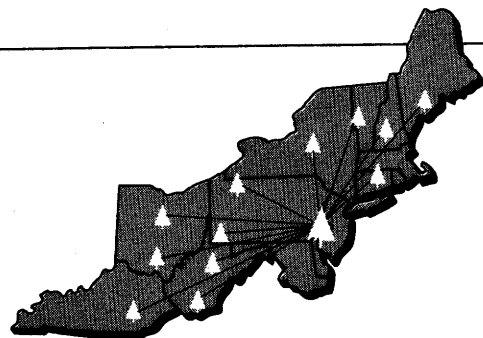


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Northeastern Forest Experiment Station



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LONGEVITY OF BLACK CHERRY SEED IN THE FOREST FLOOR

Abstract.—Observations made on the Fernow Experimental Forest in West Virginia indicate that some black cherry seeds remain viable in the forest floor over three winters. On the average fewer than 10 percent of the seeds stored in the forest floor germinated the first spring, about 50 percent germinated the second spring, and 25 percent germinated the third spring.

The longevity of seeds stored in the forest floor—both of desirable hardwood species and of the principal competing species—is important in forest management. If viable seeds of the desired species accumulate in the forest floor, they may ensure good amounts of reproduction when favorable conditions are created—as through harvest cuttings. Furthermore, if viable seed is stored in the forest floor, managers need not rely on current seed crops nor on timing the cutting to take advantage of good seed crops.

Conversely, the presence of many viable seeds of *unwanted* species may mean that numerous seedlings of these will start and will compete with reproduction of desired species. To eliminate such competition, seed sources of undesirable species may have to be removed from the forest stand years before the harvest cutting.

In recent years information has been published about seed storage in the forest floor for several hardwood species. Sander and

Clark (1971) determined that yellow-poplar (*Liriodendron tulipifera* L.) seeds remain viable for up to 8 years in the forest floor of the hardwood forests in the Central States. Clark (1962) found that white ash (*Fraxinus americana* L.) and hackberry (*Celtis occidentalis* L.) seeds remain viable after 3 winters of storage in the forest floor. Sassafras (*Sassafras albidum* (Nutt.) Nees) seed viability was found to be limited to one winter. Leak (1963) showed that white ash seeds also remain viable for 3 years in forest floors of the White Mountain area of New Hampshire.

Black cherry (*Prunus serotina* Ehrh.) is an important timber species in Pennsylvania and West Virginia. Delayed germination of this species in nursery seedbeds indicated that possibly in nature some of the seed might remain viable in the forest floor for more than 1 year. To determine this, tests were started on the Fernow Experimental Forest near Parsons, West Virginia, in the fall of 1968.

The Study

In the fall of 1968, mature black cherry fruits were collected in the vicinity of Parsons, West Virginia. Sixty lots of 200 fruits each were placed in field storage plots under a fully stocked hardwood stand. Thirty lots were broadcast-sown on the 1967 litter and 30 were placed on the litter in envelopes made of fiberglass screen cloth (fig. 1), similar to those used by Clark and Boyce (1964). After the fruits were placed in storage, they were covered with a depth of litter equal to the current year's leaf fall. This procedure was repeated each autumn.

The field-storage plots were rectangular—16 by 24 inches—constructed of 12-inch-wide $\frac{1}{4}$ -inch mesh hardware cloth, which was forced into a slit 6 inches deep around the perimeter of the plots to keep out burrowing animals (fig. 2).

The interior of each plot was divided into

three subplots, each 8 by 16 inches—one to be used for broadcast storage, one for fiberglass envelope storage, and one to serve as a control.

The 30 field storage plots provided 90 subplots—enough to sample 6 envelope, 6 broadcast, and 6 control subplots annually for 5 years. However, in the late spring after the first winter, mice got into 15 of the plots and ate all the stored seeds. The experiment was revised so that 6 plots were sampled after the first winter, 3 plots were sampled after the second winter, and 2 plots were sampled after the third winter of storage.

Samples were removed from the storage plots in late April each year. Seeds that had germinated in the storage plots were removed from the samples and counted. Ungerminated seeds were placed on "Kimpak" paper, covered with a blotter, moistened, and put in a germinator where the temperature was main-

Figure 1.—A fiberglass screen envelope containing seed.

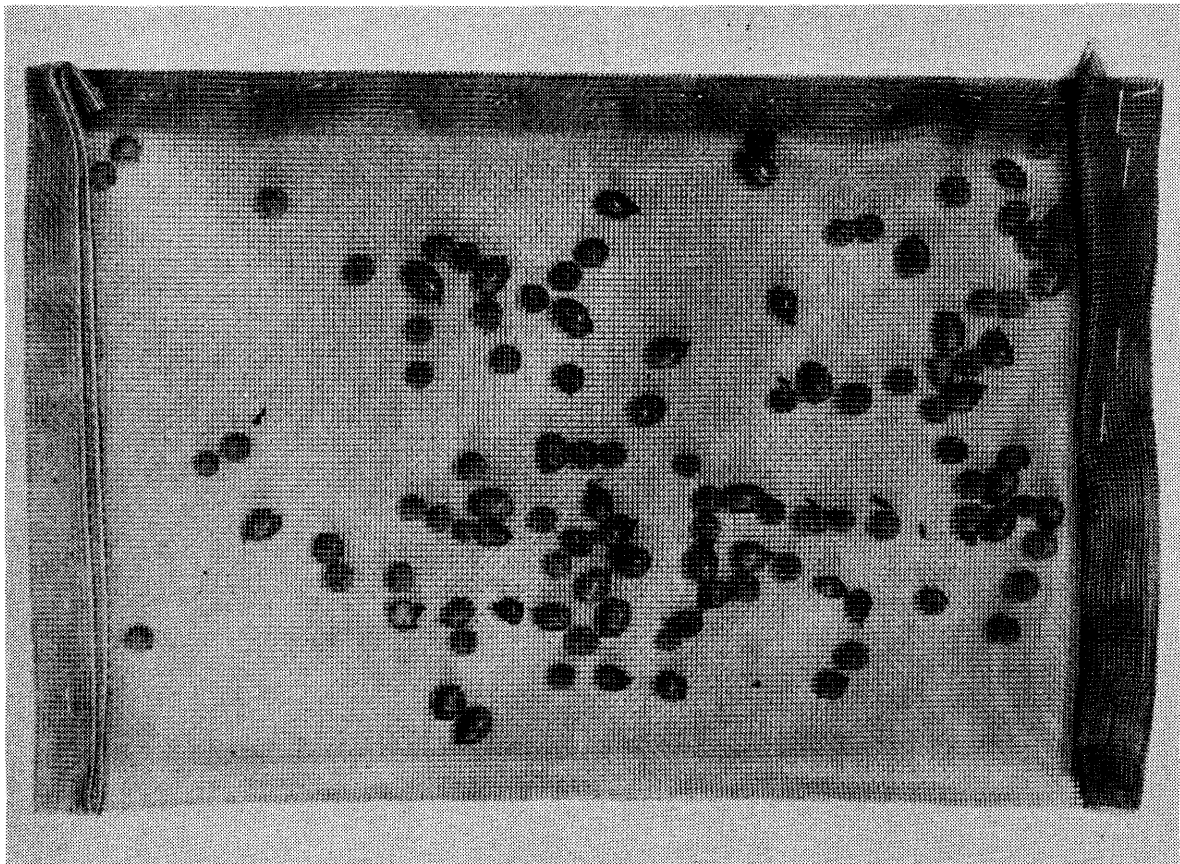




Figure 2.—Field storage plot.

tained at 78° F. Tests in the germinator were terminated after 3 weeks.

Results

Very few seeds germinated after the first winter—8.7 percent of the broadcast-stored seeds and 4.6 percent of the envelope-stored seed (table 1). In the samples collected after the second winter, 45.5 percent of the broadcast-stored and 54.7 percent of the envelope-stored seed germinated. After the third winter of storage, 23.5 percent of the broadcast-stored seeds and 26.5 percent of the envelope-stored black cherry seeds germinated.

More than 90 percent of the germination each year occurred in the field storage plots. This was recorded at the time the plots were sampled. The percent germination each year is the sum of field germination and tests in the germinator (table 1).

Since no natural black cherry seeds were found in the control plots during the first

Table 1.—Percent germination of black cherry seeds

Plot number	Type of storage	
	Broadcast	Envelope
AFTER FIRST WINTER		
	<i>Percent</i>	<i>Percent</i>
1	5.0	1.0
2	14.0	0
3	13.0	15.5
4	2.0	1.0
5	6.5	8.5
6	12.0	1.5
Average	8.7	4.6
AFTER SECOND WINTER		
7	51.5	46.0
8	42.5	53.5
9	42.5	64.5
Average	45.5	54.7
AFTER THIRD WINTER		
10	20.5	28.0
11	26.5	25.0
Average	23.5	26.5

year test, control plots were not sampled thereafter.

Accumulating the average percent germination for each year, we found that 78 percent of the broadcast-stored seeds and 86 percent of the envelope-stored seeds germinated during the first 3 years. Between 2 and 3 percent of the seed each year had rotted.

In general, more broadcast-stored seeds germinated after the first winter; but after the second and third winters, slightly more envelope-stored seed germinated (table 1).

Discussion

Under the conditions of the study, some of the black cherry seeds retained their viability over three winters. On the average, fewer than 10 percent of the seeds stored germinated after the first winter, 50 percent germinated after two winters, and 25 percent germinated after three winters.

We are repeating the study to find out if the longevity pattern is the same over a different span of years. In addition, we also have longevity tests under way with wild grape (*Vitis aestivalis* Michx.), pin cherry (*Prunus pensylvanica* L.f.), and sassafras.

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