Crop and Soil Responses to Fibrous Paper Mill Sludge

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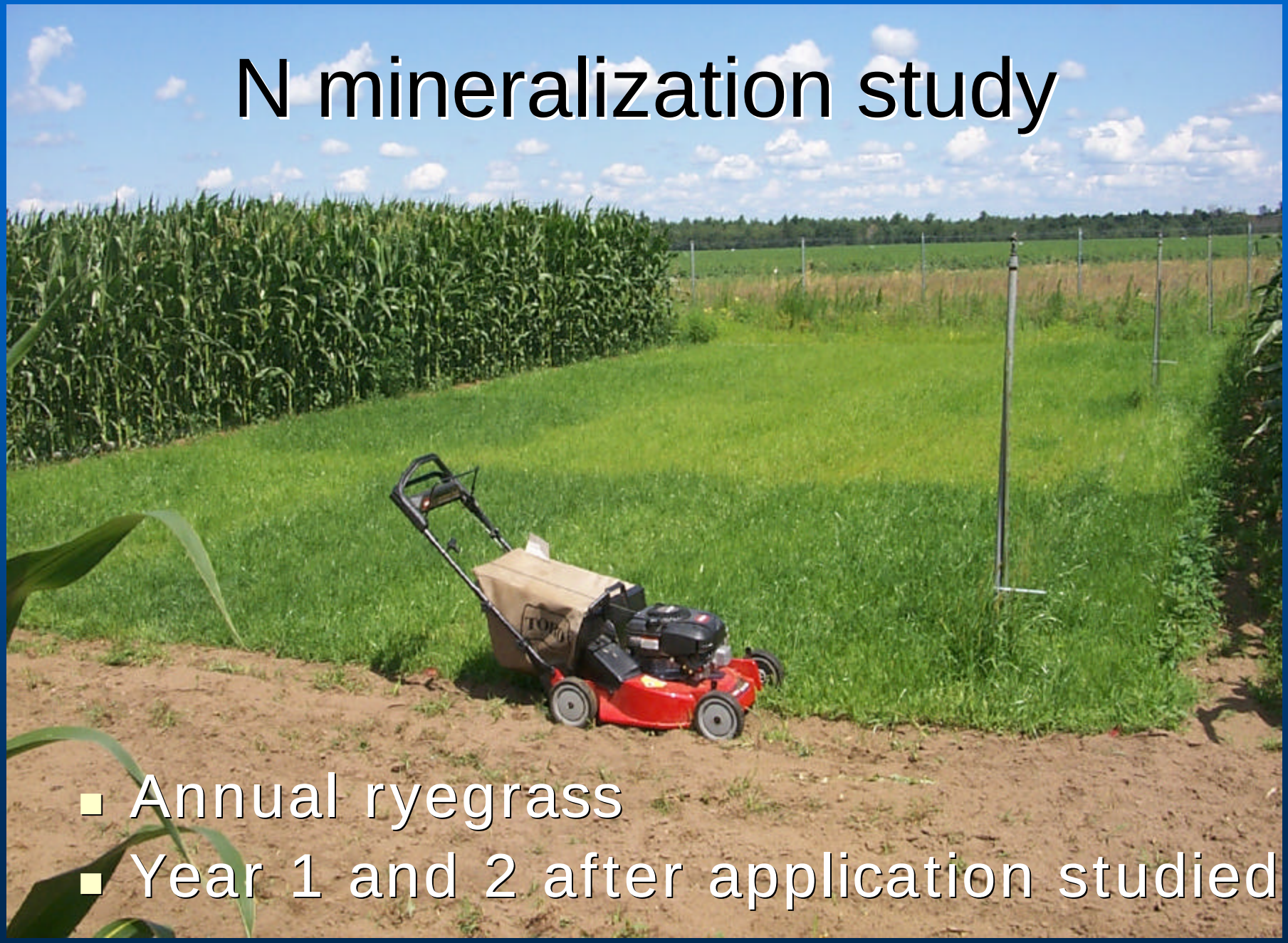
Background

- Early work began in the 1970's
- Land spreading started in the 1980's
- Multiple test sites used – Portage, Juneau and Wood Counties
- Consogro program initiated

Varying C:N ratios in early greenhouse studies


N mineralization study in greenhouse

N mineralization study



- Annual ryegrass
- Year 1 and 2 after application studied

High rate of sludge

Main treatments

- All required N from paper mill sludge, based on 25% availability
- All N from commercial fertilizer
- 50% of N from sludge and 50% from commercial fertilizer


Split applications of N

Crops studied (1993-present)

- Field corn – 5 years
- Sweet corn – 9 years
- Soybeans – 4 years
- Snapbeans – 5 years
- Potatoes – 9 years

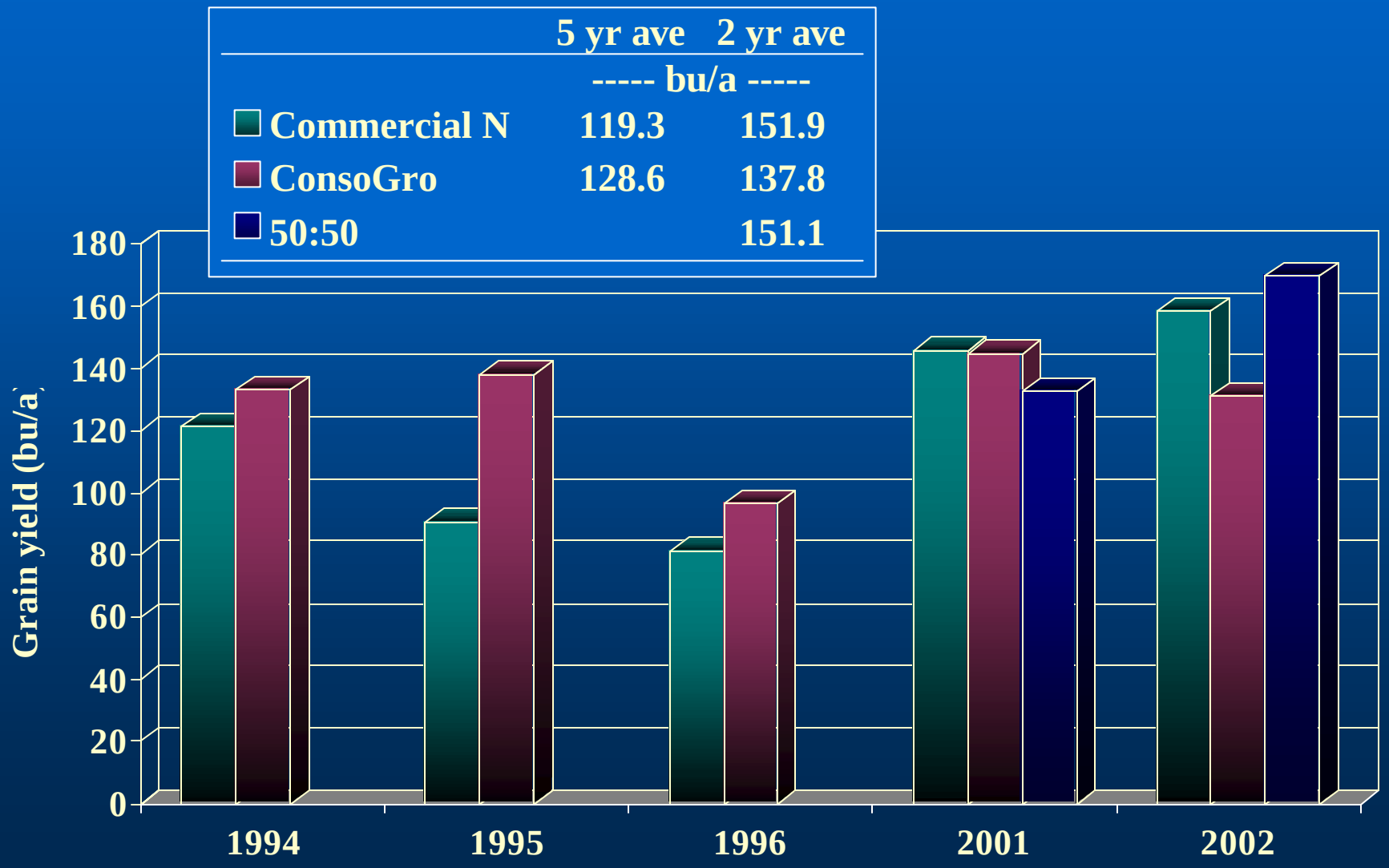
Effect of sludge treatment on soil test parameters

	1994		2000	
Soil test parameter	Pre-plant	Post-harvest	Pre-plant	Post-harvest
pH	6.4	6.2	6.1	6.5
OM	1.0	1.4	1.7	1.8
K	131	115	176	150
Ca	358	623	477	877
SO_4-S	3.4	8.1	3.9	4.8
TN	300	500	328	748

1994 and 2000 were the first years of application at two different study locations.

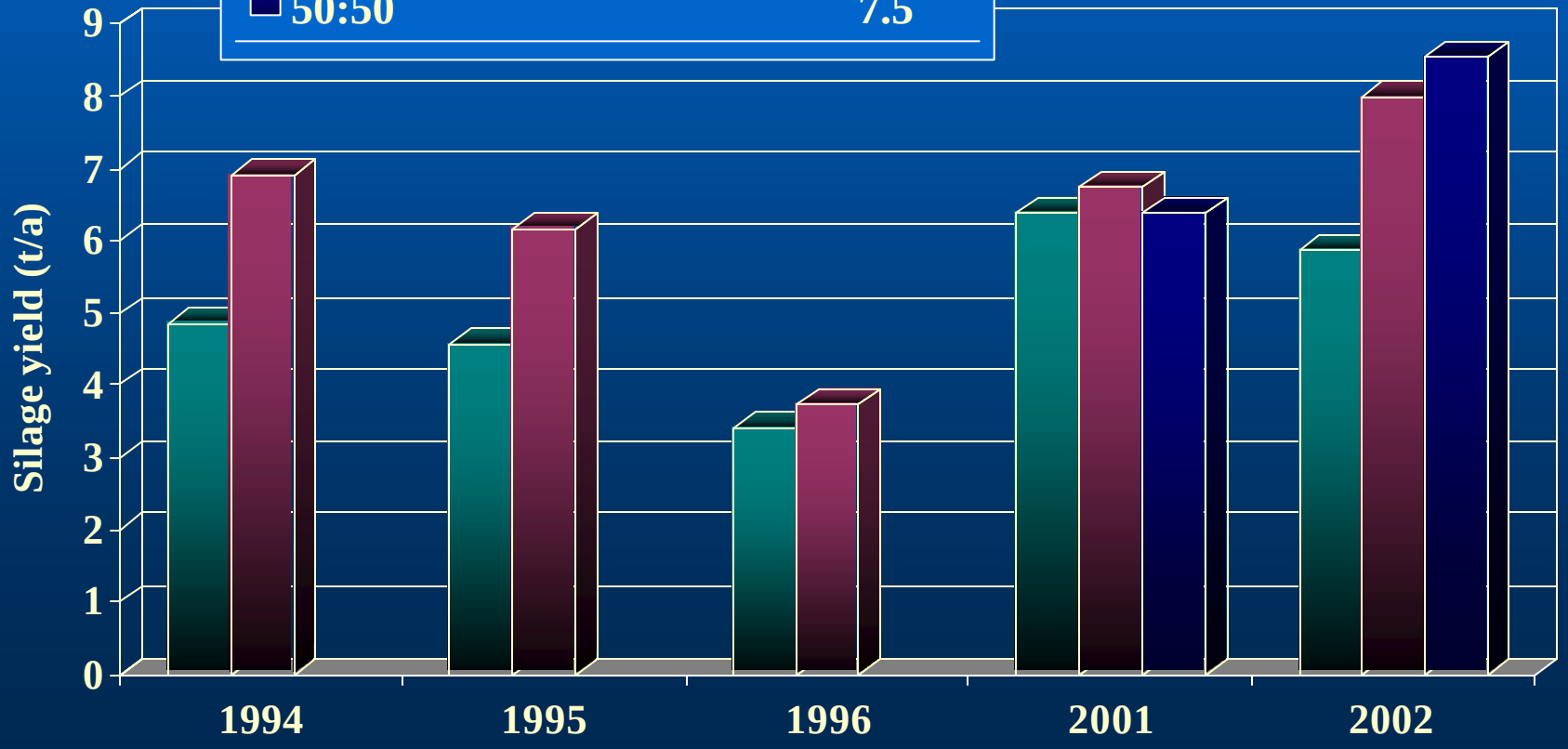

All N from sludge
Commercial N
50:50 treatment

Field corn grain yield



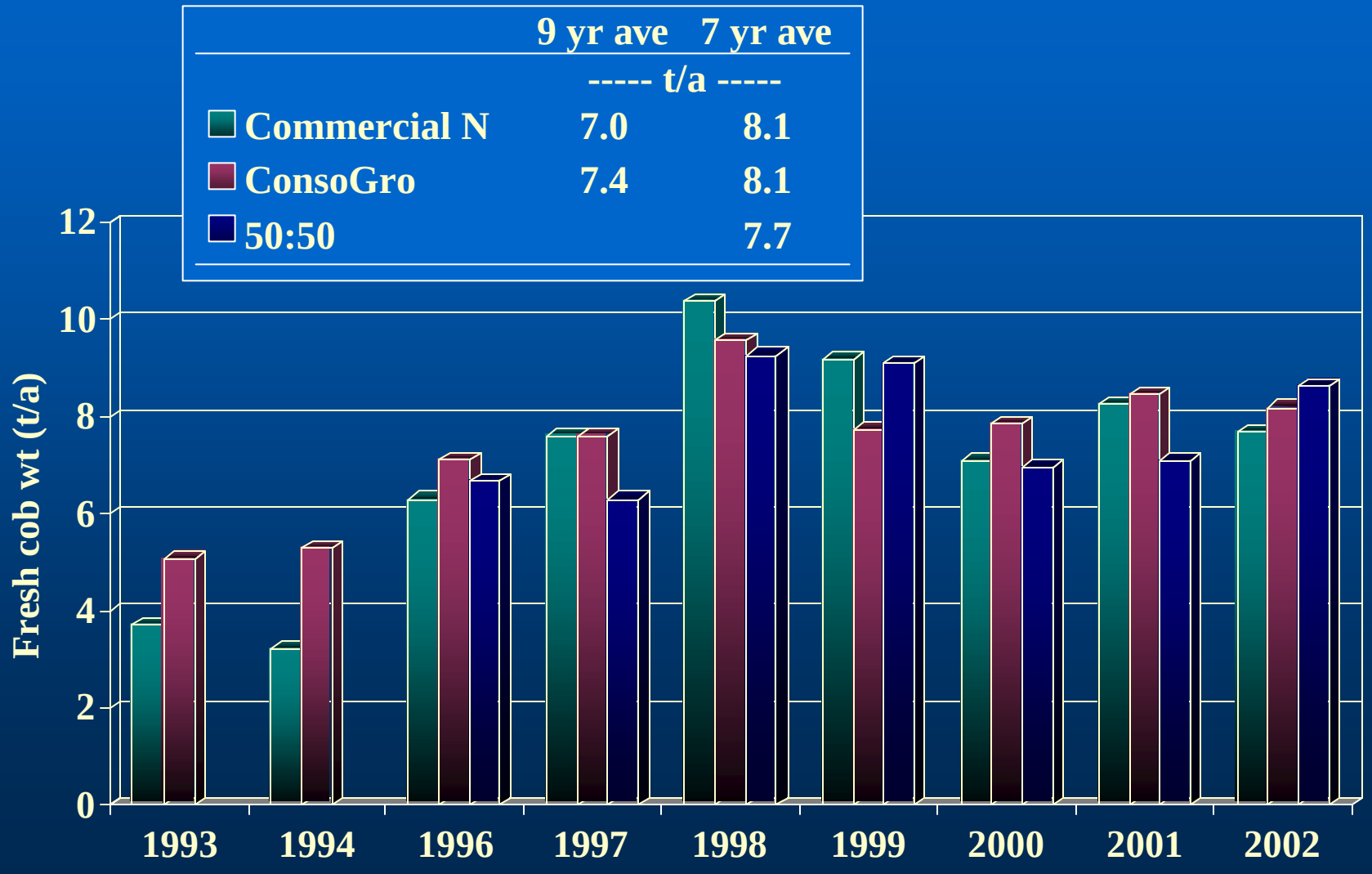
Corn silage yield

	5 yr ave	2 yr ave
	----- t/a -----	
Commercial N	5.6	7.5
ConsoGro	6.3	7.4
50:50		7.5



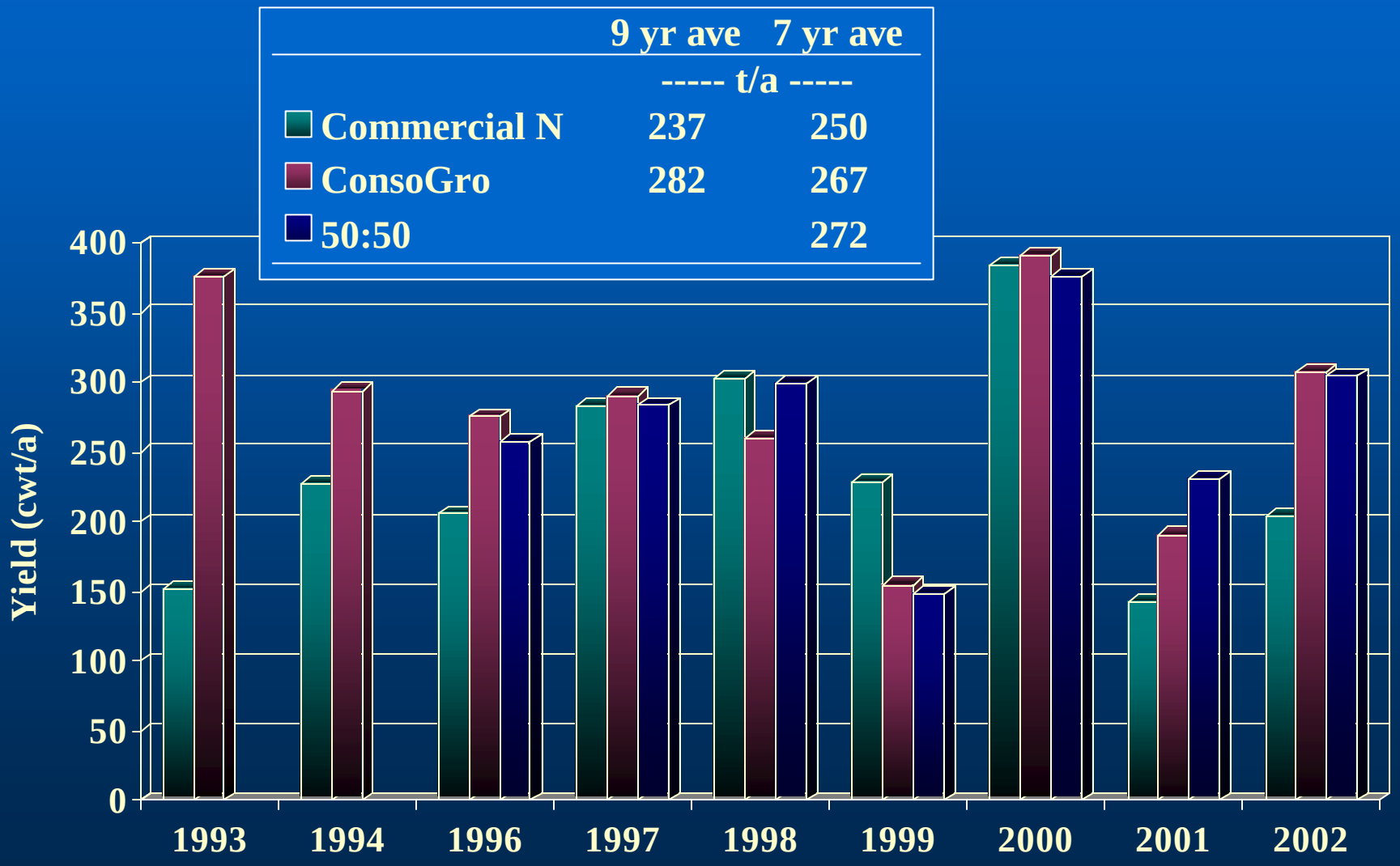

Sweet Corn
Treatment

Sweet corn yield



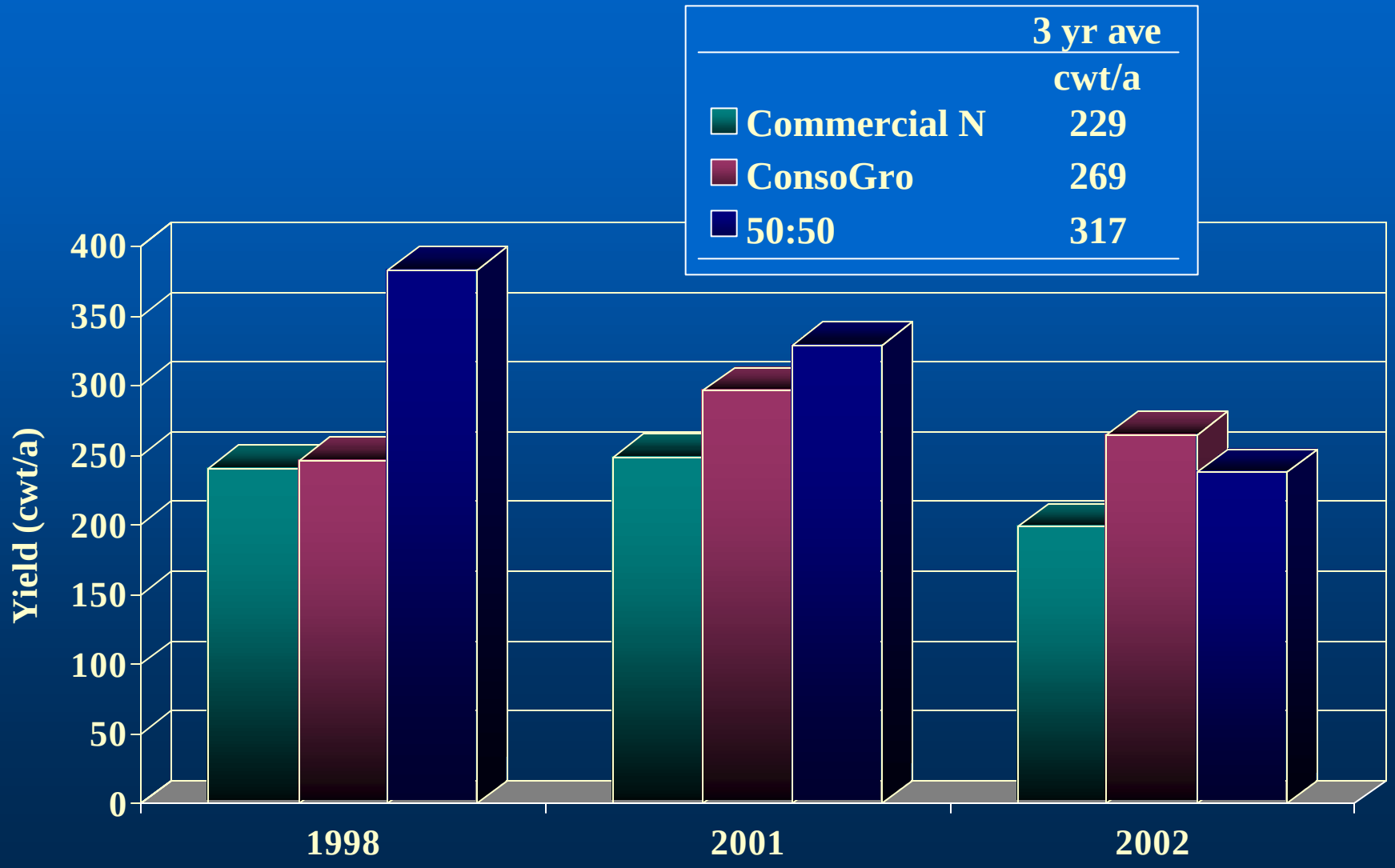

Potatoes
Treatment

Red Norland potato yield

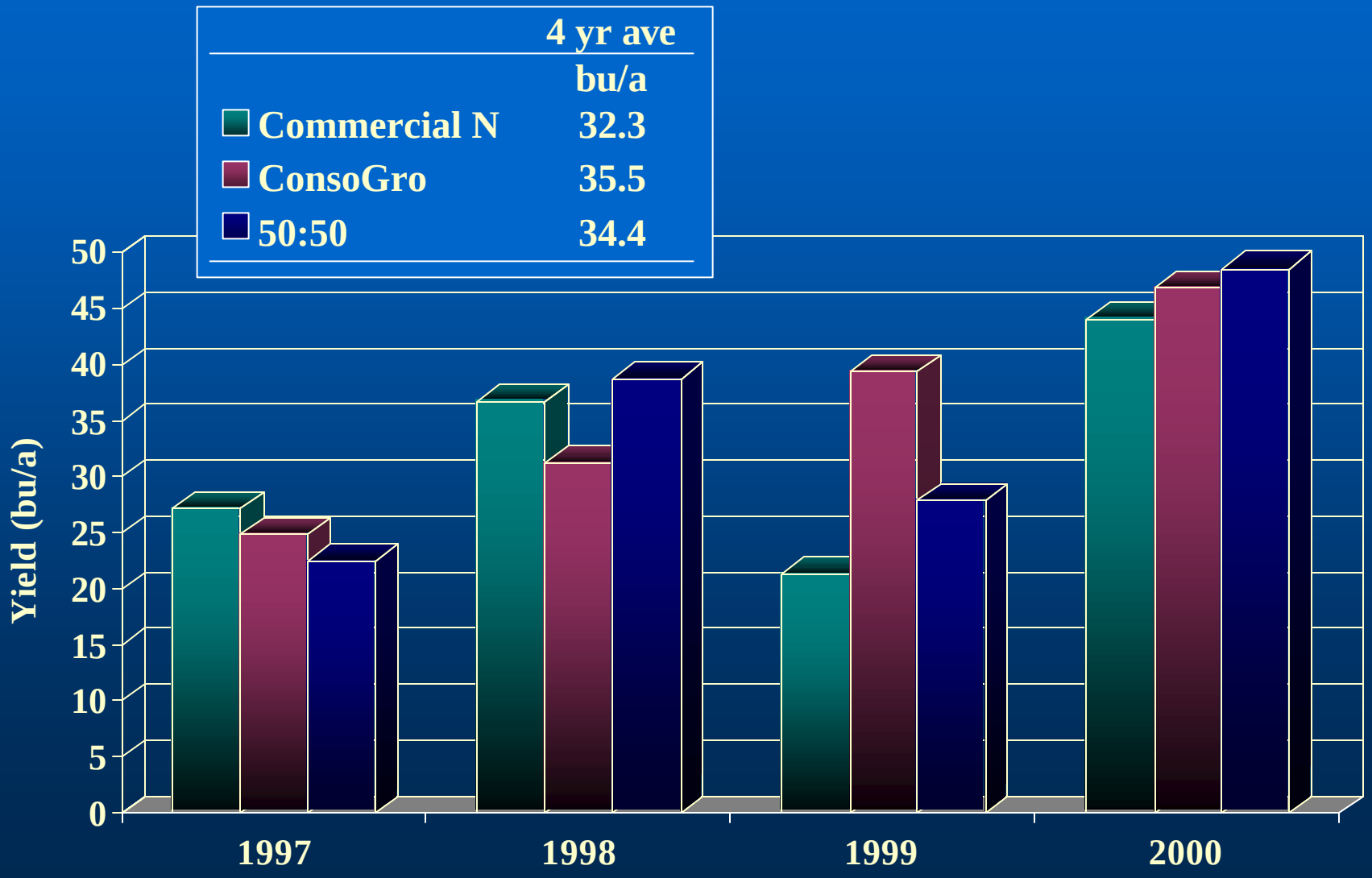


Red and White Varieties

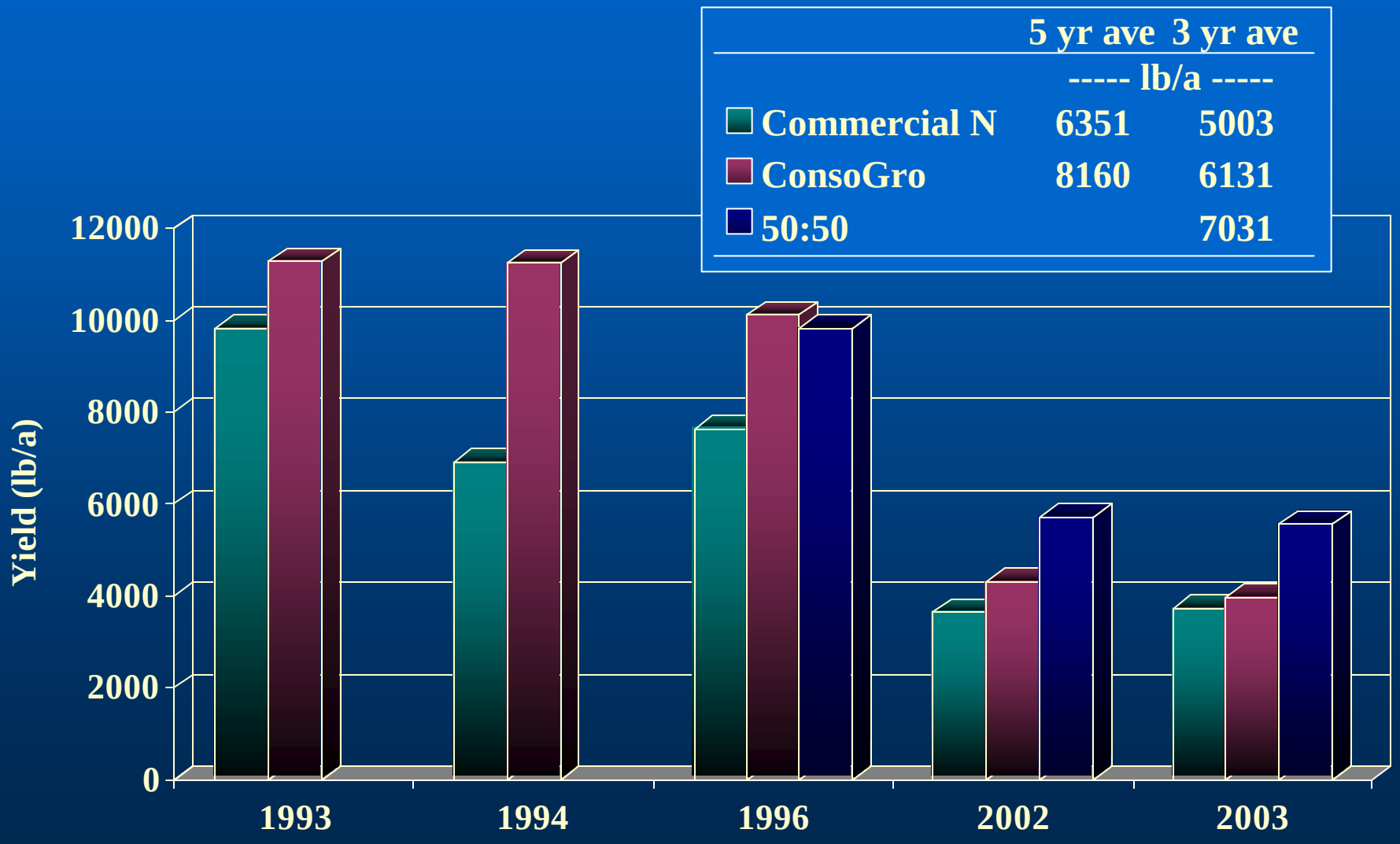
White potato yield



Soybean yield



Snapbean yield



Effect of sludge treatment on mid-season sweet corn earleaf tissue mineral levels

Tissue parameter	1994		2000	
	Comm. N	ConsoGro	Comm. N	ConsoGro
N	2.73	3.11	2.78	2.38
P	0.42	0.47	0.30	0.31
K	2.70	2.46	2.47	2.34
Ca	0.60	0.88	0.38	0.51
S	0.16	0.26	0.29	0.22

Summary

- 1. The application of ConsoGro generally increased soil pH, OM, TN, Ca and SO_4-S, and lowered K
- 2. Crops grown on sludge amended soils yielded as well or greater than on non-amended soil
- 3. Soil physical properties were enhanced with sludge additions