Southern Forestry Notes

FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Southern Forest Experiment Station, New Orleans, La.

No. 134 July 1961

ESTIMATING PINE SEED YIELDS

Formulae that predict yield of seeds per cone have been developed for longleaf, slash, and loblolly pines by the Alexandria Research Center. They estimate yields from the number of full seeds exposed by slicing the cone in half longitudinally with a special knife.

The formulae are:

Longleaf pine	$Y = 11.18 + 6.02X$
Slash pine	$Y = 4.93 + 7.49X$
Loblolly pine	$Y = 18.06 + 6.52X$

Y is the total number of sound seeds per cone. X is the average number of seeds per cone exposed in slicing--only seeds whose white interiors are exposed by the knife should be counted. Users of these formulae should recognize that there is considerable tree-to-tree variation, and that at least two cones from each of 30 trees should be sampled to predict seed yield of a particular stand.

The longleaf formula was tested by slicing four cones from each of 40 trees in August 1960. The average number of exposed seeds (X) was 13.8 and yield (Y) was estimated to be 94.3. Cutting tests of seeds from a like sample of cones collected in October showed an average of 97.7 sound seeds per cone. This difference of about 3 seeds per cone represents less than one ounce of seed per bushel of cones.

Pounds of seed per bushel of cones can be calculated if local information is available on (1) number of cones per bushel, (2) number of seeds per pound, and (3) recovery of seeds from cones. Gross estimates can be made by assuming that cones and seed will be of average size (75 longleaf, 200 slash, and 500 loblolly cones per bushel, and 5,000, 14,500, and 18,500 seeds per pound, respectively). Then, if recovery is 100 percent, one bushel of cones will yield 1 pound of seed when an average of 9 longleaf, 9 slash, and 3 loblolly seeds are exposed in bisecting the cones.--B.F. McLemore.

SITE AFFECTS GRADE OF CHERRYBARK OAK

Influence of site quality on grade, vigor, height, and other characteristics of cherrybark oak was recently evaluated on 113 plots throughout the Midsouth.

The plots were put into 4 groups, according to their site as measured in terms of the height in feet that freegrowing cherrybark oaks in well-stocked stands attain in 50 years. Groups were about equal in number of plots, and in age, diameter, basal area, and form class of the trees. Tree vigor, grade of butt log, and amount of insect attack were evaluated for each tree on a 1-2-3 system, with 1 being the highest in vigor and grade and best from standpoint of insect attack. Number of potential 16-foot logs was also estimated.

Results were:

	Site index (feet)					
	105+	104-95		94-85		Below 85
Number of potential logs	3.10	2.90	*	2.69	**	2.05
Vigor	1.45	1.41	**	1.82	**	2.59
Grade of butt log	1.34	1.51	*	1.79	**	2.49
Insect incidence	1.04	1.12		1.11	**	1.57

One asterisk between two means indicates that the difference is statistically significant at the 5-percent level; 2 asterisks, at the 1-percent level. Thus, trees on sites 94-85 are significantly poorer in all features except insect incidence than those on sites 104-95. And as sites fall below 85, the sharp decline of cherrybark oak quality suggests the consideration of other species, hardwood or pine.--*W.M. Broadfoot*.

NO ADVANTAGE IN PLANTING HARDWOODS DEEP OR WITH MATTOCK

In tests on lowland sites in north Mississippi, planting bottom-land red oaks and sweetgum seedlings deep or with a mattock afforded no advantage over bar planting at root-collar depth.

Nuttall, cherrybark, water, and willow oak and sweetgum seedlings were planted on Falaya silt loam in an abandoned field, and underplanted and released from a sweetgum-water oak stand growing on Waverly silty-clay loam. Half of the trees were planted to a depth of one-half stem length or 3 inches above the rootcollar, whichever was less, and the remainder at rootcollar depth.

First-year survival was equally good for both methods and depths of planting. Second-year survival percentages averaged 83.6 for bar and 81.4 for mattock planting; 80.5 for deep and 85.5 for rootcollar planting. As no consistent significant differences were associated with either method or depth, the faster and more economical planting with bar and at rootcollar depth is recommended.--*Russell M. Burns.*

GROWTH AND SURVIVAL IN TENNESSEE STRIP-MINE PLANTATIONS

Two-year survival and growth of planted loblolly, shortleaf, and Virginia pine were satisfactory on strip-mine spoil banks in southeastern Tennessee, but white pine was disappointing.

The trees were bar-planted in February 1959 on newly dumped coal spoils near Tracy City. There were four replications, all on a buff-colored shaly silty clay loam with an average stone content of 42 percent. Survival at the end of the second growing season averaged 55 percent for the white pine and 69 to 74 percent for the yellow pines. Two-year growth (in feet) was: white pine 0.4, shortleaf 0.6, loblolly 0.8, and Virginia pine 1.0. Growth of Virginia and loblolly was significantly better than that of shortleaf; growth of all three yellow pines was significantly better than that of white pine.

The low survival was due in part to a severe drought during the second growing season, but the principal agent of mortality was active soil erosion during both years. Many seedlings were washed away, and others were buried. Sheet and gully erosion are continuing, and further losses may be expected. Much of the mortality due to erosion could have been prevented by waiting a few years for the spoil surfaces to stabilize before planting.--*J.D. Burton.*

SEEDLING MORTALITY IN OUACHITAS

Mortality of natural shortleaf pine reproduction in the Ouachita Mountains of Arkansas varies with aspect, cover, and depth of soil.

Seedlings from the bumper crop of 1957 were marked for observations in December 1958, after their first year. Two growing seasons later, in August 1960, tallies gave the following mortality percentages: 67 on soils more than 20 inches deep, 45 on soils less than 12 inches deep; 61 on north slopes, 51 on south slopes; 65 under heavy pine overstory, 68 under heavy pine-hardwood, and 62 under heavy hardwood canopies. Under light hardwood and grass-forb covers, mortalities were 46 and 38 percent, respectively.

Included in this total mortality was the loss from frost heaving in the severe winter of 1959-60. Of the seedlings alive in December 1959, 29 percent of those on north slopes died by May 1960; 18 percent died on south slopes. Thirty-three percent died on deep soils, 15 percent on shallow soils. Heavier winter losses on deep soils are believed to result from slower drainage, and consequently greater frost heaving, than on shallow soils. Summer mortality on deep soils was probably caused by heavier competition than is normally found there.--*James L. Smith, D.R. Bower*, and *W.W. Blocker*.

RECENT PUBLICATIONS

*Christopher, J.F. *1960 pulpwood prices in the Mid-south.* Southern Pulp and Paper Manufacturer, July 1961, p. 46.
*Echols, R.M., and Bowden, A.B. *Inexpensive ring analyzer for cumulative summerwood measurements.* Forest Science, June 1961, pp. 147-148.
*McClurkin, D.C. *Eroded sites rebuild slowly.* Mississippi Farm Research, March 1961, p. 5.
*Peevy, F.A. *Testing the new herbicides.* Forests & People, Second Quarter, 1961, pp. 20-21, 36-37.
*Smith, L.F. *Rapid growth of slash and loblolly pines on cultivated plots.* Tree Planters' Notes 46, pp. 9-10.
*Snyder, E.B. *Measuring branch characters of longleaf pines.* Occasional Paper 184, 4 pp.

In Proceedings, Sixth Southern Conference on Forest Tree Improvement:

*Campbell, T.E., and Wakeley, P.C. *Possible refinements in controlled pollination of southern pines.*
*Jewell, F.F. *Artificial testing of intra- and interspecies southern pine hybrids for rust resistance.*
*McKnight, J.S., and Bonner, F.T. *Potentials and problems of hardwood tree improvement.*
*Maisenhelder, L.C. *Selection of Populus clones for southern bottom lands.*
*Snyder, E.B. *Racial variation in root form of longleaf pine seedlings.*
*Wakeley, P.C. *Results of the Southwide Pine Seed Source Study through 1960-61.*

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*Copies are available at the Southern Station.