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# Effect of Different Levels of Nitrogen Fertilizer on Growth of Canola (*Brassica napus* L.)

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## Abstract

Two varieties of canola (*Brassica napus* L.) Rainbow and Con I were treated with different levels of nitrogen (0, 60, 90 and 120 N kg $ha^{-1}$) as urea before sowing and with split application of these levels before sowing and at the time of flower initiation. The data for plant height, number of leaves, leaf area, fresh and dry weight of root as well as shoot and number of flowers each for per plant showed an increasing trend as negating the difference of time of fertilizer application their application.

## Introduction

Canola (*Brasica napus* L.) and mustard (*Brassica juncea*) are important species of *Brassica genus* that are grown as oil seed crop in Pakistan. Total requirements of edible oil of Pakistan for the year 1996-97 was 1.8 million tons, of which 0.538 tones (Anonymous, 1996-97) million tons were met from local resources and the remaining had to be imported therefore, facing an acute deficiency of edible oil because the domestic production hardly meets 29% of the total demand. Thus the country is bound to import oil in large quantities. The increasing population growth rate and average per capita consumptions show that our requirements may reach upto 2.0 million tons by the year 2000 (Muhammad, 1988).

Nitrogen is involved in most of the biochemical reactions that compose life. The importance of nitrogen in the structure and metabolism of the plants and the need of the slant for a continuous supply of nitrogen dramatically point out of natures most paradoxical situation. Brassica cultivars show a positive response to the application of nitrogen fertilizer and a significant increase in seed yield has been) observed (Ali and Shah, 1983). Jang *et al*. (1987) also reported that application of nitrogen fertilizer increases stem elongation shoot and root dry weights, number of pods/inflorescence and seed yield.

Keeping in view the facts mentioned above, a project was initiated to observe the response of canola (*Brassica napus* L.) towards the application of different levels of nitrogen fertilizer.

## Materials and Methods

The experiment was conducted at the experimental area of Department of Botany, University of Agriculture, Faisalabad a split plot design. There were seven treatments of nitrogen as urea with three replications for each. The allowing treatment schedule was observed for departmental purpose.

Two varieties of canola (Rainbow and Con I) which providad by the Oil Seed Department, Ayub Agriculture research Institute, Faisalabad were used. The sowing of seeds was done in rows keeping a row to row distance of 30 cm. After fifteen days of germination, thinning was done to keep a plant to plant distance of 20 cm. After twenty days of flower formation five plants in which enthesis has been occured were randomly selected from each replicate and data for plant height, number of leaves, leaf area, fresh and dry weights of shoot and root and number of flowers per plant were recorded. Leaf area was calculated by using the formula of Carleton and Foote (1965).

| Treatments | Nitrogen (urea) doses (Kg $ha^{-1}$) | Before sowing (Kg $ha^{-1}$) | At flower initiation (kg $ha^{-1}$) |
|---|---|---|---|
| $T_1$ | - | - | - |
| $T_2$ | 60 | 60 | - |
| $T_3$ | 90 | 90 | - |
| $T_4$ | 120 | 120 | - |
| $T_5$ | 60 | 30 | 30 |
| $T_6$ | 90 | 45 | 45 |
| $T_7$ | 120 | 60 | 60 |

Lear area = maximum length x maximum width x Gorectionfactor (0.399).

The data were statistically analyzed by analysis of variance technique (Steel and Torrie, 1984). Duncan's New Multiple Range Test was applied for comparison of treatment means.

## Results and Discussion

All the treatments of nitrogen fertilizer significantly increased the plant height as compared with control (Fig. 1). Split applications of all the treatments reflected similar results as the full dose. Maximum plant height was observed under 120 kg N $ha^{-1}$ and then decreased gradually with descending levels of nitrogen. Among the varieties Rainbow responded better than Con-I in respect of plant height. As the nitrogen is major essential element which as used in the synthesis of protein building blocks of all plants and animals. So upto the optimum level of nitrogen enhanced in growth may be expected but beyound it will be toxic to plant. These findings are in agreement with those of Singh and Saran (1987).

Leaf area was increased with increasing in the level of

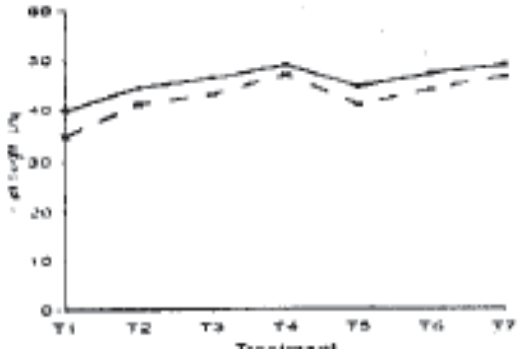


Fig.1: Effect of different levels of nitrogen on plant height of two varieties of canola (*Brassies napus* L.)

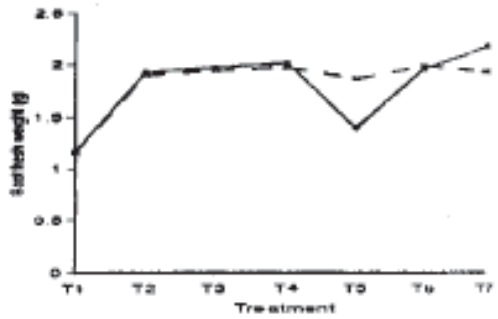


Fig. 4: Effect of different levels of nitrogen on root fresh weight of two varieties of canola (Brassies *napus* L.)

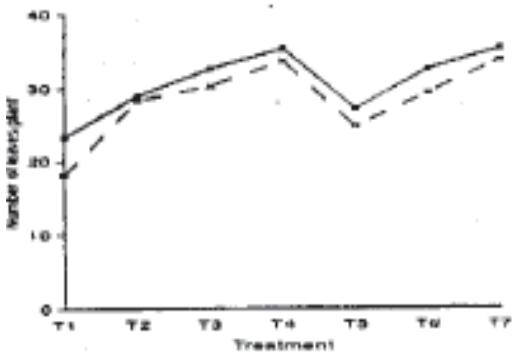


Fig. 2: Effect of different levels of nitrogen on number of leaves per plant of two varieties of canola (*Brassies napus* L.)

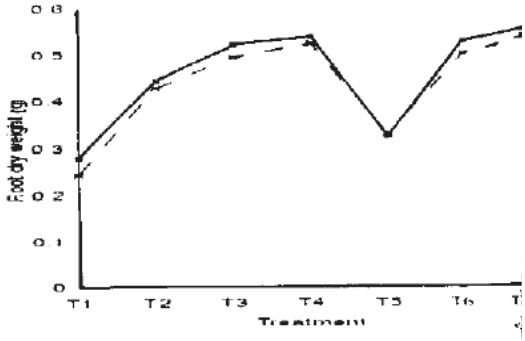


Fig. 5: Effect of different levels of nitrogen on root weight of two varieties of canola (*Brassica napus* L.)

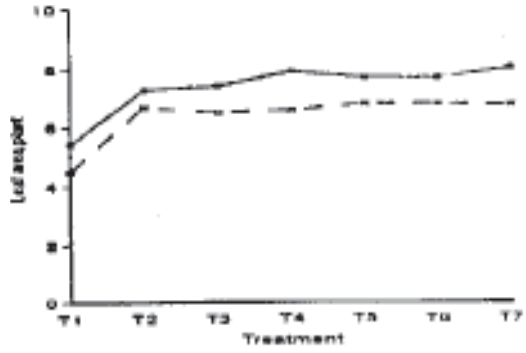


Fig. 3: Effect of different levels of nitrogen on leaf area per plant of two varieties of canola (*Brassics napus* L.)

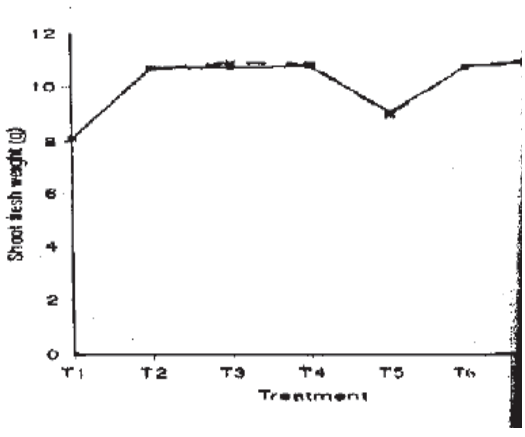


Fig. 6: Effect of different levels of nitrogen on shoot weight of two varieties of canola (*Brassies napus* L.)

nitrogen fertilizer (Fig. 3). Maximum leaf area (48.80%) with control was calculated under split application of 120 kg N $ha^{-1}$. Rrainbow showed 15.47 percent more leaf area than Con-I. As the results showed that Rainbow had more leaf area than Cone-I. It may be concluded that Rainbow have higher photsynthetic efficiency due having higher ability of absorbing sunlight necessary for photosynthesis. The many reports Kler *et al*. (1992) The varieties with higher leaf area having higher biomass and yield.

Maximum number of leaves per plant were observe the application of 120 kg N/ha, (Fig. 2) irrespect

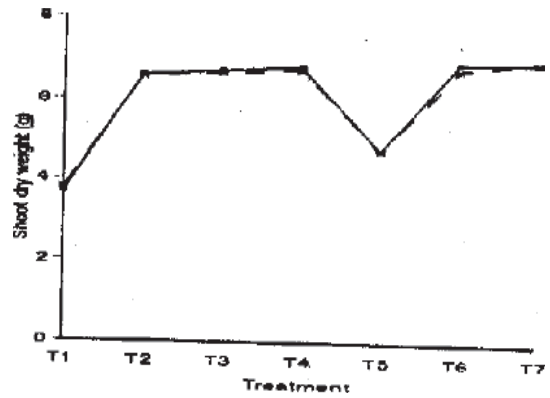


Fig. 7: Effect of different levels of nitrogen on shoot dry weight of two varieties of canola (*Brassies napus* L.)

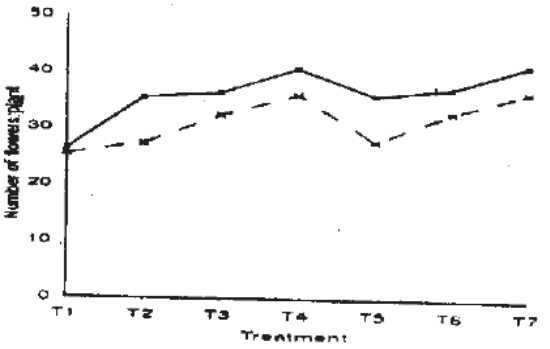


Fig. 8: Effect of different levels of nitrogen on number of flowere per plant of two varieties of canola (*Brassies napus* L.)

Application. Similarly, full and split application of 90 kg N/ha also showed statistically similar results. In the remaining treatment of 60 kg N/ha, full nitrogen application at sowing gave better results than its split dose.

Frash and dry weights of root (Fig. 4 and 5) shoot (Fig. 6 and 7) and number of flowers per plant also increased with increase in the levels of nitrogen fertilizer. Among the treatments, 120 kg N/ha either in split application or single dose treatment revealed better as compared with the others. Both the varieties showed almost similar results in respect of fresh and dry weights of root and shoot and number of flowers per plant. Jang *et al*. (1987) and Kler *et al*. (1992) have also reported almost similar results. It is evident from the results that nitrogen fertilizer produced significant effects on vegetative growth as well as on number of flowers per plant (Fig. 8). Seed yield depends upon the number of flowers. Greater the number of flowers, greater the seeds will be formed and greater amount of oil will be produced. in the present studies application of 120 kg N/ha proved better regarding all the parameters studied, so it is suggested that 120 kg N/ha is the best dose of nitrogen fertilizer for canola.

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