

## EFFECT OF POULTRY MANURE INCORPORATED WITH NITROGENOUS AND SULFUR FERTILIZER ON THE GROWTH, YIELD, CHLOROPHYLL AND NUTRIENT CONTENTS OF RICE var. BRRI dhan33

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**Key Word:** Poultry Manure, Nitrogen, Sulfur, Rice var. BRRI dhan33.

### Abstract

The experiment was conducted in the farm of Sher-e-Bangla Agricultural University, Dhaka, Bangladesh during the period from August to December 2012 to study the effect of various combinations of organic manure and inorganic fertilizer on the growth, yield, chlorophyll and nutrient content of rice var. BRRI dhan33. The treatment consists of T<sub>1</sub>: 100% Inorganic fertilizer (Recommended dose) + 5 ton poultry manure (PM) /ha, T<sub>2</sub>: 75 % N of recommended dose + 5 ton PM /ha, T<sub>3</sub>: 50 % N of recommended dose + 5 ton PM /ha, T<sub>4</sub>: 25 % N of recommended dose + 5 ton PM /ha, T<sub>5</sub>: 75 % S of recommended dose + 5 ton PM /ha, T<sub>6</sub>: 50 % S of recommended dose + 5 ton PM /ha, T<sub>7</sub>: 25 % S of recommended dose + 5 ton PM /ha, T<sub>8</sub>: 100% Inorganic fertilizer and T<sub>9</sub>: 5 ton PM /ha. Significant variation was found in growth and yield parameters as well as in chlorophyll content and nutrient content of aman rice. The most of the growth parameters (plant height, leaf length and diameter, leaf number and total tiller plant<sup>-1</sup>) results were found better in 100% Inorganic fertilizer + 5 ton PM ha<sup>-1</sup> which was statistically similar with 75 % of recommended dose of S + 5 ton PM ha<sup>-1</sup>, 75 % of recommended dose of N + 5 ton PM ha<sup>-1</sup> and followed by 50 % of recommended dose of S + 5 ton PM ha<sup>-1</sup>, respectively while the lowest from 5 ton/ha PM treatment. On the other hand, significantly higher chlorophyll "a", "b" and total chlorophyll content were recorded in 100% Inorganic fertilizer + 5 ton PM ha<sup>-1</sup> and it was closely followed by 75 % of recommended dose of N + 5 ton PM ha<sup>-1</sup> and lowest in 5 ton PM ha<sup>-1</sup>. Number of effective tillers plant<sup>-1</sup>, panicle length, number of rachis plant<sup>-1</sup>, filled grain plant<sup>-1</sup> and fresh weight of plant were highest in 100% Inorganic fertilizer + 5 ton PM /ha and it was either statistically similar or closely followed by 75 % of recommended dose of S + 5 ton PM ha<sup>-1</sup>. Higher grain yield (4.18 t ha<sup>-1</sup>) was recorded in T<sub>1</sub> which was statistically similar with T<sub>5</sub> (4.13 t ha<sup>-1</sup>) whereas lowest grain yield (3.67 t ha<sup>-1</sup>) was from sole PM. Similarly, N content in grain and N, K content in straw were also showed similar trend. S content in grain and P, S content in straw were higher in 75 % of recommended dose of S + 5 ton PM /ha compared to other fertilizer treatments. Lowest N and S content in grain and N, P, K, S content in straw were found from the treatment using poultry manure only.

### Introduction

Rice is intensively cultivated in Bangladesh covering about 80% of arable land. Rice alone constitutes 95% of the food grain production in Bangladesh. Unfortunately, the yield of rice is low considering the other rice growing countries like South Korea and Japan where the average yield is 7.00 and 6.22 t ha<sup>-1</sup>, respectively (FAO, 1999). A suitable combination of

organic and inorganic sources of nutrients is necessary for sustainable agriculture that can ensure food production with high quality. Nambiar (1991) views that integrated use of organic manure and chemical fertilizers would be quite promising not only in providing greater stability in production, but also in maintaining better soil fertility. Meelu and Singh (1991) showed that 4 t ha<sup>-1</sup> poultry manure along with 60 kg N/ha as urea produce grain yield of crop similar to that with 120 kg N/ha as urea alone. Depleted soil fertility is a major constrain to higher crop production in Bangladesh. Applications of both chemical and organic fertilizers need to be applied for the improvement of soil physical properties and supply of essential plant nutrients for higher yield. (Sarvanan *et al.*, 1987). Rice is very responsive to N fertilization and high yield potential of modern varieties cannot be realized without N supply to the plant during the entire growing season. Nitrogen has quickest and remarkable effect on cereals production (Brady, 1999). Sulphur, one of the most important nutrients for all plants and animals, is considered as the fourth major nutrient after nitrogen, phosphorous and potassium for agricultural crop production. It is involved in chlorophyll formation, activation of enzymes and is a part of vitamins biotin and thiamine (B1) (Hegde and Sudhakara Babu, 2007). Poultry manure is superior to the other farmyard manure as a source of nitrogen supply. All the nitrogen in poultry manure is not in available from initially. Hence, soils treated with poultry manure are less susceptible to nitrogen leaching since the vegetables grown utilize nitrate as they are produced (Maynard, 1984). Considering the above facts, the experiment was under taken to find out the response of PM along with chemical fertilizers for rice var. BRRI dhan33.

## Materials and Methods

The experiment was conducted in the farm of Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh during the period from August to December 2012. The experimental area is located at 23.41' N and 90.22' E latitude and at an altitude of 8.6 m from the sea level. The soil of the experimental field belongs to the Tejgaon series under the Agro-ecological Zone, Madhupur Tract (AEZ- 28) and the General Soil Type is Deep Red Brown Terrace Soils. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. Rice var. BRRI dhan33 was used in the experiment. The Treatments were: T<sub>1</sub>=100% Inorganic fertilizer (Recommended dose) + 5 ton poultry manure/ha, T<sub>2</sub>=75 % N of the recommended dose + 5 ton poultry manure/ha, T<sub>3</sub>= 50 % N of the recommended dose + 5 ton poultry manure/ha, T<sub>4</sub>= 25 % N of the recommended dose + 5 ton poultry manure/ha, T<sub>5</sub>: 75 % S of the recommended dose + 5 ton poultry manure/ha, T<sub>6</sub>: 50 % S of the recommended dose + 5 ton poultry manure/ha, T<sub>7</sub>: 25 % S of the recommended dose + 5 ton poultry manure/ha, T<sub>8</sub>: 100% inorganic fertilizer, T<sub>9</sub>: 5 ton poultry manure/ha. The amounts of N, P, K, S and Zn fertilizers required per plot were calculated as per the treatments. Poultry manure was used @ rate of 5 ton/ha and was applied before four days of final land preparation. Forty days old seedlings of BRRI dhan33 were transplanted on 21<sup>st</sup> August, 2012. All other intercultural operation was done as per requirement. The crop was harvested at full maturity when 80-90% on 27 December, 2012. The data collected on different parameters were statistically and the mean differences among the treatments were compared by Duncan's Multiple Range Test (DMRT) test at 5% level of significance. Nitrogen was determined by micro kjeldahl method (Jackson, 1973).

Amount of chlorophyll were calculated using the following equations/ formula (Witham, 1986):

$$\text{Chlorophyll a (mg/g)} = [12.7 (\text{OD}_{663}) - 2.69 (\text{OD}_{645})] V/1000W$$

$$\text{Chlorophyll b (mg/g)} = [22.9 (\text{OD}_{645}) - 4.68 (\text{OD}_{663})] V/1000W$$

$$\text{Chlorophyll a+b (mg/g)} = [20.2(\text{OD}_{645}) - 8.02 (\text{OD}_{663})] V/1000W$$

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Where,

OD = Optical density regarding of the chlorophyll extract at the specific indicated wavelength (645 and 663nm)

V = Final volume of the 80% acetone chlorophyll extract (ml)

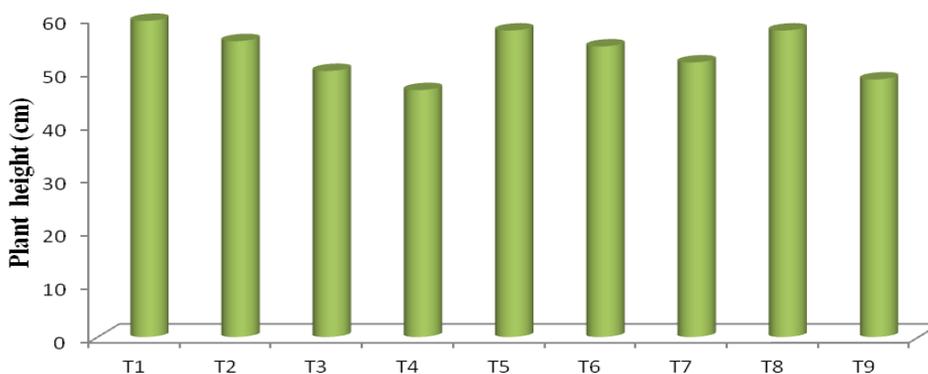
W = Fresh weight in gram of the tissue extracted

## Results and Discussion

The results of different growth parameters, chlorophyll contents, yield attributes, yield and nutrient concentrations in the straw and grains of rice were found significant and summarized below

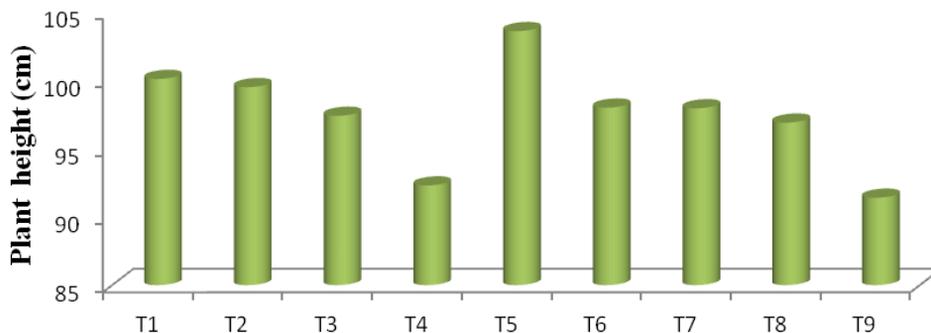
### Plant height

The data on plant height of rice at different growth stages as influenced by organic and inorganic fertilizers are presented in Fig. 1. The plant height at 30 days after transplanting (DAT) differed significantly due to different treatments where higher plant height (59.4 cm) was recorded in T<sub>1</sub> and it was statistically similar with T<sub>5</sub> (57.6 cm) and T<sub>8</sub> (57.6 cm). Lowest plant height at 30 DAT (48.4 cm) was found from T<sub>9</sub>. The plant height at 60 days after transplanting (DAT) also differed significantly due to different treatment where maximum plant height (103.6 cm) was recorded in T<sub>5</sub> and it was closely followed by T<sub>1</sub> (100.1 cm) and T<sub>2</sub> (99.5 cm). Lowest plant height at 60 DAT (91.4 cm) was found from the treatment using sole poultry manure. At harvest, plant height also showed significant where maximum plant height (104.6 cm) was recorded in T<sub>5</sub> and it was closely followed by T<sub>1</sub> (102.2 cm) and T<sub>2</sub> (101.0 cm). Lowest plant height at harvest (93.2 cm) was found from the treatment using sole poultry manure. The results showed that combination of organic and inorganic fertilizers significantly increased the plant height than sole use of inorganic fertilizer and then that of organic manure. Combination of organic and inorganic fertilizers was found better by Umanah *et al.* (2003) in upland rice and Channabasavanna (2003) in wetland rice than only inorganic fertilizers.



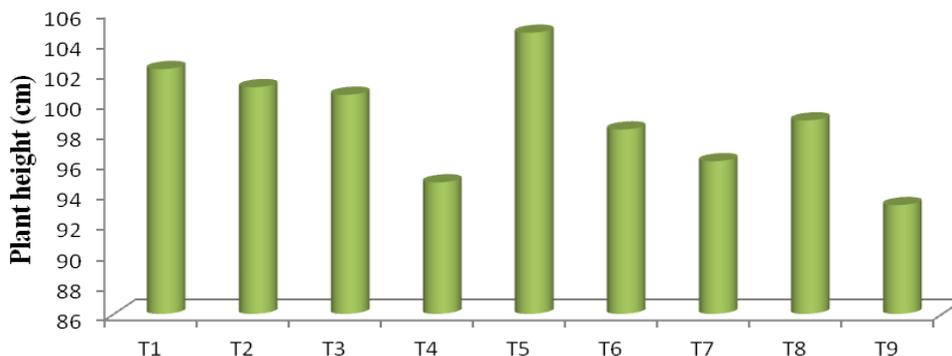
T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 1(a). Effect of different combinations of organic and inorganic fertilizer on plant height of BRR1 dhan33 (30 DAT)



T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 1(b). Effect of different combinations of organic and inorganic fertilizer on plant height of BRR1 dhan33 (60 DAT)



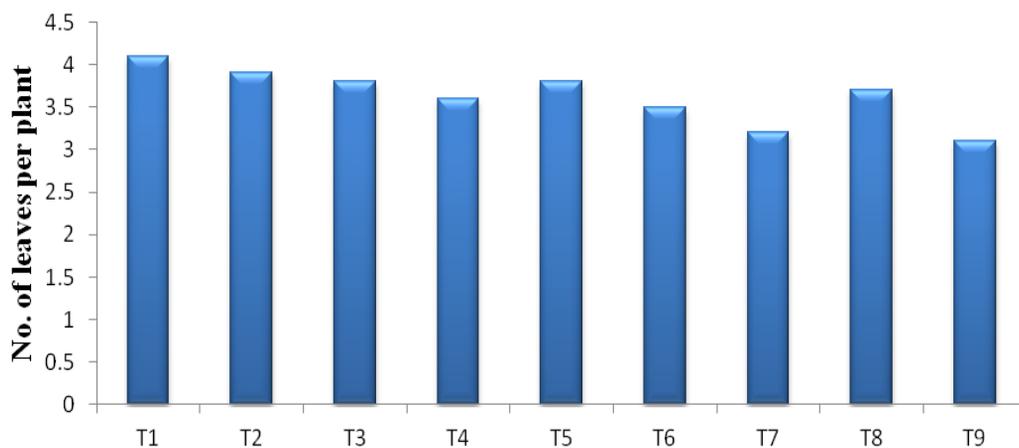
T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 1(c). Effect of different combinations of organic and inorganic fertilizer on plant height of BRR1 dhan33 (at harvest)

### Number of leaves

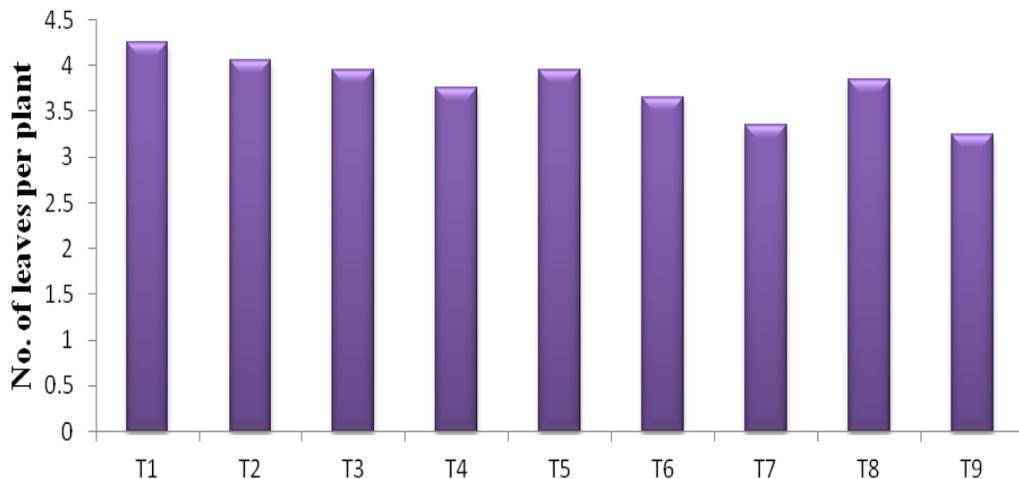
The data on number of leaves plant<sup>-1</sup> of rice at different growth stages as influenced by organic and inorganic fertilizers Fig. 4 (a, b & c). The number of leaves plant<sup>-1</sup> at 30, 60 DAT and at harvest differed significantly due to different treatments. Significantly higher number of leaves plant<sup>-1</sup> (4.1) was recorded in T<sub>1</sub> which was statistically similar to T<sub>2</sub> (3.9). Lowest number of leaves plant<sup>-1</sup> at harvest (3.41) was found from the treatment using only poultry manure. Combination of organic and inorganic fertilizers significantly increased the number of leaves plant<sup>-1</sup> than sole. Ndaeyo *et al.* (2008) showed that higher NPK (15:15:15) fertilizer significantly increased number of leaves.

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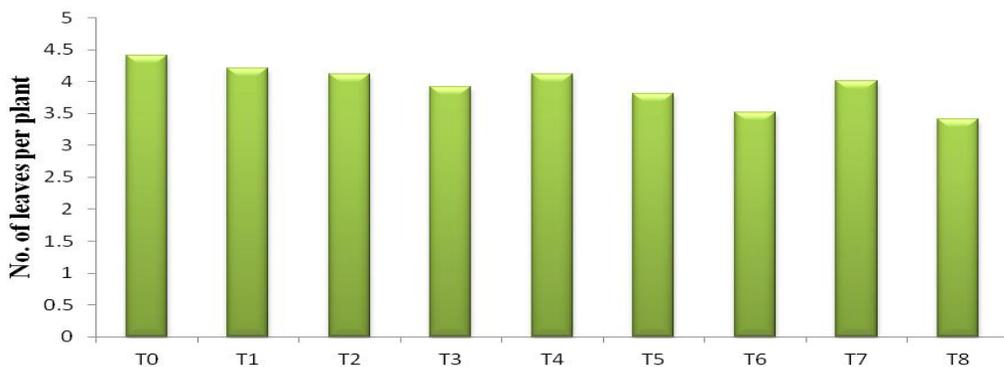
T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 2(a). Effect of different combinations of organic and inorganic fertilizer on number of leaves plant<sup>-1</sup> of BRR1 dhan33 (30 DAT)



T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 2(b). Effect of different combinations of organic and inorganic fertilizer on number of leaves plant<sup>-1</sup> of BRR1 dhan33 (60 DAT)

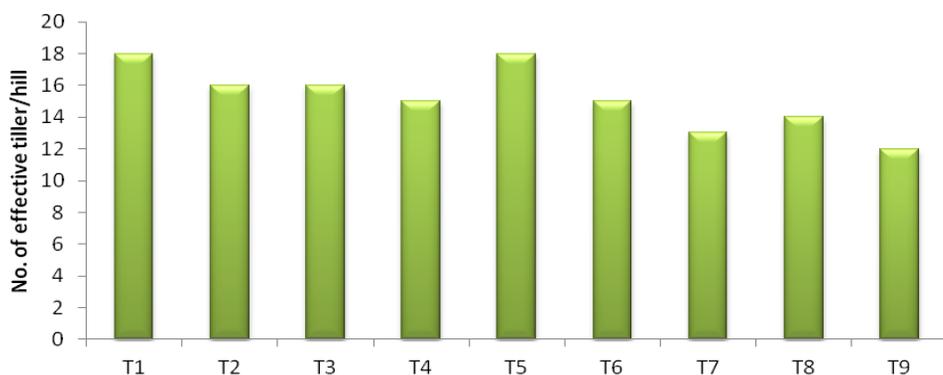


T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 2 (c). Effect of different combinations of organic and inorganic fertilizer on number of leaves plant<sup>-1</sup> of BRRI dhan33 (at harvest)

#### Number of effective and non-effective tillers at harvest

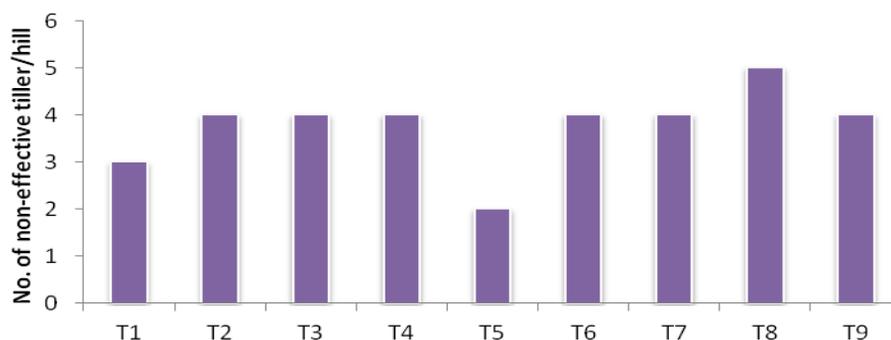
The data on number of effective and non-effective tillers plant<sup>-1</sup> of rice at harvest as influenced by organic and inorganic fertilizers in Fig. 6 (a & b). The highest number of effective tillers plant<sup>-1</sup> (18) was recorded in T<sub>1</sub> while lowest number of effective tillers plant<sup>-1</sup> at harvest (12) using sole poultry manure. The number of non-effective tillers plant<sup>-1</sup> at harvest also differed significantly due to different treatments. Highest number of non-effective tillers plant<sup>-1</sup> (5) was recorded in T<sub>8</sub> and lowest number at harvest (2) from the treatment using T<sub>5</sub>. Combination of organic and inorganic fertilizers significantly increased the number of effective and decreased the number of non-effective tillers plant<sup>-1</sup> than sole use of inorganic fertilizer and than that of organic manure. Amin *et al.* (2004) found that increased fertilizer dose of NPK increase number of total tillers plant<sup>-1</sup>.



T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 3(a). Effect of different combinations of organic and inorganic fertilizer on number of effective tillers plant<sup>-1</sup> of BRRI dhan33

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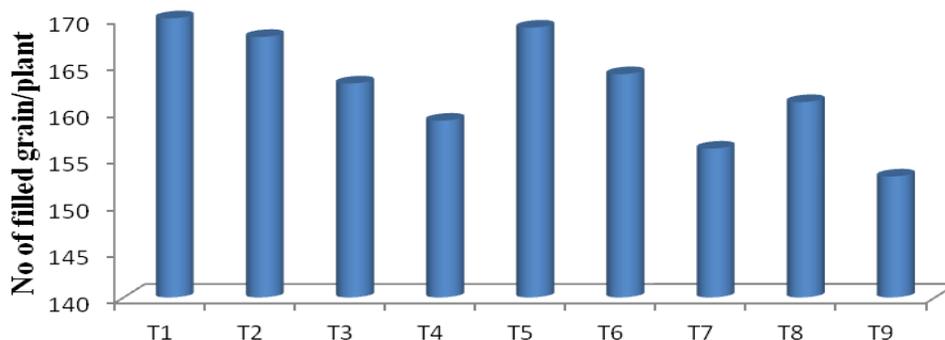


T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 3(b). Effect of different combinations of organic and inorganic fertilizer on number of non-effective tillers plant<sup>-1</sup> of BRR1 dhan33

### Number of filled grain per plant

Significantly higher number of filled grain plant<sup>-1</sup> (170) was recorded in T<sub>1</sub> (100% Inorganic fertilizer + 5 ton poultry manure/ha) and it was closely followed by T<sub>5</sub> (169) and T<sub>2</sub> (168). Lowest number of filled grain plant<sup>-1</sup>(153) was found from the treatment using sole poultry manure (Fig. 4.9).

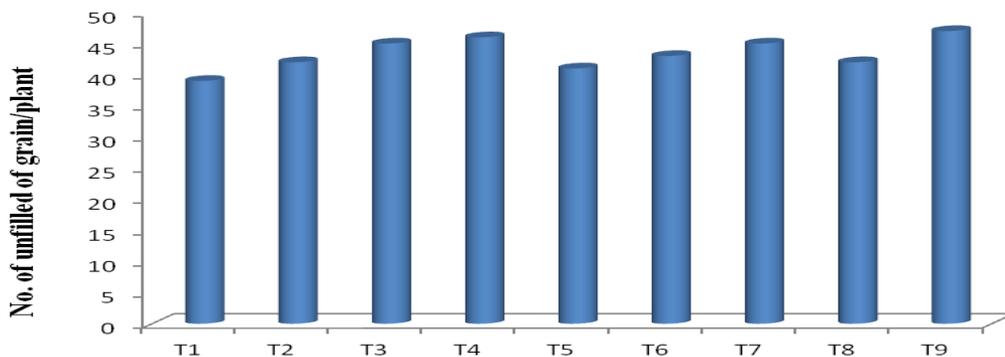


T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 4. Effect of different combinations of organic and inorganic fertilizer on number of filled grain plant<sup>-1</sup> of BRR1 dhan33

### Number of unfilled grain per plant

The number of unfilled grain plant<sup>-1</sup> differed significantly due to different combinations of organic and inorganic fertilizer (Fig. 10). Significantly lower number of unfilled grain plant<sup>-1</sup> (39) was recorded in T<sub>1</sub> and it was closely followed by T<sub>5</sub> (41). Highest number of unfilled grain plant<sup>-1</sup> (47) was found from the treatment using sole poultry manure.

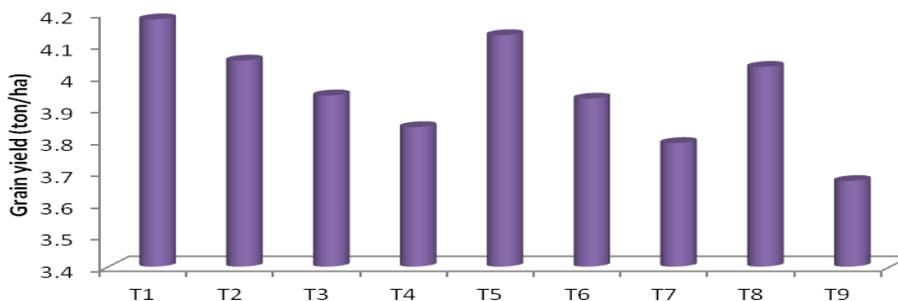


T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 5. Effect of different combinations of organic and inorganic fertilizer on number of unfilled grain plant<sup>-1</sup> of BRRI dhan33

### Grain yield

The higher grain yield (4.18 t ha<sup>-1</sup>) was recorded in T<sub>1</sub> where lowest grain yield (3.67 t ha<sup>-1</sup>) was found from the treatment using sole poultry manure (Figure 12). Sarker *et al.* (2001) observed that application of nitrogen increased grain and straw yields significantly.



T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 6. Effect of different combinations of organic and inorganic fertilizer on grain yield (t ha<sup>-1</sup>) of rice var. BRRI dhan33

### Chlorophyll content (mg g<sup>-1</sup> fresh weight of leaf)

The data on chlorophyll content (“a”, “b” and total) of rice at different growth stages as influenced by organic and inorganic fertilizers in Table 1 a, b). The chlorophyll “a” content at different growth stages (45, 60 and 75 DAT) differed significantly due to different treatments. Significantly higher chlorophyll “a” (2.838, 1.592 and 0.61mg g<sup>-1</sup> fresh weight of leaf respectively) was recorded in T<sub>1</sub> while lowest chlorophyll “a” content from the treatment using sole poultry manure. Significantly higher chlorophyll “b” (2.905, 2.358 and 0.351 mg g<sup>-1</sup> fresh weight of leaf respectively) was recorded in T<sub>1</sub> (100% Inorganic fertilizer + 5 ton PM /ha).

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Table 1(a). Effect of different combinations of organic and inorganic fertilizer on chlorophyll content of rice var. BRRI dhan33

Treatments	Chlorophyll a (mg g <sup>-1</sup> fresh weight of leaf)			Chlorophyll b(mg g <sup>-1</sup> fresh weight of leaf)		
	45 DAT	60 DAT	75 DAT	45 DAT	60 DAT	75 DAT
T <sub>1</sub>	2.838 a	1.592 a	0.61 a	2.905 a	2.358 a	0.351 a
T <sub>2</sub>	2.532 b	1.428 b	0.466 bc	2.496 bc	1.808 c	0.328 a-c
T <sub>3</sub>	2.458 bc	1.407 bc	0.452 bc	2.48 bc	1.504 d	0.246 a-c
T <sub>4</sub>	2.406 b-d	1.383 bc	0.405 c	1.945 d	1.23 e	0.21 c
T <sub>5</sub>	2.427 b-d	1.438 b	0.535ab	2.341 c	1.749 c	0.299 a-c
T <sub>6</sub>	2.397 b-d	1.381 bc	0.534 ab	1.783 d	1.563 d	0.267 a-c
T <sub>7</sub>	2.318 cd	1.374 bc	0.432 bc	1.571 e	1.474 d	0.266 a-c
T <sub>8</sub>	2.339 cd	1.378 bc	0.401 c	2.435 bc	1.76 c	0.299 a-c
T <sub>9</sub>	2.301 d	1.311 c	0.369 c	1.402 e	1.219 e	0.226 bc
LSD <sub>0.05</sub>	0.1394	0.1061	0.1153	0.1781	0.1394	0.1104
CV %	3.01	2.54	1.987	3.25	1.69	5.13

Table 1(b). Effect of different combinations of organic and inorganic fertilizer on chlorophyll content (total) of rice var. BRRI dhan33

Treatments	Total chlorophyll (mg g <sup>-1</sup> fresh weight of leaf)		
	45 DAS	60 DAS	75 DAS
T <sub>1</sub>	5.382 a	3.797 a	0.961 a
T <sub>2</sub>	5.028 b	3.236 b	0.794 a-c
T <sub>3</sub>	4.938 bc	2.911 cd	0.698 bc
T <sub>4</sub>	4.351 d	2.613 e	0.615 bc
T <sub>5</sub>	4.768 c	3.247 b	0.834 ab
T <sub>6</sub>	4.18 d	2.944 cd	0.801 a-c
T <sub>7</sub>	3.889 e	2.848 d	0.698 bc
T <sub>8</sub>	4.774 c	3.138 bc	0.7 bc
T <sub>9</sub>	3.703 f	2.53 e	0.595 c
LSD (0.05 )	0.17	0.23	0.19
CV (%)	3.57	2.91	3.39

### **N content in grain**

N content in grain (%) differed significantly among the different combinations of organic and inorganic fertilizer (Figure 13). Significantly higher N content in grain (1.28%) was recorded in T<sub>1</sub> and lowest N content in grain (1.10%) from the treatment using poultry manure only.

### **S content in grain (%)**

Significantly higher S content (0.47%) was recorded in T<sub>5</sub> and lowest S content (0.183%) was found from the treatment using poultry manure only (Fig. 14). Bari *et al.* (2013) was also found that nutrient content in grain increased while organic manure combined with inorganic fertilizers.

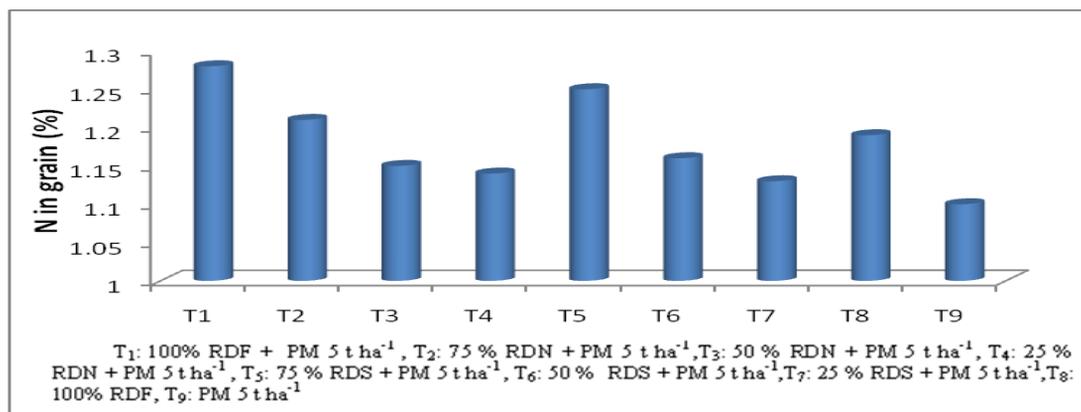


Fig.7. Effect of different combinations of organic and inorganic fertilizer on N content in grain (%) of BRR1 dhan33

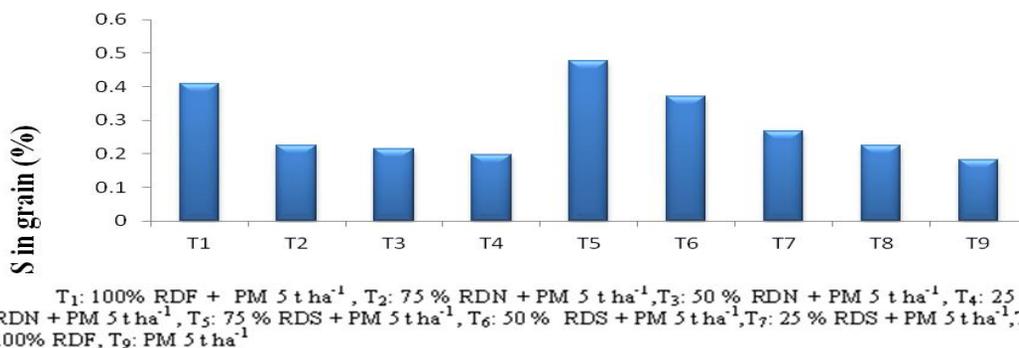


Fig. 8. Effect of different combinations of organic and inorganic fertilizer on S content in grain (%) of BRR1 dhan33

#### N content in straw (%)

N content in straw (%) differed significantly among the different combinations of organic and inorganic fertilizer (Figure 4.15). Significantly higher N content (0.351%) was recorded in T<sub>1</sub> which was closely followed by T<sub>5</sub> (0.334%). Lowest N content (0.286%) was found from the treatment using poultry manure only. These results have the conformity with the results of Bari et al. (2013).

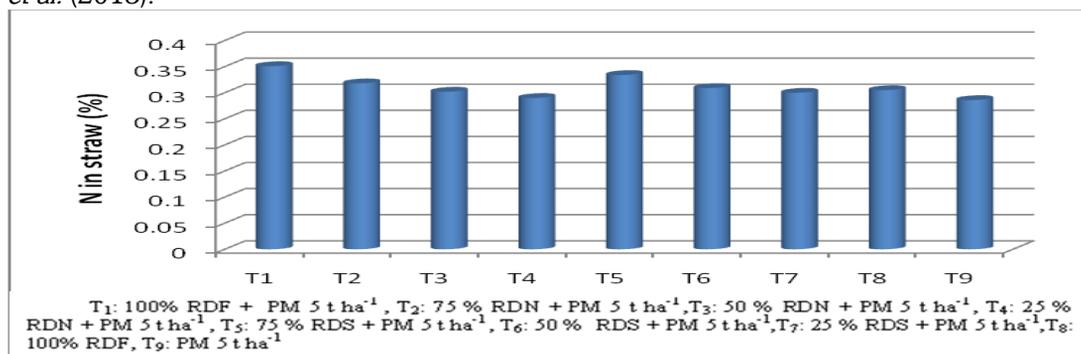


Fig. 9. Effect of different combinations of organic and inorganic fertilizer on N content in straw (%) of BRR1 dhan33

### P content in straw (%)

P content in straw (%) differed insignificantly among the different combinations of organic and inorganic fertilizer (Figure 16). Though higher P content (0.213%) was recorded in T<sub>5</sub> which was closely followed by T<sub>1</sub> (0.195%). Lowest P content (0.146%) was found from the treatment using poultry manure only. These results agree with the results of Bari *et al.* (2013).

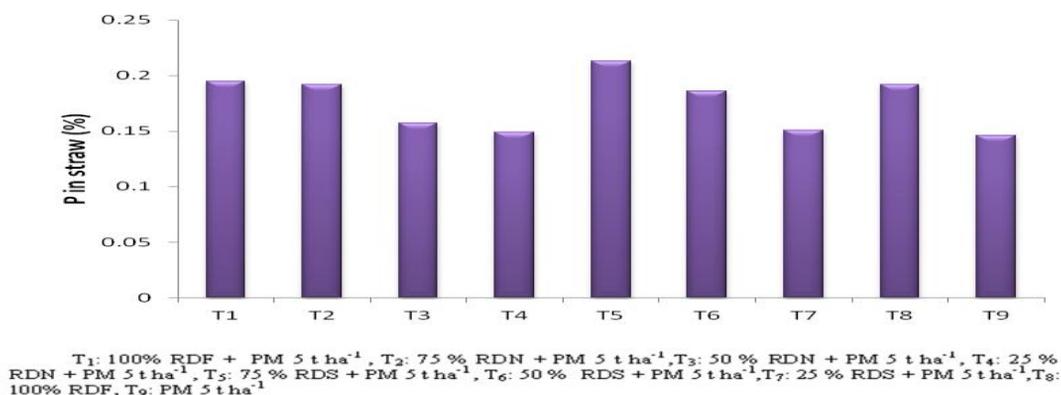


Fig. 10. Effect of different combinations of organic and inorganic fertilizer on P content in straw (%) of BIRRI dhan33

### K content in straw (%)

K content in straw (%) differed significantly among the different combinations of organic and inorganic fertilizer (Figure 4.17 and Appendix XI). Significantly higher K content (1.8 %) was recorded in T<sub>2</sub> which was closely followed by T<sub>5</sub> (1.63%). Better results were also given by T<sub>3</sub> and T<sub>6</sub> both of which gave 1.47% K in straw. Lowest K content (1.15%) was found from the treatment using poultry manure only. These results have the conformity with the results of Bari *et al.* (2013).

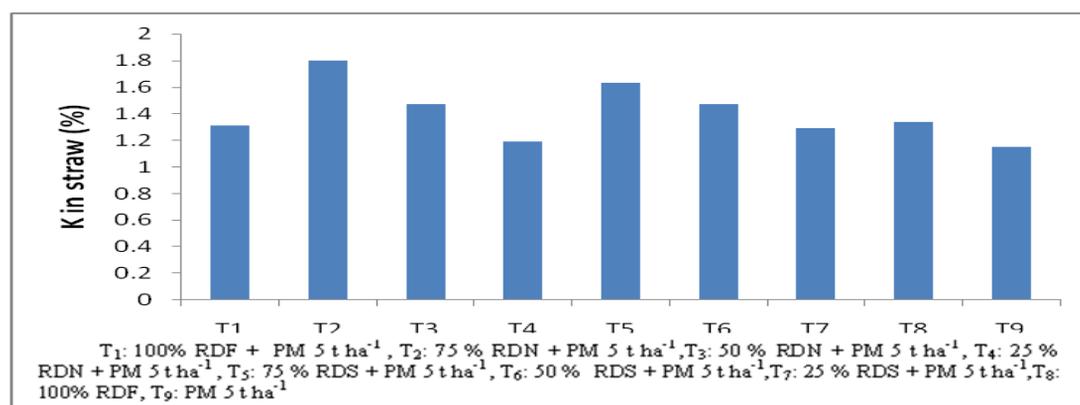
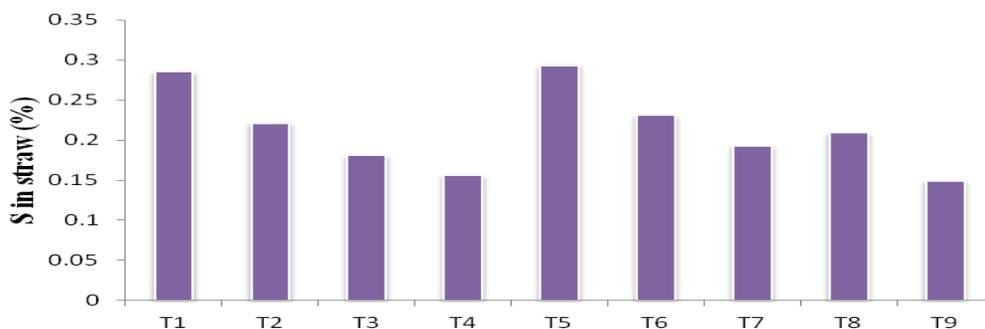


Fig. 11. Effect of different combinations of organic and inorganic fertilizer on K content in straw (%) of BIRRI dhan33

### S content in straw (%)

S content in straw (%) differed significantly among the different combinations of organic and inorganic fertilizer (Fig. 18). Significantly higher S content in straw (0.293%) was recorded in

T<sub>5</sub> and lowest S content in straw (0.149 %) was found from the treatment using poultry manure only. These results have the conformity with the results of Bari *et al.* (2013).



T<sub>1</sub>: 100% RDF + PM 5 t ha<sup>-1</sup>, T<sub>2</sub>: 75 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>3</sub>: 50 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>4</sub>: 25 % RDN + PM 5 t ha<sup>-1</sup>, T<sub>5</sub>: 75 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>6</sub>: 50 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>7</sub>: 25 % RDS + PM 5 t ha<sup>-1</sup>, T<sub>8</sub>: 100% RDF, T<sub>9</sub>: PM 5 t ha<sup>-1</sup>

Fig. 12. Effect of different combinations of organic and inorganic fertilizer on S content in straw (%) of BRR1 dhan33

## Conclusion

Significant variation was found in growth and yield parameters as well as in chlorophyll content and nutrient content of aman rice due to the various combinations of organic and inorganic fertilizers. The treatment of 100% Inorganic fertilizer + 5 ton poultry manure /ha could give the maximum growth, yield, chlorophyll and nutrient contents of rice var. BRR1 dhan33.

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