Table 2. Relation of initial soil nitrate level to early season nitrogen needs of cotton.

Soil* nitrate	Stage of growth at which N fertilizer may be needed
ppm nitrate	
0-10	At planting or as soon after as practical
10-20	By 6-leaf to square stage
20-30	By time of first flower
30 plus	Use petiole test to determine if needed

*When soil nitrate values are reported as N, multiply by 4.4 for use with this table.

Soil and petiole analyses can serve as guides for developing an adequate but not excessive N fertilizer program. These techniques can not be used to increase the maximum yield possible or to correct any factor limiting yield that is not nutritional. Therefore, their most effective use does not always increase yields. These "tools" aid only in insuring that adequate N is available for the attainment of the maximum yield under existing conditions.

In many cases the only benefit that the grower derives from the use of these tools is the assurance that the N fertilizer program is adequate and that excessive fertilizer was not used.

Some growers who collect their own samples feel that other benefits are realized. For example, these growers see more of their cotton more often and take a closer look at how the plants are growing and fruiting. They also learn of insects, water penetration, diseases, and many other important factors that otherwise might go unnoticed though essential in the total management of the cotton crop.

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Nitrogen and Manure Effects on Cotton

T. C. Tucker, J. L. Abbott and E. W. Carpenter

In 1960 a long-term experiment was initiated at the Cotton Research Center, field D-1 in which four levels of N fertilizer were imposed on four main treatments. The main treatments of border size were: (1) cotton annually, (2) alternate years of fallow and cotton, (3) cotton with 10 tons of manure annually, and (4) alternate years of sesbania and cotton.

The cotton variety--Acala 44 was used initially. Since 1962 Acala 44-10 has been used as well as Pima S-2 in 1963 and 1964.

All yields are for 80 feet of row spaced 40 inches apart and are reported in pounds of seed cotton per plot. The values in Table 1 are means of four replications.

The effect of N and manure plus N was beneficial during the early years of this study. The rapid build-up of verticillium wilt with N, manure, and manure plus N application has been shown by Dr. Lester Blank, USDA plant pathologist. In the earlier years of the study the highest yields were obtained from the manure plus N treatments; however, in recent years N on the manure borders has depressed yields. Wilt symptoms were observed much earlier in 1965 on the manure borders and yields appear to be lower relative to continuous cotton and other treatments in 1965. The 50 pound N rate increased yields on all basic treatments except manure where a depression in yield occurred. Slightly higher yields were indicated for the sesbania border and the NP treatment. (See Table 1.)

In 1965 a new experiment was initiated on field D-2 that will involve different rates of manure and frequency of application as well as N rates. Hopicala (A-4447) was the variety of cotton used in 1965. The manure treatments were all the same initially, thus, the yields reported in table 2 are means of all manure borders.

Table 2. Effect of N and manure on seed cotton yields of Hopicala cotton in 1965.

N Lbs./A	Seed Cotton Yields	
	Control	Manure
	--pounds per 120 feet of row--	
0	19.3	28.0
75	20.7	27.0
150	20.6	26.4

Yields were approximately 33 percent greater where manure was applied and N had little effect. The most wilt resistant cotton variety of cotton available will be used each year in this study.

Table 1. Seed cotton yields per plot from 1960 through 1965 as influenced by N on four basic treatments.

Nitrogen Lbs./A	Cotton Annually	Fallow Cotton	Cotton Manure	Sesbania Cotton
	pounds per plot			
		1960		
0	18.1a	Fallow	19.4a	Sesbania
50	18.0a		23.1b	
100	19.5ab			
150	20.1b			
		1961		
0	11.7a	13.0a	15.2a	12.9a
50	11.9a	15.7ab	20.1b	17.9b
100	15.7b	16.6b	22.5b	18.0b
150	18.2b	15.6ab	22.3b	17.1b
		1962		
0	9.3a		19.9a	
50	12.0ab	Fallow	22.4a	Sesbania
100	14.2b		20.0a	
150	13.7b		22.1a	
		1963--Acala 44-10		
0	13.2a	16.6a	20.7b	11.7a
50	15.9b	17.1a	19.1ab	15.6b
100	17.9b	17.3a	19.0ab	16.5b
150	16.9b	17.6a	17.6a	16.1b
		1963--Pima S-2		
0	8.5a	8.2a	12.3a	8.2a
50	9.6ab	10.8b	14.3b	11.6b
100	10.5b	11.1b	13.9ab	11.8b
150	9.8ab	11.9b	12.4a	11.6b
		1964--Acala 44-10		
0	11.0a		17.2a	
50	15.1b	Fallow	15.8a	Sesbania
100	15.1b		15.9a	
150	14.7b		15.2a	
		1964--Pima S-2		
0	7.2a		12.3a	
50	9.7ab	Fallow	11.9a	Sesbania
100	10.4b		11.7a	
150	9.9ab		10.5a	

Table 1 (Continued)

Nitrogen-Phosphorus Lbs/A	Cotton Annually	Fallow Cotton	Cotton Manure	Sesbania Cotton
	pounds per plot			
	1965**--Acala 44-10 only			
0-0	14.5a	15.6a	16.8b	16.7a
50-0	18.4c	19.9b	14.8a	21.4b
100-0	16.2b	20.1b	14.6a	21.4b
150-0	17.6bc	19.9b	14.9a	21.6b
0-50	15.3a	16.4a	17.7b	17.4a
50-50	18.0b	18.7b	14.2a	21.7b
100-50	18.6bc	20.5c	14.5a	21.9b
150-50	19.5c	18.6b	14.0a	22.1b

* means followed by the same letter are not significantly different at .05 level of probability.

** in 1965 one-half of each border received phosphorus

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Interactions Between Nitrogen and Phosphorus Fertilizer for Cotton Production

John Birchett, Wallace H. Fuller and Jim Holladay

The research project was designed to determine the effects of nitrogen-phosphorus interaction in cotton with test plots grown under actual field conditions and duplicated on two parcels of land in completely different areas. These two fields were selected on the basis of their comparatively low N and P levels for that particular area to facilitate detection of responses to fertilization.

The field plots were established on the Boswell farms, property near Sun City and Picacho, Arizona. The use of the property was negotiated by Chevron Chemical Company, who is working cooperatively with the Department of Agricultural Chemistry and Soils.

At each area, there were 12 fertilizer treatments which were replicated three times for a total of 36 plots. These treatments were randomly assigned to a position within each of the three replicated blocks. The plots were made up of quarter mile rows in which each of the 4 rows was fertilized. Each field represented a different planting method as both solid and plant-two-ship-one planting designs were used. In each case four planted rows