The response of the low country live wood termite *Glyptotermes dilatatus* to extracts of tea stems decayed by various fungi

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Low country live wood termite *Glyptotermes dilatatus* is the major pest of tea cultivation in low elevation. Field observations indicated that they are attractive to rotted stumps and initiate the colony in the rotted stump. Bush debilitation and dyeing of tea plants are the major symptoms of termite infestation. In the present study, role of fungi present in the rotted tea stems to attract termite on tea plant was investigated.

Responses of alates to rotted tea stems, healthy tea stems and tea leaves were studied and the results revealed that the alates of *G. dilatatus* were more attractive to rotted tea stems than the healthy tea stems and tea leaves of susceptible cultivar, TRI 4042. Percentage response of alates to rotted stems, healthy stems and leaves of tea cultivar TRI 4042 were 41 ± 3.3, 16±0.8 and 19 ± 0.8 respectively. Since alates were attractive to the rotted tea stems, the responses of alates to ethyl acetate extracts of rotted tea stems and healthy tea stems were studied. The results further confirmed that the constituents' presents the rotted tea stems were more attractive than that of the healthy tea stem extracts. The extracts of rotted stems of four tea cultivars, TRI 2023, TRI 2027, TRI 4042 and TRI 4049 were tested and the percentage responses of alates to the extracts were 86±1, 80±1, 75±3 and 67±1.7 respectively. Since wood rot fungi are the main causal organism for wood decay in the tea plant the fungi present in the rotted stems, termite galleries and living termites were isolated and identified using identification keys (Barnett,1960; Domsch, *et al.*, 1993). The results obtained showed that number of fungal strains isolated from the rotted stumps, termite galleries and living termites were 15, 08 and 09 respectively. In order to investigate whether these fungi induce the decaying of the tea stem, selected fungi were tested for their substrate utilization abilities using pure substrates of starch, cellulose, pectin and lignin. The substrate utilization ability of the individual fungal species was determined for substrates which are commonly present in wood.

Evaluation of substrate utilization potentials of the wood rot fungi using cellulose, starch, pectin and lignin, revealed that all the fungal strains utilized starch. The cellulose utilization ability was demonstrated by *Acremonium* sp. 1, *Acremonium* sp. 2, Penicillium sp., and *Aspergillus* sp.1. All the test fungi were able to produce pectate lyase enzyme except *Aspergillus* sp.3 and *Mortriella* sp. The polygalacturonase enzyme was produced by *Acremonium* sp. 2, *Acremonium* sp. 2, *Penicillum* sp., *Nectria* sp. *and Aspergillus* sp.3 to break pectin molecules. The ability to produce lignases by the test fungi was also studied. All the fungi showed ability to produce peroxidase enzyme, tyrosinase was produced by *Acremonium* sp. 2, *Nectria* sp. and *Aspergillus* sp.3. The results indicated that none of the test fungi can produce laccase to break lignin (Table 2). Results revealed that there is a potential to induce decay of heart wood of tea plant by *G. dilatatus*.

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Table 1: Fungi isolated from rotted stumps, termite galleries and termites.

Fungi from rotted stumps	Fungi from termite galleries	Fungi from living termite
Black sterile sp.	*Acremonium* sp.1	*Acremonium* sp. *1*
Acremonium sp.1	*Acremonium* sp.2	*Acremonium* sp. *2*
White sterile sp.1	*Fusarium* sp.	*Penicillum* sp.
Trichoderma sp.	*Trichoderma* sp.	*Nectria* sp.
Acremonium sp.2	*Penicillium* sp.	*Mortriella* sp.
Mortriella sp.	*Aspergillus* sp.	*Aspergillus* sp.*1*
Fusarium sp.	white sterile sp.	*Aspergillus* sp.*2*
Nectria sp.	*Nectria sp.*	*Aspergillus* sp.*3*
Cylindrocarpon sp.		
Penicillium sp.		
Aspergillus sp.		
White sterile sp.2		

Table 2. Substrate utilization patterns of the selected fungi, isolated from surface sterilized *G. dilatatus*

Fungal species	Cellulose	Starch	Pectin		Lignin		
			Polygalacto Uronase	Pectate Lyase	P	L	T
Acremonium sp. 1	+	+	+	+	+	_	_
Acremonium sp. 2	+	+	+	+	+	_	+
Penicillum sp.	+	+	+	+	+	_	_
Nectria sp.	_	+	+	+	+	_	+
Mortriella sp.	_	+	_	_	+	_	_
Aspergillus sp. 1	+	+	_	+	+	_	_
Aspergillus sp. 2	_	+	_	+	+	_	_
Aspergillus sp. 3	_	+	+	_	+	_	+

Replicates =3 L = Laccase P = Peroxidase
T = Tyrosinase

Conclusions

Low country live termite is more attractive to decayed wood over the healthy wood. It could be due to the constituents produce during process of decay.

There is a potential to induce decay of heart wood of tea plant by infestation of Low country live wood termite *G, dilatatus.*

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References

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