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EFFECTS OF COMPOST ON THE PRODUCTIVITY OF THREE LEGUMINOUS (SOYA BEAN, COWPEA AND COMMON BEAN) UNDER TWO AGROECOLOGICAL ZONES OF CAMEROON

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ABSTRACT

The effect of compost on the productivity of three seeds vegetables (soya bean, cowpea and common bean), is studied in a field under Bertoua and Ngaoundere Cameroon in 2015 and 2016. In order to promote the plants in Cameroon while preserved food safety, the experimental set-up used is a full randomized block with 6 treatments ; 4 control (soya bean, cow- bean and common bean) 4 dosed with organic manure (fertilizer- soya bean, fertilizer-cowpea and fertilizer-common bean) repeated three times in each study zone. The rate of seed emergence, plant growth, and production parameters are evaluated. The results obtained show that in each of the two study zones, the productivity of the plants studied is higher in 2015 than in 2016, the organic fertilizer significantly increases ($p < 0.05$) the productivity of leguminous compared to control. The percentage of increase in average seed yield in the fertilizer-soya bean, fertilizer-cowpeas and fertilizer-common beans systems during the years of study compared to the control was respectively; 89.81, 76.57 and 83.74 % under Ngaoundéré climate and 77, 21, 85.01 and 90.30 % in the Bertouazone of Cameroon. These results show that; the zone of Ngaoundéré is more favourable for the cultivation of leguminous than the Ngaoundere Cameroon zone. In addition, the organic manure is beneficial for the cultivation of soya bean, cowpea and common bean.

KEYWORDS: *Legumes Common Bean, Soya Bean, Cowpea, Organic Fertilizer, Bertoua, Ngaoundéré, Cameroon*

INTRODUCTION

Legumes are very important family of flowering plants, herbaceous or arboreal (Fabaceae), including one of the major properties are symbiotic with bacteria (Rhizobium) capable of fixing atmospheric nitrogen inert to transform it into biologically useful nitrogen made available to plants. The product legumes are sources of vegetable protein are the by-products of the oil mill are used in many zones and the waste can also be recovered as fuel, animal bedding or organic fertilizer (MAEP, 2004). Some plants, such as soya bean, dominate the world market (RibieretRouzière, 2011). But there are a number of other legumes whose importance should not be neglected, such as cowpea and beans.

In collaboration with CIAT-PABRA (International Center for Tropical Agriculture - Pan Africa Bean Research Alliance), IRAD has launched work on these vegetables and has selected new varieties for each plant characterized by a cycle of vegetative courtyard and good yield (GLP 190) for beans, Lori for cowpea andGoinia for soya beans. These varieties were selected for our study. (IRAD 2013). The use of organic manure is associated with this work for the cultivation of these legumes;This fertilizerbrings nutrients and trace elements that can increase plant yields and improve productivity (Sequi 1990;Ciavatta et al., 1993). Thus, the objective of this work is to preserved food security and promote

the culture of soya bean, cowpea and beans which are foods widely grown and consumed in the world and Cameroon for their high protein. Specifically, our work is to determine the effect of organic manure on yield of soya bean, cowpeaand common bean in the locality of Bertoua and Ngaoundéré of Cameroon.

MATERIALS AND METHODS

Description of Experimental Zones

The field study took place in the years 2015 and 2016 in two agro-ecological zones of Cameroon: Sudano-Guinean and the Bimodal Forest climates in Adamawa and East regions respectively. In Sudano-Guinean zone, study was carried out at Bini-Dang locality in the experimental farm of Laboratory of Biodiversity and Sustainable Development of University of Ngaoundere Cameroon situated at 7°24'671'' North Latitude, 13° 34' 238'' East longitude and 1155.8 m Altitude. The vegetation of experimental zone was herbaceous savannah dominated by *Imperatacylindrica*and *Pennisetum purpureum*. There are some shrubs such as *Annona senegalensis*, *Hymenocardiaacida*and *Terminalia* spp. In the Bimodal Forest climate, the study was conducted in the locality called Birpondo situated at 4° 60'9'' North Latitude, 13°3'4'' East Longitude and 668 m Altitude. The experimental zone cultivated is herbaceous savannah dominated by *Imperatacylindrica*.

Seeds Sample and Fertilizer

The seeds of varietiesgoiania of soy bean,cowpea;fekem and common bean;GLP 190 are used for this work. These soya bean, cowpea and bean varieties used to have a short life cycle and a good seed yield (IRAD, 2013). It should be noted that the use of short-cycle food crops has an advantage for the farmer in that the farmer can have several harvests a year if he uses cultivation methods in the off-season. Cowpea,soya bean and common bean seeds are provided by IRAD in Garoua Cameroun.

Seeds of Soya Bean; Variety Goiania, Seeds of Common Bean, Variety GLP 190, Seeds of Cowpea & Variety Lori

Figure 1: Seeds of Seeds Used

Organic Manure

The composts used in this study are produced at the experimental composting unit of the Laboratory of Biodiversity and Sustainable Development located behind the deanship of the University of Ngaoundere. It is compost derived from cattle manure. The compost used as an amendment for this work consisted of compost made from cow dung and garbage. 50 g of this fertilizer was applied per hole, about 2,5 Kg/ha.

Composting on the First Day & Mature Compost

Figure 2: Compost Appearance at Different Stage Composting.

Experimental Design

A 2×2×2 experimental design with 02 experimental zones (East and Adamawa Cameroonian regions); two types of fertilizers (control and compost) and two seasons cropping years (2015 and 2016) with three replications was used.Cowpea, soya bean and common bean seeds was planted in six columns separated at 1 m space each (10,000 plants/ha). The experimental device consists of 2 to 3 m length and 20 m wide, an zone of 460 m^2. The experimental set-up is a completely randomized block comprising 6 treatments (3 control (soya bean, cowpea and common bean) and 3 with fertilizer (fertilizer-soya bean, fertilizer-cowpea and fertilizer-common bean) repeated 3 times in each of the studies zones. The experimental unit has 18 m^2 (6 m long x 3 m wide). The elementary plots are spaced 1 m. an experimental unit contains 55 plants arranged in 5 rows of seedlings. Each line comprises 11 plants. The gap between two successive plants on the same line is 0.5 m and the gap between two consecutive lines in a basic plot is 0.5 m (Figure 2).

Registered data and Statistical Analysis

Seedling emergence and survival plants rates were recorded at two weeks after sowing and flowering stage respectively. During the vegetative stage, plants height and number of leaves per plant were assessed at regular intervals of 14 days. At flowering stage dry biomass and stem diameter at collar were measured. At maturity, the number of bunches per plant, the number of fruits per bunch and the seeds yield (Kg/ha) were evaluated. 30 plants are sample. At maturity, seed yield was evaluated. The results are statistically analysed using the Statgraphic Plus version 5.0 program which performs the analysis of variance. Duncan test is used to judge the difference between the averages of treatments and the correlation test is used to study the relationship between the differentparameters.

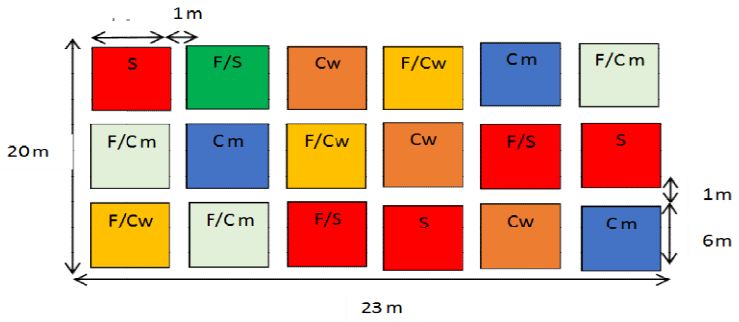


Figure 2: Experimental Plan.

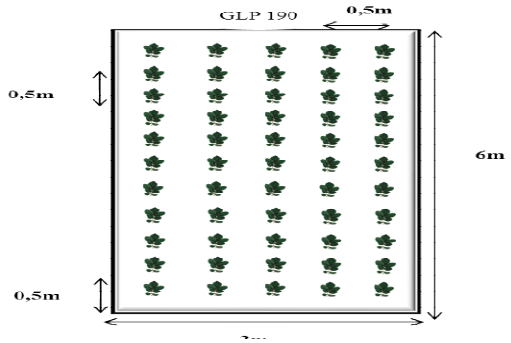


Figure 3: Plants inside the Experimental Unit.

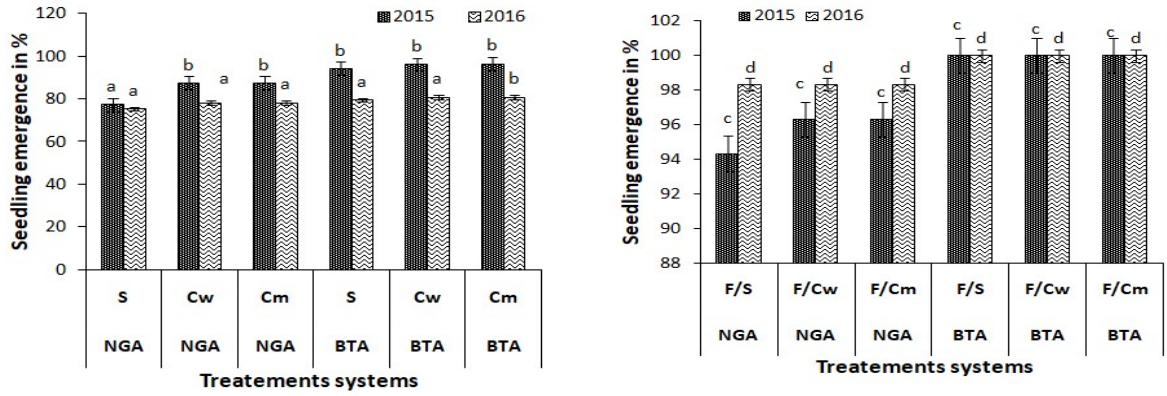
RESULTS AND DISCUSSIONS

Seedling Emergence Rate of Soya Bean, Cowpea and Common Bean

Raising the rate of legume plants are presented in Figure 4. It has there is a significant difference ($p < 0.05$) between the control and the manure organic on the emergence of legumes used in this work. In addition, the two study zones (Ngaoundere and Bertoua) and the year of experimentation significantly influence ($p < 0.05$) the emergence of legumes. In the control, the rate of emergence of legumes in the Ngaoundérézone varies from 77.33 to 87.5 in 2015 and 75.33 to 87.5 in 2016 in the Bertouazone of 94.33 at 96.5 in 2015 and 79.67 to 80.33 in 2016. For plants that received the organic fertilizer, the rate of emergence of legumes in the Ngaounderezone ranges from 94.33 to 96.33 in 2015 and 98.33 in 2016 in the Bertouazone of legume emergence is 100% in 2015 and 2016.

The results obtained on seedling emergence of legumes s used for this work are similar to data reported in the literature century. Indeed, the work of Monteiro (2008) in Niger and N'gbesso *et al*. (2013) in Côte d'Ivoire reveal that emergence of cowpea plants occurs between 3 and 7 days after sowing and that cowpea emergence rates vary from 83 to 100. In the present study, emergence of cowpea plants was observed from 5 days after sowing in each of the two study zones, suggesting that the two study zones in this work would not influence the emergence time of the plants. The cowpea seedlings. Also, on the emergence of common bean plants. Pamo *et al*. (2005) in western Cameroon and Cubaka(1995) in Rwanda reports that bean emergence occurs between 6 and 14 DAS with emergence ranging from 79 to 82%. In this study the emergence of beans is observed from 7 years ago. In addition, Prieur and Laffont(2008) and Prior and Stairs (2014) in France; report that the emergence of soya bean is 7 DAS and varies between 70 and 90% depending on the variety.

In this study, the Sudano-Guinean climate of the Adamaoua Cameroon region is more favourableto the emergence of leguminous seedlings compared to Bertoua. This suggests that legumes would develop better in different climatic and edaphic conditions. Moreover, the significant influence ($p < 0.05$) of organic manure on the emergence of leguminous seedlings, soya bean, cowpeas and beans, will be justified by the sufficient intake of this fertilizer in mineral elements to increase the rate seedling inoculated against the control.



Control & Compost

Figure 4: Emergence Rate of Legumes.

Effect of Organic Fertilizer on Growing Parameters of Legumes

Table 3 represents the height and the number of leaves of legumes seedlings as a function of time, cropping systems and the experimental zone. These figures show that there is a significant difference ($p < 0.05$) between the control and the organic fertilizer, on the one hand,and, on the other hand, between the two study zones and the year of study on the studied growth parameters (size and number of leaves of soya bean, cowpea and common bean) at 56 days after sowing (DAS). However, the difference begins to be significant ($p < 0.05$) between the different cropping systems and the two study zones on leguminous growth from 70 DAS. Overall, the curve expressing leguminous growth parameters as a function of time has the appearance of a sigmoidal curve Growth grows slowly during the first 70 years, after which this growth exponentially increases between 70 and 175 DAS and becomes slow with time beyond that date in each of the two study zones. (Tayeb, 2011) reports that organ growth is the result of increasing the number of cells that make it up and the size of individual cells. Cellular growth generally has an exponential and sigmoidal appearance.

Effect of Organic Fertilizer Systems on the Height and Number of Leaves of Legumes

Table 1 shows the growth parameters (size and number of leaves) of soya bean, cowpea and bean at maturity at 98 days after planting (DAS), depending on the cropping systems, the study zone and in the year of experimentation. In general, it appears from this table that there is a significant difference ($p < 0.05$) between legumes in combination with organic manure and control on leaf size and number in this work. In addition, the zone significantly influenced ($p < 0.05$) the size and number of leaves of the legumes for control. In this study, the size and the number of sheets in legumes vary respectively the witness 26.3 7±0.33 at 30.58±0, 33 cm and 29.54±0.28 to 59.12±0.27 in 2015 and 25.23±0.33 at 30.58±0.3 3 cm and 28.61±1.04 at 54.27±0.17 in 2016. In the zone of Bertoua of 30.57±0.29 to 34.52±1.19 cm and 34.13±0.27 to 59.12±0.27 in 2015 and 27.27± 0.37 to 32.13±0.23 cm and 28.67± 0.41 to 57.33 ± 0.27 in 2016. For plants that received the organic fertilizer, the rate of emergence of legumes in the Ngaounderezone ranged from 34.12±0.17 to 35.32±0.19 cm and 31.27±0.17 to 63.47±0.17 in 2015 and 37.73±0.33 to August 3.87±0.33 cm and 36.33±0.27 to 69.33±0.14 in 201 6 in the Bertouazone from 34.12 ± 0.17 to 35.32 ± 0.19 cm and 34.13 ± 0.27 to 67.43±1.33 in 2015 and from 39.72 ± 1.19 to 39.92 ± 0.17 cm and 36.33±0.27 to 69.33 ± 0.14 in 2016 (Table 1). In this study, the size and number of leaves of soya bean, cowpea andcommon bean are higher in theorganic fertilizer system thanunfertlized.

The results obtained in this study on growth parameters (size and number of leaves) of cowpea at 112 DAS corroborate the work of (Taffouo *et al.*, 2008) in Douala, Cameroon who reports that the size and number of leaves of cowpea maturityvary respectively 32.18 to 110.7 cm e t of 19.5 to 115.85. Haro *et al.*(2015) in Burkina Faso, report that the size of cowpea plants varies from 12 5 to 13.4 cm. In addition, the work of (Megueni *et al.*, 2011) in the Adamawa Cameroon report that the number of leaves of mature cowpea seedlings varies between 15 and 25. Also the work (Mazollier *et al.,*2010) in France show that the size of the common bean fields to maturity between 21 and 220 cm. The data obtained on the number of leaves of common bean plants at 98 JAS are consistent with those of Pamo *et al*.(2005) who report that the number of leaves of this plant varies from 2.77 to 12.53. Similarly (Cubaka, 1995) reports that the number of bean leaves varies from 9 to 15. Furthermore, the results obtained are the size of the soya bean plants in the two study zones are lower than the work of (Prieur and Laffont, 2008) and (Prieur and Escalier, 2014). report that the size of mature soya bean plants varies between 60 and 105 cm. Also,Kasongo et al. (2015) in Congo report that the number of leaves of mature soya bean plants varies between 17 and 23 leaves per plant.

Table 1 shows S unfertlized soya bean; Cw: unfertlized cowpea; Cm: unfertlized common bean C/F: organic fertilizer-soya beans; F/Cw: organiquefertiliser-cowpea; F/Cm: organic fertilizer-common beans; NGA: Ngaoundéré zone; BTA: Bertoua zone.

The values ofbands followed bythe same letter are not significantly different ($p< 0.05$).

Table 1: Plant Height and Number of Leaves per Plant at 98 Days After Sowing (DAS)

Parameters	Treatments Systems	S	F/S	Cw	F/Cw	Cm	F/Cm
	Zones			**2015**			
Plant height	BTA	31.03±0.^{b}	36.72±0.2^{c}	34.52±1.1^{b}	37.83±0.1^{c}	30.57±0.2^{b}	36.78±0.2^{c}
	NDE	27.03±0.^{a}	34.92±0.^{c}	30.58±0.3^{a}	35.32±0.1^{b}	26.37±0.3^{a}	34.12±0.1^{c}
Number of Leaves	BTA	34.23±0.^{b}	37.54±0.^{d}	59.12±0.27^{b}	67.43±1.33^{d}	29.54±0.28^{b}	34.13±0.27^{c}
	NDE	29.92±1.^{a}	33.61±1.^{b}	54.27±0.17^{a}	63.47±0.17^{c}	28.61±1.04^{a}	31.27±0.1^{b}
Parameters	**Treatments Systems**	**S**	**F/S**	**Cw**	**F/Cw**	**Cm**	**F/Cm**
				2016			
Plant Height	BTA	29.19±0.3^{b}	39.88±0.3^{d}	32.13±0.2^{b}	39.92±0.7^{b}	27.27±0.3^{d}	39.72±1.1^{d}
	NDE	25.64±0.3 ^{a}	37.87±0.3^{c}	28.27±0.1^{a}	38.87±0.7^{b}	25.23±0.3^{c}	37.73±0.3^{c}
Number of Leaves	BTA	31.67±0.^{b}	38.33±0.^{d}	57.33±0.2^{b}	69.33±0.4^{c}	28.67±0.4^{b}	36.33±0.2^{d}
	NDE	30.36±1.4^{a}	37.67±1.^{c}	57.67±0.1^{a}	68.33±0.^{c}	27.67±1.4^{a}	33.88±0.1^{b}

Effect of Organic Fertilizer is Yielding and are Related Traits of Leguminous.

The Table 2 represent respectively the production parameter number of pods developed per plant, seed numbers per pod, and seeds yield of soya bean, cowpea and bean plants at maturity 112 days after sowing. It is a significant difference ($p <0.05$) between the fertilizer and the control, the Bertouazone and the zone from Ngaoundéré and two years of study in the number of pods per plant, the number of root nodules and grain yield at the soya bean, cowpeas and common bean.

In the present study the dry biomass pulses varies with the control, in Ngaoundérézone ranges from 6.33 ± 0.27 to 7.27 ± 0.17 g in 2015 and 5.23 ± 0.33 to 6.58 ± 0.33 g in 2016. In the Bertouazone from 7.16 ± 0.29 to 9.13 ± 0.23 g in 2015 and from 6.19 ± 0.33 to 8.52 ± 1.19 g in 2016. For plants that received the organic fertilizer, dry biomass pulses in Ngaoundérézone ranges from 6.12 ± 0.33 to 8.32 ± 0.19 g in 2015 and 6.67 ± 0.33 at 8.87 ± 0.17 g in 2016. D in the

Bertouazone from 7.27 ± 0.29 to 9.83 ± 0.19 g in 2015 and from 7.72 ± 1.19 to 10.84 ± 0.17 g in 2016 (Table 2). There is a positive and significant correlation ($r = 0.80$; $p < 0.05$) ($r = 0.71$; $p < 0.05$) ($r = 0.56$; $p < 0.05$) between dry biomass and seed yield respectively for soya bean, cowpea and bean.

The results of the dry biomass of cowpea plants obtained s in both zones corroborate those of (Konate et al., 2012) in Ivory Coast and Diop et al. (2012) e in Senegal and Haro et al. (2015) who report that the dry biomass of cowpea plants at maturity varies between 2 and 5 g. Also, Zaman et al. (2009) in Niger, report that the biomass of beans varies around 2 and 3 g. furthermore Konate et al. (2012) report that the biomass of mature soya bean plants ranges from 2 to 8 g.

The number of our brows go through years of legume plant study varies in control, in Ngaoundérézonesof 7.67 ± 0.17 to 70.66 ± 0.33 2015 6.27 ± 0.13 and 59.33 ± 0.27 in 2016. In the Bertouazone from 8.13 ± 0.27 to 74.66 ± 0.13 in 2015 and from 7.72 ± 0.27 to 63.33 ± 0, 27 in 2016. For crops that have received organic fertilizer, the e number of pods per plant of legumes in the Ngaounderezone ranged from 7.37 ± 0.29 to 67.67 ± 0.17 in 2015 and of 9.72 ± 1.33 to 75.67 ± 0.13 in 16. In the Bertouazone of 9. 37 ± 0.17 to 78.13 ± 0.27 in 2015 and 12.92 ± 1, 33 to 79.97 ± 0.27 in 2016 (Table 2). There is a positive and significant correlation ($r = 0.55$; $p < 0.05$) ($r = 0.56$; $p < 0.05$) ($r = 0.78$; $p < 0.05$) between the number of seeds and seed yield respectively for soya bean, cowpea andcommon beans.

These results on the number of our brows go by cowpea plants obtained in this study corroborate those of Ben (1991) in Tunisia Yoka et al. (2014) (N'gbesso et al., 2013) who report that the number of pods per mature cowpea plant varies from 8 to 86. Also, Pamo et al. (2005) report that the number of cloves of common beans varies around 5 and 9 depending on the inoculum used. In addition, Chataignon and Arjauré(2014), in France, Konate et al. (2012), Prieur and Laffont (2008) and Prieur and Escalier (2014) report that the average number of pods per mature soya bean plant varies between 13 and 98 depending on the variety.

The number of seeds per pods the years of this study legumes does not vary significantly ($p > 0.05$) according to the fertilizer, the study zone and the year of experimentation. The number of seeds per pod of legumes in this study was 2.67 ± 0.33 to 7.67 ± 0.27 (Table 2).

The results on the number of seeds per pod s cowpeas obtained corroborate those of Ben (1991) Yoka et al. (2014) and N'gbesso et al. (2013) c e s authors report that the number seeds per pod cowpea maturity ranges from 7 to 12. Further,Pamo et al. (2005), report that the number of seeds per common bean pod varies from 2.44 to 2.46. Chataignon and Arjauré (2014), Prieur and Laffont.(2008) and Prieur et Escalier(2014) report that the average number of seeds per soya bean pod at maturity varies between 2 and 3 seeds.

In this study, the seed pulses varyin control, in the zone of Ngaoundéré 119.1 ± 0.13 to 123.1 ± 1.33 Kg / ha in 2015 and 115.17 ± 0.13 to 117.21 ± 0.13 Kg / ha in 2016. In the Bertouazone from 138.85 ± 0.17 to 146.88 ± 0, 27 Kg / ha ha in 2015 and from 119.85 ± 0.17 to 140.84 ± 1.33 Kg / ha in 2016. For crops that received the organic fertilizer, the legume yield of legumes in the Ngaoundérézone varies from 123.1 ± 0.27 to 150.28 ± 0.19 Kg / ha in 2015 and from 138.92 ± 1.33 to 158.62 ± 0.27 Kg / ha in 2016. In the Bertouazone of 150, 74 ± 0.27 to 158.92 ± 0.17 in 2015 and from168.88 ± 0.27 to 178.78 ± 1.9 7 kg / ha in 2016 (Table 2).

The results on the yield of cowpea seeds obtained in this study are low compared to those of Lawane et al. (2010) in Ndjamena in Chad, Ben (1991) in Tunisia (Taffouo et al. (2008) and N'gbesso et al. (2013) who report that the yield of

mature cowpeas varies from 1000 kg / ha to 12 t / ha. In addition, Pamo et al., (2005) Djeugap et al. (2014) and Mazollier et al. (2010) in France report that seed yield of field beans varies from 987 kg / ha to 0.75 t / ha depended on the inoculum used. In addition, Kasongoet al. (2015), Prieur and Laffont (2008) and (Prieur and Escalier, 2014) reported that the yield of soya bean seeds ranges from 2.5t / ha to 40 t / ha depending on the variety.

Table 3 shows S unfertlized soya bean; Cw: unfertlized cowpea; Cm: unfertlized common bean C/F: organic fertilizer-soya beans; F/Cw: organiquefertiliser-cowpea; F/Cm: organic fertilizer-common beans; NGA: Ngaoundéré zone; BTA: Bertoua zone.

The values of bands followed by the same letter are not significantly different ($p< 0.05$).

These results show that the organic manure, the two study zones, and the year of experimentation significantly ($p <0.05$) influence some morphological parameters and the seed yield of the legumes studied. This is in line with the work of Derogoh et al. (2018), which report soya bean, cowpea, and common bean yields vary by genotype, study zone, and years of experimentation. In this study, legumes studied develop betterproduce more under the climate of the zone of Bertoua than Ngaoundéré. This may explain the best results on grain yield of legumes obtained in the Bertouazone. This observed difference in productivity in both study zones is explained by the fact that both zones carry different climatic and soil characteristics (Derogoh et al., 2018; Derogoh et al., 2019). It has also been proved in this study that the Bertouazone is ideally suited to growing soya bean, cowpea and common beans because of its soil and its more favourable climate. According to (Gerbeaud, 2017) the sandy soil is the ground ideal for growing leguminous. In addition, the influence of organic fertilizer on the growth and productivity changes of these pulses, may be explained by the fact that the intake fertilizer e in the soil, quantities of nitrogen and mineral elements necessary for the growth of our corps. According to Mason (1991), organic manure helps to enrich the soil by adding organic matter and nutrients. They consist of various substances: nitrogen, phosphorus, potassium, calcium, sodium, sulphur, lead, chloride, carbon and various types of bacteria. Manure is an excellent fast-acting fertilizer. Good cultural practice through the provision of this fertilizer, improves soil fertility in a sustainable way Ciavatta et al. (1993). In addition,Sequi (1990), organic manure is a nutrient and micronutrient input that stabilizes the soil pH, increases its organic matter content, improves its structure and its ability to retain moisture, which increases crop yields. Thus, we can say that the contribution of organic manure improves growth and increases in productivity, of soya bean, cowpea and common beans.

Table 2: Yield Related Traits of Soya Bean, Cowpea and Common Bean

Parameters	Treatments Systems	S	F/S	Cw	F/Cw	Cm	F/Cm
	Zones			**2015**			
Number of Root Nodules	BTA	33.67±0.41^{b}	43.54±0.28^{c}	121.33±0.27^{b}	137.43±1.33^{d}	23.67±0.41^{a}	34.13±0.27^{b}
	NDE	27.36±1.04^{a}	34.61±1.04^{b}	92.67±0.13^{a}	127.47±0.17^{c}	19.67±1.04^{a}	23.27±0.17^{b}
Dry Biomass	BTA	7.16±0.29^{a}	7.27±0.29^{b}	9.13±0.23^{a}	9.83±0.19^{b}	7.57±0.29^{a}	9.23±0.23^{a}
	NDE	6.33±0.27^{a}	6.12±0.33^{b}	7.27±0.17^{a}	8.32±0.19^{b}	6.37±0.33^{a}	8.27±0.17^{a}
Cloves by Plant	BTA	74.66±0.13^{b}	78.13±0.27^{d}	64.33±1.33^{b}	67.16±0.17^{d}	8.13±0.27^{a}	9.37±0.17^{a}
	NDE	70.66±0.33^{a}	67.67±0.17^{c}	58.72±1.33^{a}	62.16±0.13^{c}	7.67±0.17^{a}	7.37±0.29^{a}
Seeds by Clove	BTA	2.67±0.33^{a}	2.67±0.27^{b}	7.67±0.27^{a}	7.67±0.17^{a}	3.67±0.23^{a}	3.67±0.27^{a}
	NDE	2.33±0.17^{a}	2.67±0.17^{b}	7.63±0.33^{a}	7.67±0.33^{a}	3.63±0.17^{a}	3.67±0.33^{a}

Seeds Yield (t/ha)	BTA	138.85±0.17 a	158.92±0.17 b	146.88±0.27 a	158.74±0.21 b	146.54±1.33 b	150.74±0.27 d
	NDE	119.12±0.13 a	123.14±0.27 b	119.12±0.13 a	150.28±0.19 a	123.14±1.33 a	138.72±0.33 c

Table 3

Parameters	Treatments Systems	S	F/S	Cw	F/Cw	Cm	F/Cm
				2016			
Number of Root Nodules	BTA	27.23±0.28 b	47.33±0.21 d	117.12±0.27 b	148.67±0.14 d	19.54±0.28 b	39.33±0.27 d
	NDE	22.92±1.04 a	39.67±1.04 c	88.27±0.17 a	133.33±0.19 c	14.61±1.04 a	27.27±0.19 c
Dry Biomass	BTA	6.19±0.33 a	8.92±0.33 a	8.52±1.19 a	10.84±0.17 a	6.27±0.37 a	7.72±1.19 a
	NDE	5.23±0.33 a	6.87±0.33 a	6.58±0.33 a	8.87±0.17 a	5.64±0.33 a	6.67±0.33 a
Cloves by Plant	BTA	63.33±0.27 a	79.97±0.27 d	70.37±0.17 b	78.72±0.33 d	7.72±0.27 a	12.92±1.33 a
	NDE	59.33±0.27 b	75.67±0.13 c	57.37±0.29 a	65.97±0.23 c	6.27±0.13 a	9.72±1.33 a
Seeds by Clove	BTA	2.33±0.33 a	2.67±0.27 a	7.33±0.27 a	7.67±0.17 a	3.33±0.23 a	3.67±0.27 a
	NDE	2.33±0.17 a	2.67±0.17 a	7.33±0.33 a	7.67±0.33 a	3.33±0.17 a	3.67±0.33 a
Seedsb Yield (t/ha)	BTA	119.85±0.17 b	178.74±1.33 c	138.54±0.27 b	178.78±1.97 d	140.84±1.33 b	168.88±0.27 c
	NDE	115.17±0.13 a	138.92±1.33 b	117.21±0.13 a	158.62±0.27 c	117.12±1.33 a	148.77±0.13 b

CONCLUSIONS

This work under Bertoua and Ngoundere Cameroon in 2015 and 2016 was our aim of studying the effect of composton the productivity of three legumes (soya bean, cowpea and common bean), in order to promote these plants in Cameroon; show that in each of the two study zones, the productivity of the plants studied is higher in 2015 than in 2016, varied according to fertilizer, experimental zoneand experimentation year. The percentage of increase in average seed yield in the fertilizer-soya bean, fertilizer-cowpea and fertilizer-common bean systems during the two years of study compared to the control treatments wererespectively; 89,81, 76.57 and 83.74% under Ngaoundéré climate and 77,21, 85.01 and 90.30% in the Bimodal Forest zone of Cameroon. The Sudan-Guinean zone of Cameroon is more favourableto the cultivation of the beaver of all the vegetables studied in the climate of the Bimodal Forest of East Cameroon. Compost better improved leguminous bean productivity, Sudano-Guinean climate of Adamawa Cameroon better improved leguminous growth.

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