Eurasian Journal of Soil Science 2023, 12(2), 159 - 168

Eurasian Journal of Soil Science

Journal homepage : http://ejss.fesss.org

Soil properties and growth of yellow bell pepper (*Capsicum annum*) as influenced by compost and arbuscular mycorrhizal fungi

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Article Info

Received : 07.12.2021
Accepted : 06.12.2022
Available online : 15.12.2022

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Abstract

Compost is an inexpensive agricultural waste which improves soil health and quality. The experiment was carried out to assess the influence of compost and mycorrhizal inoculation (*Glomus mosseae)* on soil properties and growth of yellow bell pepper in pots under screen house conditions, in a completely randomized design with three replicates. The treatments included mycorrhizal inoculation only (C0M1), compost at 20 t ha^{-1} only (C1M0), compost at 30 t ha^{-1} only (C2M0), compost and mycorrhizal inoculation at 20 t ha^{-1} (C1M1), compost and mycorrhizal inoculation at 30 t ha^{-1} (C2M1) and control (no amendment / uninoculated). Compost and mycorrhizal inoculation (C1M1 and C2M1) significantly improved soil N, P and K compared to control. Inoculation with mycorrhizal only (C0M1) increased uptake of N, P, K, Ca and Mg compared to uninoculated. Co-utilization of compost and mycorrhizal inoculation significantly increased root and shoot dry biomass compared to uninoculated. The highest fruit yield was obtained at C2M1 followed by C1M1 in comparison to compost application only. Treatment C2M1 recorded the highest prevalence of percent root colonization. This suggests that compost and *Glomus mossea* could be considered to have a sustainable potential for better growth and yield performance in the production of yellow bell pepper in an Alfisol.

Keywords: Arbuscular mycorrhizal fungi, compost, nutrient uptake, soil fertility, soil nutrient.

Introduction

Many agricultural lands require an intervention strategy to improve the nutrients contents of the soil. The organically managed soil systems in the tropics are increasingly utilized to combat constraint to food security (Chukwuka and Omotayo, 2009). Major factors that constrain agricultural soil fertility are caused by excessive erosion, nutrient run-off, loss of organic matter and low soil biodiversity (Santos et al., 2011). Compost, an effective organic fertilizer produced from organic waste biomasses (Patchaye et al., 2018). The use of organic biomass as soil conditioner is now rapidly gaining importance in tropical agriculture as it promotes soil physical, chemical and biological properties (Zong et al., 2010; Gautam and Pathak, 2014). Furthermore, evidence suggest that application of compost to soil increase soil organic matter, promotes soil fertility and activities of soil microbial communities (González et al., 2010; Carlson et al., 2015; Cozzolino et al., 2016). The application of compost resulted to increased soil available macro and micro nutrients that stimulates microorganism development in soils (Biala, 2000); moreover, compost significantly increases crop growth and activities of soil microorganisms (Gosling et al., 2006; Weber et al., 2007). Compost is a potential habitat for arbuscular mycorrhizal fungi (AMF) functionality (Warnock et al., 2010). Arbuscular mycorrhizal fungus is important in sustainable agriculture since mycorrhizal association hastens nutrient acquisition for crop growth and development (Hu et al., 2009; Smith et al., 2015). According to Hodge and Fitter (2010), the co-

: https://doi.org/10.18393/ejss.1219669
: http://ejss.fesss.org/10.18393/ejss.1219669
Publisher : Federation of Eurasian Soil Science Societies
e-ISSN : 2147-4249

amendment of compost and mycorrhizal inoculation increased crop growth better than either sole amendment due to arbuscular mycorrhizal fungi ability to exploits nutrients released by mineralization of organic matter. One of the benefits derived by host of arbuscular mycorrhizal fungi is that it enhances the absorption of soil mineral nutrients, which includes the major and micro nutrients (Linderman, 1992; Perner et al., 2007). The availability of these nutrients is usually affected by soil property, climate and crop type (Cely et al., 2016). Phosphorus has been described in literature as poorly accessible plant nutrient because of its immobility in soils (Smith and Read, 2008; Neumann and George, 2010). Evidence by research has confirmed AM fungi provides multifunctional benefits to soil by improving aggregate stability, creating more resistance to water stress and diseases which mostly depends on origin and species compatibility (Jung et al., 2012; Verbruggen et al., 2013). Horticultural crop such as yellow bell pepper is one of the major components of traditional food in Nigeria. It is known to be rich in vitamins and minerals (Malik et al., 2011) and play significant roles in disease prevention including diabetes, fever, heart and cancerous diseases (Serpeloni et al., 2015; Shahidi and Ambigaipalan, 2015). They are commercially produced due to its high demand and value which is mostly nutritive and medicinal purpose (Tanwar et al., 2021). However, yield and fruit quality are affected by a number of environmental factors such as type of soil, chemical fertilizer, pests and diseases (López et al., 2014). There is need to meet rising demands by adopting sustainable practices to assist in improving the soil, increasing crop growth and enhance mineral nutrient uptake. Several authors reported positive outcome of utilizing arbuscular mycorrhizal fungi on horticultural crops most especially *Glomus species* (Tanwar et al., 2011; Krüger et al., 2012). *Glomus mosseae* is known to provide specific benefits with horticultural crops by improving fruit yield and quality (Franco et al., 2013). It can facilitate uptake of mineral nutrients, promote growth and develop symbiotic association in rhizospheric region of pepper plants (Nadeem et al., 2014; Rouphael et al., 2015; Smith et al., 2015). Therefore, the objective of this study is to evaluate the effect of compost and *Glomus mosseae* inoculation on improving soil fertility, growth and yield of yellow bell pepper.

Material and Methods

Experimental site and design

The experiment was performed at the screen house of the Department of Agronomy University of Ibadan Nigeria (7°24'N; 3°48'E) between June and August, 2020. Soil samples were collected at 0-20 cm depth at Teaching and Research farm and transported in plastic bags to the screen house. A completely randomized design with three replicates involving yellow bell pepper (*Capsicum annum* L) at two seedlings per pot, and two treatment factors: compost and mycorrhizal inoculation. Three levels of compost applied in this study: 0, 20 and 30 t ha^{-1} (equivalent to 0, 50 and 75 g compost per pot); two rates of mycorrhizal inoculation at 0 and 20 gram per pot and each treatment with 5 kg soil per pot.

Soil and plant analysis

Soil pH in water measured using pH meter. The particle size analysis was carried out by Gee and Or (2002) indicating loamy sand texture and classified as an Alfisol according to US soil taxonomy, total nitrogen by Kjeldahl method (Bremmer, 1996) and organic carbon was determined by Walkley–Black method (Nelson and Sommers, 1996). Available phosphorus was by Bray extraction method (Frank et al., 1998). The Exchangeable bases K^+, Ca^{2+} and Mg^{2+} was extracted using 1N ammonium acetate, where K^+ was determined by flame photometer and Ca^{2+} and Mg^{2+} were determined by atomic absorption spectrophotometer (Okalebo et al., 2002). Plant samples were oven-dried (70^{0}C) and milled. Then, digested milled samples were used to determine N content by Kjeldahl method (Bremmer, 1996). The samples were dry ashed in a furnace (500^{0}C for 6 h) and extracted using nitric-perchloric-sulfuric acid mixture which was used to detect phosphorus (P), potassium (K), calcium (Ca) and magnesium (Mg) according to Tel and Hagarty (1984). Afterwards, P was finally determined by vanadomolybdate colorimetry method, K by flame photometer while a method of titration (EDTA) was used to determine Ca and Mg (AOAC, 2005).

Plant, compost and mycorrhizal treatment

The pepper seedlings used in this study was yellow bell pepper (*Capsicum annum* L.) collected from Institute of Agriculture and Research Training Ibadan Nigeria. Animal waste compost was collected from Organic farm of the Federal University of Agriculture Abeokuta Nigeria. Arbuscular mycorrhizal fungi (*Glomus mosseae*) inoculum was originally and commercially obtained from Biocult Pty Limited, South Africa and collected from soil microbiology laboratory of Department of Agronomy, University of Ibadan Nigeria. It was multiplied in pot cultures using maize as host plant. The inoculum was applied to the third central part of the soil a day before transplanting yellow bell pepper seedlings (Ubah et al., 2012). Percent root colonization was done by observing stained roots under a dissected microscope (Giovannetti and Mosse, 1980).

Table 1. Soil physical and chemical characteristics and nutrient composition of compost

Parameters	Units	Soil		Units	Compost
pH(H_2O)		7.40	pH		8.03
TN	g kg^{-1}	0.42	TN	%	0.86
AP	mg kg^{-1}	7.23	AP	%	1.46
OC	g kg^{-1}	6.20	OC	%	20.70
K^+	cmol kg^{-1}	2.00	K	%	1.22
Ca^{2+}	cmol kg^{-1}	7.80	Ca	%	0.32
Mg^{2+}	cmol kg^{-1}	2.80	Mg	%	0.54
Particle Size Distribution					
Sand	%	73.80			
Silt	%	26.10			
Clay	%	2.00			
Textural Class		Loamy Sand			

TN = Total nitrogen, AP =Available phosphorus, OC=Organic carbon

Statistical analysis

The results of this experiment were obtained by one-way ANOVA using SPSS v 19.0. Differences were separated by Duncan Multiple Range Test (DMRT) at significance level of 0.05. All data presented are means of three replicates.

Results

Effect of compost and AMF on nutrient concentration

The effect of compost with or without AMF inoculation on the improvement of soil nutrients is shown in Table 2. The AMF inoculation only (C0M1) led to 29.1 % increase in total nitrogen (TN) concentration compare to control. Compost and AMF inoculation (C1M1) at 20 t ha^{-1} significantly increase (3.49 %) compared to C1M0 (compost application only) and control. Similarly, compost and AMF inoculation at 30 t ha^{-1} (C2M1) was higher by 3.92 % compare to compost application only (C2M0) and significantly higher than control (C0M0). Soil Ca content increased with or without AMF inoculation. Treatment with AMF inoculation only (C0M1) significantly increase compare to control. Both levels of compost and AMF inoculation (C1M1 and C2M1) were higher by 4.28 % and 3.57 % when compared to C1M0 and C2M0 respectively. Mg concentration showed AMF inoculation only (C0M1) increase by 6.95 % compare to control. C1M1 treatment at 20 t ha^{-1} was higher by 4.83 % when compared to compost application only (C1M0). Compost and AMF inoculation (C2M1) significantly increase compare to C2M0 at 30 t ha^{-1} and control. Application of compost with or without AMF inoculation influenced changes in K concentration. C0M1 increased by 7.63 % compare to control. Treatment C1M1 at 20 t ha^{-1} led to significant increase compare to compost application only (C1M0). The application of compost in combination with AMF inoculation (C2M1) showed no significant difference compare to C2M0. AMF inoculation only (C0M1) showed no significant effect compare to control in soil organic carbon (Figure 1). Compost and AMF inoculation at 20 t ha^{-1} was significantly higher by 5.23 % compared to the application of compost only (C1M0). Similarly, C2M1 significantly increase compare to compost application only and control. Available P showed significant differences (Figure 2). AMF inoculation only (C0M1) was higher by 28.67 % compared to control. Compost and AMF inoculation at 20 t ha^{-1} significantly increase compare to C1M0 and control. Similarly, C2M1 treatment at 30 t ha^{-1} significantly increase compare C2M0 and control.

Table 2. Nutrient concentration in soil as affected by compost and AMF inoculation

	TN (g.kg^{-1})	Ca (cmol.kg^{-1})	Mg (cmol.kg^{-1})	K (cmol.kg^{-1})
C0M0	0.95±0.06d	1.13±0.01d	1.07±0.01d	1.09±0.01e
C0M1	1.34±0.04c	1.25±0.02c	1.15±0.01d	1.18±0.02d
C1M0	1.38±0.02bc	1.34±0.02c	1.38±0.02c	1.24±0.02c
C1M1	1.43±0.01abc	1.40±0.03b	1.45±0.03c	1.31±0.01b
C2M0	1.47±0.02ab	1.62±0.03a	1.62±0.04b	1.38±0.01a
C2M1	1.53±0.01a	1.68±0.02a	1.94±0.03a	1.40±0.02a

Mean ± SE of three replicates are shown; different letters on numerical values indicate significant differences ($p < 0.05$) along the columns. C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20tha^{-1} only; C2M0=compost at 30tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30tha^{-1}.

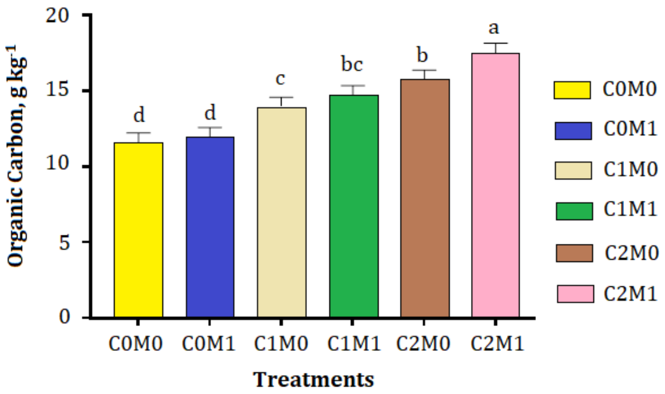

Figure 1. Organic carbon as affected by compost and AMF inoculation. Bars represent the mean ± SE of three replicates ($p < 0.05$). C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20 tha-1 only; C2M0=compost at 30 tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20 tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30 tha^{-1}.

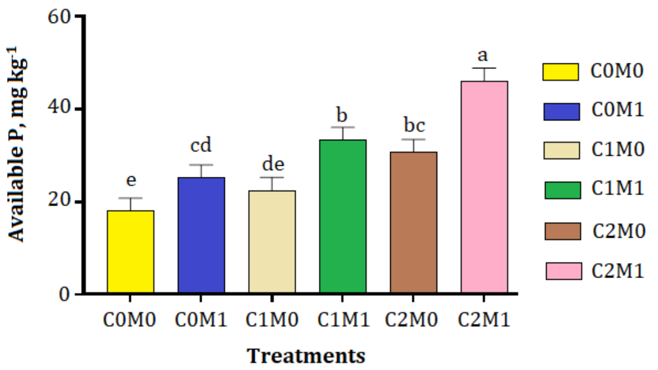

Figure 2. Available P as affected by compost and AMF inoculation. Bars represent the mean ± SE of three replicates ($p < 0.05$). C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20 tha^{-1} only; C2M0=compost at 30tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20 tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30 tha^{-1}.

Effect of compost and AMF on nutrient uptake

Table 3 presents trends of compost application with or without AMF inoculation in uptake of nutrients. AMF inoculation only (C0M1) significantly increased N uptake compared to control. Compost and AMF inoculation (C1M1) at 20 t ha^{-1} significantly increase compare to compost application only (C1M0) and control. Treatment C2M1 and C2M0 (30 t ha^{-1}) showed no significant difference but both significantly higher than control (C0M0) for N uptake. Treatment application significantly differs in P uptake as shown in Table 3. AMF inoculation (C0M1) significantly increase compared to control. The application of compost and AMF inoculation at 20 t ha^{-1} significantly increase compared to C1M0. Similarly, C2M1 was significantly higher compared to compost application only at 30 t ha^{-1}. Ca uptake showed AMF inoculation only (C0M1) significantly increase compare to control. Treatment C1M1 was higher by 11.1 % compare to compost application only (C1M0). However, C2M1 at 30 t ha^{-1} significantly increase compare to compost application only (C2M0) and control. Mg uptake indicated compost application with or without AMF inoculation at both levels was significantly higher than control except AMF inoculation only (C0M1). The treatment C1M1 and C2M1 were significantly higher by 14.8 % and 7.46 % compared to C1M0 and C2M0 respectively. K uptake showed AMF inoculation only (C0M1) was 13.3 % higher compared to control. C1M1 was significantly higher compare to compost application only at 20 t ha^{-1} (C1M0). Compost in combination with AMF inoculation at 30 t ha^{-1} was higher by 5.8 % compare to C2M0.

Table 3. Nutrient uptake as affected by compost and AMF inoculation

	N (gkg^{-1})	P (mg kg^{-1})	Ca (mg kg^{-1})	Mg (mg kg^{-1})	K (mg kg^{-1})
C0M0	0.10±0.01c	1.11±0.01f	0.11±0.01e	0.12±0.01d	0.26±0.02d
C0M1	0.13±0.01bc	1.22±0.01e	0.20±0.02d	0.18±0.01d	0.30±0.01d
C1M0	0.17±0.01b	1.36±0.02d	0.24±0.01cd	0.46±0.03c	0.38±0.02c
C1M1	0.25±0.02a	1.56±0.02c	0.27±0.01c	0.54±0.04b	0.46±0.02b
C2M0	0.26±0.01a	1.66±0.02b	0.35±0.02b	0.62±0.02a	0.48±0.02ab
C2M1	0.27±0.01a	1.72±0.12a	0.47±0.03a	0.67±0.02a	0.51±0.01a

Mean ± SE of three replicates are shown; different letters on numerical values indicate significant differences ($p < 0.05$) along the columns. C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20tha^{-1} only; C2M0=compost at 30tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30tha^{-1}.

Effect of compost and AMF on vegetative growth and percent root colonization

As shown in Table 4, the plant height basically increased after soil amendment. AMF inoculation (C0M1) significantly increase compare to control. Application of compost at 20 and 30 t ha^{-1} increase by 7.65 % and 7.83 % compared to compost and AMF inoculation respectively. Treatment with AMF inoculation showed no significant difference compare to control in stem diameter. The application of compost in combination with AMF inoculation (C1M1) was higher by 18.03 % compare to compost application only. Similarly, compost and AMF inoculation at 30 t ha^{-1} increase by 13 % compared to C2M0. Root dry biomass for AMF inoculation (C0M1) was significantly higher compared to control. Compost and AMF inoculation at 20 and 30 t ha^{-1} increased by 5.69 % and 6.08 % compare to compost application only. Shoot dry biomass revealed significant differences of treatment application. Inoculation with AMF only (C0M1) was significantly higher compared to control. Compost in combination with AMF inoculation at 20 and 30 t ha^{-1} significantly increase compare to C1M0 and C2M0 respectively. Significant increases in fruit yield were recorded with compost and AMF inoculation in comparison to compost only. Compost and AMF inoculation (C2M1) at 30 t ha^{-1} significantly increased (8.17%) compared to compost application only (C2M0). Similarly, compost and AMF inoculation (C1M1) at 20 t ha^{-1} was significantly higher compared to compost application only (C1M0). Inoculation with AMF only (C0M1) significantly increased compared to control. Percentage root colonization is presented in Figure 3. AMF inoculation (C0M1) significantly increase compared to control. Treatment C1M1 at 20 t ha^{-1} significantly increase compared to compost application only and control. Similarly, compost and AMF inoculation (C2M1) significantly increase compared to compost application only (C2M0).

Table 4. Vegetative growth of pepper plant as affected by compost and AMF inoculation

	Plant Height (cm)	Stem Diameter (cm)	Root Dry Biomass (g/pot)	Shoot Dry Biomass (g/pot)	Fruit Yield (g/pot)
C0M0	12.83±0.57d	0.46±0.02b	0.67±0.03e	1.07±0.02f	0.71±0.31e
C0M1	16.03±0.42c	0.47±0.02b	1.04±0.02d	1.31±0.03e	2.37±0.05d
C1M0	17.90±0.12bc	0.50±0.03b	1.16±0.01c	2.14±0.02d	4.01±0.06c
C1M1	16.53±0.31bc	0.61±0.03ab	1.23±0.02c	2.23±0.01c	5.71±0.02b
C2M0	20.43±0.56a	0.60±0.01ab	1.39±0.02b	2.31±0.02b	5.84±0.19b
C2M1	18.83±0.24ab	0.69±0.01a	1.48±0.04a	2.40±0.01a	6.36±0.04a

Mean ± SE of three replicates are shown; different letters on numerical values indicate significant differences (⍰ < 0.05) along the columns. C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20tha^{-1} only; C2M0=compost at 30tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30tha^{-1}.

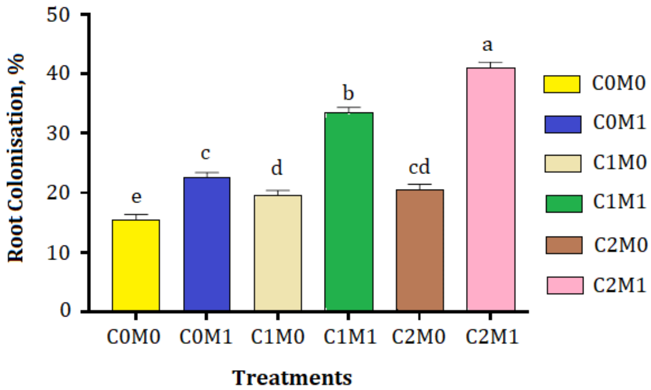

Figure 3. Percent root colonisaton as affected by compost and AMF inoculation. Bars represent the mean ± SE of three replicates (⍰ < 0.05). C0M0=control, C0M1= mycorrhizal inoculation at 20g only; C1M0= compost at 20 tha^{-1} only; C2M0=compost at 30 tha^{-1}only; C1M1=compost and mycorrhizal inoculation at 20 tha^{-1}; C2M1=compost and mycorrhizal inoculation at 30 tha^{-1}.

Discussion

We found evidence that in this study compost and AMF inoculation increase soil total N concentration. This result corresponds with that of Xu et al. (2015) who reported that AMF can access nitrogen from organic sources and also mineralization of compost in the soil help increase nitrogen content as declared by Aylaj et al. (2019). Astiko et al. (2013) argued that organic amendments with AMF inoculation increase soil N, P, K and organic carbon. It is important to note that AMF inoculation and organic amendment such as compost, manure, plant residue positively impact soil fertility status and biological activities (Warnock et al., 2007). The available P concentration in our study increased with compost and AMF inoculation compared to uninoculated. Ortas et al. (2012) reported that inoculation with mycorrhizal fungi increased phosphorus concentration compared to uninoculated plants which might be due to production of phosphatase enzyme. Also, Fischer and Glaser (2012) stated that organic additives contributed to increased concentration of phosphorus as a result of various nutrient releases such as nitrogen, phosphorus and potassium from compost application. In our study, the application of compost and AMF inoculation increased K concentration in the soil. This trend did not differ from Astiko et al. (2013) who reported organic amendment with AMF inoculation increased the concentration of K in the soil. In our study, compost and AMF inoculation significantly increase concentration of soil carbon. Quilliam et al. (2010) and Olsson et al. (2014) discovered that inoculation with symbiotic fungi aided nutrient exchange which promoted increase in soil carbon content. More so, incorporation of organic amendment will help improve the functions of AM fungi (Warnock et al., 2010) and increase soil N, P and K content as discussed by Demir and Gülser (2015). One of the most positive effects of mycorrhizal colonization is the increase in nutrient uptake. In this study, treatments showed significant increases in the nutrient uptake. The application of compost and AMF inoculation showed a positive response in N uptake. Earlier studies suggested that introduction of AM fungi enhanced the uptake of nitrogen (Hodge and Fitter, 2010; Whiteside et al., 2012). Mycorrhizal inoculated plants in combination with compost significantly influenced uptake of Ca, Mg and K. This conforms to Akande et al. (2018) who reported that AM fungi in combination with organic amendment increased Ca, Mg and K uptake. P uptake was promoted with compost and AMF inoculation in this study which was possibly due to phosphatase activity from external hyphal of AMF in rhizosphere (Widiastuti et al., 2003). It is ascertained that increased P uptake caused nutrients balance in plant and therefore promote uptake of other available soil nutrients (Boonlue et al., 2012). Furthermore, several mechanisms are responsible for increased P uptake, including soil exploration, absorption and release of phosphorus through fungal hyphae (Nazeri et al., 2014). Ortas (2012) proved that inoculation with arbuscular mycorrhizal fungi proved effective in soils with low phosphorus concentration than with higher content in a field research. In addition, compost in combination with AMF inoculation increased K uptake than uninoculated with compost. Perner et al. (2007) in earlier works concluded that arbuscular mycorrhizal fungi enhanced phosphorus and potassium uptake in pelargonium plant. The result of this study showed compost and AMF significantly contributed to increase in yellow bell pepper growth and yield compared to uninoculated. This affirms with Tanwar and Aggarwal (2013) who stated that inoculation with AMF especially *Glomus mosseae* promotes growth of red bell pepper due to its compatibility and ability to absorb nutrients from the soil. Also, Aminifard et al. (2013) in a research reported that *Capsicum species* exhibited rapid growth after incorporation of compost which might be related to the decomposition of compost materials and nitrogen mineralization. Furthermore, other authors reported that organic amendment and AMF relatively increased vegetative growth of tomato (Maaitah et al., 2014), red bell pepper (Tanwar et al., 2013b), green bell pepper (Tanwar et al., 2013a), Lentil (Hanif et al., 2013) and improved varieties of *Capsicum species* (Olawuyi et al., 2014). More so, improvement in plant growth might be attributed to supply of sufficient nutrients to soil and mutual connection of AMF and function in root zones as reported by Akyol et al. (2019). Another trending reason as stated by Tanwar et al. (2011) and Kim et al. (2010) is the ability of AMF to acquire and translocate nutrients via mycelia throughout the roots. In our study compost and AMF inoculation increased shoot and root dry biomass compared to uninoculated. This connotes the study of Olawuyi et al. (2014) who reported that organic amendment and AMF inoculation positively influenced shoot and root biomass of pepper plants in a field experiment. Çekic et al. (2012) stated that inoculation with *Glomus mosseae* significantly influenced shoot and root biomass yield of *Capsicum annuum* due to enhanced nutrient acquisition. An increase in biomass might be achieved through improved plant growth which suggests improved fresh shoot and root development (Tanwar et al., 2012). In addition, compost and AMF improved vegetative growth and yield of tomato and pepper plant as a result of symbiotic association between plant root and advanced uptake of mineral nutrients as investigated by Fawole et al. (2016) and Oni (2015). As documented in this study, AMF inoculated plants significantly increased root colonization compared to uninoculated. This relates to findings of other studies that AMF root colonization increased as a result of acquisition of phosphorus by the mycelia network of host root plant in the soil (Tanwar et al., 2014; Kim et al., 2017). Also, conforms to a report that increase in percent root colonization is as a result of increase in soil nitrogen content (Hodge and Fitter, 2010; Smith and Smith, 2011). Contrarily, a non-effective colonization has been attributed to increased level of phosphorus in the soil as stated by Prasad et al. (2012) and Naghashzadeh et al. (2013). The extent of development and colonization of fungi to roots is dependent of host plant, origin and strain of mycorrhiza as discussed by Mau et al. (2014) and Verbruggen et al. (2013). Yield is considered an important factor in production of horticultural crops. In this study, compost and AMF positively contributed to yield of yellow bell pepper of inoculated than uninoculated. This is relevant to findings of Copetta et al. (2011) who reported that green compost and AMF inoculation assisted in improving yield of tomato plants due to increased level of colonization and nutrients accumulation. AyanfeOluwa (2019) and Hossain et al. (2017) affirmed that utilization of compost and mycorrhizal inoculation enhanced growth and yield of horticultural crops by mutual association of AMF and steady release of nutrients from applied compost. Investigations from similar studies for Onion (Ortega-García et al., 2015), Celosia (Komolafe et al., 2021) and Okra (Kayode et al., 2018) have proven increase in crop growth and yield may be assigned to symbiotic associations of AMF and compost mineralization.

Conclusion

Short-term application of compost with and without mycorrhizal inoculation at transplanting enhanced plant growth, uptake of essential nutrient and improved soil productive capacity. The effect of combined application of compost and AMF inoculation positively influence macronutrients in the soil, plant growth, nutrient uptake and root colonization. Since compost is an organic amendment, combination with AMF could be a management strategy to improve soil productive quality. This could be recommended to farmers since it is environmental friendly and requires no specialized skill for its application. Therefore a long-term experiment should be conducted since longer time allows more decomposition of compost.

Acknowledgements

The authors acknowledge the Organic Agriculture Farm of the Federal University of Agriculture Abeokuta and Institute of Agricultural Research and Training Ibadan, Nigeria.

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