# THE PROPER NITROGEN RATE FOR EARLY AND LATE SOWN COTTON IN EGYPT

**E.A. Makram and S.A. Ali**
**Cotton Research Institute**
**Agricultural Research Centre**
**Giza, Egypt**

## Abstract

Testing three nitrogen rates for two planting dates on Giza 80 cotton cultivar grown in middle Egypt. For early sowing, nitrogen rates had little effect on plant growth, yield components, yield and earliness. For late sowing, increasing nitrogen rates increased plant growth, while it decreased yield components, ealiness and significantly the yield of seed cotton. The lower nitrogen rate, 112.5 kg/ha proved to be sufficient for producing higher yield for both early and late sowings, in semi-fertile soils.

## Introduction

The nitrogen requirements for early and late sowings had been tested for Egyptian cotton cultivars in order to avoid rank growth which reduced the yield. El-Shahawy *et al.* (1994) using the nitrogen rates, 112.5, 162.5 and 212.5 kg/ha on Giza 76 cultivar, obtained slight effect on plant growth and number of days from sowing to first flower appearance. Yield components and yield of seed cotton increased in favour of higher nitrogen rates, for both early and late sowings. Makram *et al.* (1994) used the same nitrogen rates on Giza 75, they found that plant growth and yield components were slightly affected for both planting dates. Yield of seed cotton increased insignificantly by increasing nitrogen rates, while yield earliness increased in favour of lower nitrogen rates. Abdel-Malak *et al.* (1996) used Giza 83 cultivar with the same nitrogen rates, they found that plant growth, cotton yield and its components increased in favour 212.5 kgN/ha for early sowing and 162.5 kgN/ha for late sowing.

Therefore, this investigation was carried out to determine the optimum nitrogen fertilizer dose for Giza 80 in early and late sowings.

## Materials and Methods

Two experiments were carried out for each planting date in 1992 and 1993 seasons at Sids Agricultural Research Station in middle Egypt, using the Egyptian cotton cultivar Giza 80 (*Gossypium barbadense L.*). Experiment design was complete randomized blocks with four replications. Plot size was 26.0 $m^2$, including eight rows of 65 cm width. Sowing dates were on March 24 and 30 for early sowing and on April 25 and 21 for late sowing in 1992 and 1993, respectively. The nitrogen rates were 112.5, 162.5 and 212 kg/ha. Five guarded hills, ten plants, were chosen by random for estimating final plant height (cm), number of sympodia per plant, number of open and unopened bolls per plant, boll weight (gm), seed cotton yield per plant (gm) and number of days from sowing to appearance of first flower. Yield earliness was estimated as percentage of first pick to total yield. The soil chemical analysis was done for estimating NPK (Table 1). The data were subjected to statistical combined analysis for both seasons.

## Results and Discussion

Final plant height and number of sympodia per plant were insignificantly affected by nitrogen rates, for both planting dates (Table 2). Although, the means of both characters had indefinite trend for early sowing it tended to increase in favour of higher nitrogen rate for late sowing. This might be due to the increase of air and soil temperature with higher nitrogen rates. Similar results were obtained by El-Shahawy *et al.* (1994).

For both planting dates, number of open bolls and yield per plant were decreased by increasing nitrogen rates (Tables 2 and 3). Only the differences of yield per plant for late sowing was significant. For early sowing, boll weight was slightly affected by nitrogen rates, while the means tended to decrease by increasing nitrogen rates for late sowing. Number of unopened bolls was slightly affected for early sowing, while it increased by increasing nitrogen rates for late sowing. However, these results could be an indication that higher nitrogen rates increased boll shedding for early sowing without affecting boll weight and number of unopened bolls per plant, where favorable climatic conditions at late season. Besides the role of potassium in adequating the excess of nitrogen rates and increasing boll maturation (Table 1). For late sowing the situation was different, while lower nitrogen rate accelerated the process of cut-out early in suitable climatic conditions, higher nitrogen rates prolonged the fruiting period which brought the late bolls to unfavorable weather which resulted of producing lighter bolls, besides increasing infested and immature bolls. Accordingly, increasing nitrogen rates for late sowing decreased the yield per plant significantly. Similar results were obtained by Makram *et al* (1994). and Abdel Malak *et al.* (1996).

The yield of seed cotton per unit area was a real reflection of yield per plant, where the plant stand at harvest was slightly affected by nitrogen treatments (Table 3). Therefore, the yield tended to decrease slightly by increasing nitrogen rates for early sowing and decreased significantly for late sowing. So, the nitrogen rate of 112.5 kg/ha proved to be sufficient for producing higher yield in case of semi-fertile soils in middle Egypt for Giza 80 cultivar for March and April plantings. While nitrogen rates had little effect on number of days from sowing to the appearance of first flower, it decreased the first pick percent

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by increasing nitrogen rates, which was more pronounced for late sowing. The previous results are agreed or disagreed with one or more characters with those obtained by El-Shahawy *et al*. (1994) and Makram *et al.* (1994).

## References


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Table 1. Physical and chemical analysis of experiment soil.

| % T.S.S. | % Calcium Carbonate | N | P (p.p.m) | K |
|---|---|---|---|---|
| 0.25 | 3.5 | 50 | 24 | 570 |

Table 2. Mean plant growth characters open and unopened bolls and boll weight.

| Sowing date | N Rates (Kg/ha) | Plant Height (cm) | Number SymPodia /plant | Open bolls /plant | Unopened Bolls /plant | Boll weight (gm) |
|---|---|---|---|---|---|---|
| | 112.5 | 105 | 12.6 | 16.0 | 4.7 | 2.50 |
| March | 162.5 | 101 | 13.1 | 15.2 | 4.3 | 2.58 |
| | 212.5 | 101 | 12.8 | 15.1 | 4.3 | 2.54 |
| | 112.5 | 124 | 14.2 | 11.5 | 6.4 b | 2.34 |
| April | 162.5 | 125 | 14.5 | 10.8 | 7.7 ab | 2.28 |
| | 212.5 | 134 | 16.1 | 10.0 | 8.3 a | 2.22 |

Table 3. Mean yield per plant and hectare, yield earliness and number of days to first flower appearance.

| Sowing date | N Rates (Kg/ha) | Yield /plant (gm) | Plant stand (1000) | Yield Hectare (kg) | Yield earliness percent | Sowing To 1st flower (days) |
|---|---|---|---|---|---|---|
| | 112.5 | 40.0 | 115.8 | 4748 | 90.0 | 86 |
| March | 162.5 | 39.2 | 116.7 | 4745 | 89.5 | 87 |
| | 212.5 | 38.3 | 119.9 | 4678 | 89.0 | 87 |
| | 112.5 | 26.8 a | 119.3 | 3314 a | 79.9 | 76 |
| April | 162.5 | 24.7 ab | 116.4 | 3101 ab | 77.8 | 76 |
| | 212.5 | 19.3 b | 120.7 | 2942 b | 75.2 | 75 |