

# *Nitrogen, Phosphorus, pH, and Organic Matter on Leafy Spurge*

## *Infested Rangeland in*

### *Southwestern, North Dakota*

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### **Introduction**

Soil samples were taken on N½ of section 29 of T141N, R103W of Golden Valley County. Section 29 is presently separated into four pastures and managed by two different grazing treatments (seasonlong and 3 pasture twice-over rotation) and is one of two sections of rangeland presently involved in a leafy spurge research/demonstration grazing study (part of TEAM Leafy Spurge). The study is looking at the use of multiple control measures in controlling leafy spurge using sheep and insects. Cow/calf pairs and ewes graze both sections, as a multi-species approach. The grasslike plant community on this section was dominated by blue grama, western wheatgrass, and threadleaf sedge on silty range sites, and western wheatgrass, inland salt grass, foxtail barley, and sandberg bluegrass dominated the saline lowland range sites.

The objective of the soil sampling was to detect if there was a difference between non infested native sites and leafy spurge infested sites in nitrogen, phosphorus, organic matter, and pH. This study area displayed a mosaic pattern of dense green leafy spurge patches with a under story of a number of graminoid species, however, non infested sites showed evidence of been denuded of elements needed for plant growth or a results of heavy grazing pressure in the past. Our hypothesis was that native sites would be lower in nitrogen, phosphorus, and organic matter, and have a higher pH in the soil depth of 0-6 inches, and overtime there would be changes within treatments.

### **Procedure**

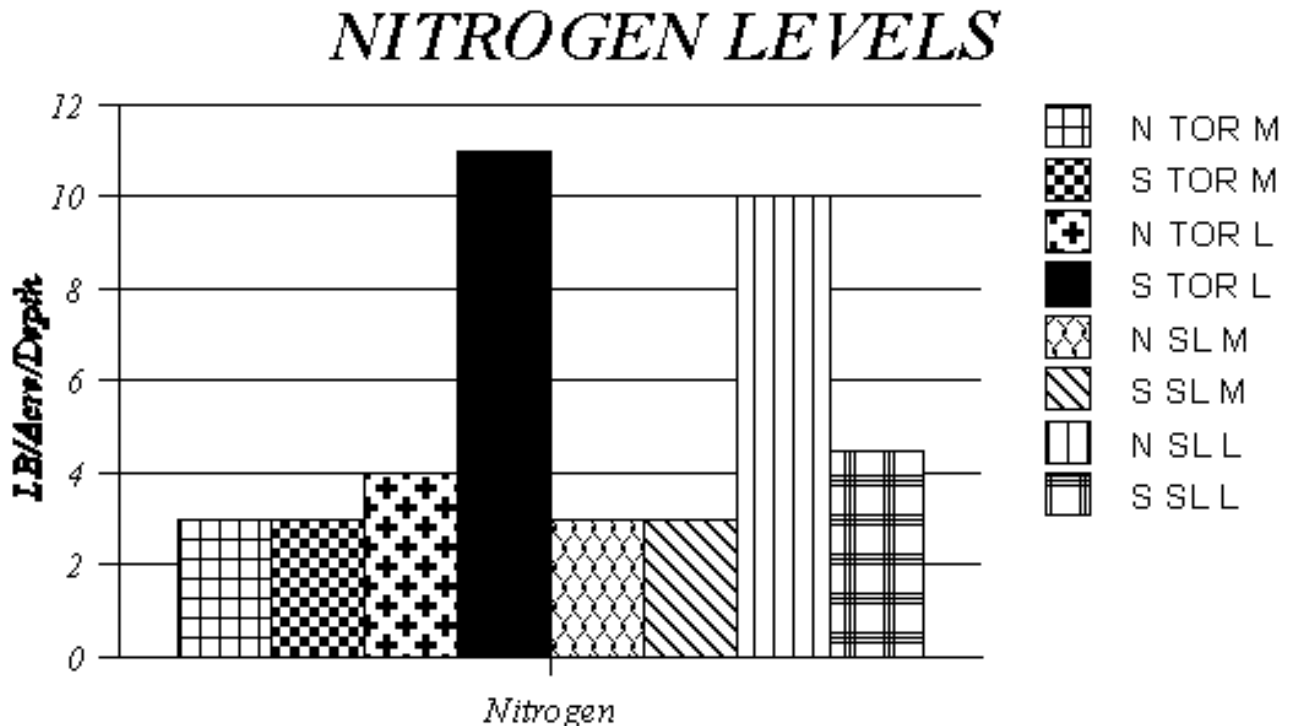
A total of sixteen samples was systematically taken on the third week of July, on two different range sites within the study site. The two range sites chosen made up most of the study area. Eight samples (four leafy spurge sites and four native sites) were collect on a saline lowland site (lowland) and eight were collect on a silty range site (midland). Soil samples were taken from 0-6 inches in depth and were collect from both grazing treatments. We recorded each sampling site on a map so that we could return to the sites each year to detect any changes that might occur with the different grazing practice. We will take samples the third weekend of July each year throughout the duration of the grazing study (four years).

## Results

Results showed that non infested sampling sites and infested sampling sites were similar in nitrogen, phosphorus, pH, and organic matter, with the exception of the pH level on lowland sites (figure 1, 2, and 3). The pH level was generally higher on a non infested lowland sites than infested lowland sites. Soil analysis did show a negative correlation between pH and the percent of organic matter present. Sites with a higher pH had a lower percent of organic matter present in all sampling sites and treatments. Visual observation of the two range sites, silty and saline lowland, showed that there was no difference in graminoid species richness, the number of grass species, within leafy spurge infested and non infested sites.

## Future

In the future we plan to continue sampling the sites and increase the number of samples by systematically choosing other silty and saline lowlands in study area. The demonstration grazing study is large scaled study consisting of two replicated grazing treatments, so we plan to expand our sampling to the second replication. Leafy spurge stem densities and soil moisture will be collected on both replications in 1999 and throughout the duration of the study.

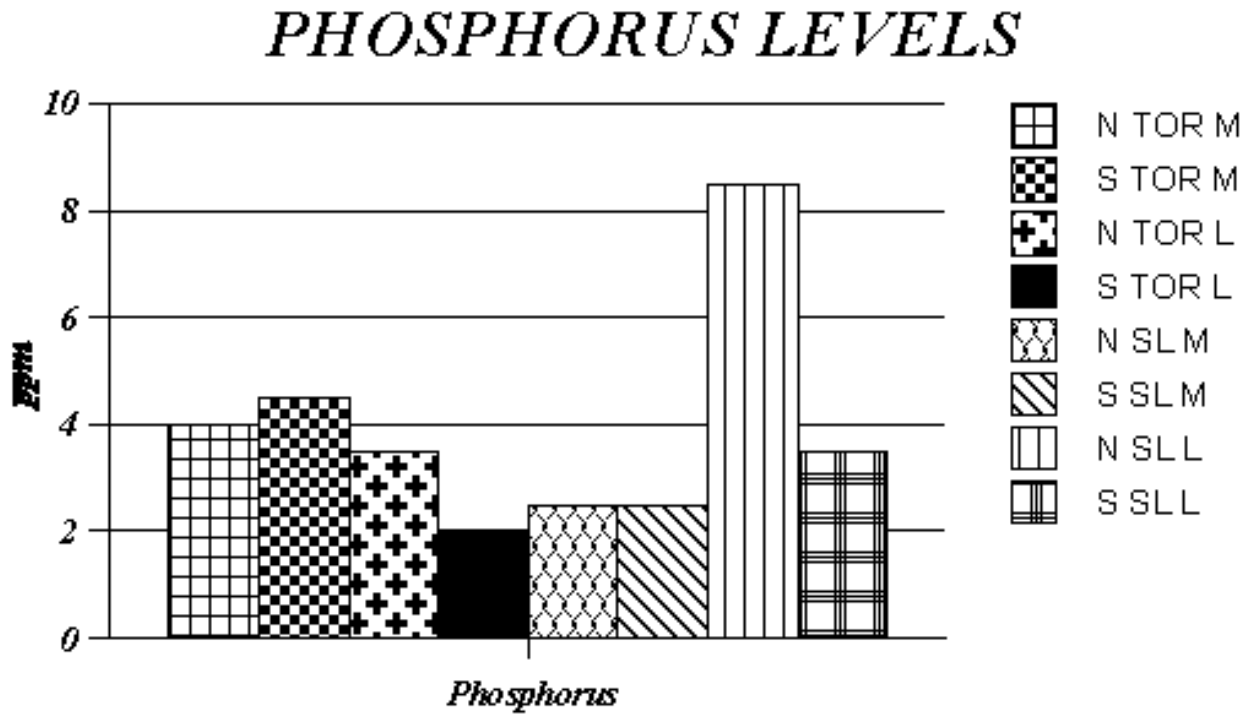


**Figure 1.**

Level of nitrogen on

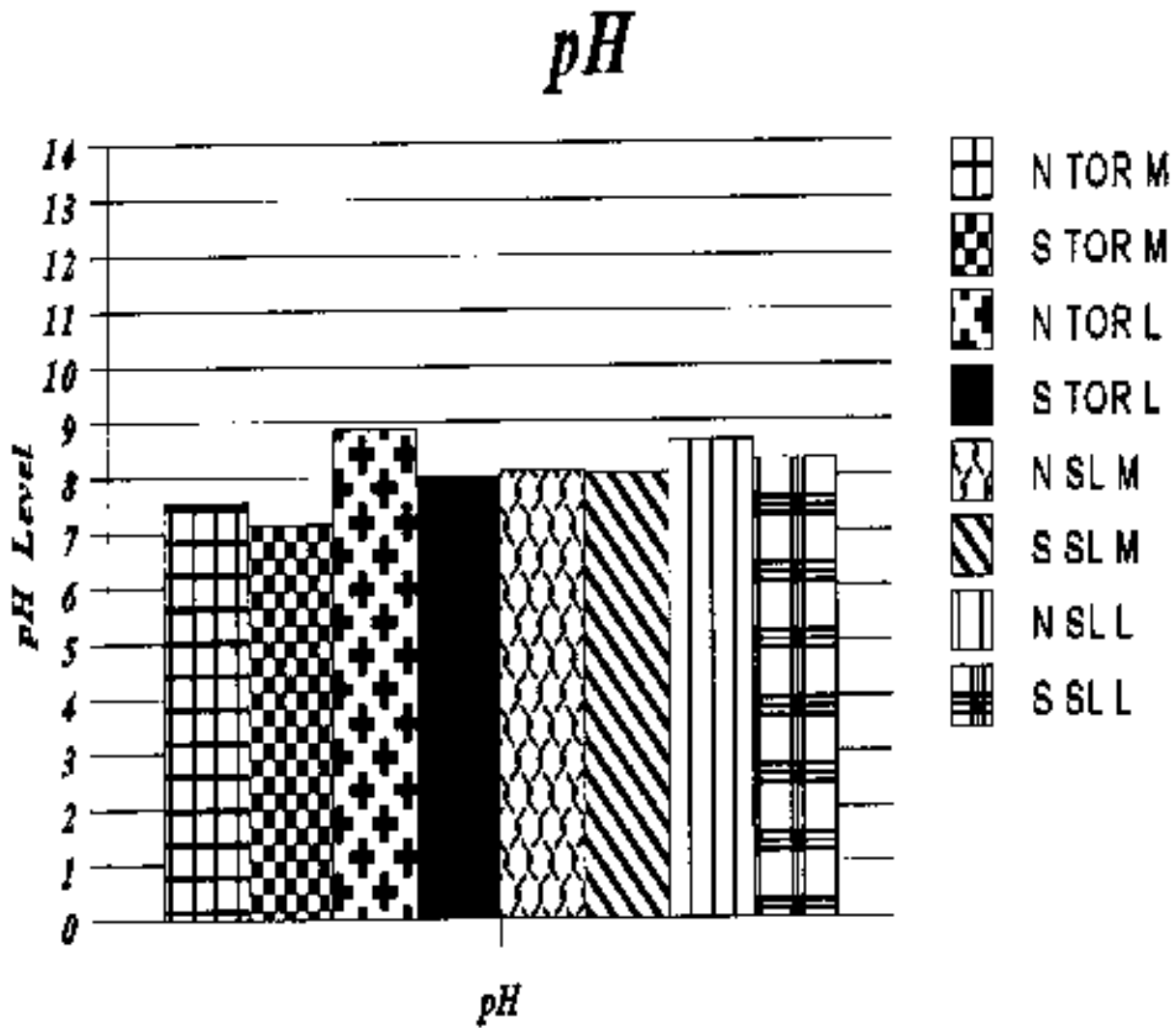
leafy spurge infested sites (S) and non infested sites (N) in southwestern North Dakota, within treatments (twice-

over rotation (TOR) and seasonlong (SL)) on midland (M) and saline lowland (L) sites, in 1998.



**Figure 2.**  
Level of  
phosphorus on  
leafy spurge

infested sites (S) and non infested sites (N) in southwestern North Dakota, within treatments (twice-over rotation (TOR) and seasonlong (SL)) on midland (M) and saline lowland (L) sites, in 1998.



**Figure 3.** Level of pH and percentage of organic matter on leafy spurge infested sites (S) and non infested sites (N) in southwestern North Dakota, within treatments (twice-over rotation (TOR) and seasonlong (SL)) on midland (M) and saline lowland (L) sites, in 1998. Organic matter in this chart is the percent by ignition.



