

12418

Miscellaneous information on Sirex noctilio gleaned on the Australian trip in April 1995

1. The Sirex hymenopterous parasites would be exported as adult wasps (which live for \pm 30 days).
2. The free-living Deladenus nematodes produce the parasitic form in response to low pH and high CO₂ levels which are produced by the Sirex larvae.
3. Only if three Sirex holes are located at a site on the log have eggs been laid, otherwise the wasp has merely probed or deposited mucus and fungus.
4. For the nematodes to become properly established in the tree, the natural water content of \pm 280 % (in relation to dry matter) must be lowered but not below 50 % or otherwise the nematodes dry out.
5. The Deladenus nematodes must be fertilised to reproduce.
6. The Sirex mycangia are filled with bits of mycelium and not proper fungal spores i.e. paired mycangia containing arthrospores.
7. Nematodes enter the testes of the Sirex male which then swell dramatically but the nematodes don't pass through the duct (only the sperm does) and so is not passed on to the female wasps or causes the males to become sterile.
8. Sirex females are unable to know if the fungus has already been deposited in a tree and so must go through the same sequence of depositing mucus and fungus before laying their eggs.
9. If too many nematodes are injected into a tree they compete with the Sirex larvae for the fungus which results in smaller Sirex wasps being produced - through malnutrition.
10. Sex ratio in favour of males means fewer females are getting mated probably because they are too sparse and dispersed and not meeting at suitable trees. With excess males then being produced, the sex ratio rights itself in time.
11. Nematodes should be released in both the epicentre and marginal areas for the best results. Its best to start in the epicentre where most of the infested trees are to be found. Trap trees in marginal areas work extremely well - far better than searching for infested trees.
12. The Ibalia egg parasites emerge with the emerging Sirex wasps whereas the other species of wasps which parasitise the late instar larvae must be present before the emergence of the Sirex wasps.
13. The hymenopterous parasites of Sirex in Australia were collected in Central Europe and collections made around North Africa and the Mediterranean Basin may be more suitable to South African conditions.
14. Sirex is moving at a rate of 40 - 50 km a year in N.S.W.
15. At Mt. Gambier 1.8 million trees were killed by Sirex in 1987 with up to 80 % killed in some plantations.
16. Sirex infestation symptoms begin with a wilt where the needles are deflected back on themselves. Yellowing begins on needles at the base of the tree and then moves upwards. Later symptoms are the red-brown needles, while the tree dies from the base of the crown upwards with some trees still having green needles at the tips.
17. P. taeda is as susceptible as P. radiata but P. elliottii

is fairly resistant.

18. If the osmotic pressure of a tree is too high the Sirex female injects her ovipositor into it but then rejects the tree.

19. Unmated females are common when the wasp arrives in a new area merely because they fail to find mates.

20. The mucus is translocated to the needles where it disrupts normal functioning of the needles. This weakening of the tree attracts more females. The fungus blocks the tracheids, further stressing it.

21. CCA (Copper chrome arsenate) treatment of timber does not kill the larvae after a certain stage i.e. once they have completed feeding.

22. Ibalia leucospoides is the most common parasite which oviposits through the holes drilled by Sirex, to lay eggs on early instar larvae of Sirex - 40 % parasitism. Ibalia may start emerging before the Sirex wasps emerge - same for M. nortoni.

23. The tree begins to die after the fungus and mucus have been injected due to irreversable damage to tracheids and phloem. Sirex eggs hatch (after two weeks) induced by fungal growth.

24. Sampling for % parasitism by the nematode is done using both male and female wasps.

25. Trap trees (2 - 4 in groups) are established in spring viz. November by injecting them with a sub-lethal dose of Dicamba. Drought could adversely affect the trap trees by causing them to die too soon.

26. 100 000 nematodes are required per tree, with 2000 nematodes per hole and 50 holes per tree.

27. Once the Sirex (ground or air) survey shows a 5 % infestation then action must be taken and nematode inoculations begun.

28. Nematodes cannot move in the tree when there is no water in the tracheids and not because the tracheids have collapsed.

29. There is hybridisation between the less infective strains and the Kamona strain to the detriment of the latter.

30. It needs only one nematode entering a Sirex larva to eventually cause the complete sterilisation of the wasp.

31. Once the nematode has entered the Sirex larva and the wasp emerges, the reproductives produced by the original "invader" nematode enter the Sirex eggs as they are being produced i.e. prior to the chorion being formed around the egg (which hinders or prevents invasion in other Sirex species).

32. Why New Zealand has no major problem with Sirex is because the nematode entered the country with the wasp in the beginning and the climate is more favourable to the trees (higher humidity) which are not stressed as in Australia.

33. Laboratory flight trials have shown that a large Sirex wasp can fly 200 km on a "treadmill". The larger the wasp the further it can fly.

34. The Sirex larva actually "spits" out enzymes which digest the mycelia on which they "munch". Some wood is passed through the gut but most goes past the larva on either side as it chews its way forward in search of new fungal mycelia.

35. The Sirex larva moults about 14 times during its development and any penetration scars due to nematode entry will be lost at each moult. This can also be used to find out which instar is most infested.

36. The specially designed Sirex hammer must be pulled out from above holding the top of the hammer and not by the handle if it becomes stuck, as this could damage the punch.

37. To check if the Deladenus nematode is in a tree, sections or chips can be removed and placed in water overnight to allow them to swim out of the tracheids. Place something to lift the sections from the container floor to make it easier for them to swim out. Best placed with the tracheid openings projecting into the water.