# *Use of FGD Gypsum Soil Amendments for Improved Forage and Corn Production*

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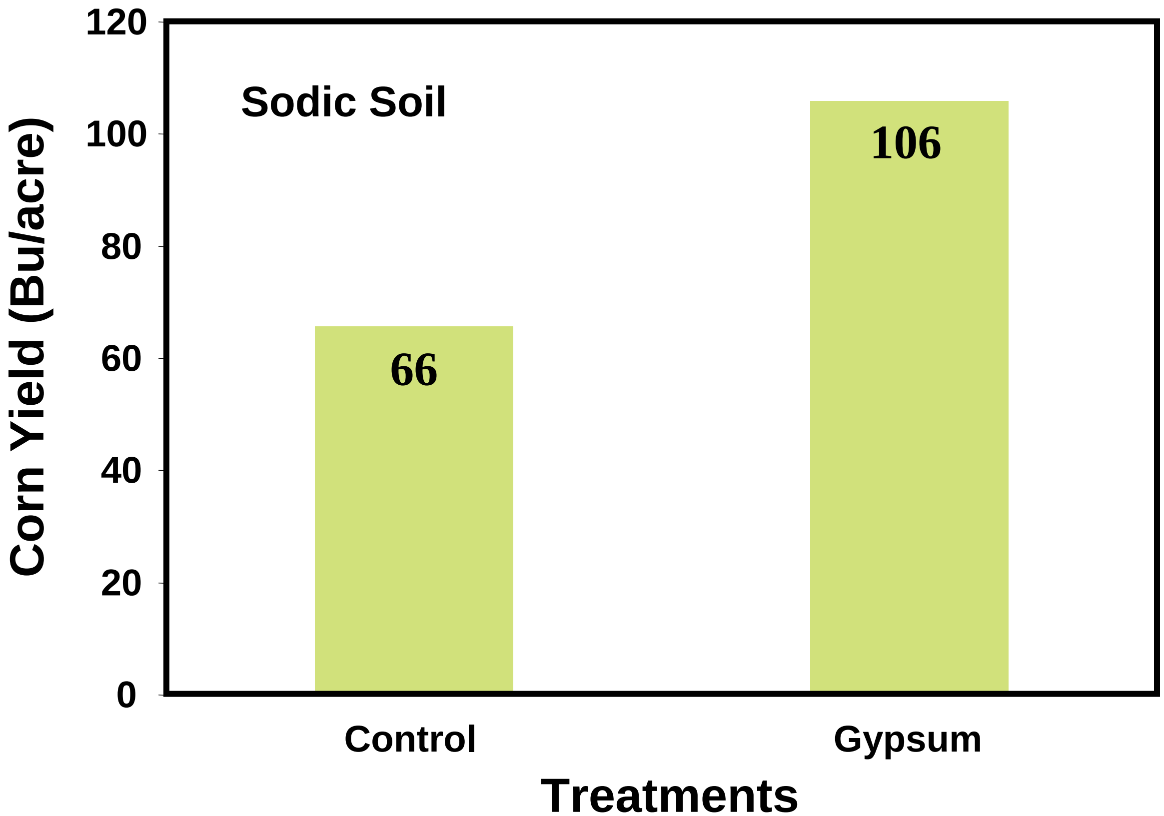
**http://www.oardc.ohio-state.edu/soilbiolab/**

# *Corn/Forages Production and Gypsum*

- Sulfur Nutrition
- Soil Chemical Properties
- Soil Physical Properties

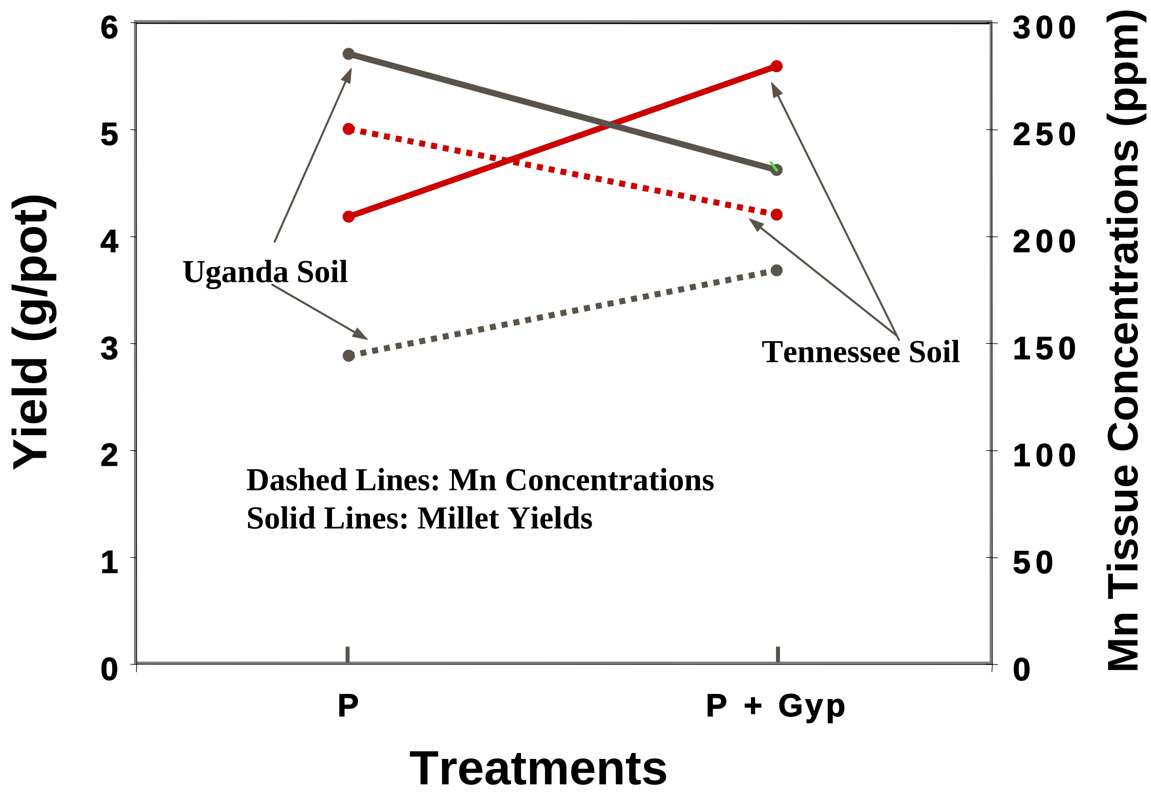
# *Corn Production and Gypsum*

# *Corn (Chemical Properties)*



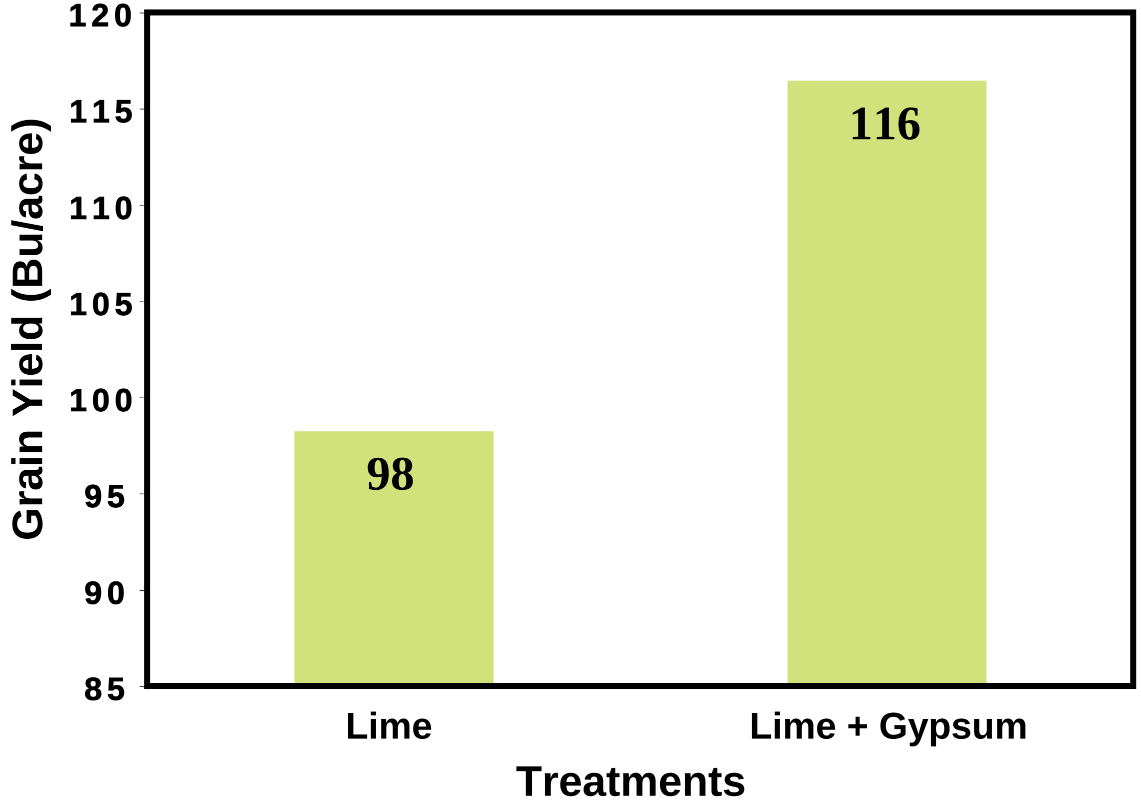

**(Fehrenbacher et al., *Illinois Res.*, Spring, 3-4, 1972)**

# *Millet (Surface Acidity and Plant Nutrition)*



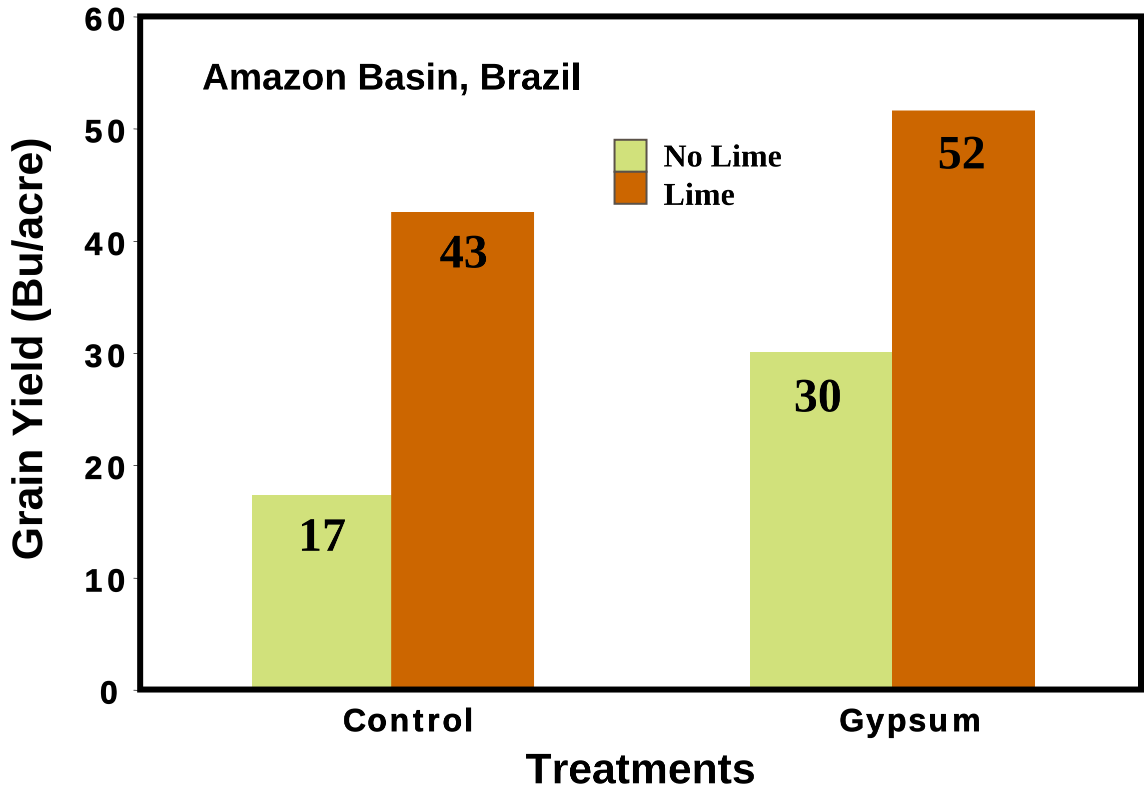

(McLean and Ssali, *Soil Sci.*, 123:155-164, 1977)

# *Corn (Subsoil Acidity)*



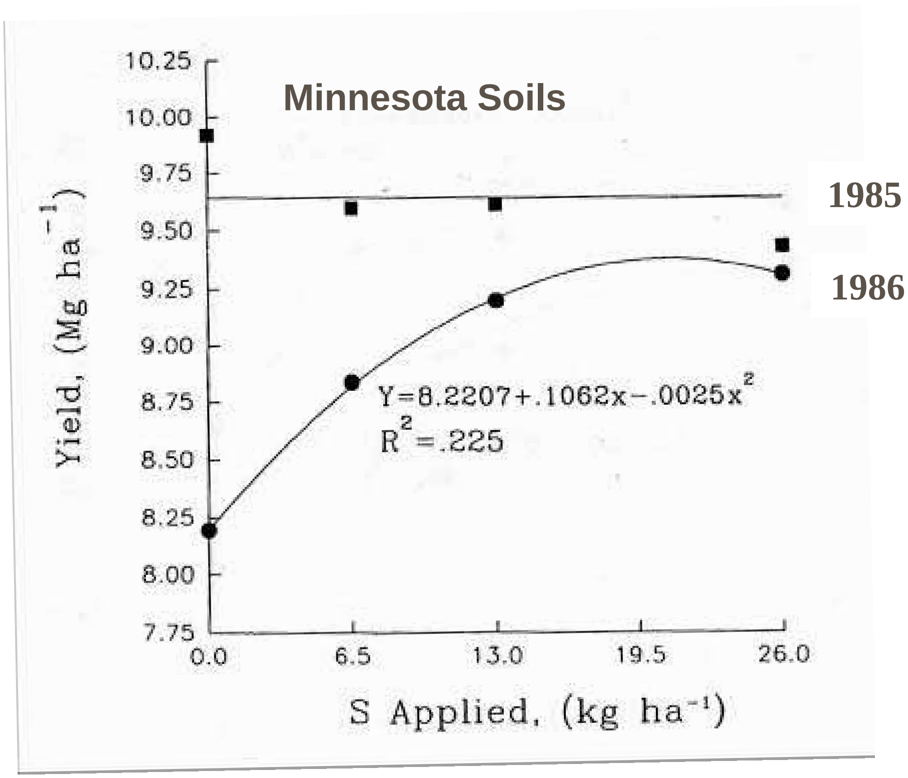

(Farina and Channon, *Soil Sci. Soc. Am. J.*, 52:175-180, 1988)

# *Corn (Surface and Subsurface Acidity)*



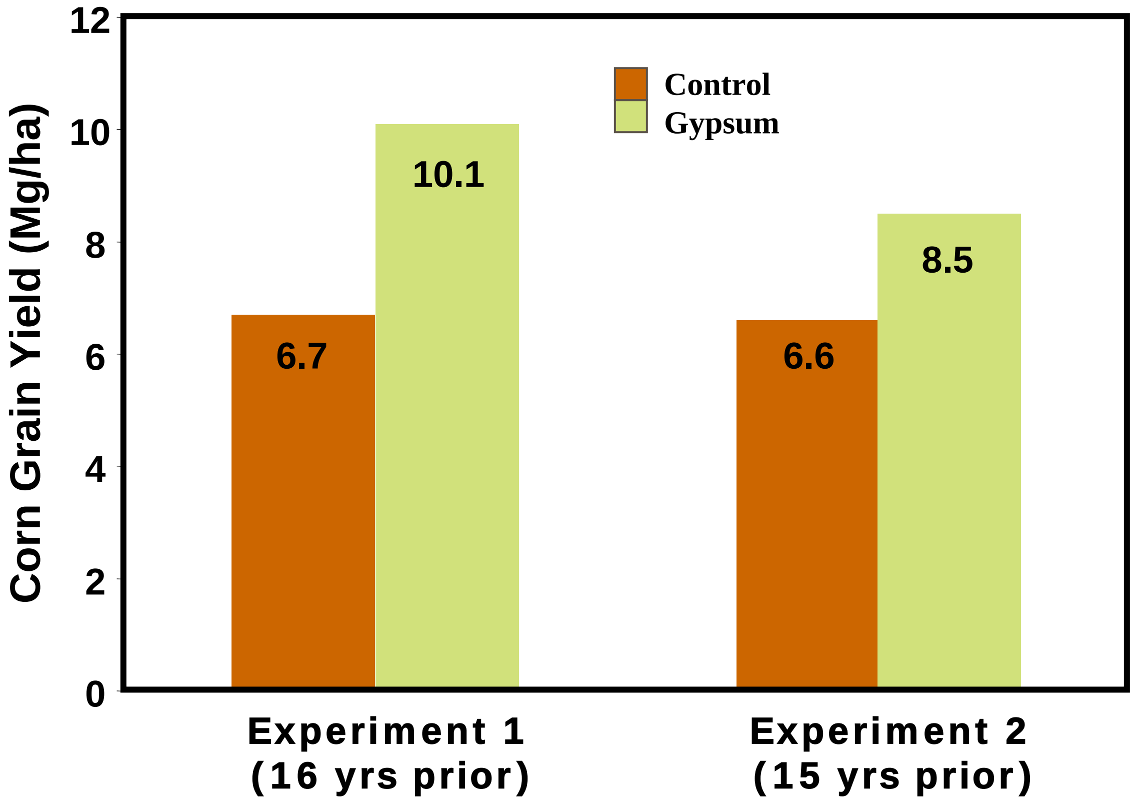

(Smyth and Cravo, *Agron. J.*, 84:843-850, 1992)

# *Corn (Sulfur Nutrition)*



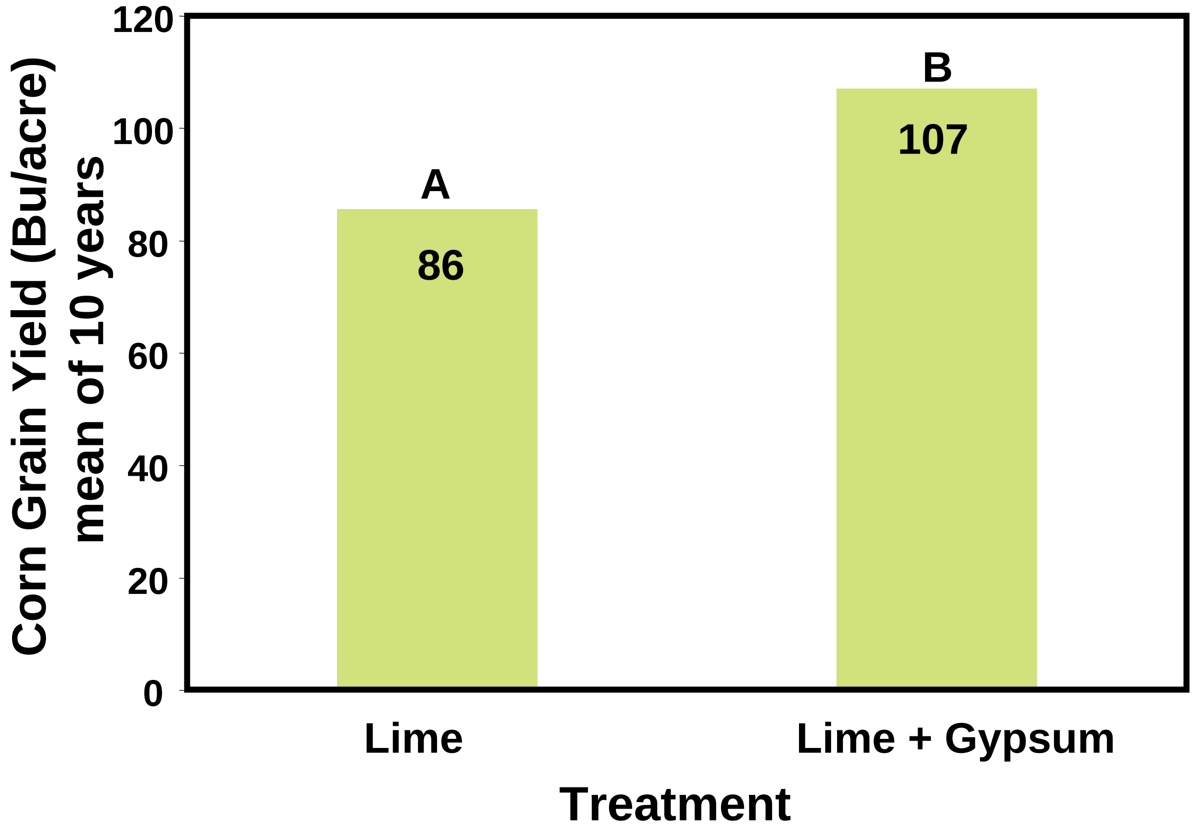

(Rehm, *Commun. Soil Sci. Plan Anal.*, 24:285-294, 1993)

# *Corn (Subsoil Acidity)*



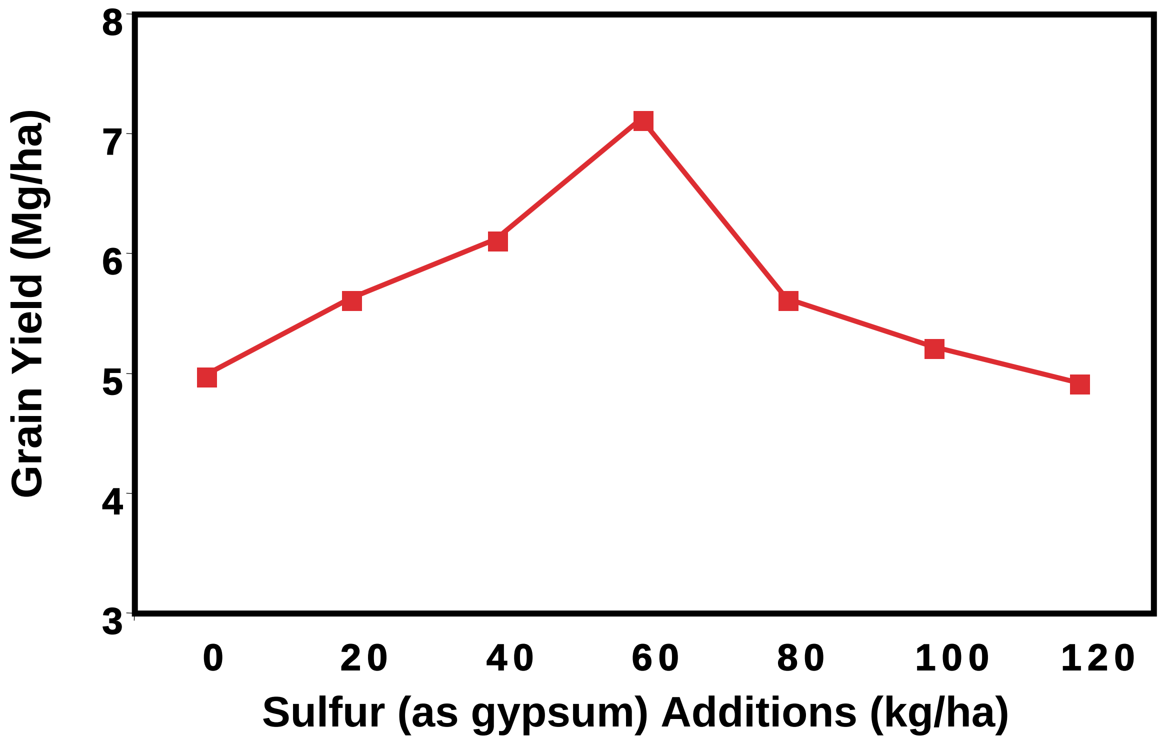

**(Toma et al., *Soil Sci. Soc. Am. J.*, 39:891-895. 1999)**

# *Corn (Subsoil Acidity)*



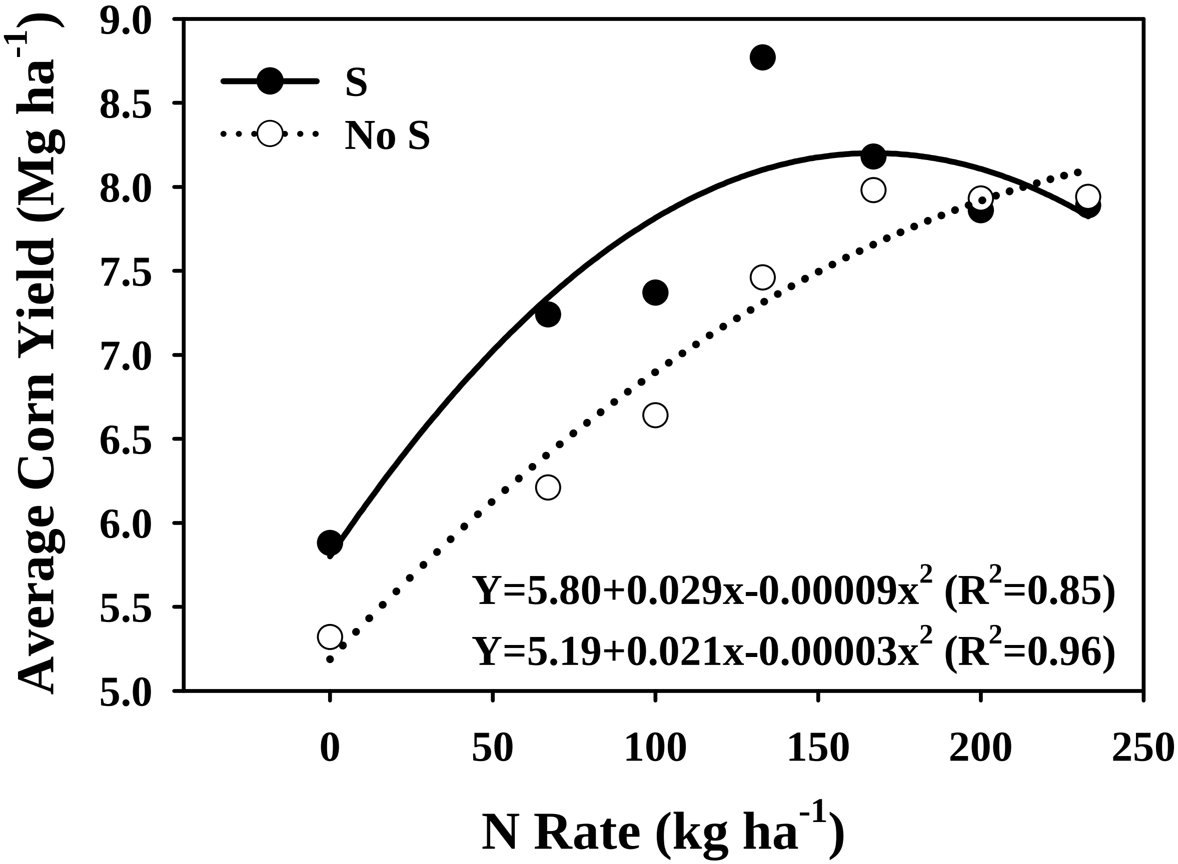

(Farina et al., *Soil Sci. Soc. Am. J.*, 64:646–651 (2000)

# *Corn (Sulfur Nutrition)*



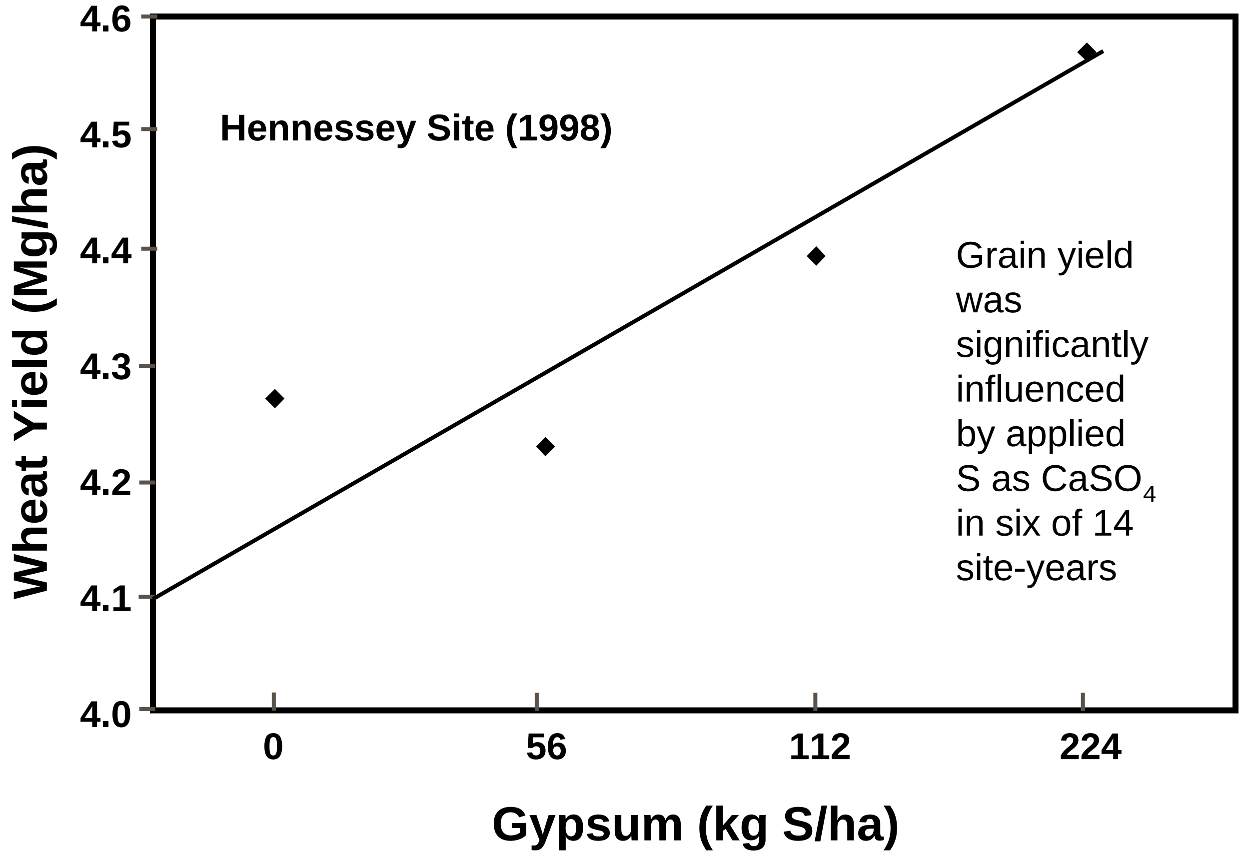

(Khan et al., *Commun. Soil Sci. Pl. Anal.*, 37: 41–51, 2006)

# *Corn (Sulfur Nutrition)*



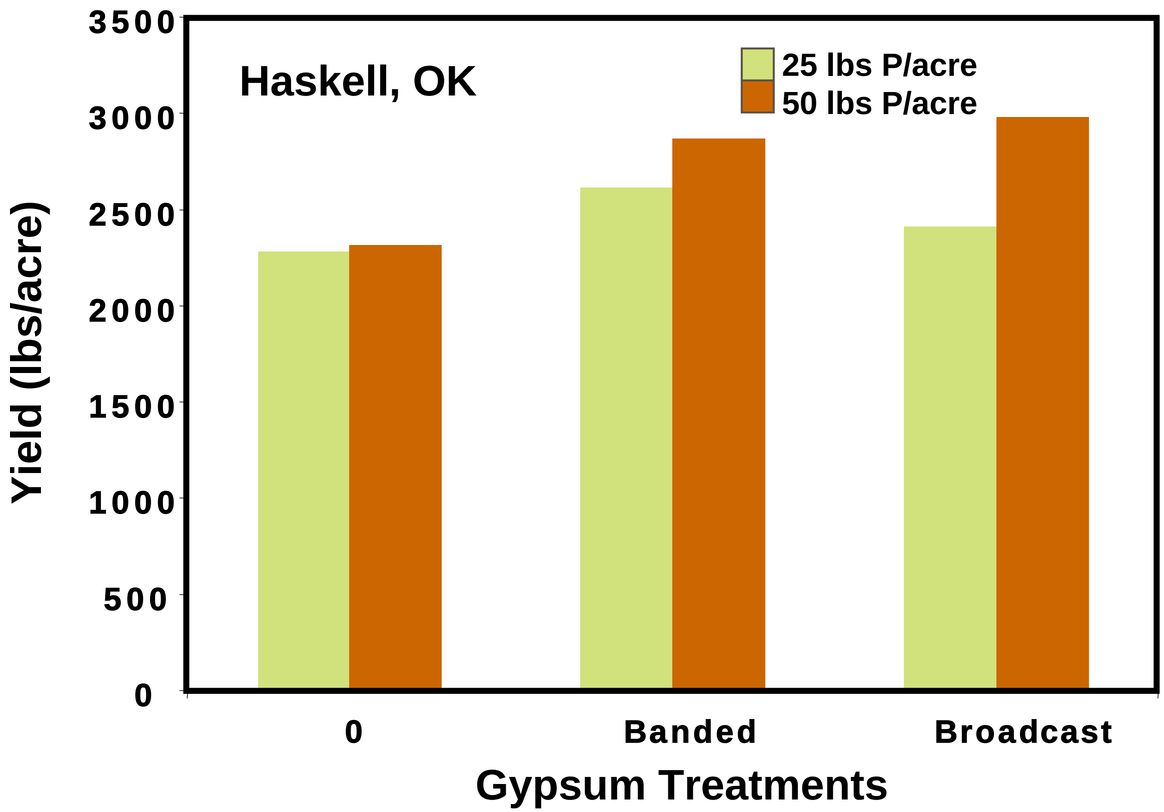

(Chen et al., *Soil Sci. Soc. Am. J.*, In Press, 2008)

# *Wheat (Sulfur Nutrition)*




(Girma et al., *J. Plant Nutr.*, 28:1541–1555 (2005)

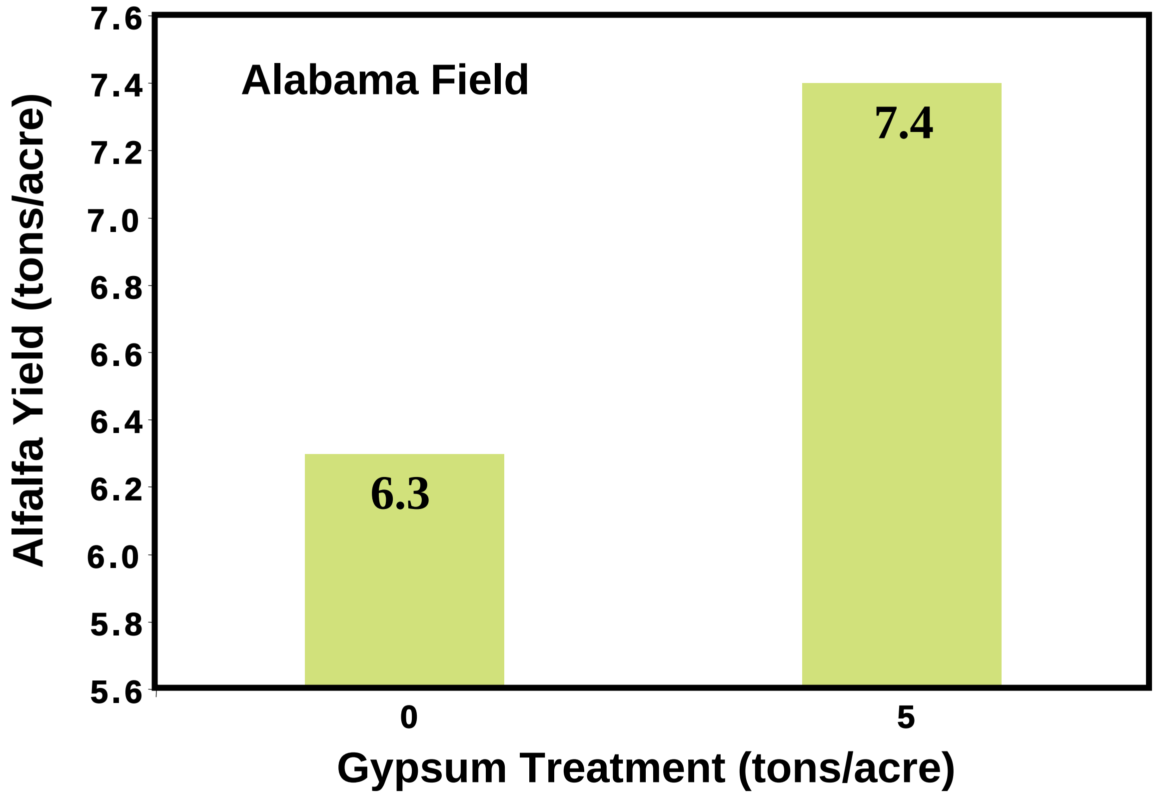
# *Wheat (Plant Nutrition)*




**(Phillips et al., *J. Plant Nutr.*, 23:251-261, 2000)**

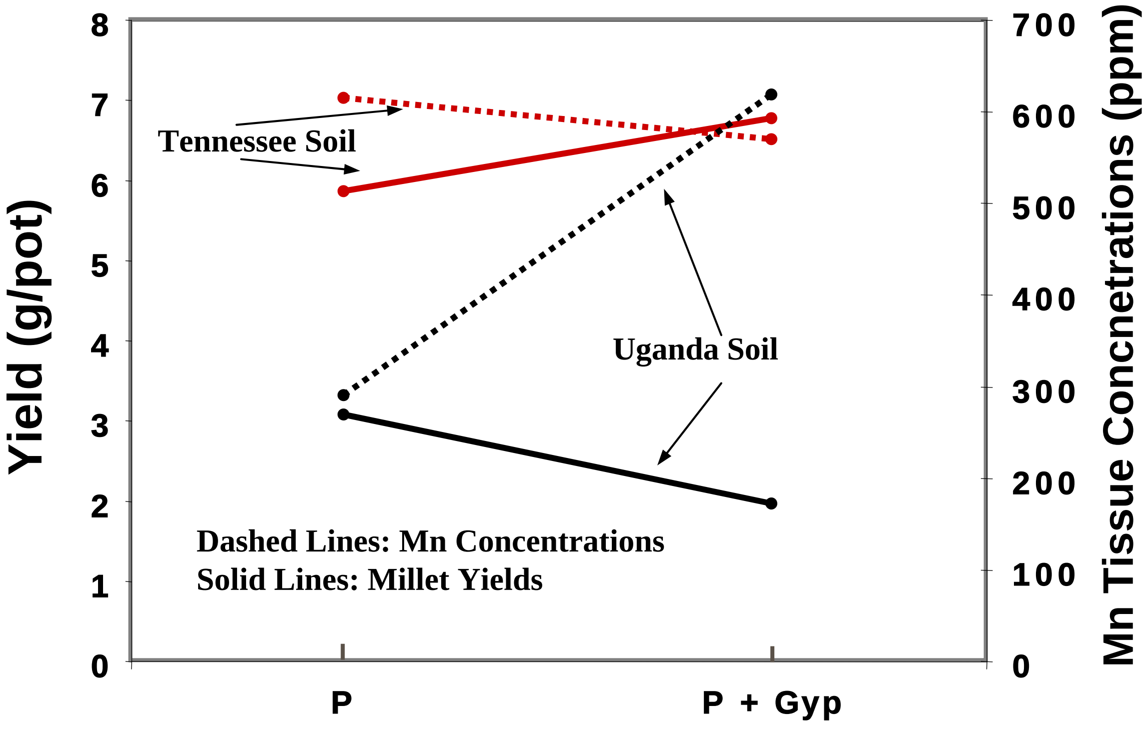
# *Forages Production and Gypsum*

# *Alfalfa (Sulfur Nutrition and Nematode Control)*



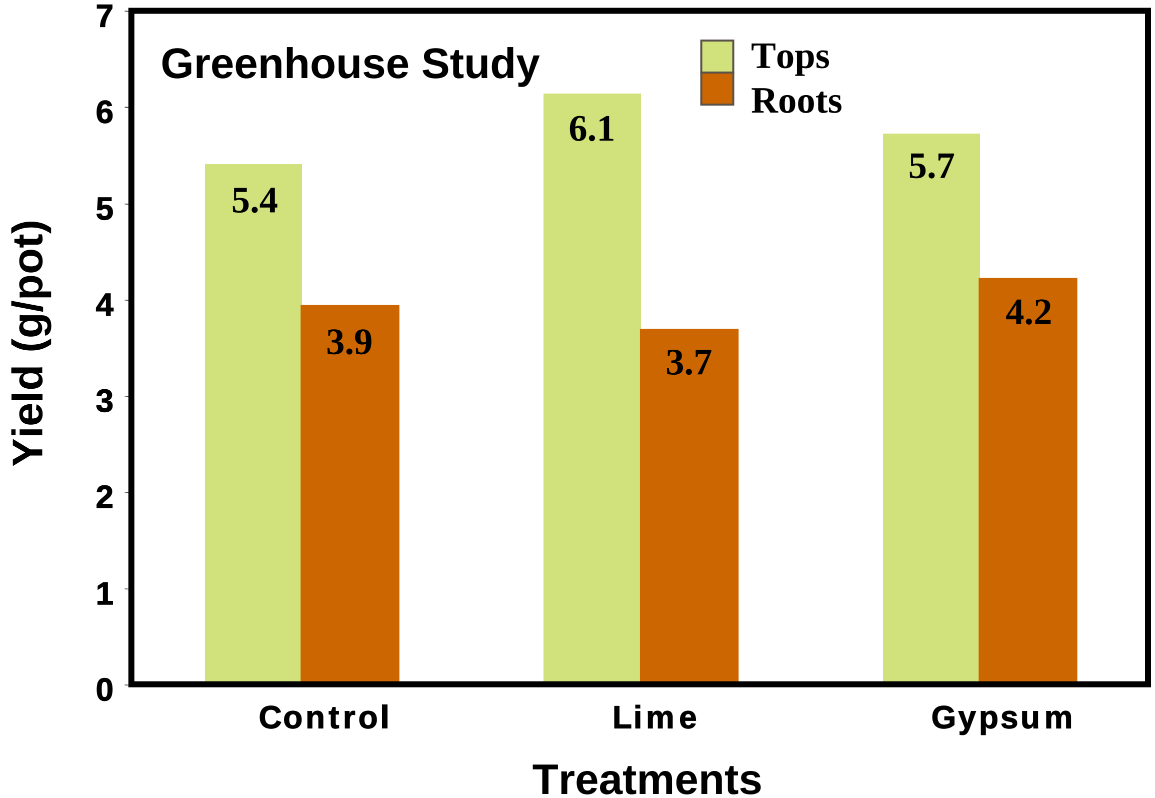

**(Mitchell and Ball, *Alabama Agri. Exp. Station*, Spring, 1972)**

# *Alfalfa (Surface Acidity and Plant Nutrition)*



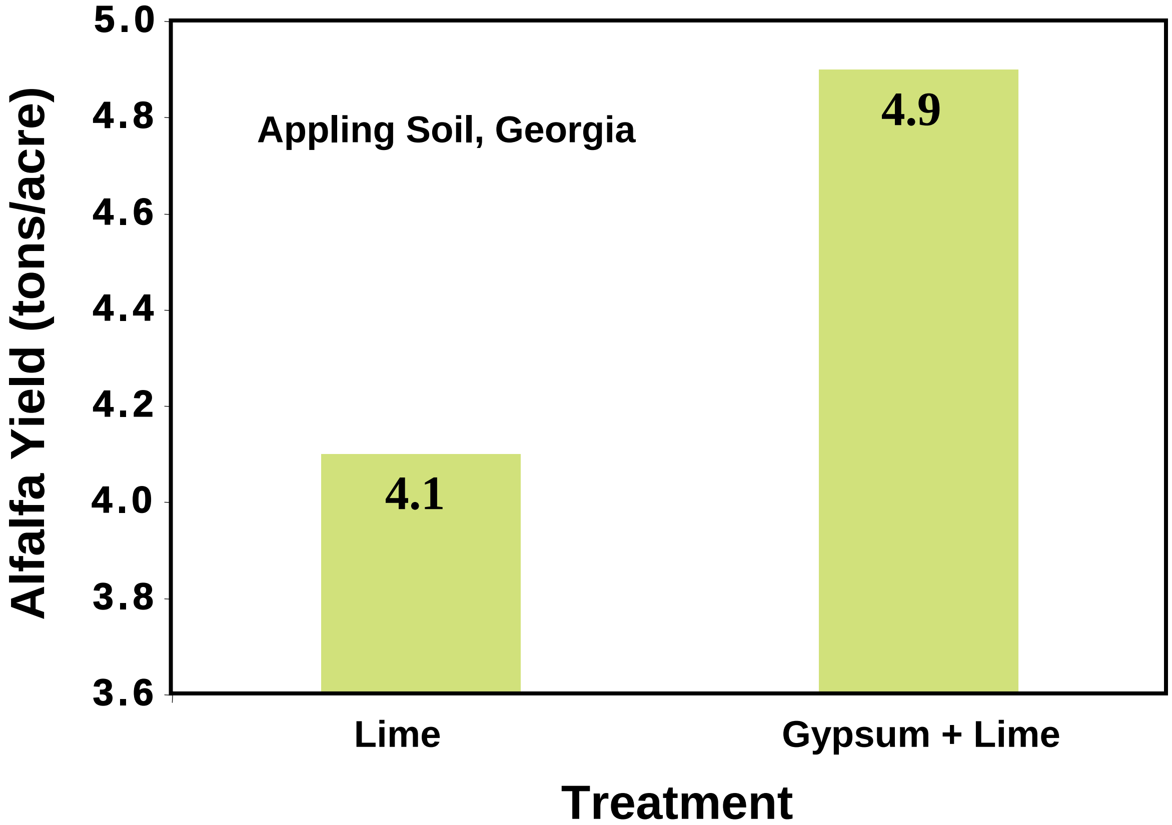

(McLean and Ssali, *Soil Science*, 123:155-164, 1977)

# *Forages (Subsoil Acidity)*



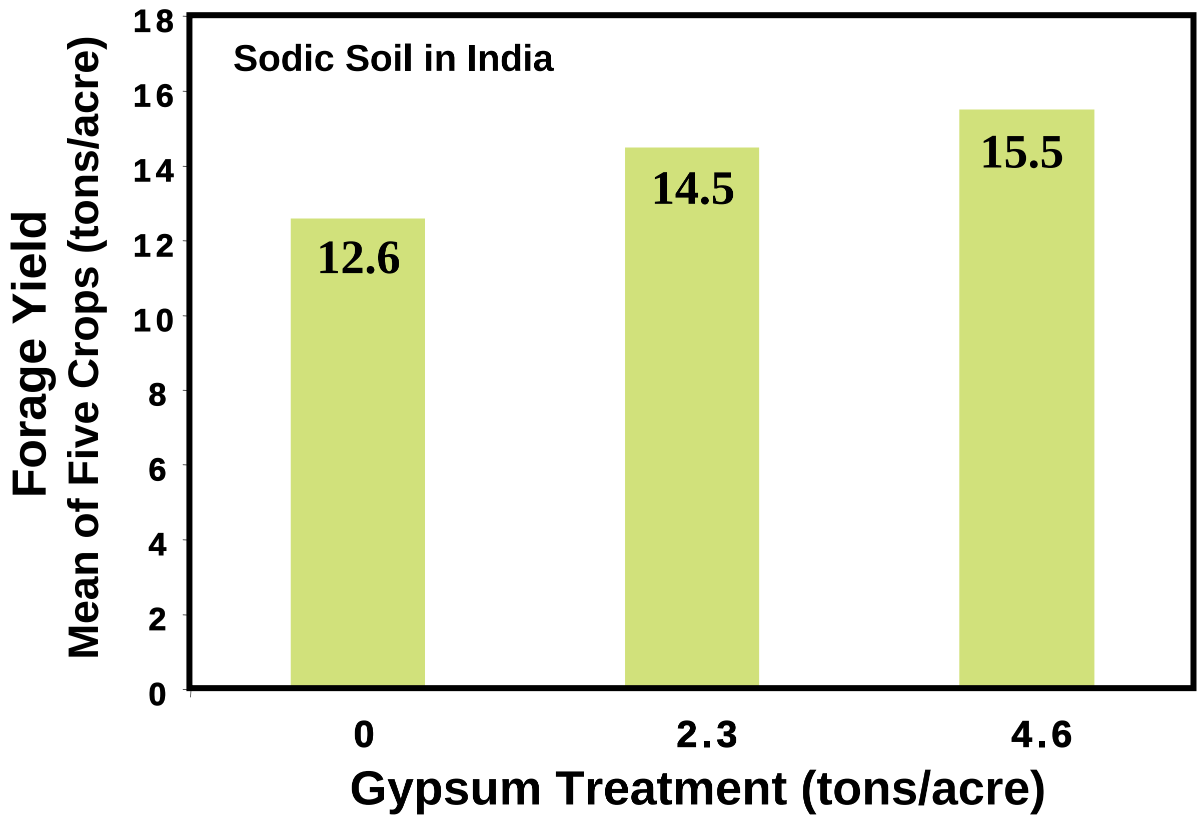

(Black and Cameron, *New Zealand J. Agric. Res.* 27:195-200, 1984)

# *Forages (Subsoil Acidity)*



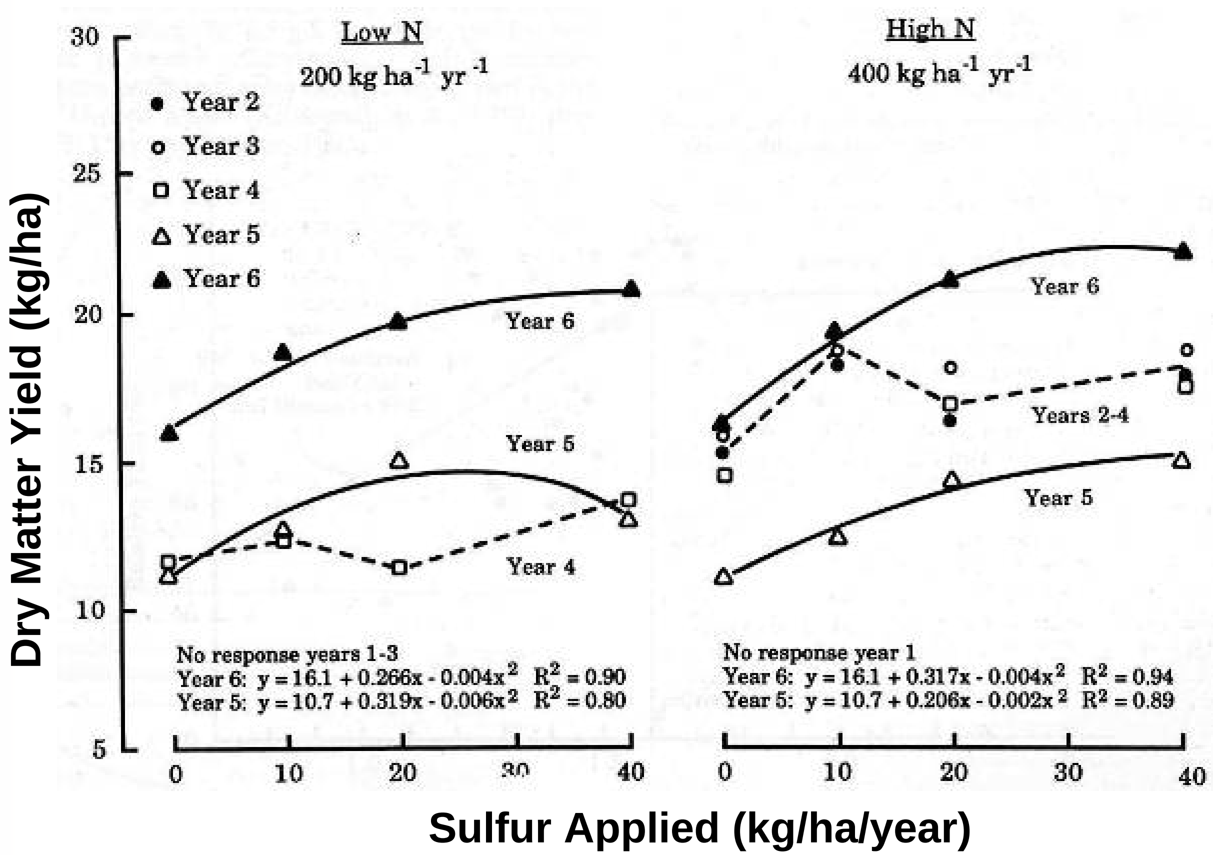

(Bouton, *Crop Science*, 26:334-336, 1986)

# *Forages (Soil Chemical/Physical Properties)*



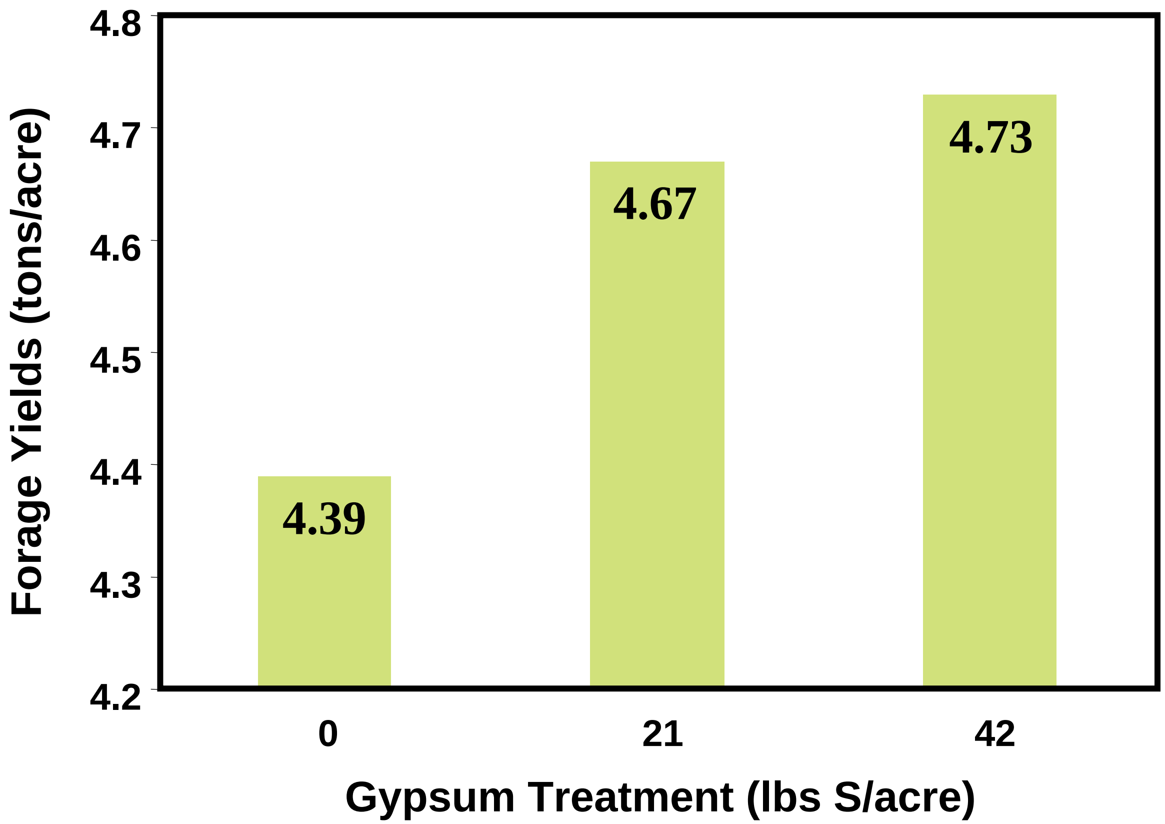

**(Kumar, *Expl Agric.*, 24:97-103, 1988)**

# *Forages (Sulfur Nutrition)*



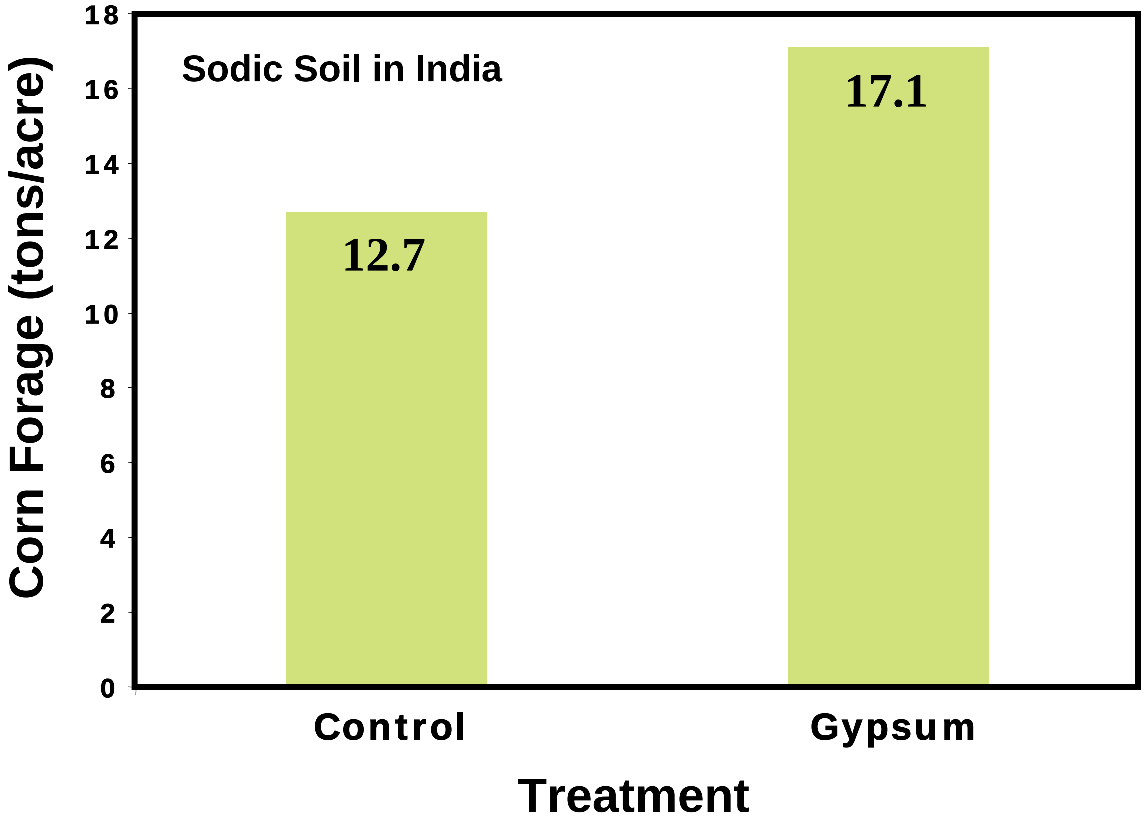

(Mitchell and Blue, *Agron. J.*, 81:53-57, 1989)

# *Corn Silage (Sulfur Nutrition)*



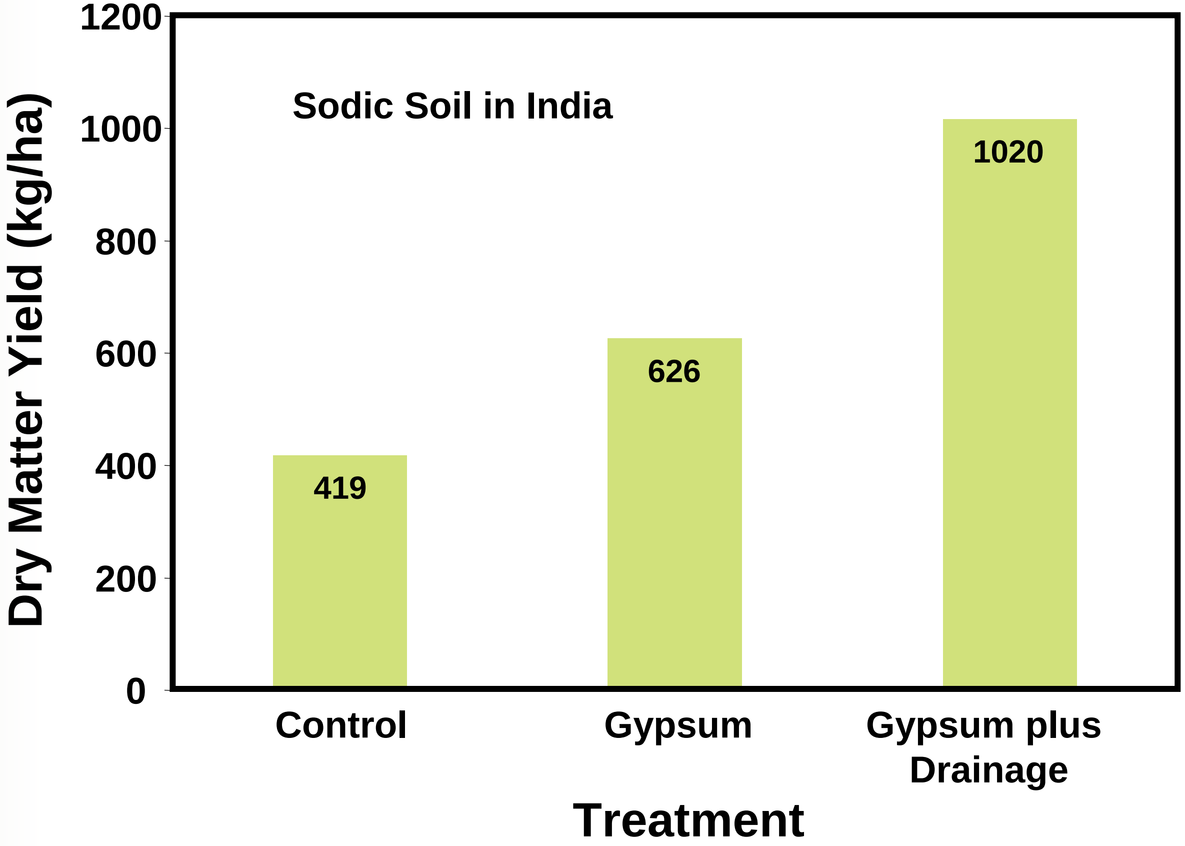

(Kless et al., *Grass and Forage Science*, 44:277-281, 1989)

# *Forages (Soil Physical Properties)*



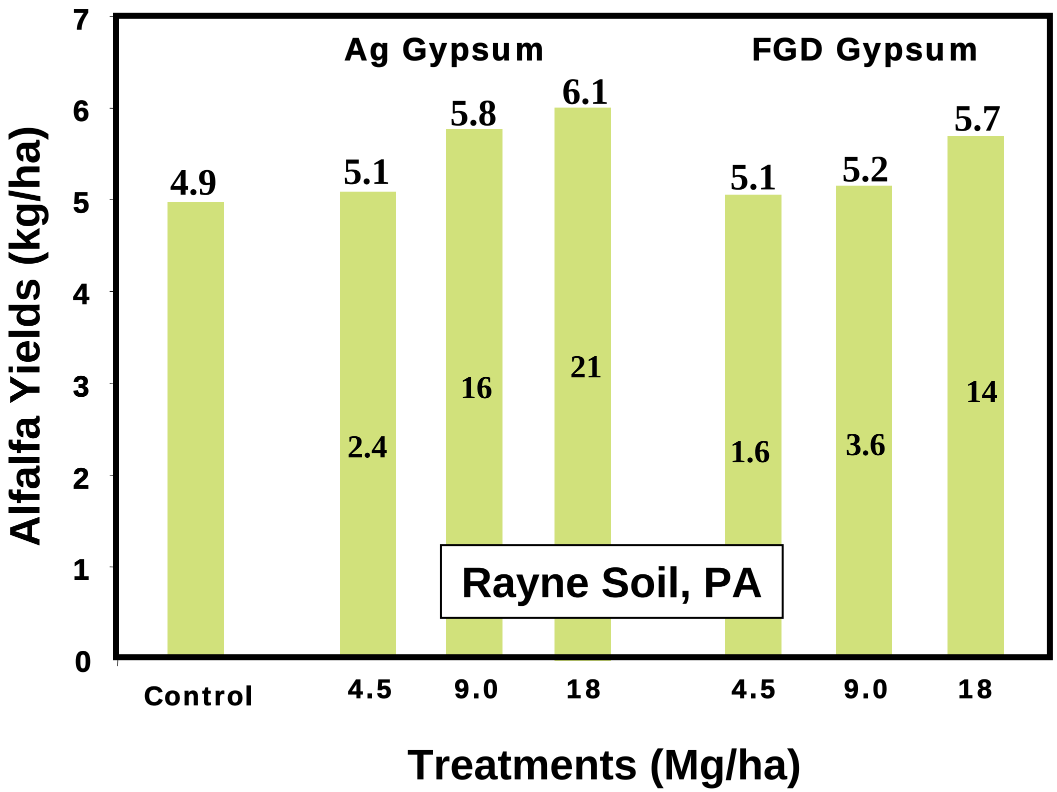

(Kumar, *Expl Agric.*, 26:185-188, 1990)

# *Forages (Subsoil Acidity)*




**(Gupta and Arya, *J. Arid Environ.*, 30:67-73 (1995)**

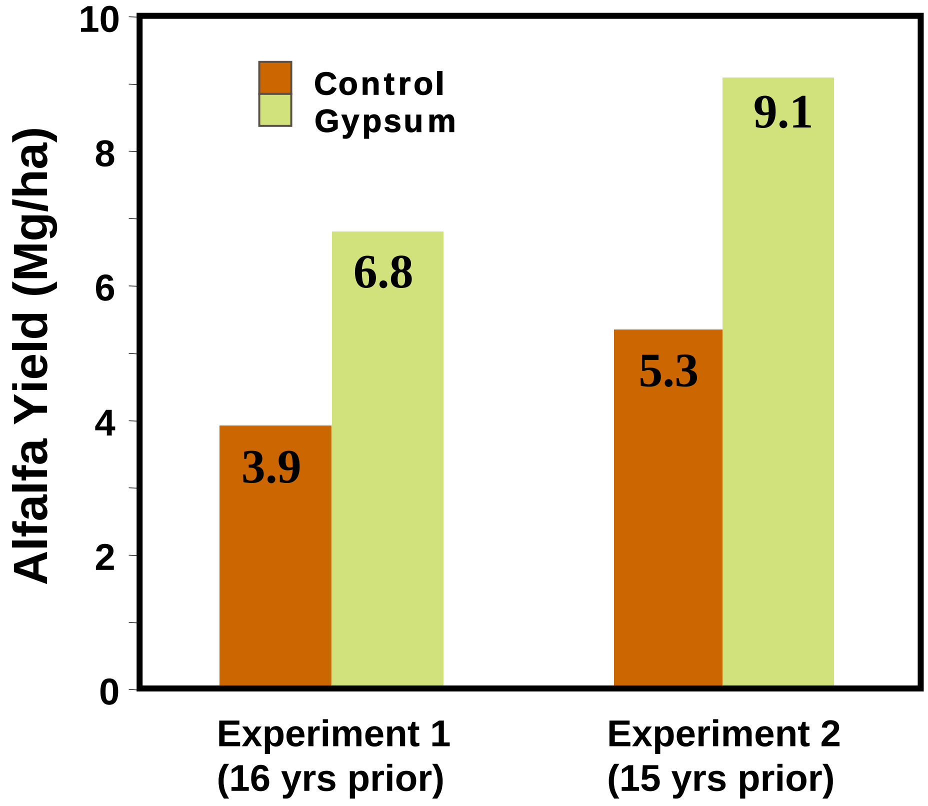
# *Forages (Subsoil Acidity)*




Soluble Al content in the 45-60 cm soil layer was decreased 43% by treatment regardless of gypsum source.

Stout and Priddy, *Commun. Soil Sci. Plant Anal.*, 27:2419-2432, 1996)

# *Forages (Subsoil Acidity)*




**Toma et al., *Soil Sci. Soc. Am. J.*, 39:891-895, 1999)**

## *Forages (Chemical and Physical Properties)*

- A study in Wisconsin using wallboard gypsum (16 tons/acre) showed a positive trend for increased yield of alfalfa at three of four locations (Wolkowski, Commun Soil Sci. Plant Anal., 31:187-199, 2000)

# *Forages (Subsoil Acidity)*

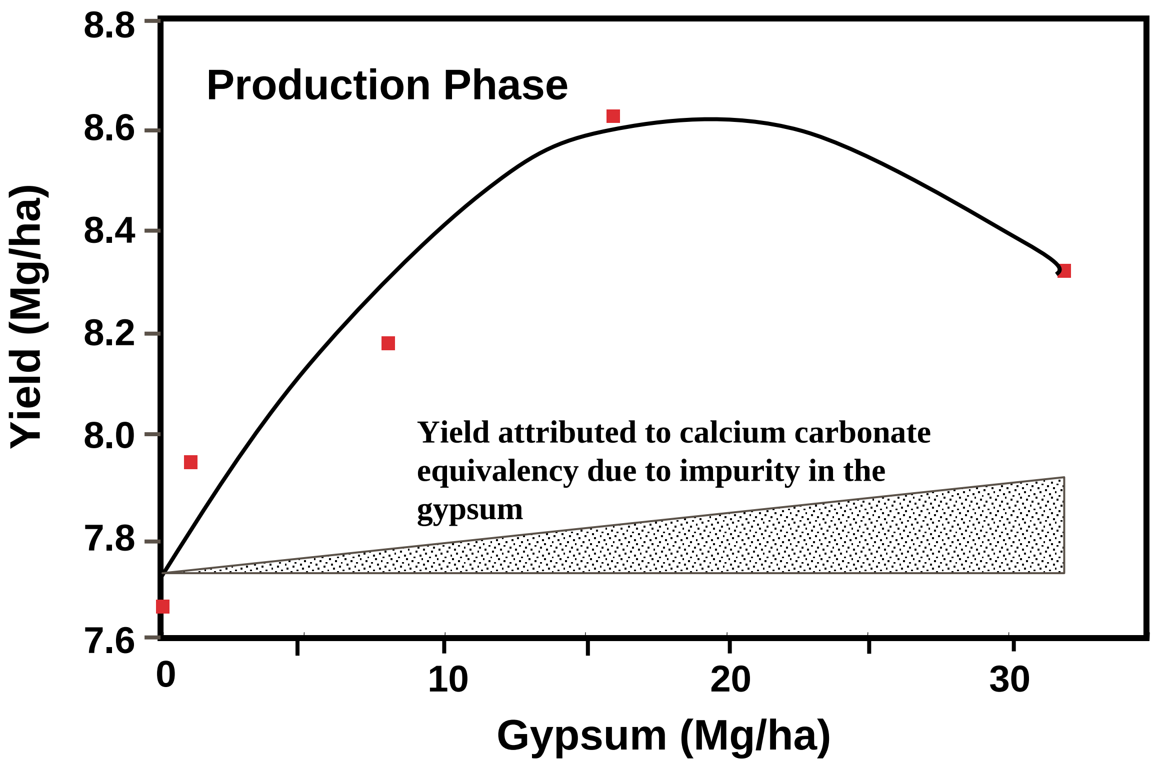
## Achievements in management and utilization of southern grasslands

**CARL S. HOVELAND**

*J. Range Manage*. 53:17-22 January 2000

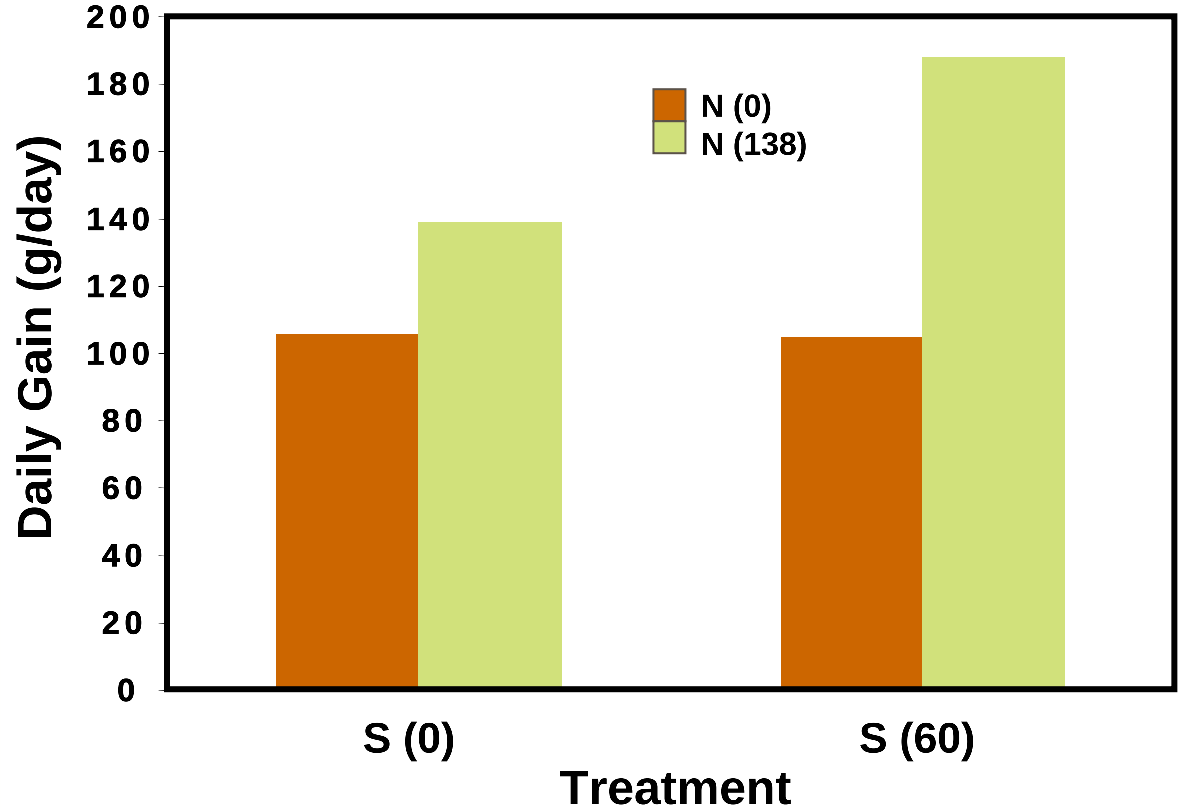
Grasslands in the humid southern USA are utilized primarily for grazing on improved pastures, most of which were developed since the 1930s and 1940s. Future areas of emphasis in improvement of these grasslands may include: (a) greater use of grazing-tolerant grasses and legumes; (b) stress-tolerant tall fescue with "friendly" non-toxic endophytes; (c) feed antidotes to the toxins of endophyte-infected tall fescue; (d) use of herbicide-and pest-resistant biotechnology genes in forage plants; **(e) use of gypsum to alleviate subsoil acidity and improve rooting depth of aluminum-sensitive forage cultivars;** (f) greater use of computers in information access and decision making by livestock producers; (g) greater use of forages for wildlife food; (h) breeding of pasture plants with greater winter productivity; (i) development of a perennial grass biomass energy industry for electrical generation and liquid fuel production.

# *Forages (Subsoil Acidity)*



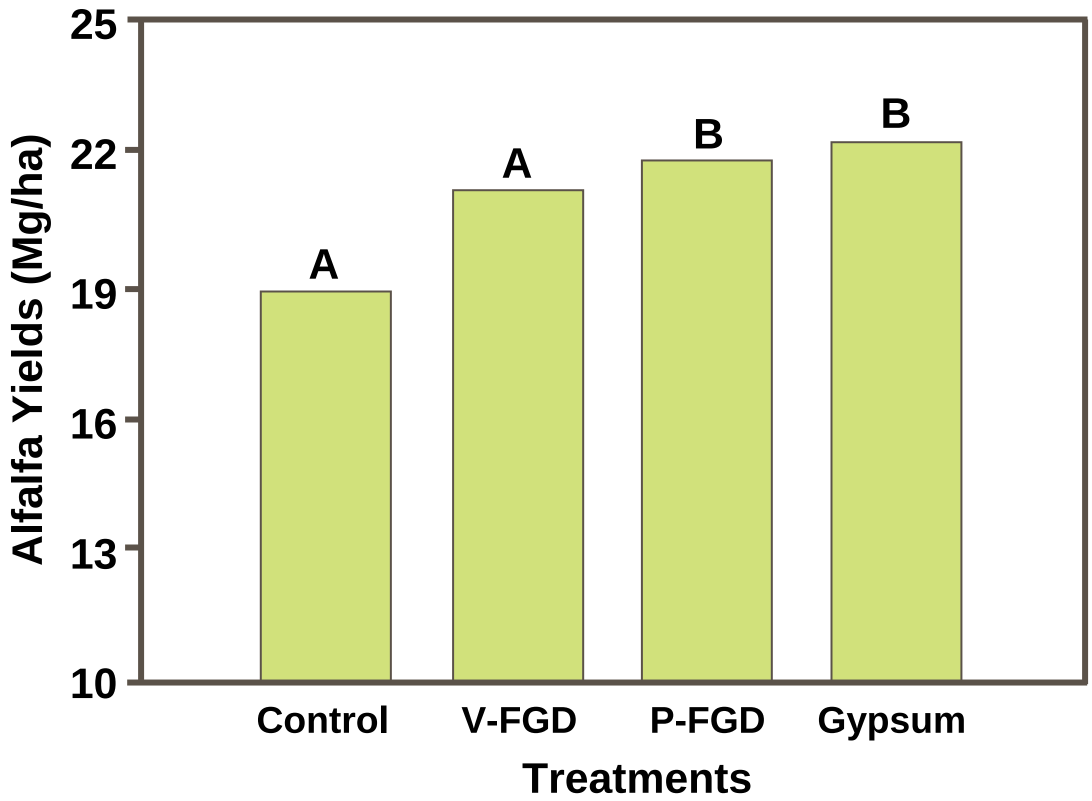

(Ritchey and Snuffer, *Agron. J.*, 94:830–839 (2002)

# *Forages (Quality)*



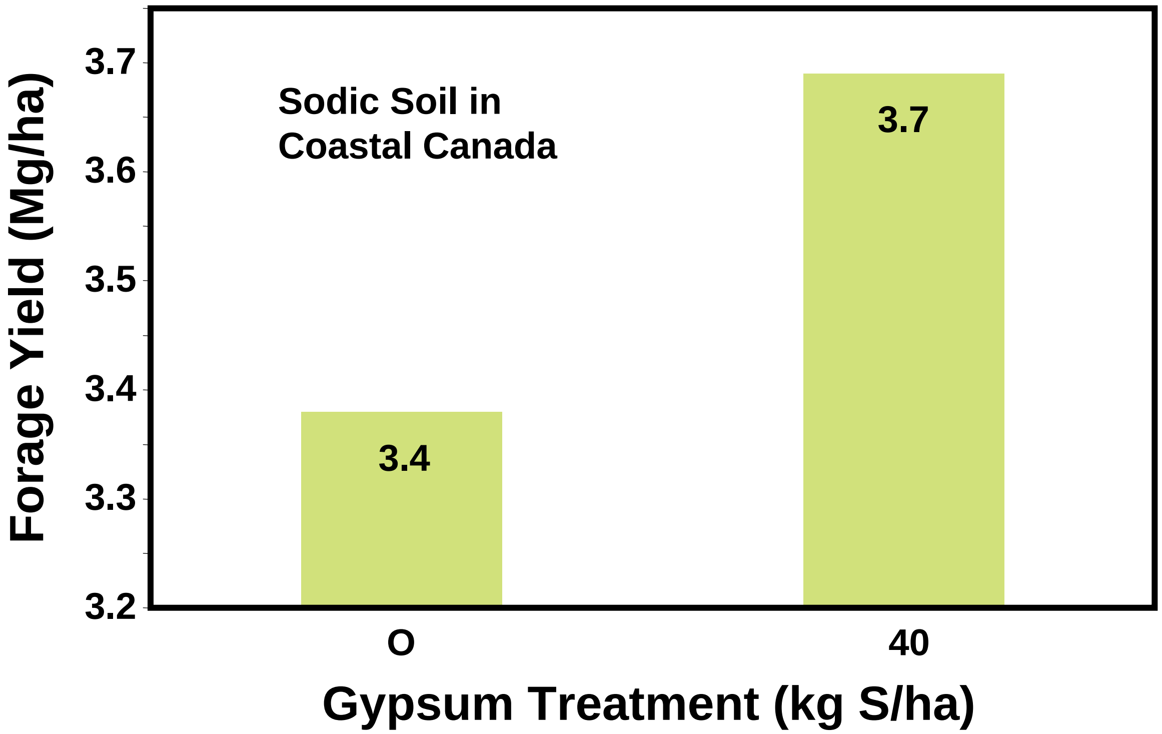

(Wang et al., *Nutr. Cycl. Agroecosystem,* 62:195–202 (2002)

# *Forages (Sulfur Nutrition)*




**(Chen, Dick and Nelson, Jr., *Agron. J.*, 97:265-271, 2005)**

# *Forages (Sulfur Nutrition)*




**(Zheljazkov et al., *J. Environ. Qual.*, 35:2410–2418 (2006)**

# *Conclusions*

- The scientific literature contains numerous examples of corn grain yield and forage yield benefits associated with use of gypsum.
- Benefits for corn and forages seem to be mostly associated with increased sulfur nutrition and reduced subsoil acidity.
- Treating sodic soils with gypsum increases productivity of the soil for crop production.
- Benefits of gypsum use may persist for several years after application to soil.
- Inappropriate use of high rates of gypsum can decrease yield (due to nutrient imbalances).

# Thank You