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Objective: Improve rainfed alfalfa yields with several nutrient application methods.

Methods:

The treatments:

Four preplant P rates, knifed perpendicular to planted alfalfa.

Two broadcast P rates in years 3, 4, 5

Two compost rates in years 3, 4, 5

Cultural practices for alfalfa establishment, treatment application and harvest.

Haskell Ag Lab, Concord, NE 2001 – 2006.

Item	Date
Trifluralin @ 1.75 L ha ⁻¹	April 30, 2001
Disk before herbicides	April 30, 2001
Apply knife treatments	May 9, 2001
Field cultivate	May 9, 2001
Plant Garst 631, 17 kg ha ⁻¹	May 9, 2001
Roll seedbed	May 10, 2001
Herbicides Sethoxydim/Dash 2.33 L ha ⁻¹ and 2,4-DB;	July 5, 2001
Initial soil sample	Nov 5, 2001
Final soil sample	September 2006
Compost Application:	June 17, 2003
	July 13, 2004
	April 15, 2005

Harvests: July 30, Sept 30, 2001

June 3, July 7, Aug 2, and Sept 4, 2002

June 12, July 8, and Sept 4, 2003

June 8, July 12, and Sept 7, 2004

June 7; July 7; and Aug 10, 2005

June 2; July 5; and Aug 14, 2006

Rainfall (mm): 676 (2003); 701 (2004); 732 (2005); 757 (2006)

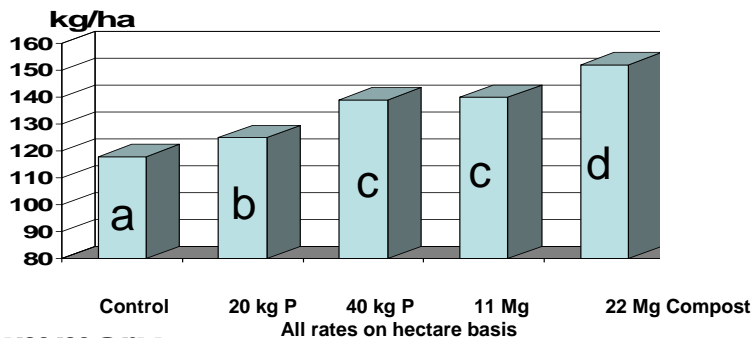
Compost content:	Total applied over 3 years; 11 Mg/ha rate (kg/ha)
Organic N	272
Ammonium	11
Phosphorus (P)	200
Potassium (K)	392
Sulfur	124

Results:

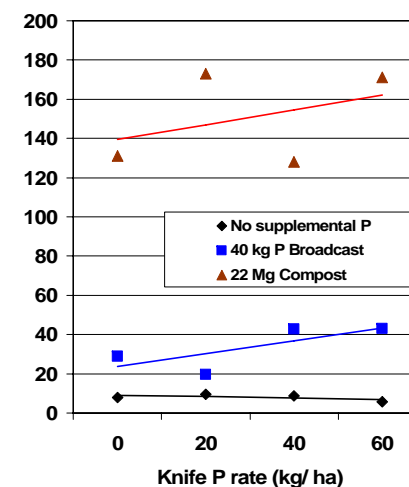
Effect of broadcast P and compost application on alfalfa yield.

	2003	2004	2005	2006 ¹	Total
	----- 100% DM Mg ha ⁻¹ -----				
No compost	13.2	15.8	12.1	11.4	52.5
20 kg ha ⁻¹	12.9	16.1	11.7	12.3	52.9
40 kg ha ⁻¹	13.0	16.9	12.5	13.0	55.4
11 Mg ha ⁻¹	13.2	16.8	12.2	13.2	55.4
22 Mg ha ⁻¹	13.3	17.1	12.5	13.7	56.6
LSD _{0.05}	NS	1.1	0.7	0.7	1.9

Effect of broadcast P and compost after 0 knife preplant application on total P recovery (2003-2006.)



Effect of phosphorus and compost application on soil P levels (2006; 0-0.05 m depth). Bray #1 P



Summary:

1. Knife bands did not increase yields.
2. When no annual P was applied; soil samples did not find knife P bands (0.15 m data not shown).
3. All annual P treatments increased yield; 11 Mg ha⁻¹ compost (66 P kg ha⁻¹) and 40 kg ha⁻¹ had equivalent yields, and 22 Mg ha⁻¹ compost (132 P kg ha⁻¹) had highest yields.
4. Phosphorus removal by alfalfa was greater than application for the control and the 20 kg ha⁻¹ P application.