INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2025, Vol. 6, No. 6, 2671 – 2676
http://dx.doi.org/10.11594/ijmaber.06.06.01

Research Article

Effect of Organic Fertilizer (Cow Manure and Chicken Dung) Application on Growth and Yield of Mungbean *(Vigna radiata L.)*

Merhama M. Sammah*, Sharnalyn K. Ammad, Munib J. Baki, Milda M. Aming, Fernalyn H. Kairan, Aldimar S. Murphy

College of Agriculture, Mindanao State University – Sulu, Jolo, Sulu, Philippines, 7400

Article history:
Submission 03 May 2025
Revised 31 May 2025
Accepted 23 June 2025

**Corresponding author:*
E-mail:
merhama.sammah@msusulu.edu.ph

ABSTRACT

Mungbean (*Vigna radiata L.)* is a useful legume with short maturity and nitrogen-fixing capacity, which makes it suitable for poor farmers. In Sulu Province, it is of cultural importance as a vegetable crop and valued for medicinal value. But as demand has increased with expanding populations, so has its decline in production. In response, a field experiment was carried out from August 11 to November 25, 2021, at the Mindanao State University – Sulu, College of Agriculture Demo Farm. The research tested the impacts of organic fertilizers—cow manure and chicken dung—on Mungbean performance under Randomized Complete Block Design (RCBD) with three treatments and four replications. Results indicated that chicken dung significantly increased the yield and growth of the crop and resistance to the Mosaic Virus compared to cow dung. The outcome of these findings indicates the promise of chicken dung as a good organic fertilizer for improving Mungbean productivity and promoting sustainable agriculture.

Keywords: *Organic Fertilizer, Cow Manure and Chicken Dung, Growth, Yield, Mungbean*

Introduction

Mungbean *(Vigna radiata L.)* is a highly planted pulse crop in Sulu Province, usually planted in association with peanuts and string beans. It is widely consumed in traditional foods like *bangbang sug* and *syuruh* or *sindul*, and is also prized for its medicinal value. As nutritious as it is, Mungbean is traditionally seeded with low inputs or even without fertilization. But higher demand buttressed by growing populations require higher productivity while not harming the environment. Mungbean is part of sustainable agriculture as it has nitrogen-fixing properties (Delfin et al., 2008) and nutrients, having approximately 22.5% protein, 9.4% water, and 343.5 kcal/100g (Nair et al., 2013). Its digestibility and phytic acid content are high, which increases the bioavailabil-

How to cite:
Sammah, M. M., Ammad, S. K., Baki, M. J., Aming, M. M., Kairan, F. H., & Murphy, A. S. (2025). Effect of Organic Fertilizer (Cow Manure and Chicken Dung) Application on Growth and Yield of Mungbean *(Vigna radiata L.)*. *International Journal of Multidisciplinary: Applied Business and Education Research*. *6*(6), 2671 – 2676. doi: 10.11594/ijmaber.06.06.01

ity of iron and zinc and thus render it a nutritious crop, especially for poor farmers. Studies have proved that the employment of organic manures such as cow dung and chicken droppings can increase the quality of soil, improve crop growth, and reduce dependency on chemical inputs (Adekiya et al., 2020; Ginandjar et al., 2021). Organic fertilizers not only increase the health of plants and their resistances to disease and insects but also result in sustainable soils in the long run (Hayudini, 2018; Bolan et al., 2010). Effective waste management, such as composting, has been reported to improve the status of soils and reduce environmental degradation (Aming-Hayudini et al., 2022). Chicken dung, in particular, is rich in nutrients like nitrogen, phosphorus, and potassium and has shown to significantly improve plant nutrient uptake (Agbede et al., 2008; Dikinya & Mufwanzala, 2010). However, potential risks such as trace element accumulation from poultry treatments must be considered (Bolan et al., 2010). Though both chicken dung and cow manure have proven to be effective in enhancing Mungbean production and soil health (Tejada et al., 2009; Adekiya et al., 2020), their differential influence on Mungbean yields in the local setting is yet to be fully exploited. Thus, this research seeks to evaluate and compare the growth and yield impacts of composted cow manure and chicken dung on Mungbean, and to determine which organic fertilizer returns the most desirable outcome.

Methodology

The test was from August 11 to November 25, 2021, at the Mindanao State University – Sulu, College of Agriculture Demo Farm, with a Randomized Complete Block Design (RCBD) with three treatments and four replications. The treatments were: T1 = control (no fertilizer), T2 = cow manure, and T3 = chicken dung. The trial attempted to find out how the effects of these organic manures differed on Mungbean yield and growth. The experimental area of 264 square meters was planted in 12 plots of uniform size of 18.75 square meters with alleys of 0.50 meter between blocks and plots. Preparation of land included clearing, plowing, and harrowing twice or thrice for each plot to obtain fine tilth. It was sown with 2,160 Mungbean seeds by the hill method with hills at 50 cm and row spacings of 60 cm.

Fertilizer was used in three stages. The first was done basally before planting, with 5 kg of cow manure in T2 and 5 kg of chicken dung in T3. The second and third were done following the ring method on the 30th day and 60th day after planting, respectively, as per the treatments allocated. Plants were watered every afternoon until pod formation. Weed control was performed two weeks after planting and repeated as needed until the canopy closed to minimize competition for nutrients and moisture. For pest and disease management, *madre de cacao* leaf extract was used as an organic pesticide.

Data collection was by tagging sample plants and taking seed germination levels. Growth data taken included height of the plant, leaves per plant at 50 days after planting, and flower number. Yield data included flowers per plant, pod weight, seeds per pod, seed weight per plot, and 1,000-seed weight. Pest and disease incidence data were also recorded, in the form of percentage infestation of black aphids and mosaic virus infection per plot. All data gathered were documented and compared utilizing analysis of variance (ANOVA) to establish differences among treatments.

Results and Discussion

Organic manure application had a great influence on the growth and yield performance of Mungbean. Chicken manure consistently yielded greater values in germination percentage, plant height, leaf count, and flowering, which signify that it favors vegetative growth. The findings validate Widowati et al's findings (2004), where they cited that chicken dung contains higher levels of major nutrients like nitrogen, phosphorus, potassium, and calcium, which are quickly available for plants owing to the fast decomposition rate of the material. Ginandjar et al. (2021) also reported the same findings, highlighting the contribution of chicken dung towards increasing the height of plants and overall growth processes.

Table 1. Effects of Organic Fertilizers on Mungbean Growth Parameters

Treatment	Seed Germination (%)	Plant Height (cm)	No. of Leaves (50 DAP)	No. of Flowers (42 DAP)
Control (no fertilizer)	81.36	44.19	147.75	38.75
Cow Manure (5 kg)	93.75	58.89	213.75	48.29
Chicken Dung (5 kg)	98.75	63.56	217.25	58.02
ANOVA	**Highly Significant ()**	**Highly Significant ()**	**Highly Significant ()**	**Highly Significant ()**
CV (%)	4.86	6.84	3.52	1.88

Whereas both chicken dung and cow manure enhanced vegetative and reproductive growth factors over the control, the activity of chicken dung was generally more marked, particularly for flower production and seed germination. The implication is that chicken dung has a greater potential for enhanced early establishment and reproductive success over cow manure. Increased access to nutrients, particularly phosphorus and potassium, is likely to be a vital constituent for pod and seed development (Zainal et al., 2014; Hidayat, 2008).

Yield traits were also along the same line. There was highest number of pods per plot, seed weight, and seeds number with chicken dung treatment. Such findings agree with Indraswari et al. (2018) and Agbede et al. (2008), which reported that poultry manure enhances flowering, podding, and filling of seeds with increased phosphorus availability. However, the 1,000 seed weight did not significantly differ between treatments, showing that while organic fertilizers are conducive to overall yield, they do not substantially alter the size of individual seeds.

Table 2. Effects of Organic Fertilizers on Mungbean Yield Parameters

Treatment	Pods/Plot	Pod Weight (kg/Plot)	Seeds (30 Pods)	Seed Weight (kg/Plot)	1,000-Seed Weight (g)
Control	1,072.25	3.75	333.00	0.37	42.50
Cow Manure (5 kg)	1,608.00	3.89	353.50	0.65	47.50
Chicken Dung (5 kg)	1,637.50	3.97	373.75	0.93	48.75
ANOVA	* Significant	** Highly Significant	** Highly Significant	** Highly Significant	ns (Not Significant)
CV (%)	14.04	1.16	2.27	8.43	7.86

The higher concentration of nutrients, particularly phosphorus and potassium, is likely to be an essential factor in the development of pods and seed formation (Zainal et al., 2014; Hidayat, 2008).

Yield characters were in line with the trend. The highest number of pods per plot, seed weight, and number of seeds under chicken dung treatment existed. This trend is the same as presented by Indraswari et al. (2018) and Agbede et al. (2008), which documented that poultry manure enhances flowering, podding, and filling of the seed through improved availability of phosphorus. But the 1,000 seed weight had no statistically significant treatment difference, which means that while organic fertilizers increase the total yield, they do not dramatically alter the size of individual seeds.

Table 3. Effects of Organic Fertilizers on Pest and Disease Incidence

Treatment	Black Aphid Infestation (%)	Mosaic Virus Infection (%)
Control	2.25	2.75
Cow Manure (5 kg)	1.50	1.50
Chicken Dung (5 kg)	2.25	1.25
ANOVA	ns (Not Significant)	** Highly Significant
CV (%)	27.83	27.32

Although chicken dung has merits, consideration should be given to possible environmental and agronomic issues. Chicken dung may contain trace elements that are toxic and include arsenic, copper, and zinc because of additives and drugs applied in poultry (Bolan et al., 2010). Unless composted or controlled, it also could pose health risks through the introduction of pathogens, make unpleasant smells, and lead to nutrient runoff, most significantly phosphorus, that would lead to eutrophication of local water bodies. Such risks highlight the necessity of proper composting and application rates to ensure both environmental and agronomic safety.

Globally, the present research validates that composted chicken manure is a great organic fertilizer with significantly improved productivity of Mungbean. However, further investigation is suggested in order to consider long-term impacts on soil health, possible accumulation of trace metal, and safe composting technology to maximize its application in integrated sustainable agriculture management systems.

Conclusion

This research proved that chicken dung and cow manure both contribute positively to the development and yield of Mungbean, though with better performance in most of the parameters by chicken dung, including increased resistance to infection by Mosaic Virus. The results project chicken dung as a better organic fertilizer under the conditions of this research. For resource-poor farmers, in general, employment of chicken dung is a cost-effective, eco-friendly way for the improvement of Mungbean productivity. Extension agencies and agricultural institutions should consider promoting training and guidelines on proper handling and application of chicken dung to reap maximum benefits with least environmental and health implications. More research should include long-term soil fertility impacts and composting procedures to ensure wider acceptance.

References

Adeyemo, A. J., akingbola, o.o., &Ojeniyi, S. O. (2019). Effects of poultry manure on soil-infiltration, organic matter contents and maize performance on two contrasting degraded alfisols in southwestern Nigeria. *International Journal of Recycling of Organic Waste in agriculture, 8,* 73-80.

Adekiya, A. O., Ogunboye, O. I., Ewulo, B. S., & Olayanju, A. (2020). Effects of different rates of poultry manure and split applications of urea fertilizer on soil chemical properties, growth, and yield of maize. *The Scientific World Journal, 2020, 1-8.*

Agbede, T.M., Ojeniyi, S. O., Adeyemo, A. J. (2008). Effect of poultry manure on soil physical and chemical properties, growth and grain yield of sorghum in Southwest Nigeria*. American-Eurasian Journal of sustainable Agriculture, 2(1), 72-77.*

Akosah, D. K., Adjei-Nsiah, S., & Brentu, F. C. (2021). Response of late valencia sweet orange (Citrus sinensis (L.) Osbeck) to fertilization on acrisols of the semi-deciduous forest agroecological zone of Ghana. *Communications in soil science and plant analysis, 52*(11), 1275-1285.

Aming-Hayudini, M. A. E., Jaddani, M. Y. T., & Habibun, S. I. (2022). Practices on waste disposal and its environmental effects. *International Journal of Multidisciplinary: Applied Business and Education Research*, *3*(8), 1569-1576.

Arancon, N. Q., Edwards, C.A., babenko, A., Cannon, J., Galvis, P., & Metzger, J. D. (2008). Influences of vermicomposts, produced by earthworms and microorganisms from

cattle manure, food waste and paper waste, on the germination, growth and flowering of petunias in the greenhouse. *Applied soil Ecology, 39*(1), 91-99.

Bolan, N.S., Szogi, A.A., Chuasavathi, T., Seshadri, B., Rothrock, M.J., panneerselvam, P., 2010. Uses and manangement of poultry litter. *World's poultry Science Journal, 66,(*4), 673-698.

Delfin, e. F., paterno, E.S., Torres, F. G., & Santos, P.J. A. (2008). Biomass, nitrogen uptake and fixed nitrogen partitioning in field grown mungbean (Vigna radiate) l. Wilczek) inoculated with bradyrhizobium. *Philippine. Journal of crop science (PJCS), 33*(3), 24-33.

Dikinya, O., & Mufwanzala, N. (2010). Chicken manure-enhanced soil fertility and productivity: effects of Application rates. *Journal of Soil Science and Environmental Management, 1*(3), 46-54.

Eissa, M. A. (2016). Influence of compost and chicken manure applications on vegetative growth, nutrient uptake and yield of Balady Mandarin trees. *Middle East Journal of Agriculture Research, vol. 5*(4), 918–924.

Ginandjar, s., Hakim, l. A., Subandi, M., Rahmadi, A., & Hakim, M. T. A. (2021, April). The effect of dung and local microorganism of banana corm application on the growth and the yield of Mung beans (Vigna radiata L) vima-2 variety. In *IOP Conference series: Earth and Environmental Science* (Vol. 739, No. 1, p. 012078). IOP Publishing.

Gomez-Brandon, M., lazcano, C., Dominguez, J. (2008). The evaluation of stability and maturity during the composting of cattle manure. *Chemosphere 70*(3), 436-444.

Hayat, R., Ali, S., ijaz, S.S. Chatha, T. H., & Siddique, m. T. (2008). Estimation of N2- fixation of mungbean and mash bean through xylem uriede technique under rainfed conditions. *Pak J Bot, 40*(2), 723-734.

Hayudini, M. A. A. (2018). Preventive Health Care Measures and Health Promotion Implemented by Public Health Officials in Mainland Sulu. *International Journal of Humanities and Social Sciences*, *10*(4), 1694-2639.

Hidayat, N. (2008). Pertumbuhan Dan Produksi Kacang Tanah (Arachis Hypogea L.) varietas lokal Madura pada berbagai jarak tanam dan dosis pupuk fostor. Agrovigor: jurnal Agroekoteknologi , 1(1), 55-64.

Hussain, F. I. D. A. Buriro, M., NIZAMAN, M. R., AHMED, S., SAIF-UR-REHMAN, N. A., & HUMA, Z. (2016). ,Growth and yield response of mungbean to different levels of potassium. *International Journal of Agricultural and Environmental Research, 2*(1), 67-76.

Indraswali, E., Alia, Y., & Soverda, N. (2018). Respons Tanaman Kacang Hijau (Vigna Radiata L.) Terhadap Pemberian Pupuk Organik Kompos Ampas Tebu. *Jurnal Agrium, 15*(2), 70–74.

Kadian, N., Gupta, A., Satya, S., Mehta, R.K., Malik, A. (2008). Biodegradation of herbicide (Atrazine) in contaminated soil using various bioprocessed materials. Bioresource Technology, 99(11), 4642-4647.

Kasim, K. S., & Aming-Hayudini, M. A. E. (2022). Factors Influencing Treatment Default among Direct Observed Treatment Short-Course Enrolled in Pulmonary Tuberculosis. *International Journal of Multidisciplinary: Applied Business and Education Research*, *3*(9), 1749-1764.

Khan, A., Jan, M.T., Marwat, K.B., Arif, M. (2009). Organic and inorganic nitrogen treatments effects of plant and yield attributes of maize in a different tillage systems. *Pak. J. Bot, 41*(1), 99–108.

Kumar, M., Kumar, A., Sewhag, M., & Chaudhary, K. (2021). Assessing mungbean productivity under organic management. *Legume Research-An International Journal, 44*(3), 349–352.

Moller, K., (2009). Influence of different manuring systems with and without biogas digestion on soil organic matter and nitrogen inputs, flows and budgets in organic cropping systems. *Nutri. Cycling Agroecosyst, 84*, 179–202.

Nair, R.M., Yang, R.Y., Easdown, W.J., Thavarajah, D., Thavarajah, P., Hughes, j.D.A., & Keatinge, J.D. H. (2013). Biofortification of mungbean (Vigna radiate) as a whole food

to enhance human health. *Journal of the Science and Food of Agriculture, 93*(8), 1805-1813.

Santoso, M. H., Naim, S., Suroso, S., Hayudini, M. A. A., & Shrestha, P. (2023). INFLUENCE OF WORK ENVIRONMENT AND EMPLOYEE COMPETENCE ANALYSIS ON EMPLOYEE PERFORMANCE. *Chanos Chanos*, *21*(1), 31-40.

Tejada, M., Hernandez, M. T., & Garcia, C. (2009). Soil restoration using composted plant residues: Effects on soil properties. *Soil Tillage Research, 102*(1), 109–117.

Timsina, J. (2018). Can organic sources of nutrients increase crop yields to meet global food demand?. *Agronomy 8(*10), 214.

Wander, M. (2019). Managing manure fertilizers in organic systems*. eOrganic. Org November 8(2019): 2019.*

Widowati. L. R., Widati, S., Jaenudin, U., & Hartatik, W. (2005). Pengaruh Kompos Pupuk Organik Yang Diperkaya Dengan Bahan Mineral Dan Pupuk Hayati Terhadap Sifat-Sifat Tanah, Serapan Hara Dan Produksi Sayuran Organik. *Laporan Proyek Pinilitian Program Pengembangan Agribisnis, Balai Penelitian Tanah, TA.*

Zainal, M., Nugroho, A., & Suminarti,N. E. (2014*). Respon Pertumbuhan Dan Hasil Tanaman Kedelai (Glycine max (L.) Merill) Pada Berbagai Tingkat Pemupukan N Dan Pupuk Kandang Ayam.* (Doctaral dissertation, Brawijaya University).

Ziogas, M., ipsilantis, I., Matsi, T., & Kostopoulou, S. (2021). Longterm fertilization with liquid cattle manure leaves legacy nutrients, but not organic carbon and has no effect on soil microbial and physical properties a year after last application. *Communication and Soil Science ans plant Analysis, 52*(11), 1264-1274.