

Integrated of Organic Manures and Inorganic Fertilizers was Effective for Yield, Component Yield and Quality of Landrace Rice on An Giang, Vietnam

Nguyen Thi Lang, Bui Chi Hieu, Le Hoang Phuong, Bien Anh Khoa, Nguyen TrongPhuoc, Bui Chi Buu

High Agricultural Technology Research Institute for Mekong Delta (HATRI), Viet Nam

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Abstract— The present study aimed to determine the effect of different organic and inorganic source of fertilizers on growth and performance of rice. The experiment was conducted at two locations: Tinh Bien and Tri Ton AnGiang province with two varieties of landrace rice with AG3 and AG4. Each experiment has seven treatment. Treatments included a combination of organic and inorganic nutrients at seven rates (F1:80-40-40+ organic manures 10 t ha⁻¹; F2:60-40-40+ organic manures 10 t ha⁻¹; F3: 40+40+40+ organic manures 10 t ha⁻¹; F4: 20-40-40+ organic manures 10 t ha⁻¹. F5: only organic manures 12 t ha⁻¹; F6: control no dose of NPK; F7: farmers used: 120-40-60+ organic manures 12 t ha⁻¹). The experiment is arranged on the farmer's field, a split-plot in a randomized complete block design with three replications. Treatments produced significant results for plant height. Panicle length and grain yield but thousands grains weight was not significant. Result showed that application of half of recommended 60-40-40 + organic manures 10 t ha⁻¹ produced significantly higher value for grain yield and good for quality landrace rice.

Keywords— landrace rice, nutrition N. P. K. productivity, factors that constitute productivity.

I. INTRODUCTION

The use of nitrogen fertilizer (N) contributes to the productivity of major food crops and has contributed to the rapid growth of the world's population (Tilman et al., 2011). The use of nitrogen fertilizer is expected to increase to produce enough food to feed the world's population. Which is expected to be 9.3 billion people by 2050 (Ladha et al., 2005). However, increasing the N rate does not appear to be effective in increasing productivity, as N efficiency decreases at high nitrogen levels (Tilman et al., 2011). Conventional agriculture indicates the direction of increasing maximum productivity by using high-dose chemical fertilizers that continuously lead to environmental degradation. It shows that reducing soil fertility leads to lower organic matter content and effective use of nutrients. Farmers feel the most impact among others is that the plant does not respond to fertilizer despite increased dosages; and the increase in plant productivity

cannot be compared to the addition of fertilizer (Padmini 2009); (Padminiet al., 2013). Depending on chemical fertilizers as a source of nutrition, besides it tends to reduce soil yields causing a decrease in yield. It also reduces the quality of rice. For example the structure of rice becomes hard due to its high amylose content and low amylopectine (Jian et al., 2004). Some traditional Sabah local varieties have the potential to be grown as they can contribute to higher rice yields and their accommodation rates can be minimized by the adoption of NPK. The Serendah Merah (V3) variety received with F1 has no significant difference between the NPK fertilizer applied. So it can be recommended for farmers, the amount of fertilizer used in F1 treatment (60:30:30 kg ha⁻¹) is the least. So it offers an economic advantage because low fertilizer costs are needed to achieve higher yields and better grain quality. (Mohdet al., 2018). A field experiment was conducted for the effect of different sources of

nutrients on NPK uptake by rice at various growth periods. The NPK uptake by rice at various growth periods was significantly increased with the application of 100% NPK in combination with FYM @ 10t ha⁻¹. However, it was on par with that of green manuring together with 100% NPK during both the years of the study (Mohana et al., 2017). Most of the landrace rice land in An Giang belongs to the group of poor sandy soils and uneven distribution of rainfall during the year. In addition to the use of low-yield genotypes (Ishag, 1980). The objective of this study is to improve the yield of landrace rice varieties and find a relationship between the dosages of N, P, K and integrated application of organic manures and inorganic fertilizers was effective for enhancing growth, yield, and the yield components of landrace rice.

II. MATERIALS AND METHODS

2.1. Two varieties of landrace AG3 and AG4.

2.2. Experimental experiments were conducted in Tri Ton and Thanh Bien An Giang provinces, with sandy soil structures. Experimental soils have been cultivating seasonal rice for ten years and in recent years have been managed in the conservation system for the seasonal rice region. Prior to the experiment the soil layer was collected in each area in layers 0 to 30 cm deep to make up the composite sample, which was used to analyze chemical indicators according to the method of (Raijet et al., 2001) and particle size according to (Camargo et al., 2009) - Experimental layout: The experiment is arranged on the farmer's field A split-plot in a randomized complete block design (02 varieties, 7 experiments, 3 repetitions, at 02 locations, the area of each laboratory is 25 m²).

Experimental layout method

No	Treatment : (F) = (N-P-K)
1	F1 = 80-40-40 + organic manures 10 t ha ⁻¹
2	F2 = 60-40-40 + organic manures 10 t ha ⁻¹
3	F3 = 40-40-40 + organic manures 10 t ha ⁻¹
4	F4 = 20-40-40 + organic manures 10 t ha ⁻¹
5	F5 = only organic manures 10 t ha ⁻¹
6	F6 = 0-0-0 + 0
7	F7 = farmers (120-40-60 + organic manures 12 t ha ⁻¹)

About fertilization: only use innocuous fertilizers to assess the effect of nutrients on rice crops. Experiments do not use compost and other fertilizers. Single forms of innocuous stools are used as follows: urea (46% N), phosphatesuper (16% P₂O₅, 20% CaO) and potassium chloride (60% K₂O).

Agro-morphology Analysis

AG 3 and AG4 traditional varieties were planted in the field at Tri Ton and Tinh Bien. During the wet season from 2020. Seeds were sown in the raised seedbeds, and 30-day old seedlings were transplanted at one seedling per hill. Hills were established at distances of 20 x 20 cm. The standard cultural management practices for rice were followed (Bui, 1986).

Quality traits

A total of AG 3 and AG 4 varieties were evaluated (Table 1) and the following quantitative traits were considered: Panicle length (cm): length of panicle at maturity measured from the base of the plant to the tip of the panicle (taken from 10 random selected primary panicles per accession per replication). Panicles per plant (number): the total number of panicles per plant (from 10 random selected primary panicles per accession per replication). 1000-grain weight (g): weight of 1000 well-developed grains at 14% moisture content (from 5 random selected primary panicles per accession per replication). Filled grains (number): obtained from counts of total number of filled grains per panicle (from 5 random selected primary panicles per accession per replication). Unfilled grains (number): obtained from counts of total number of unfilled grains per panicle (from 5 random selected primary panicles per accession per replication). Yield obtained from the harvested plants in each replication. Harvested grains were threshed, cleaned, dried, and weighed for each accession per replication. Moisture content per plot was determined immediately after weighing using a moisture meter. Yield = weight of harvested grain (g)/number of hills harvested x number of possible hills x MF (of the harvested grain).

Cooking and eating properties

Milled grains underwent assessment of physical traits (grain dimensions, proportion of head rice in milled rice, and chalkiness) and then a test portion of each sample was ground into fine flour (100-mesh) using a Udy Cyclone Sample Mill (model 3010-30, Fort Collins, CO). Reverse osmosis (RO) water and reagent-grade chemicals were used for the chemical analyses.

+ **Amylose content:** The AAC of isolated rice starch was analysed by using the iodine reagent method [AACC International, 1999]. Briefly, exactly 25 mg rice flour was gelatinized overnight in 2 ml of 1.0 N NaOH in a water bath set at 50°C. The solution was boiled in the water bath for 10 min and then cooled to room temperature. The cooled solution was extracted three times with 5 ml of butanol:petroleum ether (1:3) to remove the lipid. After which 1.5 ml of 0.4 N KI was added to the solution and mixed. The AC was determined in duplicating

with an ART-3 Automatic Titrator, according to the manufacturer's instruction (Hirama Laboratories, Japan) in which 1.57mM KIO₃ was titrated at a speed of 2.5μl per s to the starch solution. The titration terminal was automatically detected with a sensitivity setting of 3, and the used volume of KIO₃ was transformed into amylose content. Standard amylose solutions were prepared as checks by dissolving pure amylose and amylopectin in distilled water (Tan YF et al., 1999).

+Gelatinisation temperature

GT was determined using the alkali digestion test [Little RR et al 1958]. A duplicate set of six whole-milled kernels without cracks was selected and placed in a plastic box (5×5×2.5cm). 10mL of 1.7% (0.3035M) KOH solution was added. The samples were arranged to provide enough space between kernels to allow for spreading. The boxes were covered and incubated for 23h in a 30°C oven. The starchy endosperm was rated visually based on a seven-point numerical spreading scale as a standard evaluation system for rice [IRRI .2013]. According to the ASV score. GT of rice grains can be classified into four groups: high (1–2), high-intermediate (3), intermediate (4–5), and low (6–7) [IRRI.2013].

+Gel consistency

Gel consistency was determined as previously described [IRRI.2013]. Rice flour (100mg) was mixed with ethyl alcohol (0.2mL) containing 0.025% thymol blue and 0.2M potassium hydroxide (2mL) and heated in a boiling water bath for 8 minutes. After heating, the sample tubes were allowed to cool in an ice-water bath and immediately laid horizontally on the table. Gel consistency was measured by the length of the cold rice paste in the culture tube held horizontally for one hour, Hard, medium, and soft gel standards such KhaoDawmali 105 are respectively included in every set.

Milling recovery

Brown rice samples of 100 g from each treatment plot were milled in a McGill-type miller no. 2 with the 685 g added weight on the pressure cover for 30 sec, followed by 30 sec without the added weight. Total milled rice weight was determined. Head rice yield was determined by sizing milled rice with a Satake testing rice grader TRG 05A using a 4.75-mm mesh indentation, weighing the broken and whole grain fractions. Total and head milled rice yields were calculated as percent of rough rice. Head rice yield in kg/ha was calculated from rough rice yields determined at harvest of each experiment from a 5-m² area within each plot.

Data Analysis

Analysis of variance.

The agro-morphological data collected were initially analyzed through analysis of variance to verify genetic variation in the traits measured. The few traits with insignificant genetic variation, based on the F-test, were not considered for further analyses.

III. RESULT AND DISCUSSION

3.1. *Experimental soil properties:* The production of landrace rice grains is extremely important thanks to the structure of the soil. The soil must have a bright, light texture with good drainage system and moderately low amount of organic matter. The results of land analysis at Tri Ton and Tinh Bien locations showed that the maximum humidity reserves fluctuated from 40.8% to 41.0% for TinhBien and Tri Ton in order. Organic C content is not high (0.92% and 0.86%). This suggests that organic matter is not so high suitable for growing landrace rice because the soil is often porous, allowing root remove and lodging. Bright soil color reduces the color of the shell. Ensures the attractiveness of rice grains and catches the eye with the market. The soil drains well, providing air inside the soil for the root system to grow. The percentage of lightning particles is very low (1.2-2.02%) (Table 1). Mild - neutral soil (pHKCl 6.01-6.25). Landrace rice grows best in slightly soil with 6.0 to 6.5.

Table 1: Some properties of the tested soil (0–30 cm depth) before sowing

Property	Value assessment	
	site I: Tri Ton	Site 2 : Tinh Bien
Component distribution (%)		
Sand	66,4	65,78
Silt	32,5	31,20
Clay	3,1	2,02

Property	Value assessment	
	site I: Tri Ton	Site 2 : Tinh Bien
Soil texture	Sandy loam	Sandy loam
Saturation percent (S,P%)	41,0	40,8
pH (soil)	6,09	6,35
E,C (dS m ⁻¹ , at 25 °C)	0,42	0,55
Soil physical and chemical analysis		
Total N (%)	0,089	0,093
Available N (ppm)	28,0	47,0
P (ppm)	7,40	11,20
K (ppm)	137,6	148,5
Exchangeable cation (meq/L)		
Ca ⁺⁺	0,90	0,98
Mg ⁺⁺	0,38	0,29
Na ⁺	0,08	0,19
K ⁺	0,25	0,39
Organic carbon (ml/lit) -C (%)	0,92	0,86

3.2. Effects of fertilizers on plant height, filling and unfilling of landrace rice.

3.2.1. Analysis of the impact of fertilizers on the componts of yield composition of rice plants This analysis is based on factors: productivity and productivity composition in two different locations.

a) *Experiments at Tri Ton*: Treatments produced significantly different effect on all measured parameters: plant height. Filled/ panicle and unfilling % at 5% level of significance. The average plant height of the AG3 is 128.5cm in the F6 non-fertilization test. The tallest height in the F7 treatment(134.6 cm). N fertilizer changes have a change in the height of the landrace rice on AG 3 which is statistically significant on the treatments. The average height of AG4 when not fertilized is 127.5 cm in the F6 and the tallest is also in the full fertilization test (F7)

according to farmers (138.3 cm). For the number of filling / panicle recorded the fertilization change experiments are statistically significant on the treatments.

b) *The experiment at TinhBien* similar to the experiment in Tri Ton. Most of the treatment are statistically significant for plant height, filling and unfilling %. For plant height of AG3 is 130.2 cm in the non-fertilization treatment F6. The tallest in the F2 (134.2 cm). The ratio of filling / panicle is highest in the F2, then the F1 and F3 treatments. The rate of % unfilling the highest fertilizer levels F5. F 6 is 22.1% and 28.6% respectively. For the AG4 the lowest height in the F6 test and the tallest in the F2 test is 126.1cm, 136.6cm respectively in order. (Table 2). The highest recorded filled / panicle of F2 to F1. The lowest percentage of filling/ panicle is F6, then F5. (Table 2)

Table 2. Effects of fertilizer on the development of landrace rice

Factors (F)	AG 3			AG4		
	Plant height (cm)	Filled grains / panicle (number)	% unfilling	Plant height (cm)	Filled grains / panicle (number)	% unfilling
Site 1: Tri Tôn						
F1= 80-40-40+organic manures10 t ha-1	132.7	112.5	15.2	138.2	108.3b	20.1
F2= 60-40-40 + organic manures10 t ha-1	134.8	100.4	13.7	136.6	109.2a	15.6
F3= 40-40-40 +organic manures10 t ha-1	132.1	108.3	18.2	133.6	99.4c	12.8
F4= 20-40-40 +organic manures10 t ha-1	131.5	98.4	16.7	132.5	89.6d	22.4
F5= only organic manures10 t ha-1	130.8	92.6	20.4	131.3	78.6e	20.1
F6= 0-0-0+ 0	128.5	61.5	25.7	127.5	63.7f	25.4
F7= Famers (120-40-60 + organic manures r 12 t ha-1	134.6	117.1	19.5	138.3	108.5b	16.5
Site 2: Tinh Bien						
F1= 80-40-40+ organic manures 10 t ha-1	132.5c	118.9b	12.2f	135.7b	112.3b	14.5d
F2= 60-40-40 + organic manures 10 t ha-1	134.2a	119.6a	12.6f	134.6c	113.2a	12.9e
F3= 40-40-40 +organic manures 10 t ha-1	133.5b	118.3b	17.6e	133.6d	109.6c	14.8d
F4= 20-40-40 +organic manures 10 t ha-1	131.7d	99.4e	18.5d	133.6d	89.5e	12.6e
F5= only organic manures 10 t ha-1	131.2d	98.5f	22.1b	132.3e	79.5f	21.6b
F6= 0-0-0+ 0	130.2e	71.5g	28.6a	126.1f	68.1g	32.6a
F7= Famers (120-40-60 + organic manures 12 t ha-1	132.7c	115.4d	19.1c	137.9a	100.2d	18.9c

3.2.2. Effects of fertilizers on yield for landrace rice.

a) *Experiments at Tri Ton*: Treatments produced significantly different effect on all measured parameters: panicle length and grain yield, thousand grains weight at 5% level of significance. The panicle length of AG3 fluctuates from 27.8-26.6cm. In the thousand grains weight there is no significance for the all treatments except not fertilization (F6) for lower weight in AG 3. For AG 4. The treatments for thousand grains weight are highest in

F1, F2 and F7 (30.5grams). The lowest thousand grains weight are also in F6 (28.6grams). In terms of recorded productivity like AG 3 for the highest productivity in the F2 test. This is recorded on AG 4 (F2) for a yield of 4.6 tons / h.a). fertilizers application (60 -40-40 kg/ha+ organic manures 10 t ha-1) increased grain yield both AG 4 and AG 3 at Tri Ton.

b) *Experiments at Tinh Bien*: Treatments produced significantly different effect on all measured parameters: panicle length and grain yield. Thousand

grains weight at 5% level of significance. Yield recorded the same AG 3 yield higher than AG 4. However, 1000-grain weight is higher than AG 3. On the yield of the treatments are statistically significant. The most productive test on the F2 test (table 3). On the treatment of only organic fertilizer, the yield is achieved 3.5 ton/ha for AG 3 and 3.8 ton/ha for AG 4. The results showed that among the various nutrient combinations. Combine application of inorganic fertilizer F2 and F1 the yield the same with the result of Kumari et al. (2018). Positive effect of straw incorporation was also found by Kumari et al., (2018) in

rice-wheat cropping system. Zhao et al., (2019) compared straw removal with straw incorporation in rice-wheat cropping system and found that increase in wheat yield was significant and rice was not significant. Zhao et al., (2019) found the positive influence of straw incorporation on soil aggregation and enzyme activities. Mahapatra (1991) found that one third of the inorganic N can be substituted by applying rice or wheat straw at the time of planting to give similar rice yields. Similar results were also reported by Salahine et al. (2017).

Table 3. Effects of fertilizers on yield and yield components in landrace rice

Factors (F)	AG3			AG4		
	panicle length (cm)	1000-grain weight (g)	yield(ton/ha)	panicle length (cm)	1000-grain weight (g)	yield(ton/ha)
Site1: TriTon						
F1= 80-40-40+ organic manures 10 t ha-1	27.8a	28.7a	4.2a	29.2a	30.5a	4.5a
F2= 60-40-40 + organic manures 10 t ha-1	27.7a	28.6a	4.3a	28.2b	30.5a	4.6a
F3= 40-40-40 +organic manures 10 t ha-1	27.6a	28.4a	4.2a	28.5b	29.9b	4.3a
F4= 20-40-40 +organic manures 10 t ha-1	27.7a	28.8a	3.6a	28.6b	29.9b	3.2a
F5= only organic manures 10 t ha-1	27.6a	28.6a	3.5b	28.6b	29.3b	2.9b
F6= 0-0-0+ 0	26.6b	27.4b	2.9c	27.6c	28.6b	2.5b
F7= Famers (120-40-60 + organic manures r 12 t ha-1	27.7a	28.7a	4.2a	28.5b	30.5a	4.2a
Site 2: Tinh Bien						
F1= 80-40-40+ organic manures 10 t ha-1	27.6b	28.4a	4.6b	28.7a	30.5a	4.5a
F2= 60-40-40 + organic manures 10 t ha-1	28.6a	28.6a	4.8a	28.9a	30.1a	4.5a
F3= 40-40-40 +organic manures 10 t ha-1	28.7a	28.7a	4.2d	28.3a	30.2a	4.3b
F4= 20-40-40 +organic manures 10 t ha-1	28.4a	28.7a	4.3c	27.8b	30.4a	4.2c
F5= only organic manures 10 t ha-1	27.7b	27.8b	3.5e	28.4a	29.6b	3.8d
F6= 0-0-0+ 0	26.4c	27.4b	2.8f	28.9a	28.7c	3e
F7= Famers (120-40-60 + organic manures 12 t ha-1	28.4a	28.5a	4.6b	28.6a	30.7a	4.3b

3.2.3. The effected of fertilizers on rice qualities(Cooking and eating properties) of landrace rice

a) Experiments at Tri Ton: Analyzing the amylose content of AG 3 varieties recorded fluctuations in fertilizer levels that have changed statistically. Amylose levels

increased slightly when nitrogen levels were increased. In the full fertilizer treatment (F1) the average amylose (%) content is calculated for AG3 (18.6). Similar to the experimental fertilization of F7 (amylose content is 18.6%). Other tests showed that lower amylose levels ranged from 17.2% to 17.7%. For AG4 varieties in the high amylose test is the F7 (fertilizer according to farmers). Thus, the amylose content has changed due to changes in the amount of fertilizer. Next Gel consistency (GC) also recorded fluctuations on both two varieties. In particular, in gelatinisation temperature (GT) there is no change in the tests for both varieties (table 4). This is also

noted on the AG 4. The GT popularity alone has not changed all of treatments.

b) *Experiments in Tinh Bien*: The amylose content recorded on the tests shows statistical significance on the tests the lower the fertilizer level, the lower the amylose content. The fluctuation in amylose levels is not high in F1 until F6 tests except in F7. For both AG 3 and AG4 varieties. Gel consistency is the same for amylose content that are not statistically significant on AG 4. However, there is little change amylose at on AG3 at F7 treatment (Farmers (120-40-60 + organic manures 12 t ha⁻¹).

Table 4. Effect of fertilizers on cooking and eating properties of landrace rice

Factors (F)	AG3			AG4		
	Amylose content (%)	Gel consistency l(mm)	Gelatinisation temperature	Amylose content (%)	Gel consistency l(mm)	Gelatinisation temperature
Site1: TriTon						
F1= 80-40-40+ organic manures 10 t ha ⁻¹	18.6a	87.5a	5	18.3a	85.5c	5
F2= 60-40-40 + organic manures 10 t ha ⁻¹	17.8b	87.9a	5	17.5b	86.7b	5
F3= 40-40-40 + organic manures 10 t ha ⁻¹	17.7b	87.7a	5	17.2b	86.4b	5
F4= 20-40-40 + organic manures 10 t ha ⁻¹	17.6b	85.6c	5	16.6c	87.5a	5
F5= only organic manures 10 t ha ⁻¹	17.2b	86.7b	5	16.5c	87.2a	5
F6= 0-0-0+ 0	17.4b	86.7b	5	16.2c	86.2b	5
F7= Farmers (120-40-60 + organic manures r 12 t ha ⁻¹	18.9a	83.2c	5	18.5a	85.6c	5
Site 2: Tinh Bien						
F1= 80-40-40+ organic manures 10 t ha ⁻¹	17.9b	86.7b	5	16.8b	88.5a	5
F2= 60-40-40 + organic manures 10 t ha ⁻¹	17.2b	87.6a	5	16.2b	88.2a	5
F3= 40-40-40 + organic manures 10 t ha ⁻¹	17.3b	87.2a	5	16.3b	88.7a	5
F4= 20-40-40 + organic manures 10 t ha ⁻¹	17.8b	86.6b	5	16.7b	88.6a	5
F5= only organic manures 10 t ha ⁻¹	17.6b	87.6a	5	16.8b	88.1a	5

F6= 0-0-0+ 0	17.2b	86.5b	5	16.5b	88.4a	5
F7= Famers (120-40-60 + organic manures 12 t ha-1	18.1a	86.4b	5	17.2a	86.5b	5

3.2.4. The effected of fertilizers on the milledqualities of landrace rice

a) *Experiment at Tri Ton*: Analyzing the rate of milling on rice varieties with different levels of fertilizer recorded in terms of the ratio of head rice, brown rice and the ratio of white rice both varieties AG3 and AG 4 on two points of statistical significance. Analysis of brown rice ratios showed that the F2 treatment gave a high percentage of head rice on both varieties of 55.4% on varieties (AG3) and 52.4% on (AG4). The treatment had the lowest percentage of head rice in the F7 (46.7%). The same of

AG 4 (48.7%). AG 3 had much higher head rice at treatment F2 (60-40-40 + organic manures 10 t ha-1). (Table 5)

b) *The experiment at TinhBien* is similar to the one at Tri Ton. The milling ratios of AG3 and AG 4 are statistically significant in the treatments. It is worth noting that the proportion of head rice recorded as AG3 shows higher head rice of AG 4. Treatment F2(60-40-40 + organic manures 10 t ha-1) give hight head rice at AG 3 and AG 4.

Table 5. Effect of fertilizers on milled rice content for landrace rice

Factors (F)	AG3			AG4		
	Brown rice (%)	White rice (%)	Head rice (%)	Brown rice (%)	White rice (%)	Head rice (%)
Site1: TriTon						
F1= 80-40-40+ organic manures 10 t ha-1	80.5d	73.4d	48.8d	82.4a	76.8a	51.2b
F2= 60-40-40 + organic manures 10 t ha-1	81.6c	76.4a	55.4a	80.6c	75.6b	52.5a
F3= 40-40-40 +organic manures 10 t ha-1	81.5c	72.5e	54.b	81.6b	71.4e	50.4c
F4= 20-40-40 +organic manures 10 t ha-1	84.2a	74.6c	53.5c	82.7a	72.5d	50.6c
F5= only organic manures 10 t ha-1	82.1b	72.5e	53.3c	81.6b	75.6b	50.3c
F6= 0-0-0+ 0	81.5c	73.4d	53.2c	80.3c	74.6c	50.5c
F7= Famers (120-40-60 + organic manures r 12 t ha-1	80.5d	75.2b	46.7e	81.2b	74.5c	48.7e
Site 2: Tinh Bien						
F1= 80-40-40+ organic manures 10 t ha-1	80.7b	74.2c	52.3c	82.4a	74.5c	52.7b
F2= 60-40-40 + organic manures 10 t ha-1	81.6a	76.8a	55.6a	81.6b	76.2a	53.2a
F3= 40-40-40 +organic manures 10 t ha-1	78.9c	76.5a	54.6b	82.4a	74.5c	50.4d
F4= 20-40-40 +organic	80.5b	74.5c	54.3b	80.6c	74.5c	51.4c

manures 10 t ha-1						
F5= only organic manures 10 t ha-1	81.5a	74.5c	55.2a	80.4c	75.1b	51.2c
F6= 0-0-0+ 0	80.6b	74.7c	54.7b	80.7c	76.4a	51.7c
F7= Famers (120-40-60 + organic manures r 12 t ha-1	80.4b	75.4b	48.6d	80.9c	75.1b	49.8e

3.3. Discussion

The nitrogen -deficient tree will be elongated in both at Tri Ton and Tinh Bien experiments for both AG3 and AG4 varieties in the treatment F 6. In two sites, the AG4 variety had a higher plant height, compared to the AG3 variety. This is in the same with Dobermann and Fairhust's (2000) comments. The application of nitrogen fertilizer can increase the height of the plant, the number of panicles. According to (Spargo et al., 2013). "the desired pH range of 6.0 to 7.0 of most crops but acidity reduces the availability of nitrogen. Phosphorus and potassium. P deficiency of this nutrient can lead to a decline in plant growth; weak root system, and seed quality, low yield. Phosphorus plays an important role in the development of roots, promoting early flowering and ripening and resistance to disease and drought. In table 2 with treatment 5 and 6 lack of phosphorus the plant height is the same with other treatment but the yield is very low table 3. Phosphorus deficiency can delay the maturation of rice crops and increase sensitivity to rice disease (Fageria et al., 2003). Potassium-deficient plants cannot use nitrogen and water more efficiently and are more susceptible to disease." Low to moderate soils require fairly reasonable management (Belachew and Abera. 2010). Furthermore. The proper application of potassium is closely related to the dependence of cell walls, bundles and growth intensity of the trunk, which enhances resistance to the tree against reclining beans (Kong et al., 2014). Rice plants that are deficient in potassium will often have high cases when the disease enters which can lead to the incidence of the disease. Therefore, this study was conducted to assess the effect of different levels of NPK fertilizer on the growth and productivity of landacerice varieties. Soil organic matter is the local biodegradation that affects soil structure and porosity. The rate of penetration of water, humidity, the diversity and biological activity of soil organisms and the availability of nutrients (Bot and Benitez 2005). Soil structure affects soil fertility and how air and water move through the soil (Macie. 2013). The results revealed no interaction effects of NPK fertilizers and rice varieties on the physiological characteristics, lodging incidence characteristics and yield component. There were

significant different observed on the plant height, panicle number, percentage of filled grains and 1,000 grains weight of different rice varieties. Different levels of NPK exerted significant effect on yield and component yield such as 1,000 grains weight and grain yield. This can happen because compost has high nutrients. The tallest plant height is affected by a combination of compost and a fertilizer recommendation N. P. K but does not differ significantly when compared to other experiments except by combining compost and fertilizer n. P. K. at 80 N consciousness (F1). The increase in the height of landrace rice may be related to the full availability of water in the test area during the test period. However, Tri Ton and Tinh Bien are mainly based on heavenly water, so the disruption of water sources affects the development of rice crops. In this experiment. AG 3 and AG 4 had a slight increase in amylose levels in the F7 test. Which was consistent with previous reports (El-Kadyet al., 1999) reporting that the application of nitrogen fertilizer slightly increased amylose content.

Fertilization depending on the rice variety with the level of 120 N / ha significantly increased the proportion of whole rice decreased in the F7. The yield is also reduced due to the landrace and the leaves are more likely to fall when applying high nitrogen fertilizer. These productivity trends also to explain that limping alone cannot serve to reach the maximum potential of acidic soils. Thus suggesting that depleted soils N and K. Which clearly affect crop performance as were observed when these modifications (fertilizer P) were applied in combination with manure (Farag and Zahran. 2014). Organic sources along with chemical fertilizers have improved the productivity and quality of landraceon the F1 test also recorded in Table 4 . Therefore, it can be inferred that potassium manure along with K released from straw, increases the availability of this nutrient in complexes and in soil solutions, allowing for better absorption of nutrients as evidenced by the nutritional status of the crop. In many physiological and metabolic processes, including photosynthesis, osmosis, nutrient transport, carbohydrate transport and storage, nitrogen absorption and protein and starch synthesis (Hawkesford et

al.. 2012; Raza et al.. 2014). Given the importance of nitrogen fertilization for the yield in grains from rice crops, it is necessary to know the best dose for each variety as well as its effect on productivity components and other agroecological parameters such as cycle yield, plant height and yield composition of the plant. Increasing the rate of nitrogen fertilizer can increase productivity but reduce particle quality on the F7 test. On the other hand, there are many factors that play a huge role in the quality of rice. The quality of cooked rice and its taste, which is important to consumers. The most important factor that can affect the quality of cooked rice is the amylose (AC) content, which is part of the starch. Other factors such as gel consistency (GC) and gelatinization temperature (GT). In general, the AC in rice grains will determine the softness and hardness of the grain after the cooking process. GC is the mucus ratio during cooking. In fact, GT is the water temperature of starch particles at an irreversible expansion (Zamani and Alizade. 2007). Dong et al. (2007) showed that nitrogen intake had a profound effect on the quality of cooking and the nutritious value of rice, with an increase in GC but a decrease in AC. Young Lee (2006) in this study concluded that there was a negative correlation between the amount of nitrogen and amylose in rice on Table 4 and the rate of milling quality also decreased table 5. Dong et al. (2007) showed that nitrogen intake had a profound effect on the quality of cooking and the nutritious value of rice, with an increase in GC but a decrease in AC. Young Lee (2006) in this study concluded that there was a negative correlation between nitrogen and amylose levels in grains.

IV. CONCLUSION

Integrated application of organic manures and inorganic fertilizers was effective for enhancing growth, yield, and the yield components of landrace rice. The increase in the rate and dosage of N, P and K from the F1 treatment has significantly increased plant height. Panicles per plant (number. 1000-grain weight (g). Filled grains / panicle). The interaction between genotypes and fertilization of nitrogen, phosphate and potassium had a significant effect on all agricultural and crop yield indicators at both test sites. The genotype of the AG3 gives the value of the above indicators higher than that of the AG4 in both locations. The increase/decrease in fertilizer intake has had a significant and statistically significant effect ($p \leq 0.05$) on the yield and quality of landrace rice grains in both all treatments the exception of 1000-grain weight. AG 3 and AG 4 received with F2 had significant difference between NPK fertilizer applied. Therefore it can be recommended to farmers. The amount of fertilizer used in treatment F2 (60:40:40 kg

ha⁻¹ + organic manures 10 t ha⁻¹) is the least. Thus, it gives an economical advantage as low fertilizer cost is required to achieve higher yield and better grain quality.

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