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Nitrogen Scheduling and Weed Management Practices for Increasing Boro Rice Yield in Lower Assam

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Abstract: Highest grain yield, Straw yield and weed count efficiency were recorded by the treatment T_{10} being significantly superior to rest of the treatments. Lowest weed Dry matter $wt(g/m^2)$ was also recorded by the treatment T_{10} . B:C ratio was found highest under the treatment T_{10} . Application of Pre-Emergence weedicide @0.75 kg a.i./ha + 2 hand weedings at 25DAT and 50DAT recorded highest grain yield of 84.07 q/ha (T_{10} -Treatment) in Lower Assam.

Key Words: Hand weedings, Butachlor, Pretilachlor, N-Scheduling, Max-tillering, Panicle-Initiation, Flowering and Yield –reduction.

INTRODUCTION

Boro rice is the second most important food grain crop in Lower Assam next to winter rice. It is a summer season crop grown mainly under irrigated condition weed is the most important factor that declines the yield of summer rice crop adversely in some places of Lower Assam. Yield reduction in transplanted rice has been reported to be 28 to 45% due to uncontrolled weeds (Singh *et al* 2003) Butachlor and Pretilachlor weedicides were used as Pre-emergence weedicides in most of the places of

Lower Assam to control the weed problems along with other practices for getting higher yield of summer rice. Farmers often apply urea as Nitrogenous fertilizer for top dressing in rice field than the required quantity for obtaining higher yield in rice production. Keeping above facts in view, the present investigation was conducted to find out the most effective and economic method of weed management and N-scheduling under transplanting condition of boro rice in Lower Assam.

METHODOLOGY

A field experiment on summer rice (cv-Joymoti) crop was conducted during 2015-16 in between winter and summer season period at Livestock Research Station, AAU-Mondira to study the effect of N-schedulling and weed management practices for getting higher yield of boro paddy (summer rice)

The experimental site was sandy loam to loamy textured soil with p^H 5.6, organic carbon content 0.52%, available N, P_2O_5 and K_2O were 156.0kg/ha, 17.0kg/ha and 242kg/ha, respectively. After incubation, the germinated seeds of boro rice (cv-Joimoti) was sown in the nursery bed on 19th November, 2015 to raise the seedlings. The main field of boro paddy was ploughed with power tiller followed by ladderings were completed with the help of rotavator before transplanting of rice seedlings. 30 days old seedlings were transplanted on 19th December, 2015 in the puddled field as per treatments. "Butachlor" and "Pretilachlor" weedicides were applied a day before transplanting as per treatments. The plot size was 100m² (10m x 10m). The designed was 3RBD. Recommended fertilizer dose of 60-40-30kg/ha of N, P_2O_5 and K_2O were applied in all plots. There were 10 numbers of treatments/replication viz T₁-Weedy check, T₂-One Hand weeding at 25DAT, T₃-Closer planting (15cm x 15cm) + Butachlor @ 1.5kg a.i./ha, T₄-Butachlor @ 1.5kg a.i./ha, T₅-Pretilachlor @ 0.75kg a.i./ha, T₆-Closer Planting (15cm x 15cm) + Pretilachlor @ 0.75kg a.i./ha, T₇-Butachlor @ 1.5kg a.i./ha + hand weeding at 30DAT.

T₈-Pretilachlor @ 0.75kg a.i./ha + Hand weeding at 30DAT

T₉-Butachlor @ 1.5kg a. i./ha + Two hand weedings at 25DAT & 50DAT.

T₁₀-Pretilachlor @ 0.75kg a. i./ha + Two hand weedings at 25DAT & 50DAT.

Boro rice was irrigated once in a week by maintaining a 5cm depth of irrigation till its maturity.

This boro rice (cv-Joimoti) takes about 165-170 days for its maturity (seed to seed). At the time of transplanting-temperature record was 12°C-16°C. Gradually it increases to 30°C-33°C towards its maturity in the month of June first week. Almost 600-650mm rainfall was received by this crop for its growth and development. N-schedulling in boro rice was found better when four numbers of top dressings were completed at Tillering, Max-tillering, Panicle-Initiation stage and Flowering stage of boro rice. The rate of application of N-schedulling was 7.5kg/ha of Nitrogen and source of Nitrogen was urea.

RESULTS AND DISCUSSION

Highest weed dry wt of 65.72g/m² was recorded by the treatment T₁ being significantly superior to rest of the treatments (Table 1). Next highest weed dry wt (g/m²) was recorded by the treatment T₄ being at par with T₅ and significantly differ to rest of the treatments (Table 1). Lowest weed dry wt (g/m²) was recorded by the treatment T₁₀ (7.02g/m²) being at par with T₉ treatment (9.25g/m²) and both this two treatments were significantly inferior to rest of the treatments. Highest weed count efficiency (%) was recorded by the treatment T₁₀ (89.30g/m²) being significantly superior to rest of the treatments. Highest grain yield of 84.07q/ha and straw yield of 99.65q/ha were also recorded by the treatment T₁₀ and it was found significantly superior to rest of the treatments. Highest B:C ratio was also recorded by this treatment T₁₀ (5.55:1). This is followed by the treatment T₉ (4.95:1) and T₆ (3.05:1). Thus, the T₁₀ treatment viz Pretilachlor @ 0.75kg a.i./ha + Two hand weedings at 25 days after transplanting and 50 days after transplanting shows lot of positivity in this trial as per the data shown in Table 1. N-schedulling effect on grain yield was also recorded highest (84.00q/ha) when four times top dressings were completed at Tillering, Max. Tillering, Panicle-Initiation and Flowering stage of boro rice (Table 2). The recommended fertilizer dose of boro rice is 60-40-30kg/ha of N, P_2O_5 & K_2O . Basal

Table 1
Weed parameters and yield characters of Boro Rice

<i>Treatment</i>	<i>Weed Dry wt g/m²</i>	<i>WCE (%)</i>	<i>Grain Yield (q/ha)</i>	<i>Straw Yield (q/ha)</i>	<i>B:C ratios</i>
T1	65.72	78.48	25.15	30.18	0.96:1
T2	26.15	60.26	38.18	45.78	1.65:1
T3	23.15	64.77	48.16	58.92	2.82:1
T4	42.15	35.86	32.16	28.59	1.50:1
T5	40.12	25.60	30.02	36.02	1.34:1
T6	22.15	43.57	50.15	60.18	3.05:1
T7	30.05	54.28	41.70	50.04	2.25:1
T8	32.15	51.08	44.05	53.82	2.49:1
T9	9.25	85.92	81.55	96.88	4.95:1
T10	7.05	89.30	84.07	99.65	5.55:1
CD at 5%	5.64	2.98	3.74	8.18	–

Table 2
N-Scheduling and grain yield of Boro Rice

<i>Fertilizer Dose</i>	<i>Basal Application</i>	<i>Top Dressing @ N/ha</i>	<i>Grain Yield (q/ha)</i>
60-40-30	40-40-30	20 kg at Max Tillering stage	65.45
60-40-30	30-40-30	15 kg at max Tillering stage + P.I., stage	74.00
60-40-30	30-40-30	10 kg at Tillering stage Max Tillering stage + P.I. stage	80.12
60-40-30	30-40-30	7.5 kg at Tillering stage + Max Tillering stage + P.I. stage + Flowering stage	84.00

application was 30-40-30kg/ha of N,P₂O₅&K₂O and top dressings were @ 7.5kg N/ha in different crop growth stage (Table 2).

CONCLUSION

Boro rice is also called as summer rice in Indian context; suffers due to adverse effect of low temperature causing formation of poor tillers/hill and less numbers of panicles at initial stage of crop growth were recorded. To escape from early flood in low lying areas as well as low temperature effect on anthesis of boro rice-transplantation time needs

to be completed with 20th December to 20th January in each calendar year. Yield reduction in boro rice field of lower Assam is a common phenomenon due to the presence of weeds; which takes the nutrients from the field itself. But the yield reduction could be over come with the application of Pretilachlor as Pre-emergence weedicides and applied in the field @0.75kg a.i./ha. This is followed by the two hand weeding at 25 days after planting and 50 days after planting are very much needed in order to obtain a good yield of boro rice in all the places of lower Assam. Most common weeds of Boro rice are

Eichornia crassipes, Echinochloa crus-galli, Cydon dactylon, Cyperous rotundus, Cyperous iria, Cyperous difformis, Ammannia baccifera, caesulia axillans, Digitaria sanguinalis, Vallisneria spp, Ceratophyllum spp etc. in lower Assam.

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