

Bed Planting Method for Establishment of Direct-Seeded Aman Rice in Rice-Wheat Cropping System

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ABSTRACT

An experiment was conducted at the Bangladesh Rice Research Institute, Gazipur during wet season (June-November) of 2002 and 2003 to determine the effects of bed width, plant row number per bed and seed rate on the agro-economic productivity of direct-seeded rice (DSR) under bed planting in rice-wheat cropping system. Planting in 70, 80 and 90 cm width bed with two and three plant rows per bed along with flat (conventional) and 30, 45, 60 and 75 kg seed ha⁻¹ were tested. Bed planting with 70 cm width of beds increased yield DSR up to 16 %, over conventional method. It increased the grains panicle⁻¹ of rice. Weed infestation was less in bed planting. The cost of cultivation in bed planting (Tk 12,901-13,701 ha⁻¹) was lower than conventional method (Tk 18,045 ha⁻¹) whereas gross return, gross margin, and benefit-cost ratio in 70 cm beds (Tk 41,870-46,800 ha⁻¹, Tk 28,110-33,640 ha⁻¹ and 3.04-3.56, respectively) were higher than conventional method (Tk 39,910-41,360 ha⁻¹, Tk 21,810-23,280 ha⁻¹ and 2.20-2.29, respectively).

Improvement of Existing Rice Yield through Recommended Fertilizer and Cultural Management at Farmers' Fields

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ABSTRACT

Grain yield of T. Aman rice increased by 15-32% because of BRRRI recommended cultural practices compared to farmer's practices (FP). None of the newly released BRRRI varieties was superior to BR11 in terms of grain yield. In the Boro season, BRRRI recommended cultural management resulted in 18-33% higher grain yield of BRRRI dhan28 compared to FP. In comparison to farmer's fertilizer management, grain yield of T. Aman rice increased by 1.6-2.5 t ha⁻¹ because of soil test based (STB) fertilizer management or BARC recommendation at Kurigram site. Similar trend was observed with STB fertilizer management at Pirganj, Thakurgaon areas. Additional fertilizer costs incurred due to STB fertilizer management resulted in Tk 7820-16320 ha⁻¹ added income during T. Aman season and that of Tk 5525-19465 ha⁻¹ during Boro season. Rice yield could be increased at farmer's field if they only adopt BRRRI recommended cultural practices. The increase in grain yield would be much more higher if fertilizers are applied based on soil test and/or BARC recommendation.

Effects of Genotypes and Seed Quality on Low Temperature Tolerance of Rice during Germination

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ABSTRACT

Laboratory experiments were carried out to compare the temperature responses with respect to genotype and seed vigor during germination. Above 90% germination for BR5, BR11, BR14, BR23, BR24, BRR1 dhan28, BRR1 dhan29, BRR1 dhan31, BRR1 dhan32 and BRR1 dhan33 were recorded between 18-33°C. At 13.7°C, seeds of BR14, BR24, BR26, BRR1 dhan28, BRR1 dhan29, BRR1 dhan31 and BRR1 dhan32 germinated by 80% while less than 9% germination was recorded in BR1, BRR1 dhan30, Kartiksail and Kalaghora. The rate of germination (seeds hr^{-1}) increased from 13.7°C with increasing temperature and attained a maximum level at optimum temperature (around 30.9°C) for most of the genotypes. However, the slowest rate of germination was recorded for all genotypes at low temperature. The highest rate of germination was found for BR23 while the lower rates of germination were recorded for BR1, BR5, BRR1 dhan30, Kartiksail and Kalaghora. The lower germinating genotypes along with BR5 had the shallower slopes (0.0006 to 0.0011), whereas for other genotypes had slopes ranging from 0.0013 to 0.0019. This was found when rates of germination were regressed against sub-optimal temperature range. Distinct differences in germination (at $21 \pm 1^\circ C$) between genotypes began to be seen at and after 48 hours ageing at 24% seed moisture content and 45°C. At this ageing treatment BR1, Kartiksail, Kalaghora were identified as the lowest quality seed lots. The above seed lots had the poorest viability than other genotypes. The calculated viability period (p) ranged from 24.2 hours (for Kalaghora) to 117.3 hours (for BRR1 dhan33). Positive and significant ($P < 0.01$) relationship was seen between germination at low temperatures (13.7 and 15.8°C) and three assessment of physical quality (germination after 48 hours ageing, initial seed quality (K), and viability period) when all genotypes were included, while no significant relationship were existed when the lower germinating BR1, Kartiksail and Kalaghora were excluded. Seed quality as well as genotypic variations might influence the final germination and rate of germination of rice genotypes at low temperature.

Soil Fertility Mapping at Micro Level for Rice Production : Prashadkalua village

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ABSTRACT

The study was undertaken in Kurigram district to compare the farmer's perception of soil fertility with soil test based results, delineation of soil nutrient map and to facilitate nutrient management decision at micro level. Soil samples were collected at 0-15 cm deep with geo-referenced (i.e. with latitude and longitude) and analyzed for different nutrient status. The mouza map was screen digitized with ARC View 3.2 and built in ARC/Info 3.5.1 to 1:10,000 scales. Soil samples were geo-referenced with geographic positioning system (GPS) and the map was used to spatial analysis the soil nutrient data. Different soil test values were used to make individual nutrient surface using Inverse Distance Weight (IDW) interpolation method. Farmers' perception about the fertility of their farm was moderate to low. The soil analysis data revealed that the soil of that locality is acidic in nature with a silty loam to loam soil of low organic matter. Almost all soils are deficient in P and K. Sulphur content is quite adequate in most soils except some parts of the farm. Ca and Mg were found below critical level in the locality for growing rice. Fertility map showed the most of the areas were similar to the farmers' perception. This also cleared that long experience in farming developed a conception of crop production in a particular soil in their locality. Based on the total fertility status of Prashadkalua village a fertilizer guideline were prepared for sustainable rice production with less destroys of the soil health and restore the soil fertility for future generation. By following the fertilizer guideline, optimum crop production can be possible in the similar agro-ecological zones.

Growth and Yield of Modern and Traditional Fine Grained Rice Genotypes in Aman and Boro seasons

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ABSTRACT

The experiment was done at the Bangladesh Rice Research Institute, Gazipur. Twelve traditional fine-grained rice genotypes were compared with modern aromatic rice varieties, which were transplanted on 15 August in Aman 1998 and 1 January in the Boro seasons 1999, to find out high yield genotypes. Chinigura, Kataribhog (awnless) and Badshabhog exhibited higher grain yield (2.73, 2.55 and 2.53t/ha respectively) in both the seasons. The higher number of panicles, grains panicle⁻¹ and lower spikelet sterility contributed to higher grain yield and matured within 140-149 days. None of the test genotypes overcome the yield of BRRI dhan37 and BRRI dhan38 in Aman season, and Superfast (Indian) and Khazor (Iranian) in the Boro season. BRRI dhan37 and BRRI dhan38 are suitable for cultivation in the Aman season, and Superfast, Khazor for Boro season but the traditional rice, Chinigura and Kataribhog (awnless) can be planted in both the seasons to obtain satisfactory grain yield.

Estimation of Critical Level of Phosphorus for Predicting Response of Rice in Boro and T. Aman Season

A L Shah¹

ABSTRACT

The experiments were conducted at the Bangladesh Rice Research Institute (BRRI), Gazipur in phosphorus (P) fertilized plots to observe its residual effect on rice yields and to determine season-wise critical level of soil available P for adjustment of P fertilizer recommendations. The residual effect of P increased rice yield over P control in both Boro and T. Aman seasons. The highest grain yield increase was recorded with the highest P rate due to higher availability of soil P. The critical level of soil available P (Modified Olsen) was 10 and 8 mg kg⁻¹ soil in the Boro and T. Aman seasons, respectively.

Nitrogen Management Option for Direct Wet Seeded Rice in Boro and Aman season

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ABSTRACT

Field experiments were conducted at the Bangladesh Rice Research Institute, Gazipur during 2001-2002 to find out the effect of N management practices on growth and yield of direct wet-seeded *Aman* and *Boro* rice compared to transplanted rice. Crop establishment methods did not influence grain yields both in *Aman* and *Boro* seasons. There was no variation in grain yield due to N management practices under different planting methods. Leaf color chart (LCC) based N management resulted in 4-8% higher grain yield than either three splits with or without basal N. The increase in grain yield with LCC based N management compared to control varied from 28-45% depending on growing seasons. LCC based N and three splits with or without basal N produced comparatively higher dry matter than other N management practices. Similar pattern followed for crop growth rate and leaf area index.

Tillering Behavior of Rice and its Contribution to Grain Yield as Influenced by Seedling Age in Boro Season

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ABSTRACT

A field experiment was carried out to find out the relationship between tillering ability and different morphological characters of rice plant, dry matter (DM) production and nitrogen (N) absorption and to find out the contribution of tillers on rice grain yield as affected by seedling age in Boro season. Rice varieties having higher tiller number gave shorter and thicker leaves. Shorter and thicker leaves led to less competition for DM and N among tillers, which resulted in higher efficiency of DM production and N absorption for tiller production. The dead tillers increased with the decrease of shoot DM and accumulated N in shoot. Tillering behavior and contribution of tillers on grain yield were greatly influenced by seedling age, especially with BRRI dhan28. In case of 70-day-old seedlings of short duration variety, percentage and contribution of tertiary tiller was higher than 30-day-old seedlings. Secondary tiller contributed most to grain yield of both short and long duration varieties.

Manipulation of Seeding Date and Seedling Age to Avoid Flash Flood Damage of Boro Rice at the Northeastern Haor Areas in Bangladesh

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ABSTRACT

Flash flood (20-100 cm) may damage Boro rice at the *haor* area in the Northeastern Bangladesh. Early crop establishment (late October to early November seeding) to avoid the flood is not possible as the crop might encounter low night temperature in late February to early March at its reproductive phase. Therefore, to find out a technology to avoid the stress, three experiments were conducted in Boro season from 2003-2005, manipulating seeding date and seedling age. Grain yield was reduced significantly in late seeding. The highest yield could be achieved using 15-30-day-old seedlings. The growth duration increased with the increase of seedling age and decrease of apparently low minimum temperature. A day increase of seedling age would increase half a day of growth duration. Therefore, a safe harvest (by 30 April) is dependent to seedling age and nature of low temperature in the cropping season. Forty-five-day old seedlings from mid-November seeding and 30-day-old seedlings from early December seeding of BRRI dhan29 could yield the safe harvest. BRRI dhan28 was quite safe even up to mid-December seeding provided 30-day-old seedlings be used.

Effect of Water Stress in Terms of Solar Radiation (0.60 MJ M^{-2}) and Nutrient Solution Electrical Conductivity on Water Relations of Rice

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ABSTRACT

An experiment was carried out in the glasshouse unit of the Imperial College at Wye, University of London, UK during May to November 1999 to find out the effect of intermittent water stress and nutrient solution EC on water relations, transpiration rate and leaf temperature of rice plant. Two levels of intermittent water stress (CC = continuous circulation of nutrient solution throughout the life cycle and RS = water stress was imposed from panicle initiation to maturity) and two levels of nutrient solution EC (3.0 mS cm^{-1} and 2.0 mS cm^{-1}) were used. Rice plants were grown using nutrient film technique (NFT). Nutrient status of the solution was maintained by adjusting solution EC and water stress was imposed by withholding circulation of the nutrient solution until the plants had received 0.60 MJ m^{-2} solar radiations. Water stress significantly decreased water uptake by the plant. The leaf water potential (ψ), relative water content (RWC) and water use efficiency (WUE) of plant were not significantly affected by water stress. Water stress significantly decreased leaf transpiration rate but increased leaf temperature. Nutrient solution EC did not affect water uptake, ψ , RWC, WUE, leaf transpiration rate and leaf temperature.

Farm-Retail Price Spread of Rice in Some Selected Areas of Bangladesh

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ABSTRACT

The study was undertaken to evaluate farm-retail price spread of rice and its effect on shift of demand and supply schedules in Northwestern Bangladesh and Greater Mymensingh region of Bangladesh. The results of the study indicates that there exists seasonal as well as spatial variabilities of price spread. The shift in the demand and supply of rice significantly influences the farm-retail price spread. The size of the consuming population is an important factor in shifting the price spread upwards. Unwanted increase of population size should be controlled to keep the price spread in a steady position. Per capita income and price of substitute grain was found to be less effective in determining the spread. Supply schedule, which is determined by the volume of production, is inversely related with farm-retail price spread. Therefore, the magnitude and direction of these factors must be kept in observation while formulating a sound price policy that would take care of the farmers and the consumers' simultaneously.

Spikelet Fertility Improvement in Rice through Nutrient Management

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ABSTRACT

The experiment was conducted at the Bangladesh Rice Research Institute (BRRI), Gazipur during Boro seasons of 2005 to 2007 to reduce spikelet sterility and to increase the grain number per unit area. Variable combinations of nitrogen, phosphorus, potassium and sulfur fertilizers were used along with different N management options in four treatments. Copper (Cu) and magnesium (Mg) spraying at maximum tillering (MT) stage was included with soil test based (STB) fertilizers dose (T3). Grain number per unit area increased by 10-15% when STB fertilizer dose was used along with Mg and Cu spraying at MT stage (T3) compared to BRRI recommended fertilizer rate and management (T1). Moreover, sterility percentage decreased by about 4% in T3. Grain number per unit area also increased by about 6% when STB fertilizer dose along with four equal splits of N (T2) than T1. One an average, about 8% yield was increased in T2 and T3 treatments compared to BRRI recommended fertilizer rate and management.

Influence of Integrated Nutrients Management on Growth and Yield of BRRI dhan45

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ABSTRACT

The experiment was conducted at the Bangladesh Rice Research Institute, Gazipur during 2006 Boro season. BRRI dhan45 was grown to find out optimum levels of nutrient and their sources for higher grain yield. The treatments combinations were: T_1 = control, T_2 = N:P:K:S @ 100:24:65:10 kg/ha, T_3 = 2/3 T_2 + 2 t/ha poultry litter (PL), T_4 = N:P:K:S @ 150:24:65:10 kg/ha, T_5 = 2/3 T_4 + 2 t/ha PL, T_6 = N:P:K:S @ 200:24:65:10 kg/ha and T_7 = 2/3 T_6 + 2 t/ha PL. The treatment T_5 was superior to T_6 and T_7 in respect of crop growth rate (CGR), N uptake, N use efficiency, protein content and yield and yield components. Addition of poultry litter @ 2 t/ha (oven dry basis) reduced one third of the chemical fertilizer requirement and gave comparable grain yield than higher amount of chemical fertilizer alone.

Response of Aromatic Modern Rice to Nitrogen under Transplant Condition in Wet Season

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ABSTRACT

The experiment was conducted at the Bangladesh Rice Research Institute, Gazipur in wet season. BR5, BRRI dhan34, BRRI dhan37 and BRRI dhan38 were tested with 0, 25, 50, 75 and 100 kg N ha⁻¹ to determine optimum N level for higher yield. Thirty-day-old seedlings were transplanted on 15 August at 20- x 15 cm both in 1999 and 2000. Plant height, tiller number, dry matter production, panicle number, spikelet sterility and straw yield increased with increased N levels in both the years. For cultivation of aromatic fine rice the optimum N level was 73 kg ha⁻¹ in wet season. However, the estimated optimum N level was 66, 45, 80 and 81 kg ha⁻¹ for higher grain yield with BR5, BRRI dhan34, BRRI dhan37 and BRRI dhan38, respectively. Higher N rates caused crop lodging after flowering resulting in increased spikelet sterility and decreased grains panicle⁻¹. The test variety BRRI dhan38 gave 25% higher grain yield than BRRI dhan34 but comparable with others.

Performance and Potential of Rice Processing Industry in Some Selected Areas of Bangladesh

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ABSTRACT

The study was undertaken to evaluate the nature of organization, market behavior and performance of rice milling sector of Bangladesh. The rice milling industry of Bangladesh was running within a competitive environment and was more or less "atomistic", where no single firm or seller was able to lead the market individually. There were no sales and promotional expenditures as product differentiation was absent and, there was no barrier for new entrants in this industry. Any type of agreement or 'collusion' was not found to determine the seller's price. Independent price setting was not also possible or not was effective because of the smaller market share by the miller and the product had no differential characteristics. Therefore, millers have to adjust their prices with the current market conditions, although they desire long run profit along with a fair profit. Performances of the sector were not so good, because, unutilization of large and automatic mills to their full capacity. Most of the rice mills are running with decade old furnished machinery, creating different problems frequently. However, rice milling is the largest industry in the economy. A large number of skilled and non-skilled workers including a significant number of women are employed in this sector.

Evaluation of SRI in Perspective to Maximize Yield and Profitability of Boro Rice

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ABSTRACT

The system of rice intensification (SRI) and traditional cultivation practices along with their modifications in respect of seedling age, spacing, irrigation and fertilizer management were evaluated in Boro (irrigated dry season rice) seasons of 2001-02 and 2003-04 at Bangladesh Rice Research Institute (BRRI). Traditional practice with SRI recommended younger seedlings increased 5-11% grain yield and 6-20% gross margin of Boro rice over traditional practice, while grain yield and gross margins were 27-71% and 62-398% higher over SRI practice, respectively. Weeding cost in SRI practice was increased by 25-59% over traditional practice though total variable cost was increased by only 1-3%. Cost for irrigation water management under SRI was 20% lower than traditional water management though labor cost for irrigation was 50% higher in SRI water management than traditional one. The SRI practice for growing Boro rice was not advantageous over traditional practice in terms of grain yield and economic return.

Effect of Crop Establishment Methods on the Performance of Transplanted Aman Rice in North-western Region of Bangladesh

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ABSTRACT

The field experiment was conducted at Bangladesh Rice Research Institute (BRRI), Rangpur to observe the performances of crop establishment methods during Aman 2004 and 2005 seasons. System of rice intensification (SRI), BRRI recommended conventional transplanting, Bolan (double transplanting), seedling throwing and wet-direct seeded rice by drum seeder methods were used for crop establishment. The SRI method produced about 1.60 t ha⁻¹ higher grain yield than Bolan and wet-direct seeded rice by drum seeder method. The highest number of panicle was observed from the wet-direct seeded rice by drum seeder method in both seasons. The SRI method produced significantly higher number of filled grains panicle⁻¹ in both the seasons. Tillers deteriorating trend was less in SRI than other methods. The SRI and wet-direct seeded rice by drum seeder took less time for maturation than other planting methods, although field duration was higher.