



Research article

Effect of red laterite soil and vermicompost on growth and development of chilli and brinjal grown under polypot conditions

Hruda Ranjan Sahoo, Madhuchhanda Sahoo, Mayeetreyee Baboo and Nibha Gupta*

Division of Plant Pathology and Microbiology, Regional Plant Resource Centre,
Bhubaneswar-751015, Odisha, India

*Corresponding Author: nguc2003@yahoo.co.in

[Accepted: 29 September 2015]

Abstract: The effect of vermicompost on growth enhancement and productivity of vegetable crops like chilli and brinjal grown in polypots was observed under greenhouse conditions and compared with red laterite soil treated as control. Periodical observations noted at 30 days interval up to 120 days exhibited increasing order of growth enhancement in both the crop plants with vermicompost mixed soil. Although the effect of vermicompost on growth of chilli could not be significant; its impact on plant productivity is quite evident. However, significant difference could be observed in Brinjal plants grown in both the normal soil and vermicompost treated soil. Enhancement in growth parameters such as leaf area, fresh weight and shoot fresh weight was noticed but no direct effect of vermicompost in fruit productivity and total weight was observed.

Keywords: Vegetable crops - Growth parameters - Productivity - Vermicompost.

[Cite as: Sahoo HR, Sahoo M, Baboo M & Gupta N (2015) Effect of red laterite soil and vermicompost on growth and development of chilli and brinjal grown under polypot conditions. *Tropical Plant Research* 2(3): 172–174]

INTRODUCTION

Vegetables are important food components of dietary systems as they provide essential nutrients for human health. However, they require high amounts of nutrients for its luxuriant growth and development. Brinjal and chilli are widely cultivated vegetable crops. Brinjal (*Solanum melongena* L.) is most popular vegetable crop grown in the world and Chilli (*Capsicum annuum* L.) is also an important vegetable crop with high consumption rate (Ahmed *et al.* 2000, Datta *et al.* 2011). The economic, nutritious and pharmacological significance is responsible for its high demand. Although India is the largest producer of chilli in the world but lower yield in terms of area used for cultivation (Bharathi *et al.* 2004, Khan & Raj 2006). As a result of which large amount of chemical fertilizer is applied to enhance productivity of vegetable crops. There is enormous use of fertilizers that has led to major environmental and health concerns due to its deleterious effect on aquatic ecosystem. Mesophilic processes such as vermicomposting better known as vermiculture biotechnology refers to the breeding and propagation of earthworms for cost-effective and eco-friendly organic manure (Beffa *et al.* 1998, Masciandaro *et al.* 2000, Aalok *et al.* 2008, Perera & Nanthakumaran 2015). Vermicompost can be used to improve soil health and enhance plant growth without causing damage to the environment. Vermicompost plays a major role in improving growth and yield of different field crops, vegetables, flower and fruit crops such as sorghum (Patil & Sheelavantar 2000), sunflower (Devi & Agarwal 1998), coriander (Vadiraj *et al.* 1998), brinjal (Babu *et al.* 2010) etc. The present investigation was carried out to observe the effect of vermicompost on vegetative growth and fruiting of chilli and brinjal under the pot culture conditions.

MATERIALS AND METHODS

In order to study the impact of vermicompost on growth of vegetable crops, a pot culture experiment was set up at the green house in Polybags of size 10×10" capacity containing 5kg of red laterite soil. Only soil was treated as control whereas test experimental sets were supplemented with vermicompost at the rate of 250g/pot. Seeds of chilli and Brinjal were sown into polypots containing control soil and soil supplemented with vermicompost. The pots were maintained in the green house at an adequate temperature and water was supplied

daily to maintain the moisture level of the soil. Data on growth parameters of both the vegetable crops was recorded for Plant height, fruiting pattern and biomass periodically. The fruit development and harvest was recorded after 120 days.

RESULTS AND DISCUSSION

Data recorded on leaf number and plant height of chilli is presented in figure 1. Periodical observations noted at 30 days interval up to 120 days exhibited the increasing order of growth enhancement. Vermicompost treated plants showed better growth than simple soil. 38.9% enhancement in shoot height was observed at 90 days of growth in vermicompost added plants of chilli. Data recorded on fruit harvest of chilli at 120 days has been depicted in figure 2. Effect of vermicompost on plant growth could not be significant; its impact on plant

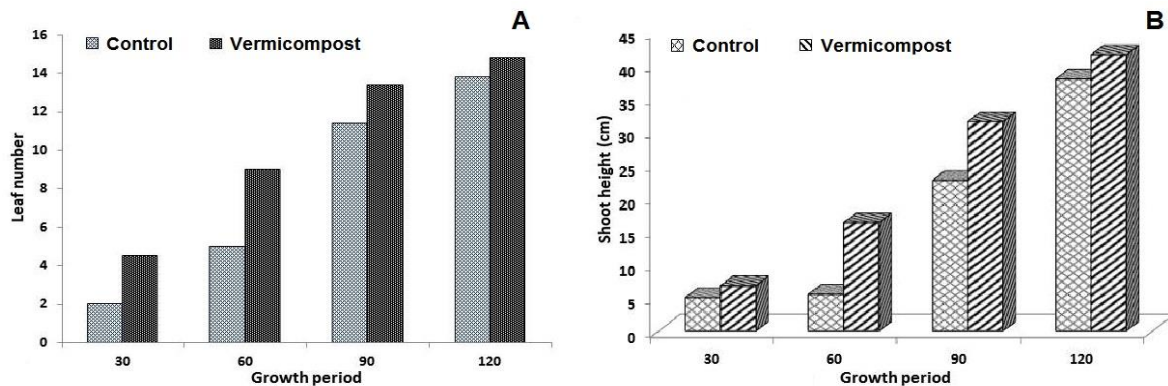


Figure 1. Effect of Vermicompost on Chilli: **A**, Leaf number; **B**, Shoot height.

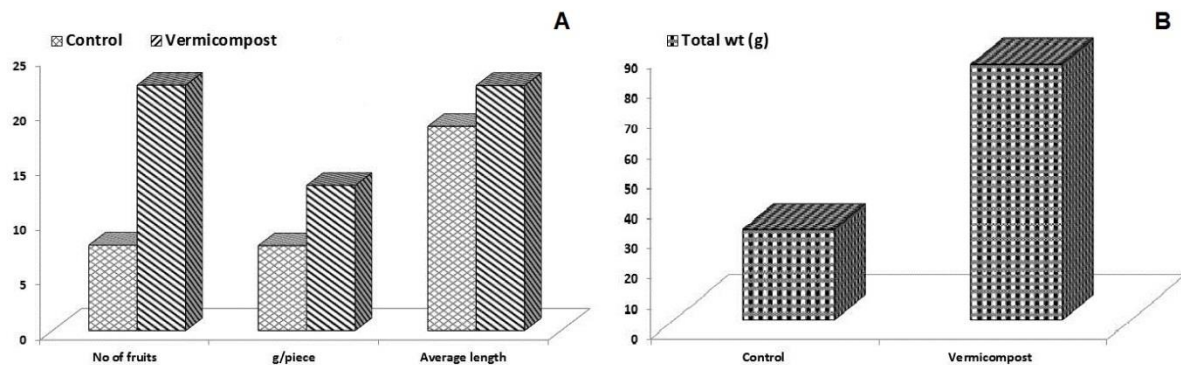


Figure 2. Effect of vermicompost on Chilli fruit at 120 days: **A**, Number, weight & length; **B**, Total weight.

productivity is quite evident. Four times more number of fruits and their weight was observed in vermicompost treated plants as compared to the untreated plants in first harvest. Fruit length and weight per fruit was also observed in the chilli plants grown in vermicompost added soil. Second harvest of the vegetable product showed similar pattern of growth enhancement in plants under treated condition. Data recorded on growth of Brinjal has been presented in figure 3. Very significant difference could be observed in plants of both the normal soil and

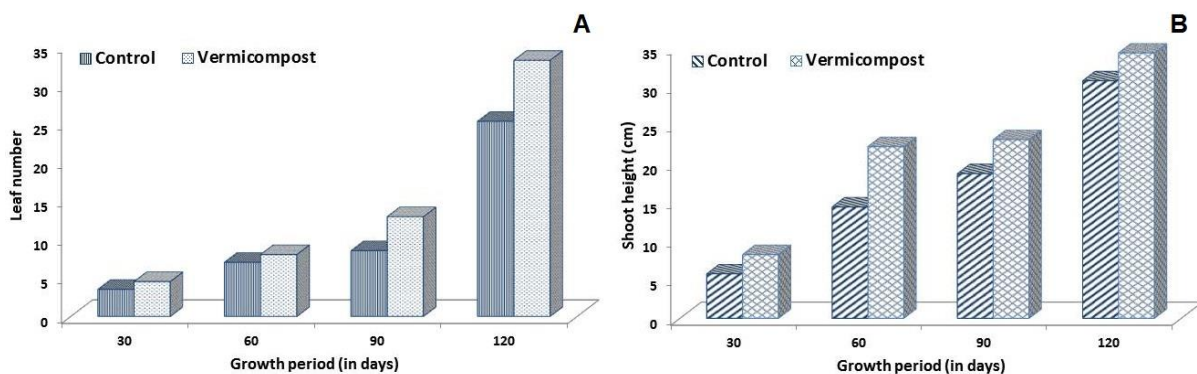


Figure 3. Effect of Vermicompost on Brinjal: **A**, Leaf number; **B**, Shoot height.

vermicompost treated soil. The growth performance of brinjal under poly pot conditions was influenced by the vermicompost treatment. Enhancement in leaf area, fresh weight and shoot fresh weight as presented in figure 4 is clearly evident from the present study. No direct effect of vermicompost in fruit productivity and total weight

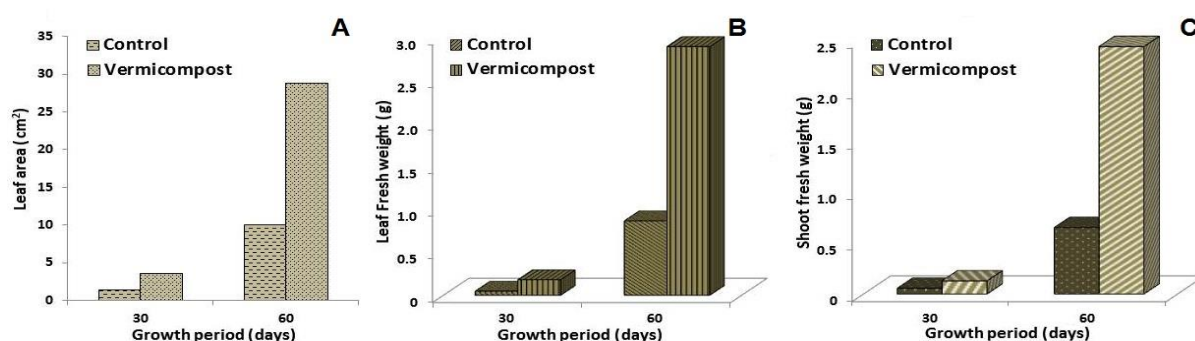


Figure 4. Effect of Vermicompost on Brinjal: **A**, Leaf area; **B**, Leaf fresh weight; **C**, Shoot fresh weight.

was observed. However, (40.37 ± 20.69) and (51.83 ± 18.53) g/fruit was observed in normal soil and vermicompost treated soil, respectively. The effect of vermicompost has been clearly demonstrated in the present study. To formularize the general usage of vermicompost for these crops more in depth study is required as crop productivity and improvement is also dependent upon agro climatic zones and its microhabitats.

ACKNOWLEDGEMENTS

The financial assistance obtained through Forest and Environment Department, Govt. of Odisha (State Plan Project 2014-15) and INSPIRE programme (No. DST/INSPIRE Fellowship/2013/506) DST, Govt. of India is gratefully acknowledged.

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