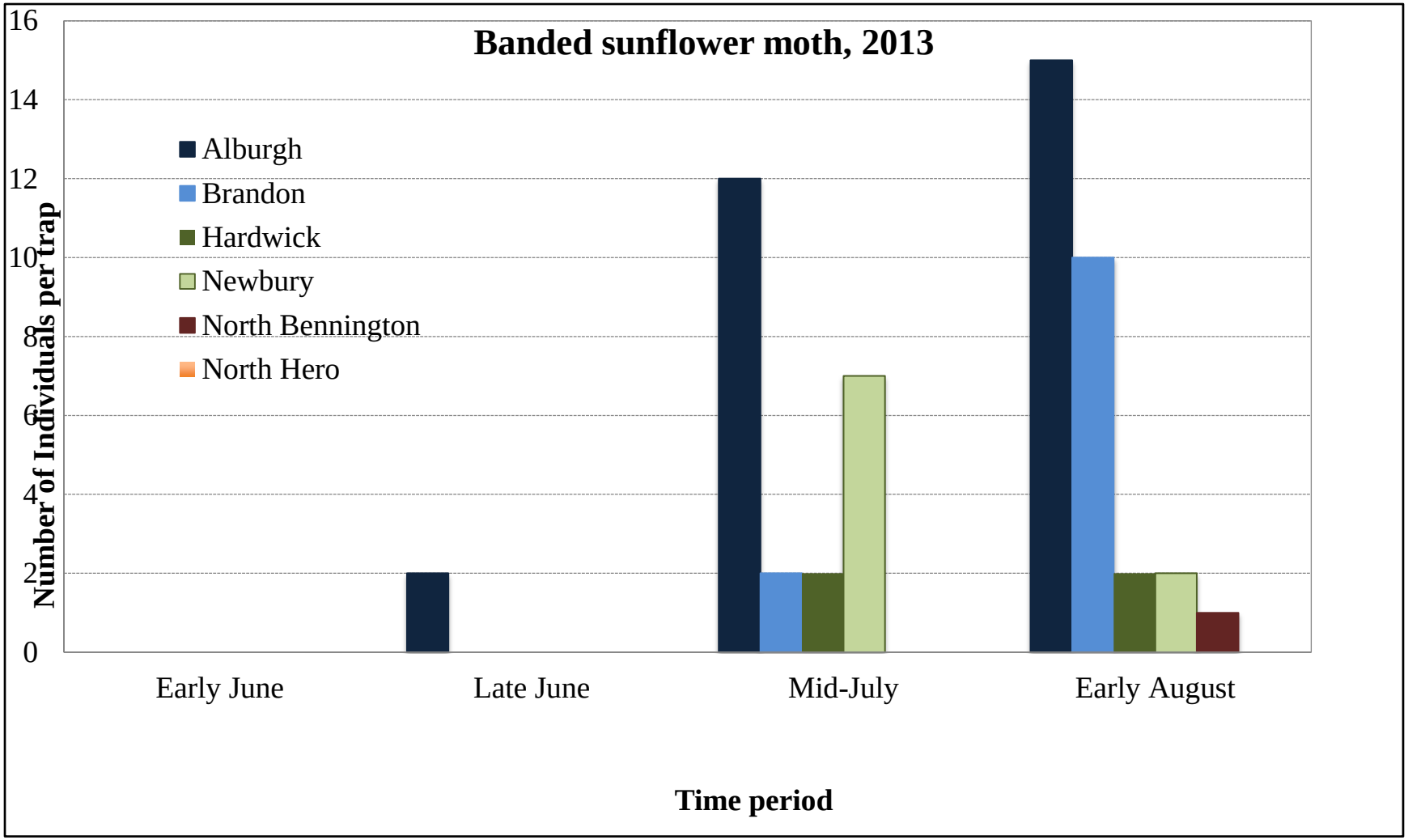
Figure 6. Sunflower maggot fly.

Figure 7. Sunflower seed maggot fly.

Seasonal Appearance



BSM – Around the State




Marlin

Sunflower Maggots

Related to the fruit fly

Not major problem in sunflower regions

Infects plants in early June

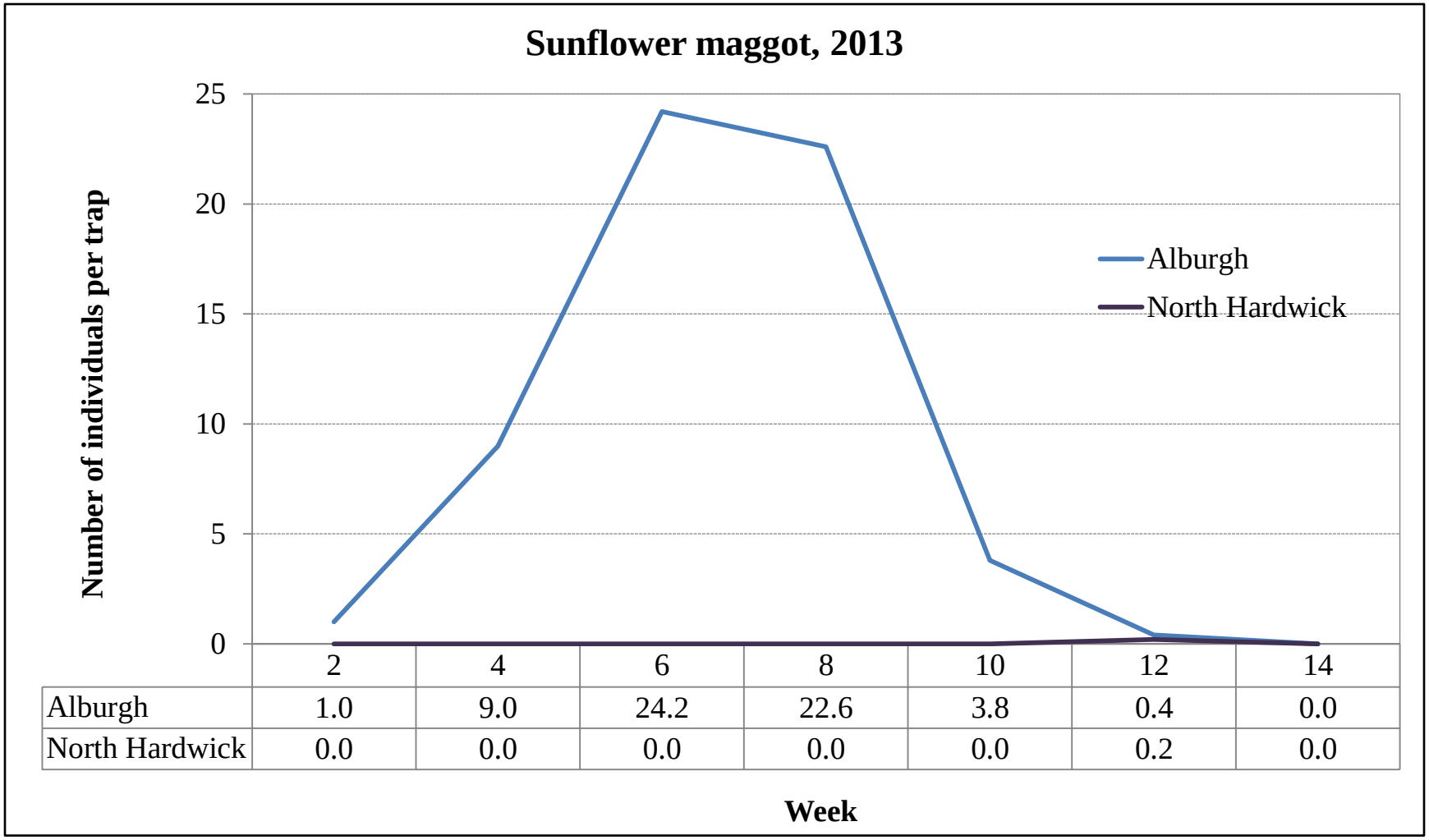
Overwinters as pupae in soil

Plants can have up to 30 larvae with minimal decline yield

Lodging is a result of excess nitrogen and larvae?

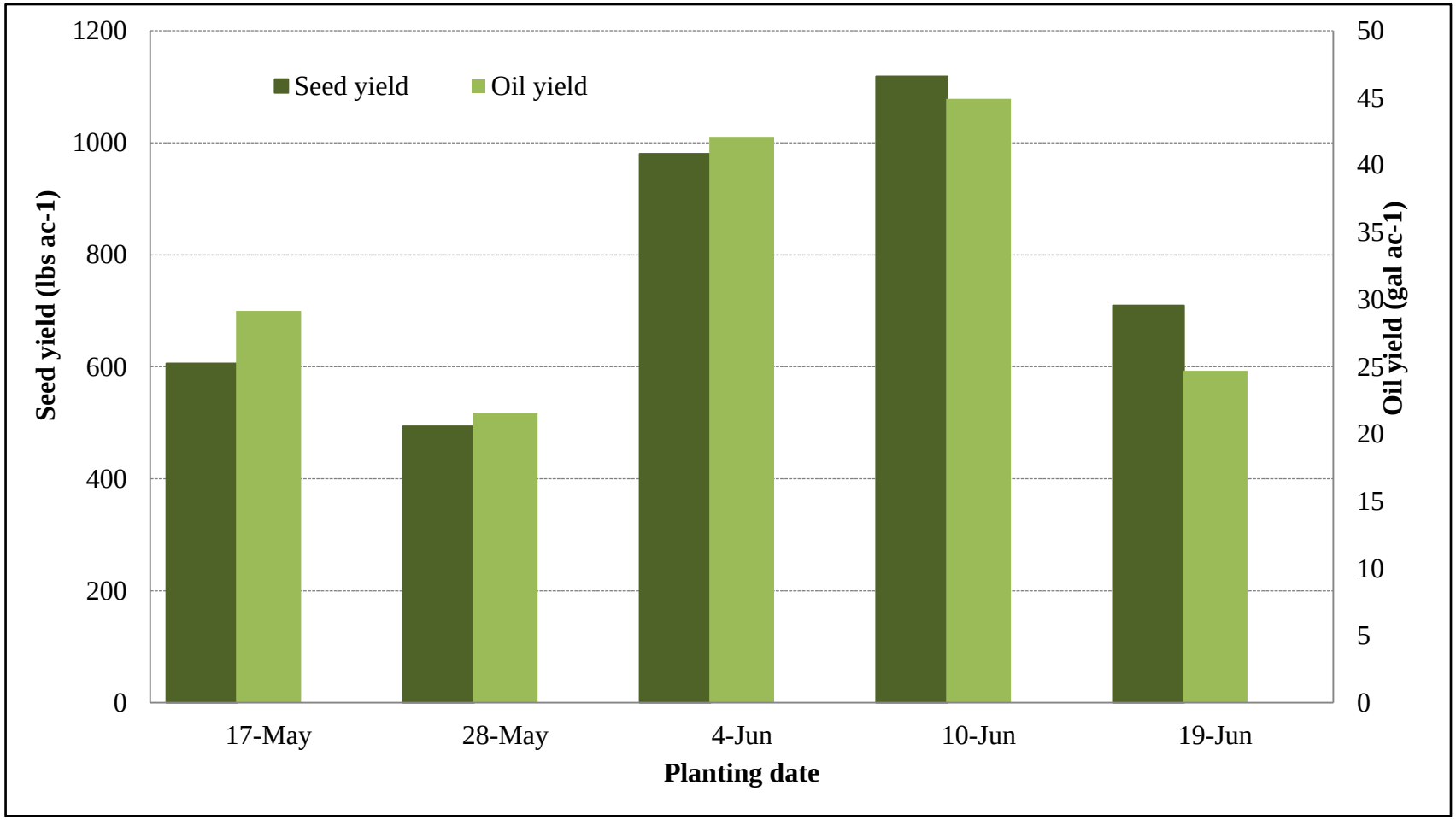
Frank Peairs, CSU

Sunflower Maggot

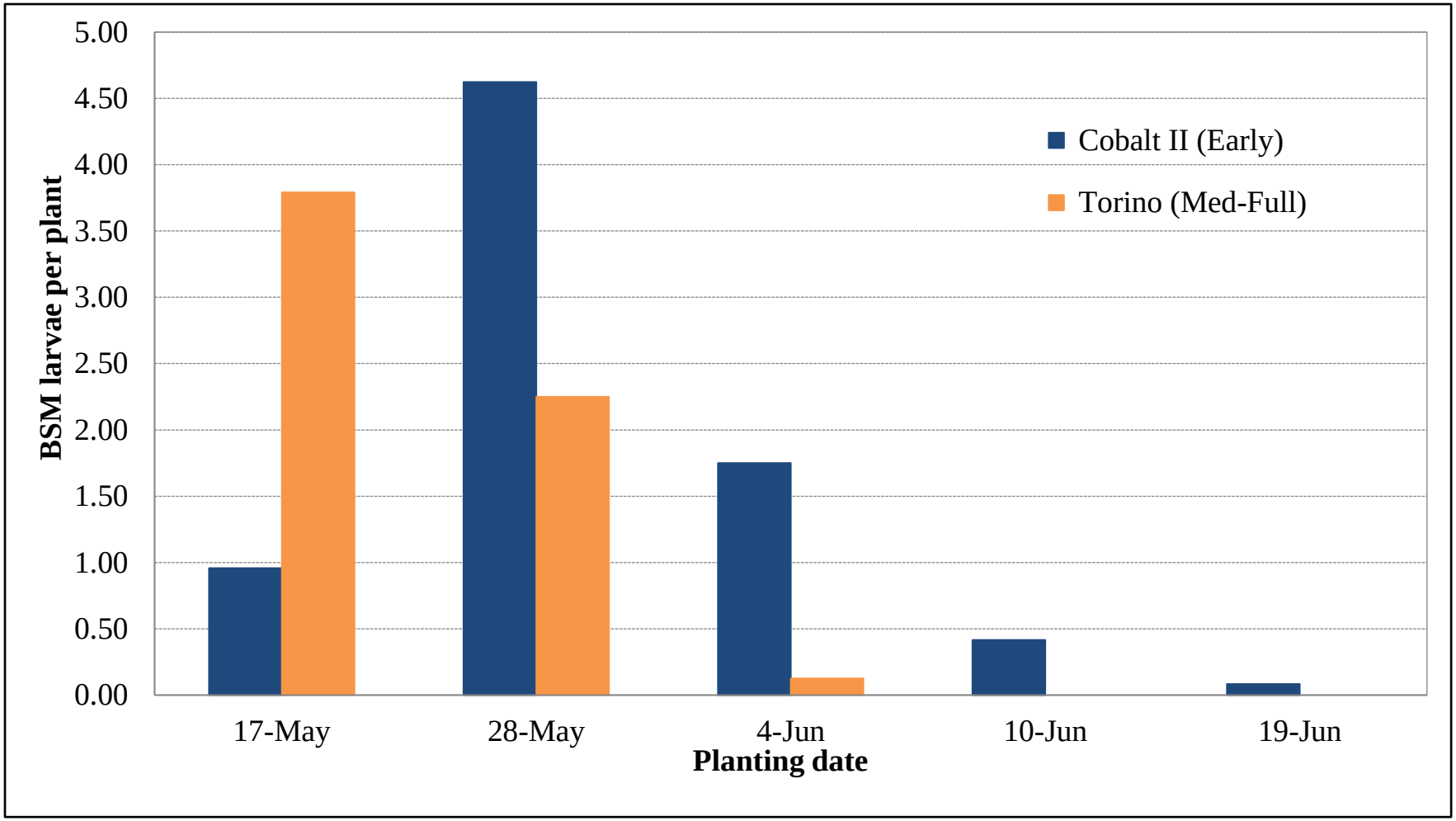


	2	4	6	8	10	12	14
Alburgh	1.0	9.0	24.2	22.6	3.8	0.4	0.0
North Hardwick	0.0	0.0	0.0	0.0	0.0	0.2	0.0

Planting Date & Yield

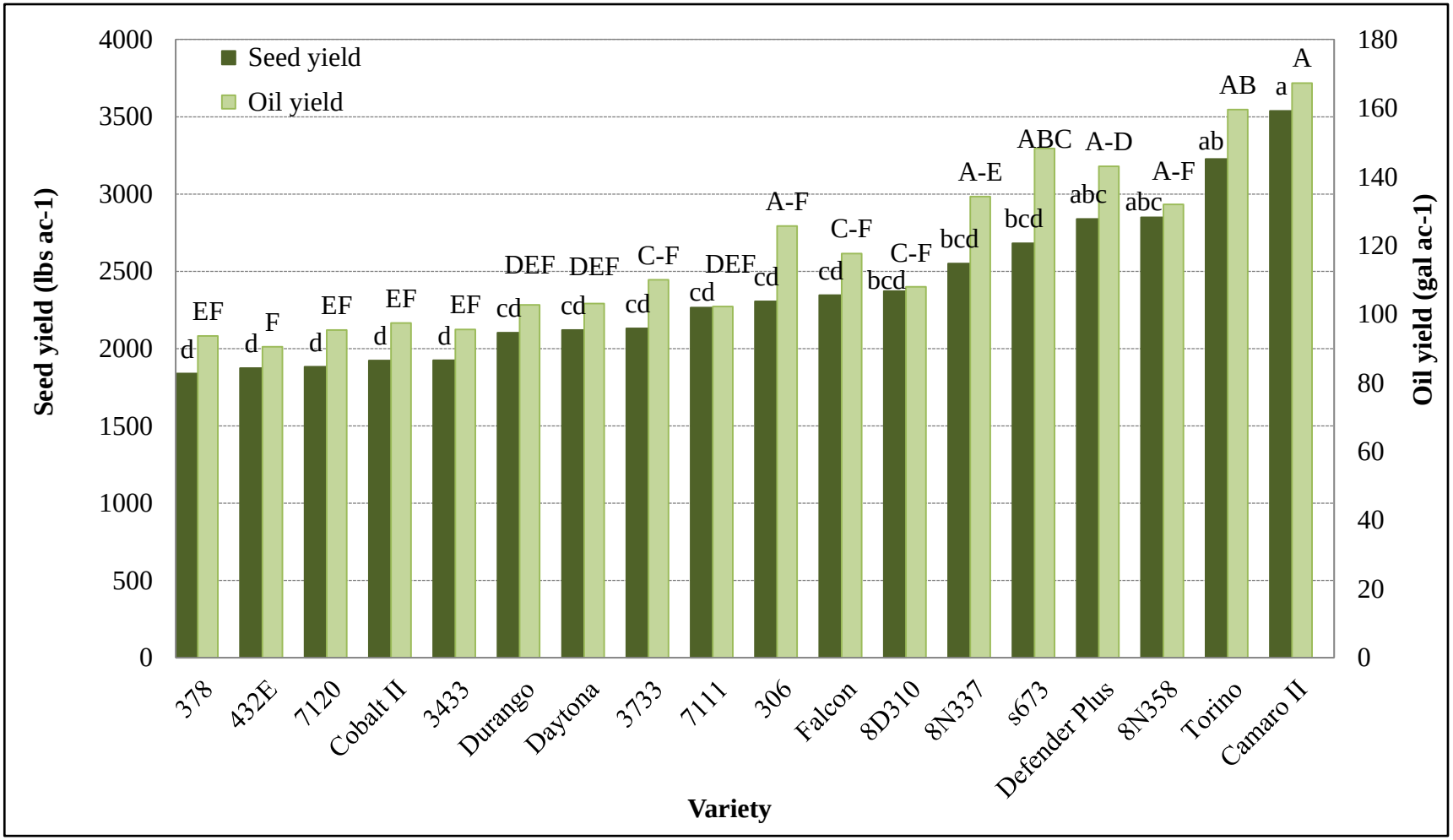


BSM & Planting Date

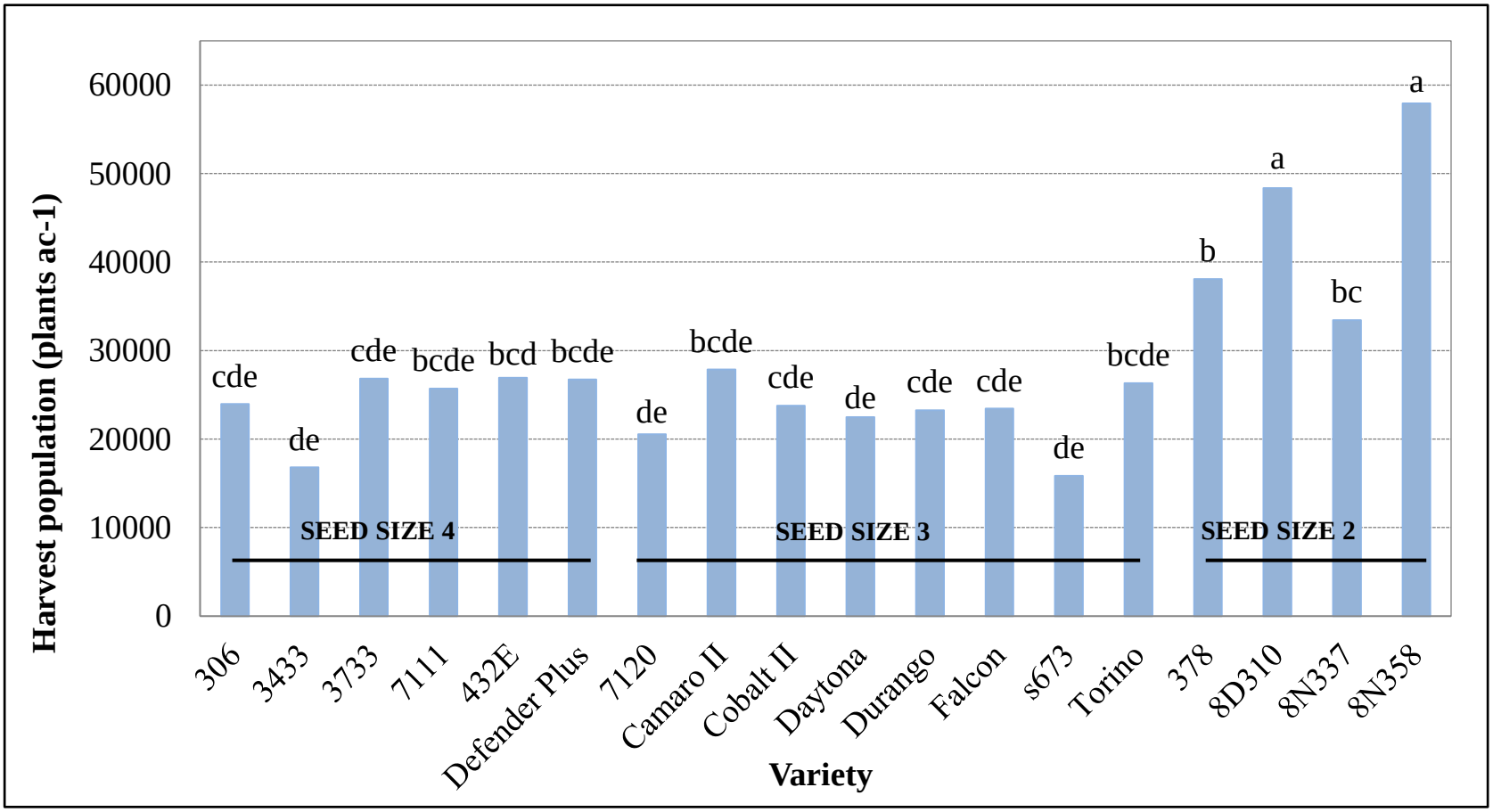


Planting Date and Birds

Sunflower Variety Trial



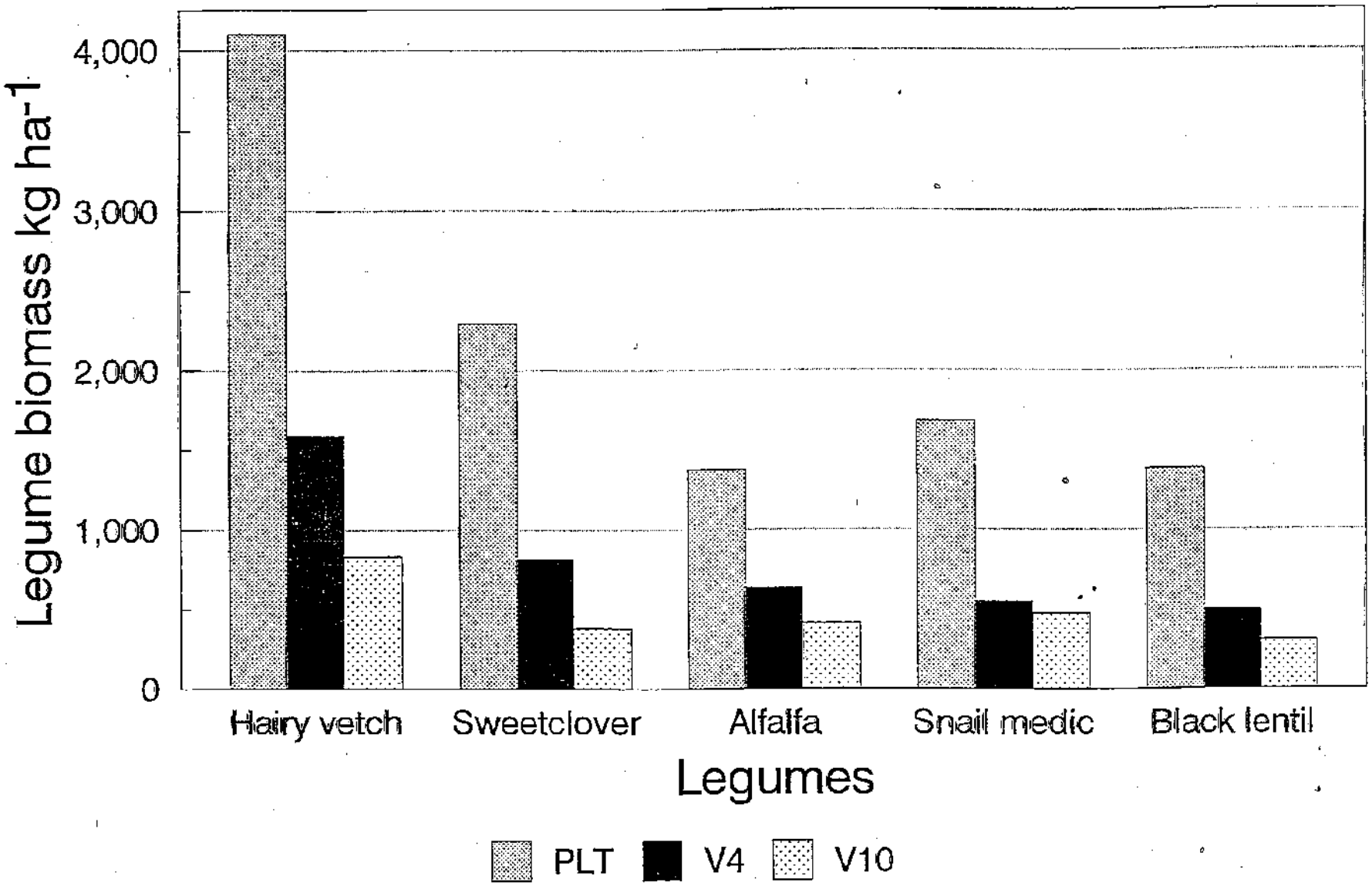
Sunflower Variety Trials

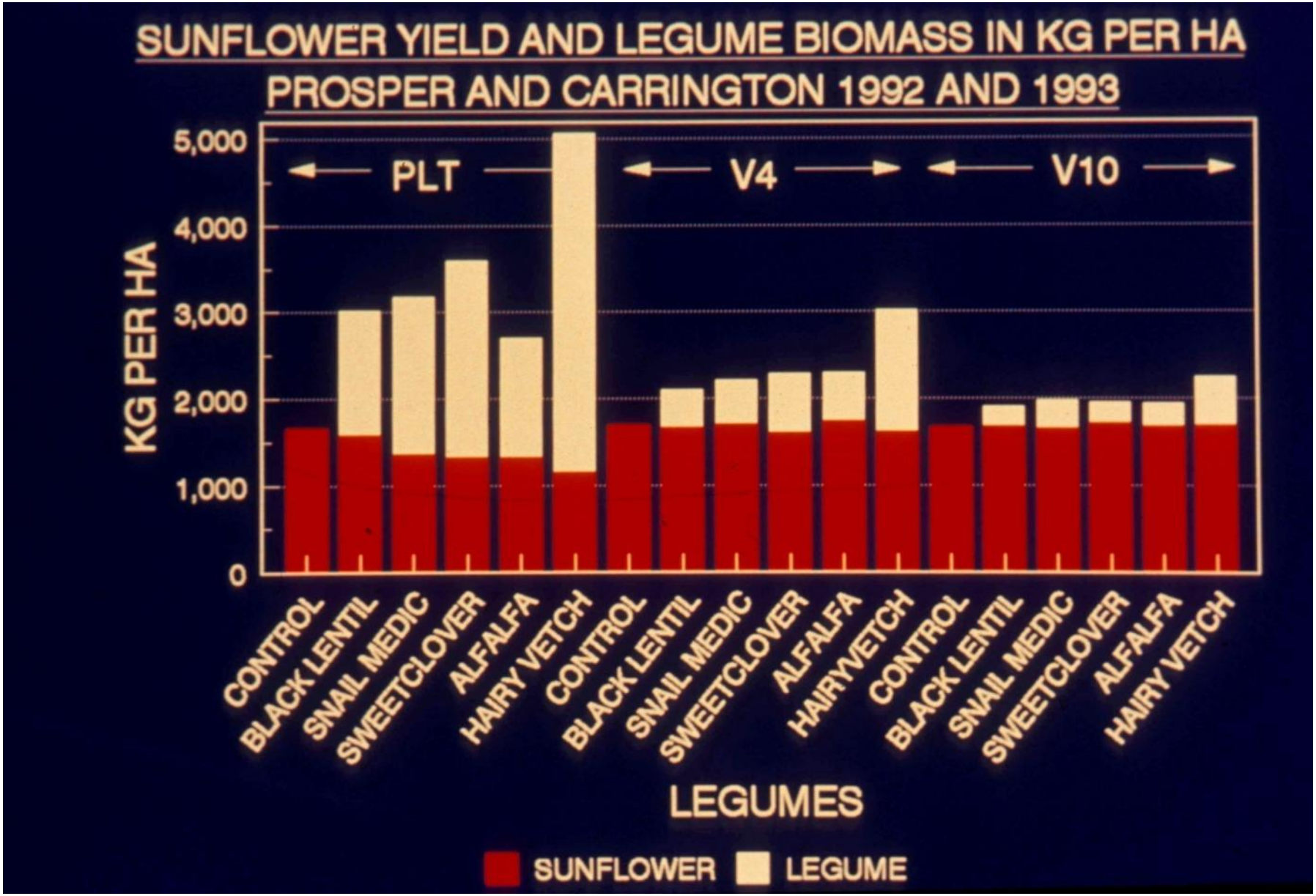


Cover Crop Interseeding

Penn State Interseeder

Mean legume biomass
Carrington, ND, 1992 and 1993
Prosper, ND, 1992 to 1994




SUNFLOWER YIELD AND LEGUME BIOMASS IN KG PER HA
PROSPER AND CARRINGTON 1992 AND 1993
KG PER HA
5,000
4,000
3,000
2,000
1,000
0
PLT
V4
V10
CONTROL
BLACK LENTIL
SNAIL MEDIC
SWEETCLOVER
ALFALFA
HAIRY VETCH
CONTROL
BLACK LENTIL
SNAIL MEDIC
SWEETCLOVER
ALFALFA
HAIRYVETCH
CONTROL
BLACK LENTIL
SNAIL MEDIC
SWEETCLOVER
ALFALFA
HAIRY VETCH
LEGUMES
SUNFLOWER
LEGUME

Flax variety trial

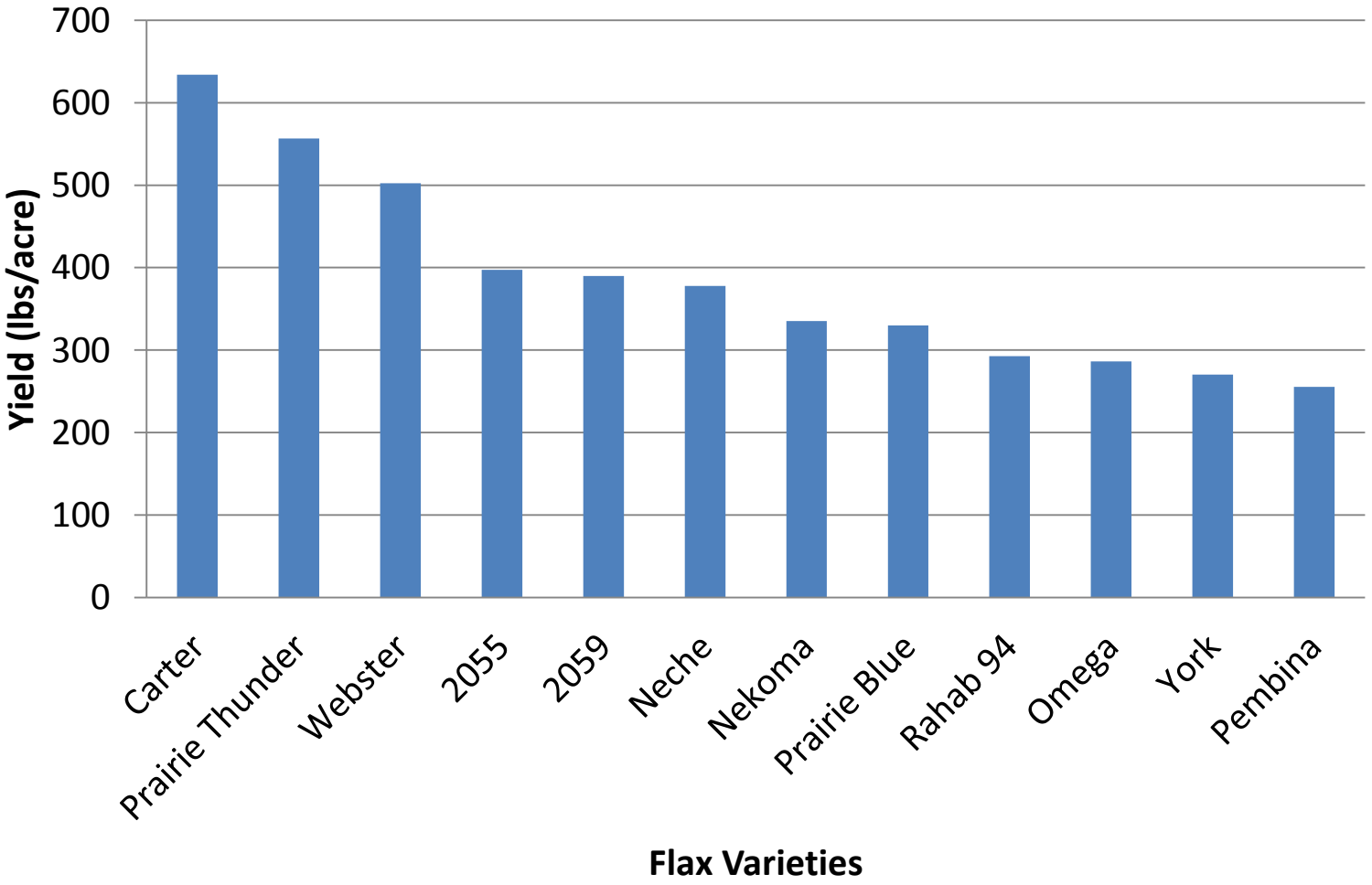


Figure 1. Flax control plot.

Figure 2. Wide row flax with Schmotzer hoe.

Figure 3. Narrow row flax.

Oilseed Crops in Rotations

Oilseed Crops in Rotations

HGM cover crop	Soil pH	Available P	K	Mg	Al	Ca	CEC	Zn	Organic matter
		ppm	ppm	ppm	ppm	ppm		ppm	%
Caliente	5.83	**9.53***	**57.3**	47.7	78.3	549	3.27	1.10*	**2.93***
Ida & Pacific Gold	**6.17***	9.43*	55.7	**61.7***	79.7	**704**	**5.05***	1.00	2.77
Control	5.73	9.03	54.0	44.3	**93.0***	602	4.70*	**1.20***	2.83
LSD (0.10)	0.28	0.37	NS	13.6	9.3	NS	•	0.13	0.08
P-value	0.0426	0.0786	0.8148	0.0939	0.0309	0.2238	0.0902	0.0609	0.0137
Trial mean	5.91	9.33	55.7	51.2	83.7	619	4.10	1.10	2.84

Seed Meals

Crude Protein:

Canola 30 %

Sunflower 34 %

Fat:

Canola 34%

Sunflower 15%

Dairy Feeding Trial

Canola meal source	Crude protein	Crude fat	Net energy lactation
	% DM		Mcal/lb
Farm grown	33.1	13.4	1.15
Purchased	36.3	2.94	0.79

Dairy Feeding Trial

Feed	Milk Yield (lbs)	Fat (%)	Protein (%)
Farm grown	40.4	3.11	2.80
Purchased	39.1	3.25	2.80

Meal Nutrient Content

Nutrient content	**Sunflower**	**Canola**	**Mustard**
% N	5.60	4.60	6.00
%P	1.26	0.74	1.02
%K	1.49	0.68	1.02

Other Meal Benefits

Biocidal properties

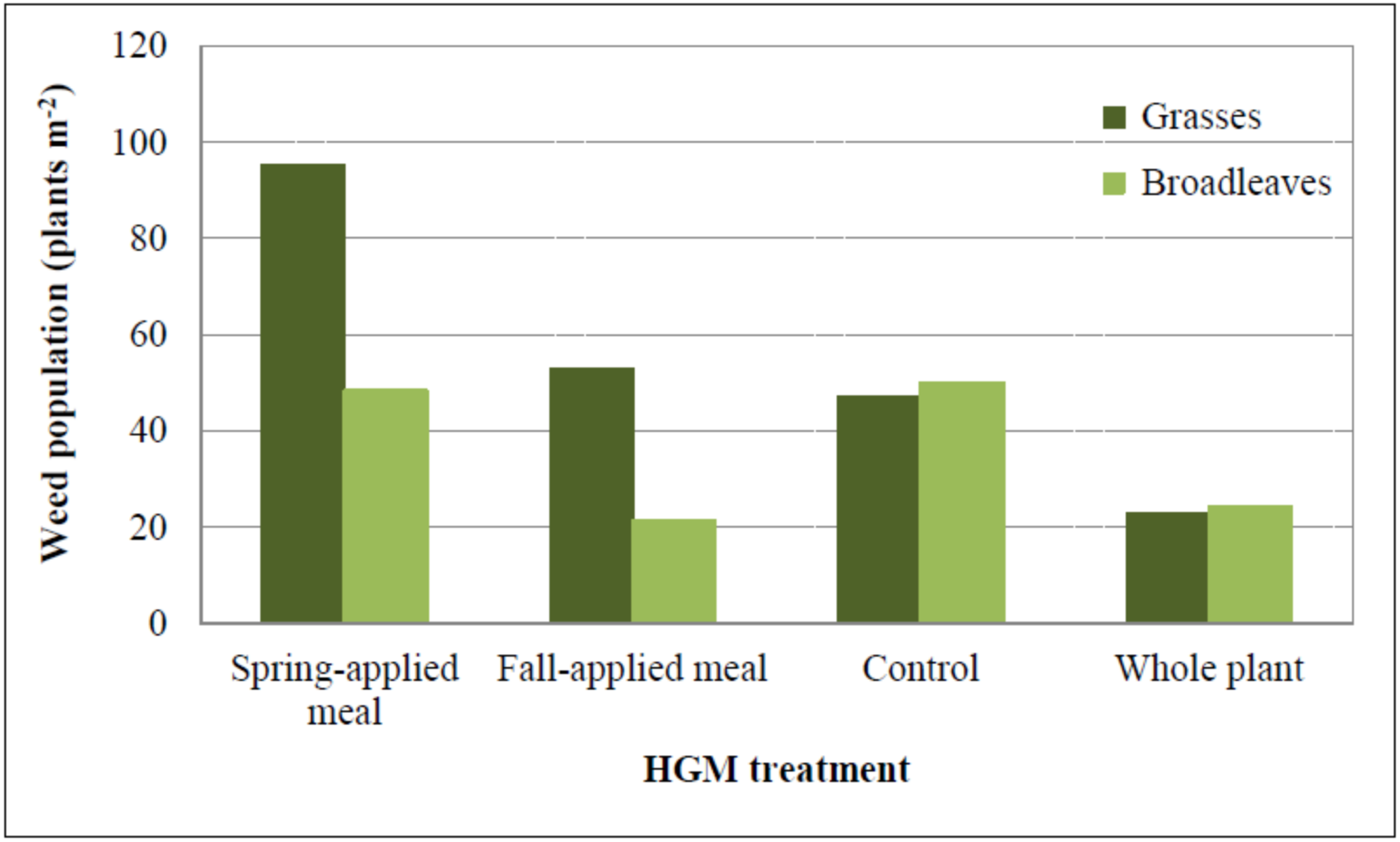
- Some oilseed crops have high glucosinolate values
- These glucosinolates hydrolyze into isothiocyanates
- Various mustards have high glucosinolates
- Suppress diseases and nematodes

Weed Control with Oilseed Meals

Table 3. Weed counts in oilseed amended plots in 2008 and 2009.

Amendment	2009
	Weed count
Sunflower meal	33b
Canola meal	38b
Mustard meal	15a
Control (synthetic N)	52c

**Within each column, numbers followed by the same letter are not significantly different ($P<0.05$).

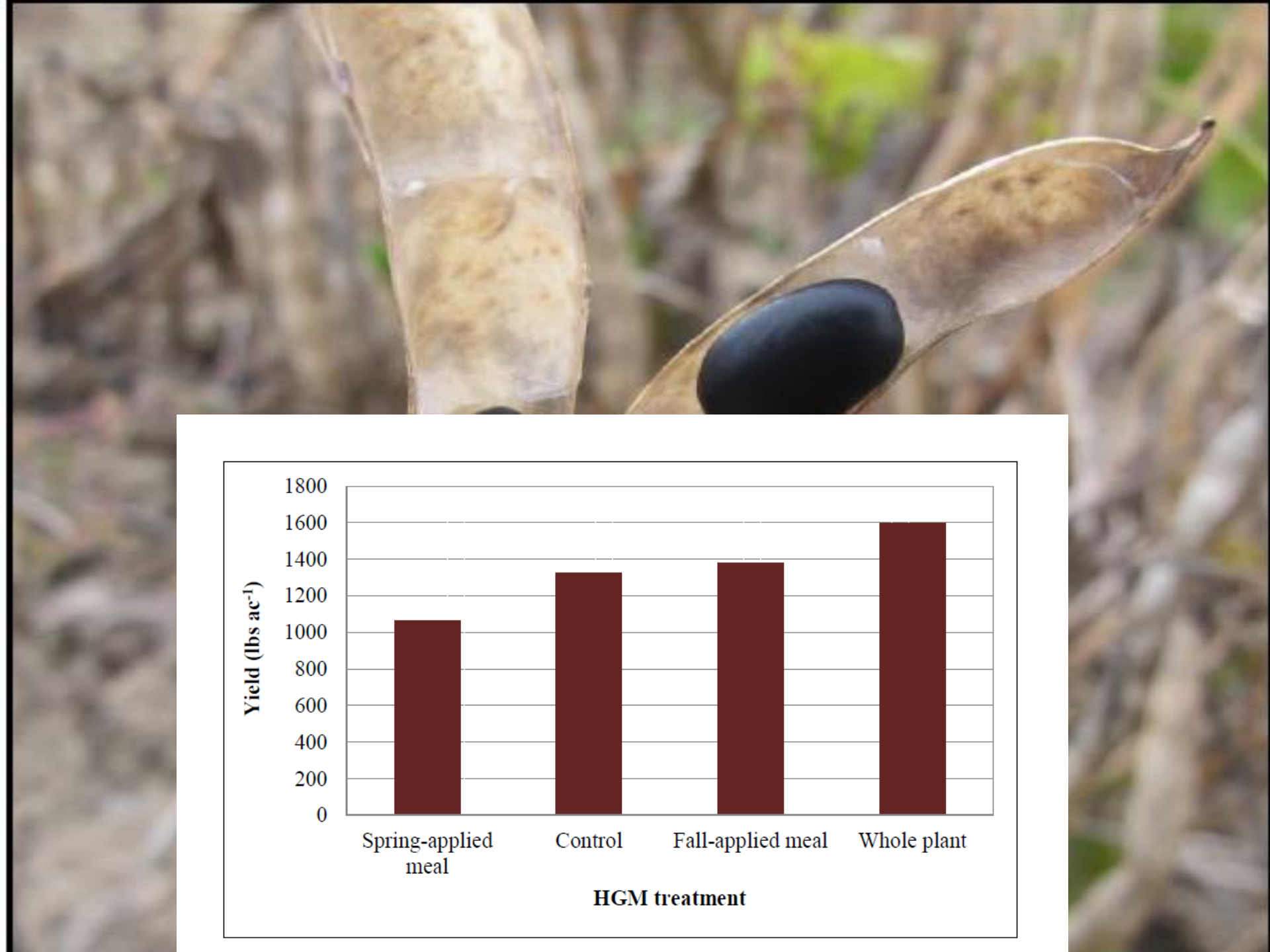

120
100
80
60
40
20
0
Weed population (plants m-2)
Grasses
Broadleaves
Spring-applied meal
Fall-applied meal
Control
Whole plant
HGM treatment

Organic Nitrogen Source

Impact of oilseed meal amendments on soil nitrate levels at 4, and 8 weeks after planting.

Amendment	4 week NO_3 (ppm)	8 week NO_3 (ppm)
Sunflower meal	41.2a	28.6b
Canola meal	49.7a	37.5a
Mustard meal	53.1a	38.5a
Control (synthetic N)	17.8b	9.38c

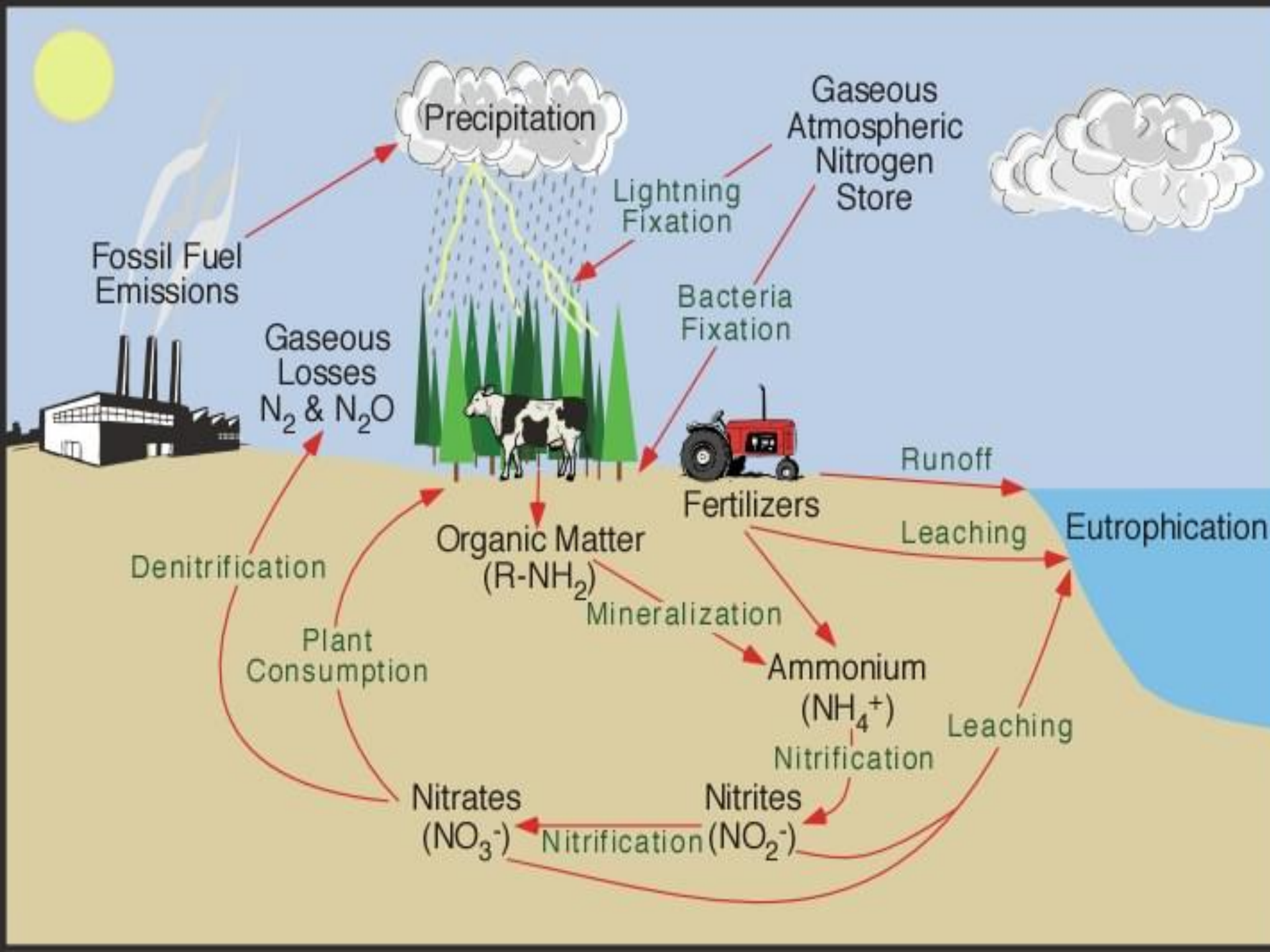
**Within each column, numbers followed by the same letter are not significantly different ($P<0.05$).


1800
1600
1400
1200
1000
800
600
400
200
0
Yield (lbs ac-1)
Spring-applied meal
Control
Fall-applied meal
Whole plant
HGM treatment

Soil Nitrogen

- **Organic Nitrogen (SOM)**
  - **slowly available to crops**
  - **microbes required**

- **Inorganic Nitrogen**
  - **rapidly available - Plant Available Nitrogen**
  - **ammonium ion (NH_4^+) and nitrate (NO_3^-)**


Precipitation
Gaseous Atmospheric Nitrogen Store
Lightning Fixation
Fossil Fuel Emissions
Bacteria Fixation
Gaseous Losses N_2 & N_2O
Runoff
Fertilizers
Eutrophication
Leaching
Organic Matter ($R\text{-}NH_2$)
Denitrification
Mineralization
Plant Consumption
Ammonium (NH_4^+)
Leaching
Nitrification
Nitrates (NO_3^-)
Nitrites (NO_2^-)
Nitrification

Mineralization

(Soil Temp. > 50 degrees F)

Air, Moisture, Nice Home!

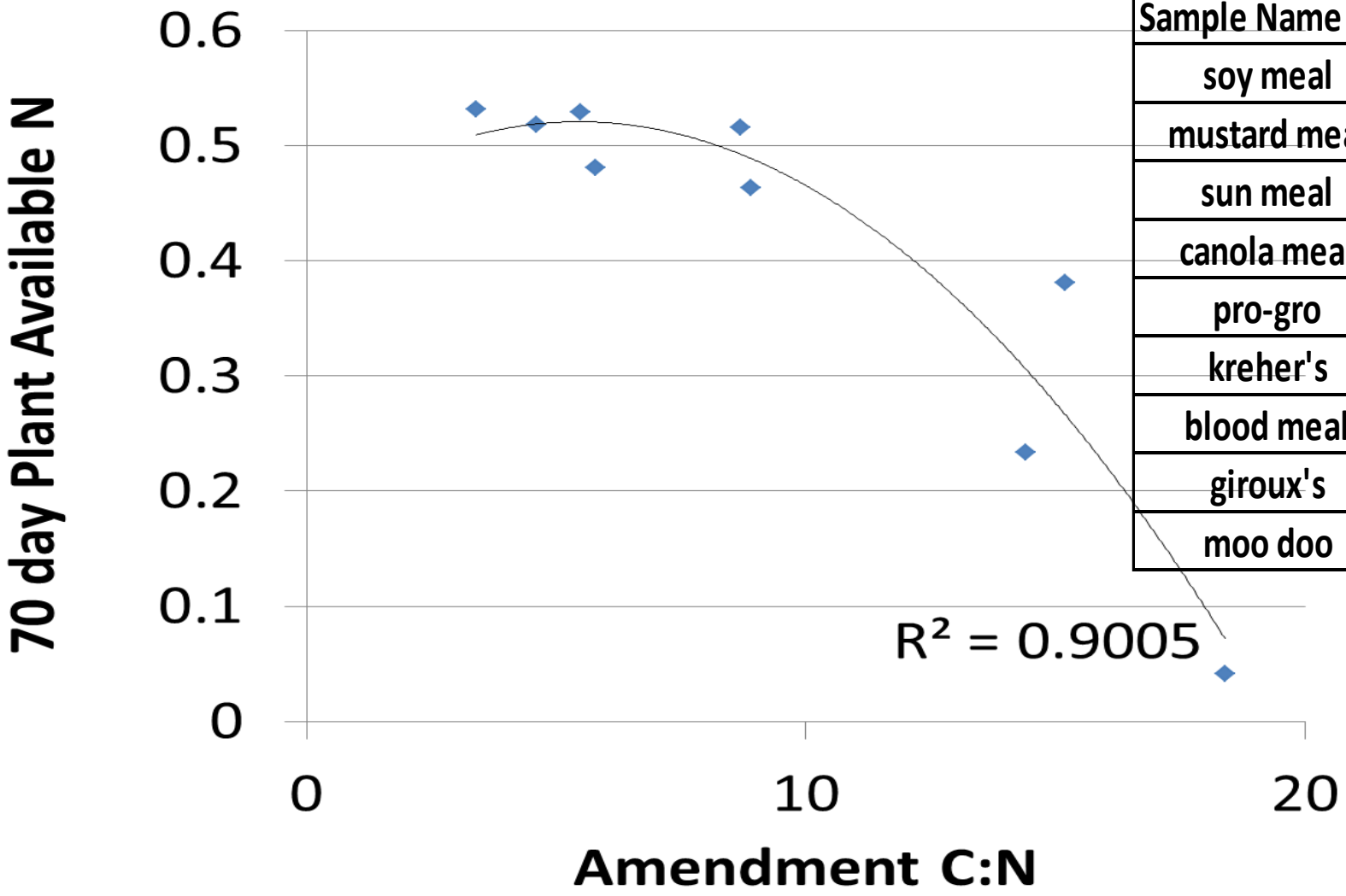
	Soil A	Soil B
Soil Series	Winooski Fine Sandy Loam	Vergennes Clay
Location	Windsor, Vermont	West Addison, Vermont
Management History	Conventional continuous vegetables	Conventional soybean/corn rotation
Organic Matter (%)	1.6	5.1
pH	6.7	7.2
Available P (ppm)	35.4	7.5
K (ppm)	197	228
Mg (ppm)	108	587
Al (ppm)	18	14
Ca (ppm)	1037	4905
Zn (ppm)	0.7	0.8
Effective CEC (meq/100g)	6.6	30.0

Organic Fertilizers

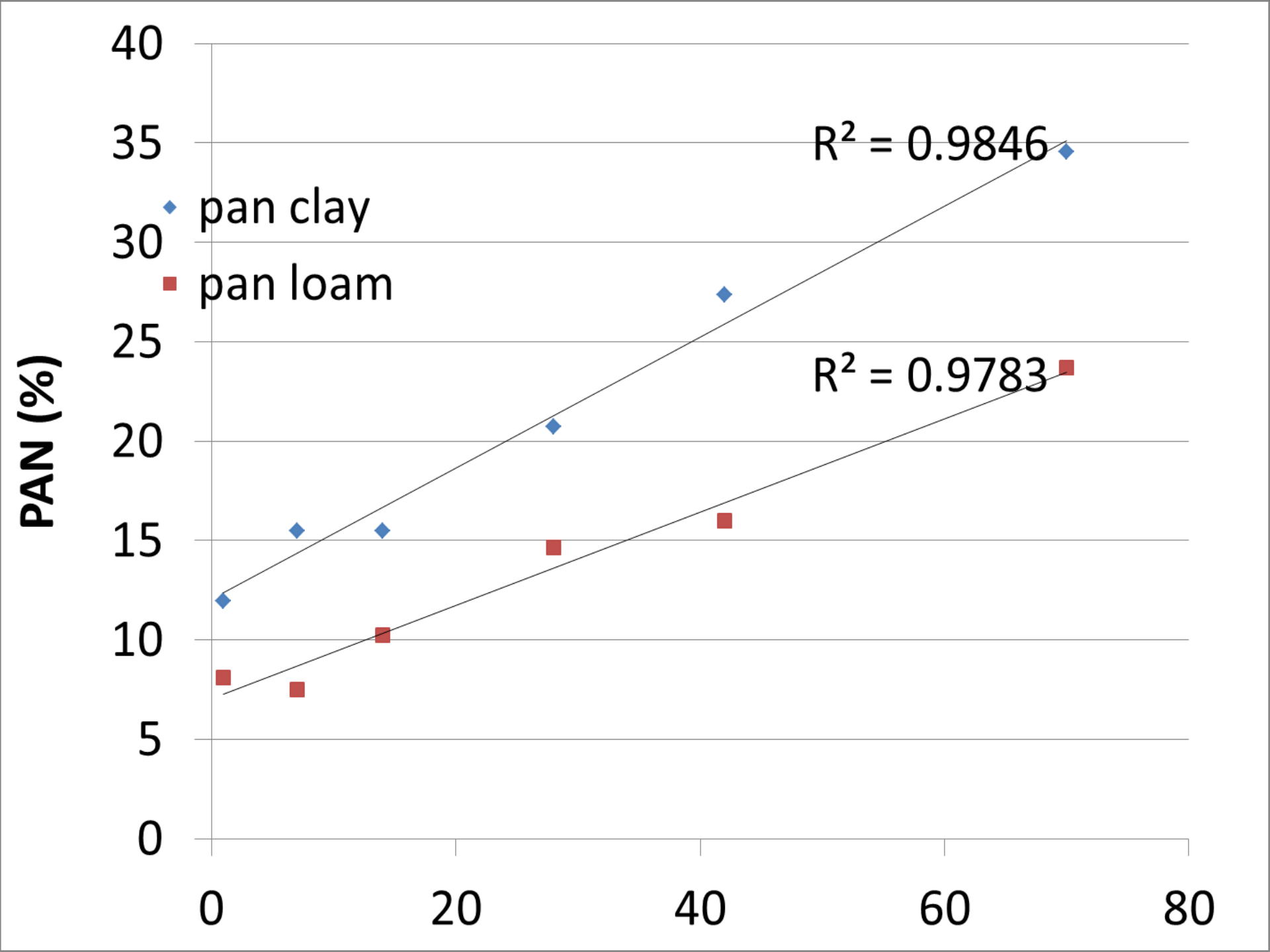
Amendment	Total C %	Total N %	C:N ratio
soybean meal	44.7	8.19	5.5
mustard meal	50.3	5.68	8.9
canola meal	48.7	5.57	8.7
pro-gro	23.1	5.07	4.6
kreher's	31.4	5.41	5.8
blood meal	51.3	15.2	3.4
giroux's	24.2	1.68	14.4
moo doo	37.0	2.01	18.4
chilean nitrate		16.0	

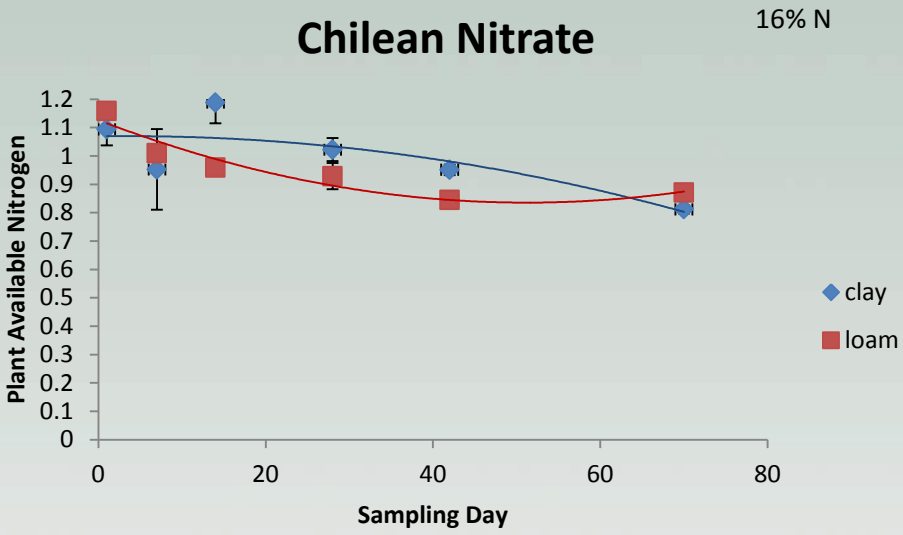
Feather meal, alfalfa meal, cheep cheep

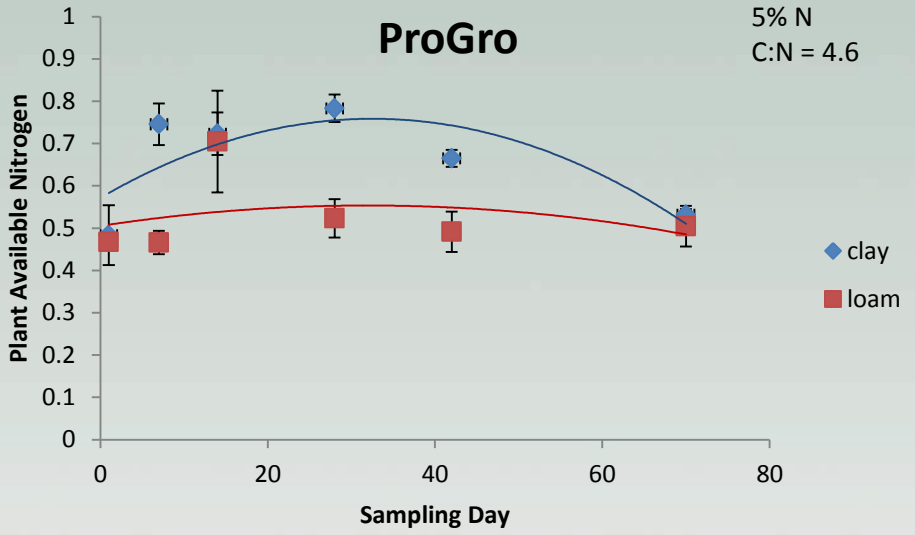
C:N Ratio

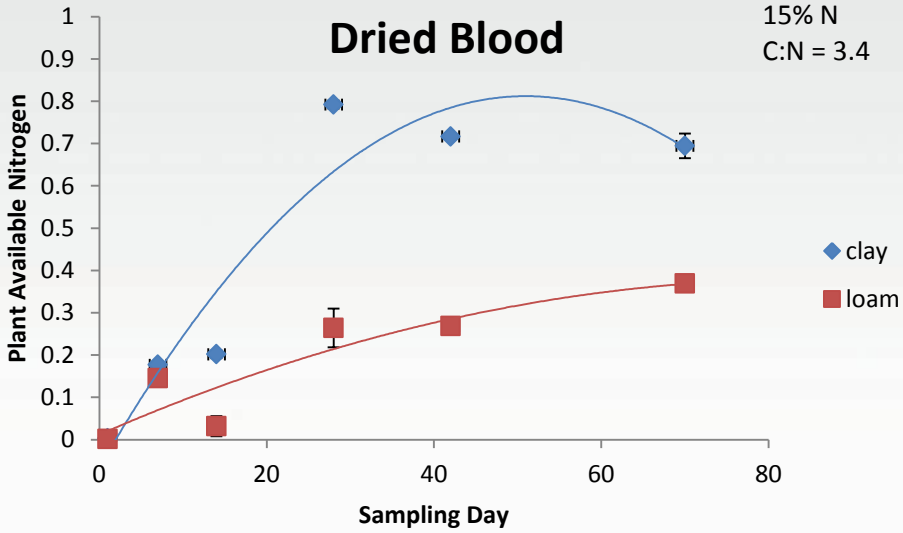


Sample Name	C:N ratio
soy meal	5.5
mustard meal	8.9
sun meal	15.2
canola meal	8.7
pro-gro	4.6
kreher's	5.8
blood meal	3.4
giroux's	14.4
moo doo	18.4


40
35
30
25
20
15
10
5
0
PAN (%)
pan clay
pan loam
R² = 0.9846
R² = 0.9783
0
20
40
60
80







14 day

Chilean = 16 lbs N in 100

ProGro = 3.5 lbs N in 100

Blood = 3 lbs N in 100

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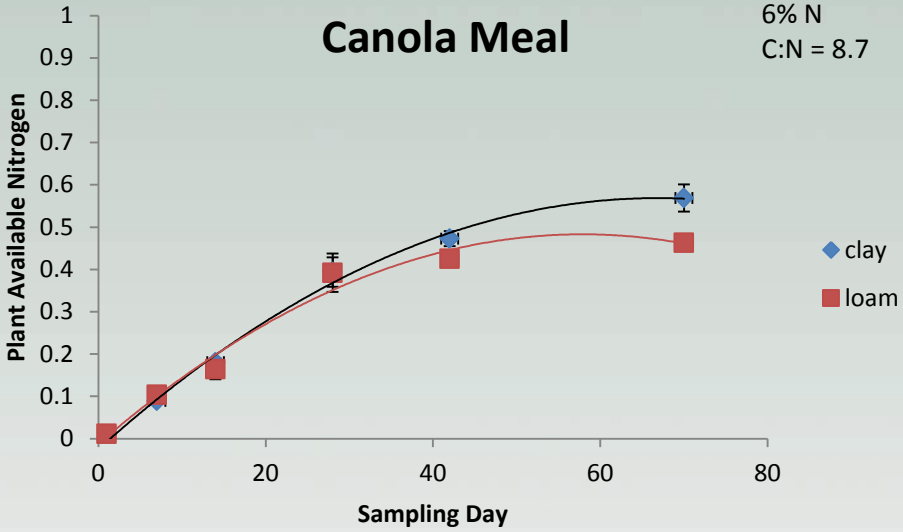
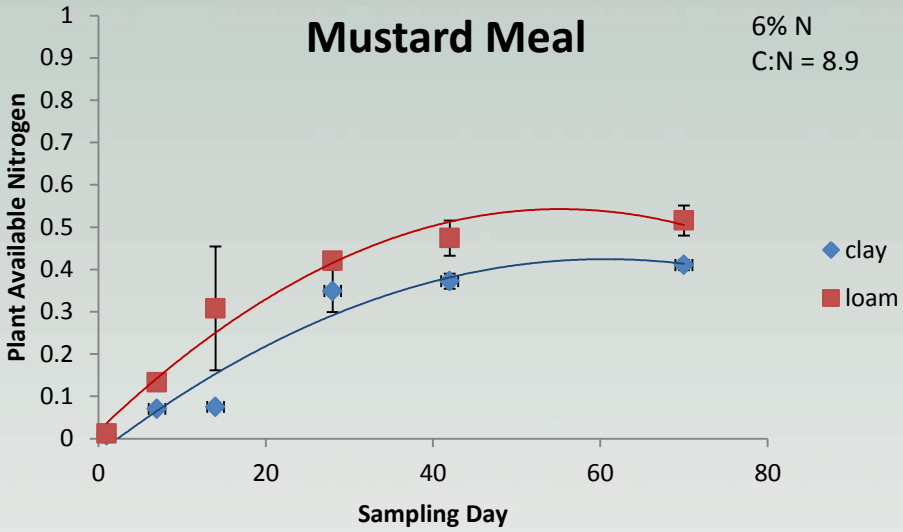
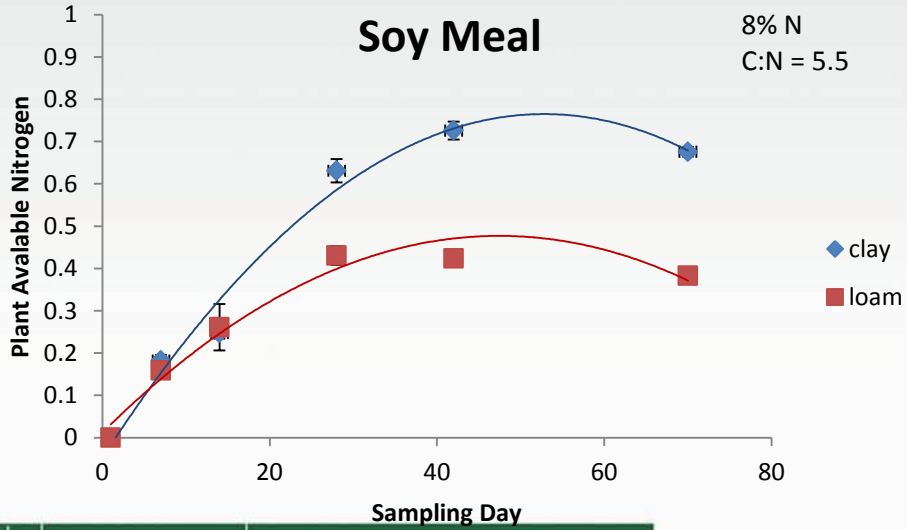
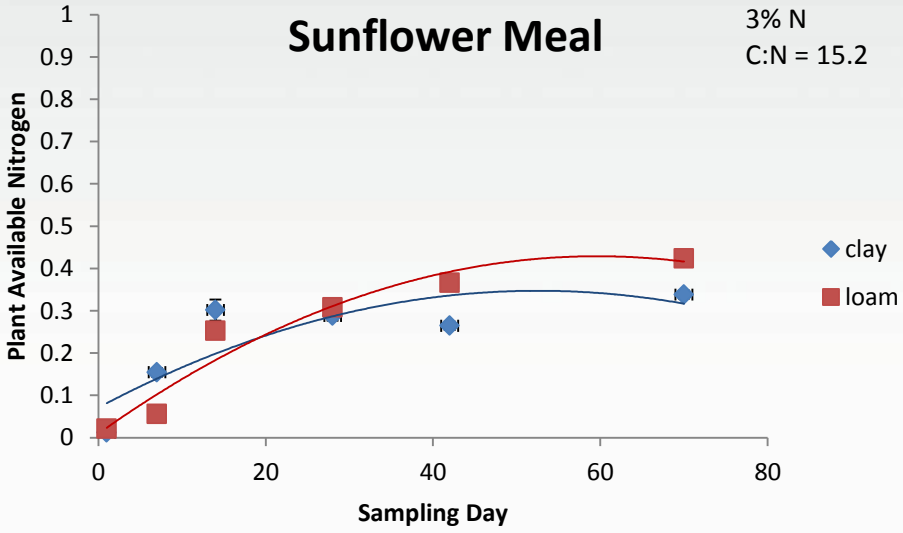
CULTIVATING HEALTHY COMMUNITIES









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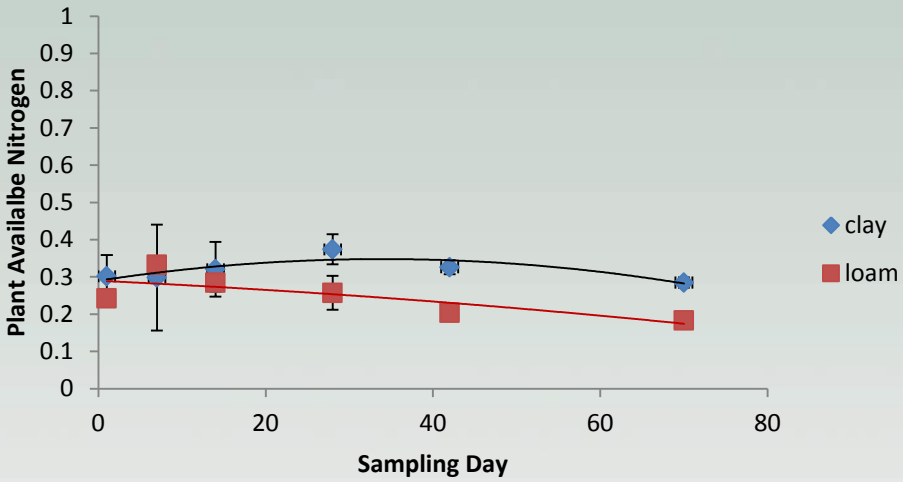
CULTIVATING HEALTHY COMMUNITIES

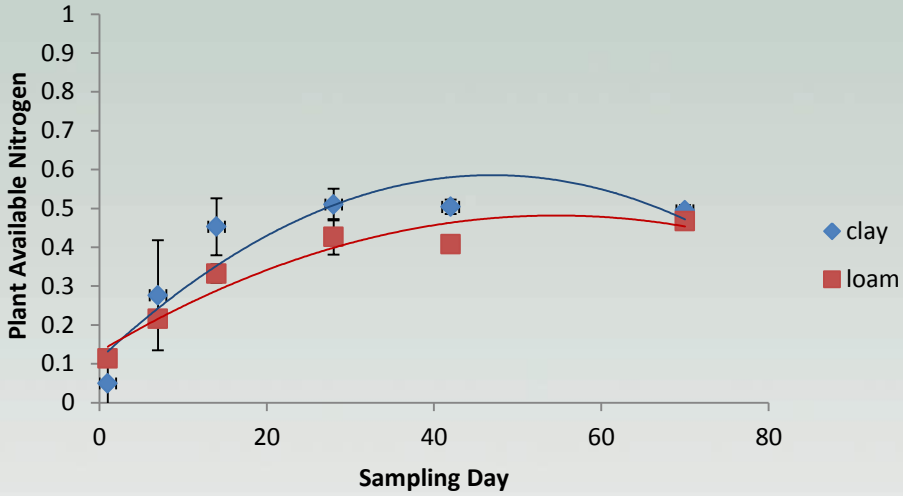
Giroux's Poultry Litter

1.7% N
C:N = 400



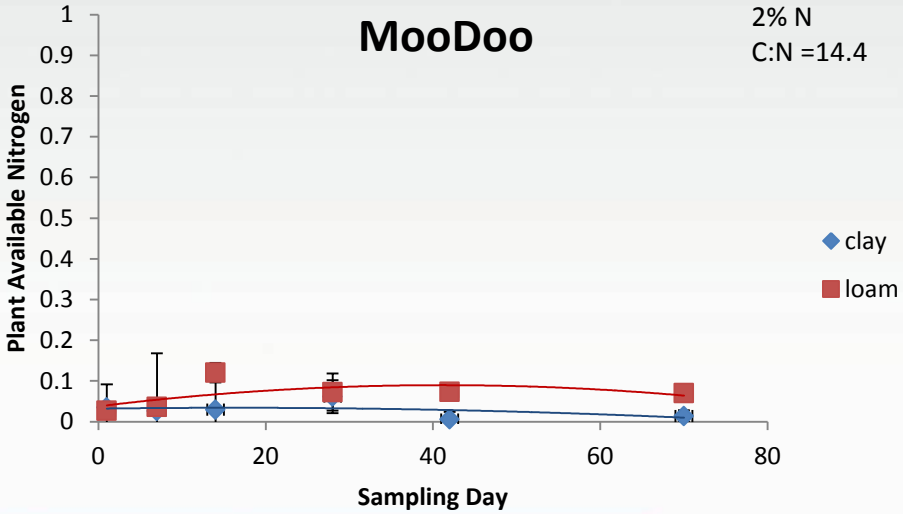
Kreher's

5.4% N
C:N = 5.8



MooDoo

2% N
C:N =14.4



14 day
Giroux's = 0.5 lbs N in 100
Kreher's = 1.62 lbs N in 100

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CULTIVATING HEALTHY COMMUNITIES

Amount of each amendment needed to contribute 100 lbs of Plant Available N during the 70 days after incorporation (average of two soils)

	Soy Meal	ProGro	Dried Blood	Poultry Litter	Chilean Nitrate
70 day PAN (%)	0.529	0.518	0.532	0.234	0.841
Amt needed (dm basis) †	2348	3807	1241	25470	744
Amt needed (wet basis) †	2647	4138	1340	45645	744
PAN†	**100**	**100**	**100**	**100**	**100**
Total N†	192	193	189	427	119
$/lb N‡	$2.87	$7.80	$6.95	††	$3.50
$/lb PA‡	$5.75	$15.0	$13.0	††	$4.46

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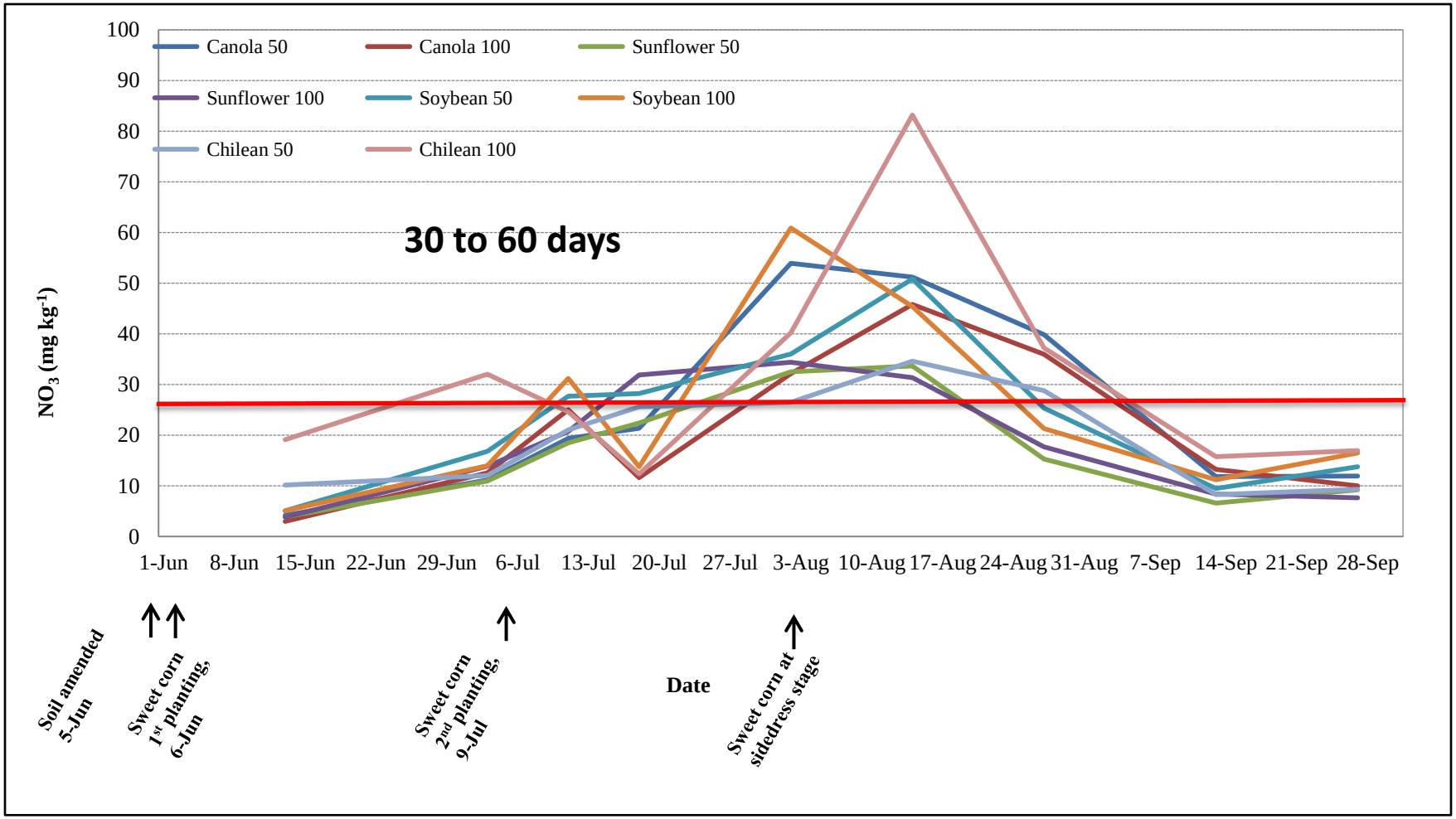
CULTIVATING HEALTHY COMMUNITIES

Oilseed Meal for Fertilizer



Fuel Testing at NW Manufacturing

Test furnace

Clean emmisions

www.uvm.edu/extension/cropsoil/