Causes and prevention of injury to young citrus by termites

*By Philip A. Stansly and Robert E. Rouse**

Reports of damage to young citrus by the eastern subterranean termite (Reticulitermes flavipes Kollar) were first reported by Watson (1927) who noted that trees were attacked most often after winter banking with soil. Although winter banking is no longer a common practice, several factors have combined to increase prevalence of termite problems in Florida citrus. One factor is the loss of chemical insecticides registered for soil application. Another factor is increased planting brought about by the movement of citrus acreage south from freeze-prone northern locations. Many of the new groves have been established on newly cleared pine/palmetto woodland, the natural habitat of subterranean termites.

** University of Florida, IFAS Southwest Florida Research and Education Center P. O. Drawer 5127 Immokalee, FL 33934*

Termites kill young citrus by girdling. Bark is removed from the trunk and cambium in a neat ring between soil line and crown roots. A more efficient method of execution could not be imagined! What stimulates termites to girdle is uncertain, but we see by the dryness of the wounds that they are probably ingesting sap as well as bark. Fresh bark and sap are hardly normal fare for subterranean termites which usually prefer dead and seasoned wood, especially of conifers. Starvation has probably driven them to live citrus like lame tigers turned maneater. However, there is method to their madness. Termites leave the tree once it has been girdled and killed, but may return later to consume the wood after it has dried and seasoned. The end result of girdling has been the creation of a suitable food source!

Termite management - preplant. What can be done to prevent termite depredations in young citrus groves? First of all, remember the role of subterranean termites in the pine/palmetto ecosystem is the breakdown of wood. They inhabit all pine woods in Florida and will not just go away when the land is cleared. Remnant populations underground can maintain themselves on buried logs and roots and continue to haunt the grower for years. The fewer of these roots and logs that remain after clearing, the smaller and less permanent these populations will be. Therefore, the first step in managing termites is to remove as much wood residue as possible before planting.

Termite management - planting. The second phase of termite management occurs at planting. Remember that termites usually attack the trunk crown below the soil line, but not the roots. Even if an occasional root is girdled, the tree will survive. Therefore, it is prudent to plant the tree as high as possible, preferably with the top scaffold roots exposed. Shallow planting is a desirable practice for other reasons as well. For one thing, it elevates the bud union, reducing the risk of foot rot to the susceptible scion. Also "tap root curl" may be avoided by not jamming the tree too deep into a shallow planting hole.

Termites initially remove bark from the trunk crown below the soil line while roots are rarely affected.

Girdling of the trunk is followed by rapid decline and death of the tree. Protection efforts concentrate on the vulnerable crown.

The subterranean termite Reticulitermes flavipes Kollar normally feeds on dead wood, but will also attack live citrus.

Termite management - post-plant. Termite management post-planting includes monitoring for termites and the avoidance of tree wraps in infested areas. Termites are especially active on citrus in the summer, possibly because rising water tables force them close to the surface where damage occurs. However, trees may be attacked during any season, so groves at risk should be scouted year-round. Girdled trees will become chlorotic, beginning with the leaf veins. Early stages of chlorosis may be accompanied or even preceded by shock bloom. These symptoms are similar to those seen with foot rot, but can be distinguished by inspecting the effected area of the trunk. Termite damage results in a clean removal of bark initially below the soil line. In contrast, foot rot causes a scaling of the bark, usually initiated above the bud union.

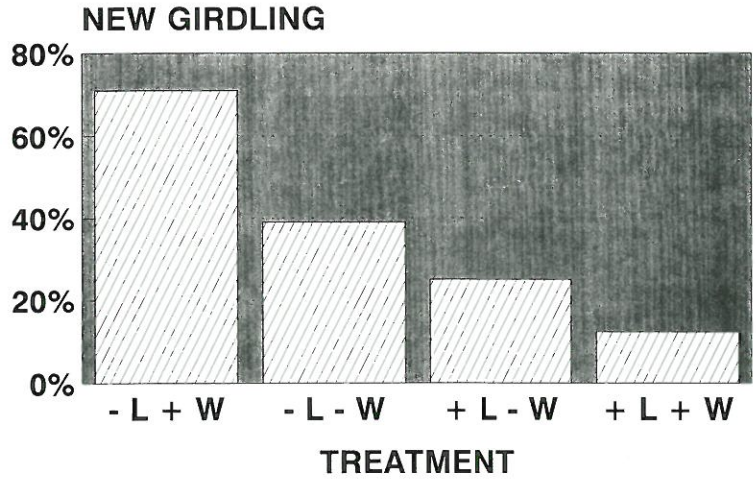
Termite infestation can be ascertained even before damage has occurred by the use of "bait blocks" of seasoned pine, buried a few inches deep in damp sand near the edge of the irrigation emitter pattern. A cardboard circle laid on the surface and covered with a flowerpot has also been used successfully (G. Storey, personal communication). Trees in infested areas should be monitored regularly by removing soil around the base with the finger and looking or feeling for lesions.

Tree wraps act in the same way as soil banks around trees, providing an extension of termite habitat up the trunk. For this reason, tree wraps should not be used, or at least used with caution, in termite-infested parts of the grove.

Termite management - rescue. Often growers do not realize they have a termite problem until trees have been lost. Resets may have already been put in and lost as well. Once the problem has been determined, all trees in the block should be censused for termite activity and damage. Trees with greater than 50 percent girdling should be removed and replaced with resets, planted and cared for in the manner outlined above. Trees with less than 50 percent girdling trees may be saved by rescue treatments outlined below.

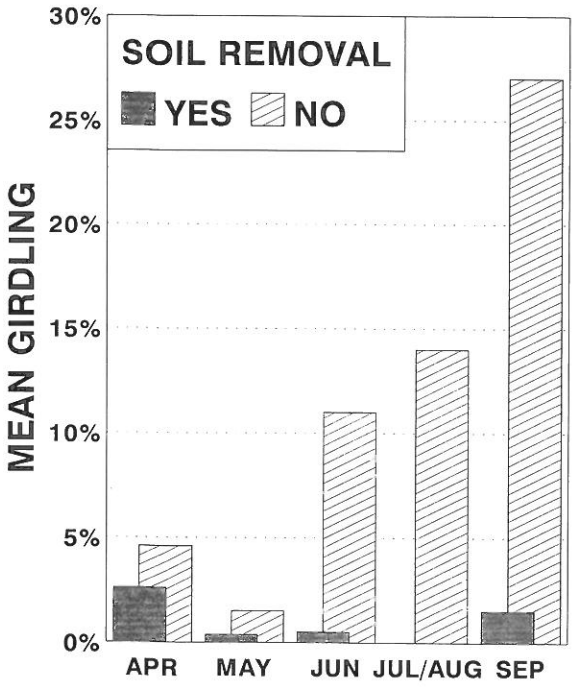
Soil washout. Remove soil from the base of the tree to the level of the scaffold roots exposes affected parts of the tree to the air, to discourage further termite activity. Soil may be conveniently removed with a steam of water under pressure from a handgun supplied by a water wagon. This treatment might have to be repeated

EFFECT OF LORSBAN 15G and TREE WRAPS
On Termite Girdling 3 MONTHS POST-TREATMENT



L = LORSBAN, W = WRAP

Soil removal at the base of established trees has reduced risk of termite girdling.



YES	2.6%	0.37%	0.5%	0%	1.5%
NO	4.6%	1.5%	11%	14%	27%

after rains have washed soil back around the trunk.

Pesticides. Application of a labeled insecticide to soil immediately adjacent to the trunk may provide some short-term termite deterrence. The most effective formulation appears to be granular. We have obtained about three months protection with applications of granular chlorpyrifos (Lorsban® 15G) applied this way, either to resets or to established trees. The insecticide can be applied inside the tree wrap although scaling often occurs where the granules are held in constant contact with the bark. Lorsban applied through the microirrigation system to control fire ants may also provide some termite deterrence although we have not evaluated this procedure. Insecticide treatment would be most effective if combined with soil removal as described in the preceding paragraph.

Termite injury to citrus - future outlook. We have observed termites attacking trees up to five years old. This is not to say that older trees would not be attacked, although their thicker bark could make them less appetizing. It is likely that after five years in the grove without a normal food supply most remnant termite populations would have largely starved out. Possibly this process could be hastened by removing dead wood or even trapping out worker termites. Termite problems are a symptom of new grove development and will die away with time. This may be of little consolation for the owner of an affected grove. Hopefully the recommendations we have provided above will be of some help in the interim. ■

Further References

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