Topic

Effect of rate and application time of granular sulphur on soil pH reduction, growth, yield and yield components of lentils

By

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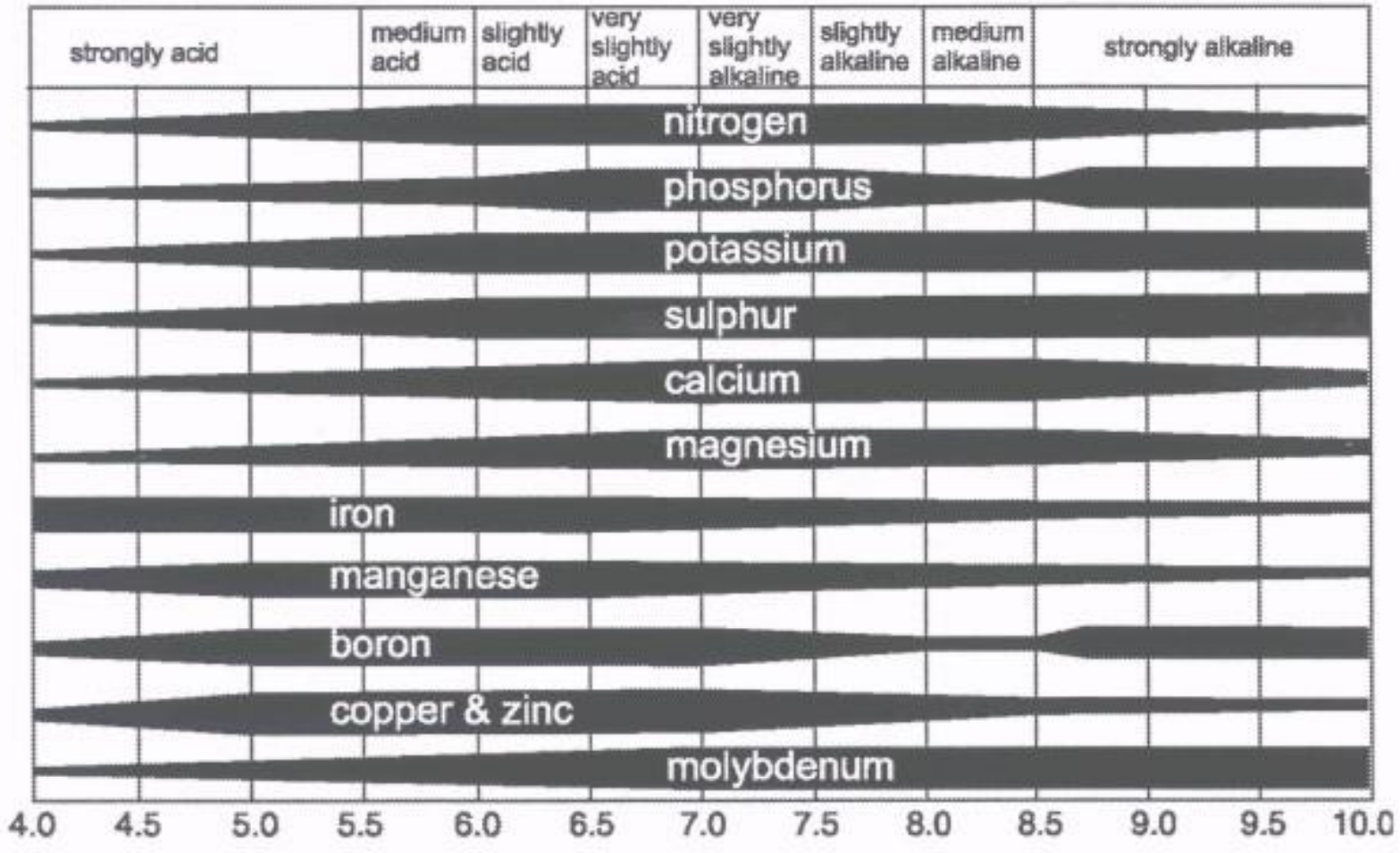
Objectives

- measure the effects of different rates of granular sulphur on seed establishment, seed yield and yield components of lentils

Project Overview

- High soil pH has been suspected to responsible for low productivity of most soils around Rosetown
- Most soils under study has pH 8.0 to 8.3
- Purpose is to reduce soil pH to 6.5 within 3 to 5 years

Chart of the Effect of Soil pH on Nutrient Availability



Materials and Methods

- Soil pH was tested for plot before trial and averaged 8.2
- Granular sulphur (Tiger 90, Tiger-Sul Products, Canada) was used – May 02, 2014
- Lentil cultivar Maxim was treated with Trilex Evergol.
- Fertility program at seeding was 10-26-10-10-1 N-P-K-S-Zn
- Seeding date: May 27

Materials and Methods

- Fertility grogram: 50 lb/ac MAP seed placed
- Preburn chemical: 1 L/ac of glyphosate and Heat at 80 ac/jug
- Incrop chemical: Solo at label rate

Materials and Methods cont'd

- Treatments:

  a) Control – no granular sulphur

  b) 0.7 lb/100ft^2 (304.9 lb/ac)

  c) 1.0 lb/100ft^2 (435.6 lb/ac)

  d) 1.3 lb/100ft^2 (566 lb/ac)

  - Plot design and reps: RCBD with 3 replications.

Materials and Methods cont'd

- Soil pH was tested for 2 in (5 cm), 4 in (10 cm) and 6 in (15 cm) depth at 30, 60, 90 and 120 days after sulphur application
- Plant above ground tissues were analyzed for mineral concentration at peak vegetative stage.
- Seeds from each treatment were analyzed after harvest for mineral and protein concentration
- Seed yield (bu/ac) was determined at harvest from each plot and analyzed for yield differences between treatments
- Mean values from treatment's were subjected to ANOVA and separated by LSD ($p < 0.05$)

Results

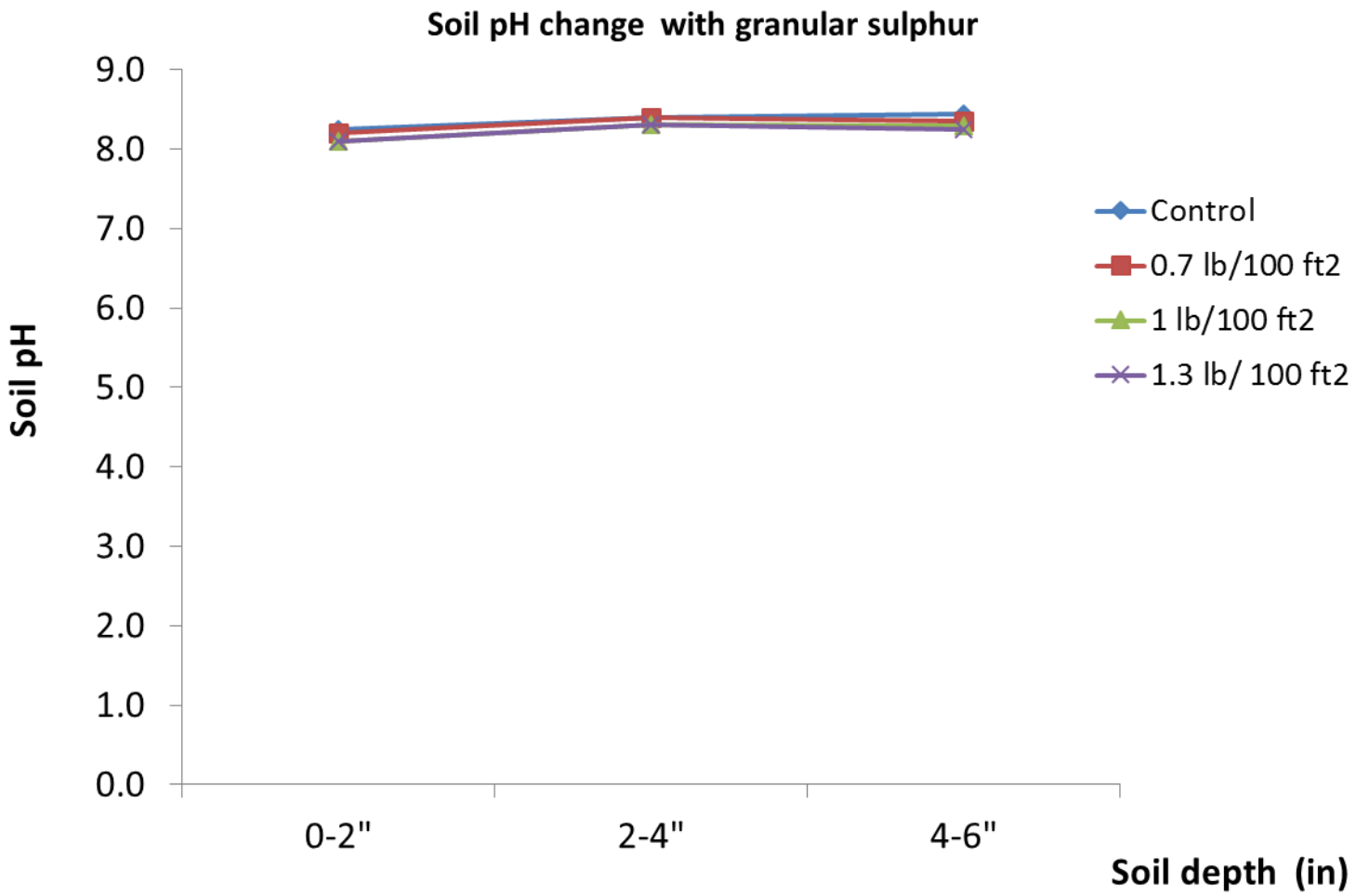


Fig 1. Soil pH for the control, 0.7 lb/100ft^2, 1.0 lb/100ft^2, and 1.3 lb/100ft^2 at 0-2 in, 2-4 in and 4-6 in depths at 30 days after granular sulphur application.

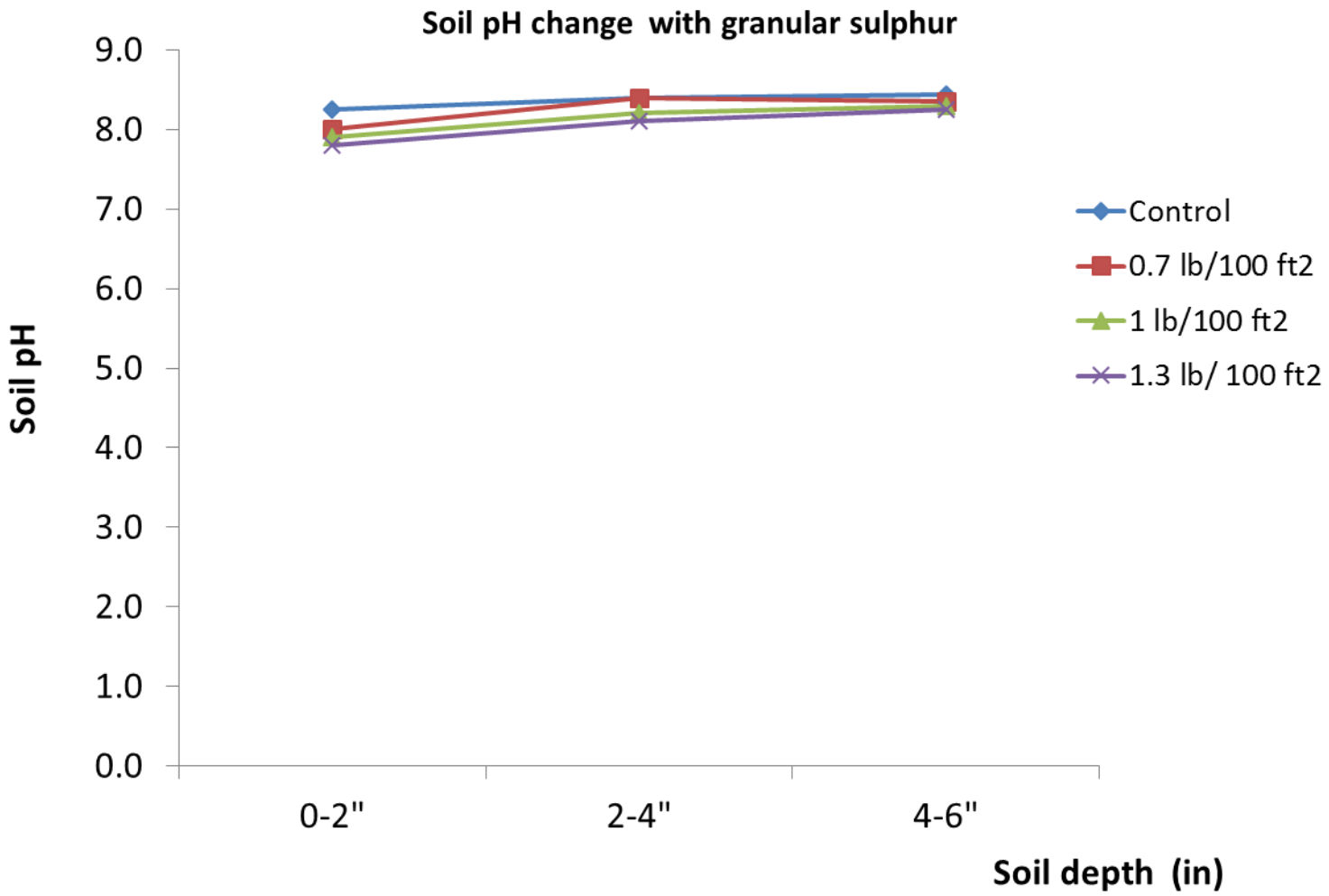


Fig 1. Soil pH for the control, 0.7 lb/100ft^2, 1.0 lb/100ft^2, and 1.3 lb/100ft^2 at 0-2 in, 2-4 in and 4-6 in depths at 60 days after granular sulphur application.

Results

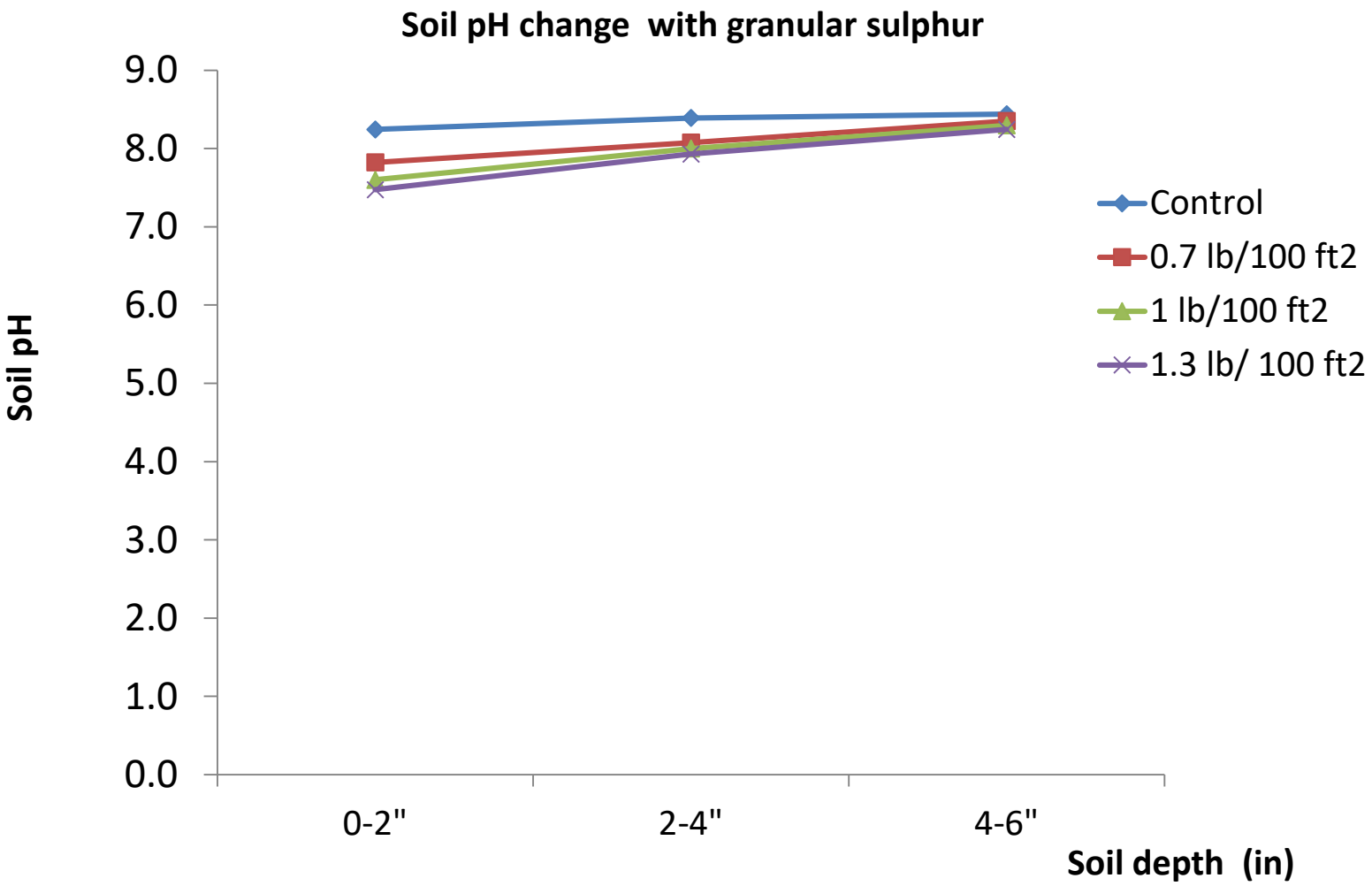


Fig 1. Soil pH for the control, 0.7 lb/100ft^2, 1.0 lb/100ft^2, and 1.3 lb/100ft^2 at 0-2 in, 2-4 in and 4-6 in depths at 90 days after granular sulphur application.

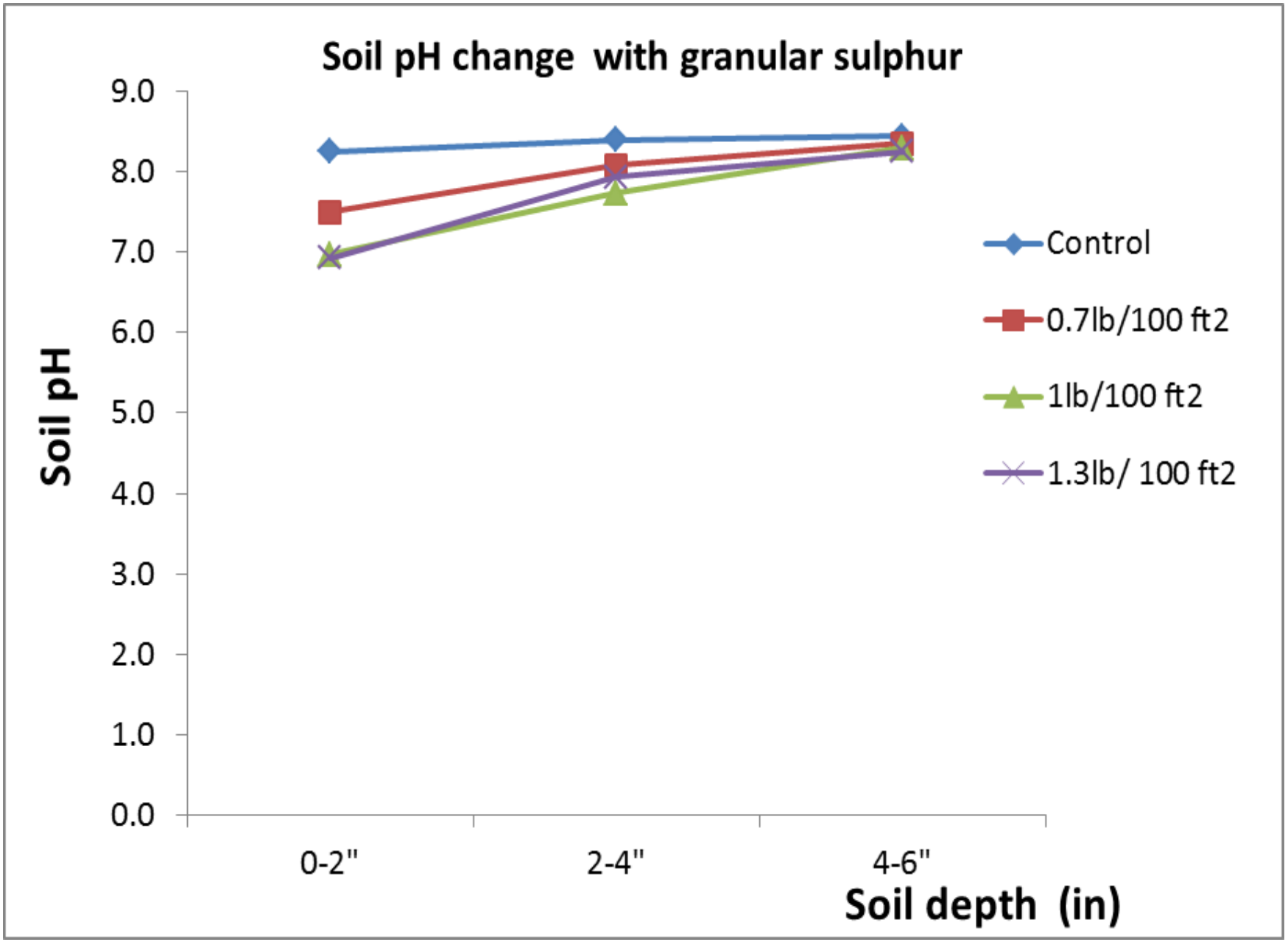


Fig 2. Soil pH for the control, 0.7 lb/100ft^2, 1.0 lb/100ft^2, and 1.3 lb/100ft^2 at 0-2 in, 2-4 in and 4-6 in depths at 120 days after granular sulphur application.

Table 1. Effect of soil pH reduction on lentil mineral concentration at peak vegetative stage.

Treatments	%N	%P	%S	Fe (ppm)	Mn (ppm)	Zn (ppm)
Control	3.19	0.22	0.19	63.9	21.6	15.3
0.7 lb/100ft^2	3.48	0.29	0.22	71.3	30.6	20.7
1.0 lb/100ft^2	4.22	0.32	0.23	79.3	30.9	27.3
1.3 lb/100ft^2	4.40	0.34	0.25	84.1	32.0	28.0

Table 2. Effect of soil pH reduction on lentil growth, development, seed yield and yield components.

Treatments	Mean pods plant^{-1}	Mean seeds pod^{-1}	Seed yield (g) plant^{-1}	% Protein	TSW (g)	Yield (bu/ac)
Control	62.9^{a}	1.2^{a}	2.4^{a}	22.1^{a}	30.7^{a}	30.1^{a}
0.7 lb/100ft^{2}	80.2^{b}	1.2^{a}	2.9^{ab}	23.1^{b}	30.2^{a}	33.0^{b}
1.0 lb/100ft^{2}	86.5^{b}	1.2^{a}	3.4^{bc}	22.8^{a}	35.6^{b}	32.7^{b}
1.3 lb/100ft^{2}	84.5^{b}	1.1^{a}	3.2^{c}	22.5^{a}	34.9^{b}	33.4^{b}

Observations/ conclusions

- High pH reduction was seen in 0-2 in for 1.3lb/100 ft^2 treatment (reduced from 8.2 to 7.0) after 120 days
- The 0.7 lb/100 ft^2 and 1 lb/100 ft^2 treatments reduced to 7.5 and 7.0 respectively.
- There was marginal or no pH changes in the 2-4 in and 4-6 in layers
- Seed yield followed the order 1.3 lb/100 ft^2 > 1 lb/100 ft^2 > 0.7 lb/100 ft^2 > Control.

Seed Yield of lentil (bu/ac)

Control treatment = 30.1 bu/ac

0.7 lb/100 ft^2 treatment= 33.0 bu/ac

1.0 lb/100 ft^2 treatment= 32.7 bu/ac

1.3 lb/100 ft^2 treatment= 33.4 bu/ac