# STRATIFY YELLOW-POPLAR SEED OR SOW DIRECTLY?

G. A. Limstrom
Central States Forest Experiment Station, U. S. F. S. Columbus, Ohio

A frequent topic of discussion among nurserymen in the Central States region is the best treatment for yellow-poplar seed before sowing. At the Marietta State Forest Nursery in Ohio, stratifying the seed in sand for one or more years has given the best results. On the other hand, State and Federal nurseries in Indiana and Illinois frequently sow seed of this species in the fall shortly after collection. This divergence of practices may be explained by a current source study of this species. The study shows that the best presowing treatment of yellow-poplar seed may vary by seed sources, conditions affecting seed formation and dormancy, or other factors not yet fully understood.

In the fall of 1952 yellow-poplar seed from eight different sources in the three States was collected for use in a seed-source study. Samples of seed from each of these sources were selected at random and sown at the U. S. Forest Service Nursery, Vallonia, Ind., in the fall of 1952. Other samples from the same collections were stratified deeply in sand at the nursery until the fall of 1955 and then sown. Stratified seed from all Ohio and Illinois sources produced a much higher percentage of seedlings than did seed sown immediately after collection in the fall (table 1). For the Indiana sources, on the other hand, the reverse is true: direct sowing was superior to stratification.

**Table 1.--Percentage of yellow-poplar seeds that germinated and survived for 1 year (tree percent) by seed treatment and seed source (U. S. Forest Service Nursery, Vallonia, Ind.**

| Seed Source | Seed Treatment | |
|---|---|---|
| | Sown immediately after collecting | Stratified 3 years |
| Zaleski, Ohio | 0.15 | 2.96 |
| Athens, Ohio (B) | 1.06 | 3.83 |
| Marietta, Ohio | 1.52 | 6.79 |
| Athens, Ohio (A) | 1.87 | 7.79 |
| Hardin Co., Ill. | 1.55 | 2.88 |
| Jonesboro, Ill. | 2.95 | 4.35 |
| Cannelton, Ind. | 7.68 | 6.21 |
| Dexter, Ind. | 12.00 | 7.73 |

In tests of this kind it is impossible to control all variables that may affect germination and survival. Presowing seedbed treatments, weather, fertility, watering schedules, and so forth are difficult to duplicate in two different seasons even at the same nursery. But the results differ so widely--more than 300 percent in four out of eight cases--that there is little doubt seed stratification influences the germination of yellow-poplar seed. The reasons for this variation in germination habits among different seed sources are not known. However, it is plain that a knowledge of how the effects of stratification vary among different seed sources may result in more as well as better seedlings.

Another study shows that apparently stratification also influences date of germination and hence the number of plantable 1-0 seedlings that can be grown. Seed from six of the above sources was collected from the same seed trees 3 different years. Those collected the first 2 years were stratified; those collected the third year were not. All were sown at the Vallonia Nursery in the fall of 1955. The strikingly greater percentage of seedlings taller than 6 inches produced from the stratified seed is evidence that stratified seed must have germinated much earlier than seed sown directly (table 2). Again, there were wide differences among seed sources.

Table 2.--Percent of seedlings more than 6 inches tall 1 year after sowing.

| Seed source | Collected 1952 Stratified 3 yrs., sown fall 1955 | Collected 1954 Stratified 1 yr., sown fall 1955 | Collected 1955 sown fall 1955 |
|---|---|---|---|
| Marietta, Ohio | 62 | 90 | 41 |
| Athens, Ohio (A) | 62 | 51 | 44 |
| Zaleski, Ohio | 72 | 48 | 23 |
| Athens, Ohio (B) | 77 | 68 | 7 |
| Cannelton, Indiana | 88 | 73 | 56 |
| Hardin Co., Illinois | 90 | 95 | 78 |