

# TWO SPECIES OF FUNGI ASSOCIATED WITH BASAL STEM ROT FOUND

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Signs of infection: Shelf-like basidiomata, the fruiting or reproductive structures of the fungus, grow on the tree trunks. | Photo Credit: [ARUN KUMAR](#)

Researchers from Kerala have identified two new species of fungi from the genus *Ganoderma* that are associated with coconut stem rot. They have also genotyped the two fungi species, named *Ganoderma keralense* and *G. pseudoapplanatum* and identified genetic biomarkers. The DNA barcodes have been made publicly available in DNA sequence repositories so that future studies can use it for early detection of the pathogen. The research was published in the journal *Mycologia*.

The butt rot or basal stem rot of coconut is known by several names in different parts of India: *Ganoderma* wilt (Andhra Pradesh), *Anaberoga* (Karnataka) and Thanjavur wilt (Tamil Nadu), to mention a few.

The infection begins at the roots, but symptoms include discolouration and rotting of stem and leaves. In the later stages, flowering and nut set decreases and finally the coconut palm (*Cocos nucifera*) dies.

A reddish brown oozing is seen. This oozing has been reported only in India. Once infected, recovery of the plants is not likely. Not surprising then, that this causes a huge loss: By some estimates made in 2017, in India, around 12 million people are said to depend on coconut farming.

Another sign of infection is presence of shelf-like “basidiomata,” which are the fruiting or reproductive structures of the fungus, on the tree trunks. “Although microscopic, many fungi... produce macroscopic fruiting structures on the substrates where they grow [for example, *Ganoderma*],” says T.K. Arun Kumar of Zamorin’s Guruvayurappan College, Kohikode, who led this research, in an email. He further explains that the basidiomata of *Ganoderma* bear reproductive propagules (called spores) which are dispersed through wind and sometimes with the help of insects. “That is how the pathogen spreads from one host to the other,” he adds.

Since the fungus is microscopic, it is only detected after the symptoms start manifesting or when the reproductive structures are borne, which can be too late.

Surprisingly, before this study, the disease was commonly attributed to the genus *Ganoderma* and the specific species involved were not identified correctly. One reason for this could be the lack of studies focusing on taxonomy. “Plant pathologists may be very good at identifying diseases based on disease symptoms, devising strategies to prevent disease occurrence and even in developing disease resistant plants. However, there is a dearth of fungal taxonomists among plant pathologists who are able to identify fungal pathogens with accuracy,” says Dr Arun Kumar.

The two-member team collected the material for their research during the years 2015 to 2019. “There was a large-scale outbreak of the disease in Kozhikode district, Kerala, a few years back and our examination of the collected fungal specimens along with collections [over many years] from plantations throughout Kerala revealed that the identity of pathogenic species was hitherto

unrecognised,” says Dr Arun Kumar. This led him and PhD student N. Vinjusha to study the specimens further, first morphologically and then through genome sequencing. The two species seemed to be new to science. “This discovery was based on morphological characters, DNA sequences of the Kerala collections and phylogenetic analyses by comparing DNA of all *Ganoderma* species known worldwide,” says Dr Arun Kumar. The research has revealed the identity of the pathogenic species associated with butt rot. Hence, species-specific disease prevention strategies can now be developed.

As Dr Arun Kumar says: “So far, scientists and farmers had to solely rely on the visible symptoms of the disease [which appear only at a later stage, after complete colonization], but now they can easily detect the presence of the pathogen much earlier by analysing plant extracts which can be easily obtained at any stage of growth.”

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