

MANAGEMENT OF CASSAVA STEM AND ROOT ROT

Introduction

Cassava is one of the important tuber crops in Kerala. During 2019, wilting with rotting of roots and stem in collar region was observed in cassava in some parts of Kollam district in Kerala. Later, this was seen in other districts of the state, where cassava is grown in wet lands which reduced the yield upto 100%. ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI) conducted extensive survey, laboratory studies and field trials which indicated that, these symptoms were likely to be caused by soil acidity coupled with nutrient imbalances under waterlogged conditions, which resulted in root damage and further aggravated by pathogenic infestation. To address this issue, management strategies were developed as given below.

Symptoms

This disease affects at all growth stages of the crop. Blackening of the stem and presence of fungal mycelia/pustules near the collar region is the main symptom. Usually, the infection starts at the base of the stem just below the soil and it progresses upwards and downwards. Later on, it spreads to the tubers, which subsequently get decayed. The feeder roots and stems are more infected than the tubers. In severely affected plants, the lower leaves show abnormal yellowing, drooping and wilting.



Leaf yellowing and wilting



Blackening of collar region



Fungal infection on the affected area

Factors responsible and causal organism

Since 2020, the disease was widespread and noticed in the cassava growing wetlands of all districts of Kerala. The symptoms usually appear very quickly in a short span of time, approximately within 7-10 days, following the onset of rain after a period of elevated temperature. In Kerala, the incidence was found high during May-June and September-October.

Different species of *Fusarium* in the soil cause stem and root rot. Infection is favoured by high soil acidity (pH: 3.5-5.0) and imbalanced soil nutrient status, especially excess N and low levels of Ca, Mg, B and Zn which was found aggravating the rotting followed by pathogen infection.

Management

- Follow strict sanitation of the field by removing and burning of the infected plants
- Maintain proper soil drainage especially in clayey soils
- In clayey soils, adopt deep ploughing or digging to a depth of upto 50 cm followed by application of recommended dose of organic manures either as farm yard manure (FYM) or compost @12.5 tonnes per hectare to improve the soil physical properties which will facilitate proper drainage and percolation of excess water in wetland conditions
- Apply soil ameliorant, either phosphogypsum or lime @ 1.5 tonnes per hectare at 10-15 days before planting after ensuring enough soil moisture at the time of application

- Follow balanced application of primary, secondary and micronutrients either through customized fertilizer (CF) with the grade as N: P₂O₅: K₂O: Mg: Zn: B @ 7: 12: 24: 3.5: 1.25: 0.4 (Preparation of CF is given in Table 1) @ 41 g per plant at 30-45 days after planting and top dressing with urea and muriate of potash @ 27 and 15 g per plant respectively within 30-45 days after first application or by following soil test based application of recommended nutrients @ N: P₂O₅: K₂O: MgSO₄: ZnSO₄: Borax @ 100: 50: 100: 20: 12.5: 10 kg per hectare.

Table 1. Preparation of customized fertilizer for cassava

Sl. No	Fertilizer	Content	Quantity required (g per kg or kg per ton)
1	Urea	N- 46%	50
2	Di ammonium phosphate	N-18%, P ₂ O ₅ -46%	260
3	Muriate of potash	K ₂ O- 60%	400
4	Magnesium sulphate	Mg-16%	155
5	Zinc sulphate	Zn-33%	40
6	Borax	B-10.5%	40
7	Filler/lime/dolomite/any other inert material		55

- Apply neem cake @ 20 g per plant
- Apply *Trichoderma asperellum* enriched FYM @ one kg per plant (Mix 2.5 kg *T. asperellum* with 100 kg FYM, keep for two weeks in shade by covering with plastic sheet and mix it with 12.5 tonnes of FYM for application in one hectare) (or) apply 50 g of *T. asperellum* enriched manure prepared by mixing one kg of *T. asperellum* with 100 kg of FYM or vermicompost
- Use only healthy uninfected setts as planting materials and avoid planting of setts from infected fields
- Dip the setts in Carbendazim 50% WP solution (prepared by dissolving one g in one litre) for 10 minutes. This will provide protection from fungal infections in and around the planting material
- After rainfall, if the initial symptoms are observed, drench the soil around the stem with Carbendazim 50% WP solution (prepared as above) and the drenching volume can be adjusted according to the age of the plant. OFTs conducted in Kerala are given below.



**OFT at Sadanandapuram
(Kollam)**



**OFT at Parasuvaikkal
(Thiruvananthapuram)**



**Farm advisory visits at Palakuzha
(Ernakulam)**

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