COMPARATIVE STUDY ON RATOONING POTENTIAL OF STANDARD RICE VARIETIES OF PNG

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ABSTRACT

The comparative ratooning potential of 4 standard varieties of PNG was studied under lowland field conditions. The crop performance was measured for yield and yield components, of both the main and ratoon crop. Senis was the highest yielding and the yield of rest of the varieties was statistically at par with each other, in the main crop. On contrary to this Wantok and Tambu were the highest yielding varieties under ratoon crop, while Niupela and Senis yielded significantly lower. The yield and its components of the varieties behaved similarly. Wantok and Tambu seem to be good for ratooning.

Key words: *Ratooning potential, rice varieties, yield components.*

INTRODUCTION

Rice ratooning means to have another rice crop without transplanting a second crop. The crux of the technique is to induce growth of stubbles of the main crop. It is a low cost technology to get extra yield, without spending any money on land preparation, nursery raising and doing the back breaking job of transplanting. For mechanised rice cultivation it also saves on machinery use. The practice of ratooning saves at least 20% in water requirements for ratoon crop (Grist 1959). In addition to this, ratoon crop has a shorter growing duration and is relatively free from weeds and costs less than a second transplanted crop.

It has been practised in many parts of the world and has been found to be very advantageous. In China, the rational practice of ratooning was advocated as far back as 1954 (Iso 1954), and more recently, it has been reported to be economical in Sichuan province of China (Jinguo 1991), and India (Singh *et al.* 1987), where a second crop is impossible to grow. To find out the most suitable genotypes, variants, segregating material and hybrids (Sutaryo and Suprihatno 1993, Singh *et al.* 1984, 1987) have been screened elsewhere in the world. In PNG Sajjad (1993) has also recommended the practice to save money and time to raise another rice crop. Lin (1994) has written a supplementary note, commenting on the article of Sajjad (*op. cit.*). Lin not only supported the guidelines of the author but also suggested some modifications. In fact he has described some specific practices most commonly used in Taiwan, for over twenty years of rice ratooning.

We also envisaged selecting the best variety (ies) with a better ratooning potential, for PNG, where the cost of rice cultivation is already relatively high, compared to rest of the rice producing countries of the world. This prompted the present study and the results are presented in this paper.

MATERIALS AND METHODS

Four standard rice varieties of PNG namely Wantok, Tambu, Niupela and Senis were selected for the study. The field grown 20 days-old seedlings of the varieties were transplanted on 29.5.1991, at a square planting of 20 cm x 20 cm., by using two seedlings per hill. The experiment was conducted in Randomised Complete Blocks and had three replications. Each variety was planted on a gross area of 15 m^2 per replication. The compound fertiliser was used at N.P.K. rate of 100,50,50 kg/ha respectively. All

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P,K, and 40% N were applied at the transplanting time. The two top dressings (30% N for each) were done 20 and 40 days after the transplanting date.The other normal cultural practices were followed during the growing period of the crop. The crop was harvested on 2.10.1991. The datum on yield was recorded by harvesting 25 plants per genotype per replication. The data on yield components were recorded on 10 guarded plants per genotype per replication. The main crop was harvested by leaving 25 cm high stubbles from ground level, to facilitate vigorous sprouting. Immediately after harvesting the main crop, the field was irrigated and urea fertiliser was broadcast at the rate of 60 kg N/ha. The ratoon crop was harvested on 29.1.1992, using the same procedure as for the main crop.

EXPERIMENTAL RESULTS

Yield

It is evident from the results (see Table 1) that yield of Senis, in the main crop was significantly higher than the others, while the yield of the rest of the varieties was at par with each other. On the contrary, in the ratoon crop, Wantok, Tambu were the highest yielders, and Senis and Niupela, the lowest yielders.

Plant height

For the main crop, plant height of Niupela was the maximum, followed by Wantok, Tambu and Senis. Plant height of later three varieties were statistically non significant with each other. Under ratoon crop, the four varieties behaved similar to the main crop. Plant height of Niupela was again the highest, and plant height of rest of the varieties was statistically at par with each other.

Number of productive tillers per hill

Under main crop, number of productive tillers per hill was the lowest in Niupela. Under ratoon crop, Senis produced the highest productive tillers per hill and Niupela the lowest. The tillering capacity of Wantok and Tambu was statistically at par with each other and was significantly less than Senis.

Table 1. Comparative yield and yield components of four standard rice varieties of the main (first row) and ratoon (parentheses), under lowland field conditions at Bubia, during 1991-1992.

Varieties	Yield t/ha	Plant ht (cm)	Productive tillers/hill	Panicle length (cm)	Grains/ panicle	Spikelet fertility (%)
Wantok	7.1B (3.3a)	79.0B (75.9b)	14.2A (10.2b)	26.6B (20.6b)	94.0C (44.8b)	80.8A (75.6a)
Tambu	6.9B (3.9a)	83.6B (70.7b)	11.3AB (10.8b)	26.1A (19.6b)	102.0C (46.8b)	81.3A (79.4a)
Niupela	7.3B (2.0b)	110.7A (99.9a)	9.0C (8.4C)	25.3A (23.5a)	155.0A (77.3a)	84.9A (68.3b)
Senis	8.5A (1.7b)	94.0B (68.9b)	12.8A (12.3a)	26.6A (20.2b)	124.4B (46.5b)	84.9A (69.5b)

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

Panicle length

Under main crop, panicle length of Tambu, Senis and Niupela were longer than that of Wantok. Under ratoon crop, maximum panicle length was recorded for Niupela, while the trait was statistically at par with each other for rest of the varieties.

Number of grains per panicle

Under main crop, Niupela produced the highest number of grains (155/panicle), followed by Senis (124.4), Tambu (102.0), Wantok (94.0). For the ratoon crop, maximum number of grains were also produced by Niupela, compared to rest of the varieties. The rest of the varieties were statistically at par with each other for the trait.

Spikelet fertility (%)

Under the main crop, spikelet fertility of all the varieties was statistically at par with each other. But in the ratoon crop, maximum spikelet fertility was observed for Wantok and Tambu, while spikelet fertility for rest of the varieties was statistically at par with each other.

DISCUSSION

It is evident from the results of the study that under the ratoon crop, Wantok and Tambu produced statistically higher yield than rest of the varieties under study, while the yield potential of Niupela and Senis was statistically at par with each other. For yield components, the results of the study was very interesting. For instance, Senis has produced the maximum number of productive tillers per hill, while maximum value of panicle length has been recorded for Niupela. Again Niupela has produced the highest number of grains per panicle.

Maximum spikelet fertility has been recorded for Wantok and Tambu, while Niupela has shown significantly lower spikelet fertility. It is clear that the top yielders have also had significantly the highest spikelet fertility.

CONCLUSION

It may be concluded from the results of the study that Wantok and Tambu are good for ratooning. Yield and spikelet fertility may be used as selection criteria for ratooning ability.

RECOMMENDATIONS

To make rice ratooning more productive & economical, a package for the management of both the main and ratoon crops is recommended as under:

Main crop

Transplant 20 days-old seedlings in well puddled field. The dykes (bunds) should be up to 45 cm to retain the water all the time. Transplantation should be accomplished by using two to three seedlings per hill at a square planting of 20 cm x 20 cm. Use compound fertiliser at N.P.K. rate of 100, 50, 50 kg/ha respectively. Apply all P, K and 40% N at the time of transplanting. Top dress the crop two times (30% N each), 20 and 40 days after the transplanting date. Light top dressing has also been recommended at the grain filling stage (Lin 1994). Harvest the main crop, by leaving the stubbles 20-25 cm high from ground level.

Ratoon crop

Immediately after harvesting the main crop, irrigate the field and apply N at the rate of 60 kg/ha, in the standing water. The sprouts will start growing very vigorously only if the fertiliser is applied. If fertiliser is not added, the sprouts growth will not be that robust; and colour of the crop will be pale, the very undesirable feature of ratoon crop. The two subsequent irrigations should be thorough and water must stand up to 7.5 cm in the field. A greater care is required to monitor the insect pests build up in the ratoon crop, another undesirable feature of ratoon crop. If insect pest build up beyond the threshold level, use insecticides to control the population build up. More recently Lin (1994) has recommended that after one week when the new shoots sprout from the stubbles to a height of about 15 cm, the stubbles should be cut again 3 to 5 cm above ground level. This practice he has considered

very critical because the cutting of the regrowth and stubbles at a lower level will induce development of more new shoots. He has further argued that more shoots will develop more roots at the lower nodes which in turn sustain a strong and healthy ratoon crop.

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