

**Identification and characterization of  
Die-back Syndrome in *Camellia sinensis*  
(TRI 2025).**

**By**

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## Abstract

Preliminary observations were done in different locations where the disease has already been reported. All of them showed similar physiological/anatomical symptoms. Though many have argued this to be a physiological disorder, the mode of spread in the field showed pathological affiliations.

During the eight months under investigation in the Nuwara Eliya Estate, the affected area expanded by 129.75 m<sup>2</sup> from its initial size of 104.25 m<sup>2</sup> to 234 m<sup>2</sup>. A distinctive increase in the rate of spread was observed during hot seasons. The spread of the disease followed the direction of the wind, from lower to higher elevations. It was found that the expansion of an affected patch occur from one bush to the adjacent ones. The way of infection from an affected to a healthy one was the physical touch. It was also observed that the spreading is possible across rows possibly through the movement of pluckers. The plant as a rule is regularly plucked and trimmed. Thus a pathogen can make an easy entrance through these wounded parts with the involvement of man.

The microbial load of soil was found comparatively low for an agricultural soil. No significant difference was detected in the microbial populations of soils collected from diseased and healthy ones in the same field.

The xylem sap of affected plants yielded only a single type of bacterium, identified as *Pantoea agglomerans* (Beijerinck) (Galvini *et al* 1989). The bacterium has a record of being a secondary colonizer of diseased or stressed plant materials. This bacterium was isolated from dew collected from the foliage (Phylloplane) in the affected area. The

bacterium is a Gram negative rod (*Bacillus*) belonging to the herbicola group of the family Enterobacteriaceae. The sap of 'assumed' healthy by their physical appearance, upon incubation over 72 hours developed traces of the same bacterium. It was observed that such 'assumed' healthy bushes die within 1-2 weeks, once they come in contact with diseased one. Phylloplane micro-flora of the TRI 2025 did not show any significant difference between healthy and diseased. Stem section analysis of the cultivar showed that there is a significant xylem blocking in diseased plants, which increased in numbers with the severity of symptoms. Therefore the die-back can be attributed to the water shortage caused by these blockades in the vascular system. The isolated bacterium is capable of producing extra cellular polysaccharides (EPS) which can block vessels and frost injury in leaves, which leads to scorching.

Following all the observations and the evidences it is affirmative that the *Pantoea agglomerans* (Beijerinck) Gavini *et al* 1989, is the cause for the TRI 2025 Die-back Syndrome. The emergence of the visual symptoms occurs once the bacterium comes out of its latent or dormant stage in a healthy plant. Therefore the disease of the cultivar TRI 2025 at high elevations could be classed as a stress driven relationship between an opportunistic pathogen and a stressed plant.