

# Re-emergence of lethal wilt disease in east coast regions of Tamil Nadu

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Coconut (*Cocos nucifera* Linn.) is one of the versatile plantation crops that provides livelihood security to more than 12 million farm families worldwide. Coconut has been extensively cultivated in the east coast regions of Tamil Nadu and forms the backbone of agrarian economy in this tract. The coconut farmers faced a severe setback due to the Gaja cyclone in 2018 that ravaged the coconut plantations in this region. Farmers are slowly limping back to normalcy with planting of new coconut seedlings. Amidst such a situation of crop loss and recovery thereafter, the re-occurrence of the lethal wilt disease of coconut in Thanjavur district was reported during February - March 2022. This disease was first reported from this region during 2007 as a disease of unknown etiology and later named as lethal wilt disease (LWD) in 2021 after characterizing the phytoplasmal pathogen associated with it. Being a region endemic to basal stem rot disease (Thanjavur wilt), farmers are hereby sensitized about the re-emergence of LWD and symptoms of these two diseases for better clarity, understanding and for further timely follow-up.

## Lethal wilt disease (LWD)

As the name indicates, this is a lethal disease that kills the palm. This disease is associated with phytoplasma belonging to '*Candidatus phytoplasma asteris*' (16Srl-B), a prokaryotic phytopathogenic bacteria. Phytoplasmas are usually restricted to phloem of palms arresting the translocation of photosynthates. Abnormal and sudden nut fall including buttons is the first characteristic symptom of LWD. Inflorescence necrosis and shedding of male flowers will be immediately followed. Yellowing and bronzing of leaves progresses from the outer whorls

to spear leaf. The dried leaves remain hanging on the crown (skirting of leaves around the trunk) for a few days before detachment from trunk. As disease advances, necrosis and rotting of spear leaves and death of growing point occurs (Fig.1). Eventually, the entire crown perishes leaving a bare trunk. Affected palms die within 3-5 months after the appearance of the initial nut fall symptom. The rapid death of palms is definitely a matter of concern to the farmers of the region.

Occurrence of LWD affected palms is seen in leaps and jumps typical to vector transmission. Phytoplasma disease is usually transmitted by auchenorhynchan hemipteran insects which has not been established in the case of LWD so far. LWD is normally noticed during December to June, with a peak during summer phase (February - May). This may be due to the active prevalence of the vectors





during summer months. The transmission rate is quite slow in the region.

### Re-emergence of LWD

After the first report during 2007, the disease incidence was gradually progressing in east coast of Tamil Nadu. During 2016-2018, LWD was rampant in Thanjavur, Thiruvarur and Pudukottai districts of Tamil Nadu killing more than 300 palms. In November 2018, Gaja cyclone has devastated coconut plantations in the LWD endemic tracts. As majority of the adult yielding palms were uprooted and destroyed by the cyclone, there was no report on the occurrence of LWD in the three subsequent years. But during February -March, 2022, farmers and agricultural department officials from Enathi and Seruvaviduthi villages (Pattukottai Taluk) in Thanjavur district reported the occurrence of palms showing typical symptoms of LWD. The inflorescence and spear leaf samples collected from a symptomatic palm in

Seruvaviduthi tested positive for LWD phytoplasma in polymerase chain reaction test using phytoplasma specific primers. Based on the nucleotide sequences of 16S rRNA region and virtual RFLP the association of LWD phytoplasma *Candidatus phytoplasmaasteris* was identified, confirming the re-emergence of the LWD in east coast of Tamil Nadu after Gaja cyclone

### Management

- Periodic surveillance in plantations in disease endemic tracts
- Immediate uprooting and destruction of palms after diagnosis of typical symptoms.
- Regular removal of weeds in the system to avoid harbouring of pathogens.
- In order to de-risk farmers compatible intercrops are advised in the coconut plantations for steady and continuous income.

## Basal stem rot (BSR) disease (Thanjavur wilt)

This is a fungal disease caused by the soil-borne *Ganoderma spp.*. Being a debilitating disease, it affects the palm health significantly. In India, severe incidence of the disease was first reported from Thanjavur District of Tamil Nadu during 1950s and hence the disease is commonly known as Thanjavur wilt. The infection starts from roots and symptoms are seen in the crown as yellowing and wilting of leaflets during the initial stages, often confused with the symptoms of severe drought. The dried fronds of the lower whorls droop down from their point of attachment and hang vertically downwards to form a skirt around the trunk apex. The drooped leaves fall off one by one leaving only a few leaves at the apex. As the disease progresses normal development of flowers and bunches is arrested. Nut yield is considerably reduced over a period of time. In course of time, the apex of the trunk shows tapering with the advancement of the disease, and bleeding symptoms may appear on the bole region. Initially these bleeding patches appear on several places as parallel vertical streaks. They soon coalesce, forming a discoloured band around the trunk (Fig 2). These brownish patches may extend up to 1 m from ground level. Emergence of fungal brackets are observed in certain cases, mostly after the death of the palm. In severe cases, the crown is easily blown off by wind, leaving only the decapitated stem. Occasionally, some infected palms do not show bleeding patches.

### Management

Basal stem rot disease is found contiguous and in patches in a locality. Such palms sustain for a long period of time if adequate management options are undertaken. Integrated disease management practices involving following components are recommended

- Removal of dead palms and palms in advanced stage of the disease and destruction of the boles and root bits of the diseased palms
- Isolation of neighbouring healthy palms, by digging isolation trenches around the affected palm
- Application of *Trichoderma* enriched neem cake (5 kg per palm at six monthly interval)
- Intercropping with banana
- Treat severely infected palms by root feeding of hexaconazole @ 2% (100 ml solution per palm) and

soil drenching with 0.1 % hexaconazole or with 40 l of 1 % Bordeaux mixture in the coconut basin .

- Application of neem cake (5 kg) fortified with *Trichoderma harzianum* (CPTD 28) talc formulation (50 g) per palm per year at six monthly intervals help in reduction in the incidence and recovery of the affected palm.
- Avoid flood irrigation. Excessive irrigation and submergence of palm basin with water aggravates the disease spread
- Soil-test based palm nutrient application for regaining the health of the palms

### How to differentiate between BSR and LWD symptoms ?

Both LWD and BSR are present in the Thanjavur, Tiruvarur and Pudukottai districts of Tamil Nadu and have some of the symptoms like foliar yellowing, skirting of dried leaves around the trunk etc in common. This may cause confusion among farmers in the identification of the disease. Based on the distinct and characteristic symptoms, the disease can be diagnosed appropriately and proper management is to be undertaken at the earliest.

Basal Stem Rot	Lethal Wilt Disease
Nut yield reduced	Abnormal nut fall and shedding of buttons
Yellowing, drying and drooping of older leaves that progresses very slowly	Bronzing and yellowing of older leaves and proceeds to spear leaf within 2-3 weeks
Bleeding patches on the base of the trunk	Bleeding patches absent
Slow weakening of palms	Rapid death of palms in 3-4 months
Disease incidence in patches	Disease incidence in random

In the case of LWD, surveillance for identification of diseased palms and timely uprooting / destruction of affected palms are very crucial to arrest the spread of the disease. Farmers need not panic but correct understanding of symptoms and adoption of recommended management practices are effective for successful management of BSR. Evolving emergency preparedness module to tackle LWD is the need of the hour. Strengthening quarantine and timely diagnosis are very important to halt biosecurity threats looming into the country. ■