

Presummer Harvesting Reduces Pine Seedling Losses to Pales Weevils

Gordon E. Moore¹

Research Scientist, USDA Forest Service, Southeastern Forest Experiment Station, Forestry Science Laboratory, Research Triangle Park, N. C.

A study of pales weevil damage to planted southern pine seedlings indicates that completion of stand harvesting before July 1 in a given year results in lower subsequent seedling mortality after planting.

In several Southeastern States, insecticides are used to reduce seedling mortality from the pales weevil (*Hylobius pales* Herbst). Soon after harvesting, adult weevils are attracted to harvesting debris. Their offspring may continue emerging to feed on and kill unprotected seedlings on restocked tracts for up to a year in some instances. An alternative is to allow tracts to lie fallow for 12 to 18 months (2) after harvest, but timber companies are often unwilling to lose so much growth potential. Preliminary research indicated that the delay between harvesting and planting might be reduced to 6 to 7 months if harvesting was completed by late spring (1, 3). The primary objective of the study described here was to test this approach.

Materials and Methods

Six pairs of plots were installed and sampled in June 1980; each pair was located in the same county and not more than 20 miles apart. One of the pair had the bulk of harvesting

before and the other after July 1, 1979. Although site preparation methods varied (raking and bedding, raking, burning, or windrowing), all paired plots were prepared in the same manner. Pines were planted from 3 to 12 months after harvest. Some plots were planted in 1979 and others in the spring of 1980.

Seedlings were checked in June 1980 to determine mortality that had occurred since planting in an attempt to increase the accuracy over fall surveys alone. Flags were placed by living and dead seedlings so that they could be easily located during a second mortality check in October 1980. Seedlings were sampled in a diagonal pattern across each field. Twenty-five seedlings per row (or empty spaces where seedlings had been) were checked and flagged; after offsetting 1 to 2 rows, depending upon the size of the field, another 25 seedlings were checked until a total of 500 were examined. In smaller or shallower fields, the pattern was altered to examine the required number of seedlings.

Results and Discussion

Most weevil-caused seedling mortality occurred in late winter and spring because of the feeding of overwintering adults (3). These results (table 1) confirm that plots harvested after July 1 suffered more mortality than plots harvested earlier

(differences significant at the 0.01 level, $+ 0.01 = 4.08$ with 5 degrees freedom). In June, dead seedlings were easy to locate, and the cause for mortality was usually easy to identify. In the fall, many dead seedlings had disintegrated or were hidden by weeds, making assessment of mortality and its causes very difficult.

In addition to pales weevils, drought killed substantial numbers of seedlings (table 1). More seedlings died from drought than from pales weevils on 9 of 12 plots. Poor planting methods, which left exposed roots or air pockets around roots, also contributed to mortality.

Site preparation methods appeared to have little effect on the level of pales weevil-caused mortality. There was as much variation within as between methods. There was also not much effect that was attributable to the interval between harvesting and planting. Slightly higher weevil-caused mortality was evident in plots planted less than 4 months after cutting than in other plots. However, the effect of that interval was small in comparison to the effect of harvest timing.

The results indicate that completing harvesting before July 1 in a given year results in lower resident pales weevil populations and subsequent mortality when pine seedlings are replanted. It is probable that early harvesting with fall or winter regeneration will reduce requirements for extensive planting delay and pretreatment because harvesting debris tends to dry out

¹The author thanks Mr. Don Rogers, North Carolina Forest Service, for assisting in a portion of this work.

²Survey methods developed by the Forest Service, Southeastern Area, State and Private Forestry.

Table 1.—Mortality of untreated loblolly pine seedlings caused by pales weevils (PW) and other factors during 1980 on areas harvested before and after July 1, 1979, and planted 3 to 12 months later¹

Plot location (County)	June survey				October survey			
	Harvested before July 1		Harvested after July 1		Harvested before July 1		Harvested after July 1	
	PW	Other	PW	Other	PW	Other	PW	Other
	----- % mortality -----							
Chesterfield, S.C.	1	2	2	-	1	7	-	-
Chesterfield, S.C.			5	17			6	41
Halifax, N.C.	<1	10			1	21		
Halifax, N.C.			31	14			53	27
Burke, N.C.	0	6			<1	19		
Burke, N.C.			13	19			17	37
Iredell, N.C.	2	7			4	20		
Iredell, N.C.			12	1			17	21
Berkeley, S.C.	4	<1			5	1		
Berkeley, S.C.			29	14			33	17
Charleston, S.C.	2	21			3	26		
Charleston, S. C.	-	-	12	17	-	-	12	18

¹500 seedlings checked per plot.

²- = not applicable.

during the summer. Although additional testing is required, insecticide pretreatment of planted seedlings may be unnecessary except in areas heavily infested with pales weevils.

Literature Cited

1. Doggett, C. A.; Grady, C. R.; Green, H. J.; Kunselman, M. B.; Layman, Harry; Taylor, Sam. Seedling debarking weevils in North Carolina. For. Note 31. Raleigh, NC: North Carolina Forest Service; 1977. 4 p.
2. Walstad, J. D. New strategies for controlling pales weevil in pine plantations of the Southern U.S.A. Proceedings, International Union of Forestry Research Organizations XVI World Congress; Oslo, Norway. Vienna, Austria: Secretariat of the International Union of Forestry Research Organizations; 1976: 459-486.
3. Walstad, J. D.; Nord, J. C. Applied aspects of pales weevil control. Down to Earth 31: 8-15; 1975.