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A NEW WOOD ROT IN TEA (*CAMELLIA SINENSIS*)

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An unusually severe wood rot has been observed in clonal tea in 1991, on two estates in the Nuwara Eliya District (Nuwara Eliya Group and the Diyagama West Estate). Similar symptoms in seedling tea were reported in 1906 on Diyanilakele Estate and Petch reported this to be caused by *Hypoxylon vestitum* (Petch, 1924).

Symptoms

The first noticeable symptoms are, wilting and scorching of the foliage (Fig. 1), in a large branch which very often makes up for a fairly big portion of the canopy of the bush. This is easily observed from a distance at which point one will realise for the first time that, there is a field problem. This wilting/scorching is more prevalent and the spread is, apparently faster during the drier months of the year.

The wilting, which comes on suddenly is followed by scorching within a few days (Fig. 2). Consequent to this sudden wilting, the leaves remain attached to the branch until a very late stage in the rotting, is reached. These branches as well as others which do not show any wilting of the leaves but may have been nearer to it, break off easily from the main frame, at the slightest force on the branch. This could happen, when you try to

walk through the affected bushes. A closer examination of the base of the broken branch will show severe wood rotting of the entire cross section of the branch, but for a thin strip of healthy tissue on the underside (Fig. 3). On an average the diameter of the affected branches measure up to 3-5 cm and the length of the diseased patch up to 15 cm when it reaches the collapsible stage (as measured along the upper surface).

Unlike in normal wood rot, where the affected wood is fairly firm and hard, the affected wood in this instance is soft and brittle. It is this character which makes the affected branches to snap off very easily.

The wood that is already dead, bear irregularly shaped black encrustations (Fig. 4), which is a characteristic of the disease. In one place in addition to these black encrustations (Fig. 5), some slender rubbery protrusions, about 5 mm in length were also observed .

Etiology

There is evidence that the infections, very often start from pruning cuts and wounds. Once infected it is able to reach the frame by the end of the current cycle. This will make the complete removal of the infections at the time of the next pruning a non realistic operation. The disease progression is faster towards the frame and the collar from the point of entry. This results in a fairly extensive, otherwise healthy branch above the infected patch. In advanced cases infection can continue below soil level.

It was also observed that the infection/decay starts from the upper surface of the branch which then progressively



Fig. 1 - Leaves of one branch beginning to scorch after initial wilting.



Fig. 2 - An infected branch that has collapsed, before wilting has completed.



Fig. 3 - Broken branch showing the healthy strip of wood, which supports the canopy until the last stages.



Fig. 4 - Irregularly shaped black encrustations (fruiting bodies), that bear ascospores on dead wood.



Fig. 5 - Black encrustations along with rubbery protrusions from Diyagama West Estate (Clone K 145).

radiates down the cross section of the branch. This explains the supportive, thin-healthy-strip of a tissue, that attaches the affected branch to the main frame, up to the time of detection/ collapse.

It is suspected that, the first signs of wilting starts when the vascular system of the thin healthy strip of tissues, is unable to meet the demand for water by the still vigorous canopy of the affected branch. Once the foliage is wilted, there is no recovery. Normally, all the affected branches collapse due to the weight of the canopy (distal end) or wind or any other external cause, before the entire cross-section of the branch is infected. As a result, only the older wounds created by similar branch breakage will bear testimony to 100% infection of the cross-section.

Causal Organism

An ascomycetous fungus has been found to be associated with the disease. This fungus gives a thick white mycelium with distinct zonations on Czapek Dox Agar (CDA) medium. The edge of the mycelium has numerous indentations, resulting in an undulating margin of the culture. They failed to produce spores after several months of incubation at 27°C. This same mycelial growth was obtained by two different methods:

i) From surface sterilised (using 5% sodium hypochlorite) freshly infected wood sections.

ii) From fresh, intact black encrustations (stromata) incubated inside a moist polythene sleeve until they started swelling (about two weeks). A smear from this was transferred onto Czapek dox agar medium, by streaking. Subcultures were made from this to obtain the identical fungus.

Individual spores as collected from intact stromata (ii above), are dark brown, elliptic - fusiform to bean shaped, one celled with a distinct furrow on one side. They are carried in clusters of 8 inside an ascus. These asci in turn, are carried in perithecia.

All these observations indicate that this wood rot problem is very similar to that caused by *Hypoxylon*. A confirmation on this is awaited from the International Mycological Institute (IMI) of the United Kingdom.

Other important observations

So far, we have observed this problem only on three clones, PK 2 (in Nuwara Eliya), KO 145 (in Diyagama West) and TRI 2142 (in Bogawana Estate). The clones TRI 2025 (Nuwara Eliya) and Walaha Yellow (Diyagama), growing adjacent to the infected areas were apparently unaffected. The clones are approximately 25 years of age. The elevation of both these estates are around 1500 m (5000 ft) amsl. The presence of this type of wood rot in other clones are being investigated.

Severe wood rot as reported in South India and Kenya are caused by *Hypoxylon serpens var. effusum*, which normally damages the frame higher up. But in this instance it starts on the lower branches and works its way towards the frame and the collar and even beyond when allowed to spread, unchecked.

REFERENCES

PETCH, T. (1924). Ann. Rep. Royal Botanical Gardens, Peradeniya, 146 - 164.