

STRATIFIED WALNUT SEED STILL VIABLE AFTER FOUR YEARS IN STORAGE

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It is commonly believed that black walnut seed should be sown immediately after collection, or stored no longer than over winter and then sown in the spring. After several years of testing different storage methods, we have found that the viability of black walnut seed can be maintained for 4 years or more when the seed is stratified in deep pits.

Procedures

Black walnut seed for the study was collected from a stand near Orleans, Ind., during the good seed year of 1965. The nuts were mixed and hulled, and spread to dry in a basement at the Vallonia nursery in southern Indiana. A cracking test showed that most of the seeds were sound. Although the hulled walnuts were allowed to dry 3 days, they were only surface dry when prepared for storage.

More than 100 lots of 100 nuts each were prepared and placed in the storage conditions described below:

1. Dry cold storage at 19°F.-seed in plastic bags.
2. Moist cold storage at 19°F.-seed mixed with moist sand and sealed in airtight metal containers.
3. Dry cold storage at 37°F.-seed in plastic bags.
4. Moist cold storage at 37°F.-seed mixed with moist sand and placed in plastic bags.
5. Moist storage in outside stratification pits-1 seed not treated or bagged.

1 Stratification pits were located at the Vallonia, Ind. Nursery (39° N. latitude) on a well drained sandy soil. The pits were 3 to 4 feet deep. Buried seedlots were enclosed in 8-inch mesh wire screens to insure recovery of seed.

2Methyl cellulose is a dry, water soluble sticker particularly adapted to heavy coating (pelleting) of seeds. A mixture of 3 ounces of methyl cellulose in 1 gallon of water was used to coat the walnut seed.

6. Dry storage in outside stratification pitsseed in plastic bags.

7. Dry storage in outside stratification pitsseed coated with methyl cellulose.²

Four seedlots of fresh untreated seed and four seedlots of methyl cellulose treated seed were sown in nursery seedbeds in the fall of 1965 (the year collected). Then each succeeding fall for 4 years, four seedlots were taken from each of the seven storage conditions and sown in nursery seedbeds. Each time the seeds were sown, the seedbeds were mulched with straw and covered with a 1/2-inch mesh wire screen. Germination was tallied periodically each spring until it ceased.

Findings

Pit stratification proved to be the best storage method for maintaining walnut seed viability (table 1). In fact, seed stratified for 1 year in deep pits germinated significantly better than seed sown immediately after collection. Even after 4 years stratification, the average germination was slightly better than for freshly sown seed.

Treating the seed with methyl cellulose or enclosing it in plastic bags did not significantly help maintain viability of pit-stratified seed. Plastic bags may help in handling and recovery, but neither treatment can be justified on the basis of improving storability.

Cold storage maintained seed viability for only about 1 year regardless of moisture conditions or storage temperature. During the first year many of the seed stored at 37°F. germinated prematurely and molded while in storage. Ice crystals formed within the seed stored at 19°F. and apparently killed most of the seed by the second year of storage. An intermediate temperature might have maintained seed viability longer. Also,

TABLE 1.—Germination¹ of black walnut seed after various storage periods by storage method and seed treatment (percentage)

Year sown	Years in storage	Cold storage				Pit stratification		
		19°F.		37°F.		Moist Plain	Dry	
		Dry	Moist	Dry	Moist		Plastic bags	Methyl cellulose
1965	0					32		33
1966	1	26	44	22	15	50	60	49
1967	2	1	4	15	15	49	35	50
1968	3	2	8	10	3	42	39	45
1969	4	3	2	9	2	37	20	48

¹Average germination of four seedlots that contained 100 seeds each.

drying the seed to a lower moisture content may have prevented molding and premature germination.

These results clearly show that walnut seed can be successfully stored for a number of years by pit stratification. Although no special facilities are required, good internal drainage is probably

important for the soils. Also, somewhat deeper stratification pits may be needed when storing seed at more northerly locations. Nurserymen in particular should find this information useful because they can now store seed from bumper seed years for use during poor years.