

## PROGRESS REPORT - 1996

S.S. Malhi, Agriculture and Agri-Food Canada,

Research Centre, Lacombe, Alberta T4L 1W1

**Project: Maximizing Forage Productivity by Improving Effectiveness of P Fertilizer**

### I. Objectives

1. To determine the effect of various levels of P on dry matter and protein yield of alfalfa and smooth brome grass grown for hay in central Alberta.
2. To compare the effect of broadcast versus banding, low annual versus single high initial rates, and fall versus spring application of P on dry matter and protein yield of alfalfa and smooth brome grass grown for hay.

### II. Activities

Field experiments on alfalfa received P fertilizer in fall, 1995 and spring, 1996 on the existing stands. The plots were harvested two times during growing season in 1996 (i.e., late June and mid September) for hay yield and the finely-ground plant samples are being analyzed for total N and P. All plots were soil sampled in late September, 1996 to a depth of 0-7.5, 7.5-15, 15-22.5 and 22.5-30 cm. The soil samples were air dried and ground, and are being analyzed for extractable P, total N, organic matter and pH.

### **III. Results and Discussion**

There was a substantial increase in dry matter yield (DMY) from annual P applications in 1996 and forage yields continued to increase up to 30 kg P/ha rate (Table 1). Single high initial applications at 50, 100, 150 and 200 kg P/ha rates produced less forage yield than the annual applications of 10, 20, 30 and 40 kg P/ha, respectively. Disc-banding generally produced greater forage yield than surface-broadcasting for both annual and single initial applications. Broadcast P at 20 kg/ha applied in fall produced slightly higher forage yield than similarly applied P in the spring.

### **IV. 1997/98 Action Plan**

1. Complete chemical analyses of plant and soil samples.
2. Complete statistical analyses and final report.

Table 1. Influence of rate, mode and method of P application on dry matter yield (DMY) of alfalfa in a field experiment at Ponoka in north-central Alberta in 1996.

Fertilizer treatment		Rate of P (kg P/ha)	DMY (kg/ha)		
Mode/time of application	Method of placement		Cut 1	Cut 2	Total
Annual, spring	Broadcast	10	3820	2045	5865
		20	5486	2954	8440
		30	5343	3960	9330
		40	5211	3508	8719
	Disc-band	10	5200	2974	8174
		20	5854	3966	9820
		30	5862	4017	9879
		40	6295	4196	10491
Single, initial	Broadcast	50	2877	2061	4938
		100	3991	2817	6808
		150	3953	2456	6409
		200	5237	3111	8348
	Disc-band	50	4036	2615	6651
		100	4338	2838	7176
		150	5898	3393	9291
		200	5394	3768	9162
Annual, fall	Broadcast	20	1992	1039	3031
Check		0	4972	3753	8725