SHORT COMMUNICATION

Popularization of raised bed method of turmeric cultivation for rhizome rots control

Srividya Rani.N*, M.Balakrishna, S.Firoz Hussain, B.S.Kanthi Sri and E.Karunasree
KVK, Vonipenta, Mydukur, YSR district-516173,
Dr.Y.S.R.Horticultural University, Andhra Pradesh
**Email vidyamscag@gmail.com*

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ABSTRACT

Krishi Vigyan Kendra, Vonipenta had conducted Front Line Demonstration on Turmeric from 2020 to 2022 in Adireddypalli, Settivaripalli, Chapadu, kesalingayapalli, Gangavaram, Viswanathapuram and Kasinayana villages to study the potential yield reduction factors that are mainly due to the diseases and yield difference between the farmers' practice and demonstration. To control rhizome rot seed treatment with metalaxyl + mancozeb @ 2 g/l + monocrotophos @ 1.5ml/l of water followed by soaking in Trichoderma viride @ 5g/l of water. The net returns were higher in raised bed method of cultivation followed by seed treatment and suggested the large area also to undergo this practice.

INTRODUCTION

Turmeric is the major crop which is spread in an area of 6000 acres in the year 2020 to 2022 and it is one of the most important commercial crops being cultivated in the major mandals with an area of 2144 acres in the year 2023 (Report of State Department of Horticulture, Andhra Pradesh). We have observed turmeric package of practices, yield and marketing aspects from the year 2017, but the farmers are facing major problem like Rhizome rot infestation and the yield was reduced with a major loss of more than 60 per cent. So, in order to overcome this problem, we have initiated FLD (Front Line Demonstration) on Raised bed method of turmeric cultivation in the year 2020-2022 and selected villages were Adireddypalli, Settivaripalli, Chapadu, kesalingayapalli, Gangavaram, Viswanathapuram and Kasinayana

Farmers generally grow turmeric by adopting traditional method of sowing in the flat beds. This method results in increased incidence of rhizome rot which increases cost of cultivation, decreases yield and economic returns. Planting method of rhizome influence growth and yield of turmeric. Ridge and furrow method, raised bed method of turmeric cultivation decreases rhizome rot incidence. However, these methods were adopted previously in relatively lesser area of YSR district. So, ICAR, KVK, Vonipenta have conducted trails and demonstrations of turmeric cultivation on raised bed method with drip irrigation in farmers' field to facilitate larger adoption of the practices and for better yield.

Rhizomes rot of turmeric in flat bed method of cultivation

The disease causes root rot and rhizome rot caused by *Pythium aphanidermatum*, resulting in typical rot of rhizomes from October onwards. The affected rhizomes appear soft and shrunken to start with, later dry up and become hard. Foliar yellowing

and drying up of foliage which are the normal symptoms of maturity of the crop during October - November would be indistinguishable from the symptoms of the disease affected clumps. When infected rhizomes are cut open, the infected zones typically appear as dull brown and dark (Choudhary *et al.*,2009). The disease development occurs as the pathogen is facultative parasites and lives as a saprophyte on the organic matter in the soil for several years. It spreads from vulnerable plants and the disease is favored by 35 °C soil temperature, 15-20 percent soil moisture in alluvial or sandy soils. In order to control this rhizome rot infestation raised bed method of planting is practiced. Non adoption of seed treatment, inadequate use of recommended fertilizers and lack of awareness on plant protection measures are the major cause under plant pathology aspects.

Background of improved method of cultivation

Under Horticulture aspects -KVK, Vonipenta has popularized turmeric cultivation on raised bed with drip irrigation system for efficient use of natural resources and prevention of rhizome rot in order to get higher yields and net returns. Each year, the Front line demonstration was conducted in 10 locations covering these four villages. The demonstration on cultivation of turmeric by raised bed method with drip irrigation comprised of cultural, biological and chemical methods. Apart from showcasing the viability of raised bed method, farmers were also sensitized on the relevance of these technologies (Hiremath and Hilli, 2012) by organizing awareness programmes on seed treatment in the farmers' fields during sowing of turmeric, focused group discussions on how important the seed treatment is in reducing the rhizome rot in turmeric, conducting method demonstrations by involving RHWEP (Rural Horticultural Work Experience Programme) students in adopted villages, training programmes on package of practices in turmeric crop and sending timely messages through different Information and Communication Technologies and also through kisan mobile advisories.

Good practices

The FLD was conducted to study the potential yield reduction factors that are mainly due to the diseases and yield difference between the farmers' practice and demonstration. To control rhizome rot seed treatment with metalaxyl + mancozeb @ 2 g/l + monocrotophos @ 1.5ml/l of water followed by soaking in *Trichoderma viride* @ 5g/l of water. Cultivation of Turmeric by raised bed (Paired row with drip) method (convenient length, 20-25cm height, 90cm width, 30cm between two beds for drainage and 45cm between the paired rows) (Nagarjuna *et al*.,2021). Horticulture department officials, Agriculture department officials and ATMA staff are conducting programmes through trainings for VHAs (Village Horticultural Assistants) and VAAs (Village Agricultural Assistants) and also through RBKs (Rythu Bharosa Kendras) they are conducting the programmes.

Challenges

Initially the farmers in Mydukur and Turmeric growing regions, the farmers were not practicing seed treatment as they were thinking it is time taking and increased the cost of cultivation, but after practicing the farmers realized the importance of seed treatment which had a great impact on reduction of rhizome rot by reducing the chemical sprays through FLDs and training programmes.

Benefit and impact

1. Rhizome rot infestation had been reduced
2. Seed treatment also reduced the incidence of rhizome rot
3. Obtaining good yields due to less incidence of rot
4. Cost of cultivation had been reduced as the seed treatment reduced the chemical sprays
5. Fetching higher net returns and the impact nearly reached to 35 to 40 villages directly and indirectly to almost 28 villages through magazine readings etc.

The benefit and impact of raised method of cultivation have been detailed in the following Tables and graph.

Sustainability and scaling up

Use of this raised bed method of turmeric cultivation reduced the incidence of rhizome rot and cost of cultivation which is the need of the hour to be incorporated into the farmers of its importance through awareness, method demonstrations, on and off campus training programs in the adopted villages of KVK (Sunil Kumar *et al.*,2021). This can happen even without KVKs through the line departments of agriculture and horticulture as the KVKs can't reach the entire district.

Lessons learned

- Farmers need more attention after harvesting of the fresh rhizomes for advanced storage facilities next crop and post- harvest management of fresh rhizome.
- They need facilities like turmeric boilers at-least one or two per each village on rent basis through KVK system and this can be provided through other KVKs where turmeric cultivation is mainly promoted.
- Farmers-producer organizations in KVK operational areas are providing services to the farmers through KVKs on trainings and marketing aspects on cultivation and post- harvest management techniques in turmeric.
- NGOs, Coromandel and Grow more companies interacted with the KVK regarding success in turmeric cultivation and they are also taking into other villages also.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Table 1: Average yield aspects from 2020 to 2022 of the Turmeric crop under FLD

Crop(Turmeric)	Yield (t/ha.)	Cost of Cultivation (Rs./ha)	Gross returns (Rs./ha)	Net returns (Rs./ha)	B:C Ratio
Demonstration	39.6	1,70,500	5,80,800	4,10,300	3.41
Farmer practice	34	1,76,400	5,19,734	3,43,334	2.94

Table 2: Through awareness programmes in the year 2023 and 2024 the yield aspects are as follows

Crop (Turmeric)	Yield (t/ha.)	Cost of Cultivation (Rs./ha)	Gross returns (Rs./ha)	Net returns (Rs./ha)	B:C Ratio
Demonstration	42.3	1,50,000	6,43,500	4,93,500	4.29
Farmer practice	35	1,67,400	5,25,000	3,57,600	3.13