University of Idaho Extension

Manure study update

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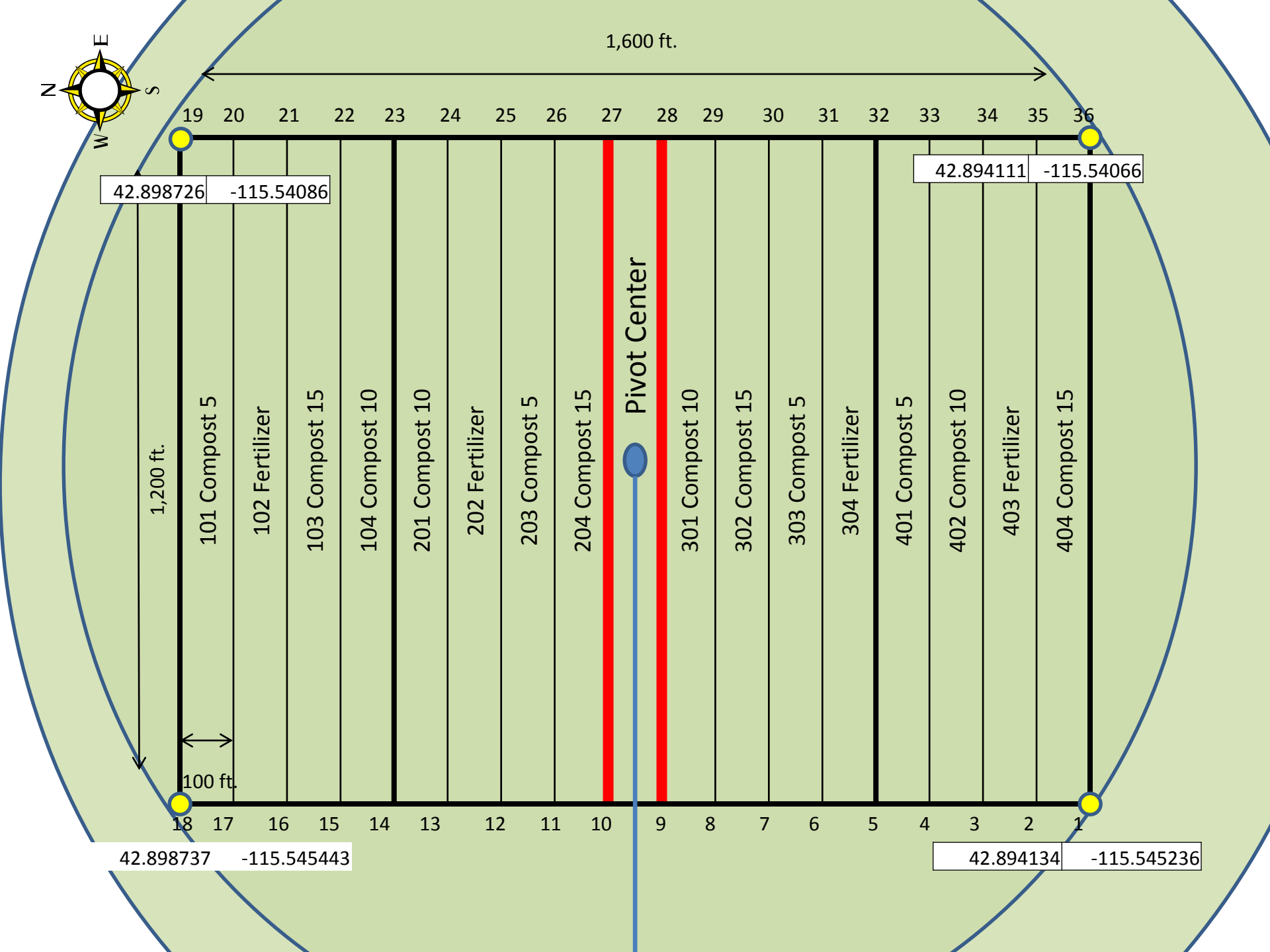
The set up….

- Cooperator field in Hammett, Idaho
  - Flying H Farms
  - 120-acre pivot
  - Sandy soil
  - Grain corn (2014) – Bannock potatoes (2015) – Navy beans (2016)

The set up….

- Dairy compost
  - Partially composted dairy manure
- Compost application treatments
  - 0, 5, 10, and 15 ton compost/acre
  - Applied in the spring of 2014, 2015, and 2016
  - At time of bean planting in 2016, plots had received 0, 15, 30, and 45 ton compost/acre
- Plot size – 100 wide ft. by 1,200 ft. long
  - ~2.5 acre sized plots
  - Whole study, 43 acres


N
E
S
W
1,600 ft.
19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
42.898726 -115.54086
42.894111 -115.54066
1,200 ft.
101 Compost 5
102 Fertilizer
103 Compost 15
104 Compost 10
201 Compost 10
202 Fertilizer
203 Compost 5
204 Compost 15
Pivot Center
301 Compost 10
302 Compost 15
303 Compost 5
304 Fertilizer
401 Compost 5
402 Compost 10
403 Fertilizer
404 Compost 15
100 ft.
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
42.898737 -115.545443
42.894134 -115.545236

- Commercial scale compost spreading
- Spreaders calibrated at treatment rates
- 50-foot spread

Pothole Rd

Dairy Compost Nutrient Content *(as received)*

Dairy Manure Source, By Year	Moisture Content (%)	N (lb/ton)	P2O5 (lb/ton)	K2O (lb/ton)
2014	15	27.4	23.2	52.2
2015	20	28.3	22.0	56.5
2016	26	22.4	21.0	46.8

2016 Preplant soil nutrient response to repeated dairy compost applications. Hammett, Idaho (0-12 inch depth). Sandy soil. Compost applied three times, from 2014 to 2016.

Cumulative Compost rate (wet ton/acre)	Organic matter (%)	pH	NO_3-N (ppm)	Olsen P (ppm)	Olsen K (ppm)	SO_4-S (ppm)
0	0.67c	7.88b	1.95	19d	217d	4.8c
15	0.78bc	8.00a	2.55	30c	330c	6.2bc
30	0.91a	7.98ab	3.15	44b	415b	8.1b
45	0.89ab	8.05a	4.15	51a	478a	12.2a
p-value	0.0029	0.0279	0.1591	<0.0001	0.0001	0.0004

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2016 Preplant soil electrical conductivity response to repeated dairy compost applications. Hammett, Idaho (0-12 inch depth). Sandy soil. Compost applied three times, from 2014 to 2016.

Cumulative Compost rate (wet ton/acre)	**EC (Soluble salts) (dS/m)**
0	0.47d
15	0.66c
30	0.87b
45	1.05a
p-value	<0.0001

2016 Preplant soil electrical conductivity response to repeated dairy compost applications. Hammett, Idaho (0-12 inch depth). Sandy soil. Compost applied three times, from 2014 to 2016.

Soil EC upper threshold: 2.0 dS/m (below 1.0 dS/m, ideal)

(Soluble salts) (dS/m)
0.47d
0.66c
0.87b
1.05a
<0.0001

2016 Preplant soil nutrient response to repeated dairy compost applications. Hammett, Idaho (0-12 inch depth). Sandy soil. Compost applied three times, from 2014 to 2016.

Cumulative Compost rate (wet ton/acre)	**DTPA Zn µg/g**	**Available B µg/g**
0	1.4b	0.30c
15	1.6ab	0.32cb
30	2.0a	0.39ab
45	1.9a	0.41a
p-value	0.0233	0.0196

2016 Preplant soil nutrient response to repeated dairy compost applications. Hammett, Idaho (0-12 inch depth). Sandy soil. Compost applied three times, from 2014 to 2016.

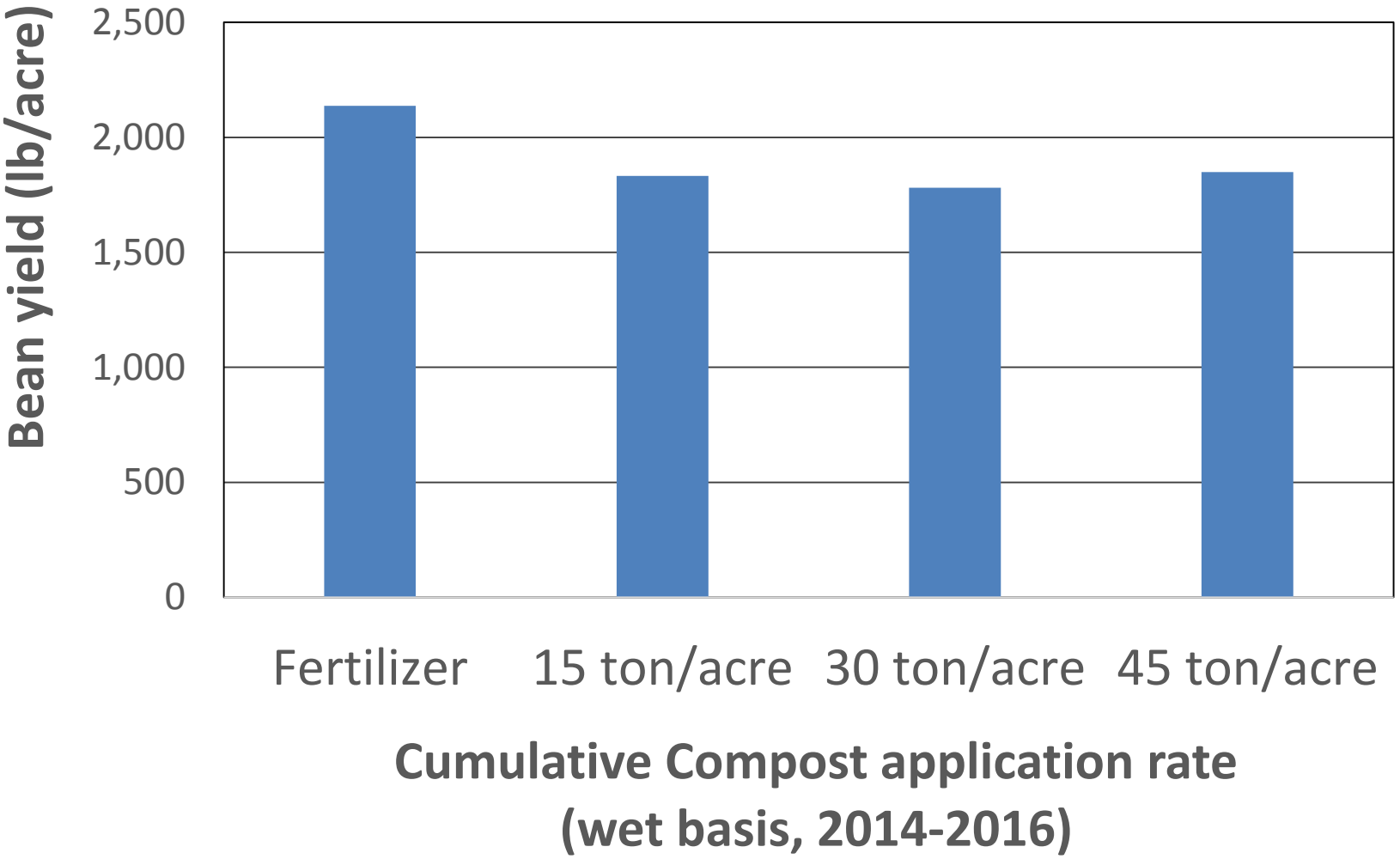
Soil Zn lower threshold: 2.0 ppm

Soil B upper threshold: 0.5 ppm

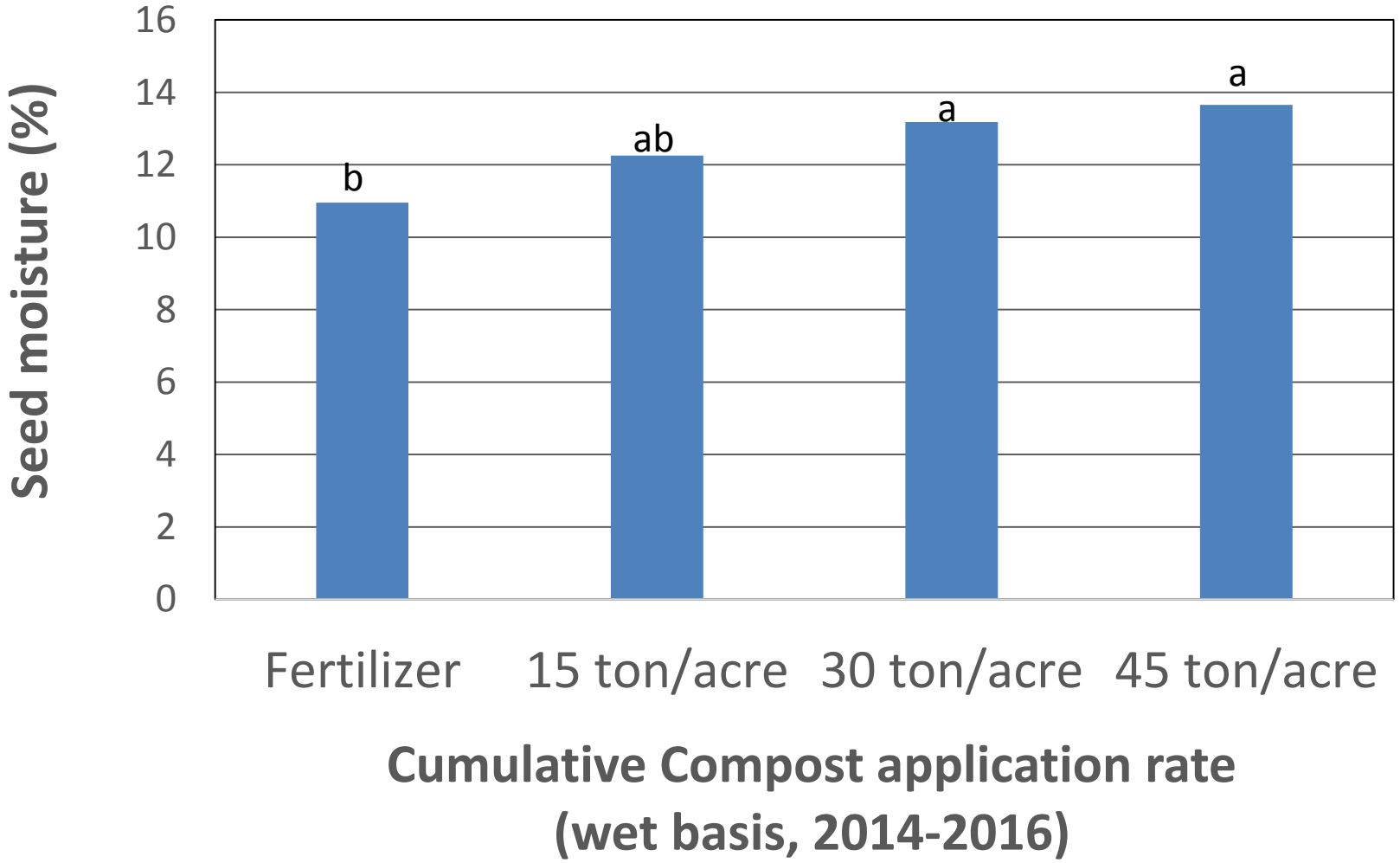
		Available B µg/g
0	1.4b	0.30c
15	1.6ab	0.32cb
30	2.0a	0.39ab
45	1.9a	0.41a
p-value	0.0233	0.0196

Yield and seed moisture

Compost history had no significant effect on bean yield (p-value=0.67)



Compost history did have a significant effect on seed moisture at harvest (p-value=0.048)



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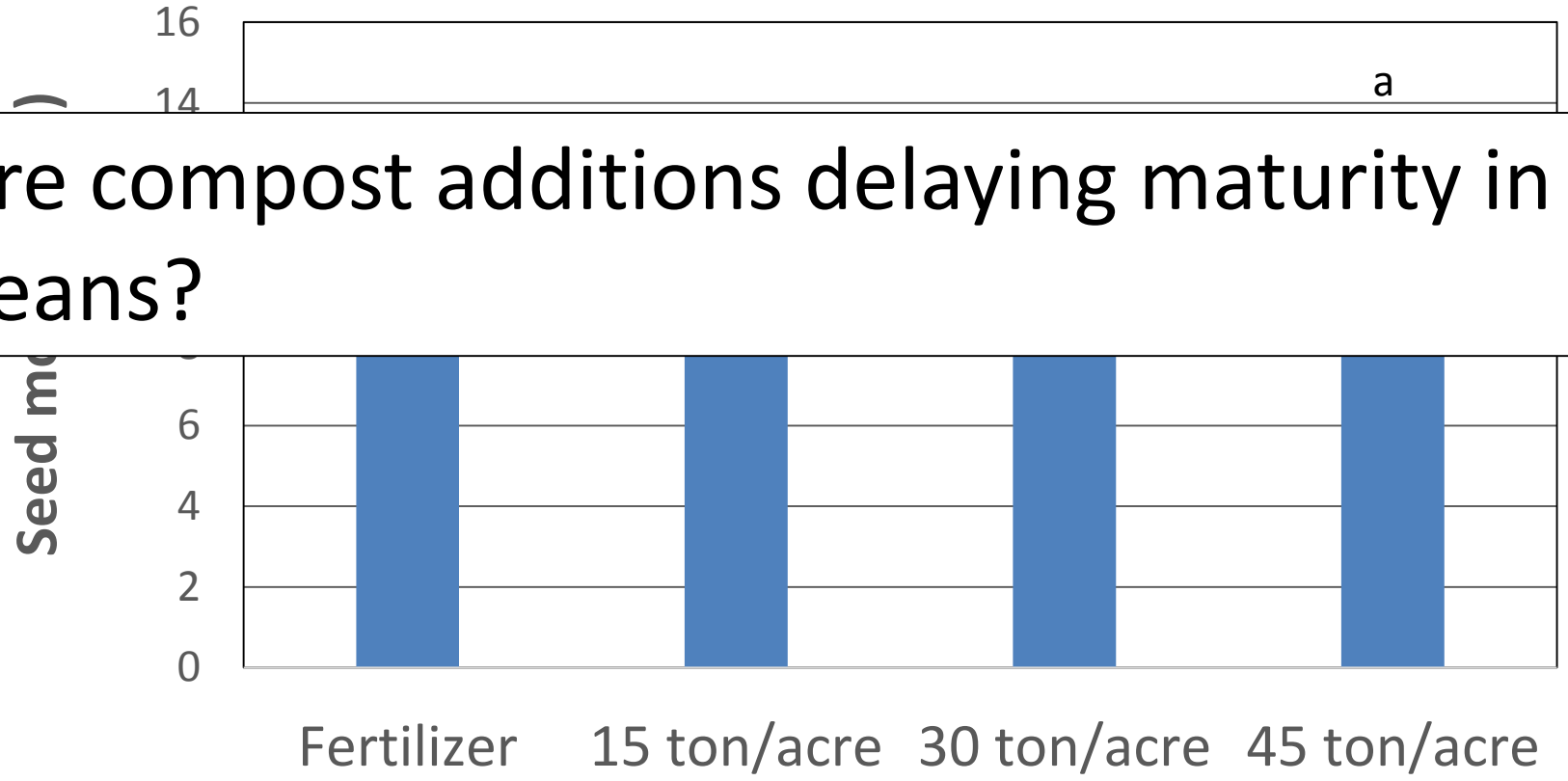
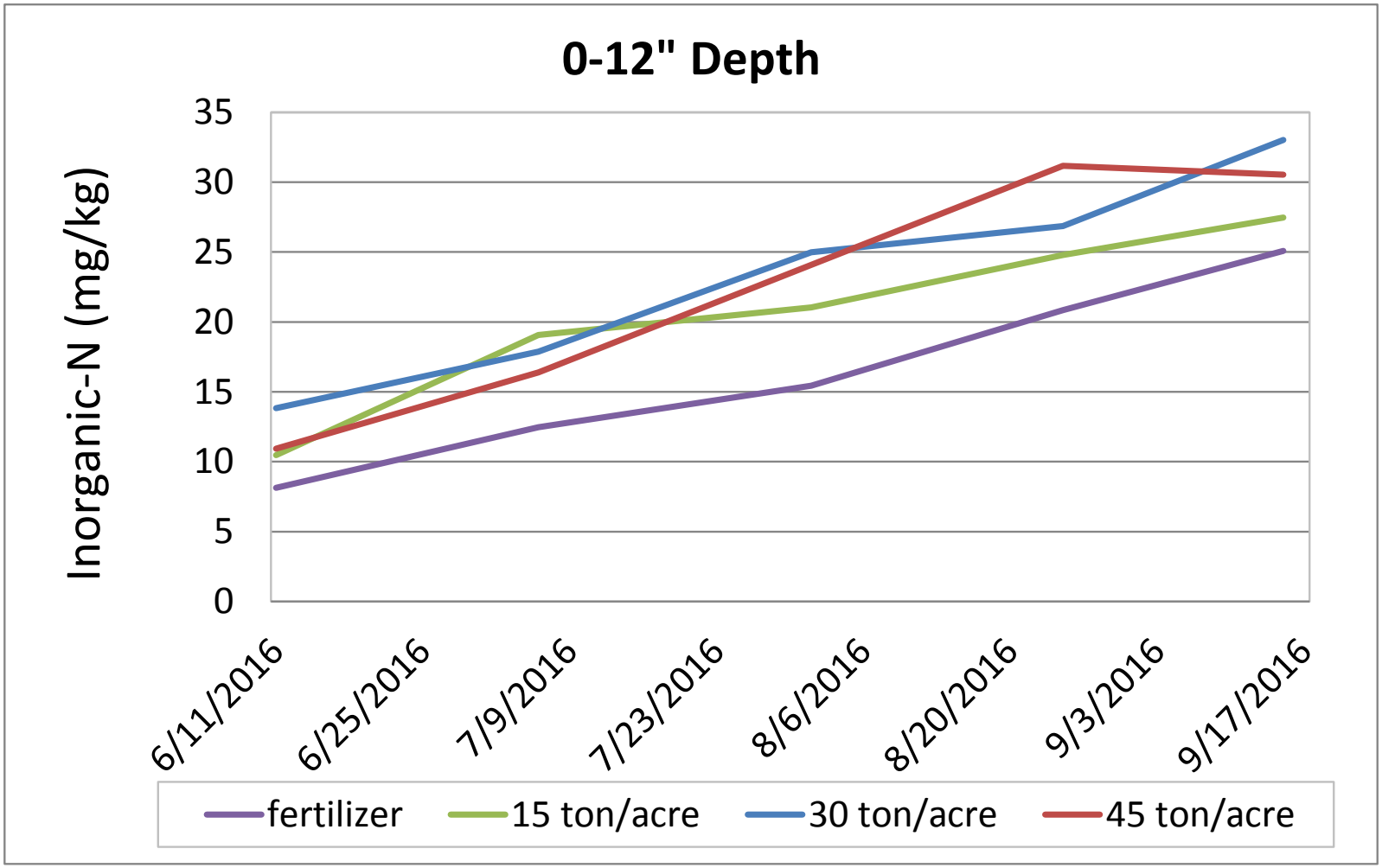
Are compost additions delaying maturity in beans?

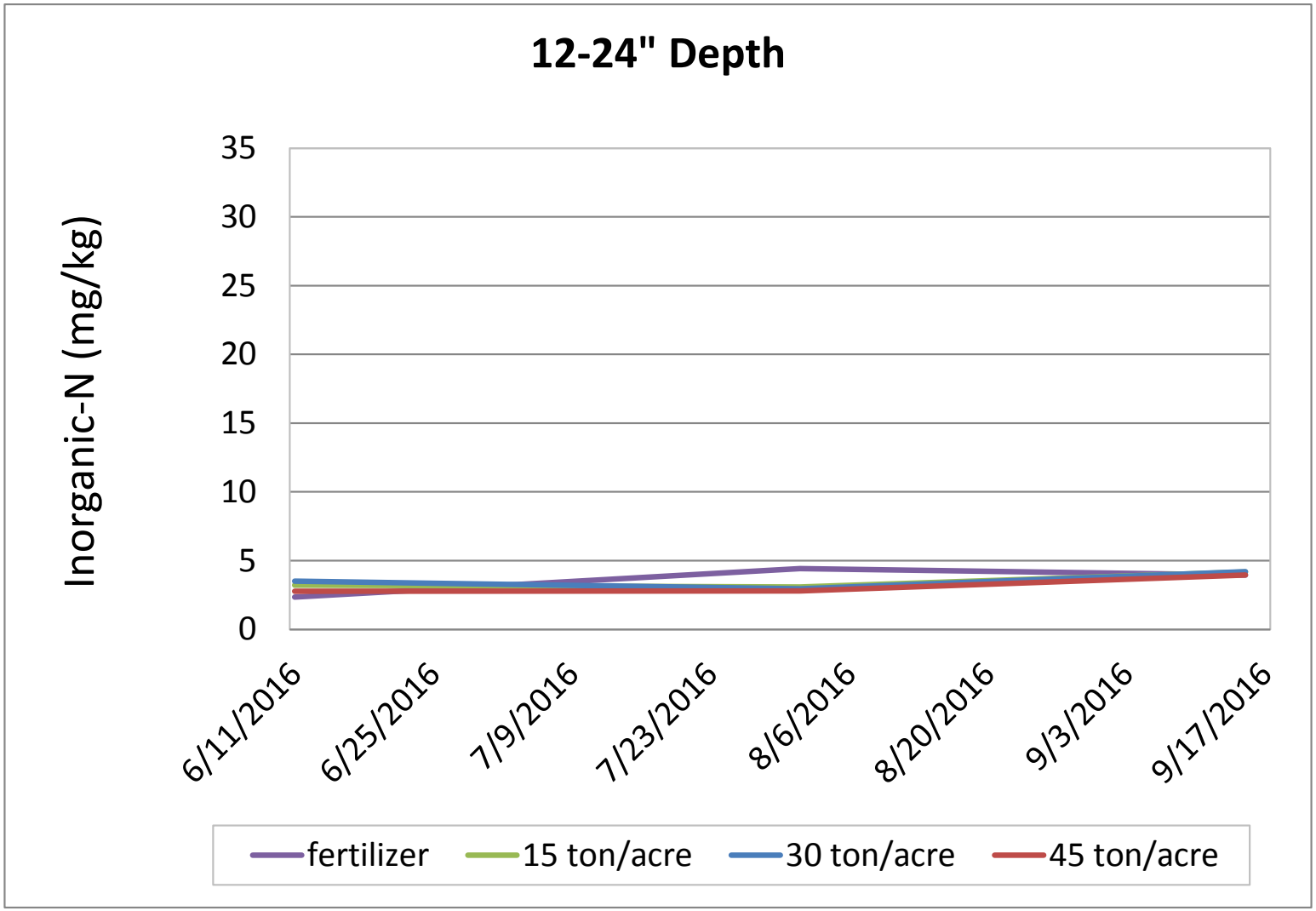


In-season release of N from compost

In-season release of N from compost, first foot depth



In-season release of N from compost, second foot depth

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Soil nutrients

- Excellent source of P, K, S, and Zn
  - Growers can save $ on these fertilizers
  - Zn especially important for bean growers
  - Nitrate leaching from compost, not detected
- Watch out for P accumulations
- Watch out for B accumulations

Bean Yield

- Repeated applications of dairy compost applications at rates up to 45 ton/acre did not significantly lower yield
  - Soil salinity levels increased but remained below thresholds for beans

Seed moisture

- Seed moisture increased with increasing manure application rate
  - Indicates a delay in maturity
    - Cause not known
    - Speculation - Small increase in-season N release at least partially responsible

Acknowledgements

- Idaho Bean Commission
- Flying H Farms
- Stukenholtz Consulting Services
- UI Analytical Sciences Laboratory
- Magic Valley compost
- Max Wheeler, Kaitlin Garofano, Wiley Satterwhite, and Briar Meeks

Thank you!