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IMPACT OF NITROGEN RATES ON GROWTH, YIELD AND YIELD ATTRIBUTES OF CROPPING SYSTEMS

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ABSTRACT

At the research area of the cereals and pulses branch of the Ayyub agricultural research institute, Faisalabad, a field experiment was carried out in 2001–10 to assess the impact of various nitrogen levels on growth and yield of characteristics. Eight nitrogen concentrations, namely 0, 29, 58, 87, 116, and 145, were assessed. Prior studies on planting methods were restricted to examining the effects of row ratios and spacings on the growth and yield of the wheat crop in the former and on both crops in the latter. In all series, only the base crop (wheat) received nitrogen fertiliser applications; the intercrop's nutrient requirements were not taken into account. According to Singh et al. (1974) and Borse and Mahajan (1980), the growth in height and dry matter was gradual up until one month, grew quickly, and reached its peak in the second month. Thereafter, the change was extremely tiny.

KEYWORD: nitrogen, growth, cropping systems, nitrogen fertilizer.

INTRODUCTION

Cropping Systems: Prior studies on planting methods were restricted to examining the effects of row ratios and spacings on the growth and yield of the wheat crop in the former and on both crops in the latter. In all series, only the base crop (wheat) received nitrogen fertiliser applications; the intercrop's nutrient requirements were not taken into account.

Overall, the findings indicated that altering rOM spacing had no significant impact on the production of irrigated wheat (Sharma et al., 1971; Dhillon et al., 1979). Singh et al. (1980) noticed some benefits of close spacing (22–27 cm) on drylands; however, when the distance between the rows was increased past this, the yields dramatically declined.

To better understand the nitrogen needs of both irrigated and rainfed wheat, numerous studies were carried out. Additionally, the impact of nitrogen on wheat produced both alone and in combination with other crops was investigated. Additionally, the impact of fertiliser on seed quality was examined.

Plant Growth and Development

Plant Height and Dry Matters

According to Singh et al. (1974) and Borse and Mahajan (1980), the growth in height and dry matter was gradual up until one month, grew quickly, and reached its peak in the second month. Thereafter, the change was extremely tiny.

Application of nitrogen significantly increased height (Sharma et al., 1970; Prinker and Gledhi11, 1972; Abdul Galli1, 1976; Saxena et al., 1965; Woodward, 1966; Suri and Singh, 1970; Chandra Mohan et al., 1977; Agrawal and Yadav, 1978); the increase was noted up to 80 kg N/ha dose, and the additional increase beyond this dose was very small. Similar to how nitrogen increased plant height, it also made plants heavier than the unfertilized crop (Singh, 1970; Jessop and Pathica, 1974; Sandhu and Gill, 1976; Sorour and El-Sharkway, 1976; Agrawal and Yadav, 1978); this weight gain was seen throughout all plant portions (Singh and Seth, 1978). However, the rise was not seen over 120 kg N (Singh et al., 1974; Borse and Mahajan, 1980); additionally, the rate of increase varied over the course of the growing period. In a fertilised and non-fertilized crop, it was different. When fertilised, it grew for over 100 days (grain filling stage) in unfertilized crops and for up to two months in fertilised crops; the growth beyond these two stages was negligible (Singh and Anderson, 1978). After flowering, the plant generated the most dry weight, the majority of which was in the form of grain, while leaves also made a sizeable contribution. (1978, Biscoe and Gallagher).

The studies done by Singh and Singh (1980) yielded various results. They claimed that plant dry weight grew more with larger doses and peaked at the tillering, boot

leaf, and milk phases. Singh and Anderson (1978) and Singh and De (1978) both reported findings that were similar.

Yield and Yield Components

The application of nitrogen had a significant impact on a variety of wheat plant characteristics, including tiller number height, leaf area, and dry matter accumulation. It has a good impact on the growth and development of yield components as well as the wheat plant's capacity for yield.

Yield Components

To learn how nitrogen affects different wheat plant yield components, numerous experiments were carried out. According to the findings, nitrogen fertilisation significantly increased the number of tillers per plant (Singh, 1965; Tiwari and Singh, 1969; Sharkway and Ageier, 1974; Moursi et al., 1976; Roy et al., 1976; Suambali and Gupta, 1976; Bishnoi and Patrick, 1979; Gill and Singh, 1980; and Ghosh and Mukhopadhyay, 1985). They noted that the increased survival rate of the newly produced tillers (Biscoe and Gallagher, 1978) and the improved N uptake by the plant (Chattopadhyay et al., 1975; Singh and Sharma, 1978; and Biscoe and Gallagher, 1978) were the causes of the rise in the number of tillers.

Even though the number of tillers increased when larger nitrogen dosages were applied, the rise was not uniform across all of the trial sites. For instance, Roy et al. (1976) and Sorous and 1-Sharkway (1976) did not see any increase, but Ghosh and Mukhopadhyay (1984) recorded the maximum tiller number/plant at a N dose of 40 kg/ha. Sandhu and Gill (1972) also reported a similar increase, but at twice the nitrogen dressing. On the other side, Agrawal (1971) showed that N dosages (100-140 kg N/ha) had a negative effect on the formation of tillers.

Up until jointing stage (Sandhu and Gill, 1972) or up to flag leaf stage (Campbell and Davidson, 1979), the number of tillers increased. Singh et al. (1972) also found similar outcomes. After these two stages, all workers observed a decrease in the quantity of tillers. According to Chandra Mohan et al. (1977), there is a direct association between the number of tillers and grain yield.

According to Roy et al. (1976) and Singh & Singh (1989), nitrogen greatly enhanced the quantity and weight of grains/ear, the length of the ear, and the test weight. The increase in dosages, however, did not have a similar effect on all of the yield parameters stated. This was due to the fact that the growth of these components was significantly influenced by the soil N condition at sowing and during the post-planting period.

(Sharkway and Gaier, 1974, line 81). Increased nitrogen doses (25–50 Ng N/ha) did not result in an increase in the length or quantity of grains per ear, but they did significantly increase grain weight (Roy et al., 1976). In contrast, Ghosh and Mukhopadhyay (1984) saw improvements in all yield components when 40 kg of nitrogen was supplied. Jadhav and Jadhav (1983) also observed a rise, but they observed even higher values when greater dosages were paired with high irrigation water levels.

Yield

Application of nitrogen, in general increased yield (grain and straw) both on drylands (Saxena et al., 1971; Singh and Agrawal, 1973; Tomar and Shukla, 1973; Agrawal and Singh, 1975: Meelu et al., 1976, Sondge and Upadhyay. 1977: Nadagoudar and Misra, 1977; Sharma and Upadhyay. 1978: Sekhawat and Mathur, 1976: Thakur et al., 1976; Koregave and Kolhe, 1978: Gahlot et al., 1978; Kilian and Joubert, 1983 and Ghosh and Mukhopadhyay, 1984) as well as under irrigated conditions (Mahapatra and Leelavathi, 1971; Singh and Verma, 1970; Singh et al., 1978; Singh et al., 1971; Roy et al.,1976; Sinha and Sharma, 1976; Chandra Mohan, 1977; Sekhawat et al., 1975; Agrawal and Moolani, 1978; Prasad et al.,1981: Sharma and Das, 1982; Kapur et al., 1984; Ghosh and Mukhopadhyay, 1984 and Dhonde et al., 1985, Nakhtore and Kewat, 1999). The response of wheat to application of higher doses of x, however, differed costernly on reinfed lands the yields increased only at a lower doos of fertilizer (Sevens et al., 1971; k 2 al., 1979 Kilian and Joubert, 1983; Ghosh and hopadhyay, 1984 Singh and Agarwal, 1973 and Agrawal and Singh, 1975). The first author recorded Increase for doses Letveen 20 and 30 kg 15/ha, and the remaining between 25-25 kg s/ha. Meelu et al. (1976) from his work on rainfed wheat in Punjab pointed out that besides the available soil moisture organic carbon contents of soll was another factor which determined wheat productivity on these lands. These workers also noted that the increase of yield due to increase in I changed by moisture available in soil at sowing and the rainfall received during the crop season. The yields climbed up to 80 kg 8 when the soil moisture status was high, which was 20 kg more than the recommendations made by workers for the rainfed crop. The findings of Singh and Srivastava (1971) provided more support for this. They noted that soils holding between 242-263 of available water upto 120 an depth and if small showers (137-141 mm) were received in the season the rainfed wheat showed marked increase in yield even with application of low doses of 30 kg N/ha. Bauer et al. (1965) also remarked that soil moisture at sowing and shower received during the season together improved yields by 40.3%. The results reported by Gautam and Singh (1970) and walia et al. (1979) were also in line, the latter pointed out that soils (sandy loam) which retained less moisture required more to produce yields similar to those obtained on more retentive heavy soils. This clearly indicate that water was the limiting factor in getting high fertilizer responses in rainfed wheat.

The application of splits was another aspect that increased yields. When 40 kg I was applied in two equal splits, one in the soil at sowing and the other at tillering through foliar spray, Sondge and Upadhyay (1977) obtained greater yields. Both Sekhawat and Mathur (1976) and Thakur et al. (1976) found a similar increase. Later, the authors noted that if rain fell throughout the season, the response to the same dose was improved (Nadagoudar and Misra, 1977). In a different study by Singh et al. (1984), better wheat yields were seen when two-thirds of the 40 kg N/ha total dose were drilled prior to sowing and the remaining third was combined with seed during sowing.

In a related study, Tomar and Shukla (1973) drilled the remaining half of the dose (12.5 kg N/ha) at sowing and added the remaining half (12.5 kg N/ha) to the soil after the monsoons had ended. In contrast, divided application did not benefit Koregave and Kolhe (1978) or Gahlot et al. (1978).

The advantages of split application were more under irrigation. Agrawal et al. (1972,1980) studied the effect of increasing rates of N on wheat yields and noted At one centre, increase the dose of (grain and straw) to 120 kg N/ha, and at another, to 60 kg 11/ha. Prasad et al. (1981), Sharma and Das (1982), and Kapur et al. (1983) all found similar results. Sekhawat et al. (1975) did note a rise to a dosage of 194 kg N/ha in Punjab, though. The findings of a different study conducted by Saraswat and Garg (1974) revealed a distinct pattern at Baroda. At Bhind, yields started to fall at 120 kg N, while at Morena, the third centre, differences between N doses were not as noticeable.

The results of field studies conducted in other locations revealed a connection between the depth of the water table and the crop's response to nitrogen fertiliser application (Chaudhary and Pandey, 1975); a dose of 60 kg N/ha produced 13.0 g/ha of grain, and when the dose was doubled, the yield also increased by 8.8 g/ha. Irrigation application did not benefit the crop in this situation.

The impact of four nitrogen rates—0, 40, 80, and 120 kg/ha—on wheat yields was examined by Agrawal and Moolani in 1978. Wheat yields were found to be reduced by 15–18% by delaying application (Singh et al., 1980). The greatest yields were obtained when 120 kg N was applied in two splits, half at sowing and the other half at first irrigation.

CONCLUSION

This article evaluates the impact of various nitrogen levels on crop growth and yield in a field experiment conducted in 2001–10 at the Ayyub Agricultural Research Institute in Faisalabad's cereals and pulses section. Eight nitrogen concentrations, namely 0, 29, 58, 87, 116, and 145, were assessed. Prior studies on planting methods were restricted to examining the effects of row ratios and spacings on the growth and yield of the wheat crop in the former and on both crops in the latter. In all series, only the base crop (wheat) received nitrogen fertiliser applications; the intercrop's nutrient requirements were not taken into account. According to Singh et al. (1974) and Borse and Mahajan (1980), the growth in height and dry matter was gradual up until one month, grew quickly, and reached its peak in the second month. Thereafter, the change was extremely tiny.

REFERENCES

1. A. Ali, M.A. Choudhry, M.A. Malik, R. Ahmad and Saifullah (2000). Effect of various doses of nitrogen on the growth and yield of two wheat cultivar. Pak. J. Biol. Sci, 3(6): 1004-1005.
2. A. B. Heinemann, L. F. Stone, A. D. Didonet, M. G.; Soares, B. B. Trindade, J. A. A. Moreira, A. D Canovas, (2006). Radiation use efficiency solar wheat productivity resulting from fertilization nitrogen. Brazilian Journal of Engineering Agricultural and Environmental, 10: 352-356.
3. Abedin M J. 1995. The impact of water and nitrogen on yield of wheat. M. S. Thesis. Dept. of Soil Science. IPSA, Gazipur, 1703.
4. B. L. Ma, T. Y. WU, N. Tremblay, W. Deen, N. B. Mclaughlin, M. J. Morrison, G Stewart, (2010). On-farm assessment of the amount and timing of nitrogen fertilizer on ammonia volatilization. Agronomy Journal, 102: 1, 134-144.
5. Bulman, P. and D. L. Smith. 1993. Yield and yield and components response of spring barley to fertilizer nitrogen. Agron. J, 85: 226-231.
6. D.K. Das, and T.V. Rao (1993). Growth and spectral response of wheat as influenced by varying nitrogen levels and plant densities. Annual of Agric. Res, 14: 421–425.
7. Donald, C. M. 1986. The breeding of crop ideotypes. Euphytica, 17: 385-403.
8. ESPINDULA, M. C.; ROCHA, V. S.; SOUZA, M. A.; GROSSI, J. A. S.; SOUZA L. T. Doses eformas de aplicação de nitrogênio no desenvolvimento e produção.