



# Influence of Nitrogen Nutrition on the Yield and Quality of Cotton

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## ABSTRACT

*Nitrogen plays an important role in the growth and yield of cotton. In rigid genetical conditions, growth and development of different cotton cultivars react differently to nitrogen fertilizers. The changes in parameters of cotton fibers of different cotton cultivars that react to the application of increasing doses of nitrogen fertilizers were studied. Results show that some cultivars are more responsive to applied nitrogen than other. Apparently this is related to the differences in the absorption of nitrogen from soil resources and from the applied fertilizers. These cultivars had improved fiber quality after the application of nitrogen fertilizers in comparison to the control cultivar.*

## Introduction

Cotton is a crop that requires large amounts of nitrogen fertilizers, but potential for realizing the responses are limited. By using stable isotope N.15 it has been found that after applying a dose of 250 kg/ha of nitrogen fertilizer, the co-efficient of consumption is less than 35%, another 12%-15% is absorbed by soil and more than 50% is lost as in the form of gas state which is irretrievable. An increased co-efficient of utilization plays an important role in cotton production and is dependent on the effect of the cotton cultivar, with specific characters of root absorption that are genetically controlled.

Some cotton cultivars are capable of absorbing elements from soil and the applied fertilizers, it also synthesis the absorbed elements than the organic substances, but this demands high doses of fertilizers and output is negligible. It is therefore necessary to have good knowledge of mineral fertilizers especially nitrogen. An important factor is to determine the effect of nitrogen fertilizers on different cultivars, emphasizing their utilization of the nutrients in a sustainable production system. The aim of this research was to determine the influence on the level of nitrogen nutrition on the productivity and technological quality of cotton fibers.

## Material and Methods

Field experiments were done in Tashkent Agriculture University during the years 1995-1997, on three cotton cultivars S-6524 (standard), Uldus and Mekhir (*G.hirsutum*), applying increasing rates of N fertilizers, varying from 75kg/ha to 250kg/ha, with optimum rates of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O in typical sierozem soil in the Aral Sea Basin.

Yield of seed cotton produced by different cultivars increased with increased doses of N fertilizers (Table 1). Maximum yield was produced by

cultivars S-6524 (35.5 c/ha) and Mekhir (34.8 c/ha) with an N rate of 250kg/ha, but cultivar Uldus (33.6 c/ha) gave its maximum yield at a rate of 200kg/ha. Due to the rapid maturity Uldus, it does not utilize higher rates of N fertilizer. Results shows that to obtain maximum yield for S-6524, Mekhir the appropriate dose is 250kg/ha and for Uldus is 200kg/ha.

Technological quality of cotton fiber depends on the mass of the seed cotton, output of cotton fiber, length of the fiber and strength of the fiber.

## Results

In this research work, the coefficient of consumption of N by different cultivars was calculated by the method of differential (Peterburg's method) S-6524 56% (250kg/ha), Uldus: 49% (200kg/ha) and Mekhir: 58.8% (250 kg/ha). Results shows that due to the increase in consumption, yield and technological quality has also been increased in these cultivars.

## Conclusion

To obtain maximum yield and high quality cotton fiber it is necessary to relate the rate of N fertilizer to the characteristics of the cultivar and also to determine the optimum relationship between N and K. For a dose of 250kg/ha of N fertilizer the optimum ratio of nitrogen with potassium is 1:1.

**Table 1. Yield of seed cotton produced by different cotton cultivars on applying increasing doses of nitrogen fertilizers. {Field Experiment : 1996-1997.}**

No: of Readings	Dose N Kg/ha	Yield produced c/ha								
		S – 6524			Uldus			Mekhir		
		1996	1997	Avg.	1996	1997	Avg.	1996	1997	Avg.
1	0	18.0	18.4	18.2	18.7	19.3	19.0	18.2	19.2	18.7
2	75	21.7	22.3	22.0	21.0	22.2	21.6	22.2	22.6	22.4
3	100	28.1	29.1	28.6	27.5	28.1	27.8	28.0	28.6	28.3
4	150	31.0	31.6	31.3	32.0	32.2	32.1	32.3	32.7	32.5
5	200	35.0	35.0	35.0	33.5	33.7	33.6	34.0	34.2	34.1
6	250	35.2	35.8	35.5	33.3	33.5	33.4	34.4	35.2	34.8

**Table 2. Technological quality of cotton fibers of different cotton cultivars on applying increasing doses of nitrogen fertilizers. {Field Experiment : 1996-1997.} (Average)**

Treatment No	N Rate Kg/ha	S – 6524				Uldus			
		S/C Yield Gms	GOT %	Fiber Length Mm	Fiber Strength gm/km	S/C Yield Gms	GOT %	Fiber Length mm	Fiber Strength gm/km
1	0	3.5	33.8	26.0	3.8	3.6	34.3	27.4	3.9
2	75	4.1	34.1	28.2	4.1	4.3	34.8	29.6	4.2
3	100	4.5	35.1	32.5	4.2	4.5	35.1	33.3	4.4
4	150	5.0	35.4	34.1	4.3	4.8	35.7	34.0	4.5
5	200	5.2	36.0	34.6	4.4	5.0	36.3	34.7	4.6
6	250	5.4	36.2	34.9	4.7	4.8	36.0	34.4	4.5

  

Treatment No.	N Rate Kg/ha	Mekhir			
		S/C Yield gms	GOT %	Fiber Length mm	Fiber Strength gms/km
1	0	3.8	34.4	29.2	4.0
2	75	4.4	35.1	32.3	4.2
3	100	4.7	35.4	33.1	4.4
4	150	5.0	35.9	34.2	4.7
5	200	5.5	36.2	35.0	4.8
6	250	5.8	36.4	35.5	4.9