INFLUENCE OF DIFFERENT N, P, K DOSES ON YIELD & YIELD COMPONENTS OF TWO STANDARD RICE VARIETIES OF PNG, UNDER LOWLAND FIELD CONDITIONS.

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ABSTRACT

Influence of 6 doses of N, P, K on yield and yield components of two PNG standard varieties Wantok & Tambu was studied under lowland field conditions, separately. Under no fertilizer treatment, the yield was the least, for both the varieties, while highest yeidl for Wantok and Tambu was recorded under N, P, K (kg./ha.) doses of 100:50:50, 120:60:60 and 140:70:70; and 120:60:60 and 140:70:70 respectively. Doses of 100:50:50 and 120:60:60 seem to be optimum for Wantok and Tambu respectively. The influence of all the doses on yield and yield component of both the varieties has also been presented.

Keywords: NPK doses, lowland field, yield and its components.

INTRODUCTION

The two PNG standard rice varieties i.e. Tambu and Wantok were developed through the recombination breeding techniques during 1986 (Kim, 1986; Kim and Kriosaki, 1986). Unfortunately their nuritional requirements were not determined.

Grain and Rice Research and Development Project was initiated to develop both the modern High Yielding Varieties (HYV's) and cost effective Agronomic practices, during 1990. Although both the varieties possess many undesirable traits such as eating and milling recovery etc., yet they have ideal semi dwarf plant postures.

The miracle rices of 60s were developed using Dee Gee Woo Gen & I Go Tse dwarfing gene sources. The use of donors for semi dwarf plant postures set the dawn of Green Revolution in the Asian countries in particular and world at large. The resultant recombinants possessed short, thick and sturdy culms short erect leaves, responsiveness to added fertilizers, high tillering potential, resulting in increased yields (International Rice Research Institute, 1968; Tanaka *et al.* 1969).

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We envisaged that since these two varieties possess the semi dwarf plant posture they may be fertilizer responsive. In PNG, a fertilizer rate of 100-150:50:50 Kg./ha. of N, P, K respectively has been recommended by Wohuinangu and Kap, 1980 in their review paper on, Review on Rice Research.

We conducted the present study to optimize the fertilizer rate for semi dwarf varieties under lowland field conditions. The results of the study are presented in the paper.

MATERIALS AND METHODS

Two separate experiments on Wantok and Tambu were conducted with the following N, P, K fertilizer treatments (kg/ha.).

T1= 0- 0- 0
T2= 60-30-30
T3= 80-40-40
T4=100-50-50
T5=120-60-60
T6=140-70-70

Twenty days-old field grown nursery of both Wantok and Tambu was transplanted on 3.5.1991, at a plant to row distances of 20 cm., using seedlings per hill. All P, K, & 40% N was applied at the time of transplanting. The two top dressings were accomplished with N (30 % each) after 20 and 40 days after

Table 1: Influence of different doses of NPK on yield components of rice variety Wantok, under lowland field condition at Bubia Agriculture Research Centre, during 1991.

Doses	Yield t/ha.	Plant height (cm.)	No. of productive tillers/hill.	Panicle length (cm.)	No. of grains per panicle	Spikelet fertility %	Flag leaf area (cm.sq.)	Thousand grain weight (g)
0-0-0	4.7c	80.0b	7.2b	23.9a	114.1e	82.0b	22.8c	20.0b
60-30-30	6.2b	81.2b	8.2b	24.0a	124.6d	91.7a	25.6b	20.0b
80-40-40	7.1b	86.2a	10.9a	24.3a	129.9c	92.8a	25.7c	20.4b
100-50-50	8.1a	86.3a	11.8a	24.6a	132.0b	93.5a	26.5b	20.9b
120-60-60	8.3a	87.6a	12.4a	25.1a	135.5a	94.2a	27.1a	21.3a
140-70-70	8.8a	87.9a	13.1a	25.2a	137.0a	94.7a	28.5a	23.1a

Figures in columns, followed by different letters are significant 5% level of significance according to DMRT.

Table 2: Influence of different doses of NPK on yield and its components of rice variety Tambu, under lowland field condition at Bubia Agriculture Research Centre during 1991.

Doses	Yield t/ha.	Plant height (cm.)	No. of productive tillers/hill.	Panicle length (cm.)	No. of grains per panicle	Spikelet fertility %	Flag leaf (cm.sq.)	Thousand grain weight (g)
0-0-0	5.2c	80.0c	6.0c	23.4b	116.2c	80.0b	22.7d	23.1c
60-30-30	6.1b	83.4b	6.3c	23.7a	118.3c	92.7a	24.5c	23.4c
80-40-40	6.5b	85.5b	9.2b	24.0a	122.4b	93.3a	25.0b	25.5b
100-50-50	7.0b	87.6b	10.2a	24.3a	125.9b	94.0a	26.1b	25.6b
120-60-60	7.5a	88.5a	11.5a	24.6a	129.3a	94.8a	27.7a	26.7a
140-70-70	8.8a	92.5a	12.8a	24.7a	134.2a	95.3a	30.5a	26.7a

Figures in columns, followed by different letters are significant at 5% level, according to DMRT.

the transplanting date respectively. The experiments were conducted using Randomized Complete Block Design (RCBD, with three replications). The plot size was 10 m.sq. The other normal cultural practices were followed during the growing periods of experiments.

The data on yield was recorded by harvesting a net area of 6 sq. m. per treatment per replication per experiment. The data on yield components were recorded on 25 guarded plants per treatment per replication per experiment.

EXPERIMENTAL RESULTS

YIELD

The results of the study (Tables 1 & 2) indicate that under no fertilizer treatment, the yield was the least, for both the varieties, while the highest yield for Wantok and Tambu was recorded under 100-50-50; and 120-60-60 and 140-70-70 (at par with each other); and 120:60:60 and 140:70:70 (at par with each other) respectively. Doses of 100-50-50 and

120-60-60 seem to be the optimum for Wantok and Tambu respectively.

PLANT HEIGHT

For Wantok, plant height was maximum under 100:50:50 and 120:40:60 doses followed by rest of the doses of fertilizer, while least no. of tillers were produced under no fertilizer and 60:30:30 doses. For Tambu, the three highest doses produced the mazimum no. of tillers followed by 80:40:40, 60:30:30 and no fertilizer doses (non significant with each other).

NO. OF PRODUCTIVE TILLERS PER HILL

Wantok produced maximum no. of productive tillers per hill under the highest four doses of fertilizer, while least no. of tillers were produced under no fertilizer and 60:30:30 doses. For Tambu, the three highest doses produced the maximum no. of tillers followed by 80:40:40, 60:30:30 and no fertilizer doses (non significant with each other).

PANICLE LENGTH

Panicle length of Wantok was non significant under all the doses of fertilizer. While for Tambu, under no fertilizer treatment, the panicle length was significantly less, compared to rest of the doses. Except no fertilizer, panicle length under all the rest of the doses was non significant.

NO. OF GRAINS PER PANICLE

Different doses of fertilizer affected both the varieties similarly. The maximum grains per panicle were produced by the highest two doses, followed by rest of the doses in decreasing order, for both the varieties.

PANICLE FERTILITY %

Exactly similar effect of different doses of fertilizer were observed for both the varities. The minimum value for the trait was recorded for no fertilizer, while the trait was at par among the rest of the doses, for both the varieties.

FLAG LEAF AREA

Maximum flag leaf area was recorded for the last highest two doses for both the varieties, while the minimum value for the trait was recorded for no fertilizer treatment.

THOUSAND GRAIN WEIGHT

The maximum value for the trait was observed under the highest doses for both the varieties under study. The second highest dose of fertilizer for Tambu has also influenced trait the maximum (at par with the highest dose).

DISCUSSION

For Wantok, the three highest dose of complete fertilizer of N, P, K affected yield and its components, the maximum. But for Tambu, only two highest doses affected yield and yield components, the most. It is extremely interesting to note that under the three highest doses, the yield and almost all the yield components are non significant. Similarly for Tambu, only last two highest doses have affected yield and yield components, the most. Therefore, from the result of the study, a clearer picture has emerged that, N, P, K doses of 100:50:50 and 120:60:60 has affected the yield and yield components of Wantok and Tambu respectively, the most.

CONCLUSION

It may safely be concluded from the results of the study that N, P, K doses of 100:50:50 and 120:60:60, Kg./ha. for Wantok and Tambu respectively may be recommended for lowland rice cultivation in the country.

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