



**Tamil Nadu Agricultural University**

**All India Co-ordinated Research Project  
on Spices**

## **Management of Turmeric Rhizome rot**



### **Further Information**

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## Management of Turmeric Rhizome rot

Turmeric (*Curcuma longa* L.) stands next to black pepper and cardamom in earning foreign exchange. Turmeric is susceptible to diseases, viz., leaf blight, anthracnose and rhizome rot. Among the various diseases, Rhizome rot of turmeric is the major problem in all turmeric growing areas causing severe crop losses upto 30%. The causal organism is *Pythium aphanidermatum*. Management of rhizome rot through fungicides has reduced the biodiversity of soil microbes and has led to the development of resistant strains of pathogens.

The increasing concern about the environmental impact of the misuse of pesticides has led to the search for alternative plant protection strategies. Moreover; pesticide residues also pose problems to the export oriented spice crops. Hence, biological control might be an alternative, Ecofriendly and sustainable practice for the management of rhizome rot.

### Symptoms

Typical yellowing of leaves starting from lower leaves, which gradually spread to upper regions of the plant. The margin of the leaves turned necrotic and starts drying from the margin inwards resulting in partial or complete blighting of leaves.

Water soaked, dark brown lesions appear on the pseudo-stem at the base that enlarges rapidly resulting in drying up of leaves.

The affected plants show varying degrees of root rot. The infection spreads from root to rhizome causing soft rot. As the infection progresses, the internal tissues disintegrate and outer skin gets depressed.

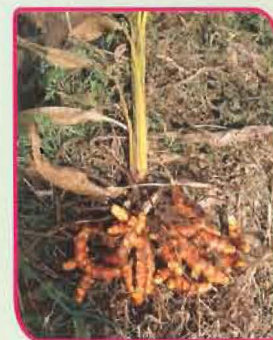
The bright orange colour of the tissues of rhizomes changes to different shades of brown in advanced stages, rotten rhizome emits foul smell.

### Management

Consortia of *Pseudomonas fluorescens* (Pfl)+ *Trichoderma viride* as seed treatment (4g/Kg) + Soil application of (2.5 kg/ha each as basal and top dressing at 150 DAP) was found to be effective with 82.38 % of control over traditional method of control.



Infected field view



Infected plant



Infected rhizomes

5. Basal application :

FYM 25 t/ha / Vermicompost -2t/ ha, composted coir pith- 10t/ha/Neem cake-500 kg/ha + Ground nut cake 200 kg/ha, Urea - 55 kg Super phosphate - 335 kg, Muriate of Potash - 30 kg + Ferrous sulphate 30 kg + Zinc sulphate – 50 kg + 10 kg Azospirillum + 10 kg Phosphobacteria

6. Spacing:

The rhizomes are to be dibbled in the side of ridges, 45 cm apart at 15 cm spacing at a depth of 4 cm

7. Top dressing

Urea 55 kg + muriate of potash – 30 kg on 30, 60, 90, 120 & 150 days after planting

8. Micro nutrient spray : 500 ml/ha

9. After cultivation : Weeding, earthing up and irrigation

10. Plant protection

Rhizome rot : Copper oxy chloride (3.0 kg/ha) or 1 % Bordeaux mixture (Copper sulphate- 5kg, Lime- 5 kg in 500 lit of water/ha)



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**A high yielding turmeric  
culture - CL 101**



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## A High yielding turmeric culture - CL 101

Turmeric - an ancient spice native of South East Asia, it is used from antiquity as a dye and condiment. It is still used in rituals of the Hindu religion and as a dye for holy robes, being natural, unsynthesized. Turmeric also called as "Indian saffron".

Turmeric culture, CL 101 is a selection from the germplasm collected from Bhavanisagar local found to be superior in yield and quality among 120 germplasm collection maintained.

It has been evaluated on large scale for three years and proposed for evaluation in the Co-ordinated Varietal Trial (CVT) under AICRP on Spices with the check BSR 2. It was evaluated under CVT for four years and found to be superior among eleven genotypes evaluated.

Forty ART/ OFT/MLT trials were conducted at Coimbatore, Salem, Erode and Namakkal districts and the performance was found to be good.

### The mean yield performance of CL 101 under ART/OFT/MLT

#### Particulars

Yield/ha (tonnes)	CL 101	BSR 2
MLT	43.90	35.20
ART/OFT	39.40	31.40
Mean	41.65	33.30

Quality parameters	CL 101	BSR 2
Curcumin (%)	4.14	3.50
Oleoresin (%)	8.50	7.90
Essential oil (%)	3.04	2.66

CL 101 recorded a higher rhizome yield of 41.65 tonnes which is 25.07 % higher than the existing variety BSR 2. It also registered high curcumin content of 4.14 which is 18.29 % increase over the variety BSR 2.

### Salient Features

1. Parentage : Selection from the germplasm collected from Bhavanisagar local
2. Duration : 250-260 days
3. Season : May - June
4. Rhizome yield : 41.93 tonnes/ha
5. Curcumin content : 4.14%
6. Check variety : BSR 2
7. Per cent increase in yield (Over control)  
Yield : 26.48 %  
Curcumin : 18.29 %
8. Pest/ disease resistance (Field conditions)
  - i. Moderately resistant to leaf blotch and leaf spot. Highly resistant to rhizome rot.
  - ii. Field tolerant to thrips, shoot borer, leaf folder and scale insect.
9. Special features
  - i. High yielding
  - ii. High curcumin content
10. Area of adaptability Coimbatore, Erode and Salem Districts of Tamil Nadu

### Package of practices for Turmeric

1. Soil and climate  
A friable well drained red loamy soil in wet or garden lands under tropical conditions is ideal
2. Season : May - June
3. Seed rate : 2000 kg rhizomes /ha
4. Seed Treatment : 10 kg Azospirillum + 10 kg Phosphobacteria + *Pseudomonas fluorescens* (20kg/ha) + *Trichoderma viride* (8kg/ha)



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**Management of foliar  
diseases in turmeric**



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## Management of foliar diseases in turmeric

Turmeric (*Curcuma longa* L.) is an important commercial crop grown for its underground rhizome which is widely used as condiment, dye and medicine.

Among the fungal diseases, leaf spot caused by *Colletotrichum capsici* (Syd), leaf blotch caused by *Taphrina maculans* (Butler) are the major diseases of turmeric and causes yield losses upto 20 %.

### Leaf spot

- Elliptic or oblong spots of different sizes on both the surface but more on the upper surface
- The centre of the spots are grayish white and thin with numerous black dot-like acervuli arranged in concentric rings. Severely affected leaves dry and wilt.



**Leaf spot infected field**

### Leaf Blotch

- This disease usually appears on lower leaves in October and November.
- The individual spots are small and are mostly rectangular in shape.
- The disease is characterized by the appearance of several spots on both the surfaces of leaves, being generally numerous on the upper surface.
- They are arranged in rows along the veins.
- The spots coalesce freely and form irregular lesions.
- They first appear as pale yellow discolorations and then become dirty yellow in color.



**Leaf blotch infected field**

### Technology for the management of foliar diseases

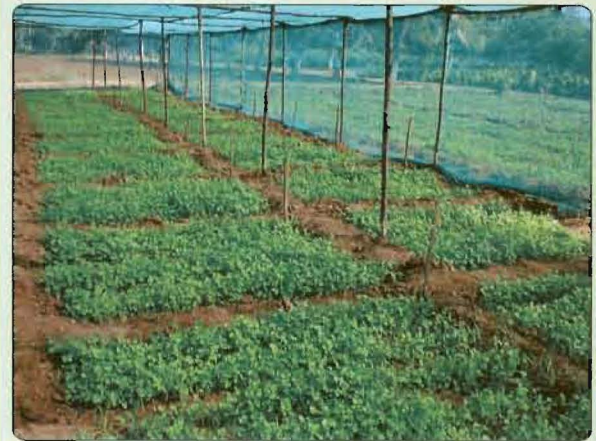
- Foliar spray with Propiconazole @ 0.1% on 45 and 90 days was found to be effective in reducing the foliar diseases of turmeric to 68.59 % control over check.



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**Cultivation of leafy coriander  
under shade net**



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## Cultivation of leafy coriander under shade net

Grown for green leaf as well as for seed. Coriander enjoys the status of a commercial crop in many countries of the world including India, Morocco, USSR, Hungary, Poland, Rumania, Guatemala, Mexico and USA.

Green coriander, which is also called Cilantro, Chinese parsley, Mexican parsley and Japanese parsley is used for seasoning of curries, salads, soups and in Chinese, Thai, Mexican and poultry dish.

In Tamil Nadu, the leafy coriander production and availability is very low during summer month (March - April). To overcome this problem, experiments were conducted for three years under open and shade net during summer. The Coriander was raised under different shade net houses with 35% shade, 50 % shade, 75% shade and open condition. In all the three years the highest leaf yield was recorded under 50% shade.

### The mean performance of leafy coriander

Shade levels	Herbage yield (kg/200 m <sup>2</sup> )	BC Ratio
35% shade	72.65	2.70
50% shade	116.30	4.35
75% shade	82.75	3.10
Open	52.30	1.90

### Description of the technology

- Season : March – April
- Shade level : 50 per cent agro shade net
- Variety : CO(CR)4
- Harvest : Physiologically matured leaf on 45<sup>th</sup> day of sowing

- Herbage yield of 116.30 kg/200m<sup>2</sup>
- Benefit cost ratio : 4.35
- Duration : 45 days

### Package of practices for Coriander

1. Season : March - April
2. Shade level : 50% agro shade net
2. Seed rate : 10-12kg /ha (Irrigated crop)
3. Seed Treatment : Azospirillum @ 1.5 kg/ha
4. Field preparation and sowing :

Prepare the main field to a fine tilth and form beds and channels (for irrigated crop). Sow the split seeds at a spacing of 20 x 15 cm. The seeds will germinate in about 8-15 days.

Seeds are to be treated with Azospirillum @ 3 packets/ha. Seed treatment with *Trichoderma viride* @ 4 g/kg of seed has to be done to control wilt disease.

5. Manuring: FYM 10 t/ha; 10 kg N, 40 kg P and 20 kg K as basal application.
6. Irrigation (for irrigated crop only) : First irrigation immediately after sowing and the second on the third day. Subsequent irrigations at 7-10 days interval.
7. Top dressing : Top dressing may be done at 10 kg N/ha 30 days after sowing.
10. Harvest: Physiologically matured leaf on 45<sup>th</sup> day of sowing.
11. Yield: 116.3 kg/200 m<sup>2</sup>



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## **Powdery mildew management in Coriander**



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## **Powdery mildew management in Coriander**

Coriander is one of the important culinary spice crops grown for its green leaves and seeds. The crop is prone to attack by several diseases. Among the diseases, the Powdery mildew disease caused by *Erysiphe polygoni* is an important disease causing yield loss upto 20%.

### **Symptoms**

- Small, white circular patches on young parts of stems and leaves.
- Coalesce to cover extensive areas of leaf surface.
- Leaves are reduced in size and distorted.

### **Bio control agents**

Application of fungicide on coriander leaves to control the disease causes direct effect to human health since the leaves are having aromatic value and tender leaves of coriander are used almost every day.

Therefore to alleviate all these ill effects bio control agents are the alternate viable technology for the management of powdery mildew of coriander.

Seed treatment with *Pseudomonas fluorescens* (IISR 6) at the rate of 10 g/kg of seed followed by foliar application @  $10^8$  CFU on 60 days after sowing and second spray on need based is effective in reducing the powdery mildew disease with an efficiency of 63.76 % compared to control (21.50%).

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