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Research Article

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The Effects of Long-Term Organic and Inorganic Fertilisation on Soybean Yield, Carbon and Nitrogen Content

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ABSTRACT
The soybean plant, with its high protein and oil content, plays a vital role in both human nutrition and animal feed, and is a strategic agricultural product, particularly due to its ability to fix nitrogen in the soil. The application of various long-term sources, such as mineral fertilisers, compost, manure, and mycorrhiza, plays a significant role in increasing soybean yield by directly affecting both the plant's productivity and carbon sequestration in the soil. The experiment was established in 1996 within the Soil Science and Plant Nutrition Research Area of the Research and Application Farm at Çukurova University's Faculty of Agriculture, utilising a randomised block design. The current research began with Soybean (*Glycine max* (L.) Merr.) cultivation in the 2022-2023 production year. Before cultivation, control, mineral fertilizer (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}) were applied. After harvest, different parts of the soybean were harvested. The nutrient content of different parts of the soybean plant was analyzed. Total, inorganic and organic carbon concentrations in the soil were investigated. Also, CO_2 fixation through photosynthesis was determined. The highest grain yield and total biomass were found in soybean plants treated with compost application. In general, compost, compost+mycorrhiza, and subsequently manure applications produced higher yields and biomass than mineral fertilizer and control plots in the soybean plant environment. Additionally, total carbon concentration and total CO_2 fixation in the soil were highest in the compost application. The total organic carbon (TOC) in the soil was highest following manure application. Agricultural sustainability and carbon sequestration in soil are recommended for further research to mitigate the potential negative effects of climate change through the use of manure, compost, and mycorrhizae. Future studies should examine the impact of these applications under different plant species and soil types. These findings could play an essential role in shaping environmental policies related to carbon sequestration, the carbon cycle, and soil health.
Keywords: Soybean, Soil organic carbon, Nutrient uptake, Mineral fertilizer, Mycorrhiza, Compost, Manure

INTRODUCTION

Soybean (*Glycine max* (L.) Merr.) is a critical legume crop globally, valued for its high protein and oil content as well as its ability to fix atmospheric nitrogen through symbiotic relationships, thus contributing to soil fertility and sustainable agricultural systems. Fertilization strategies particularly the long-term application of organic amendments and inorganic fertilizers play a significant role not only in enhancing soybean yield but also in influencing soil organic carbon (SOC) and total nitrogen (TN) dynamics (Tian et al., 2018).

Long-term experiments have shown that integrated applications of organic and inorganic fertilizers often outperform sole inorganic treatments in maintaining or increasing SOC and TN pools over time while also supporting higher or more stable yields. For instance, one study found that a 21-year treatment combining organic manure and inorganic inputs significantly boosted SOC accumulation and improved yield under soybean-wheat rotations (Choudhary et al., 2021). Another long-term trial (20+ years) reported that combined animal manure and NPK treatments led to higher soybean yield trends and elevated SOC/TN levels compared with mineral-only fertilisation (Panday et al., 2024). In semiarid soils cultivated with soybeans, long-term fertilisation has a positive impact on yield stability and soil C and N contents (Yu and Liu, 2023).

Similarly, in the last 28 years, the present research area has investigated the regular effects of several organic and inorganic fertilisers on determining soil organic carbon and soil quality parameters. Despite such evidence, region-specific analyses remain limited, especially under Mediterranean climate conditions, where rapid organic matter mineralisation and seasonal moisture fluctuations pose distinct challenges. Accordingly, this study was conducted in a long-term experimental field established in 1996 at the Research and Application Farm of the

Faculty of Agriculture, Çukurova University. The aim is to evaluate the effects of different fertilisation treatments (control, inorganic fertiliser, animal manure, compost, and compost + mycorrhizae) on the yield of soybeans (*Glycine max* (L.) Merr.) and on soil carbon and nitrogen contents. This study aims to elucidate the long-term effects of organic and inorganic inputs on both crop performance and soil carbon–nitrogen dynamics under Mediterranean conditions.

MATERIALS AND METHODS

The experiment was established in 1996 within the Soil Science and Plant Nutrition Research Area of the Research and Application Farm at Çukurova University, using a randomised block design. It was composed of five treatments × three replicates = 15 plots, each of 10 × 20–m (200-m^2) dimensions. The current research began with Soybean (*Glycine max* (L.) Merr.) cultivation in the 2022-2023 production year. Before cultivation, control, mineral fertilizer (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}) were applied. The experimental plot was sown with an intra-row spacing of 7 cm and an inter-row spacing of 45 cm. In this experimental site, identical treatments have been implemented each year since 1996, and no chemical herbicides have been applied for weed management. Immediately after harvest, different parts of the soybean were harvested. Plant samples were oven-dried, finely ground, and homogenized prior to analysis. Shoot and root samples were dry-ashed at 500 °C overnight, and the concentrations of P, K, and Zn in the resulting ash extract were determined using an ICP (Inductively Coupled Plasma) instrument. Total C and N concentrations were then determined by dry combustion at 900 °C using a C and N elemental analyzer (LECO Corporation, St. Joseph, MI). The nutrient content of different parts of the soybean plant was analyzed. Total carbon sequestration and CO_2 fixation in the soil were analysed.

RESULTS AND DISCUSSION

Dry Matter Yield

When the effects of organic and inorganic fertiliser applications on the shoot dry matter of soybeans were examined, the differences among the mean values obtained from the treatments were found to be statistically significant ($p < 0.0001$). Compared to the control, the highest shoot dry matter biomass values were obtained from compost 2889 kg ha^{-1}, mineral fertilizer 2364 kg ha^{-1}, compost + mycorrhiza 2111 kg ha^{-1}, animal manure 1448 kg ha^{-1}, and control 1010 kg ha^{-1} treatments, respectively (Table 1). However, when the effects of different organic and inorganic fertilisers on soybeans were evaluated in terms of grain yield, the differences among treatments were found to be statistically nonsignificant.

The difference in total biomass weight among the treatments was found to be statistically significant ($p<0.002$). The highest value was obtained from the compost treatment, at 4349 kg ha^{-1}, while the lowest value was recorded in the control treatment, at 1519 kg ha^{-1}. The relatively high mean value observed in the compost treatment was attributed to greater variation among replicates. Similarly, the compost + mycorrhiza treatment showed higher values compared to the animal manure treatment.

The application of organic fertilisers not only provides nutrient support to plants but also improves soil properties and enhances microbial activity. Increased microbial activity can promote atmospheric nitrogen fixation in leguminous crops such as soybean, thereby improving plant growth and indirectly contributing to enhanced plant development and yield.

According to the results of previous studies, green manure applications have been reported to improve soybean growth and yield compared to chemical fertilizer applications (Egbe et al., 2022). On the other hand, Iqbal et al. (2021) demonstrated in another study that various animal manure applications resulted in lower dry matter yield than chemical fertilizer applications. This finding was attributed to the higher nutrient availability provided by mineral fertilisers compared to organic manures, which supports our results. Although green manure applications naturally undergo decomposition in the soil, similar to compost materials, they may enhance the nutrient content in plant tissues, thereby promoting nutrient uptake by the plant roots. Usually, green manure has a short-term effect on soil fertility parameters but may effect on soil biota.

Carbon Concentrations and Content of Different Parts of Soybean

When the effects of different organic and inorganic fertilizer applications on the shoot %C concentration of soybean plants were examined, the differences among treatments were found to be statistically insignificant (Table 2). The lowest value was observed in the mineral fertiliser treatment, at 32.74%, while the highest value was obtained from the compost + mycorrhiza treatment, at 38.91%. In contrast, the differences in grain %C concentration among treatments were statistically significant. Regarding the %C concentration in the grain, the lowest value (43.29%) was observed in the mineral fertilizer treatment, whereas the highest value (47.72%) was obtained from the compost + mycorrhiza treatment. When the shoot carbon (C) content (kg ha^{-1}) was examined, the differences among treatments were found to be statistically significant ($p<0.014$). Compared to organic fertilizer application, the lowest C content was observed in the animal manure treatment with 499.7 kg ha^{-1}, while the highest C content was determined in the compost treatment with 982.8 kg ha^{-1}. The grain C content was also found to be statistically significant ($p<0.019$). Compared to the control, the lowest and highest values were obtained from the mineral fertilizer (299.1 kg ha^{-1}) and compost (696.3 kg ha^{-1}) treatments, respectively.

Compost is the unequivocal top performer, increasing grain, shoot, and total C above the control by 462, 640, and 1102 kg ha^{-1}, respectively (Table 3). While adding AMF + compost yielded smaller gains (166/483/649 kg ha^{-1}), indicating the second positive synergy after the compost alone. Consistently, the contribution analysis attributes the greatest C accrual to compost (297/287/291 % for grain/shoot/total), with mineral and compost+AMF providing moderate contributions and manure the smallest (142 % total), underscoring compost as the dominant driver of carbon accumulation in this dataset.

When the total CO_2 fixed by the plant was examined, the different organic and inorganic fertilizer applications were found to have a statistically significant effect on the soybean plant ($p<0.0001$). The total CO_2 fixed by the plant, from the lowest to the highest, was determined as 2115.7, 3014.6, 3930.2, 4496.2, and 6156.8 kg ha^{-1} for the control, animal manure, mineral fertilizer, compost + mycorrhiza, and compost treatments, respectively.

Nutrient Concentrations and Content of Different Parts of Soybean

According to the research results, the effects of different organic and inorganic fertilizer applications on soybean shoot nitrogen concentration were found to be statistically significant in terms of nitrogen concentration ($p<0.0077$). Compared to the control, the lowest N% % concentration was recorded in the compost + mycorrhiza treatment (2.98%), while the highest value was obtained from the compost treatment (3.78%). Statistically, the differences among treatments for grain nitrogen concentration were not significant. When examining the grain nitrogen concentrations, the lowest value was observed in the compost + mycorrhiza treatment (6.75%), and the highest value was found in the compost treatment (7.38%), compared to the control (Table 3).

When the effects of different organic and inorganic fertilizers on the N content (kg N ha^{-1}) of the soybean shoot were examined, the differences among treatments were found to be statistically insignificant. Compared to the control, the lowest N content was observed in the animal manure treatment, at 51.13 kg ha^{-1}, while the highest N content was obtained in the compost treatment, at 110.02 kg ha^{-1}. Similarly, the N content in the grain was also statistically insignificant, with the lowest and highest values recorded in the animal manure (48.46 kg ha^{-1}) and compost (108.71 kg ha^{-1}) treatments, respectively. When the total N content in the shoots and grains of the soybean plant was evaluated, it was found that the different organic and inorganic fertiliser applications had a statistically significant effect ($p < 0.0040$). The total N content, from lowest to highest, was determined as 60.59, 99.59, 118.22, 136.34, and 218.73 kg ha^{-1} for the control, animal manure, compost+mycorrhiza, mineral, and compost treatments, respectively.

Organic fertilizer applications, particularly compost and compost combined with mycorrhiza, significantly increased the plant nitrogen content compared to the control, indicating that organic fertilizers were more effective in enhancing plant nitrogen accumulation (Akşahin et al., 2021).

Nutrient Concentrations (K, P, Zn) in Soybean Grain and Shoot

The application of organic fertilizers to the soil enriches its organic matter content, thereby improving its physical, chemical, and biological properties. The enhanced organic matter content facilitates the uptake of plant nutrients, increases potassium solubility, and enhances its availability to plants. According to literature findings, Morya et al. (2018) investigated the effects of organic and inorganic fertilizer applications on plant nutrition and reported that plants grown in areas treated with animal manure absorbed higher amounts of potassium compared to the control.

The concentrations of plant mineral nutrients, such as phosphorus (P), potassium (K), and zinc (Zn), were measured. When the effects of different organic and inorganic fertilizers on the grain %K concentration of soybean were examined, the highest %K concentration was obtained from the compost + mycorrhiza treatment (1.97%), while the lowest value was recorded in the control treatment (1.37%). The %K concentrations measured in other fertilizer treatments were 1.88%, 1.87%, and 1.82% for compost, animal manure, and mineral fertilizer applications, respectively (Table 4).

In the plots where soybeans were cultivated with different organic and inorganic fertiliser applications, the differences among the mean grain %P concentrations were found to be statistically significant ($p < 0.0001$). The highest %P concentrations were obtained from mineral fertilizer (0.77%), compost+mycorrhiza (0.77%), compost (0.76%) and control (0.40%) treatments, respectively. Similarly, the effects of different organic and inorganic fertilisers on the grain zinc concentration of soybeans were also found to be statistically significant ($p < 0.0001$). The highest Zn concentrations were recorded in the compost (70.50 mg kg^{-1}), compost+mycorrhiza (69.90 mg kg^{-1}), animal manure (66.30 mg kg^{-1}), and mineral fertilizer (52.97 mg kg^{-1}) treatments, while the lowest value was observed in the control treatment (45.55 mg kg^{-1}). Generally, N-fixing plants have high levels of mineral nutrients, particularly micronutrients (Ortas et al., 2019).

Zhang et al. (2015), reported in their study that, under long-term experimental conditions, organic fertilizer applications improved soil properties and enhanced the uptake of micronutrients. This finding supports the results of our research. Generally, the micronutrient content of leguminous plants is measured at higher levels compared to macronutrients, which is considered important for both animal and plant nutrition and health. Sönmez and Özen (2019) reported in their study on the changes in soil nutrient content under different periods and vermicompost applications that the available Zn content in the soil generally increased with the application dose, while the Cu content tended to decrease.

Table 1. The Effect of organic and inorganic fertilization on soybean shoot, grain and total dry weight

Fertilizers	Shoot dry weight kg ha^{-1}	Grain yield kg ha^{-1}	Total dry weight kg ha^{-1}
Control	1010.00 ± 122.50^{c}	509.00 ± 89.00	1519.00 ± 109.66^{c}
Mineral	2363.75 ± 246.25^{ab}	685.10 ± 305.10	3048.85 ± 551.35^{b}
Manure	1447.50 ± 10.00^{c}	689.00 ± 111.00	2136.50 ± 121.00^{bc}
Compost	2888.75 ± 366.25^{a}	1460.00 ± 852.00	4348.75 ± 1082.63^{a}
Compost + AMF	2110.83 ± 435.79^{b}	840.00 ± 80.00	2950.83 ± 358.77^{b}
LSD (p<5%)	578.9717	716.0343	1036.9302
ANOVA (p-value)	<0.001***	0.100^{ns}	0.002**

Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).

Table 2. The Effect of organic and inorganic fertilisation on soybean grain and shoot carbon concentrations and contents.

Fertilizers	Grain %C	Shoot %C	Grain C content kg ha^{-1}	Shoot C content kg ha^{-1}	Total C kg ha^{-1}
Control	45.87 ± 2.00	33.94 ± 0.34	234.08 ± 45.78	342.94 ± 43.64^{c}	577.02 ± 54.20^{c}
Mineral	43.29 ± 2.44	32.74 ± 1.72	299.08 ± 137.28	772.80 ± 73.11^{ab}	1071.88 ± 205.32^{bc}
Manure	46.74 ± 1.11	34.52 ± 0.40	322.45 ± 56.75	499.73 ± 9.31^{bc}	822.18 ± 66.00^{bc}
Compost	47.61 ± 0.22	33.53 ± 5.85	696.32 ± 408.81	982.81 ± 293.79^{a}	1679.14 ± 628.63^{a}
Compost + AMF	47.72 ± 1.26	38.91 ± 1.63	400.30 ± 30.22	825.94 ± 204.99^{ab}	1226.24 ± 174.78^{ab}
LSD (p<5%)	3.3440	5.7822	346.8353	336.4258	578.4292
ANOVA (p-value)	0.080^{ns}	0.209^{ns}	0.094^{ns}	0.014*	0.019*

Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).

Table 3. Compared to control treatments, the contribution of Organic Fertilizers to grain, shoot and total carbon contents

	Fertilizers	Grain C content	Shoot C content	Total C content
			kg C ha^{-1}	
Differences with Control	Mineral	65	430	495
	Manure	88	157	245
	Compost	462	640	1102
	Compost + AMF	166	483	649
Contribution of Fertilizers	Mineral	128	225	186
	Manure	138	146	142
	Compost	297	287	291
	Compost + AMF	171	241	213

Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).

Table 4. The Effect of organic and inorganic fertilisation on soybean shoot, grain concentrations and nitrogen.

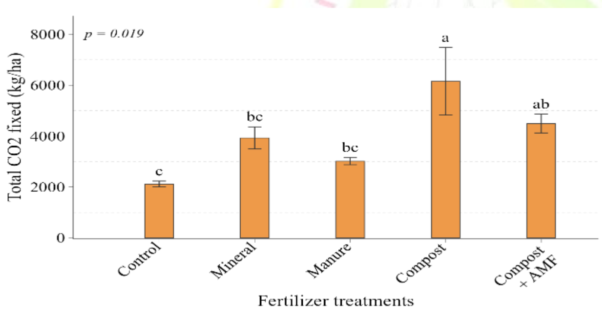
Fertilizers	Grain N%	Shoot N%	Grain N content kg ha^{-1}	Shoot N content kg ha^{-1}	Total N kg ha^{-1}
Control	6.18 ± 0.03	2.89 ± 0.08^{b}	31.48 ± 5.57	29.14 ± 3.11^{c}	60.62 ± 5.47^{c}
Mineral	7.19 ± 1.09	3.66 ± 0.50^{a}	50.36 ± 24.62	85.98 ± 8.20^{a}	136.34 ± 27.14^{b}
Manure	7.02 ± 0.33	3.53 ± 0.13^{a}	48.46 ± 9.37	51.13 ± 2.30^{bc}	99.59 ± 11.62^{bc}
Compost	7.38 ± 0.17	3.78 ± 0.35^{a}	108.71 ± 65.36	110.02 ± 22.31^{a}	218.73 ± 75.13^{a}
Compost + AMF	6.75 ± 0.22	2.93 ± 0.08^{b}	56.61 ± 3.63	61.61 ± 11.02^{b}	118.22 ± 7.69^{bc}
LSD (p<5%)	1.0587	0.5786	57.1395	24.1510	67.7146
ANOVA (p-value)	0.180^{ns}	0.019*	0.102^{ns}	<0.001***	0.007**

Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).

Table 5. The effect of different organic and inorganic fertilizers on the concentrations of K, P and Zn (mg kg⁻¹) in grain and shoot of soybean.

Fertilizers	Grain		
	%K	%P	Zn mg kg^{-1}
Control	1.37 ± 0.02^{b}	0.40 ± 0.02^{b}	45.55 ± 3.95^{c}
Mineral	1.81 ± 0.06^{a}	0.77 ± 0.04^{a}	52.97 ± 6.27^{b}
Manure	1.87 ± 0.11^{a}	0.73 ± 0.01^{a}	66.30 ± 2.10^{a}
Compost	1.88 ± 0.36^{a}	0.76 ± 0.13^{a}	70.50 ± 0.60^{a}
Compost + AMF	1.97 ± 0.02^{a}	0.77 ± 0.04^{a}	69.90 ± 2.50^{a}
LSD (p<5%)	0.2852	0.1224	6.5348
ANOVA (p-value)	0.008**	<0.001***	<0.001***
	Shoot		
	%K	%P	Zn mg kg^{-1}
Control	1.71 ± 0.33	0.27 ± 0.04^{c}	20.35 ± 1.45^{c}
Mineral	2.45 ± 0.19	0.37 ± 0.02^{b}	34.41 ± 0.71^{b}
Manure	1.80 ± 0.39	0.47 ± 0.01^{a}	45.00 ± 4.50^{a}
Compost	1.54 ± 0.04	0.41 ± 0.04^{ab}	41.10 ± 6.70^{ab}
Compost + AMF	1.62 ± 0.46	0.38 ± 0.08^{b}	40.85 ± 1.85^{ab}
LSD (p<5%)	0.6579	0.0757	7.1791
ANOVA (p-value)	0.074^{ns}	0.003**	<0.001***

Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).



Control, mineral fertiliser (NPK), animal manure (25 tons ha^{-1}), compost (25 tons ha^{-1}), and compost + mycorrhiza (10 tons ha^{-1}).

Figure 1. The Effect of organic and inorganic fertilisation on soybean total CO_2 fixation by using Table 1 and Table 2 data.

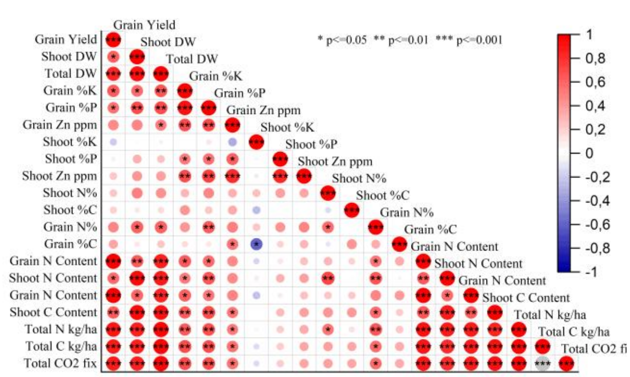


Figure 2. Correlation matrix among the measured parameters of soybean. ($p \leq 0.05$, $*p \leq 0.01$, $**p \leq 0.001$).

When the shoot values of the soybean plant were examined, the highest %K concentration was obtained from the mineral fertilizer treatment (2.45%), while the other treatments recorded %K concentrations of 1.80%, 1.71%, and 1.62% for animal manure, control, and compost+mycorrhiza applications, respectively (Table 5). The lowest value was observed in compost treatment (1.54%). The effect of fertilizer applications on %K concentration was found to be statistically significant ($p<0.0380$). The results suggest that the compost treatment, which produced the highest shoot dry matter yield in soybean, exhibited the lowest %K concentration, possibly due to a dilution effect. When the impact of organic and inorganic fertilisers on shoot %P concentration was examined, the smallest differences among treatment means were found to be statistically significant ($p<0.0039$). The highest %P values were recorded as 0.47%, 0.41%, 0.38%, and 0.37% for the animal manure, compost, compost + mycorrhiza, and mineral fertiliser treatments, respectively, while the lowest value (0.27%) was observed in the control treatment. Organic and inorganic fertiliser applications increased plant P uptake, yielding parallel results to those of previous studies conducted in the same area (Ahmed et al., 2024).

When the effects of different organic and inorganic fertilizers on shoot Zn concentration (mg kg⁻¹) of soybean were examined, the differences among treatments were found to be statistically significant ($p<0.001$). The highest Zn concentrations in the shoot tissues were recorded as 45.00, 41.10, 40.85, and 34.41 mg kg⁻¹ for animal manure, compost, compost+mycorrhiza, and mineral fertilizer treatments, respectively, while the lowest concentration (20.35 mg kg⁻¹) was observed in the control treatment. Numerous studies in the literature have reported that the application of organic and inorganic fertilisers enhances plant Zn nutrition (Pinto et al., 2004; Zhang et al., 2015).

The correlation analysis revealed strong positive relationships among yield, growth, nutrient uptake, and physiological parameters in soyabean. In particular, grain yield showed highly significant correlations ($p \leq 0.001$) with shoot and total dry weight, grain nutrient contents (%K, %P, Zn mg kg^{-1}), and total nitrogen and carbon accumulation.

These findings suggest that soybean yield is directly linked to nutrient acquisition and photosynthetic efficiency. The strong correlations observed between nitrogen and carbon parameters indicate that these two elements play complementary roles in the plant's metabolic processes.

The findings of this study demonstrated that the application of organic and inorganic fertilizers had a significant influence on the growth, yield, and nutrient uptake of Soybean (*Glycine max* (L.) Merr.). When growth performance, grain yield, and nutrient content were evaluated together, it became evident that the sufficient availability of essential nutrients, such as N, P, K, and Zn, played a crucial role in physiological development and yield potential.

Organic amendments, particularly compost and well-decomposed animal manure, improved the physical and chemical properties of the soil, thereby enhancing the availability and uptake of plant nutrients. These organic inputs enriched soil organic matter, stimulated root development, and consequently increased the plant's capacity for water and nutrient absorption.

The application of mycorrhiza further contributed to nutrient acquisition by expanding the effective root surface area and facilitating the uptake of relatively immobile elements such as phosphorus and zinc. The combined use of mycorrhiza and organic materials appeared to support soil microbial activity and nutrient cycling, which was reflected in the overall improvement of plant growth and yield components.

CONCLUSION

This study revealed that the integrated use of organic and inorganic fertilizers significantly enhanced the growth performance, yield, and mineral nutrient accumulation of Soybean (*Glycine max* (L.) Merr.). The applications of compost, animal manure, and compost combined with mycorrhizal inoculation also improved plant root development and overall mineral nutrient dynamics within the rhizosphere. Organic fertilizer treatments promoted greater biomass production and higher accumulation of nitrogen and carbon in soil. Such improvements contribute to mitigating greenhouse gas emissions and indicate the potential to reduce dependence on mineral fertilisers, thereby supporting ecosystem management for improved soil sustainability. The application of organic fertilisers enhances the positive relationships among nutrient utilisation, photosynthetic capacity, and yield, thereby improving both productivity and quality in soybean cultivation. Organic inputs not only enhances crop productivity, but also provides long-term environmental benefits, representing a key strategy for sustainable agricultural development.

CONFLICT OF INTEREST

The author here declares there is no conflict of interest in the publication of this article.

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