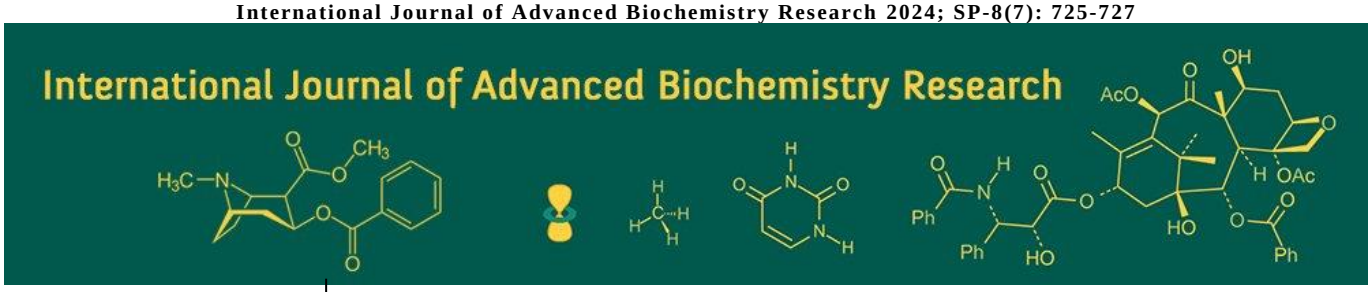


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# Effect of different levels of N: P: K, vermicompost and FYM on establishment of karonda under Prayagraj agroclimatic condition

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**Abstract**
Karonda is botanically known as *Carissa carandas* from the family Apocynaceae. Karonda is a medium-sized, thorny shrub. It has a greenish white bark on young shoots and greyish brown on mature stems. An experiment entitled Effect of different levels of NPK, Vermicompost and FYM on establishment of karonda under Prayagraj agroclimatic condition was carried out at Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The experiment was conducted in Randomized Block Design (RBD) with eight treatments in which one being the control and three replications. The different ratio of treatments is maintained. The result revealed that at monthly interval, the treatment $T_5$ RDF+Soil+Vermicompost+FYM (1:2:1) was found to be significantly promising with respect to maximum plant height (44.62) cm, maximum number of leaves (41.75), maximum stem diameter (7.39) mm, maximum root length (11.59) cm, was observed in establishment of Karonda.

**Keywords:** Karonda, Vermicompost, FYM, RBD

## 1. Introduction
Karonda (*Carissa carandus* L.) is an evergreen, hardy and thorny fruit shrub with immense neutraceutical value which belongs to family Apocyanaceae. It is best suited for growing in arid tropics and subtropics with minimum management and higher yields. It can also be grown successfully in marginal lands and wastelands and is mainly grown in Maharashtra, Karnataka, Bihar, Madhya Pradesh, Rajasthan and West Bengal. It is used as live bio-fence around orchards besides providing attractive edible fruits.

Karonda is commonly grown from seeds. The fresh seeds are sown in nursery during August-September. One year old seedlings are transplanted when seedlings propagation is done. Karonda plants grown as protective hedges require limited fertilization. Manuring however is beneficial. Its plants slowly get exhausted after taking 2 crops and show symptoms of die back. Therefore, 10-15 kg well rotten farmyards manure or compost/plant applied before flowering is useful (Chadha, 2003) [1]. Mishra and Jaiswal (1998) [2] reported on the effect of gibberellic acid (0, 250, 500, 750 or 1000 ppm), applied 6 times at monthly intervals on the growth of 9-month-old seedlings of C. *carandas*. Seedling height and stem diameter increased with increasing concentration of gibberellic acid.

Vermicompost and Farmyard Manure (FYM) are crucial components of integrated nutrient management in agriculture, enhancing crop productivity sustainably. Vermicompost, derived from earthworm-mediated decomposition of organic matter, is rich in essential nutrients and beneficial microorganisms. Its balanced nutrient profile promotes robust plant growth, improves soil structure, and enhances nutrient uptake efficiency. Additionally, vermicompost contributes to soil moisture retention and suppresses harmful pathogens, fostering a healthier agroecosystem. On the other hand, FYM, composed of decomposed organic materials, provides a slow-release source of nutrients, enriching soil fertility over time. Its organic content aids in moisture regulation, reducing soil erosion risks. Together, these organic amendments offer a holistic approach to nutrient management, ensuring long-term soil health and sustained crop yields while mitigating environmental impact associated with chemical fertilizers.

## 2. Materials and Methods

This chapter contains the details of the materials used and methods adopted for the present thesis entitled — Effect of different levels of N: P: K, vermicompost and FYM on establishment of karonda under prayagraj agroclimatic condition which was carried out at the experimental plot located at Department of Horticulture, SHUATS, Prayagraj, Allahabad. One year old Karonda seedlings were procured from local nursery for planting. Pits of 1 ft×1ft×1ft were dug at a spacing of 2 m×2 m. pits were exposed to Sunlight for a week. Then pits were filled with nutrient mixtures as per the treatments. After planting the seedlings were watered copiously.

**Table 1:** Treatment details

| Sl. No. | Symbol | Treatment |
|---|---|---|
| 1 | $T_0$ | Soil (Control) |
| 2 | $T_1$ | RDF+Soil+Vermicompost (1:1) |
| 3 | $T_2$ | RDF+Soil+FYM (1:1) |
| 4 | $T_3$ | RDF+Soil+Vermicompost+FYM (1:1:1) |
| 5 | $T_4$ | RDF+Soil+Vermicompost+FYM (2:1:1) |
| 6 | $T_5$ | RDF+Soil+Vermicompost+FYM (1:2:1) |
| 7 | $T_6$ | RDF+Soil+Vermicompost+FYM (1:1:2) |
| 8 | $T_7$ | RDF+Soil (1:1) |

RDF- (Recommended Dose of Fertilizers) i.e. N:P:K- 15:5:7.5 gm/plant

## 3. Results and Discussion

### 3.1 Growth Parameters

**3.1.1 Plant height:** From the data, it was revealed that the maximum plant height of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1) with (44.62) cm followed by treatment $T_6$ (Soil + Vermicompost + FYM 1:1:2) with (42.9) cm and the minimum plant height was recorded in $T_0$ (control) with (30.47) cm.
These results are supported by the findings of Kaur J. *et al*., (2019) [3], Maanik *et al*., (2022) [3, 4].

**3.1.2 Number of leaves:** From the data, it was revealed the maximum Number of leaves of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1) with (41.75) cm followed by treatment $T_6$ (Soil + Vermicompost + FYM 1:1:2) with (39.02) cm and the minimum Number of leaves was recorded in $T_0$ (control) with (28.37).
These results are supported by the findings of Kaur J. *et al*., (2019) [3], Maanik *et al*., (2022) [3, 4].

**3.1.3 Stem Girth:** In the present investigation the maximum stem girth of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (7.39) mm followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (7.15) mm and the minimum Stem Diameter was recorded in $T_0$ (control) with (4.96) mm.
These results are supported by the findings of Maanik *et al*., (2022) [4].

**3.1.4 Number of branches:** The maximum number of branches of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (7.39) mm followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (7.15) mm and the minimum Number of branches was recorded in $T_0$ (control) with (4.96) mm.
These results are supported by the findings of Maanik *et al*., (2022) [4].

**3.1.5 Leaf area**: In the present investigation, the maximum leaf area of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (3.87) $cm^2$ followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (3.77) $cm^2$ and the minimum Leaf area was recorded in $T_0$ (control) with (2.72) $cm^2$.
These results are supported by the findings of Harsimrat K. Bons *et al*., (2020) [5].

**3.1.6 Leaf area index:** From the data, it was revealed that the maximum Leaf Area Index of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (0.77) followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (0.76) and the minimum Leaf Area Index was recorded in $T_0$ (control) with (0.54).
These results are supported by the findings of Arancon *et al.*, (2004), Harsimrat K. Bons *et al.*, (2020) [6, 5].

**3.1.7 Chlorophyll content** – From the data, it was revealed that the maximum Chlorophyll content of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (51.67) followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (50.00) and the minimum Chlorophyll content was recorded in $T_0$ (control) with (38.68).
These results are supported by the findings of Singh and Mishra (2005) [7].

**3.1.8 Root length:** The maximum root length of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (11.59) followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (11.13) and the minimum root length was recorded in $T_0$ (control) with (8.55).
These results are supported by the findings Rai and Mishra (2005), Seema Kumari *et al.*, (2019) [8, 9].

**3.1.9 Number of secondary roots:** The maximum Number of Secondary Root of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (39.54) followed by treatment $T_6$ (Soil + Vermicompost +FYM 1:1:2 respectively) with (38.8) and the minimum Number of Secondary Roots was recorded in $T_0$ (control) with (30.06).
These results are supported by the findings of Kaur J. *et al*., (2019) [3].

**3.1.10 Number of tertiary roots** – The maximum Number of Tertiary Root of karonda was recorded in treatment $T_5$ (Soil + Vermicompost + FYM 1:2:1 respectively) with (39.54) followed by treatment $T_6$ (Soil + Vermicompost + FYM 1:1:2 respectively) with (38.8) and the minimum Number of Tertiary Roots was recorded in $T_0$ (control) with (30.06).

**Table 2:** Effect of different levels of N:P:K, Vermicompost and FYM on Growth parameters of Karonda.

| Treatments | Plant height (cm) | No. of Leaves | Stem girth | Number of branches | Leaf area | Leaf area index |
|---|---|---|---|---|---|---|
| $T_1$-Soil (Control) | 30.47 | 28.37 | 4.96 | 3.53 | 2.72 | 0.54 |
| $T_2$-RDF+Soil+Vermicompost (1:1) | 38.58 | 35.78 | 6.16 | 4.10 | 3.28 | 0.64 |
| $T_3$-RDF+Soil+FYM (1:1) | 36.87 | 34.48 | 5.67 | 4.00 | 3.16 | 0.63 |
| $T_4$-RDF+Soil+Vermicompost+FYM (1:1:1) | 41.62 | 38.07 | 6.88 | 4.98 | 3.57 | 0.71 |
| $T_5$-RDF+Soil+Vermicompost+FYM (2:1:1) | 40.3 | 36.64 | 6.5 | 4.46 | 3.48 | 0.69 |
| $T_6$-RDF+Soil+Vermicompost+FYM (1:2:1) | 44.62 | 41.75 | 7.39 | 5.40 | 3.87 | 0.77 |
| $T_7$-RDF+Soil+Vermicompost+FYM (1:1:2) | 42.9 | 39.02 | 7.15 | 5.18 | 3.77 | 0.761 |
| $T_8$-RDF+Soil (1:1) | 35.2 | 32.43 | 5.36 | 3.81 | 2.87 | 0.57 |
| F test | S | S | S | S | S | S |
| SE (d) | 0.333 | 0.347 | 0.118 | 0.578 | 0.039 | 0.013 |
| CD (5%) | 0.721 | 0.752 | 0.256 | 1.251 | 0.085 | 0.027 |
| CV | 1.05 | 1.187 | 2.307 | 15.944 | 1.433 | 2.319 |

| Treatments | Chlorophyll content | Root length | Number of secondary roots | Number of tertiary roots | Establishment percentage |
|---|---|---|---|---|---|
| $T_1$-Soil (Control) | 38.68 | 8.55 | 30.06 | 175 | 66.90 |
| $T_2$-RDF+Soil+Vermicompost (1:1) | 42.44 | 9.66 | 33.92 | 210 | 84.22 |
| $T_3$-RDF+Soil+FYM (1:1) | 41.61 | 9.11 | 32.86 | 189 | 79.29 |
| $T_4$-RDF+Soil+Vermicompost+FYM (1:1:1) | 47.94 | 10.75 | 36.18 | 240 | 87.67 |
| $T_5$-RDF+Soil+Vermicompost+FYM (2:1:1) | 46.51 | 10.08 | 35.17 | 237 | 86.93 |
| $T_6$-RDF+Soil+Vermicompost+FYM (1:2:1) | 51.67 | 11.59 | 39.54 | 277 | 91.07 |
| $T_7$-RDF+Soil+Vermicompost+FYM (1:1:2) | 50 | 11.13 | 38.80 | 254 | 89.04 |
| $T_8$-RDF+Soil (1:1) | 40.45 | 8.93 | 30.83 | 185 | 74.92 |
| F test | S | S | S | S | S |
| SE (d) | 0.226 | 0.115 | 0.25 | 29.712 | 2.631 |
| CD (5%) | 0.489 | 0.248 | 0.541 | 64.342 | 5.698 |
| CV | 0.616 | 1.408 | 0.882 | 16.475 | 3.906 |

## 4. Conclusion

From the present investigation, it is concluded that among the different inter cropping's, the treatment $T_5$-RDF+Soil+Vermicompost+FYM (2:1:1) was found in superior in terms of number of leaves, plant height, number of shoots. Among the different treatments, the highest gross return, net return and benefit cost ratio is also under the treatment $T_5$-RDF+Soil+Vermicompost+FYM (2:1:1)

## 5. References


1. Chadha KL. Handbook of Horticulture. Directorate of knowledge management in agriculture. ICAR New Delhi; c2003. p. 200-201.
2. Mishra KK. New karonda varieties from Pant Nagar. Indian Horticulture. 1998;52(4):9-10.
3. Kaur J, Kaur A. Studies on seed viability, germination and seedling vigour in karonda. Int J Recent Sci Res. 2019;10(6):32742-32745.
4. Maanik DJB, Jasrotia A, Bakshi P, Sharma R, Lal M. Propagation studies on karonda (*Carissa carandas* L.) Under Jammu sub-tropics.
5. Bons HK, Paul A. Characterization of karonda (*Carissa carandus*) genotypes under Punjab conditions. Indian J Agric Sci. 2020;90(2):449-452.
6. Baghel K, Sahu GD, Chandrakar Y, Chandel Y. Study on effect of organic pre sowing treatments on seed germination of papaya (*Carica papaya* L.) in Chhattisgarh plains.
7. Singh S, Singh AK, Meghwal PR, Singh A, Swamy GSK. Karonda. In: Tropical and Sub Tropical Fruit Crops: Crop Improvement and Varietal Wealth Part, 1; c2014.
8. Rai R, Misra KK. Micropropagation of Karonda (*Carissa carandas*) through shoot multiplication. Sci Hortic. 2005;103(2):227-232.
9. Seema K, Mehta K, Singh N. Studies on the effect of plant growth promoting rhizobacteria (PGPR) on growth, physiological parameters, yield and fruit quality of strawberry cv. chandler. J Pharmacogn Phytochem. 2018;7(2):383-387.
10. Surabhi VK, Raikar SD, Channaveerswami AS. Studies on influence of gibberellic acid (GA3) on growth, seed yield and quality of Zinnia (*Zinnia elegans* Jacq). Int J Pure Appl Biosci. 2018;6(3):548-552.
11. Narute TT, Parulekar YR, Narute TK. Effect of plant growth regulators on yield and yield attributing character of marigold cv. Calcutta marigold under Konkan conditions. Int J Curr Microbiol Appl Sci. 2020;9(10).
12. Gupta VN, Datta SK. Influence of gibberellic acid (GA3) on growth and flowering in chrysanthemum (*Chrysanthemum morifolium*, Ramat) cv. Jayanti. Indian J Plant Physiol. 2000;6(4):420-422.
13. Zosser Cherik N, Sangma, Devi Singh, Urfi Fatmi. Effect of plant growth regulators on growth, yield and flower quality of gerbera (*Gerbera jamesonii* L.) cv. Pink Elegance under naturally ventilated polyhouse (NVPH). Int J Curr Microbiol Appl Sci. 2017;6(10):468-476.