



## A Study on Soil Health Issues in Cultivating Curry leaf (*Murraya koenigii*) in Nutrition Gardens of Raichur district in Karnataka

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**ABSTRACT:** Curry leaves (*Murraya koenigii*) have been used as a flavouring agent in Indian cuisine since long time. Many studies have revealed that the curry leaves, whether fresh or dried, are a good source of many nutrients that benefit the human health. However, there are typical problems associated in cultivating the plant in the backyards. It is essential to consider the soil related factors that support the proper establishment of the plant, which requires generally two years. Hence, the present study was conducted for two years in Mandalagera village, Raichur taluk and Raitanagar Camp village in Sindhanur taluk, of Raichur district. There were 38 gardens, in which plants could successfully establish among the 50 initiated in two villages. Each of these gardens was evaluated for their soil health properties that supposed to support the plant establishment. Typical soil properties ranged between low to medium soil nutrition content as per the soil health composition. The established curry leaf plants were evaluated for their plant properties such as height and spread of canopy. Their patterns of distribution were studied. The plant height ranged from 95 to 185 cm, with an average of 126.6 cm and their canopy width ranged from 52 to 175 cm, with an average of 121.1 cm. Every plant in the garden was supplied with the farm yard manure regularly at an interval of two months and soil moisture was maintained.

**Keywords:** Curry leaf, *Murraya koenigii*, Nutrition Garden, Soil Health, FYM.

### INTRODUCTION

Use of spices in Indian cuisine has a long history which holds a special place in the different food systems in the world. A number of spices are in continuous usage in various foods prepared in Indian kitchens. Curry leaf (*Murraya koenigii*) plant belonging to the family Rutaceae is used very commonly in India, especially in Southern parts. There are trials to grow it in pots, but they were poorly successful, however, transplantation in the fields produces profuse biomass. The curry leaf tree should be grown in nutrient rich, well-drained soil that has full sunlight or even partial shade. In general fresh leaves have good flavour and high nutritive values. Curry leaves are a good source of antioxidants, vitamins, minerals and alkaloids (Mamta and Kanika 2019). It is therefore a good spice as well as a medicinal plant which needs the attention of nutrition gardening (Jain *et al.*, 2017).

Various efforts in understanding the agronomic practices for the curry leaf plant and the associated soil properties suggest the need for understanding the soil health issues in successful establishment of the plant. Especially in the regions where the soils are alkaline in nature. Such soils specially resist the initial growth and establishment of the plant. A suggestion of general

cultivating practice of application of farmyard manure or sufficient organic compost in alternate months was studied.

Utilization of curry leaves in routine food items has been a general practice with fried foods. Daily requirements of fresh leaves supported with fresh harvest by backyard gardens. Nutrition gardens serve these special purpose nutrition gardens have a special impact on year-round nutrition security in farm families (Anupama *et al.*, 2022). In order to address the soil health issues in neutral to alkaline soils of the Raichur district, the present study was undertaken.

### MATERIAL AND METHODS

This study on soil health issues was conducted during 2018-19 and 2019-20 in two villages of Raichur district. Mandalagera village in Raichur Taluk and Raitanagar Camp in Sindhanur Taluk were the two villages, in which, twenty-five families in each village were selected. Sums of 50 seedlings of curry plant were distributed with a suggestion of continuous monitoring with supply of farmyard manure (FYM) or compost. Every plant was supplied with 10 kg of FYM or compost in every 8 weeks of duration thereby, 12 applications of 120 kg of manure was supplied in two years.

A training programme was conducted in the beginning, regarding nutrition garden, plant care and awareness programme for soil health monitoring. Periodical visit and monitoring of the experimental site was made to ensure the plant care and soil moisture management. Soil samples of every planted site were collected at 0-15 cm during initiation, after one year and after two years of planting. The soil samples were analysed for pH (1:2.5), Electrical Conductivity ( $\text{dS m}^{-1}$ ), Organic carbon (%), available Nitrogen ( $\text{kg ha}^{-1}$ ), available Phosphorus ( $\text{P}_2\text{O}_5 \text{ kg ha}^{-1}$ ) and available Potassium ( $\text{K}_2\text{O kg ha}^{-1}$ ). The plant parameters such as plant height and plant canopy spread were measured for two years of observation.

## RESULTS AND DISCUSSION

The observations were recorded with the experimentation of soil properties during the cultivating period of curry leaf plant with each plant's height and canopy cover. Importance of a plant being used on regular basis grown in the back yards supported the interest of the participating farmers. However, only 38

plants were established and could be managed in two years of the study. The soil and plant parameters of these 38 plants were studied.

Soil parameters were recorded before the initiation of experiment and after first and second year of planting. FYM was applied before planting and successively applied either FYM or Compost of 10 kg every alternate month. Every day plants were watered to manage the soil moisture at field capacity. Under each plant, the soil samples were collected and analysed for their dynamic properties and recorded and presented in Table 1 and 2 to understand the establishment of the curry leaf plant in the study area. Soil properties for their dynamic issues were analysed. Mean and standard deviation (SD) were used to analyse the parameters under study. Measured soil parameters such as pH, Electrical conductivity (EC), Organic Carbon, Nitrogen, Phosphorus and Potassium for the 38 plants after each year of planting are presented in Table 1.

**Table 1: Dynamics of Soil properties observed after each year of experiment.**

| Parameters   | Soil properties after |             |         |      |        |         |
|--|-----------------------|-------------|---------|------|--------|---------|
|  | I year                |             | II Year |      | I year | II Year |
|  | Range                 |             | Mean    |      | SD     |         |
| pH (1:2.5)   | 6.8 - 8.0             | 6.7 - 7.8   | 7.10    | 7.15 | 0.35   | 0.31    |
| EC ( $\text{dS m}^{-1}$ )                                | 0.72- 1.20            | 0.75 - 1.10 | 0.81    | 0.79 | 0.13   | 0.12    |
| Organic Carbon (%)                                       | 0.5 - 1.25            | 0.6 - 1.30  | 0.75    | 0.80 | 0.16   | 0.14    |
| Available Nitrogen ( $\text{kg ha}^{-1}$ )               | 120 -150              | 150 - 195   | 130     | 155  | 28.75  | 26.55   |
| Available $\text{P}_2\text{O}_5$ ( $\text{kg ha}^{-1}$ ) | 25-52                 | 31 - 54     | 32      | 35   | 6.5    | 6.8     |
| Available $\text{K}_2\text{O}$ ( $\text{kg ha}^{-1}$ )   | 225 - 300             | 200 - 325   | 240     | 250  | 35     | 34.5    |

The soil reaction was measured as pH ranged between 6.8 and 8.0 amongst the sample with a mean of 7.10 and 7.15 observed after the first and second year respectively. An average of deviation occurred with 0.31 and 0.35 from each sample evaluated. The electrical conductivity measured in  $\text{dS m}^{-1}$  ranged between 0.72 and 1.20. The maintained fertility levels during the observed period such as after one year and after two year were recorded. Organic carbon ranged

between 0.5 to 1.30 %, available nitrogen ranged between 120 – 195  $\text{kg ha}^{-1}$ . This is evaluated and rated as low to medium. The available phosphorus in terms of  $\text{P}_2\text{O}_5$  ( $\text{kg ha}^{-1}$ ) has been rated as medium in rating. Potassium for its availability measured in terms of  $\text{K}_2\text{O}$  ( $\text{kg ha}^{-1}$ ) ranged between 25 to 54, with an average of 33.5 throughout the study period. There were supported studies related to soil parameters and plant health (Bonde *et al.*, 2007).

**Table 2: Dynamics of Soil properties observed during the entire experimentation.**

| Parameters   | Dynamics of Soil properties |             |                |             |                |             |
|--|-----------------------------|-------------|----------------|-------------|----------------|-------------|
|  | While Planting              | Two years * | While Planting | Two years * | While Planting | Two years * |
|  | Range                       |             | Mean           |             | SD             |             |
| pH (1:2.5)   | 6.7 - 8.1                   | 6.7 - 8.0   | 7.10           | 6.75        | 0.32           | 0.34        |
| EC ( $\text{dS m}^{-1}$ )                                | 0.71 - 1.15                 | 0.75 - 1.10 | 0.80           | 0.75        | 0.12           | 0.11        |
| Organic Carbon (%)                                       | 0.5 - 1.10                  | 0.65 - 1.25 | 0.80           | 0.85        | 0.15           | 0.14        |
| Available Nitrogen ( $\text{kg ha}^{-1}$ )               | 125 - 165                   | 130 - 185   | 135            | 145         | 25.65          | 24.25       |
| Available $\text{P}_2\text{O}_5$ ( $\text{kg ha}^{-1}$ ) | 23 - 50                     | 30 - 55     | 28             | 35          | 6.75           | 6.45        |
| Available $\text{K}_2\text{O}$ ( $\text{kg ha}^{-1}$ )   | 200 - 255                   | 200 - 315   | 245            | 285         | 34.10          | 32.20       |

\* Pooled Dataxd

The similar soil dynamics on the observed properties were compared for their overall pattern and presented in Table 2. This in fact, the comparison of the soil dynamics between the soil properties before initiation and after the experimentation completion. It showed that the effective management of soil health supported

the establishment of curry leaf plant. The success of plant establishment in two years of care was found to be substantial, to the extent of 76%. The measurement of plant height and the spread of canopy are further explained through Table 3 and 4.

**Table 3: Dynamics of Plant growth observed after each year of experimentation.**

| Parameters        | Plant growth after |          |         |       |         |      |
|-------------------|--------------------|----------|---------|-------|---------|------|
|                   | I Year             |          | II Year |       | II Year |      |
|                   | Range              |          | Mean    |       | SD      |      |
| Plant Height (cm) | 45 – 62            | 95 – 185 | 55.5    | 126.6 | 12.5    | 31.1 |
| Canopy Width (cm) | 38 – 95            | 52 – 175 | 45      | 121.5 | 1.0     | 32.5 |

The plants when were planted had a height of an average of 12 – 15 cm attained the height of 45 – 62 cm in first year and 95 – 185 cm in second year. The canopy spread was 16-20 cm while planted spread to 38 – 95 cm in first year and 52 – 175 in second year. It

helped for the establishment of plants in two years. Such observations are supported by few studies. The impression of the researchers as the critical period of plant establishment (Gupta *et al.*, 2012).

**Table 4: Dynamics of Plant growth observed during the entire experimentation.**

| Parameters        | Dynamics of Soil properties |          |             |       |             |      |
|-------------------|-----------------------------|----------|-------------|-------|-------------|------|
|                   | While Planting              |          | Two years * |       | Two years * |      |
|                   | Range                       |          | Mean        |       | SD          |      |
| Plant Height (cm) | 18 – 22                     | 95 – 175 | 20.5        | 120.5 | 2.5         | 30.1 |
| Canopy Width (cm) | 12 – 25                     | 45 – 160 | 16.5        | 121.5 | 31.0        | 31.5 |

The plant parameters such as plant height and canopy cover compared between initial planting and after two years of planting were found to be in supportive of curry leaf plant establishment.

### CONCLUSIONS

The study on soil health issues in cultivating curry leaf (*Murraya koenigii*) in nutrition gardens in neutral to alkaline soils concludes the requirement of continuous management of soil health. The observations made during the study for two years concluded the effectiveness of the initial establishment with a success of 76 % of plant survivability.

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