

Shot-Hole Borer Infestations on DT1, A Cultivar Grown for its' Quality, in Plantations in Dimbula Planting District : A Case Study

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Introduction

Shot-hole borer is one of the serious pests of tea in Sri Lanka occurring in almost all tea plantations but is concerned in plantations situated between elevations of 150 to 1400 m amsl (Walgama and Pallemulla, 2006). DT1 is a highly susceptible cultivar for the shot-hole borer and its' degree of susceptibility is similar to TRI 2025, the cultivar known for its susceptibility for the shot-hole borer (Thirugnansundaran and Jayachandran, 1989). Though DT1 is highly susceptible to the borer, in high elevations viz. above 1200 m (Up country) it was not infested as lower temperatures at elevations above this, limited the distribution and abundance of the borer in 1960s. On the other hand it was shown that shot-hole borer has extended its range of activity over the years and as a result of that it is now found in elevations above 1200 m (Walgama *et al.*, 2005). It is very likely that warming of climate would be responsible for this and the areas where the temperatures were not conducive for the well being of the borer are now becoming conducive because of the rise in temperatures. The cultivars like DT1 and TRI 2005 in those areas have now acquired high infestation levels. With a view to find out the present infestation levels of shot-hole borer on the cultivars DT1 as well as TRI 2025, a study was initiated in the estates belong to Kotagala Plantations Limited (KPL) in Dimbula Planting District of the Up country region where most of the estates do have DT1 as well as the TRI 2025.

Assessments for Shot-Hole Borer

The accumulated damage of the current cycle is best shown in the samples collected from fields which are due for prune and therefore, stem samples were obtained from fields, which were due for prune and also contained DT1 and TRI 2025. From such fields one-hectare blocks were visually demarcated and assessed the two cultivars separately. From one-hectare blocks 100 stems were collected from bushes selected randomly. The stems were then cut into 30 cm lengths and in the laboratory the stems were split open longitudinally (Figure 1). From the information on (1) Number of stems infested with shot-hole borer galleries and (2) Total number of galleries in every stem in the sample, the following parameters were calculated.

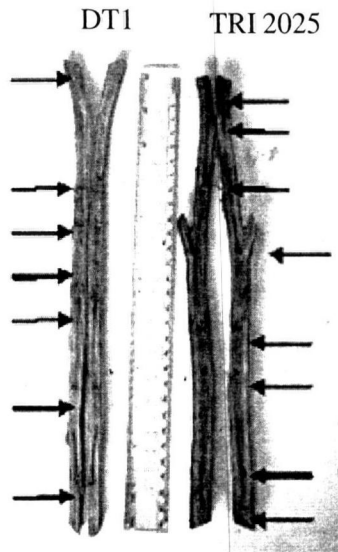


Figure 1. Position and number of galleries in stems of DT1 and TRI 2025

1. % infested stems per sample = $\frac{\text{total number of infested stems in the sample}}{\text{total number of stems per sample}} \times 100$
2. Average number of galleries per stem = $\frac{\text{total number of galleries in the sample}}{\text{total number of stems per sample}}$

These two parameters (1 and 2 above) were used to assess the degree of infestation by shot-hole borer in a given field. In addition to this, one estate (Drayton) was sampled for the entire fields to see whether the infestation is similar in all the fields within a given location.

Observations

The cultivars DT1 as well as TRI 2025 are equally infested with shot-hole borer in almost all the estates sampled in the Dimbula District (Figure 2a and b).

The percentage infested stems were more than 50% in all samples and also the values for both cultivars were generally high and equal except for Bogahawatte and Kelliewatte where TRI 2025 had showed more damage than that of DT1. Correspondingly, the average number of galleries per stem was also high in almost all the samples except for Bogahawatte and Kelliewatte. Anything in excess of 2 galleries per stem (on average) is considered high for upper elevations.

Estate records also show that percentage of land under DT1 in these estates varied between 12 – 44% and together with TRI 2025 (range between 29 – 57%) the total extents under these two susceptible cultivars vary between 48 – 78% (Figure 3). The

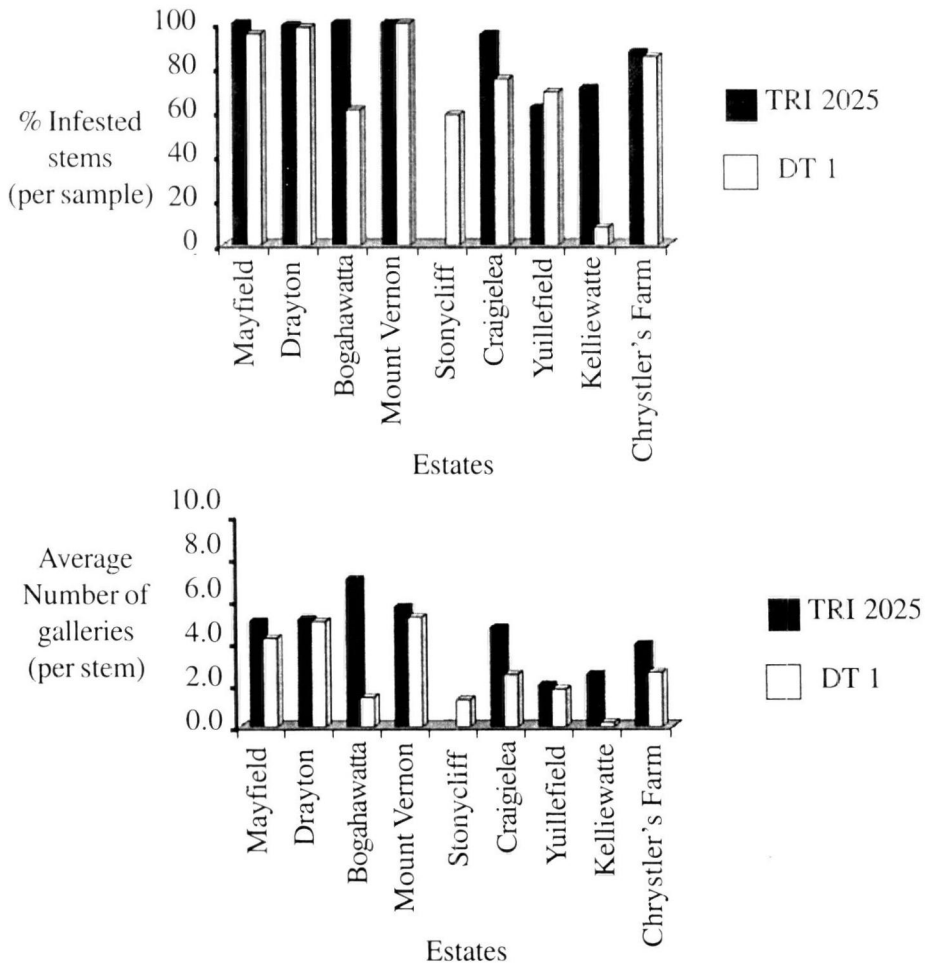


Figure 2. Infestation levels in cultivars DT1 and TRI 2025 in the plantations in terms of (a) % infested stems [G%] and (b) average number of galleries

situation is such that one can expect that these plantations are affected seriously by borer infestations resulting in high crop losses.

It is also observed that in a given location (a plantation) the distribution of shot-hole borer and the resultant infestation levels were not equal. For example in the Drayton Estate it is clearly seen that infestation levels were very high in three of the four divisions while it is very low in the other division (Table 1). Where the shot-hole borer infestation levels were high, almost all the cultivars are equally and highly affected while the infestation levels in almost all cultivars were less in those areas where the pest pressure is low. The cultivar TRI 2023 on the other hand showed infestation levels ranging from 0 – 13% (corresponding gallery density ranging from 0 – 0.2 / stem) which is indicative

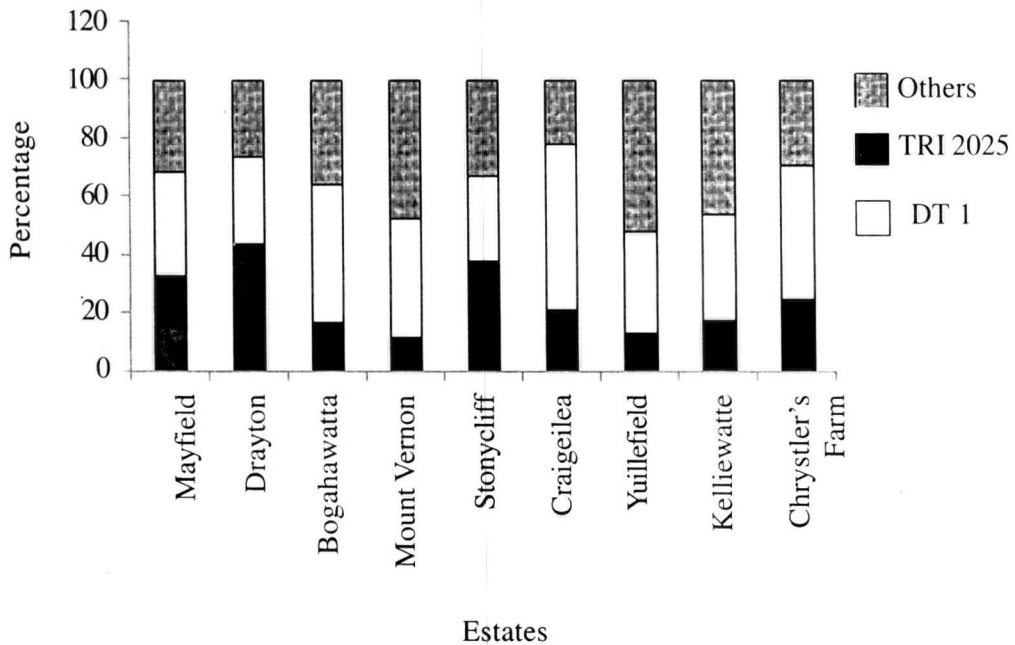


Figure 3. Percentage extents of DT1 and TRI 2025 in each plantation surveyed: (a) Stonycliff (b) CraigeLea (c) Kelliewatte (d) Yuilliefield (e) Chrysler's Farm (f) Bogahawatte (g) Mayfield (h) Drayton and (i) Mount Vernon.

of its' tolerance to shot-hole borer beetle. The cultivar was sampled in two estates Chrysler's Farm and Yuilliefield Estates.

It is clear from these observations that shot hole borer had extended its activity range upwards along the elevation as a result of climate being warmed. The borer would have found the climate in these areas now suitable for their survival and breeding, which was otherwise in the past. When there are host plants available in these areas (in the form of susceptible cultivars), which the borer prefers, high infestations result in.

The plantations in this region and others elsewhere in the region mainly depend on DT 1 for the quality and in general the dependence of TRI 2025 for the yield (Anon., 2002). Under this situation and the increasing extents under DT 1 in these plantations, one would expect the increase in the problems associated with shot-hole borer as well. It is timely that a concerted effort be taken by the plantations in these areas to manage the shot-hole borer problem.

A management strategy involving the use of recommended chemicals at the correct time (about 14-16 months after prune), if this stage of growth overlaps with the dry

Table 1. Shot-hole borer infestation levels in different divisions of Drayton Estate

Division	Field No.	Cultivar	Block	G%	Average Number of galleries
Drayton	Y	TRI 2025	1	99	6.3
		TRI 2025	2	99	4.0
	8	DT1	1	100	6.6
			2	97	5.3
			3	96	5.3
			4	98	3.9
			5	95	4.2
			6	94	5.0
			7	98	4.3
			8	99	5.0
	3	DT 1	1	97	4.6
			2	90	3.2
			3	95	4.5
			4	91	3.9
			5	96	4.6
6			80	2.9	
1			77	2.7	
	TRI2025	1	100	4.2	
K'Oya	3A	DT1	1	96	5.3
			2	94	4.3
			3	99	4.2
			4	100	5.8
			5	99	5.6
Derryclare	TRI 2025	1	41	1.0	
		2	35	0.9	
		3	62	1.7	
	KO 145	1	30	0.6	
		2	17	0.3	
		3	48	0.5	
		DT1	1	36	0.6
St. Andrew's	2C	TRI 2025	1	83	2.2
		DT 1	1	94	3.4
	NC 2	DT 1	1	98	4.1
		TRI 2025	1	82	2.6

- Sampling was done in fields which were due for prune
- G% is how much of stems is infested with SHB (in 100, 30 cm stems)
- Average is the average number of galleries per 30 cm of stem

weather, sanitation at every prune (cleaning should not be attempted if the bushes are more than 4 cycles old) to remove wood rot to arrest debilitation of bushes are some of the measures one can employ. Resting of fields for about 3 months specially when the fields comprise of DT1 and TRI 2025 is of critical importance.

References

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