Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 04, Issue: 04 (JULY-AUG, 2024)
Available online at http://www.agriarticles.com

Ganoderma wilt (Thanjavur *wilt*): A lethal Disease of Coconut Palm

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Coconut is one of the major plantation crops that are grown in the tropical areas of India. Because of its diverse use in the commercial sector, the tree is often described as 'Kalpavriksha'. India, besides Indonesia and the Philippines, is one of the world's major producers of coconut. The annual production is estimated to be 13.5 metric tonnes, contributing to Rs 307,498 million to the country's GDP. The coconut tree holds great importance in the nation's GDP, providing a significant source of employment and income-generating opportunities among horticultural crops. Due to its high adaptability to various edaphic factors such as soil, climate, and topography, the coconut palm has a high demand in the country.

The repeated occurrence of various lethal and debilitating diseases is the major factor that declines the production of coconut in our country. There are various insect pest and fungal pathogens that affect the coconut palms leading to a decrease in yield. Among these pathogens Basal stem rot caused by Ganoderma spp. is one of the severe disease affecting coconut trees.The disease also known as Thanjavur wilt ,as it emerged in the coastal areas of the Thanjavur district in Tamil Nadu. It is a widespread disease in Tamil Nadu particularly in the districts of Thanjavur and Chengulpet. Nowadays the disease has surfaced in various parts of Kerala, with the notable occurrence in the district of Malappuram, Kollam, Thrissur, and Palakkad .The pathogen has a wide range of host affecting not only coconut palms but also various other palms and several other fruit trees.

Causal organism

Ganoderma applanatum, Ganoderma boninense and Ganoderma lucidum

Epidemiology

- The palms are getting more affected from March – August. During this period a high number of wilted trees and bleeding symptoms are largely noticed, the palms experience high disease susceptibility. During these months , a large number of palms get affected and undergoes wilting.
- Uncontrolled flood irrigation or running water along the palm rows in the coconut gardens will result in the rapid spread of the disease.
- The annual rate of disease spread is from 0.2 -0.4 percent . The disease spread is through root contact from diseased roots to healthy roots.

Symptoms

- The initial symptoms of Basal stem rot (Ganoderma wilt) can be manifested as the outer whorl of leaves starts yellowing, withering and drooping.
- Widespread discolouration and rotting of roots results in the emitting of foul odour from the bark

- From the basal portion of the stem , a reddish-brown viscous liquid gradually oozes and bleeding patches will develop. These patches are very soft in touch .These bleeding patches initially develop near the ground level and in advanced stages, the basal portion of the stem completely decays which results in the death of the palm.
- At the initial stage of infection there is button shedding. The emergence of new flowers are halted. In advanced stages, the affected palm and its bunches will exhibit a downward drooping.
- The nuts in the tree will be of poor quality, with a majority being barren and unsuitable for either marketing or culinary purposes.
- When the infestation starts, the formation of new active roots will get arrested.
- The bark becomes brittle and frequently peels off in flakes, revealing open cracks and crevices.
- During rainy season, brackets will form at the base of the trunk. Ultimately, these brackets will develop which results in the death of the palm.

Management

Cultural Methods

- Remove and burn all the affected palms in the garden .
- Coconut crop can be intercropped with banana and there by reduce the disease incidence.
- Avoid flood irrigation and repeated ploughing in the coconut gardens
- At the flowering stage, cultivate and incorporate green manure crops such as daincha , sun hemp directly into the soil.

Biological Methods

- Apply *Pseudomonas fluorescens* (Pf1) @ 100g/palm/Year
- *Trichoderma viride* can be used @ 100g/palm/year.
- Apply 2kg of lime and 3 kg of potash per palm which reduces the infestation.
- Mix 200 grams of *Azotobacter* and 200 grams of *Phosphobacter* with 50 kg of farmyard manure and can be applied in the field.
- Apply Farm Yard Manure 50kg + neem cake 5 Kg once in 6 months along with fertilizers and spray the mixture onto the palm.
- Basal stem rot can be detected by EDTA test. These test is based on the O.D. values and based on that value disease intensity can be detected.

Chemical Methods

- To prevent infestation, create trenches four feet away from the palm's base and apply sulphur dust into the trenches.
- Create trenches with a radius of 1.5 meters around the palm and pour 40 litres of a 1% Bordeaux mixture into the trenches.
- For effective application, either trunk injection or root feeding methods can be employed. For root feeding, choose an active root with a small thickness, make a slanting cut, and immerse the cut end in any of the following chemicals:
    - Tridemorph (calixin 5 per cent)@2ml per 100 ml of water
    - Hexaconazole @1 ml per 100 ml water
- 2 g of Aureofungin solution and 1 g of copper sulphate solution can be mixed with 100 ml of water and can be used for trunk injection. The root feeding can be done once in a month which reduces the infestation