

Pasture pH and Liming Issues Affecting Forage Yield

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Range Cattle REC

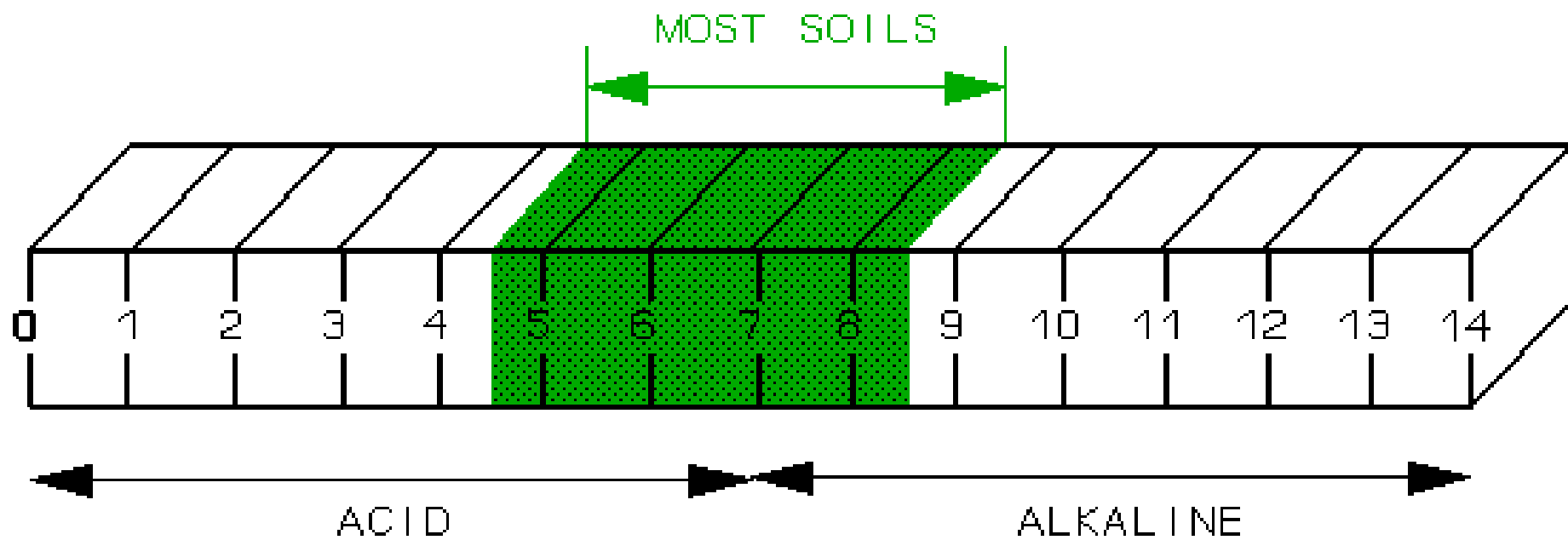
UF/IFAS, Ona, FL

Soil Acidity & pH

- Concentration of active hydrogen ions (H^+)
- Measured by an index called pH
- pH of 7 is neutral ($H^+ = OH^-$) e.g. distilled water but too high for forage growth. Causes deficiencies of Fe, Zn, Mn and Cu.
- pH of 5 to 6 slightly acidic but satisfactory for forage growth.
- pH of 4 is too low or very acid and results in poor forage root growth. Causes deficiencies of S, Mo and B.

Soil Acidity

The pH Scale



Blue 1974 @ 4.5 t/ha lime to pH
5.5 in 1961; 112 kg N/ha/yr

N-Source	DMY (10 yr avg.) t/ha	Soil pH	
		1963	1971
AN	7.5 a	5.5	4.8
AS	7.0 ab	4.9	4.3
CN	7.5 a	5.3	5.5
Urea	6.8 b	--	--

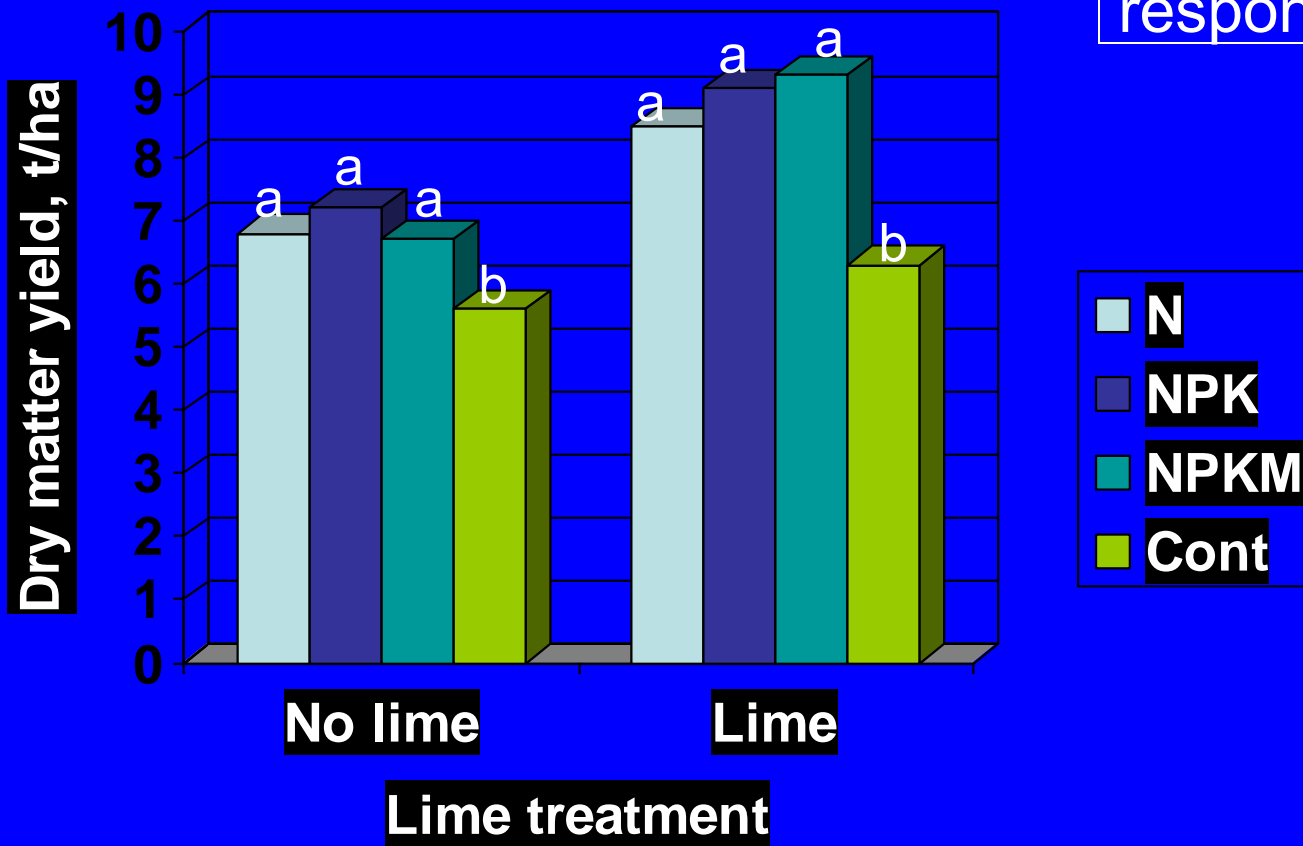
Soil Acidity

- Tends to increase with repeated use of ammonium N-fertilizer because of **nitrification**:
- 1) $2\text{NH}_4^+ + 3\text{O}_2 = 2\text{NO}_2^- + 2\text{H}_2\text{O} + 4\text{H}^+$
(Nitrosomonas)
- 2) $2\text{NO}_2^- + \text{O}_2 = 2\text{NO}_3^-$ (Nitrate)
(Nitrobacter)

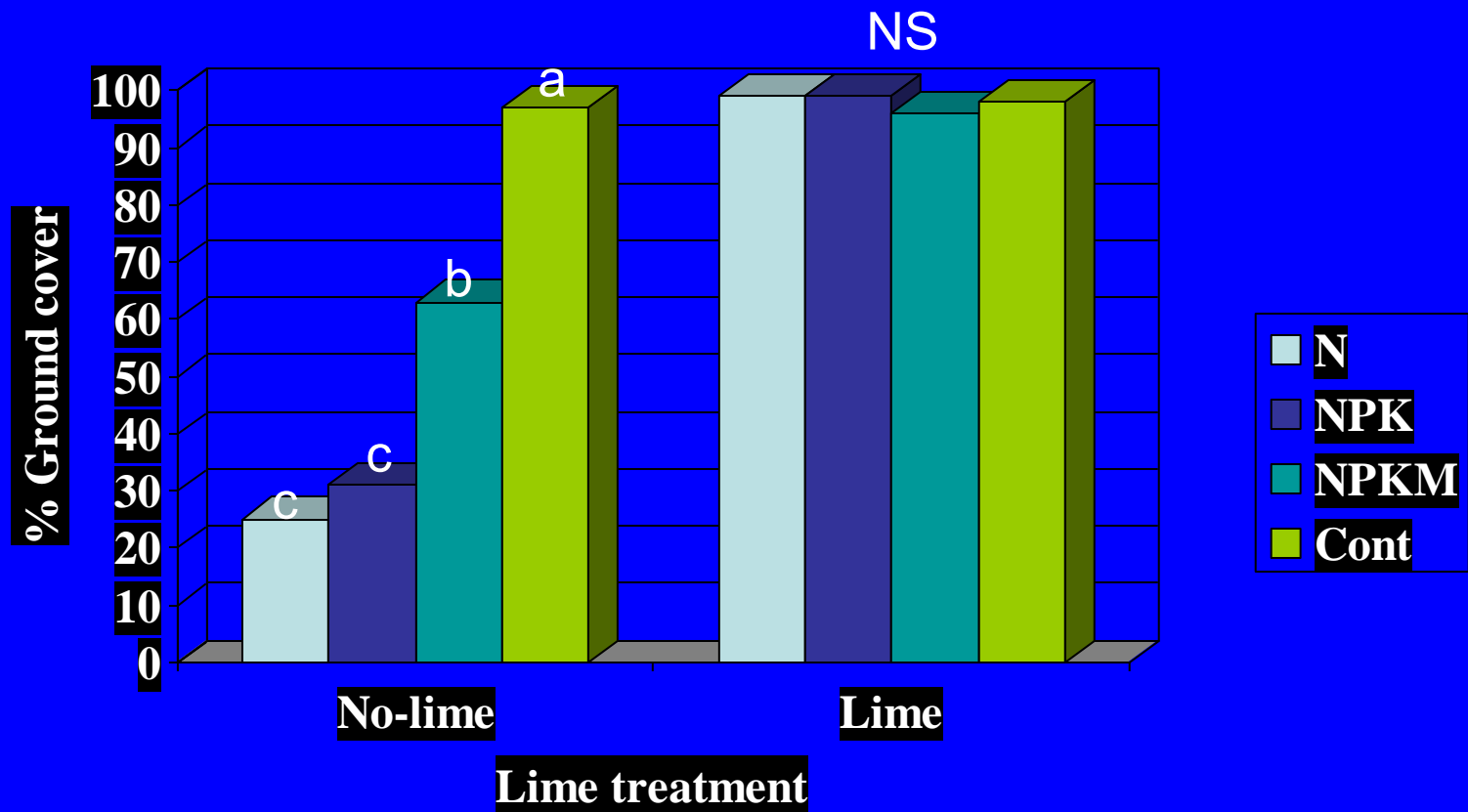
Bahiagrass Performance Under Changing Soil pH

Effect of Lime and Fertilizer on Annual DMY Hardee 87

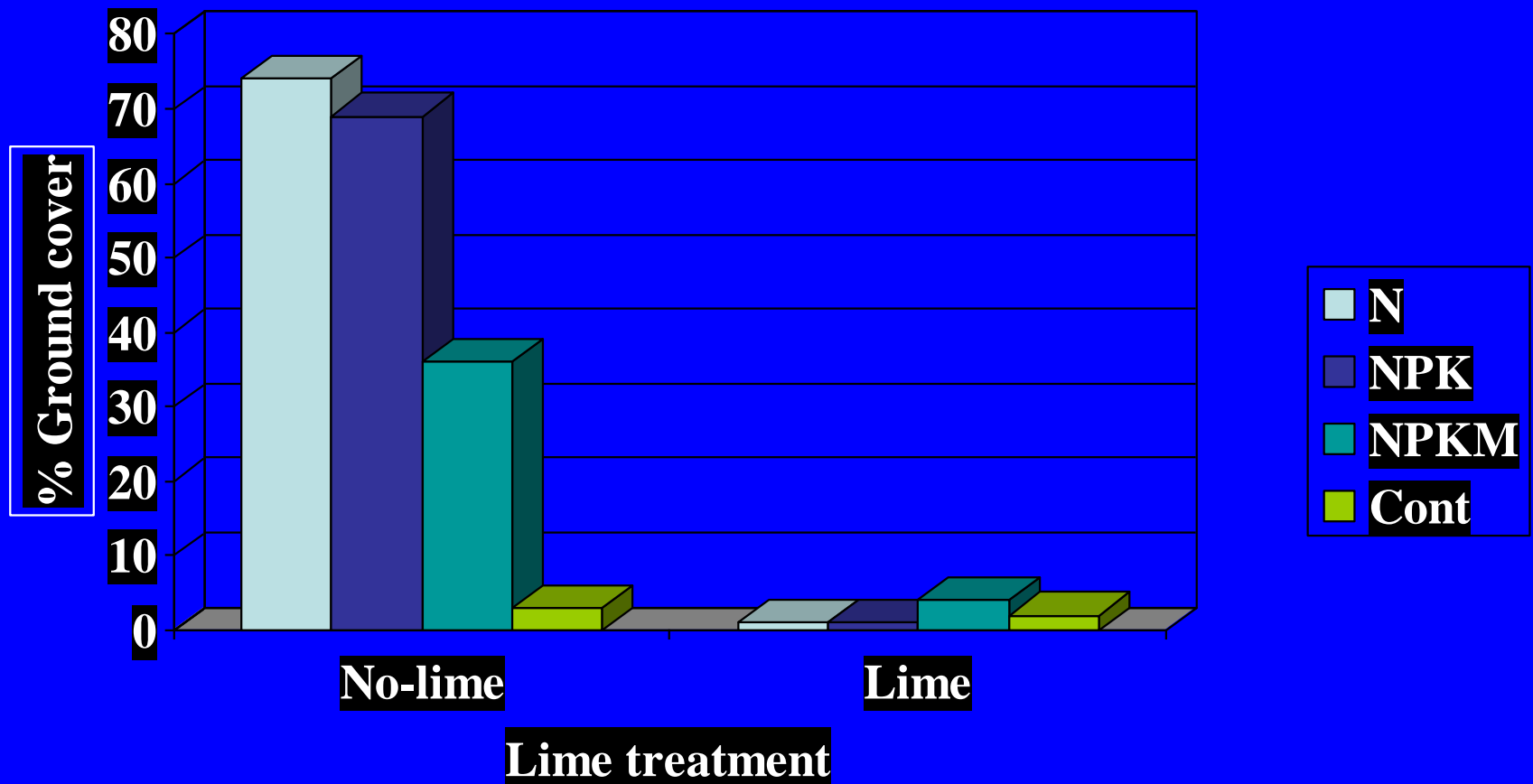
30% better response to N



2003 Spring Green Canopy Cover



2003 Spring Dead/Yellow Canopy Cover for Pasture 87









NPKM

pH 4.5

Cont

pH 4.2

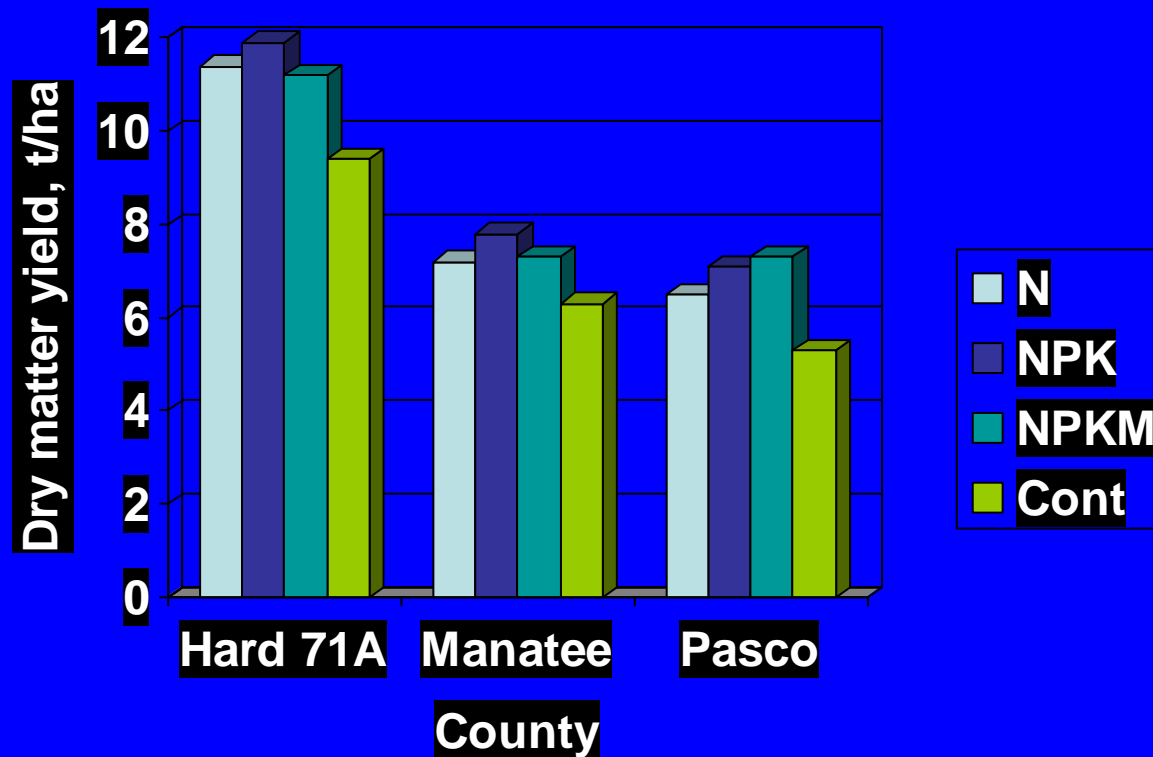
N

NPK

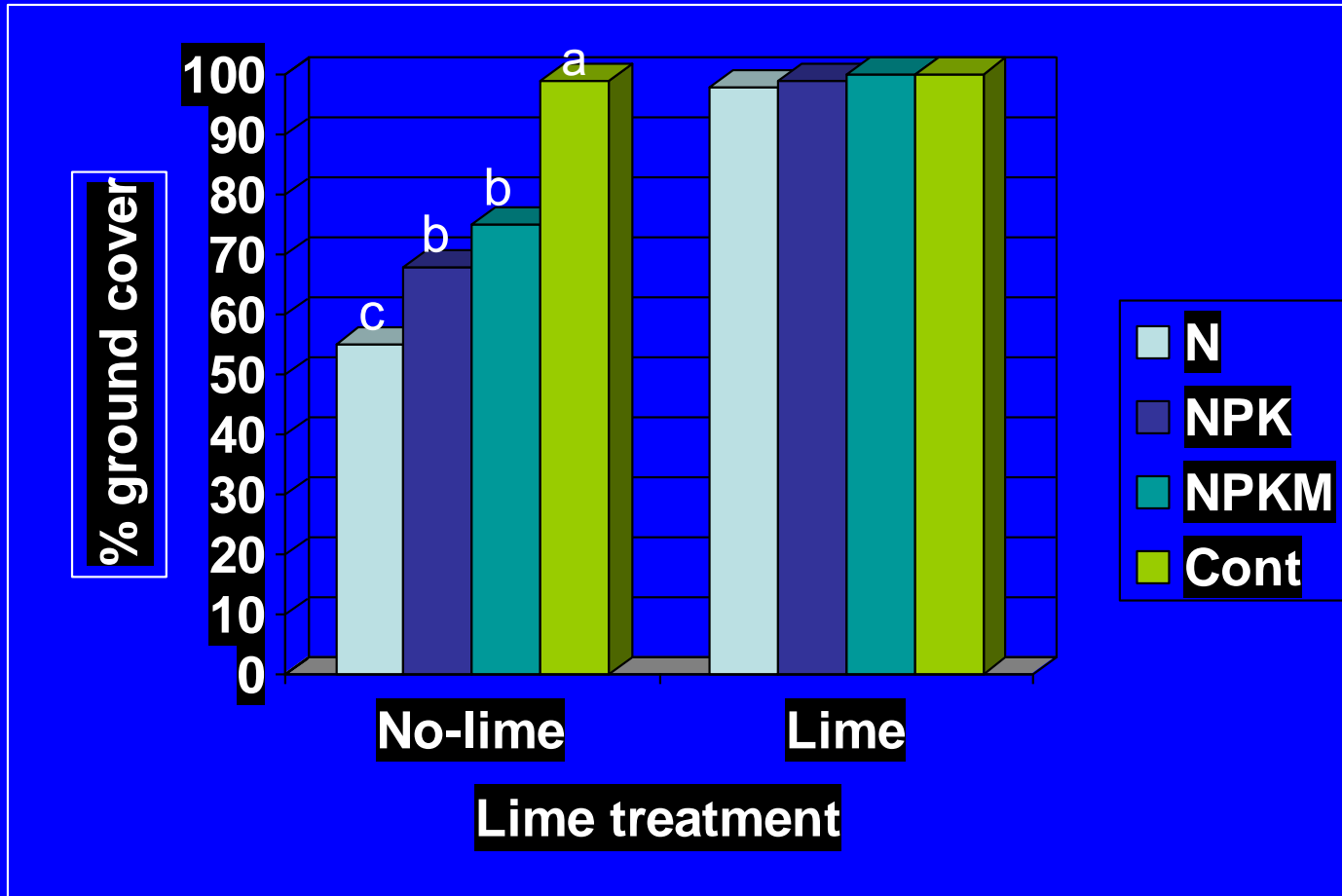


Pioneer weeds

Effect of Fertilizer on Annual DMY



2003 Spring Green Canopy Cover Pasture 71A



2005 Spring Canopy Cover Pasture 71A



2005 Spring Canopy Cover Pasture 71A



Conclusions

- N key to bahiagrass pasture production.
- Increase due to P & K cost-effective under grazing?
- Repeated N fertilization will drop soil pH, increase spring grass yellowing and stand loss to weeds.
- Monitor soil pH every 2-4 years and lime to maintain pH of 5-6.
- Alternate N-fertilizer and limed-sludge use.