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THE PROBLEM OF SCAVENGING TERMITES ASSOCIATED WITH WOOD-ROT IN MID COUNTRY TEA PLANTATIONS

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Scavenging termites associated with wood rot is fast becoming a major problem in the mid-country tea growing areas. This damage has been already observed in a wide area in estates situated in the dry and lower elevations of the district. Its severity varies in the planting sub districts of Matale and Kandy but is of not much significance in the Pussellawa and Upper Hewahata sub districts.

These termites are active in both seedling and clonal teas. Most of the seedling tea in the affected area is more than 60 years old and majority of them are of mixed jat. Almost all the seedling tea bushes have accumulated wood rot in varying degrees: it appears that the problem is more acute in older tea. Accumulation of wood rot is due to non adoption of sanitary pruning measures periodically. Vegitatively propagated tea planted in the district is mostly of the popular TRI 2000 series clones which have been observed to be more susceptible to wood rot perhaps, due to the succulent nature of wood in these clones. Of the other clones planted in the district, estate clones like Diyagama N, CY 9, CH 13 and Norwood 2 are much hardier and appear to be less susceptible. Attack by scavenging termites which are essentially secondary pests was a minor problem in the past but, has now become one of the major problems in the district.

Factors causing wood rot in tea bushes

The primary factors predisposing a tea bush to wood rot is the damage done by the shot-hole borer beetle and also by faulty pruning practices adopted by estates. The shot-hole borer can be considered as the major pest in the mid-country damaging clonal as well as seedling tea. Formation of borer galleries in young stems weaken them, subjecting them to branch-breakage at the point where galleries are formed exposing the borer galleries. Borer galleries also get exposed following pruning. Wood rotting fungi which are commonly known as Saprophytic fungi enter through the gallery openings and rot starts spreading vertically downwards through the heart-wood of the branches.These branches appear normal from outside and may even carry leaf bearing secondary branches on it. If timely removal is not done they will serve as avenues for wood rot which can spread to the collar region of the bush.

Tea bushes are periodically subjected to the drastic operation called pruning where a certain amount of leaf bearing branches are removed at a particular height and therefore carries many wounds in its basal frame. Healing of wounds in tea bushes is brought about by the formation of callus tissue on the cut surface and this tissue formation is extremely slow in tea bushes. Callus tissue usually begins to form at the periphery of the wound and grows towards the centre, and it may form a complete cover over the wound.

It usually takes a long time to form such a protective cover over a large wound caused by a prune cut. Meanwhile wood rotting fungi may gain entry into the branch and commence spreading. This may lead to a serious situation especially when proper sanitation methods are not adopted during pruning.

Faulty pruning practices carried out in tea estates can be described as follows :

1. Pruning tea at the wrong time of the year
2. Wrong methods adopted in pruning
3. Not following the correct post-prune practices

In most parts of the mid-country there is a distinct dry period from January to March. In the past, most of the estates pruned their tea during this period. Dry weather pruning has been adopted mainly to provide work for the labourers during this time and also to protect the young developing branches from blister blight infection. Pruning exposes the basal frame of the bushes which were covered by the tea canopy for many years to the direct rays of the sun. When dry weather pruning is adopted it will result in a sudden rise in temperature of the bark of the frame (about 10 - 15 °C above the ambient temperature) which may cause cracks and kill the bark through which Saprophytic fungi can gain entry and the rot begins. This is particularly so on horizontal branches where the rays of the sun falls directly and cause sun scorch on the upper surface of the branch. These scorched spots will subsequently die and would be invaded by the fungi causing rot to set in. When rot starts in horizontal branches it invariably develops into a cavity.

With time, dust and water collect in these cavities enhancing the spread of the decay in the branch.

Some times these cavities become as wide as the branch itself and so deep with only a thin strip of wood on the underside maintains continuity down to the collar. Most of the old seedling tea have horizontal branches affected in this manner. Once so affected they resemble gutters and are commonly called ' peeli wathus' or 'gutter like branches'.

The method of pruning adopted in the past was mainly a hard clean prune. This often involved removing big branches lower down the frame causing large wounds which were slow to heal and were attacked by Saprophytic fungi. Irrespective of the position of the branch removed at pruning there is always a gap between the prune cut and the first bud to develop below it. This portion naturally dies off. Even though the top may be covered with

callusing tissues protecting the cut surface, fungus will gain entry into the dead wood below through the dead tissues of the bark. There is a possibility that this rot could spread down to the collar region of the bush with time, if timely removal is not carried out.

Low prune delays recovery and if there is not enough reserves in the roots some branches may die back after pruning. These dead and debilitated branches may also be attacked by wood rotting fungi. Repeated low pruning may expose the bushes to such adverse conditions which in turn would progressively increase the wood-rot in the bushes.

Although wood-rot has been observed in both seedling and clonal tea it should be noted that all the tea bushes in a field are not equally affected by this problem. Some are very badly affected while others show only a very mild attack. There may be some bushes which are not affected at all. This may be due to the vigour of the individual bush. It should also be noted that soil conditions and other cultural and environmental factors also play a major role in the degree of wood-rot observed in the tea bushes in a given field.

Scavenging termites in tea fields

Scavenging termites associated with wood rot has become a major problem in tea plantations in the mid-country. It appears that the pest which was observed sporadically in the past has now become an important pest attacking tea bushes already debilitated with wood-rot. This has happened because, through mismanagement practices conditions favourable to scavengers have been established.

Most of the scavenging termites found in the mid-country belong to the family Termitidae. This type of scavenging termites make their nests underground. They move through underground tunnels and underneath earthen covers that they construct on the surface, above ground. They forage for dead and decaying wood and other food materials outside the nest. There is a species of scavenging termites which occasionally attack living, healthy tea

bushes eating away the live roots and branches but this type of termites are not common in the mid-country tea plantations.

Damage by scavenging termites to tea

The type of scavengers found in our tea do not feed directly on healthy live wood. The damage that they do can be described as follows :

They feed on dead wood of the bush exposing living tissues on which possibility of callus formation is extremely low as they feed on the callus tissues as well. Living tissues thus exposed also will die in turn increasing the dead wood of the bushes.

They encase the dead and moribund part of the bushes with earthen sheets or earth run ways to protect them while they feed on these tissues and the earth covers aggravate the problem of rot.

Dead wood formed on horizontal branches as a result of sun scorch are eaten away creating deep furrows which are filled with earth subjecting them to further decay resulting in formation of deep cavities. They fill the cavities formed at broken snags in the branches and hollows in the collar region with earth, killing the living tissues and promoting the activity of saprophytic fungi enhancing wood-rot.

They feed on dead wood around the exposed shot-hole borer galleries widening the galleries and covering them with earth encouraging decay.

However, it is observed that the activities of scavengers are confined to the collar region., frame and primary branches where wood-rot is present. Encasing a branch with live foliage with earthen sheets is very rare and covering the entire bush with earthen sheets were not observed. Scavenging termites were found to be more active during dry period. Construction of runways and earthen sheets were observed to be more during this period. It may be possible that during rainy period earthen constructions are washed

off forcing the termites to move to subterranean nests and depend on stored food in the nests.

Other activities of scavenging termites in tea fields

Activities of scavengers once they have invaded a tea field will not only be confined to the tea bushes. They damage the shade trees by constructing earth sheets encasing the lower part of the trunk of the tree killing the bark and feeding on it. They feed on any kind of organic matter found in the field including fallen down tea and shade tree leaves which will otherwise act as a mulch. It will be impossible to leave pruning on the field as a mulch or to introduce other mulching materials to the field, as the termites find a ready source of food material on them. It should be noted that only the mulching action that is affected this way. Their feeding helps to break down organic matter and return the nutrients to the soil. It is also difficult to plant low shade tree stumps in these fields to replace old trees or to fill vacancies as termites destroy the stumps by feeding on them. These activities will lead to ultimate depletion of carbon content of soil which inturn will weaken the already debilitated tea bushes by hindering the efficient use of applied fertiliser and by reducing the moisture retention capacity of the soil.

Management of tea fields attacked by Scavenging termites

Once the scavengers have invaded a field it is very difficult to eradicate them. Complete eradication using chemicals is not possible as the termitary is underground. Using termiticides on the tea bush were found to be effective for keeping the pest away temporarily for some time. In some places common salt and wood ash have been tried and found to be effective for a much shorter period of time.

It is very difficult to clean the bushes badly affected with wood-rot and attacked by scavenging termites. Partly decayed main branches will carry one or more leaf bearing secondary branches on them. Regeneration capacity of the bush depends on the amount of new tissues it can produce which will depend on the amount of food

material the bush can produce. Therefore, it is inadvisable to remove the main branches which are carrying the leaf bearing branches. On the other hand wood-rot may weaken the branch to such an extent in time to come that the branch will any way breakaway from the main frame.

Scavenging termites feeding on dead tissues will hasten the arrival of that day. Therefore, trying to keep the pest away once it invades the bush by removing the rotted branches or part of the basal frame will only delay the death of the bush. Thus, it is observed that scavenging termites associated with wood-rot is fast becoming a major pest and if early preventive measures are not adopted these two problems together could become one of the main cause of destruction of tea in mid-country.

Prevention of damage

Both wood-rot and scavenging termites are secondary problems which can be prevented by correcting primary factors causing them.

Damage by shot-hole borer can be minimised by adopting the integrated control measure recommended by the Institute. These include pruning at the correct time to prevent the overlap of the period the primary branches are most susceptible with the period of maximum borer colonisation. To do this in mid-country wet zone pruning should be done in April/May. Painting of large prune cuts with protective sealant and removal of borer galleries to obtain a clean surface will prevent the Saprophytic fungi gaining entry to the branches and spraying with fenthion 50% EC at a dilution rate of 4.5 liters of the product in 1000 liters of water per hectare at 14 to 16 months after pruning by which time the primary branches will become susceptible to the borer attack. By the above methods it is possible to minimize the attack by shot-hole borer on basal primary branches and subsequent breakage of these branches.

Resting before pruning for a period of 6-8 weeks will speed up the recovery and minimize the die back of branches. Medium to

light-rim lung pruning leaving adequate lungs should be adopted at pruning and it is very important to remove all snags, cankers, debilitated and weak branches at every pruning. It is also important to paint the prune cuts with a protective sealant to prevent the start of decay from these ends. Damage caused by sun scorch on horizontal branches could be prevented by correct timing of pruning operation and also by covering the frame of the bush with prunings at least for 72 hours by which time the bark tissues lose their sensitivity to solar heat.

When scavenging termites are present, bushes should be cleaned at the time of pruning as far as possible and suitable termiticides should be sprayed on frames so that the chemical will keep the pest away till the bush recovers and forms callus tissues. When there is accumulation of wood-rot due to faulty pruning practices in the past it may not be possible to clean up the entire bush in one operation. In such cases the cleaning up operation should be phased out over 2 or 3 cycles and it may be necessary to spray the chemicals periodically to keep the pest away from the bushes. It should be noted that in badly damaged bushes it is not possible to adopt the corrective measures effectively. With the loss of the main branches with much of the foliage bearing secondary branches it is not economical to keep the bush in the field any longer and it is better to replace such bushes with new plants rather than try to adopt remedial measures. It is also important to carry out correct cultural practices in fields where these two secondary problems are observed to provide maximum growing conditions to the affected bushes.

Conclusion

As controlling this subterranean pest is very difficult and involves a lot of expenses, time and energy it is important to prevent the attack by the pest. This could be done only by not providing conditions favourable to the pest, on the bushes, by reducing wood rot as much as possible and preventing decay. The damage caused by termites are so gradual that one does not notice it until problem becomes acute and beyond redeeming. Therefore, it is very

important to keep close vigilance over the above two problems and take preventive measures as early as possible. The need to do so cannot be more emphasized as the problem is fast spreading in the mid-country tea plantations.

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