

# SHOT-HOLE BORER (*Xyleborus fornicatus* Eich.) AND CLONES

E. Judenko

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## Introduction

There are several ways of killing a pig; and shot-hole-borer damage could be avoided if we had a clone of tea that the insect could not damage. Although it is unlikely that we can find a bush that is not attacked at all, it is worth looking for because it would be so valuable if it could be found. Even if an immune bush gave a poor yield or poor tea, it might be possible to recombine its immunity by cross breeding.

Complete immunity is not the only property worth discovering; as Hutchinson (1960) has pointed out for celworms, resistance to attack, without complete immunity, would be useful too, and is more likely to occur. Tolerance, which permits active attack but without noticeable harm, would also be worth finding.

The work described here has been limited in several ways: it is confined to clones and does not deal with seedling tea; there are not yet enough substantial areas of many clones in shot-hole-borer areas to give anything like a complete picture; and the sampling has had to be done in the limited time available between long-period experiments. It is not claimed that a fair comparison has been made between clones; for that, clones under test would have to be equally exposed to infection at each of a number of climatically different sites (Painter, 1951). Such investigations will become possible when the clonal plots are well advanced in various places.

## Method of Assessment

The standard-unit method (Judenko, 1958) was used, in which the numbers of shot-hole-borer galleries in 50 standard units are assessed. This method is rough and could be improved upon, but it is quick.

## Results

We examined 67 samples from 37 clones, of ages varying from 2 to 11 years from planting, on 21 estates at elevations of 120—3,800 feet (Table 1). Some of the data have been published previously (Judenko, 1958a).

Some of the places investigated were not close to tea infested with Shot-hole Borer but were separated by jungle or rubber; in these cases, a small number of galleries may be due to comparative absence of initial infestation rather than to any degree of immunity or resistance, so such isolated areas are marked in the table as "Isol".

In all cases, Superintendents were asked about the yield of the tea examined; where they said it was unsatisfactory, that opinion is recorded in the table as "Unsat.". In some cases (marked "?") yield information is not available. In all the other cases in the table, the yields were regarded as satisfactory.

It is at once notable that the isolated areas had low infestations: in 11 such samples, there were 10 with no galleries compared with only one out of 53 in non-isolated areas; in the remaining 4 isolated areas the numbers were always low (1, 2, 6, 1). Clearly the proximity of other (infested) tea is of such importance that

TABLE 1.—Incidence of shot-hole-borer galleries in some tea clones

Number in order	Elevation: feet	Estate	Clone	Age: Years	Number of galleries per 50 standard units	Remarks
1	120	Palmgarten	TRI 2023	5	0	
2			TRI 2026	5	7	
3			TRI 37	5	7	Unsat.
4			TRI 25	5	27	
5			G.K. 518	5	43	
6	400	Niriella	TRI 2025	4	0	Isol.
7			TRI 2026	4	9	Isol.
8			TRI 2024	4	1	Isol.
9	400	Millawitiya	TRI 2023	3 & 5	2	
10			TRI 2026	2 & 5	14	
11	600	Niriella	3- B 22	8	107	
12			1 B 7	8	111	
13	700	Peimadulla	TRI 25	3	0	Isol.
14			TRI 2023	3	0	Isol.
15			TRI 2024	3	0	Isol.
16			TRI 2026	2	2	Isol.
17			Nil. 12	4	6	Isol.
18	950	Karandupone	TRI 2023	2	3	?
19			TRI 2026	2	15	?
20			TRI 2024	2	16	?
21	1,000	Wellandura	Wellandura 34	8	2	
22	1,000	Endane	Endane 31	3	2	
23			Endane 30	3	9	Unsat.
24			Endane 28	3	10	
25			Endane 23	3	25	
26	2,000	Kenilworth	Kenilworth 16/3	5	65	
27			Kenilworth 16/3	3	67	
28	2,200	Somerset	S.S. 1	5	14	
29	2,200	Palamcotta	TRI 2026	4	139	
30	2,500	Enselwatte	TRI 2024	5	0	Isol.
31	3,000	Craighead	C. H. 13	3 & 7	11	
32			C. H. 13	5	24	
33			TRI 2024	5	47	
34	3,200	Delta	S/4/63	3	8	Unsat.
35			S/4/51	3	28	
36			S/4/40	3	42	
37			TRI 2024	Ab. 3 yrs.	49	
38			S/4/25	3	60	

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TABLE 1. (contd.)—Incidence of shot-hole-borer galleries in some tea clones

Number in order	Elevation: feet	Estate	Clone	Age: Years	Number of galleries per 50 standard units	Remarks
39	3,200	Enselwatte	TRI 2023	2	0	Isol.
40			TRI 2024	2	0	Isol.
41			TRI 2026	2	0	Isol.
42			TRI 2025	2	1	Isol.
43	3,300	Enselwatte	TRI 2016	2	0	Isol.
44	3,300	Queenstown	TRI 2023	8	7	
45			Q. T. 2/5	11	35	
46			Q. T. 4/4	11	67	
47	3,500	Pettiagalla	TRI 2023	7	4	
48			Pettiagalla 13-B	4	5	
49			Pettiagalla 11-2	6	8	Unsat.
50			TRI 25	5	44	
51	3,500	Ravensraig	TRI 2024	5	28	
52	3,500	Balangoda	D. G. 7	7	46	
53	3,600	Dickwella	U. D. 2/1	9	32	?
54			Q. T. 2/3	6	34	?
55			Q. T. 4/4	6	36	?
56			L. D. 4/1	9	51	?
57			L. D. 6/1	9	65	?
58	3,700	Gonakelle	TRI 2023	3	3	
59			TRI 2022	5	26	
60			TRI 2024	5	28	
61			T. S. 35	5	52	
62			P. D. 13	5	59	Unsat.
63			TRI 1526	5	68	
64			TRI 1294	5	93	Unsat.
65	3,700	Downside	TRI 2024	3	90	
66			TRI 2025	3	126	
67	3,800	Hugoland	TRI 2026	2	9	

lack of infestation in isolated areas cannot be regarded as giving any information at all about resistance (cf. Cowling, 1956). In this class TRI 2016 had no galleries, but a single examination in an isolated place cannot be regarded as even indicative, especially as TRI 2024 and TRI 2026, which appear to be rather susceptible (see next paragraph), gave 5 zeros in 7 samples.

Of the 26 estate clones not in isolated areas, only three were sampled more than once and none of the pairs gave very promising results. A few of these estate clones gave low figures on a single sample and might be worth further investigation for resistance. Of the 9 T.R.I. clones, only TRI 2023 gave consistently low numbers in six samples from different estates, while TRI 2024 was consistently high. TRI 2026 might have been regarded as consistently moderate but for the infestation of 139 at Palamcottai. Even in these two cases (TRI 2024 and 2026) the yields were not considered unsatisfactory and these clones may be tolerant; alternatively, their productivity may be so high compared with other clones that even if reduced by Shot-hole Borer, it is still satisfactory. It is not unequivocally demonstrated yet, however, that Shot-hole Borer does reduce yield, at any rate over a short period.

### Summary

1. None of the 35 clones examined from non-isolated places up to 3,800 feet A.M.S.L. was free from shot-hole-borer galleries; in most cases the data are inadequate to say more than this.

2. Clone TRI 2023 was only lightly infested in 6 independent examinations on different estates. It is not immune but may be resistant.

3. Clone TRI 2024 was consistently heavily infested but seems to have yielded satisfactorily; it may be tolerant. TRI 2026 was generally (not always) less heavily infested and it, too, may be tolerant, with some resistance.

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