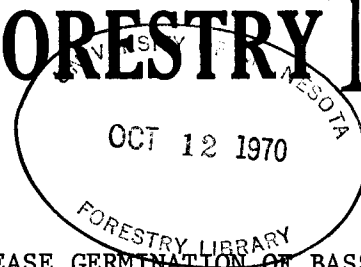




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TIMING OF SEED COLLECTIONS TO INCREASE GERMINATION OF BASSWOOD SEED

C. A. Mohn^{1/}

Early harvest followed by immediate sowing has been suggested as a means of overcoming dormancy of American basswood (*Tilia americana* L.) seed. This technique was reported to give approximately 15 percent germination when seed collection was begun "just as the seed coat turned slightly brown and concluded before the seed coat became dry and hard."^{2/} Seed maturity at the time of harvest is critical to successful employment of this technique. In order to obtain information to aid in the timing of collections, characteristics of freshly harvested fruit and seed were observed during the late summer and early autumn of 1962 and related to subsequent germination.

Collections of fruit from the south-facing, lower crowns of 3 trees were made on August 21, August 31, September 10, September 20 and September 30. Observations and measurements made on 20 fruits and seeds from each tree on each collection date are summarized in Table 2. Some variation in the development of fruits and seeds from individual trees was observed but the data in Table 2 provided a general description of changes during ripening.

On each harvest date two lots of 250 fruits from each tree were planted in a nursery and four lots of 50 fruits from each tree were stratified at 41° F. In March, 1963, stratified seeds were placed in a greenhouse for 20 days and at the end of this period germination counts were made. Seedlings produced by seed sown in the nursery were counted on May 28, 1963. Cutting tests performed on samples of 20 fruits from each tree at the time of collection permitted germination percentages to be computed on the basis of number of filled seeds. The mean germination of seed stratified at 41° F. and of seed sown in the nursery on each harvest date is given in Table 2.

The data indicate that maximum germination was observed when seed was collected after development had proceeded to the point where dry matter accumulation was completed and the loss of moisture had reduced the green weight of seed and fruit, but before the seed had dried excessively. The development of a brown seed coat and loss of green color by the embryo were apparently correlated with maximum germination (Table 2).

Two hundred fruits collected from each of seven additional trees on the five collection dates were included in the stratification treatment. Changes in fruit and seed characteristics during the harvest period of collections made from these trees were similar to those summarized in Table 2 and the only appreciable germination was observed in collections made on September 20. The relationship of fruit and seed characteristics at the time of harvest to subsequent germination in these collections was thus consistent with that already described.

The timing of harvest was more critical when seed was stratified at 41° F. than when seed was planted in outside beds (Table 2). Among the characteristics observed, moisture content may be one of the best criteria for use in timing harvest. Grouping of seed harvested and stratified at 41° F. on September 10, 20, and 30 on the basis of moisture content shows the relationship of moisture content to germination (Table 1).

^{1/} Research Assistant, School of Forestry, University of Minnesota.

^{2/} Bailey, C. V. 1960. Tree Planters Notes. 46:27.

Moisture Content (% of green wt.)	Table 1 Germination (percent)	Basis (# seeds)
10-19	1	2330
20-29	27	180
30-39	13	760
40-49	2	830
50-60	0	1840

Since the high germination between 20 and 29 percent moisture content represents that of a single collection, conclusions based on Table 1 must be tentative. The data do suggest that seed should be collected when moisture content is between 20 and 40 percent.

For field use changes in seed coat and embryo color may be the most practical guide in timing basswood seed harvest. Using these characteristics, harvesting seed as soon as possible after the majority of the seed coats have become brown and most embryos have lost their green color should tend to maximize germination.

Table 2. Relationship between germination and certain characteristics of American basswood seed and fruit at time of harvest. 1/

Collection date	Pericarp color of fruit	Texture of endosperm of fruit	Testa color			Embryo color		Mean weight of fruit (grams)	Mean weight of green seed (grams)	Mean weight of oven-dried seed (grams)	Mean moisture content of seed (%)	Germination ^{2/}	
			white	tan	brown	green	yellow					Planted seeds, May, 1963	Stratified seeds, March 1963
			(% of total number of seeds)			(% of total number of seeds)					(percent)		
8/21	green to pale green	liquid	100	0	0	100	0	.1658	.0554	.0161	71	0	0
8/31	green to pale green	semi-liquid	97	0	3	100	0	.2080	.0581	.0229	61	2	0
9/10	grey or brownish green	solid but moist	27	14	61	43	57	.2145	.0587	.0262	55	11	1
9/20	grey or brownish green	solid but moist	0	0	100	0	100	.0980	.0332	.0258	22	17	13
9/30	grey or brown	solid but moist	0	0	100	2	98	.0891	.0308	.0259	15	6	2

1/ Descriptive data based on samples of 20 fruits from each of 3 trees per harvest date.

2/ Germination of filled seeds from 500 fruits sown in the nursery and 200 fruits stratified at 41° F. from each of 3 trees.