

SUSCEPTIBILITY OF SOME TEA CLONES TO STEM CANKER CAUSED BY *MACROPHOMA THEICOLA* PETCH IN THE LOW COUNTRY

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The resistance of 24 tea clones to Stem Canker Disease caused by *Macrophoma theicola* petch was estimated from the results of a field experiment at the Low-Country Station of the Tea Research Institute of Sri Lanka at Ratnapura. Results showed that some of the clones recommended for replanting in the Low Country, viz TRI 2021, 2023, 2026 and 2027, CW 21, DG 39, KEN 16/3, MT 18 and S 106 are susceptible to the disease. Five clones, viz TRI 2022, 2025, 2043 and 2045 and H 1/58, are resistant. The paper also includes a brief description of the disease.

THE DISEASE

Stem Canker caused by *Macrophoma theicola* Petch occurs in many low-country and some mid-country tea estates in Sri Lanka (Petch 1923). The disease also occurs in India (Hainsworth 1952; Sarmah 1960).

M. theicola attacks the stem in two ways. In some cases, it causes branch cankers only, whereas in others, it kills back young shoots and may then travel downwards and kill the bushes completely. Recently the disease has caused some damage in many low country estates, killing plants in young clearings.

The disease first appears as slightly sunken, dark patches on the red wood of branches about pencil thickness (Fig. 1). These patches are usually oval, running longitudinally up the stem for a few cm. The fungus kills the bark over these patches, which then turn black and soft and they separate from the wood. The activity of the fungus is usually arrested after it kills small areas of the bark and soon callus develops around the edges of the dead patches or cankers.

In mild attacks, the cankers are completely callused over within a few months but in severe cases callus formation is usually incomplete and the fungus may renew its activity after some months and kill the cankered branches completely. In cankers which have not healed over completely, fruiting bodies or pycnidia may be found in the dead bark tissues and from these pycnidia spores are released which can start fresh infections. In some cases the bark is blackened and killed uniformly down to the base of the branch and the disease then continues into the main stem. Having entered the main stem, the fungus may encircle it completely and if that happens at the base the entire plant will be killed. Very often the affected shoot dies, the leaves wither and ultimately fall off. This type of attack is common in young tea which had not been cut back (Fig. 2).

M. theicola also attacks the older stems of mature bushes and causes typical cankers. It usually attacks the upper surface of horizontal branches, killing the bark and discolouring the wood. After some time the dead bark peels off from the wood and the exposed wood rots. As this takes place in the interior of the bush, the disease is not noticed until pruning and by that time the canker may be in an advanced state.

Severe attacks of *Macrophoma* are often observed immediately after a prolonged drought. Field observations have indicated variations in clonal susceptibility. The disease has been recorded most frequently on clone TRI 2023, but this may be due to the fact that this clones is widely used for replanting in the low country. The disease also occurs on clone TRI 2026, but the damage is usually less than on TRI 2023. In view of these observations, it seemed desirable to evaluate the resistance of clones to stem canker.

EXPERIMENTAL

In 1970 an experiment was started at the TRI Low-Country Station at St Joachim, Ratnapura, with the objective of estimating the resistance of 24 tea clones to stem canker. One-year-old plants of the 24 clones were planted out in June on a site (Field No. 3) where the soil is very gravelly and poor. Fifty plants of each clone were planted in two rows of 25 each at a spacing of 1.2 x 0.6 m (4 by 2 ft). The plants were centered once at 0.3 m (12 in.) in April 1971, then cut across at 0.45 m (18 in.) in July 1972 and brought into plucking as is the practice in the low country. Disease assessments were made on 5 May 1971, 10 July 1972 and 10 July 1973 by recording the number of cankers on each plant. In March 1972 there was a high incidence of shoot dieback and the number of shoots killed was recorded for each clone.

RESULTS AND CONCLUSIONS

The results of the observations on canker incidence are summarized in Table 1 which gives the mean number of cankers and/or dead branches for each clone. It will be noted that none of the 24 clones tested in this experiment was immune to infection. In presenting these results, clone TRI 2023 has been selected as the standard for estimating the relative resistances of the various clones. This clone is widely used for replanting in the low country and has been found to be susceptible to the disease in several districts.

TABLE 1 — *Natural incidence of stem canker (Macrophoma theicola) on 24 tea clones*

Clone	Mean No, cankers/dead branches per plant (transformed data)
PCG 2	2.94
DG 7	2.90
TRI	2.84
TRI 2023	2.69
CW 21	2.54
DG 39	2.52
TRI 2021	2.52
KEN 16/3	2.52
TRI 2026	2.51
NK/B 29	2.43
TRI 2151	2.41
MT 18	2.38
S 106	2.34
TRI 2024	2.22
M 20	2.03
TRI 2025	1.91
PUH 5	1.87
TRI 2043	1.81
TRI 2022	1.77
H 13/4	1.72
GMT 9	1.71
H 1/58	1.65
MPA 1	1.42
TRI 2045	1.35
LSD ($P = 0.05$)	0.75

The results were subjected to analysis of variance and in Table 1 mean numbers (cankers/branches) which are not significantly different from the corresponding figure for clone TRI 2023 are presented in bold print.

The clones studied could be divided into two groups, one of which is 'susceptible' and the other 'resistant'. The 'susceptible' group includes 15 clones, beginning with PCG 2 and ending with M 20, whilst the 'resistant' group has nine clones, beginning with TRI 2025 and ending with TRI 2045. It must be noted that the use of the term 'resistant' does not imply immunity but that those clones are less susceptible than the clones grouped as 'susceptible'.

The results obtained are in agreement with field observations on clonal susceptibility. For instance, we have observed previously that clones TRI 2023, TRI 2026, DG 7 and DG 39 are susceptible to the disease, whereas TRI 2043 and H 1/58 are resistant. The information on the resistances of the various clones obtained from this trial can therefore be regarded as quite reliable.

It is interesting to note that only five of the clones recommended for replanting in low country estates are resistant to the disease. There are TRI 2022, 2025, 2043 and 2045 and H 1/58. Nine recommended clones, viz TRI 2021, 2023, 2026 and 2027, CW 21, DG 39, KEN 16/3, MT 18 and S 106, are susceptible.

In areas where the soil is poor or where the rainfall is low or unevenly distributed, it may be advantageous to plant clones in the resistant group.

REFERENCES

- HAINSWORTH, E. (1962). *Tea pests and diseases and their control*. Heffer & Sons, Ltd. Cambridge, 130 pp.
- PETCH, T. (1923). *The diseases of the tea bush*. MacMillan & Co. Ltd. London, 220 pp.
- SARMAH, K. C. (1960). *Diseases of tea and associated crops in North-East India*. The Gange Printing Co. Ltd., Sibpur, Howrah, 43 pp.

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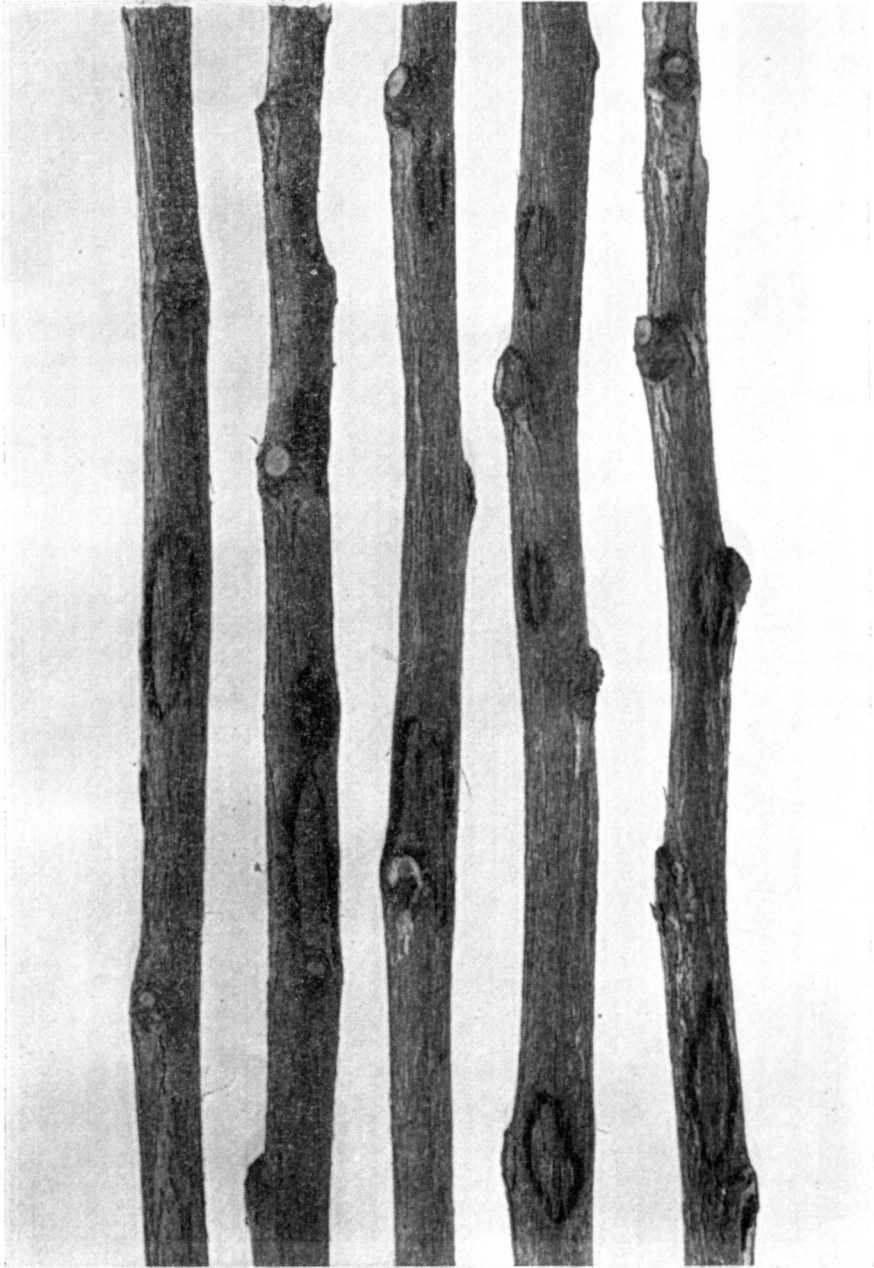


FIG. 1—Cankers caused by *M. theicola* on stems of clone DG 39

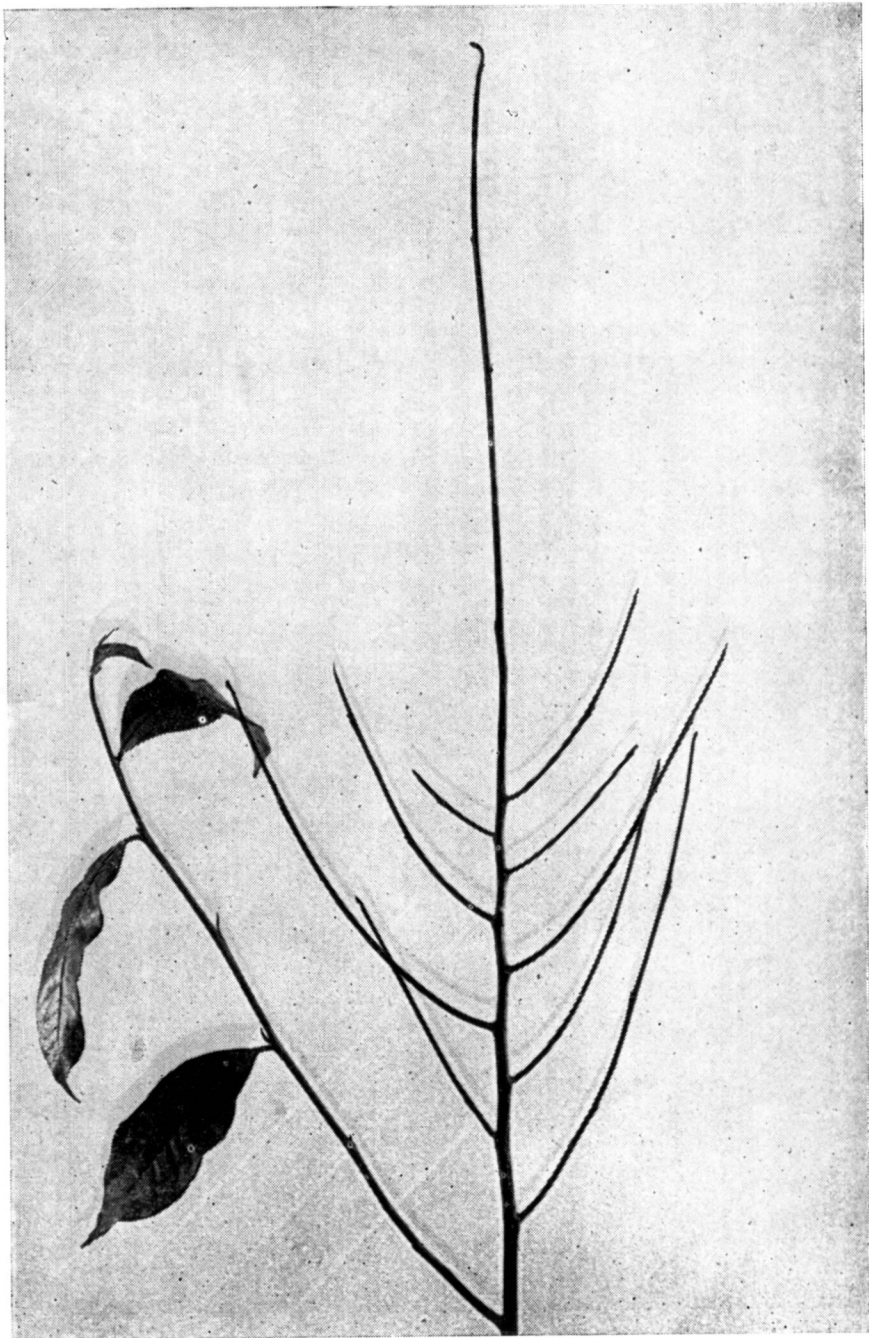


FIG. 2—*Shoot dieback caused by M. theicola on clone DG 39*