

Outbreak of new fungal disease in coconut gardens of Northern Kerala

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Among the plantation crops, coconut palm is the major crop grown both under plantation and homestead management system. It provides livelihood security to several lakhs of people across Kerala, and the capacity of coconut in providing improved nutrition, employment and income generation are well known. There are several diseases which cause damage and death thereby giving economic losses to coconut farmers. Bud rot, Thanjavur wilt and stem bleeding are the major diseases affecting coconut production especially in northern districts of Kerala.

Recently there have been many reports showing rapid drying and death of coconut palms in and around Kannur –Kasaragod districts. Experts from ICAR-CPCRI Kasaragod had visited these places based on the complaints received from farmers. To understand the etiology of the disease, different samples were collected from symptomatic palms, studied and analyzed thoroughly.

Samples were taken from Edavarmabu, Kariyankkara, Chunda, Vayalayi, Koluvali, Pandikadavu villages of Cherupuzha Panchayat of Kannur district. Experts also visited and noticed same symptoms in and around Alakkod, Changalayi and Peringome Vayakara Panchayats of Kannur. In Kasaragod district, samples were collected from Kottodi, Poodamkallu of Kallar Panchayat, Pindikadavu, Udayapuram of Kodom Belur Panchayat and Arinkal, vallikadavu, Muttakadavu of Balal Panchayat. Apart from these, samples were taken from Nullipady of Kasaragod Municipality as well as Manya, Chedikana and Talpanaje of Badiadka Panchayat of Kasaragod.

Symptoms:

The new disease symptoms are similar to that caused by *Phytophthora palmivora* in case of bud rot



and *Ganoderma sp.* in case of Thanjavur wilt disease of coconut. Based on the observations taken from the diseased palms, the general symptoms of this disease are listed below.

1. Drying of leaves of outer whorl and skirting of dried coconut leaves.
2. Spreading of the infections to inner leaf whorls and subsequent drying and skirting of leaves.
3. Sudden fall of immature and mature nuts
4. The infections from leaves spread to the petioles and from the petioles, the infection spread to stalk portions of the spathe and the inflorescence leading to rotting of those regions.
5. In advance stages, infection reach upto the



1) Mycelial culture of *Lasidiplodia theobromae* and *Neodeightonia phoenicum* grown on PDA plate 2) microscopic view of two-celled, dark brown, striated conidia of *L. theobromae* and *N. phoenicum*



1) Drying of outer whorls of leaves 2) Skirting of all dried leaves 3) Toppling down of inner whorls and death of the palm 4 and 5) Rotting of petiole, spathe, inflorescence and internal tissues 6) leaf blight and drying symptoms on leaflets 7) Sudden nut fall

inner whorls of leaves around the cabbage portion resulting in severe rotting of internal tissues of the bud.

6. As a result, the last whorl of leaves along with bud portion topples down and the palms die.

7. Palms succumb to death in few months time interval.

In case of bud rot, only the bud portion rots and fall off, other leaves and nuts will be still intact. Bleeding patches and root rotting symptoms are associated with Thanjavur wilt disease are not observed in the new disease.

Casual organism:

Based on the observations and laboratory experiments including morphological and molecular studies conducted on symptomatic samples,

two fungi, namely *Lasidiplodia theobromae* and *Neodeightonia phoenicum* were found to be associated with this disease. The fungi belong to the same family *Botryosphaeriaceae* of the division Ascomycota. Hence the morphology of mycelia and spores are quite similar making it tough to distinguish from one another.

The pathogens have a very wide host range. It causes rotting and dieback in most species it infects. *L. theobromae* causes diseases such as dieback, blights, and root rot in a variety of different hosts in tropical and subtropical regions. These include guava, coconut, papaya, cocoa and grapevine. Leaf blight caused by *L. theobromae* is very severe in Tamil Nadu. It is also known to cause fruit rot in coconut. *N. phoenicum* is known to cause leaf spot and palm rot in date palms in many countries outside India.

The fungi over-winters as pycnidia on the outside of diseased wood. The pycnidia produce and releases two-celled, dark brown, striated conidia. The conidia are then dispersed by wind and rain splash, spreading the fungi from one palm to the other.

Integrated disease management strategies:

Detailed studies about the disease and the pathogen are under progress. The adhoc management strategies to be undertaken immediately are as follows:

1. Burn off the diseased dead palm's crown portion to kill the fungus thereby reducing the spread of the inoculum.
2. In early stage of disease development, cut and burn the dried up leaves of outer whorls and spray 1% Bordeaux mixture as prophylactic to the nearby leaves.
3. Root feeding of 3 healthy coconut roots with fungicide Hexaconazole 5%EC (Contaf) @ 2ml/100 liter of water is effective in controlling the disease.
4. Soil drenching with Hexaconazole 5%EC (Contaf) @ 80ml/40 liters of water is also effective for disease control. The drenching with fungicide can be repeated after 15 days interval.
5. Application of recommended dose of fertilizers (1 kg Urea, 1.5 kg Masoori phos or Rock Phosphate or 2 kg Super Phosphate and 2 kg Murate of Potash) helps in early recovery of palms from disease. ■