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Research Article

EFFECT OF ORGANIC AMENDMENT (BIOCHAR AND COMPOST) ON GROWTH AND YIELDS OF TWO VARIETIES OF RICE (*ORYZA SATIVA*) IN NGAOUNDERE-CAMEROON

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Abstract

Objective of these study was to improve the production of two rice (Oryza sativa) varieties in the Adamawa area in order to determine the influence of biochar and compost on its growth and yield.Study was carried out in Dang, precisely within Campus of University of Ngaoundere. The experimental design was a split-plot (6x2x3), the main factor is type of fertilizers, applied on two varieties of Rice which represent the second factors Plants parameters considered are: Tillage and height of plants taken at 60th and 90th days after sowing (DAS) during growing stages and at 90th DAS for the number of ramification and size of plants. Yields of plants (Panicles number per plants, number of seeds per panicles and weighting of 100 seeds per units) were determined. Ours results of this study showed that organic amendment significantly ($P<0.05$) improves the growth parameters of plant Rice at 60th and 90th days after sowing, when it's applied alone or with association with a certain doses of mineral fertilizers, compared to control treatment. The variety Jarra better responses to amendment with biochar and compost for these parameters. The contribution of biochar and compost, combined with chemical fertilizers significant ($P<0.05$) increased yields to 6.16 t/ha, 4.03 t/ha, respectively for the mixture compost+chemical fertilizers, biochar+chemical fertilizers for variety NL28. For the variety Jarra, we recorded an increase of 3.96 t/ha and 4.53t/ha, respectively for the mixture of biochar+chemical fertilizers and compost+chemical fertilizers in comparison to non-amended plots control. Biochar and compost alone were increased yields of 1.21t/ha; 2.86t/ha, respectively for variety NL28 and 1.3t/ha; 3.83t/ha, for the variety Jarra compared to negative control. The variety NL28 better responses to yields parameters. Our results suggest that the organic amendment combined with certain dose of chemical fertilizers is suitable for the product of both varieties studied. Variety Jarra responses well on growing parameters contrary to the variety NL28 which give good yields per cobs. However, compost treatment improves well compared to biochar. The benefits of these treatments it's appreciable and contribute to protect environment, Rice plants and ameliorate yields of plants.

Keywords: Biochar, Compost, Mycorrhiza, Rice, Chemical fertilizers, Ngaoundere.

INTRODUCTION

Many countries in development are confronted on an increasing of populations and an enhance of agricultural production for ensuring food security. For example, on a cases of Rice culture, basic cereals of the majority of population on the world, we estimate that product should increase of 40 % in 2030 for satisfy demand (Khush, 2005). Rice is the second cereals cultivated in world after wheat and constitute one of principal productions (FAO, 2010). In Africa, Rice culture is an important activity for the populations of certain area of west and center Africa insuring food security of 20 billion of producers. These culture secure approximatively of 1000 billion (ADRAO, 2002). The demand of Rice in west and central Africa increase with the rate of 6 % per years, compared to previous years which demand enhance to 4 % per years (ADRAO, 2004). However, 60 % need of this culture are cover by importations to the detriment of local production which are deficient (Nguetta *et al.,* 2006). Need of this culture is related principally of demographic growth and increase of Rice culture like basic food. In Cameroon, national production is estimated at 100 000 tons of cultivated paddy on 44.000 ha and the majority is secured by the irrigated zone of North-west and Far-North.

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National demand estimated in 2009 at 300 000 tons were essentially cover by importations (Folefack, 2014). In these situation, significant increasing of locale production should permit to reduces these importations and secured the dependence in terms of food. Nowadays Rice culture is confronted to many constraints such lower quantity of fertilizers on soil, dryness strictly for pluvial culture, bad agricultural practices. The loss of soil fertility remains a fundamental problem which limit the productivity of plants (Tokty, 2012). These problems are serious and crucial on tropical and subtropical country where soils are generally washed due rainy effect and inondations making soil poor in organic matter. On these soils the productivity of plants is limited in the one hand by acidity, lower capacity to uptake nutrients of soils (CEC) and by dryness effect (Mohamed, 2012). Intensive agriculture with uses of chemical fertilizers could present in certain cases a threat for the durability of natural resources (Demers, 2008). Uses of pesticides and chemical fertilizers causes the destruction of soils Fauna which is essential to soil ventilation. In these case scientific community valorize use of organic and biological fertilizers (Biochar, compost, rhizobia, mycorrhiza and microorganisms solubilizing phosphorous (MSP)) in order to preserve ours resources with respecting environment and human's health. Certain works of improvement yields of Rice with mycorrhiza and soil solarization were studied on Rice (Natebaye, 2010;

Signe, 2011). But, few works on Biochar effect and compost on some varieties of Rice are recorded in Ngaoundere, Cameroon. In these context, these study was realized in order to evaluate the effect of biochar and compost on agronomic performance of two varieties of Rice.

MATERIALS AND METHODS

Description of study

Study was realized on the locality of Bini-Dang situated at 15 km of North of the town of Ngaoundere, Cameroon. One site on of Campus of University of Ngaoundere was chosen with geographical coordinates: 7°42'36" of latitude North, 13°54'24" of longitude East and 1106 m of altitude. Soils chemical analysis of this site show that soil is acid with high quantity of iron (192.0 mg/kg), aluminium (93.89 mg/kg), and Calcium (12.08mg/kg).

Biological and chemical materials

Vegetal material is constituted of two varieties of Rize (NL28 and Jarra). Fertilizers applied was Biochar, compost and chemical fertilizers NPK with formula: 20 :10 :10. Table 1 show the characteristic of these varieties.

Table 1. Agronomics and phenotypic characteristic of varieties studied

Variety	Provenance/Origin	Yields (T/ha)	Seeds color	Cycle (Days)
Jarra	SEMRY	3 - 4	White	120 -150
NL28	IRAD Cameroon	5 - 7	White	120 -150

Experimental design

Experimental design is a split-plot with two factors: Factor 1 concerning type of fertilizers and Factor 2 concerning variety of Rize. The surface was 168m^2 (14mx12m) constituted of six treatments repeated three time. Every experimental unit have 30 plants of the same variety disposed on 5 lines and 6 colons. Distances between lines and colons were 30 cm. Sowing process was realized on Jun 2014. Seeds were sowed on a reason of 4 seeds per pockets. Four weeks after sowing, weeding process was done for limit weeds on units and during formation of cobs. Amendment with organic fertilizers consisted to inoculate seeds during sowing semis (30g/ pockets). Apply of chemical fertilizers consisted to spread on a dose of 30g/pockets at two weeks after sowing. Combined treatments (Biochar-NPK and Compost-NPK) constituted to inoculate firstly organic fertilizers (15g/pockets), then added NPK fertilizers (15g/pockets) two weeks after sowed.

Sample procedure and data collection

Ten plants per units were randomly chosen in order to sample data at 60th days after sowed. Plants parameters were: Tillage and height of plants were considered at 60th days after sowing by counting the number of ramification and measure the plants size with decameter. At 90th after sowing same parameters were evaluated with adding length of leaves, width of leaves and the panicles number. On maturity harvest was made on 10 plants sampled per unit and per variety. Panicles number per plants and the number of seeds per panicles were determined by counting. Weighting process was done on 100 seeds per units with the balance and yields (ha) were evaluated per experimental units.

Statistical analysis

Statistical analysis was done with the software R commander. Values are estimated in terms of average ± standard error. Means comparison was made using t-student test and ANOVA on the probability of 5 %.

RESULTS

Effects of treatments on germination rate according to the variety

Table 2 show variation rate of germination of variety of rice per type of fertilizers 20th days after sowing. Significant difference not recorded between types of fertilizers and variety compared to negative control ($P > 0.05$).

Table 2. Influence of treatments on germination rate according to the variety

Variety	Treatments			p-value
	Biochar	Compost	Control	
Nerica NL28	$41.10\pm13.47_{aa}$	$59.20\pm3.08^{a}_{a}$	$60.89\pm7.59^{a}_{a}$	0.2616
Jarra	$48.88\pm13.00^{a}_{a}$	$67.96\pm15.03^{a}_{a}$	$56.06\pm9.02^{a}_{a}$	0.0676
p-value	0.5409	0.3201	0.5169	

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered ($P\leq 0.05$).

Effect of treatments on height of plants at 60th And 90th days after sowing

Table 3 illustrate the effect of fertilization on increasing height of plants of rice variety at 60th and 90th days after sowing. All treatments improve height of plants Rice to one days of sowed to another for the two variety compared to negative control. But using compost+chemical fertilizers, results are suitable at 60th days after sowing for the variety Nerica NL28. Contrary at variety Jarra, combined treatments (compost+chemical fertilizers, Biochar+chemical fertilizers) are favorable on growing in the same date. At 90th days after sowing, always the two treatments (compost+chemical fertilizers, Biochar+chemical fertilizers) are significant on growing plants of Rice. Considering the comparison between treatments tested according to fertilizers, the difference is significant ($P>0.0001$). However, variety Jarra responses well on growing parameters of plants, with the treatments of Biochar, compost and chemical fertilizers compared to the variety Nerica NL28.

Effect of treatments on tillage of plants at 60th AND 90th days after sowing

Table 4 show that the interaction of treatments (Compost-Biochar-chemical fertilizers) were positive on tillage of plants at 60th and 90th after sowing compared to control. Increasing of plants tillage were important with Biochar treatment (54.64 %), followed by compost treatments (52.36 %) and chemical fertilizers (60.24 %) for the variety NL28 compared to negative control. Same remark was recorded with the variety Jarra, where tillage of plants was respectively high for Biochar (45.85 %), compost (70.04 %) and chemical fertilizers (72.82 %) compared to control. Considering the variety, the combined effects of compost+chemical fertilizers or biochar+chemical significantly improves the ramification compared to control.

Table 3. Effect of treatments on height of plants at 60th and 90th days after sowing

Variety	Treatments at 60th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+fert	Com+fert
NL28	34.6±9.38ab	32.02±10.4a b	32.63±5.61ab	19.8±7.81aa	1.21±12.81ac	1.85±11.75ad
Jarra	$46.12±19.3^{b}_{b}$	$56.46±12.51^{b}_{cd}$	$49.47±12.46^{b}_{bc}$	$28.33±6,41^{b}_{a}$	$1.19±11.41^{a}_{d}$	$61.42±15.15^{b}_{d}$
p-value	0.02942	<0.0001	<0.0001	<0.0001	0.0772	0.8253
Variety	Treatments at 90th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+fert	Com+fert
NL28	$60.71±14.89^{a}_{c}$	$54.56±17.62^{a}_{bc}$	$41.43±11.46^{a}_{b}$	$29.57±10.86^{a}_{a}$	$84.47±10.3^{a}_{d}$	$87.3±16.72^{a}_{d}$
Jarra	$71.68±18.2^{b}_{a}$	$80.1±12.74^{b}_{bcd}$	$86.86±13.38^{b}_{d}$	$46.09±13.43^{b}_{a}$	$76.8±15.84^{a}_{bc}$	$83.41±12.74^{b}_{cd}$
p-value	0.0558	<0.0001	<0.0001	<0.0002	0.0941	0.4726

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.

Table 4. Effect of treatments on tillage of plants at 60th and 90th days after sowing

Variety		Treatments at 60th days after sowing				
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+Fert
NL28	1.61±1.0aa	2.16±0.85aa	2.11±1.07aa	1.22±0.87aa	3.83±3.27ab	4.05±1.62ad
Jarra	$2.55±1.85^{a}_{ab}$	$5.5±3.94^{b}_{c}$	$4.22±2.9^{b}_{bc}$	$1.61±0.84^{a}_{a}$	$4.05±1.51^{a}_{bc}$	$7.72±3.54^{b}_{d}$
p-value	0.0678	0.0013	0.0066	0.1859	0.7955	0.0003
Variety		Treatments at 90th days after sowing				
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+Fert
NL28	$3.55±2.38^{a}_{bc}$	$3.38±1.71^{a}_{b}$	$4.05±1.1^{a}_{bc}$	$1.61±1.0^{a}_{a}$	$5.05±2.97^{a}_{cd}$	$6.22±3.62^{a}_{d}$
Jarra	$3.38±1.78^{a}_{a}$	$6.11±4.6^{b}_{b}$	$7.27±3.19^{b}_{b}$	$1.83±0.85^{a}_{a}$	$10.0±3.69^{b}_{c}$	$17.0±4.94^{b}_{d}$
p-value	0.8137	0.0246	0.0002	0.4883	<0.0001	<0.0001

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.

Table 5. Treatment effects on the length of leaves at 90th days after sowing.

Variety	Treatments at 90th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+fert
NL28	$25.11±6.25^{ab}$	$30.16±5.0^{ac}$	$29.82±8.2^{ac}$	$19.15±5.76^{aa}$	$40.96±7.58^{bc}$	$35.28±7.83^{ad}$
Jarra	$24.87±8.36^{ab}$	$28.07±5.79^{abc}$	$32.22±7.18^{ac}$	$18.07±4.4^{aa}$	$30.12±6.5^{ac}$	$34.7±7.59^{ac}$
p-value	0.9233	0.2539	0.3559	0.5325	<0.0001	0.1478

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.

Table 6. Treatments effect on width of leaves at 90th days after sowing

Variety	Treatments at 90th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+Fert
NL28	$0.95±0.17^{ab}$	$1.07±0.2^{ac}$	$0.93±0.17^{ab}$	$0.62±0.19^{aa}$	$1.29±0.12^{ad}$	$1.38±0.15^{ad}$
Jarra	$1.0±0.21^{ab}$	$1.15±0.22^{ac}$	$1.32±0.11^{bd}$	$0.85±0.11^{ba}$	$1.25±0.17^{acd}$	$1.49±0.13^{bbe}$
p-value	0.4974	0.2869	<0.0001	<0.0001	0.3777	0.0277

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.

ANOVA test showed a significant difference (P≤0.05). between treatments effect. Means comparison showed the difference between the two variety (0.0001≤P<0.025). Jarra variety was most capable on tillage compared to the variety NL8, through the treatments of compost+chemical fertilizers at 60th and 90th days after sowing.

Effect of treatments on the length of leaves at 90th after sowing

Table 5 show the length of leaves taken at 90th days after sowed. For all variety, treatments effects were significantly favorable (P≤ 0.05) on length of leaves (Table 5). Compost, Biochar, chemical fertilizers and combined effect of compost+chemical fertilizers or biochar+chemical fertilizers significantly (P<0.0001) increase the length of leaves compared to control. The combined treatments of compost+chemical fertilizers or biochar+chemical fertilizers have a best result compared to others treatments.

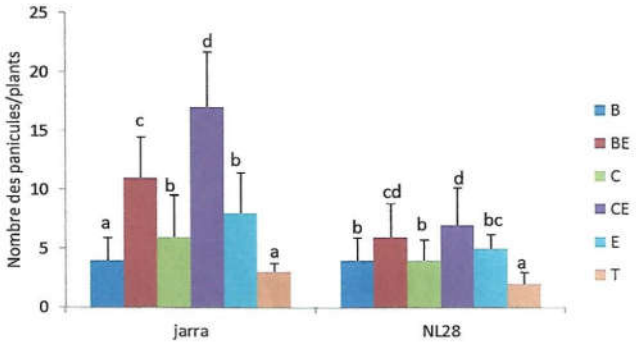
Treatments effect on width of leaves at 90th days after sowing

Table 6 show that for all treatments considered, fertilizers types were significantly improving the width of leaves for the two variety compared to control (P<0.0001). Compost, biochar and chemical fertilizers were positive, compared to non-amended plots. But if the treatments are combined (organic fertilizers+chemical fertilizers) the responses of two varieties is best compared to non-amended plots. Leaves of the variety Jarra is widest than to the variety Nerica NL28. Chemical fertilizers and combined effect (Compost+chemical fertilizers) significantly (P<0.0001) increased the wide of the variety Jarra compared to the variety NL28.

Effect of treatments on number of panicles at 90th days after sowing

Figure 1 illustrate that at 90th days after sowed, the treatments of biochar, compost and chemical fertilizers were increased the

number of panicles of the variety NL28 respectively from 42.18 %, 42.18 % and 50 % compared to non-amended plots. Variety Jarra recorded the frequencies of 29.83 %, 54.84 % and 65.43 % respectively for the treatments biochar, compost and chemical fertilizers compared to non-amended plots. If chemical fertilizers are applied association with compost or biochar, we noted an increasing of number of panicles of 75.51 % and 84.79 % respectively for the variety Jarra compared to non-amended plots. But these increasing varies from 58.5 % to 84.84 % for the same treatments of the variety NL28. Ours results showed that 95 % of two varieties tested have an important number of fertile tillers compared to the total number of tillage product. But variety Jarra present most panicles than the variety NL28.

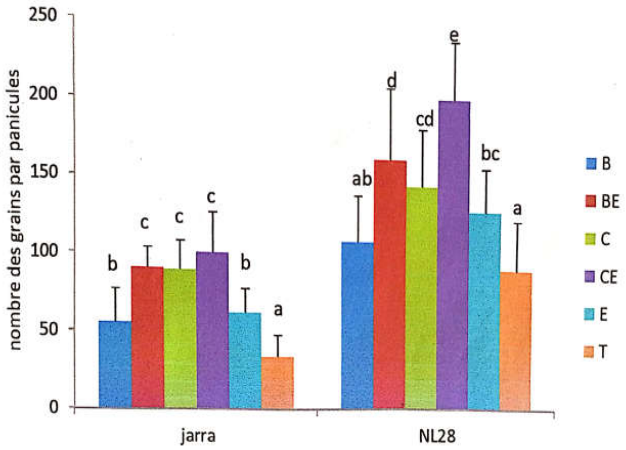


NB: Histograms with the same letter are not significantly different at the level of probability considered (P≤0.05) B=Biochar; BE= Biochar+chemical fertilizers; C=Compost; CE= Compost+ chemical fertilizers; E= chemical fertilizers; T=Control.

Figure 1. Effect of treatments on the number of panicles at 90th after sowing

Effect of treatments on the number of seeds per panicles

Figure 2 showed that effect of treatments (biochar, compost and chemical fertilizers) were positively improve the number of seeds per panicles of two varieties, compared to non-amended plots. These different treatments were increased of 16.51 %, 37.24 % et 29.69 %, respectively for biochar, compost and chemical fertilizers, compared to non-amended plots for the variety NL28. For the variety Jarra, these increasing varied of 39.34 %, 61.77 % et 45.98 %, respectively for the same treatments, compared to non-amended plots. Mixing chemical fertilizers and organic amendment improve the number of seeds per panicles for the variety NL28 from 43.88 % and 54.64 %, respectively for the treatments biochar+chemical fertilizers and compost+chemical fertilizers, compared to control. For the variety Jarra, effect of biochar+chemical fertilizers and compost+chemical fertilizers were significant increase seeds per panicles respectively from 62.15 % and 66.19 %, compared to control. A significant difference (P<0.0001) was recorded between the two variety, because the variety NL28 had good product in seeds per panicles compared to the variety Jarra.



NB: Histograms with the same letter are not significantly different at the level of probability considered (P≤0.05) B=Biochar; BE= Biochar+chemical fertilizers; C=Compost; CE= Compost+ chemical fertilizers; E= chemical fertilizers; T=Control.

Figure 2. Effect of treatments on the number of seeds per panicles

Effect of treatments on the weight of 100 seeds

Table 7 show the effect of treatment on the weight of 100 seeds per variety according to the treatments. However, all treatments not affect the weight of 100 seeds compared to non-amended plots for the two varieties. The weight of variety Jarra was significant (P<0.0001) than the variety NL28. These character is function of the height of seeds.

Effect of treatments on the weight of units and yields in ton/ha

Table 8 show the effect of treatments on weight per units. Combined effect between chemical fertilizers and organic amendments was best in term of result compared to non-amended plots (Table 8). We have a variability among variety studied concerning weight per units, because significant difference (P<0.0001) between variety was noted according to fertilizers types. Variety Jarra responses well to biochar and compost, compared to the Nerica NL28, which responses well to chemical fertilizers, biochar+chemical fertilizers and compost+chemical fertilizers. Considering the weight of seeds per unit of varieties per types of fertilizers and per unit surfaces, yields of variety Nerica NL28 varied from 1.21t/ha, 2.86t/ha, 2.1t/ha, 4.03t/ha and 6.16t/ha respectively for biochar, compost, chemical fertilizers, biochar+ chemical fertilizers and compost+ chemical fertilizers, compared to control (1.13t/ha). Contrary to variety Jarra which yields fluctuated from 1.3t/ha, 3.83 t/ha, 1.53t/ha, 3.96 t/ha and 4.53 t/ha respectively for the same treatments, compared to control (0.4t/ha).

Table 7. Effect of treatments on the weight of 100 seeds

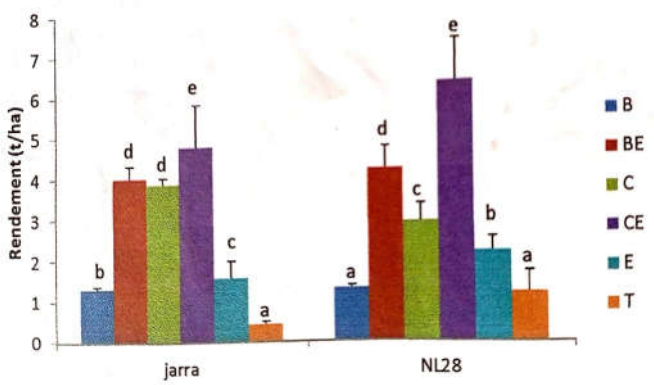
Variety	Treatments at 60th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+fert
NL28	$2.69\pm0.01^{a}_{a}$	$2.69\pm0.01^{a}_{a}$	$2.68\pm0.08^{a}_{a}$	$2.69\pm0.01^{a}_{a}$	$2.70\pm0.02^{a}_{a}$	$2.69\pm0.01^{a}_{a}$
Jarra	3.77 ± 0.77^{ba}	3.61 ± 0.00^{ba}	3.57 ± 0.00^{ba}	3.61 ± 0.02^{ba}	3.62 ± 0.02^{ba}	3.59 ± 0.03^{ba}
p-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.

Table 8. Effect of treatments on weight of units

Variety	Treatments at 60th days after sowing					
	Bio	Com	Fert	Ctrl	Bio+Fert	Com+fert
NL28	$0.37\pm0.01^{a}{}_{a}$	$1.86\pm0.1^{a}{}_{c}$	$0.63\pm0.09^{b}{}_{b}$	$0.34\pm0.14^{b}{}_{a}$	$1.21\pm0.13^{a}{}_{d}$	$1.85\pm0.07^{b}{}_{e}$
Jarra	$0.39\pm0.01^{b}{}_{b}$	$1.15\pm0.04^{b}{}_{d}$	$0.46\pm0.12^{a}{}_{c}$	$0.12\pm0.1^{a}{}_{a}$	$1.19\pm0.08^{a}{}_{d}$	$1.36\pm0.16^{a}{}_{e}$
p-value	0.0018	<0.0001	<0.0001	<0.0001	0.6987	<0.0001

NB: Values of the column for a variable followed by the same letter are not significantly different at the level of probability considered (P≤0.05). **Bio**=biochar; **Comp**=compost; **Crtrl**=control; **Bio+fert**=biochar+fertilizers; **Comp+fert**=compost+fertilizers.



NB: Histograms with the same letter are not significantly different at the level of probability considered (P≤ 0.05) B=Biochar; BE= Biochar+chemical fertilizers; C= Compost; CE= Compost+ chemical fertilizers; E= chemical fertilizers; T=Control.

Figure 3. Yields of varieties (t/ha) according to treatments

DISCUSSION

Effect of biochar and compost fertilizers on the varieties Jarra and Nerica NL28 were not significantly affected germination rate of plants. According to works of Selon Nguetta *et al.* (2006), proved the existence of homogeneity between variety on the density during germination, which similar corroborate with our results. Applied of organic amendment alone or with certain dose of chemical fertilizers are significantly affect the height of varieties. Increasing oh height of plants amended could be attributed to the stability of fertilizers which gradually liberate mineral elements needed for good development of plants and improve the high growing of plants. These results show that apply of compost and biochar are improved efficiency of chemical fertilizers and permit to reduces of half the dose of fertilizers for growing and optimal nutrition nutrition of Rice. Same remark was also made by Paré et al. (1993) founded that incorporation of fertilizers may reduce of 30 at 60 kg.ha1 the quantities of mineral fertilizers recommended for cereals culture. Uses of compost and biochar alone or combined with certain doses of chemical fertilizers are significantly increased the number of tillers of Rice. Increasing of number of ramification could be attributed in majority to the ability of organic amendments to increase efficiency of fertilizers adjusted. It is noted also the total number of tillers produced by one variety is correlated to development stage of plants and strictly related to the variety (Nguetta *et al.,* 2006). Ours results are similar to those of Signe (2011) and Natabaye (2010) on varieties of Rice Nerica, which founded an increasing of the number of ramification after mycorrhizationat Dang, Cameroon. Similar works of Dalzell (1988) showed that compost rich in micro and macro-elements contribute significantly to the growing of leaves and tillage stages of plants. Increasing of the number of leaves is due to the presence of Nitrogen fertilizers which favor good growing and vigour of plants Rice. Study on divers amendments of biochar on yields of Maize has produced similar result. For (Peng *et al.,* 2011), combined effect of biochar+chemical fertilizers have contributed of increasing biomass from 59 %, then the simple application (alone). Same results were also found by Ngakou et al. (2013) which demonstrated that compost increase significantly the length and width of leaves of varieties Nerica in Chad. Improvement of number of panicles could be attributed to improvement of soil in NPK of compost, biochar and chemical fertilizers. These results obtained with these improved varieties are similar to those previously founded by Monty et al. (1997) showing these news varieties could produce around of 100 % of fertile tillers. Increasing of number of seeds could be allotted by the positive effect of organic matter on maturation of seeds, correlation among organic fertilizers applied on soil and mineral fertilizers for the best synchronization of availability of nutrient elements for culture. Similar observation was made by Ngakou et al. (2013), which are founded a high number of seeds per panicles according to the varieties of Rice and types of fertilizers. Yields estimated in weight of 100 seeds, was not influenced by effect of treatments. It is in concordance also with weight of 100 seeds founded by Emadzadeh et al. (2010) on Rice between treatments and varieties studied. According to the same authors, principal factors that affect the maturation of seeds provide in part to luminosity of sun, which redistribute rays of homogeneous manner in experimental field. Weight of seeds is not function to types of fertilizers when they realized a test of varieties of inoculated Rice with mycorrhiza and compost in Chad (Ngakou *et al.,* 2013). Increasing of weight per units of varieties amended could be justified by the efficiency of these treatments on the availability of mineral elements. These results are different of those of Ngakou et al. (2013) founded not significant results among types of fertilizers on varieties of Rice Nerica for the weight seeds per units.

Conclusion

Objective of this study was to evaluate the effect of organic amendments (boichar and compost) on growing and yields of two varieties varieties of Rice at Dang, Cameroon. Ours results showed that application of organic amendments could optimize the productivity if they are combined with a dose of mineral

fertilizers. It is demonstrated that applied of organic fertilizers were reduces considerably the quantity of chemical fertilizers to users. These organic fertilizers alone were improved significantly growing parameters of plants Rice. Theses fertilizers also affect yields of culture. Variety Jarra responses well on growing parameters contrary to the variety NL28 which give good yields per cobs. However, compost treatment improves well compared to biochar. The benefits of these treatments it's appreciable and contribute to protect environment, Rice plants and ameliorate yields of plants.

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