Fertility

Effect of Nitrogen Fertilizer Application on Cotton Yields Safford Agricultural Center

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Summary

A soil depleted of nitrogen by cropping with Sudan grass and removing all the residues was planted to Upland (DP 90) and Pima (S-6) cotton. Nitrogen was added in the form of urea at three different stages of plant growth, applying a total of 0, 50 or 100 pounds of nitrogen. The yield of lint from DP 90 was increased where nitrogen was added; however, there were no differences in yield with the timing nor total amount of nitrogen added. In the case of S-6, fertilizer nitrogen did not increase yield.

Introduction

Nitrogen fertilizer use in the Safford area varies greatly from farmer to farmer. It is not uncommon for a good farmer to pick 2 1/2 bale cotton from a field that received no fertilizer during the crop year. Tucker et. al. indicated that cotton plants require from 60 to 100 pounds of nitrogen to produce a bale of cotton. So, one would deduce that between 150 and 250 pounds of nitrogen would be needed to produce this 2 1/2 bale crop. Some of the needed nitrogen would be supplied by carry-over from the previous crop, some from decay of organic material and some from the irrigation water.

To eliminate carry-over in this experiment, the field was planted to sudan grass in 1984 and was cut 4 times with all the residue removed. This field was then planted to cotton and nitrogen was applied at three different growth stages and the yields taken to evaluate the affects.

Materials and Methods

SOIL TYPE: Pima clay loam
PREVIOUS CROP: Sudan grass planted 23 May 1984
PREVIOUS HARVESTS: 4 harvests; 19 June, 2 Aug, 7 Sept, 17 Oct
PREVIOUS IRRIGATION: 8 times; 5 from river, 3 from well
RESIDUAL NITROGEN: 5 lbs/ac
TILLAGE: Deep ripped, disked, leveled, listed, pre-irrigated
PLANTING: 25 lbs/ac of seed on 10 April 1985

HERBICIDE: 1.5 pts/ac of Prowl + 4 pts/ac of Prometryne on 5 Mar
1.2 lbs/ac of Prometryne on 9 July

FERTILIZER: 7 treatments;

#	7 June (before 1st irrigation)	25 June (square initiation)	17 July (lay by)	Total
	Pounds of nitrogen per acre			
1	0	0	0	0
2	50	0	0	50
3	0	50	0	50
4	0	0	50	50
5	50	50	0	100
6	0	50	50	100
7	50	0	50	100

IRRIGATION: 7 times, 5 river (26 ac in.), 2 well (8 ac in.)
NITROGEN FROM WATER: 4.1 lbs N/ac in 1984, 3 lbs N/ac in 1985
HARVEST: 19 November 1985

Results

TREATMENT NUMBER	YIELD DP 90 (lint lbs/ac)		RANK	YIELD S-6 (lint lbs/ac)		RANK
1	1346	a*	7	1133	a	5
2	1470	b	6	1178	a	1
3	1516	b	4	1152	a	3
4	1503	b	5	1144	a	4
5	1589	b	1	1128	a	6
6	1551	b	2	1159	a	2
7	1520	b	3	1128	a	7
LSD (.05)	82			81		

* Values with the same letter were not significantly different at the .05 level using the Student-Newman-Keul's test.

Discussion

Historically, a yield response to N has not been seen in the Safford valley, especially with long staple cotton. It has been thought that high nitrate content in the irrigation water was the reason.

In this study, however, the nitrogen contributed by the water was negligible, yet, the yields without fertilizer nitrogen were acceptable. Further studies are needed to provide an explanation.

References

Tucker, T. C. and B. B. Tucker. Nitrogen nutrition In: Advances in Production and Utilization of Cotton: Principles and Practices. The Iowa State University Press.

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Soil Amendment Demonstration on Cotton Greenlee County

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Bengt Hansson, University of Agriculture in Sweden and Boliden Corp.

Summary

Boligrow (an aluminum sulfate material from Sweden), gypsum and soil sulfur were evaluated as amendments on soil where differential water uptake had historically been a problem. A crop of cotton was grown and the yield of cotton was taken to determine if an economical change was effected by the amendments. Statistically there was no difference between treatments. A soil analysis indicated that sodium was not a problem in this soil, so texture was probably more related to the differential water uptake problem than was the chemical makeup of the soil.