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EFFECT:OF DIFFERENT LEVELS OfNPK AND TIME OF N-APPLICATION ON YIELD AND YIELD C_MPONENTS.OF BASMATI-385

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The study conducted during the two consecutive seasons from 1995 to 1996 showed that a fertilizer dose of 130-67-67 kg ha' appeared sufficient to get higher grain yield of Basmati-;385. A schedule of nitrogen application as 1/3 at transplal1ting, 1/3 at tillering and the remaining 1/3 a,t panicle initiation was considered the best. Among all the NPKcombinations, a N dose of 130 kg ha' applied in three splits, gave the maximum paddy yield of 4.72 and 4~j4 ha' during 1995 and 1996 respectively, while NPK at the rate of 60-0-0 kg ha", all applied at transpla,n-ti\\"igproduced the minimum yield of 3.58 and 2.78 t ha' respectively. Correlation between grain yield ahd yield components was highly significant and positive.

Key words: levels of NPK, time of N application, yield of Basmati-385

INTRODUCTION

Fertilizer .will continue to play a key role in sustaining high yield of fine rice *(Oryza setive* L.) and soil productivity. Nutrient balance and proper time of fertilizer application are essential for maximizing grain yield of rice crcp. Rice gives good yield response to complete fertilizer, particularly in upland conditions (Chandra and Mishra, 1991). Efficiency of N utilization by crops is as low as 30 to 40%iAuld; and Kim, 1996). Since nitrogen is quickly lost frdm submerged fields of rice, -hence split- application is recommended to increase its efficiency. Though P requirement of rice is not as high as that of Nan:d K, yet its application improves the milling yield (Cbardt(I and Mishra, 199.1). However, the response of rice t() K is 110tas vivid as to N .and P. Thus the balanced use of N, P and K appears indispensable for increasing the rice yield. However, such information is not available under the upland conditions, of Faisalabad;, consequently the present .study was planned to sea the response of fine rice cv. Basmati-385 to different levels of NPK and time of N application.

MATERIALS AND METHODS

The experiment was conducted at the Aqronornic Research Area, University of Agriculture, Faisalaba'Q during 1995 and 1996. The soil of experlrnental field was sandy clay loam in texture with pH of 7.8, organic matter 0.73%, total nitrogen 0.036%, available P_2O_5 6.3 ppm and available K_2O 187 ppm. The experiment was laid out in a randomized complete block design using split plot arrangements with 4 replications. The net plot size measured 2 x 4 m. Treatments comprised 3 NPK levels i.e. 60-0-0 (F_1), 130-67-67 (F_2), 180-90-90 (F_3) kg ha' and 3 schedules of N application i.e, all at transplanting (N_1); 1/2 at transplanting + 1/2 at tillering (N_2); 1/3 at rransplantinq + *113* at ~illering + 1/3 at panicle initiation (N_3). Levels of NPK were placed in main plots, while times of Napplication in subplots. These nutrients weresl,Ipplied as urea, single supper-phosphate and sulphate of potash, respectively. All phosphorus and potassium vyere given as a basal, while N was applied in three equal splits as per treatment. The ,experimental field' was puddled, levelled and fertilized with a .basal dose, of ,P and K. Twenty-five days Old seedlinqs were transplanted in standing water at 20 x 20 ern spacing on 5th July each year.

RESULTS AND DISCUSSION.

The results are summarized in Table 1. Both the levels o~ NPK and time of N application significantly increased the yield and yield attributes. Treatment F_2N_3 resulted in the maximum grain yield of 4.72 and 4.54 t ha' during 1995 and 1996 respectively, against the minimum of 3.58 and 2.78 t ha' in F_1N_1 for both the years respectively. Higher grain yield obtained with the application of 130-67-67 kg NPK ha' combined with three equal splits of N (1/3 N at transplanting + 1/3 N at tillering + 1/3 N at panicle initiation) might be due to more favourable plant growth, better kernel development and positive effect of yield components that have been reported to improve through balanced NPK supply (Anonymous, 1994) and split-applicatibn of nitrogen (Chaudhry *et al.*• 1994; Yoo *et el., 1995).*

Superiority of this treatment combination (F_2N_3) over others might be due to an increase in the amount and translocation 'of available carbohydrates which

Table 1. Interactive effect of N levels and time of N application on yield and yield attributes of fine rice (Basmati-385)

Treatment	N (kg/ha)	N applied at	Grain yield (t/ha) 1995	Grain yield (t/ha) 1996	Panicle bearing tillers (No.) 1995	Panicle bearing tillers (No.) 1996	Spikelets per panicle 1995	Spikelets per panicle 1996	Normal kernels (%) 1995	Normal kernels (%) 1996	1000-kernel weight (g) 1995	1000-kernel weight (g) 1996
F_1N_1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.9 d
F_1N_2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.9	214.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F_1N_3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	228.7	221.6ab	[illegible]	[illegible]	[illegible]	15.4 bcd
F_2N_1	130-67-67	[illegible]	[illegible]	3.97bc	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	71.7 abc	15.4 c	[illegible]
F_2N_2	130-67-67	[illegible]	4.44ab	4.33ab	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73.1 ab	15.9 bc	[illegible]
F_2N_3	130-67-67	[illegible]	4.72a	4.54a	[illegible]	[illegible]	245.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F_3N_1	[illegible]	[illegible]	4.14bcd	[illegible]	[illegible]	[illegible]	216.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F_3N_2	[illegible]	[illegible]	4.27abc	[illegible]	[illegible]	[illegible]	247.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F_3N_3	[illegible]	[illegible]	4.35ab	[illegible]	[illegible]	11.1	253.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.52

increased the percentage of normal kernels by 74.3 and 76.1 during 1995 and 1996 respectively over the other treatment combinations.

The increase in grain yield and yield attributing ~~rameters such as more panicle bearing tillers, nOt'malkernels, 1000-kernel weight in this treatment co~nation might be ascribed to continuous avail~jty of nitrogen in sufficient quantities from planting"to panicle initiation. These results are sUbstanti~9 by those of Wang and Zhang (1995) who repo.~ that N applied at panicle initiation enhanced ~;!,~~rbon assimilation resulting in an increase in phO'f~¥nthats for grain filling that led to higher grain yield~'~"

Simple linear cori~~tjon coefficients (r) were calculated to determir'te.the degree (significant/non-significant) and nattlte (positive/negative) of relationships betweend_ndent and independent variables. There was a highl¥sjgnificant and positive correlation between grain yield and panicle bearing tillers (0.949 and 0.855), grainyi'3ld and spikelets paniele' (0.608 and 0.753), grain yield and 1000-kernel weight (0.581 and 0.597) during 1995 and 1996 respectively.

Application of 130-67-67 kg ha" along with N in three equal splits (F_2N_3) produced higher grain yield, while F_3N_2 and F_3N_3 treatments resulted in low but statistically equal grain yield. Thus, F_2N_3 combination is evidently economical under the given experimental conditions. It is therefore, concluded that for profitable rice cultivation in uplands of the central Punjab (Pakistan), it should be fertilized @ 130-67-67 kg ha' 'giving N in three equal splits (i.e. 1/3 at transplanting + 1/3 at tillering + 1/3 at panicle initiation).

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