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Research Article

Ratooning Ability & Performance of Hybrid Variety Mestizo7 (NSIC Rc136H), for Yield Characters under Different NPK Levels at Irrigated Low Land Conditions of Rice

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Abstract: Field experiments were used in experimental research sites from Centeral Luzon State University (CLSU), Science city of Munoz Nueva Ecija, Philippines, to value the level of nitrogen in hybrid variety Mestizo7 Hybrid (NSIC Rc136 H) was used as observation matter material. In the characters of performance. Mestizo7 was more spikelets / panicles, full grain and grain production / ha. To determine the ratoon crop as issue of fertilizer, level of hybrid variety Mestizo7 at 120-30-30 kg NPK / ha, 4768 for the longest crop. The 00 kg / ha and 150-30-30 kg / kg NPK / kg 4714 kg/ha, was the production of grain production, 100 percent. Production increased by 33 percent and 99.20% of non-nutrition plants with 2380 kg / ha.

Keywords: Irrigated lowland, NPK levels, Hybrid variety, Ratooning ability.

1. INTRODUCTION

In the economy of agriculture world, rice crop occupies a strong place being the most important diet crop by providing nutrition for people over any other crop. It represents 23% of the world's calorie supply. Rice is grown on an area of over 2.5 million hectares with an average yield of 2,117 kg per hectares. The Pakistan ranks at ninth position with respect to the area and at rank 14th for yield per hectares worldwide. In rice ecosystem of Pakistan, after harvesting of main crop a waste area remains uncultivated/followed [1]. It has been successfully adopted in many counties including India, japan. USA. Philippines. Brazil, Thailand and Taiwan. In India, of the 40 M ha under rice, about 18.9 M ha constitute the ratooning under lowland. It is known as stubble rice in USA, regeneration rice in China, second flowering in rice in London, UK and ratoon rice in India and Bangladesh. If this scenario is creditable that cost reducing technology such as, ratooning will gain relevance as an option to planting a second rice crop provided farmers are confident that they can realize reasonable ratoon yields. [2] Observed that 120 kg N ha^{-1} was noticed heavier 1000 grains weight and highest grain and straw yield. In treatment combination of 15 cm Culm cutting height of Culm and 120 kg N^{-1} were found to produce also the highest grain yield. The highest grain yield (1.56 t/ha^{-1}) resulted from ratoon crop was 25.16% of the primary crop. The yield and most of the other plant attributes were lower and field duration was also shorter in ratoon crop than those of the primary crop. Sosimo (2003) and Xu et al. (2000) investigated the A highly significant negative correlation was found to exit between grain number per panicle and the leaf area for grain filling of the main crop [3, 4]. The more grains set on the panicle, the less photosynthetic matter remain in the basic stems for ratooing rice growth at harvest of the major crop reported that Magilas, a hybrid rice variety developed by Monsanto, produces a higher ratoon yield than PSBRcH, more popularly known as Mestizo7. The highest yield of Magilas

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was 4.3 tons per hectare (t/ha), which was a little over half of the main crop yield. On the other hand, the highest yield Mestizo7 was 2.1 t/ha. Magilas had the highest ratoon vigor and most uniform stand compared Mestizo7 and two inbred varieties. Combined with the yield of the main crop, Magilas yielded a total of 12.7 t/ha, while that of Mestizo was 10.3 t/ha. The first management choice begins before the main crops even planted with the selection of an early maturing variety with a high ratooning potential. Rice breeding effort sat Rice Research station over the past decade have further improved the potential success of the ratoon crop by releasing six rice varieties that reach 50 percent heading in 81 days or less. In fact, the potential new clear field variety c11 11 reaches 50% heading in approximately 79 days [5].

2. MATERIALS AND METHODS

The experiment was conducted on the ability of ratooning for different cuttings. In the experimental area of the Research Office Centeral Luzon State University (CLSU), hybrid and inbred varieties were applied for different deficiency and fertilizer levels. The main crop experiment was conducted in the wet season. For the main crop, field was prepared thoroughly by plowing and harrowing until the desired soil tilth was attained. Four hundred grams of seed of variety of Mestizo7 (NSICRc136H), was soaked for 24 hours in fungicide solution to minimize the disease infestation in nursery of transplanted rice. Seed was sown in a well-prepared two by two seedbed. The experiment was laid out following three by two Factorial in Randomized Complete Block Design (RCBD) along with three replications using four by five m plots, with 0.5m distance between plots, twenty rows in each plot. The total area under experiment was 017m^2. There were twenty-five days of healthy transplanted seedlings in the two-year area to three plants/hill for inbred varieties and single plant/hill, following a distance of 20x20 cm between hills. Replanting of miss place hills was done three to five days after transplanting. During transplanting water level was maintained at two to three cm depth until 25-30 DAT, to prevent weed seed germination. Water was made available at the time of fertilizer and granular insecticide application. Two weeks before harvesting, the field was drained granularly to hasten maturity, prevent lodging and harden the soil for easy harvesting.

The main crop was fertilized at 15, 30 and 45 days and their transplanting, to 150-30-30, kg NPK /ha, the basal rate was 30-30-30 kg NPK/ha and second application was 30-0-0 kg NPK/ha and third application was 30-0-0 kg NPK/ha. The fertilized applied was complete fertilized (14-14-14) and Urea (46-0-0). The pre emergence herbicide butachlor (Machete) was applied at two to three days after transplanting at the recommended rate of 1.5 to 2.00 kg, a.i./ha. It was sprayed directly on the soil. Also weed were controlled by manual weeding as required to keep the field clean. The experiment was monitored daily for pest and disease incidence. For this purpose, recommended insecticides and fungicides were applied separately to prevent or control attack and appearance of pests. The rate and time of application were based on the severity of pests and diseases. Stalks were cut before the main crop was fully matured, when 80-85% of the grains in the panicle were brown in color. After harvesting in threshing, the threshed grains were sun dried for two to three days, and weighed. The moisture content was determined with a moisture meter. After harvesting the main crop, cutting heights for the ratoon crop was maintained as per plant of factor A. For ratoon crop the experiment was conducted after the harvesting of main crop which was grown from September to November 2010.

The ratoon crop experiment was comprised of similar layout and design of the main crop along with the following treatment combination:

- Factor A=Cutting height (cm), as H1=15cmH2=30cm
- Factor B=Level of fertilizer F1=0-0-0 NPK kg/ha, F2=120-30-30 NPK kg/ha, F3=150-30-30 NPK kg/ha.

2.1 Data for Main Crop and Ratoon Crop

Agro-climatic conditions, Length of panicle (cm), Number of spikelet per panicle, number of filled grains per panicle, percent panicle spikelet, weight of 1000 grains (g) and grain yield (kg/ha). The data was statistically analyzed using factorial arrangement in RCBD. For significant effects, comparison was done multiple range of Duncan using test (DMRT). The computations were done

using IRRISTAT for window and SAS V. 9.0. The main objective of the study was to determine the performance of hybrid rice variety Mestizo7 (NSIC Rc136H) for rationing at various cutting heights and, fertilizer application.

3. RESULTS AND DISCUSSION

3.1 Agro-climatic Condition During the Study

The agro climatic data was gathered and it is presented in Table 1. The data of rainfall, relative humidity and temperature for the main crop are shown; the lowest temperature was from 20.9 ^{o}C and the highest was 34.2 ^{o}C, relative humidity was from 82% to 89%, while the rainfall obtained during this experiment was recorded from 6.1 mm to 15.40 mm, respectively. The weather data gathered during the ratoon crop on temperature ranged from 23.80 ^{o}C to 32.30 ^{o}C, relative humidity ranged from 73.00% to 89.00% and rain fall recorded during the experiment was from 4.00mm to 9.60 mm, respectively. [1, 4, 5] reported that a long crop can be achieved if two or three nodes of the main crop remain, and the flow of times, temperature, day length and other factors affect the depth. Its effect on the duration of the main crop and rice ratooning is also different.

On fertilizer levels, the highest rate of fertilizer (150-30-30 kg NPK/ha) produced greater number of spikelet's with 88.00. Mestizo7 ratooned at the height of 15 and 30cm 150-30-30 kg grams applied with NPK and Mestizo7 ratooned at 30cm applied with 120-30-30 kg NPK/ha produced more number of spikelets per panicle and they were comparable but better than other treatment combinations.

3.2 Number of Filled Spikelet/panicle

There is a significant difference between the average numbers of filled spikelets of Mestizo7 influenced by fertilizer level. It was observed that the highest rate (150-30-30 kg NPK/ha) obtained the highest number of filled spikelets as compared to 120-30-30 kg NPK/ha and the unfertilized plants. In addition, the unfertilized plants significantly exhibited least number of filled spikelets/panicle (Table 4). The interaction of fertilizer level and cutting height resulted in comparable number of filled spikelets/panicle. [6] Found that cutting height has a significant effect on filled spikelets/ panicle. Similar findings were reported by previous study [4,7,3] that N application increased the filled spikelets.

3.3 Percent of Filled Spikelet/Panicle

The effect of cutting heights, fertilizer levels and treatment interaction on the percent of filled spikelet/panicle for Mestizo7 is shown on Table 5. The percent filled spikelets were not influenced by

Table 1. Agro-climatic data on the experimental period from June to November -2010 taken at the weather Station located inside the CLSU campus Science City of Munoz Nueva Ecija, Philippines

Main Crop	Relative Humidity%	Temperature ^{0}C	Rain fall (mm)	Periods
Max.	Min	8		1996
June	34.20	20.90	6.10	89.00
July	33.00	24.50	15.40	81.00
August	31.80	24.30	9.90	85.00
September	32.10	23.80	7.80	82.00

Table 2. Average panel length (cm), according to cutting height and NPK fertilizer levels in hybrid and inbred pure varieties

Cutting heights (cm)	0-0-0	Fertilizer level (kg NPK/ha) 120-30-30	150-30-30	Mean
15	19.5	20.85	21.33	20.56
30	19.14	21.33	21.03	20.50
Mean	**19.32y**	**21.09x**	**21.18x**	

Table 3. Average panel length (cm), according to cutting height and NPK fertilizer levels in hybrid & inbred pure varieties

Cutting Heights	0-0-0 (kg NPK/ha)	120-30-30 (kg NPK/ha)	150-30-30 (kg NPK/ha)	Mean
15 cm	19.50	20.85	21.33	20.56
30cm	19.14	21.3	321.03	20.50
Mean	**19.32Y**	**21.09X**	**21.18x**	

Note: Means not sharing letter in common differ significantly by Ducan's Multiple Range Test

Table 4. Average panel length (cm), according to cutting height and NPK fertilizer levels in hybrid and inbred pure varieties

Cutting heights (cm)	0-0-0	Fertilizer level (kg NPK/ha) 120-30-30	150-30-30	Mean
15 cm	44.00	70.00	79.00	64.00
30	49.00	80.00	76.00	68.00
Mean	**46.00 Z**	**75.00 Y**	**77.00 x**	

Means not sharing letter in common differ significantly by Ducan's Multiple Range Test.

the all treatments. While, the results of the current study disagreed with the previous results of [8, 9, 11, 10, 12] who observed that cutting height had a significant effect on percentage of filled grains.

3.4 Weight of 1000 Grain (g)

As shown in Table 6 there is significant difference between the 1000 grain weight influenced with the fertilizer levels but not on cutting height and treatment interaction. Hybrid Mestizo7 with fertilizer (150-30-30 and 120-30-30 kg/ha) produced heavier grain/1000 as compared to un fertilized plants.

3.5 Grain Yield kg/ha

The influence of cutting heights and fertilizer level on the grain yield/ha was found significant (Table 7). For Mestizo7, the yield increased with

Table 5. Average percent of filled as affected bycutting heights and NPK fertilizer levels in hybrid and inbred varieties

Cutting heights (cm)	0-0-0	Fertilizer level (kg NPK/ha) 120-30-30	150-30-30	Mean
15 cm	83.00	90.00	89.00	87.00
30	88.00	91.00	87.00	89.00
Mean	86.00	91.00		

Note: Means not sharing letter in common differ significantly by Ducan's Multiple Range Test

Table 6. Average weight of 1000 grain (gm) as affected by cutting heights and NPK fertilizer levels in hybrid and inbred varieties

Cutting heights (cm)	0-0-0	Fertilizer level (kg NPK/ha) 120-30-30	150-30-30	Mean
15 cm	32.00	36.00	35.00	34.00
30	32.00	38.00	38.00	36.00
Mean	32.00 Y	37.00X	36.45x	

Note: Means not sharing letter in common differ significantly by Ducan's Multiple Range Test

Table 7. Average Yield kg/ha as affected by cutting heights and NPK fertilizer levels

Cutting heights (cm)	Fertilizer level (kg NPK/ha) 0-0-0	120-30-30	150-30-30	Mean
15 cm	2244.00	4505.00	4410.00	3718.00
30	2519.00	5031.00	5072.00	4207.00
Mean	2380.00 Y	4768.00X	4741.00x	

Note: Means not sharing letter in common differ significantly by Ducan's Multiple Range Test

13.5%. Crop that were cut at the height of 30cm yielded 4207 kg/ha 3718 kg/ha for plants cut at the height of 30cm and 15cm, which is increased by 99.20% (4741kg /ha) to 100.33%(4768.00kg/ha) when applied with fertilizer at the rate of 150-30-30 and 120-30-30kg NPK/ha, respectively, and these were significantly higher compared to unfertilized plants (2380kg/ha). The yield increase for fertilized plants in Mestizo7 was comparable.

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