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Control of the Tarnished Plant Bug at the Carters Nursery

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The tarnished plant bug (Lygus lineolaris Palisot de Beauvois) is a relatively new pest in southern pine nurseries. Injury from feeding can cause southern pine seedlings to form multiple stems. Trapping studies and visual observations indicate that newly emerged seedlings are very susceptible to injury. Injury can be reduced by timely applications of certain insecticides. Tree Planters' Notes 40(4) 30-33; 1989.

In 1984, the incidence of multiple-forked (bushy-top) seedlings was becoming a concern at the Carters Nursery as well as at other nurseries throughout the South. Agents suspected as being the cause of bushy-top seedlings included chemical injury, mechanical damage, genetics, nutrient deficiencies, viruses, and insects. Observations made by staff at the Auburn University Southern Forest Nursery Management Cooperative indicated that these injuries were caused by some type of insect. Based on information from Finland (3), Oregon (4, 5), and Canada (6), the probable culprit was the tarnished plant bug (*Lygus lineolaris Palisot de Beauvois*). The diagnosis of the problem as being caused by an insect was based on the nature of the seedling damage. Adjacent seedlings were often damaged, and injury was often found in rows or clumps. On some seedlings, lesions were present on the stem.

Although it has been known for some time that the tarnished plant bug (family Miridae) could cause injury in nurseries (2), this insect had not been observed feeding in southern pine seedbeds until 1985. In 1986, South showed that the tarnished plant bug could cause young loblolly pine (*Pinus taeda* L.) seedlings to form multiple stems (7). Similar damage has been observed in slash (*P. elliotti* Engelm.), longleaf (*P. palustris* Mill.), Virginia (*P. virginiana* Mill.), and sand (*P. clausa* (Chapm. ex Engelm.) Vasey ex Sarg.) pine seedlings (8).

Trapping Lygus Bugs

In 1986, we placed several RebeII® white visual traps (covered with Tangletrap insect trapping adhesive) were placed in the seedbeds and in adjacent fringe areas. Traps were first installed on August 13 and the first insects were collected on August 18. Among the insects that were trapped, several were identified as *Lygus lineolaris*.

Because damage to the seedlings had already occurred by June, we did not attempt any control measures in 1986. Even so, we learned much about the activity of the lygus bugs in midseason to late season. Unusual appearances of the seedlings were photographed and monitored. As a result, we realized that flagging of the needles, stem lesions, and death of the terminal bud were common responses from lygus damage.

In early May 1987, we installed traps and began control measures on May 19. We used malathion and fluvalinate (Mavrik®) insecticides. Fringes and seedbeds were sprayed on a weekly basis, alternating between malathion and fluvalinate. On June 23, we began using dimethoate (Cygon®) and continued spraying until August 26. Control using malathion and fluvalinate was fair. Later control with dimethioate was excellent.

In 1986, with no control program, 17% of the seedlings were damaged by lygus bugs. In mid-May 1987, a spray program was begun and damage from lygus bugs was reduced to 6%. Although this is a drastic reduction, we were not pleased with the results. Based on information learned in 1986 and 1987, we modified our control techniques.

The Most Active Period of the Day

During the course of the 1987 season, traps were monitored at different times of the day. Most of the bugs (79%) were caught between 7:30 pm and 8:30 am.

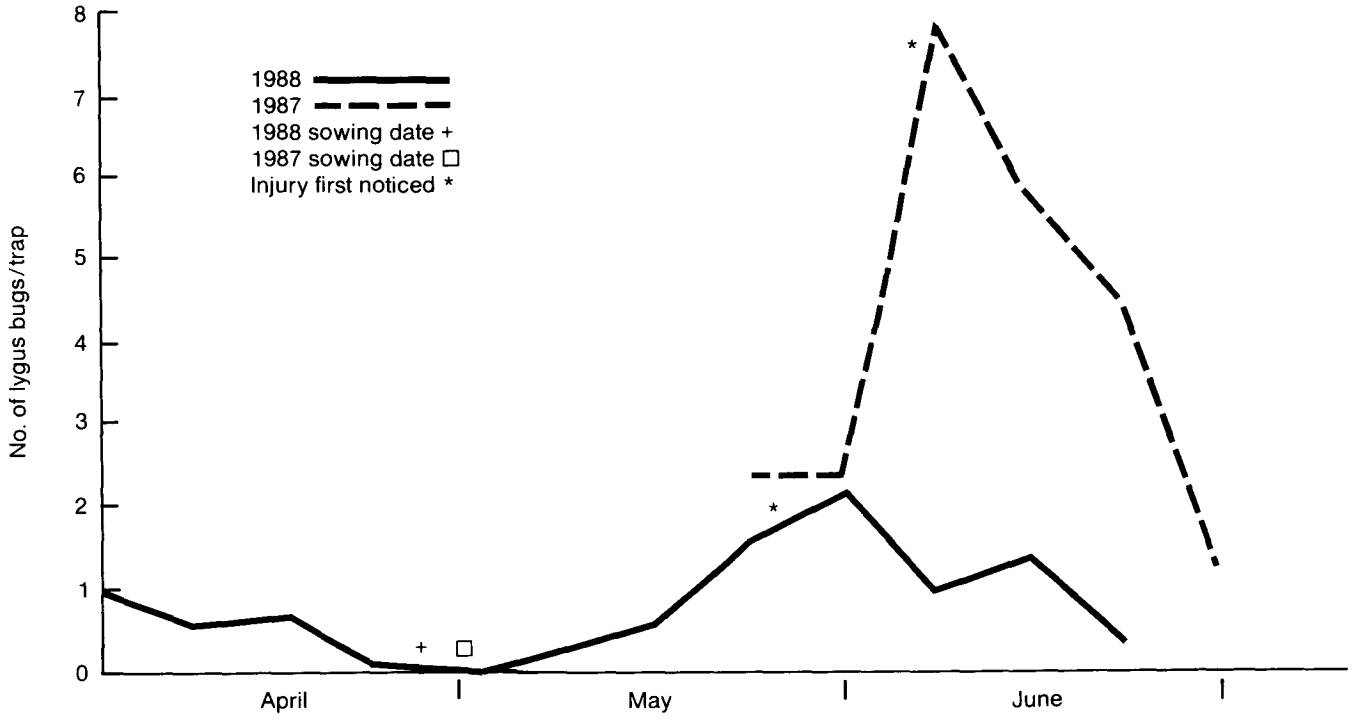

Figure 1—*Average number of tarnished plant bugs caught per trap per week during 1987 and 1988.*

About 14% were caught between 8:30 am and 1:00 pm. Activity decreased during the day, and no bugs were caught in the afternoon between 3:30 and 7:30 pm. Visual observations of surrounding hosts plants, such as cutleaf evening-primrose *(Oenothera laciniata* Hill), also indicated that lygus bugs were most active during the early morning. Because of this information, we now no longer spray after 11:00 am.

The Vulnerable Seedling Stage

In 1987, seedling damage was first noted in the first week of June, about *5* weeks after sowing (fig. 1). From this information it was concluded that injury must have occurred during a 3-week period between May 15 and June 7. In 1988, this theory was supported by observing damage in May. On May 24, damage was noted on seedlings in beds that were sown on April 25. Therefore, the seedlings were only about 2 weeks old (from emergence) when the injury was first noticed.

Damage that occurs after June 15 appears to be insignificant. The percentage of seedlings damaged after this date is usually minimal and therefore control measures may not be warranted. After this date, seedlings with large lesions, flagged tops, and crooked stems seem to totally recover by harvest time. Although some terminals may die, the seedling usually recovers.

Based on the early occurrence of injury, spraying of the fringe areas began approximately 10 days before the seedling crop was sown. The purpose of the early spraying was to lower the bug population before seed germination. The seedbeds themselves were sprayed as soon as germination began and on a weekly basis thereafter. The final application was made on June 14.

A Need for Sanitation

It was noted on several occasions that any area with weeds (i.e., bark and sawdust piles, etc.) can harbor populations of lygus bugs. Weeds in these areas must be eliminated or treated with insecticides. Special efforts

must be taken to ensure that this is done. All weeds on the fringes should be sprayed first, and not mowed until after 12 to 24 hours. All pipelines must be kept free of weeds.

Insecticide Application

Although there are several insecticides with lygus bugs listed on the label (1), we have used only malathion, dimethoate, and fluvalinate. At our nursery, malathion and fluvalinate did not give adequate control while dimethoate gave excellent control. Other nurseries have obtained good control with fenvalerate (Pydrin®) (4).

All applications were made on fringe areas and seedling beds between daylight and 11:00 am. Due to the rapid growth of seedlings and the frequency of irrigation, we deemed weekly insecticide applications necessary.

Based on our observations at Carters Nursery, we implemented the following control measures for the 1988-89 seedling crop. We believe that trapping lygus bugs is no longer necessary because the insects can easily be detected on certain preferred hosts. Future control measures will include the following:

1. **Read and follow all safety precautions and instructions on the pesticide labels.**
2. Continue to be aware of new insecticides for the most effective control of lygus bugs. We currently use dimethoate (Cygon 2E) at a rate of 0.28 to 0.56 kg ai/ha (0.25 to pounds ai/acre). Other nursery managers have used Pydrin 2.4E at a rate of 0.12 kg ai/ha (0.1 pounds ai/acre).
3. Begin spraying fringe areas and residual bark and sawdust piles, etc., 1 week before the seedling crop is sown.
4. Spray on a weekly basis. Be precise with timing on fringes and bed.
5. Spray between daylight and 11:00 am only. If the job is not completed, stop for the day and finish the following morning.
6. Apply insecticides at rates of 20 to 40 gallons of mix per acre.
7. Begin spraying seedbeds at the first signs of germination. It is important to do this regardless of the time *of* the last spray *of* the fringes. Get back on schedule next week.
8. Continue weekly applications in fringes and seedling beds. Make the final application during the second week of June.
9. Assess damage as seedlings germinate and progress. Make the final assessment during the July seedling inventory. Damage is easiest to recognize at this time.

Summary

Since 1984, the tarnished plant bug has become the most troublesome insect pest at our nursery. The amount of seedling injury was as high as 17% in 1986 and was 6% in 1987. To control this pest, we now use a combination of sanitation practices and insecticide applications. Our July 1988 inventory listed damage attributable to the tarnished plant bug as less than 1 %. Much of this reduction of injury we consider to be the result of timely applications of insecticides.

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