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The Potash/Phosphate Institute

Potassium and Phosphorus Research on Field Crops

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REPORT OF 1980 PHOSPHORUS AND POTASSIUM RESEARCH
RECEIVING SUPPORT FROM THE POTASH/PHOSPHATE INSTITUTE
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This report on 1980 research receiving partial support from PPI will cover the four areas of research proposed in our 1980 research proposal. The discussion of each study will be relatively brief with several of the individual discussion and research results taken from the 1980 Kansas Fertilizer Research Report of Progress. It should be recognized that several Experiment Field personnel and graduate students were involved in the research reported here.

I. CROP QUALITY EFFECT OF P AND K FERTILIZATION OF IRRIGATED ALFALFA

MANAGEMENT OF IRRIGATED ALFALFA

Sandyland Experiment Field
Jim Ball, George TenEyck, David Kissel, and David Whitney

An irrigated alfalfa management study was designed during 1974-1975 by several people including R. L. Vanderlip, Larry Murphy, Gerry Posler, E. Sorensen, and the authors.

The objectives are to determine (1) the forage yield and nutrient removal of alfalfa to several levels of P_2O_5 applied preplant, annually and split during the growing season; to three levels of K_2O and to one level of sulfur: (2) the forage yield, forage quality and stand persistence to three cutting management systems: and (3) whether an additional late fall cutting will reduce stand persistence under different fertility rates. This study is located on two sandy soil types; Pratt loamy fine sand and Naron loamy fine sand.

Two varieties, Kanza and Marathon, were seeded September 4, 1975 following wheat. The cutting managements are as follows: cutting each time at the bud stage, at the 1/10 bloom stage, and cutting alternately at the bud stage and the full bloom stage. Four cuttings were harvested in 1976 and are not included in the following data. Five cuttings were made in 1977 and 1978 with the additional late fall cutting being made only on the bud stage management in 1977 and on the bud and 1/10 bloom managements in 1978. In 1979 and 1980, five cuttings were taken from the bud and 1/10 bloom managements and four cuttings from the alternate cut management all managements had the late fall cutting for the two designated fertility treatments.

Results from this study show a very good response to phosphate fertilizer. The application of 80 # P_2O_5 per acre has produced good yields and is just about maintaining the initial P soil test level

The 120 # P_2O_5/a treatment has produced slightly higher yields and the soil test level of P is slightly higher than the initial level. The yield difference between the 80 lb P_2O_5/a rate and the 120 lb P_2O_5/a rate appears to be increasing as time goes on. The split P_2O_5 treatment has not shown a significant yield increase over applying all of the P_2O_5 in the early spring. There has been very little, if any, significant response to K_2O applications. There has been no significant response to 40 lbs/a of sulfur. (Table 71.)

The yield of crude protein was very good in 1980 but not quite as high as 1979. The yield levels of crude protein follow the same trends as the forage yield except for the high P rate late cutting treatment which dropped in 1980.

The trends of the amounts of nutrient removal follow the same general trends as the forage yield. The higher yielding treatments are removing about 50-55 lbs/a of P and 325-345 lbs/a of K.

The soil test levels of P are higher than the initial soil test level where over 80 lbs/A of P_2O are applied each year. The soil test levels of K have changed very little in the past 3 years.

In summary, alfalfa forage yield and crude protein yield can be significantly increased by the addition of phosphate fertilizer. The optimum level in this study is between 80 and 120 lbs/A. The yields where less than 80 lbs/A P_2O_5 has been applied annually are decreasing each year. Forage yields have not increased significantly by the addition of potassium or sulfur.

FERTILIZATION OF IRRIGATED ALFALFA

Kansas River Valley Experiment Field
L. D. Maddux and P. L. Barnes

This study was initiated in 1976 to evaluate the effects of phosphorus fertilizer applied preplant and plowed down and annual treatments of nitrogen, phosphorus and potassium on irrigated alfalfa. Kanza alfalfa was seeded April 13, 1976 at 10 pounds per acre. Annual treatments of phosphorus and potassium were applied October 29. Harvests were made May 13, June 3, July 17, August 18 and September 24 with a flail harvester. The nitrogen treatments were not applied in 1980.

Annual treatments of phosphorus fertilizer increased the percent phosphorus in all five cuttings of the alfalfa forage at both the 40 and 80 pounds P_2O_5 per acre rates (Table 31). The annual application of 80 pounds per acre of K_2O increased the potassium content of the alfalfa forage, although the differences on the first and second cuttings were not significant. Total forage yield was increased by more than one-third ton per acre with the annual phosphorus treatments and by almost one-third ton per acre with the 160 pounds per acre preplant phosphorus treatments. These are larger yield increases than last year, which probably can be attributed to the fact that the phosphorus soil test level was medium in 1976 when the test was initiated. Soil samples were taken this fall, but results are not available at this time.

Table 71

MANAGEMENT OF IRRIGATED ALFALFA

Sandyland Experiment Field

J. Ball, G. TenEyck, D. E. Kissel, and D. Whitney

Fertilizer Treatment, Lbs/A			Forage Yield, T/A @ 15% Moisture				Crude Protein Lbs/A Yield			
P_2O_5 Preplant	P_2O_5 Annual	K_2O Annual	1980	1979	1978	1977	1980	1979	1978	1977
0	0	0	6.7	7.1	7.4	7.9	2549	2799	2589	2989
0	40	80	8.0	8.7	9.0	9.1	3011	3518	3205	3467
0	80	80	8.5	9.4	9.5	9.4	3297	3848	3409	3637
0	120	80	9.2	9.7	10.0	9.4	3590	4013	3658	3648
320	0	80	8.0	8.7	9.4	9.1	3058	3473	3426	3512
320	0	80	8.5	9.5	10.0	9.6	3228	3854	3585	3635
320	80	80	9.0	9.5	10.0	9.4	3512	3916	3612	3584
320	120	80	9.1	9.4	10.1	9.5	3534	3873	3605	3639
0	120	0	9.1	9.5	10.0	9.4	3591	3878	3655	3689
0	120	160	9.2	9.6	10.0	9.6	3561	3923	3585	3630
0	80 1/	80	8.7	9.5	9.7	9.4	3408	3876	3509	3638
0	120	80 2/	9.1	9.8	9.9	9.7	3538	3961	3524	3687
320	120	80 3/	9.7	10.3	11.0	9.7	3251	4125	3907	3627
0	0	80 3/	7.5	8.0	8.0	8.0	2537	3203	2818	2931
		LSD (.05)		0.4	0.4	0.3		172	178	134

Fertilizer Treatment, Lbs/A			Nutrient Removal, Lbs/A							
			Available P - Lbs/A				Exchangeable K - Lbs/A			
P_2O_5 Preplant	P_2O_5 Annual	K_2O Annual	1980	1979	1978	1977	1980	1979	1978	1977
0	0	0	27	30	25	32	256	277	323	352
0	40	80	35	42	34	43	307	356	407	420
0	80	80	44	52	42	50	331	375	445	435
0	120	80	52	59	46	53	352	384	450	442
320	0	80	33	40	37	45	313	351	438	421
320	40	80	40	54	43	52	319	369	450	436
320	80	80	49	56	46	54	345	365	445	431
320	120	80	54	58	50	56	340	369	460	441
0	120	0	52	58	49	53	306	336	434	421
0	120 1/	160	51	56	46	52	370	392	466	439
0	80 1/	80 2/	44	52	42	49	328	379	443	433
0	120	80 3/	51	58	45	53	335	371	443	433
320	120	80 3/	51	66	53	56	309	383	472	430
0	0	80 3/	27	35	27	32	265	325	362	350
		LSD (.05)		5	3	2		20	21	16

Fertilizer Treatment, Lbs/A			Soil Test Results, Lbs/A					
			Available P			Exchangeable K		
P_2O_5 Preplant	P_2O_5 Annual	K_2O Annual	1980	1979	1978	1980	1979	1978
0	0	0	9	9	10	107	108	109
0	40	80	10	11	16	106	107	131
0	80	80	17	16	18	100	109	127
0	120	80	27	26	27	93	102	112
320	0	80	13	18	26	109	101	131
320	40	80	22	28	36	100	109	121
320	80	80	31	38	42	96	105	119
320	120	80	46	40	55	102	90	122
0	120	0	30	22	26	89	93	113
0	120 1/	160	25	26	23	113	111	119
0	80 1/	80 2/	20	24	23	102	99	134
0	120	80 3/	32	31	29	92	106	118
320	120	80 3/	49	45	49	86	96	125
0	0	80 3/	9	9	12	103	105	133

Initial Soil Test Level: P = 19 Lbs/A, K = 252 Lbs/A
Soil Samples Taken: 4/1/80, 3/30/79, 4/3/80.

1/ Split P_2O_5 application -- 40 Lbs/A early Spring, 40 Lbs/A after 3rd cut.

2/ Also includes 40 Lbs/A sulfur -- Was not applied in 1977.

3/ These treatments were cut an additional time in late Fall at about the time of a killing frost to the alfalfa.

Table 31. EFFECT OF P AND K ON FORAGE YIELD, PERCENT NITROGEN, PERCENT PHOSPHORUS AND PERCENT POTASSIUM OF IRRIGATED ALFALFA, 1980

Kansas River Valley Experiment Field

L. D. Maddux and P. L. Barnes

Fertilizers, lb/a			Cut 1				Cut 2				Cut 3			
Pre	Annual		Forage	Protein			Forage	Protein			Forage	Protein		
P_2O_5	P_2O_5	K_2O	yield[1]	%	%P	%K	yield[1]	%	%P	%K	yield[1]	%	%P	%K
0	0	80	1.59	18.02	.186	2.97	1.51	17.61	.178	2.63	1.10	21.50	.244	3.1
0	40	0	1.90	20.79	.262	2.52	1.56	17.88	.218	2.44	1.19	20.67	.281	2.6
0	40	80	1.83	18.69	.246	3.07	1.54	17.81	.214	2.71	1.15	22.19	.303	3.0
0	80	80	1.91	17.98	.263	2.95	1.71	17.82	.219	1.49	1.25	21.88	.310	2.7
80	0	80	1.74	19.42	.224	2.40	1.61	17.63	.192	2.65	1.22	21.06	.254	3.0
80	40	0	1.87	20.17	.261	2.34	1.54	18.98	.229	2.35	1.20	22.31	.313	2.6
80	40	80	1.93	20.63	.251	2.54	1.63	17.44	.213	2.48	1.24	21.52	.297	2.8
80	80	80	1.94	21.15	.293	3.55	1.49	18.61	.239	2.40	1.15	22.75	.331	2.7
160	0	80	1.86	19.96	.252	2.32	1.70	17.46	.194	2.48	1.17	21.71	.281	2.9
160	40	0	1.93	20.94	.281	2.39	1.58	18.14	.218	2.40	1.26	21.38	.284	2.4
160	40	80	1.92	20.81	.266	.257	1.62	17.52	.197	2.50	1.27	22.71	.288	2.8
160	80	80	2.13	18.98	.281	2.39	1.64	17.79	.227	2.52	1.27	22.54	.315	2.7
Preplant P_2O_5 Means:														
0			1.82	18.58	.238	2.92	1.60	17.64	.205	2.54	1.19	21.74	.289	2.8
80			1.90	20.26	.255	2.44	1.56	18.38	.220	2.48	1.21	21.97	.295	2.8
160			1.95	20.15	.266	2.43	1.63	17.69	.209	2.46	1.23	22.22	.294	2.7
$LSD_{(.05)}$			.09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Annual Fertilizer Means:														
0-0-80			1.73	19.13	.221	2.56	1.61	17.56	.188	2.59	1.16	21.42	.260	3.0
0-40-0			1.90	20.63	.268	2.41	1.56	18.33	.222	2.40	1.22	21.45	.293	2.9
0-40-80			1.90	20.04	.255	2.73	1.60	17.59	.208	2.56	1.22	22.14	.296	2.9
0-80-80			1.99	19.37	.279	2.63	1.61	18.07	.228	2.47	1.22	22.39	.319	2.7
$LSD_{(.05)}$			.11	NS	.027	NS	NS	NS	.018	NS	NS	NS	.019	.1

Fertilizers, lb/a			Cut 4				Cut 5				Total
Pre	Annual		Forage	Protein			Forage	Protein			
P_2O_5	P_2O_5	K_2O	yield[1]	%	%P	%K	yield[1]	%	%P	%K	yield
0	0	80	1.06	18.42	.224	3.39	0.98	14.83	.158	2.96	6.23
0	40	0	1.23	18.29	.271	2.84	1.10	16.42	.210	2.55	6.98
0	40	80	1.11	16.54	.240	3.42	1.04	16.17	.206	2.82	6.68
0	80	80	1.06	18.06	.279	3.15	1.11	16.00	.223	2.75	7.03
80	0	80	1.11	18.94	.249	3.37	1.07	16.29	.174	2.91	6.75
80	40	0	1.22	19.14	.265	3.06	1.13	15.38	.198	2.58	6.95
80	40	80	1.30	18.69	.258	3.09	1.07	15.08	.206	2.79	7.11
80	80	80	1.16	19.71	.307	3.28	1.10	14.54	.214	2.82	6.84
160	0	80	1.10	19.38	.254	3.16	1.07	15.58	.179	2.93	6.90
160	40	0	1.16	19.02	.284	2.96	1.12	15.96	.210	2.59	7.06
160	40	80	1.17	19.27	.262	3.17	1.18	16.54	.211	2.74	7.17
160	80	80	1.18	18.92	.291	3.16	1.20	15.65	.215	2.80	7.42
Preplant P_2O_5 Means:											
0			1.14	18.08	.255	3.17	1.08	15.90	.199	2.77	6.82
80			1.19	18.87	.269	3.25	1.09	15.43	.200	2.79	6.94
160			1.15	19.00	.272	3.12	1.14	16.14	.207	2.71	7.11
$LSD_{(.05)}$			NS	NS	NS	NS	NS	NS	NS	NS	.21
Annual Fertilizer Means:											
0-0-80			1.09	18.91	.242	3.31	1.04	15.57	.170	2.86	6.63
0-40-0			1.20	18.82	.273	2.95	1.12	15.92	.206	2.57	7.00
0-40-80			1.19	18.17	.253	3.23	1.10	15.93	.207	2.78	6.99
0-80-80			1.13	18.90	.292	3.20	1.13	15.40	.217	2.79	7.10
$LSD_{(.05)}$			.08	NS	.024	.17	NS	NS	.012	.14	.30

[1] Machine harvested yields corrected to 15% moisture, tons/a.

II. POTASSIUM REMOVAL UNDER SILAGE VS GRAIN PRODUCTION OF IRRIGATED CORN

EFFECT OF K RATE AND CROP MANAGEMENT ON IRRIGATED CORN AT SANDYLAND EXPERIMENT FIELD

Jim Ball, George TenEyck, and David Whitney

A study was initiated about 5 years ago on the Sandyland Experiment Field to investigate the effect of silage versus grain production on K needs for irrigated corn. The study involved four K rates under continued corn grain production and continuous silage production. The plots are maintained on the same area each year with all forage removed from the silage plots and the stalk residue returned on the grain plots and the K rates applied each year.

The 1980 yield and plant analysis results are presented in Table 82. There is no grain or silage (dry matter) yield response to the K application in 1980 as has been true in other years of the study. There is, however, a significant increase in leaf tissue K content at both the 8-leaf and tassel samplings with increasing K rate on both the silage and grain portion of the study. There is no difference in leaf K content in silage compared to grain plots at either sampling date.

The K content of the silage increased from 0.99% K on the check to 1.60% K with 240 lb K_2O/A. This differential in silage K content is reflected in total K uptake on the control compared to 240 lb K_2O/A of 167 compared to 263 lb K/A. This difference of 96 lb of K (115 lb K_2O) accounts for roughly half of the K applied. Potassium removal is much greater on the silage plots compared to the grain plots, however, the greater K removal over the duration of the sludge has not been sufficient to cause a growth response to K application.

The soil test levels on this sandy soil was medium to high at the start of the study and has decreased on the check plot. The K release-supply from the soil has been adequate to meet the crop need. The study does illustrate the greater K removal under silage production compared to grain and the need to closely monitor K under continuous silage production.

Table 82. Effect of K Rate and Crop Management On Corn Yield And Plant Analysis

Sandyland Experiment Field

K_2O (lb/A)	Management Crop	Yield Bu/A	Grain Analysis %N	%P	%K	8-Leaf %N	%P	%K	Tassel %N	%P	%K	Dry Matter Yield (Ton/A)	Silage %N	%P	%K	Nutrient Uptake (lb/A) Grain N	P	K	Silage N	P	K
0	Grain	176.9	1.42	0.26	0.28	3.43	0.26	1.60	3.29	0.29	1.80	----	----	----	----	140.5	25.7	27.8	----	----	----
80	Grain	170.4	1.47	0.27	0.29	3.40	0.26	2.38	3.19	0.28	2.04	----	----	----	----	139.9	25.9	27.5	----	----	----
160	Grain	166.5	1.50	0.27	0.29	3.31	0.28	2.38	3.13	0.27	2.31	----	----	----	----	139.0	25.5	26.5	----	----	----
240	Grain	172.1	1.50	0.27	0.28	3.58	0.26	2.69	3.16	0.28	2.35	----	----	----	----	144.2	25.7	26.6	----	----	----
0	Silage	----	----	----	----	3.61	0.28	1.55	3.28	0.28	1.89	8.5	1.04	.150	.99	----	----	----	176.3	25.3	166.8
80	Silage	----	----	----	----	3.40	0.26	1.98	3.21	0.27	2.13	8.3	1.01	.142	1.33	----	----	----	168.5	23.4	223.4
160	Silage	----	----	----	----	3.67	0.28	2.02	3.30	0.28	2.20	9.0	1.07	.162	1.37	----	----	----	194.2	29.8	250.5
240	Silage	----	----	----	----	3.54	0.26	2.56	3.33	0.29	2.26	8.4	1.00	.135	1.60	----	----	----	166.6	22.9	263.1
LSD (.05)		NS	NS	NS	NS	NS	NS	0.53	NS	NS	0.21	NS	NS	NS	.41	NS	NS	NS	NS	NS	61.2 *

* LSD (.10)

III. PHOSPHORUS RESIDUAL FROM P SOURCES, RATES AND FREQUENCY OF APPLICATION

EFFECT OF RATE AND FREQUENCY OF APPLICATION OF TWO PHOSPHORUS SOURCES ON GRAIN SORGHUM

East Central Experiment Field

K. A. Janssen, D. A. Whitney and D. E. Kissel

The question is frequently asked, must phosphorus fertilizer be applied annually or can it be applied less often at a higher rate. To answer this question, a phosphorus rate and frequency of application study was started at the East Central Kansas Experiment Field in 1974. Treatments included a single large application, 200 lbs. P_2O_5/a applied every four years, compared to 100 lbs. P_2O_5/a applied every other year and to 50 lbs. P_2O_5/a applied annually, thus over a four year period all plots received the same amount of phosphorus. Two phosphorus sources, ammonium orthophosphate (18-46-0) and ammonium polyphosphate (10-34-0) also are being evaluated.

In 1980, Funk's G-623-GBR grain sorghum was planted at four seeds per linear foot in 30-inch rows June 2. Furdan 10G at 12 lbs./a was applied in the furrow at planting. Ramrod-atrizine flowable at 4 qt./a (pre-emergence), plus one cultivation, was used to control weeds. Harvest was October 22. Results are presented in Table 77 .

Yield data for 1980 show the usual excellent yield response to phosphorus on this very low phosphorus testing soil. Except for the 200 lbs. P_2O_5/a ammonium orthophosphate (AOP) rate applied every four years, the 1980 and seven year average yield results show little difference in yield for rates and frequency of application or for phosphorus source. For some unexplainable reason, this year, yield for the 200 lbs. P_2O_5/a AOP rate applied every four years was higher and significantly higher than the 100 lbs. P_2O_5/a AOP rate applied biannually. This has not been the case in the past. Results from previous years have shown that the 50 lbs. P_2O_5/a rate was not adequate for optimum yield the first year of this study with the very low phosphorus soil test level of the site. In the fourth year of the study the 200 lbs. P_2O_5/a rate applied initially resulted in lower yield than the 50 lbs. P_2O_5/a rate applied annually. This suggests that on a very low phosphorus soil a four year application span may be too long. The 100 lbs. P_2O_5/a applied every other year has consistently performed well, but yield results over the seven years are no better than for the other treatments. Yield differences so far in the second 4-year application cycle have not been as apparent as in the first. An explanation could be that soil P test levels in the phosphorus treated plots have increased to the extent that response to phosphorus rate and frequency of application has been lessened (Table 77).

Plans are to continue this study at least one more year to complete the second four year cycle of phosphorus application.

Table 77

EFFECT OF RATE AND FREQUENCY OF APPLICATION OF TWO PHOSPHORUS SOURCES ON GRAIN SORGHUM

East Central Experiment Field

K. A. Janssen, D. A. Whitney and D. E. Kissel

Phosphorus Carrier	Rate and Frequency of Application		Grain Yield @ 12.5% 1980	Grain Yield @ 12.5% 7 yr. Avg.	1980[1/] Leaf Tissue Composition %P	1980[1/] Leaf Tissue Composition %N	Soil Available P 4/76	Soil Available P 4/80
	Lbs/a		Bu/a	Bu/a			Lbs/a	
----	0		51.1	46.1	.164	2.28	7	10
AOP(18-46-0)	50	Annually(74'-80')	64.8	63.0	.221	2.44	14	29
AOP	100	Biannually(74',76',78',80')	63.0	60.5	.219	2.36	12	29
AOP	200	Every 4 yrs.(74',78')	72.6	63.8	.202	2.36	18	44
APP(10-34-0)	50	Annually(74'-80')	66.6	63.4	.205	2.36	13	26
APP	100	Biannually(74',76',78',80')	65.7	61.2	.226	2.50	13	24
APP	200	Every 4 yrs.(74',78')	64.4	58.7	.215	2.41	16	26
LSD .05			9.2	--	.026	NS	3	6
Mean Values:								
Carrier								
AOP (ammonium orthophosphate)			66.8	62.4	.214	2.39	15	34
APP (ammonium polyphosphate)			65.6	61.1	.216	2.41	14	25
LSD .05			NS	--	NS	NS	NS	6
P - Rate & Frequency Applied								
50 lbs P_2O_5		Annually	65.7	63.2	.213	2.39	14	28
100 lbs P_2O_5		Biannually	64.3	60.8	.223	2.43	12	27
200 lbs P_2O_5		Every 4 yrs.	68.5	61.1	.209	2.39	17	35
LSD .05			NS	--	NS	NS	2	NS

1/ Flag leaf at boot stage.

IV. SEASONAL CHANGE IN SOIL TEST POTASSIUM ON SANDY SOILS

David Whitney, Jim Ball, and Larry Maddux

Soil sampling at monthly intervals was started in the winter of 1978-1979 to see if the potassium soil test would change on irrigated sandy soils growing relatively high yielding alfalfa and corn with no potassium fertilization. Sampling was done at the Sandyland Experiment Field near St. John by Jim Ball and at the Kansas River Valley Field near Topeka by Larry Maddux. Samples were collected from areas growing alfalfa and corn at both locations during the 1979 and 1980 crop years. Composite soil samples were collected from a relatively small area growing each crop to minimize soil variability between samplings. Samples were collected from two depths - 0-6 and 6-12 inches.

The soil samples were air-dried and crushed to pass a 2 mm sieve before analysis by the KSU Soil Testing Lab. Exchangeable potassium was determined by extraction with 1N ammonium acetate using a 1:5 soil to solution ratio and 10 minutes extraction in 50 ml Erlenmeyers at 180 OPM. Results in the following tables are reported as lb/A K in the soil.

For the 1979 season results show little change in exchangeable K over the year at the Sandyland location for either crop. This may in part be due to the relatively low soil test K levels. It should be noted that K fertilization studies close to these sampling sites did not respond to K with similar soil tests for K. At the Kansas River Valley location there is a definite decrease in the K soil test in the June-July-August period for both sampling depths for the corn. This depression would correspond to the maximum K uptake period for the corn. The alfalfa area shows a slight decline in the 0-6 inch sample K results over the entire sampling period perhaps reflecting K drawdown by the alfalfa.

Results for 1980 are very similar to 1979 results. Little seasonal trend is noted at the Sandyland location for either crop. Like in 1979 at the Kansas River Valley location, the K soil test levels decreased in the July-August-September period for the corn at both sampling depths. There appears to be a similar decrease for the alfalfa but much less in magnitude. The results on the KRV irrigated corn would suggest that sampling time would be critical for proper K soil test interpretation.

Seasonal Potassium Soil Test Results Under Two Crops at Two Locations for the 1979 Crop Year

Location and crop	Sample Depth	Sampling Date												
		Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	in													
Sandyland Expt. Field														
Corn	0-6	57	66		88		80	140	74	51		57			66
	6-12	54	58		55		78	91	109	79		53			58
Alfalfa	0-6	83	69		82		86	74	76	65		70			85
	6-12	54	65		49		75	56	63	69		68			75
Kansas River Valley															
Corn	0-6	567	720	576	756	597		575	427	343	303	494	545	652	655
	6-12	438	522	435	556	349		349	324	256	295	352	384	364	354
Alfalfa	0-6	276	311	312	274	280		258	216	297	225	231	238	221	222
	6-12	217	194	227	216	211		211	172	236	176	204	189	186	182

Seasonal Potassium Soil Test Results Under Two Crops At Two Locations For The 1980 Crop Year

Location and crop	Sample Depth	Sampling Date[1]										
	inches	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Sandyland Experiment Field													
Corn	0-6	132	107	134	105	81		83		101	77	83	114
	6-12	101	100	73	101	100		107		72	109	100	126
Alfalfa	0-6	124	111	83	126	103		80		96	131	103	119
	6-12	85	100	65	44	92		55		73	126	96	124
Kansas River Valley Field													
Corn	0-6	372	512	505	496	275	336	382		562	428	478	
	6-12	272	327	364	349	232	263	265		283	207	243	
Alfalfa	0-6	220	196	196	200	218	192	171		175	165	223	
	6-12	158	150	130	162	151	125	114		121	108	155	

[1] Most sampling dates were close to first of month shown.