Effects of Nitrogen ~~different s~~Sources ~~of nitrogen~~ on ~~various s~~Soil~~p~~Properties and~~onw~~Wheat (*Triticumaestivum* L.) Production~~crop~~

Abstract

An experiment was conducted at the Agriculture Research Farm, Shri Durga Ji Post Graduate College, Chandeshwar, Azamgarh, Uttar Pradesh during winter session of 2019-20, to assess the effects of nitrogen sources on the production ofweath and soil properties. Among nitrogen content in grain and total uptake of nitrogen were significantly affected by various treatments and highest with T_1 recommended dose of N through inorganic source and significantly superior over T_2 recommended dose of N through organic source.The availability of Nwas not significantly influenced by various treatments.

Key words: Organic source,~~Recommended dose of N, organic source,~~ nitrogen content, recommended dose, ~~in grain and~~total uptake of nitrogen, wheat production ~~were significantly~~.

Introduction

Wheat (*Triticumaestivum* L.) belongs to the family Gramineae (Poaceae),it is a staple food across the globe~~of the world~~. The important and economic consideration for increasing wheat production~~vity~~lies is the effective use of nitrogen fertilizers~~ation~~. Nitrogen fertilizers usage~~ation~~ is the most important factor ~~in front of~~to a wheat agronomist to~~for~~ achieve~~ing~~his high yield targets. About 91% of the total wheat production is contributed by northern states of India (Athority?0. India is one of the major wheat producing and consuming country. Of the world In India, wheat~~it~~ is cultivated on ~~an area of~~ 29.14 million hectare with~~having~~mean annual productionof 102.20 million tonnes and productivity level of 3140 kg ha^{-1}(Authority?) ~~respectively~~. It constitutes ~~contributes~~ about 34% of total food grain production of the country (Authority?). Among them, Uttar Pradesh ranks first in respect to area 9.734 million ha and production 32.74 million tonnes but the productivity is much lower (3113 kg ha^{-1}) than Punjab (5097 kg ha^{-1}) and Haryana (5182 kg ha^{-1}) (Anonymous, 2018-19). Nitrogen is an essential nutrient among essential plant nutrients, play key role in plant growth, development and reproduction. Though nitrogen is one of the most abundant elements on earth, still nitrogen deficiency is probably the most common nutritional problem affecting plants worldwide. Number of tillers m^{-2} in wheat increased when N rate was~~ere~~

Comment [DI1]: Types of N used and , rates and treatment pattern not indicated? Data collected and how being collected were not indicated

Comment [DI2]: What were the treatments? What is $T_{1?}$

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increased (Mossedaq and Smith 1994; Iqtidar *et al*., 2006). To cope with this situation and to compensate for nitrogen loses due to usage of synthetic N fertilizerationss, the inclusion of organic sources of nutrients become the ~~are~~ considered ~~the~~ best possible solution for N management for wheat production. Application of farmyard manure (FYM) to soil have been practiced for many centuries and its application to soil have increased crop yield, improved soil fertility, increased soil organic matter, increased microbiological activities and improved soil structure for sustainable agriculture (Blair *etal*., 2006; Kundu *et al*., 2007).What is the objective of the study)

Comment [DI8]: Spell out the objective of the study

Materials and methods

The experiment was conducted at Agriculture Research Farm of Shri Durga Ji Post Graduate College, Chandeshwar, Azamgarh during winter season of 2019-20 using~~on~~ wheat (variety Kundan-DL-153-2) as test crop. The experiment comprised of five (5) treatments used under a~~were tested in~~ randomized block design with four (4) replications using ~~with gross~~ plot size 4.0 m x 5.0 mwith wheat sowing at 20 cm within rows.~~Number of plants m^{-2} was counted from one squre meter from three places (marked with sticks) in each plot at 20 DAS and averaged out.~~Five plants were tagged randomly in each plot for data collection on~~recording~~plant height in cm at 30, 60, and 90 DAS. The height was measured from ground surface to the base of fully opened leaf before the ear emergence and up to the base of ear head after heading and averaged out. Total number of shoots per meter ~~row~~ length was counted in ~~from 3 places (marked with sticks) in~~ each plot at 30, 60, and 90 days after sowing. Plants were harvested from 25 cm row length from two places in the second row on either side in each plot at 30, 60, 90 and 105 DAS and at harvest. The plants were sun dried separately and then oven dried at 70^{0}C± 2^{0}C till a constant weight was obtained. By summing the values of dry weight of plant, dry matter accumulation of plants per meter row length was computed.

Comment [DI9]: Statement not clear

Table 1: Treatment details

T_1	Recommended dose of nitrogen through inorganic source (120 Kg) urea.
T_2	Recommended dose of nitrogen through organic source (FYM)
T_3	75% of recommended dose of nitrogen through inorganic + 25% of recommended dose of nitrogen through organic source (FYM)
T_4	50% of recommended dose of nitrogen through inorganic + 50% of recommended dose of nitrogen through organic source (FYM)
T_5	25% of recommended dose of nitrogen through inorganic + 75% of

	recommended dose of nitrogen through organic source (FYM)

Available nitrogen (Kg ha^{-1})

Available nitrogen content in soil sample was estimated by the alkaline permanagante method as described by Subbiah and Asija (1956).

Note

Comment [DI10]: Apart fron soil N, which other soil property or properties did you analyzed for before and after fertilizer treatments? There is need for you to determine pH, Available P, Organic C before and after the study

Plant analysis

Analysis of grain and straw samples at harvest was carried out for their nitrogen, phosphorus and potassium contents. Each sample was first dried in thesun and finally in an oven at 70 ±2 ^{O}C and ground in Wiley mill. Grinded grain and straw samples weighted 0.2 and 0.5 g, respectively were digested in diacid mixture of H_2SO_4+ $HClO_4$ (4:1). After digestion, a known volume was made with glass distilled water and stored in well washed plastic bottles after filtration through Whatman filter paper no.42. All the estimations in the aliquot were made according to the following procedures:

(a) Nitrogen content was determined by Nessler's reagent method (Linder, 1944).

Nitrogen uptake by crop (Kg ha^{-1})

~~First of all thoroughly powdered g~~Grains and straw of wheat samples from each plot were analyzed by modified micro Kjeldahl's method ~~as suggested by (~~Jackson,~~(~~1973). Nitrogen content in grain and straw ~~thus~~ obtained ~~separately~~ was multiplied by~~with~~ therespective dty matter yield. The values of both were expressed as total nitrogen uptake by the crop in Kg ha^{-1}.

Total nitrogen uptake (kg ha^{-1}) = N uptake by grain (kg ha^{-1}) + N uptake by straw (kg ha^{-1}).

$$\text{N uptake by grain (kg ha}^{-1}\text{)} = \frac{\text{N content in grain (\%) x Grain yield (kg ha}^{-1}\text{)}}{100}$$

$$\text{N uptake by straw (kg ha}^{-1}\text{)} = \frac{\text{N contnetin straw (\%) x Straw yield (kg ha}^{-1}\text{)}}{100}$$

Results and discussion

Table 2: Nitrogen content, uptake in grain and straw of wheat as influenced by different sources of Nitrogen

Treatments	N content (%)		N uptake (kg ha^{-1})		Total uptake (kg ha^{-1})
	grain	straw	grain	straw	
T_1-Recommended dose of nitrogen through inorganic source	1.44	0.38	69.70	24.56	94.26
T_2-Recommended dose of nitrogen through organic source	1.34	0.36	35.64	13.02	48.66
T_3-75% of recommended dose of nitrogen through inorganic source + 25% of recommended dose of nitrogen through organic source	1.56	0.43	61.09	21.30	82.39
T_4-50% of recommended dose of nitrogen through inorganic source + 50% of recommended dose of nitrogen through organic source	1.50	0.42	50.89	18.02	68.92
T_5-25% of recommended dose of nitrogen through inorganic source + 75% of recommended dose of nitrogen through organic source	1.46	0.41	39.93	14.83	54.76
SEm±	**0.016**	**0.004**	**1.746**	**0.636**	**1.886**
CD at 5%	**0.048**	**0.013**	**5.381**	**1.960**	**5.812**

Wheat ~~N~~nitrogen content (%)

Data on plant ~~pertaining to the~~ nitrogen contents~~shown in (t~~Table 2) revealed that the nitrogen content was highest in the grains than in straws and the mean differences between the ~~. The nitrogen content in~~ grains and straws were significantly ~~affected~~ differentdue to ~~by~~ the ~~application of~~ various treatments. Maximum nitrogen content in grain (1.44%) was obtained~~found~~ with the treatment T_1~~(recommended dose of nitrogen through inorganic sources)~~ and was significantly higher over~~with~~ the rest of the treatments.The least ~~Minimum~~ nitrogen content in grain was ~~recorded~~ obtainedwith T_2 (recommended dose of nitrogen through organic source).

Nitrogen uptake (Kg ha^{-1})

The data ~~shown in the (T~~table 2) revealed that nitrogen uptake was significantly affected by the various fertilizer treatments. T_1~~(recommended dose of nitrogen through inorganic source)~~ resulted in highest uptake of N in the grain (69.70 kg ha^{-1}) ~~and~~ whichwas ~~found~~ significantly higher than the rest of the treatment. The least ~~Minimum~~ nitrogen uptake was obtained~~recorded in~~with T_2 (recommended dose of nitrogen through organic source).

Total nitrogen uptake (Kg ha^{-1})

The ~~data on~~ total N uptake ~~of nitrogen given in (T~~table 2)showed~~revealed~~ that the total uptake of nitrogen also followed the same trend as observed ~~in its uptake~~ in grain and straw uptakes~~.~~

The highest~~maximum~~ nitrogen content in grain (1.44%) was observed under treatment T_1, which was the recommended dose of N through inorganic source ~~which~~ andwas significantly higher than the rest of the other treatments. However, same trend ~~also~~ ar~~found~~ obtainedfor~~in~~ nitrogen content in the straw was observed among pthertheir treatments. Similarly the nitrogen uptake in grain and straw was significantly higher in T_1than the rest of the treatments. Similar trend was observed in the total nitrogen uptake ~~of nitrogen~~. This was perhaps due to improved availability of nitrogen in the soils resulting from the fertilizer uages. The results are in corroboration~~confirmation~~ with the findings of Chaudhary *et al.* (1997)and Parmar and Sharma (1996).

The maximum available nitrogen (172.50 kg ha^{-1}) in the soil was observed with T_3 75% of recommended dose of nitrogen through inorganic source + 25% of recommended

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dose of nitrogen through organic source was higher than T_2 recommended dose of nitrogen through organic source and T_1 recommended dose of nitrogen through inorganic source but not significantly affected by any of the treatment. The results showed ~~exhibited~~ that ~~the~~ integrated nutrient application through organic and inorganic fertilizer used in a suitable combination improved the soil fertility than use of inorganic fertilizers alone. Similar results were reported by Bhiday (1994), Singh *et al*. (1999).

Conclusion

Nitrogen content in grain and total uptake of nitrogen were significantly affected by the various treatment sources and this was highest with the use of the ~~T~~$_1$recommended dose of N through inorganic source (T_1) and significantly superior over ~~T~~$_2$recommended dose of N through organic source (T_2).

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