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PERFORMANCE OF WHEAT ON GREEN MANURED AND FERTILIZED FIELDS

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The studies undertaken aimed at determining the productivity of wheat cultivar LU-26S grown on green manured and fertilized fields. A quadruplicated experiment with randomized complete block design on a sandy loam soil having N 0.03%, P 5.7 ppm and K 210 ppm, was conducted at Ochkera Research Farm, University of Agriculture, Faisalabad during 1986-87. The experimental treatments comprised control, burrying of guara root mass only, of guara shoot mass only, burrying of guara root and shoot mass and a standard dose of (125-100 kg NP ha^{-1}). Thereafter, wheat was planted. The results achieved revealed that both fertilizer use and green manuring practices remained superior in performance over the control and significantly influenced the plant growth and yield parameters. However, fertilizer produced significantly better results than the green manuring practices. This led to the conclusion that green manuring alone cannot be a substitute for artificial fertilizer.

INTRODUCTION

Wheat (Triticum aestivum L.) is amongst the most important food grain crops. But its per hectare yield is far below the inherent potential of the existing promising cultivars. Among the various yield determining factors, soil fertility status is of prime importance. As a result of continuous cropping and high cropping intensity, our soils have gone deficient in many plant food elements.

Such soils can be replenished by the addition of organic or inorganic material in addition to other field management practices. Some researchers like, Bhatti (1969), Capuno et al., (1980), Akram et al., (1982), Rachhpal et al., (1982) and Ranaj & Kadillar (1983) after using some leguminous crops for green manuring maintained that the yield of subsequent wheat increased to a considerable extent. Similarly, the role of mineral or inorganic fertilizer is well established in enhancing crop yields, where use of fertilizer containing elements like NPK in a proportionate manner was highly advocated by Dayanand et al., (1980), Malik (1981), Masud and Bhatti (1983) and Sherin (1985).

The present study was, therefore, contemplated to evaluate the comparative usefulness of green manure crop guara (Cyamopsis tetragonoloba) and inorganic fertilizer (standard dose) in influencing the performance of subsequent wheat crop.

MATERIALS AND METHODS

A quadruplicated experiment with randomized complete block design was carried out at Ochkera Research Farm University of Agriculture, Faisalabad during 1986-87 on a sandy loam soil having N 0.03 %, P 5.7 ppm and K 212 ppm by maintaining a net plot measuring 5 x 3 m. Guara was sown in the third week of June and burried in the soil in last week of August then wheat cultivar LU-26S was planted in the first week of November. The experiment comprised the following treatments:

T_1 = Control.
T_2 = Burrying of root mass only.
T_3 = Burrying of shoot mass only.
T_4 = Burrying of root and shoot mass.
T_5 = Fertilizer standard dose.
(125-100 kg NP ha^{-1})

Full phosphorus and half of nitrogen at seeding while remaining half of nitrogen was applied with first irrigation. For recording observations regarding some growth and yield parameters, plants at random were selected and labelled, whereas grain yield and

Table 1. *Wheat performance on green manured and fertilized plots.*

	No. of tillers/m^2	No. of Productive tillers/m^2	Plant height (cm)	Ear lenght (cm) (cm)	No. of grains per ear per ear	1000 grain weight (g)	Biological yield q ha^{-1}	Economic yield q ha^{-1}	Harvest index
T_1	191.75cd	184.50c	80.41c	9.77b	34.20c	40.38c	31.99d	10.00e	31.24b
T_2	199.50c	192.25c	83.73bc	10.19ab	37.75b	43.49b	34.83d	13.33d	38.24a
T_3	228.00b	221.00b	86.58bc	10.42a	36.75bc	46.52a	43.58c	16.66c	38.26a
T_4	231.75b	225.0b	89.18b	10.36a	37.90b	47.10a	52.41b	20.00b	38.33a
T_5	286.00a	266.75a	102.28a	10.68a	41.20a	47.29a	61.66a	24.16a	39.20a

biomass were recorded on net plot basis and then calculated on hectare basis. The data obtained were statistically analysed using analysis of variance technique and Duncan's New Multiple Range Test was employed at 5% level to test the significance of differences among the treatment means (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The data pertaining to various important growth and yield parameters as influenced by green manuring and fertilizer use, are presented in Table 1. It is evident from the Table that green manuring and fertilizer treatments tended to influence most of the parameters where these treatments significantly differed from control.

Plant growth parameters like plant height and fertile tillers per unit area (m^2) were affected significantly by the fertilizer treatment which out-crossed green manuring practices. Among the green manuring practices, incorporation of whole plant appeared to be more useful and effective for growth and development of succeeding wheat crop than rest of the practices. Such results were also reported by Capuno et al., (1980).

Moreover, the green manuring and fertilizer treatments also influenced the parameters like grain number per spike and 1000 grain weight to a significant extent ultimately increased the grain yield per hectare over control. Plant height increase can be attributed to the availability of relatively more N in case of fertilizer treatment. Increase in fertile tillers can be due to the balanced nutritional status of soil under fertilized plots. The increases in grain number and 1000 grain weight are also attributable to the rich soil environments under fertilized plots, which resulted in producing vigorous plants. These results are supported by the findings of Jha and Ram (1967) and Akram et al., (1982).

Finally the results led to the conclusion that burrying of the even whole plant could not produce better results than the fertilizer application. Hence it can be said that green manuring practice alone cannot be a substitute of fertilizer for obtaining higher yields of succeeding wheat crop.

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