

Insect Pests and Trees

Guest Writer — F. D. MORGAN, M.Sc., Ph.D.

Department of Entomology, University of Adelaide

The continuous battle for survival of the species is a natural phenomenon. It involves, as far as a tree is concerned, a struggle for water and nutrients from the soil; sunlight, carbon dioxide and oxygen from the atmosphere; and, from the vigour and health derived from these sources, a natural protection from its enemies. Among the latter, insects are probably the most important single group. This is, in some measure, due to the fact that insects are more numerous than any other of the enemies of trees.

Insect pests of trees fall into two broad groups; those which are capable of attacking and feeding on vigorous healthy trees and those which are only capable of attacking and feeding on sickly or moribund trees. The first group, which is termed "primary" insects, includes aphids, scale insects, lerps, the caterpillars of moths and butterflies, sawflies, gall wasps, leaf hoppers, stick insects, bud and leaf feeding beetles, cicadas, in fact all insects which feed on the leaves, flowers, and sap stream of plants. The second group, called secondary insects includes most of the insects which feed in the cambium and phloem tissues or inner bark, as well as the wood borers. Thus bark beetles, tree borers, ambrosia beetles and woodwasps are included here. Though tree death may follow attack by certain primary insects, more often attacked trees survive, with the death of twigs and branches and severe checks to growth, the main damage done. Where trees do die following attack by primary insects, the attack has usually been severe and prolonged or other factors are involved. For instance secondary insects may have become established in the weakened trees. With attack by secondary insects, the opposite is true. Almost invariably the tree dies.

Few primary insects transmit or use diseases as a means of assisting their attack on trees. In contrast many of the secondary insects, particularly woodwasps, ambrosia beetles and bark beetles, purposely or accidentally introduce diseases which are capable of killing growing tissues in the tree. More and more evidence is being obtained on the association of insects and diseases in damaging or killing our trees.

In the life of trees, insects are important in every stage. Many species destroy the flowers or live on or in the seeds; seedlings are preyed upon by a variety of insects including cutworms, caterpillars, curl grubs and bark beetles; and growing trees are defoliated by beetles, caterpillars, lerps and others or hollowed out by termites and wood borers. The cambium and phloem feeding insects are ever ready to utilise the inner bark of weakened trees for food for themselves and a place to rear their young. It is little wonder that our eucalypts do miraculous things when grown in freedom from this host of pests in places like North and South America. The same can be said of the pines and firs grown in Australia in freedom from their native pests of the northern hemisphere.

Some tree species can withstand serious loss of foliage and sap better than others. Some are notoriously tender and die if severely defoliated once. When trees are capable of recovering from insect attack, we often do nothing about helping them over their troubles, merely because we know that they will survive. That such negligence on our part may be folly, I wish to refer to some of my studies on the effect of various degrees of leaf loss on the growth of trees. These have shown that trees do not necessarily recover quickly following attack. In one case involving pines which were defoliated for four successive years by a caterpillar, some trees died, but most survived. The survivors almost ceased growth for the four years they were severely defoliated. Their increment was only 20 per cent of the average before the attack commenced. Moreover, it was a further four years before the trees began to produce wood at the average rate prior to attack. In eucalypts heavy defoliation results in twig and branch deaths. Such insect damage often leads to the undesirable development of shrubby trees where timber is the crop. In another study, measurements on young two and three year old trees showed that height growth on completely defoliated trees was usually between 50 and 90 per cent less than that produced by trees free of the defoliating insects.

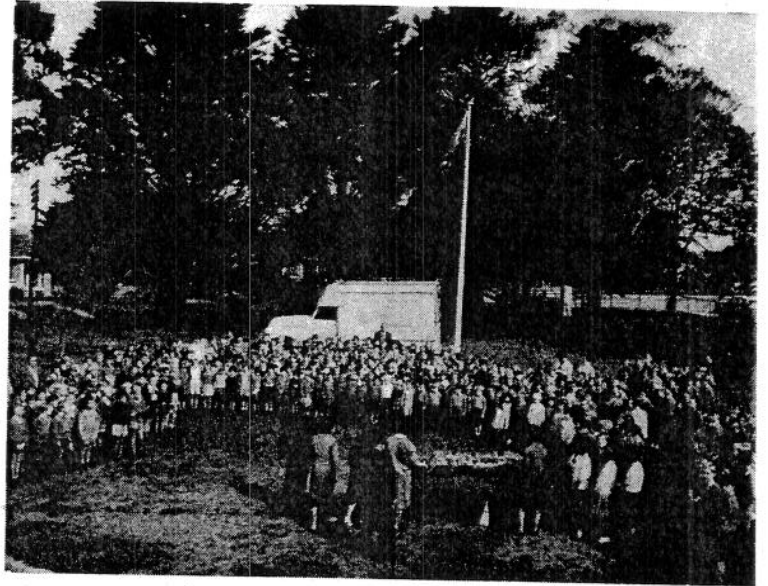
Victoria and, indeed, Australia as a whole, have forests, copses and smaller plantings of many introduced trees. They form an aesthetic as well as a most useful and valuable part of our resources. They have grown for years largely free from their native pests and in most cases have thrived. Some of our native insects have transferred their attention to these trees and a number of these insects are causing damage which is important.

However, a few insects are gradually reaching Australia from whence these trees came to us. It is these introduced insects which are the great danger to our pines, cypresses, firs, birches and others. The *Sirex* woodwasp now in Tasmania and Victoria, and the *Ips* bark beetle in Western Australia and South Australia, are of great importance to us all because they threaten our pine forests. They have beaten our efforts to keep them out and are capable of tree destruction on a greater scale than forest fire when allowed their own rules, particularly when our trees are not given the chance to protect themselves by maintaining maximum individual vigour.

Trees are beautiful to a degree somewhat beyond our comprehension. They are among our most useful possessions. When insects and disease threaten their existence we so often ignore their plight. We may often excuse our negligence by saying that nothing can be done about it. Little troubles that may start in one tree in a home garden could in a few years remove some kinds of trees completely from our land. This

has happened with the introduction of Dutch Elm Disease in Eastern North America. This disease is carried by a small beetle from tree to tree. Let us not look back in years to come, and have to say that we were foolish to allow such a thing to occur here. When big action is called for to handle big insect problems let us all lend our support to those who would protect our trees from pests. There is almost always something that can be done about insect attack on our trees and every effort should be made to obtain the knowledge which would enable this something to be the best and most economical that can be devised.

To permit a known pest to become established, before we expend any money or effort to find out pertinent facts about it, facts that would enable efficient control measures to be applied, has always appeared to me to be rather short-sighted. Likewise to tolerate the loss of millions of pounds worth of timber annually to insects when thousands spend on research could save some of those millions, is undoubtedly bad economy. When insects are probably destroying more of our trees than any other agency they should receive due consideration and priority. But, sad as it seems, it is nevertheless true, that we all of us wait until we are on the brink of disaster, or even until the damage is irreparable, before we go into action, not with the knowledge to permit unqualified success, but still groping for facts upon which to base methods and techniques that may show worthwhile results. Trees survive and flourish despite us, but I can't help feeling that the millions which die annually, are not only an indictment of our complacency but a sheer and colossal waste of one of our greatest natural resources.



These illustrations show preparation for and actual distribution of trees to some of the 35,000 members throughout Victoria of the newly-formed Junior Tree Lovers League. Members of the Mothers' Club during midday recess at a metropolitan Primary School give out the trees while the Head Teacher calls the names. Each child member receives a native tree grown in a wood-veneer tube for planting at home. Each tree bears a label with its name, description, and the member's name, and a planting-instruction slip accompanies every tree.

