Pounce® Efficacy and Residual Duration Trial – 1998

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Objectives:

1) Determine if reproduction weevils continue to have a significant impact on pine seedling survival in East Texas, western Louisiana, and southwestern Arkansas in 1998.
2) Determine the efficacy of Pounce® in reducing weevil-caused seedling mortality.
3) Determine if the longevity of Pounce® residuals on treated pine seedlings is 3 months or more.

Field Trial

Thirty-six sites, harvested after June, 1997 and replanted with loblolly pine, were selected in East Texas (north to Upshur Co., south to Hardin Co., east to Newton Co., and west to Walker Co.). Fifteen sites were planted with Pounce®-treated seedlings and 21 with untreated seedlings.

Once each site was planted, a survey of 100 marked pine seedlings (10 plots, each containing 10 flagged seedlings) was conducted at least three times (May, July, and November) to determine the percent mortality attributed to weevils and other causes.

Laboratory Trial

A laboratory colony of pine regeneration weevils (pales, *Hylobius pales*, and pitch-eating, *Pachylobius picivorus*) was established during the winter of 1997-98. Weevils were collected once a week using pit traps baited with a 5:1 mix of ethanol and turpentine and set up in recently harvested tracts. In the laboratory, collected weevil species were maintained separately in clear plastic boxes containing a layer of vermiculite, split bolts and foliage.

Two hundred loblolly pine seedlings (100 Pounce®-treated and 100 untreated) were obtained from the Texas Forest Service Indian Mound Nursery in mid-February 1998. Seedlings were treated prior to lifting on February 2 with Pounce® 3.2 EC per label recommendations (2 qt / 100,000 seedlings). All seedlings were replanted in 1/2 gal pots (four seedlings per pot; treatments separate) and placed outside for exposure to the elements. The soil was a 3:1 mix of plantation soil and potting soil. The seedlings were watered once a week or as needed.

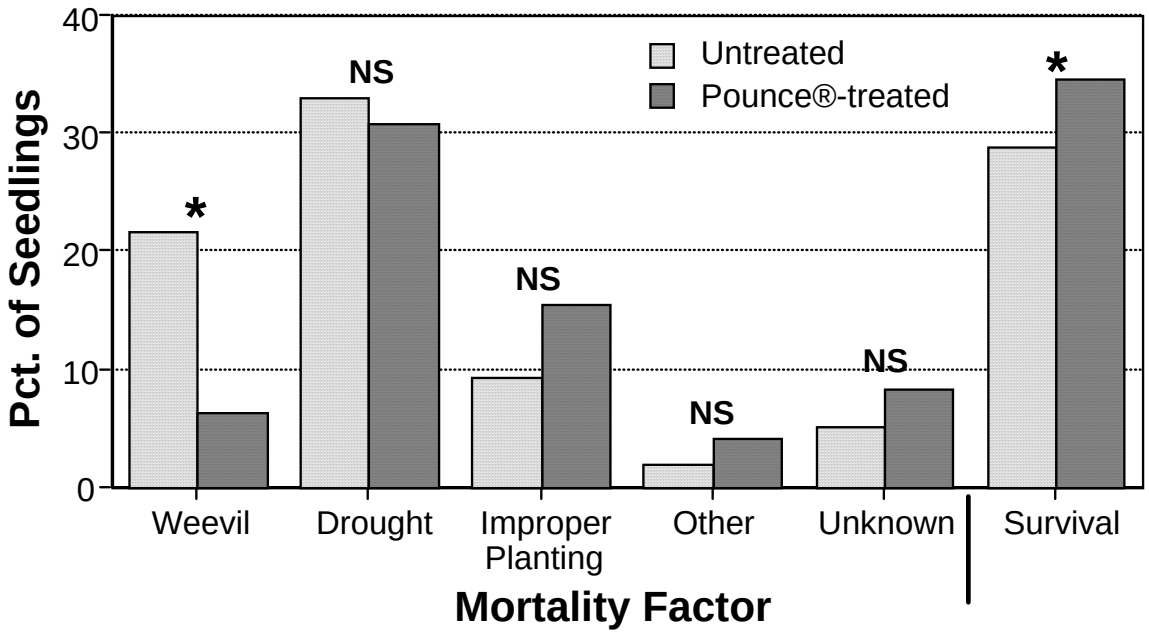
At two-week intervals for the first three months and once a month thereafter for four additional months, 32 weevils (eight males and eight females of both species) were collected from the colony containers. The weevils were placed in large petri dishes containing moist vermiculite, and starved for 24 hours. After 24 hours, eight seedlings (four treated, four untreated) were randomly selected and pulled from their pots. The root ball was clipped off at ground level and all lateral branches were removed. The remaining above-ground portion of the seedling stem was clipped into four equal lengths. Each section was placed in a moistened paper sleeve in a petri dish containing a single weevil. Each dish/weevil was examined every 24 hours for 3 days

and the number of sick or dead weevils recorded. The amount of weevil feeding on each seedling section also was measured in mm^2 at 24 hour intervals.

Results

First-year loblolly pine seedling mortality was exceptionally high in 1998. Total mortality on 21 untreated sites (those for which we have complete data) average 71.1% with a range of 5 to 92%. Drought and weevils were the major causes of mortality, accounting for 33.1% (range: 2 to 83%) and 21.6% (range: 0 to 65%), respectively (Fig. 1). In contrast, the 15 Pounce®-treated sites had significantly less weevil-caused seedling mortality (6.3%). Although overall survival of seedlings on treated sites was still very low, the planting of treated seedlings significantly increased survival compared to untreated sites (Fig. 1).

Figure 1. First-year loblolly pine seedling mortality and survival on East Texas sites planted with treated (N=21) and Pounce-treated (N=15) seedlings in 1998.



* = Significantly different at the 10% level; NS = not significant

Preliminary laboratory experiments showed no significant differences between the weevil species or sexes in the amount of feeding per 24 hours or susceptibility to Pounce®. Therefore, species and sex data were pooled. Subsequent evaluations of Pounce® longevity on treated seedlings in the laboratory showed that, overall, the chemical caused better than 50% weevil mortality even after exposure to seedlings treated nearly four months earlier (Fig. 2). However, it became evident early on in the experiment that the top half of the seedlings had not been treated as well with Pounce® as had the lower half. By separating mortality data for the two seedling halves, it is clear that when seedlings are thoroughly covered with Pounce®, as was the bottom half of the

Figure 2. Reproduction weevil mortality after exposure to Pounce®-treated loblolly pine seedling sections

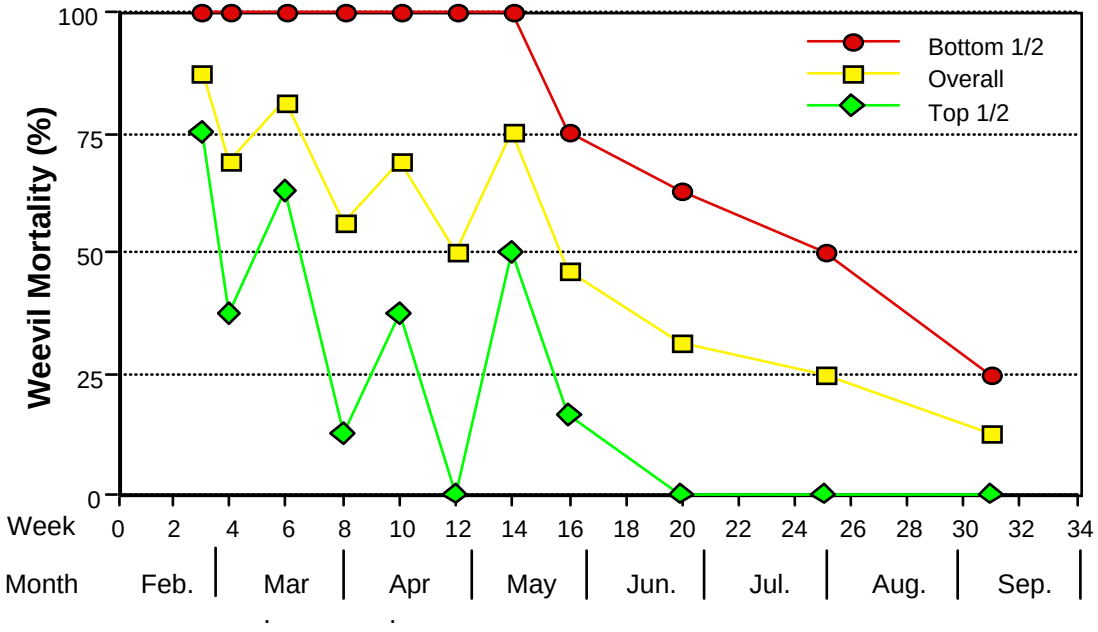
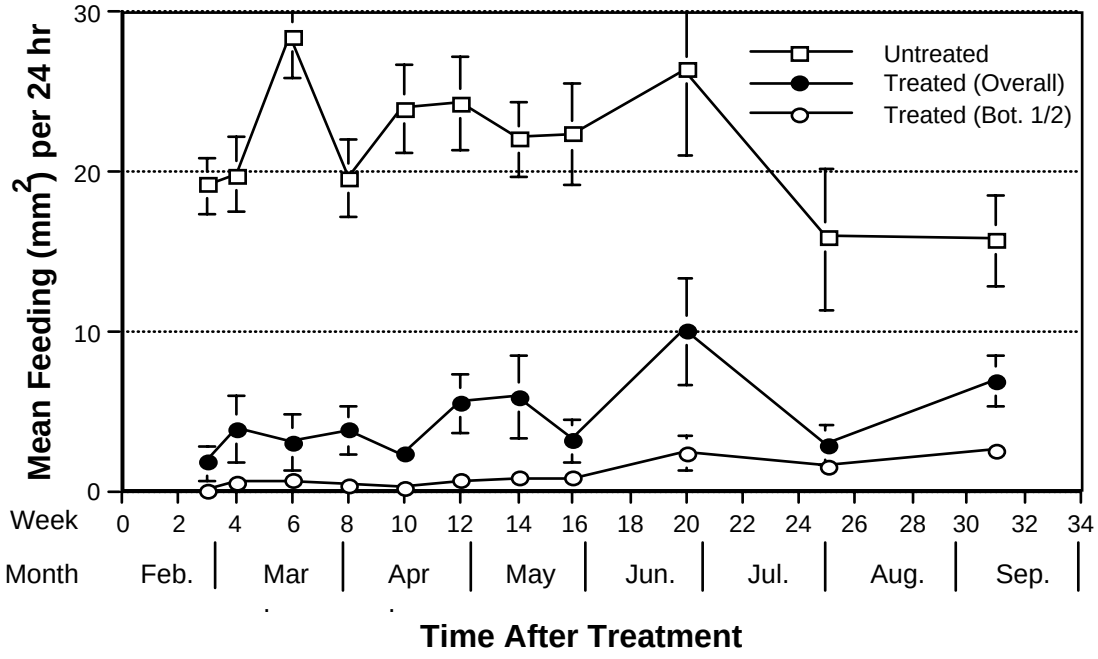


Figure 3. Reproduction weevil feeding on Pounce®-treated and untreated sections.



seedling, treated seedlings can be protected from weevils for as long as six months post-treatment. In addition, measurement of feeding areas on treated and untreated seedling sections showed that Pounce® is capable of significantly reducing the amount of feeding damage for eight months or longer (Fig. 3).

Conclusion:
The results in 1998 showed that reproduction weevils can have a significant impact on first-year seedling survival in East Texas, but that losses can be dramatically reduced with the planting of Pounce®-treated seedlings.