Effectoftillagepracticesand fertility levels on nutrient uptake and content in grain and straw of wheat under rice- wheat cropping system

Abstract

The present investigation entitle "Effect of tillage practices and fertility levels and yield of wheat in rice- wheat cropping system" was conducted at Agronomy Research Farm, CSAUAT, during *rabi* 2021-22 and 2022-23. The experiment was laid out into Split plot design with threereplication. The parameters were observed plant *viz.* Nitrogencontent ingrain andstraw (%), Nitrogenuptakeingrain andstraw(kgha^{-1}) Phosphorus content ingrain andstraw (%),Phosphorusuptakeingrain andstraw(kgha^{-1}), Potassiumcontent ingrain andstraw (%), Nitrogenuptakeingrain andstraw(kgha^{-1}). Basis on the pooled data the results of study revealed that in case of tillage practices maximum nitrogencontent ingrain andstraw (1.80 and 0.53 %), Nitrogenuptakeingrain andstraw(93.34 and 36.26 kgha^{-1}). Phosphorus content ingrain andstraw (0.31 and 0.20 %) Phosphorusuptakeingrain andstraw(16.23 and 13.80 kg ha^{-1}), Potassium content ingrain andstraw (0.42 and 1.38 %), Potassium uptakeingrain andstraw(22.15 and 93.88 kgha^{-1}) respectively was reported in conventional tillage whereas in case of various fertility levels maximum nitrogencontent ingrain andstraw (1.83 and 0.59 %), Nitrogenuptakeingrain andstraw(100.31 and 35.06 kgha^{-1}). Phosphorus content ingrain andstraw (0.35 and 0.25 %) Phosphorusuptakeingrain andstraw(18.16 and 16.63kgha^{-1}) respectively, Potassiumcontent ingrain andstraw (0.45 and 1.41 %), Potassium uptakeingrain andstraw(24.97 and 101.03kgha^{-1}) respectivelywith the application of 125%RDF+tebunconzole.

Keywords: *Conventional tillage, Flag leaf stage, Nutrient uptake and Tebunconzole,*

Comment [U1]: entitled

Comment [U2]: replications

1. Introduction

Wheat (*Triticum aestivum* L.), being an important prehistoric crop, is backbone of our national food security system. The idiom "Dal roti chalna" itself realized its significance in our livelihood. Its straw is accounted as a major feed to a large number of cattles. Thus, among the food grains, wheat is the richest source of protein and it stands at second place after pulses. It is utilized for bread, cakes, cookies, noodles, petri- products and chapatti etc. Wheat grains contains starch 60- 68%, protein 8-15%, fat 1.5-2.0%, cellulose 2.0-2.5%, and minerals 1.5-2.0% **(Kumar *et al.* 2019).**Wheat crop contributes substantially to the national food security by providing more than 50 % of the calories to the people who mainly depend on it. As such, wheat provides a major source of energy requirement of human diet and animal feed across the world. Globally, wheat is cultivated approximately 224 million hectares with an average annual global production of about 775.8 million metric tonnes. The largest producer of wheat in the world is the European Union followed by China, India and United States of America. India, being blessed and enriched with a diverse agro- ecological condition, ensuring food and nutritional security to a majority of the Indian population through production and steady supply particularly in the recent past, is the second largest producer of wheat worldwide. In India, wheat is grown on 33.64 million hectares area with 107.59 million tons production and 3206.30 kg ha^{-1} productivity during 2019-20 (Directorate of Economics and Statistics). The entire wheat growing area of the country has been categorized in to 6 major zones. The highest area of wheat cultivation is occurred in North- Western Plain Zone (NEPZ). Wheat is cultivated in all states of India except Kerala. Uttar Pradesh is major wheat growing State of India. In Uttar Pradesh wheat is grown in 9.85 million hectares area with 35.50 million tonnes production followed by Madhya Pradesh (area 6.39 million hectares and production 17.17 million tonnes) and Punjab (area 3.5 million hectares and production 17.14 million tonnes) respectively.) The global demand of wheat will increase to about 900 million tons of wheat by the year 2050. It has been estimated that India will need at least 140 million tonnes of wheat by 2050 as against present estimated production of 109.24 million tonnes. The world acreage under wheat crop accounts 216.18 million ha producing 763.6 million metric tonnes with an average of 3530 kg ha^{-1}. In India, it covers 29.32 million ha producing 103.6 million metric tonnes, one third of the total food grain production, with an average productivity of 3530 kg ha^{-1}. The current world population of 7.7 billion is expected to reach 9.7 billion by 2050. India is the second most populous country (1.3 billion) after China (1.41 billion) and expected to surpass that of China touching a peak 1.7 billion by 2050 **(Kar *et al.* 2021).** Accordingly, wheat is likely to continue to be vital in ensuring food security across the globe Uttar Pradesh is India's biggest wheat-growing state with 9.65 million hectares (36.6%), 26.87 million tonnes (39.3%), and a productivity of 2785 kg ha^{-1} **(Anonymous, 2019).** In Asia about 90% of the world's rice is grown and produced is 142 million ha area with the production of 622 million tons **(Rashid *et al.*, 2012)**. Rice is one of the major contributors to the food grain production contributing approximately 43per cent of the total food grain production in India **(Mondal *et al.*, 2020).** In Indiarice is cultivated in an area of 44.38 million hectares with a production of 104.31million tons. The country has to produce about 130 million tons of rice by 2025 to meet the food requirement of the growing population. Over 2 billion people in Asia alone derive 80% of their energy needs from, rice which contains 80% carbohydrates, 7-8% protein, 3% fat and 3% fiber. The export destinations are Middle-East countries, Malaysia, Korea, Japan, Australia, U.S.A, Canada, U.K., Italy and Sweden. The demand of Aromatic rice for internal consumption and also for export is increasing day by day **(Ankit *et al.* 2022).**Aromatic Rice emit specific aroma in field, at harvestings, in storage, during milling cooking and eating **(Rajeev *et al.* 2014).** Aroma development influenced by both genetic and environment factors. It is known that aroma is best developed when aromatic rice is grown in areas where temperature is cooler during flowering/maturity. Nearly two-third of basmati rice produced in India is exported. Basmati rice is the leading aromatic fine quality rice of the world trade and it fetches export price in the international market. In fact, Basmati rice is a gift from "Mother – Nature" to the Indian sub-continent and grows in the Indo-Gangetic plain only. There are known 23 varieties of basmati rice up to 2015, which have been approved under the Seeds Act, 1966. India is the largest producer and exporter of basmati rice in the world (**Shoomro *et al.*, 1999**). India produce more than 70% of the total world basmati rice production and the rest is produced by Pakistan. The production of Basmati rice in India is 8.7 million tonnes from 2.1 million hectares during 2014-15. Generally, conventional tillage aims at reversing and stirring a deep layer of soil; incorporating and destroying plant debris; exposing soil pests to sunshine for control; lump breaking and ground leveling. Conventional tillage involves many mechanical operations starting with deep ploughing, deep discing, ripping, shallow tine workings, and fine seedbed preparation after the harvesting of different grain crops, in both winter and summer production seasons. Thereafter a fallow period is given to enable moisture capture before the planting of the next crop. This approach results in a bare soil surface exposed to wind and water erosion and high compaction after heavy rains which then needs to be loosened again to assist in weed control and to promote moisture absorption from subsequent rainfalls. Reduced tillage is designated as full-width tillage that disturbs the entire soil surface, leaving 15% to 30% of residue cover after planting. Other conservation tillage practices in the inland PNW include minimum tillage, delayed minimum tillage, under cutter fallow, chisel, discs, and sweep tillage systems. The under-cutter method of fallow management uses wide V blade sweeps that slice beneath the soil surface and simultaneously deliver nitrogen during primary spring tillage followed by one or two non-inversion rod weeding operations during the summer to control weeds **(Pathania *et al.*, 2020)**. Both minimum tillage and delayed minimum tillage use undercutterV-sweep as a primary tillage. Herbicides may be used to control weeds following primary tillage, but secondary tillage such as rod weedingis usedmore commonly. Delayed minimum tillage is similar to minimum tillageexcept primary spring tillage with undercutter V-sweep is delayed until at least mid-May (**Ali *et al.*, 2021).**

Reduced tillage practices cannot be approached with "one size fits all." Reduced tillage

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options that you can choose will depend on conditions such as type of crop rotation, soil type, water availability for cover cropping, finance to purchase new soil management tools, and your goals for reducing tillage. It is advisable to discuss first with your Cooperative

Plant naturally takes time for growth and development and use of plant growth promoters provides nutrients for the soil microorganism, thus increasing the activities of microbes in soil, which in turn helps to convert unavailable plant nutrients into available form for faster plant growth promotion. Natural plant growth promoters (Phyto hormones) are involved in urging and stimulating root and shoot growth whereas organic plant growth promoters (PGPS) including soil fertility and productivity of crop also help in faster growth plant growth promotion and avoids grain disease. With improved chemistry plant growth promoters have multisite modes of action without being in contact only on leaf surface and are absorbed by the leaves and other plant parts and move within in treated plant (**Menhenett, 1985).**

2. Material and Method

The field experiment was conducted during *Rabi* of 2021-22 and 2022-23 atAgronomy Research Farm, CSAUAT, Kanpur. The experiment was laid out into Split plot design with 3 replication. Two levels of tillage *viz.* (1) Conventional tillage Two ploughing followed by sowing), (2) Reduce tillage (one ploughing followed by sowing were randomly allotted to main plot while ten 10 fertility levels *viz.*(1) Absolute Control. (2) RDF (150.60.40 NPK kg/ha), 3) 75% RDF (112.5; 15 30 NPK kg/ha + 10t FYM/ha) (4) 125% RDF (187.5; 75; 50 NPK kg/ha) (5) RDF (150; 60; 40 NPK kg/ha) + Two spray of chloromequate chloride (Lihocine 0.2% at first node (45 Days) and flag leaf stage (80 DAS). (6) RDF (150; 60; 40 NPK kg/ha) + Two Spray of tebunconzole (Folicur 430 SC @ 0.1%) at first node and flag leaf stage (80 DAS). (7) 75 % RDF (112.5:45:30 NPK kg/ha + 10t FYM/ha + Two Spray of Chloromequate chloride (Lihocine 0.2% at first node (45 DAS) and flagleaf stage (80DAS) (8) 75 % RDF (112.5:45:30 NPK kg/ha + 10t FYM/ha + Two Spray to tebunconzole (Folicur 430SC @0.1% at first node and flag leaf stage (80DAS) (9) 125% RDF (187.5:75:50 NPK kg/ha+ Two Spray of Chloromequate chloride (Lihocine 0.2% at first node (45 DAS) and flag leaf stage (80DAS) (10) 125 % RDF (187.5:75:50 NPK kg/ha + Two Spray of tebunconzole Folicur 430SC @ 0.1% (Folicur 430 SC @ 0.1 % at first node and flag Leaf (80DAS) were randomly allocated to sub plots. Standard culture practices recommended for Wheat was followed uniformly in all experimental plots.

N, P & K content and uptake in grain and straw of straw

Grain uptake (kg ha^{-1}) = Grain yield (q ha^{-1}) ×Nutrient content (%) in grain

Straw uptake (kg ha^{-1}) = Straw yield (q ha^{-1}) × Nutrient content (%) in straw

Comment [U4]: replications

3. Result and discussion

Nitrogencontentingrainandstraw(%)

The dataof nitrogen content in grain was not significantly affected but in straw was significantlyinfluenced by tillage practices and fertility levels. The grain have highest amount ofnitrogen content than straw. The maximum nitrogen content in grain was recorded in theconventional tillage practice (1.80 and 1.76 %) followed by the reduce tillage (1.77 and1.75%)andmaximumnitrogencontentinstrawwasrecordedinconventionaltillage(0.53 and 0.50 %) followed by reduce tillage (0.51 and 0.48%) during 2021-22 and 2022-23 year of study. Among fertility levels, the highest nitrogen content in grain (1.83 and1.80%) and straw (0.59 and 0.56 %) were recorded in 125% RDF+ tebunconzole and itwasatparwith125%RDF+chloromequatechloride(1.82and1.79%)and(0.57and 0.54 %) in grain and straw respectively. The minimum nitrogen contentin grain (1.73and1.69%)andstraw(0.47and0.45%)wererecordedinthecontrolandinteraction in nitrogen content in grain and straw between tillage practices and fertilitylevelsduringbothyear of experimentation.These results also confirms the findings of**Verma *et al.* (2006) and Kacharoo and Razdan (2006)**

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Nitrogenuptakein grainandstraw (kgha^{-1})

The data of nitrogen uptake ingrainwasnotsignificantly affected butinstraw wassignificantly influenced by tillage practicesand fertility levels. The grain have highest amount of nitrogen uptake than straw. Themaximum nitrogen uptake in grain was recorded in the conventional tillage practice(93.34 and 89.44 kg ha^{-1}) followed by the reduce tillage (88.69 and 85.56 kg ha^{-1})and maximumnitrogen uptake in straw was recorded in conventional tillage (36.26 and 33.90 kg ha^{-1}) followed by reducetillage(34.51and 32.13 kg ha^{-1}) during2021-22 and 2022-23year ofstudy.Among fertility levels, the highest nitrogen uptake in grain (100.31 and 97.38 kg ha^{-1})and straw (35.06and 38.67 kg ha^{-1}) were recorded in125% RDF+ tebunconzole and it was atpar with 125% RDF + chloromequate chloride (98.89 and 95.57 kg ha^{-1}) and (40.36 and 37.88kg ha^{-1})ingrainandstrawrespectively.Theminimumnitrogenuptakeingrain(78.40and75.01 kg ha^{-1}) and straw (29.77 and 29.61 kg ha^{-1}) were recorded in the control. There were no significantinteraction in nitrogen uptake in grain and straw between tillage practices and fertilitylevelsduringbothyear of experimentation.The consequences of the current investigation are additionally in concurrence with the investigation of**Gholami *et al.* (2014), andShri *et al.*,(2021)**

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Phosphoruscontentingrainandstraw(%)

The data of phosphorus contentin grain was not significantly affected but in straw was significantly influenced by tillagepractices and fertility levels. The grain have highest amount of nitrogen content

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thanstraw.Themaximumphosphoruscontentingrainwasrecordedintheconventionaltillage practice (0.31 and 0.27 %) followed by the reduce tillage (0.28 and 0.24 %)andmaximumphosphoruscontentinstrawwasrecordedinconventionaltillage(0.20and 0.19 %) followed by reduce tillage (0.18 and 0.17 %) during 2021-22 and 2022-23yearofstudy. Among fertility levels, The highest phosphorus content in grain (0.35 and 0.31 %)andstraw(0.25and0.23%)wererecordedin125 %RDF+tebunconzoleanditwasatpar with 125 % RDF + chloromequate chloride (0.33 and 0.30 %) and (0.23 and 0.22 %)in grain and straw. The minimum phosphorus content in grain (0.22 and 0.19 %) andstraw (0.12 and 0.12) were recorded in the control followed by RDF (0.26 and 0.23 %)and(0.16 and0.15%)ingrainandstraw. There were nosignificantinteractioninphosphorus content in grain and straw between tillage practices and fertility levels duringbothyear of experimentation. These results also confirms the findings of**Bakhshandeh*et al.* (2018) and Seth and Singh (2020).**

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Phosphorusuptakeingrainandstraw(kgha^{-1})

Thedataofnitrogenuptakeingrainwasnotsignificantlyaffectedbutinstrawwas significantly influenced by tillage practices and fertility levels. The grain have highestamount of phosphorus uptake than straw. The maximum phosphorus uptake in grain wasrecorded in the conventional tillage practice (16.23 and 14.05 kg ha^{-1}) followed by the reducetillage (14.24 and 12.23 kg ha^{-1})and maximum phosphorus uptake in straw was recorded inconventional tillage (13.80 and 12.87 kg ha^{-1}) followed by reduce tillage (12.47 and 11.56 kg ha^{-1})during2021-22and 2022-23year of study.Among fertility levels, The highest phosphorus uptake in grain (18.16 and 15.99kg ha^{-1}) and straw (16.63 and 15.29 kg ha^{-1}) were recorded in 125% RDF+ tebunconzole and itwas at par with125% RDF + chloromequate chloride (17.38 and 14.97 kg ha^{-1}) and (15.36and14.38kg ha^{-1})ingrainandstraw.Theminimumphosphorusuptakeingrain(10.21and 8.40 kg ha^{-1}) and straw (7.52 and 7.36 kg ha^{-1}) were recorded in the control. There were no significantinteraction in phosphorus uptake in grain and straw between tillage practices and fertilitylevelsduringbothyear of experimentation.The consequences of the current investigation are additionally in concurrence with the investigation of**Gupta*et al.* (2020) and Saini*et al.* (2020)**

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Comment [U13]: small case

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Potassiumcontentingrainandstraw(%)

The data of potassium content ingrain was not significantly affected but in straw was significantly influenced by tillagepractices and fertility levels. The grain have highest amount of potassium content thanstraw. The maximum potassium content in grain was recorded in the conventional tillagepractice(0.42and0.41%)followedbythereducetillage(0.41and0.40%)andmaximumpotas

Comment [U15]: has

sium contentinstrawwas recorded inconventionaltillage(1.38and1.36 %) followed by reduce tillage (1.36 and 1.35%) during 2021-22 and 2022-23 year ofstudy.Among fertility levels, The highest potassium content in grain (0.45 and 0.45 %)and straw (1.41 and 1.39%) were recorded in 125% RDF+ tebunconzole and it was at parwith125% RDF + chloromequate chloride (0.44 and 0.44 %) and (1.40 and 1.39%) ingrain and straw. The minimum potassium content in grain (0.37 and 0.36 %) and straw(1.31 and 1.30 %) were recorded in the control followed by RDF (0.39 and 0.38 %) and(1.35and 1.33 %) ingrain and straw.There were no significant interaction in potassium content in grain and strawbetween tillage practices and fertility levels during both year of experimentation andpooled.These results also confirms the findings of**Gupta*et al.* (2007), Kumar*et al.* (2015) and Singh*et al.* (2018)**

Comment [U16]: small case

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Potassiumuptakeingrain andstraw (kgha^{-1})

Thedataofpotassiumuptakeingrainwasnotsignificantlyaffectedbutinstrawwassignificantly influenced by tillage practices and fertility levels. The grain have highestamount of potassium uptake than straw. The maximum potassium uptake in grain wasrecorded in the conventional tillage practice (22.15 and 21.09 kg ha^{-1}) followed by the reducetillage (20.84and19.56 kg ha^{-1}) andmaximumpotassiumuptake instraw wasrecordedinconventionaltillage (93.88and91.03 kg ha^{-1}) followedby reduce tillage (91.52and88.73 kg ha^{-1})during2021-22and 2022-23year of study.Among fertility levels, The highest potassium uptake in grain (24.97 and 23.74 kg ha^{-1})and straw (101.03 and 98.12 kg ha^{-1}) were recorded in 125% RDF+ tebunconzoleand it was atpar with125% RDF + chloromequate chloride (24.11 and 22.90 kg ha^{-1}) and (99.11 and 96.58 kg ha^{-1})in grain and straw. The minimum potassium uptake in grain (16.99 and 15.93 kg ha^{-1}) and straw(82.41 and 80.07 kg ha^{-1}) were recorded in the control f.There were no significant interaction in potassium uptake in grain and strawbetween tillage practices and fertility levels during both year of experimentation andpooled.The consequences of the current investigation are additionally in concurrence with the investigation of**Singh*et al.* (2019), Yadav*et al.* (2019) and Puniya*et al.* (2019)**

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4. Conclusion

With rice management the management varied significantly in respect of soil organiccarbon and available nutrients as NPK in soil and soil organic matter improve with treatmentBio-decomposer Treated Residue statically at par with Urea Treated Residue (5 % urea) Thetreatmentandatdifferent stageofwheatduringboththeyearsofstudy. Different nutrient management option varied significantly in respect of soil organiccarbon and available nutrients as NPK in soil and soil organic matter improve with treatment75 %

RDF + 10 t FYM + Growth Regulator (Chlormequat chloride @0.2 % + Tebuconazole@0.1 %)staticallyatparwithtreatment125 %RDF +GrowthRegulator(Chlormequat chloride@0.2 %+Tebuconazole@0.1 %).Thetreatmentandatdifferentstageofwheatduringboth theyears ofstudy.

Table-1:Effectoftillagepracticesandfertilitylevelson Nitrogen contentand uptake ingrain and straw of wheat

Treatment	Nitrogencontent(%)						Nitrogenuptake(kgha^{-1})					
	Grain			Straw			Grain			Straw		
TillagePractices	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**
Conventionaltillage	1.803	1.76	1.78	0.53	0.50	0.52	93.34	89.44	91.59	36.26	33.90	35.08
Reducetillage	1.774	1.75	1.76	0.51	0.48	0.50	88.69	85.56	87.12	34.51	32.13	33.32
SE(m)	0.007	0.001	0.012	0.002	0.002	0.002	0.133	0.556	0.203	0.159	0.197	0.092
C.D.	NS	NS	NS	0.016	0.005	0.016	0.872	3.646	1.327	1.042	1.293	0.605
FertilityLevel												
F1(Control)	1.73	1.69	1.71	0.47	0.45	0.46	78.40	75.01	76.70	29.77	29.61	28.69
F2-RDF(150.60.40NPK kg/ha)	1.75	1.72	1.74	0.50	0.47	0.48	83.56	80.28	81.92	32.01	29.78	30.89
F3-75%RDF+10tFYM/ha	1.76	1.73	1.75	0.51	0.48	0.49	85.82	82.51	84.17	33.07	30.81	31.94
F4-125%RDF	1.77	1.74	1.76	0.52	0.49	0.50	88.01	84.65	86.33	34.25	31.96	33.11
F5- RDF+chloromequatechloride	1.78	1.75	1.77	0.53	0.50	0.51	90.28	86.88	88.58	35.51	32.85	34.18
F6- RDF +tebunconzole	1.79	1.76	1.78	0.54	0.51	0.52	92.33	89.12	90.73	36.75	34.38	35.56
F7-75%RDF+10tFYM/ha+ Chloromequatechloride	1.80	1.77	1.79	0.55	0.52	0.53	95.13	91.87	93.50	37.98	35.57	36.78
F8-75%RDF+10tFYM/ha+ Tebunconzole	1.81	1.78	1.80	0.56	0.53	0.54	97.01	93.71	95.36	39.09	36.65	37.87
F9- 125%RDF+chloromequatechloride	1.82	1.79	1.81	0.57	0.54	0.55	98.89	95.57	97.23	40.36	37.88	39.12
F10-125%RDF+tebunconzole	1.83	1.80	1.82	0.59	0.56	0.57	100.31	97.38	99.05	35.06	38.67	40.86
SE(m)	0.017	0.017	0.023	0.006	0.007	0.005	1.154	0.971	0.979	0.388	0.346	0.319
C.D.	NS	NS	NS	0017	0.019	0.014	3.322	2.795	2.818	1.118	0.995	0.329

Table- 2:Effectoftillagepracticesandfertilitylevelson Phosphorus content and uptakeingrain andstraw of wheat

Treatment	Phosphoruscontent(%)						Phosphorusuptake(kg ha^{-1})					
	Grain			Straw			Grain			Straw		
TillagePractices	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**
Conventionaltillage	0.31	0.27	0.293	0.20	0.19	0.19	16.23	14.05	15.14	13.80	12.87	13.34
Reducetillage	0.28	0.24	0.266	0.18	0.17	0.18	14.24	12.23	13.24	12.47	11.56	12.02
SE(m)	0.003	0.001	0.001	0.001	0.001	0.001	0.068	0.030	0.038	0.067	0.012	0.065
C.D.	0.019	0.008	0.004	0.007	0.009	0.004	0.444	0.200	0.246	0.440	0.081	0.424
FertilityLevel												
F1(Control)	0.22	0.19	0.20	0.12	0.12	0.12	10.21	8.40	9.31	7.52	7.36	7.44
F2-RDF(150.60.40NPKkg/ha)	0.26	0.23	0.24	0.16	0..15	0.15	12.63	10.71	11.67	10.244	9.40	9.82
F3-75%RDF+10tFYM/ha	0.27	0.24	0.25	0.17	0.16	0.16	13.38	11.42	12.40	11.02	10.16	10.59
F4-125%RDF	0.28	0.25	0.26	0.17	0.17	0.17	14.14	12.13	13.14	11.86	10.97	11.42
F5- RDF+chloromequatechloride	0.29	0.26	0.27	0.19	0.18	0.18	14.93	12.88	13.90	12.73	11.82	12.28
F6- RDF +tebunconzole	0.30	0.27	0.28	0.20	0.19	0.19	15.70	13.64	14.67	13.61	12.68	13.14
F7-75%RDF+10tFYM/ha+ Chloromequatechloride	0.31	0.27	0.29	0.021	0.20	0.20	16.61	14.25	15.43	14.50	13.55	14.02
F8-75%RDF+10tFYM/ha+ tebunconzole	0.32	0.28	0.30	0.22	0.21	0.21	17.38	14.97	16.79	15.36	14.38	14.87
F9-125%RDF+chloromequatechloride	0.33	0.30	0.31	0.23	0.22	0.22	18.16	15.99	17.07	16.63	15.29	15.96
F10-125%RDF+tebunconzole	0.35	0.31	0.33	0.25	0.23	0.24	19.21	17.01	18.11	17.91	16.53	17.23
SE(m)	0.003	0.003	0.003	0.002	0.002	0.002	0.159	0.137	0.151	0.144	0.120	0.141
C.D.	0.010	0.007	0.008	0.006	0.006	0.006	0.457	0.394	0.436	0.415	0.346	0.406

Table-3:Effectoftillagepracticesandfertilitylevelson potassiumcontent andingrain and straw of wheat

Treatment	Potassiumcontent(%)						Potassiumuptake(kgha^{-1})					
	Grain			Straw			Grain			Straw		
TillagePractices	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**	**2021-22**	**2022-23**	**Pooled**
Conventionaltillage	0.42	0.41	0.420	1.38	1.36	1.375	22.15	21.09	21.62	93.88	91.03	92.46
Reducetillage	0.41	0.40	0.408	1.36	1.35	1.360	20.84	19.56	20.20	91.52	88.73	90.13
SE(m)	0.003	0.001	0.001	0.006	0.004	0.006	0.097	0.025	0.067	0.113	0.259	0.191
C.D.	0.008	0.003	0.005	0.019	0.010	0.019	0.637	0.166	0.193	0.743	1.700	1.253
FertilityLevel												
F1(Control)	0.37	0.36	0.368	1.31	1.30	1.310	16.99	15.93	16.46	82.41	80.07	81.24
F2-RDF(150.60.40NPKkg/ha)	0.39	0.38	0.385	1.35	1.33	1.343	18.81	17.45	18.13	86.70	83.37	85.04
F3-75%RDF+10tFYM/ha	0.40	0.40	0.398	1.36	1.34	1.353	19.69	18.55	19.12	88.17	85.44	86.80
F4-125%RDF	0.41	0.41	0.410	1.37	1.34	1.358	20.57	19.65	20.11	90.23	86.82	88.85
F5- RDF+chloromequatechloride	0.42	0.41	0.415	1.37	1.35	1.365	21.49	20.05	20.77	92.12	89.01	90.56
F6- RDF +tebunconzole	0.42	0.42	0.420	1.38	1.37	1.378	21.86	20.96	21.41	94.25	91.43	92.84
F7-75%RDF+10tFYM/ha+ Chloromequatechloride	0.43	0.43	0.428	1.38	1.37	1.380	22.92	21.75	22.34	95.62	93.13	9.37
F8-75%RDF+10tFYM/ha+ tebunconzole	0.44	0.43	0.433	1.39	1.38	1.390	23.52	22.31	22.92	97.37	94.86	96.11
F9- 125%RDF+chloromequatechloride	0.44	0.44	0.438	1.40	1.39	1.395	24.11	22.90	23.50	99.11	96.58	97.85
F10-125%RDF+tebunconzole	0.45	0.45	0.448	1.41	1.39	1.403	24.97	23.74	24.36	101.03	98.12	99.58
SE(m)	0.004	0.005	0.004	0.013	0.015	0.014	0.204	0.177	0.193	1.130	1.051	0.827
C.D.	0.013	0.014	0.012	0.037	0.041	0.041	0.587	0.510	0.555	3.254	3.027	2.381

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