

Aspen Seed Collection



Nursery Information Series

Aspen Seed Collection

Randy D. Moench
Nursery Manager
Colorado State University
Colorado State Forest Service
Foothills Campus, Bldg. 1060
Fort Collins, Colorado 80523



sex born on one tree. In other words the tree is either a male tree or a female - usually. In the world of nature there are no absolutes.

Key to successful aspen seed collection is the ability to identify the flowers and determine the sex. One should be familiar with basic flower parts. Stamens and anthers, the male flower parts, are more conspicuous in aspen. Pistil and style, the female flower parts of interest are inconspicuous early on in flower development. As the female flower matures the pistil or capsule becomes more noticeable.



Figure 1: Greatly enlarged aspen pistil or capsule from female flower.

Introduction

Aspen is a signature tree of Colorado. It is the most widely distributed tree in North America.¹ Its beautiful fall foliage is a calling card for tourism. It is also an important tree for timber. Sought-after as ornamentals through out the state, many are harvested as transplants for sale in urban areas. Nursery production of aspen by seed can be successful but is not the common method. The goal of this guide is to aid the nurseryman in successful collection of viable aspen seed.

Extensive stands of flowering aspen are the exception. Typically flowering trees are few and far between but not uncommon. Flowering may not occur in the same stand year after year. Identifying several stands throughout a given region will lead to more reliable stores of aspen seed. But years of no flowering over a wide area have been observed.

Flower and Sex Identification

Aspen is typically dioecious. Flowers are not perfect but contain the structures of a single

Color can be deceptive and helpful both. Red or maroon color with anthers and stigma can be distinctive at some point during flower development. Most often it is the red color of the male anthers that catch one's eye. Male flowers seem to emerge earlier in the season than females. By the time developing female flowers are noticeable the male flowers have dried or



Figure 2: Newly emerged female aspen flower. Stigma is obvious as the bright red structure in this photo.

disappeared entirely. In Colorado male flowers can be seen in late April. Developing female flowers are more noticeable in May. Stigma of the female can be quite striking but only for a limited time.

Elevation impacts flower emergence greatly. A difference of 2000 feet can mean two weeks in emergence.

Aspen is a member of the poplar family. A distinction it shares with common cottonwood. Flower structure is very similar between the two. Many individual flowers are born or grouped in a long slender structure called the catkin. If one can identify cottonwood flowers, particularly the capsule bearing catkins that produce the abundance of cotton, you can identify the same in aspen. The female catkins, or flowers, in aspen are smaller but similar in appearance. As the flowers mature, the catkins elongate and the capsules expand.



Figure 3: A maturing female aspen catkin with its numerous green capsules.

At this point the catkin is quite green. A tree bestowed with a large flower crop can be quite striking in silhouette. With experience, crops

like this can be identified on high-speed highway surveys.



Figure 4: Developing female aspen catkins with newly emergent leaves.



Figure 5: A silhouette of a "loaded" female aspen tree. Many female catkins are hanging from this tree.

Seed Maturity

Once female flowers have been identified, proper collection time must be determined. Close examination of the seed is a must. Seed maturity is best determined by seed color. Early on in its development aspen seed is translucent and glossy.

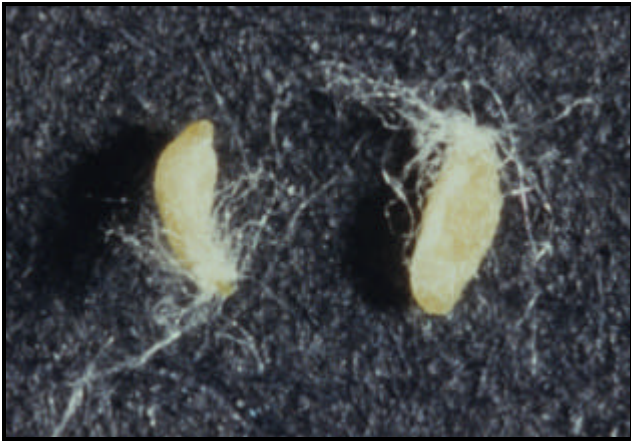


Figure 6: Greatly enlarged immature aspen seed. Typically the seed is quite translucent at this early stage.

As the seed matures, color is more noticeable. Pink or brown shades indicate collection time. A hand lens and some type of sharp probe for seed extraction is necessary to check seed maturity. It is somewhat difficult to 'tease' out seed from a developing capsule. It is a very necessary step in collecting viable seed. We rely on weekly stand exams beginning in mid-May to determine a collection date. Going longer than that can lead to a missed crop. In Colorado, typical collection dates range from late May to mid June depending on altitude.



Figure 7: A close up of mature aspen seed.



Figure 8: "Teasing" out the contents of the capsule is essential to judge seed maturity. Several immature seeds can be seen in this photograph.

Collection



Figure 9: Pruned branches from a collection trip are tubbed in water for after ripening of the seed and capsules.

Our method of collection involves pruning of catkin loaded branches from the tree. Harvested branches are then returned to the nursery for

processing. The branches are placed in large tubs of water and allowed to after ripen. This may take three days to a week. A calm still room with little air movement is necessary. In this controlled space the capsules open and discharge the seed laden cotton as a 'halo' on the branch.



Figure 10: A harvested wad of cotton prior to seed extraction.

The cotton-laden seed is then collected with a vacuum. We use a Shop-Vac® that can be used as a blower in addition to providing suction.

Extraction



Figure 11: Three layers of soil sampling sieves and a blower are used to remove the seed from the cotton.

Seed is removed from the cotton by air blown through a screen trap of different sizes. Soil testing sieves are used in three layers. The wad of seed and cotton is placed in the middle screen. A coarse top screen secures the cotton. Air is blown through the screens to remove the seed from the cotton. This is a gentle process. Too much blown air can force the cotton through the middle screen. The middle screen is sized to allow the seed to pass through to the bottom collection screen.



Figure 12: A screen of processed aspen seed.

Gilson Standard Testing Sieve Sizes		
Number	Size in inches	Position
35	0.0197	Top
18	0.0394	Middle
140	0.0041	Bottom
Gilson Company, Inc. PO Box 677 Worthington, Ohio 43085		

Storage

Extracted seed is air-dried and stored at 20° F. Viability of aspen seed seems to decline after more than one year in storage.

Our standard practice is to sow freshly collected seed early in the following spring. This fits our production cycle best.

What about buds?



Figure 13: Rounded male flower buds adjacent to pointed terminal leaf bud.

It is possible to determine flowering based on buds alone. By fall, tissue differentiation is adequate enough to tell flower sex. Shape and position of buds is distinctive. Leaf, male and female flower buds can be told apart by outward appearance. Viewing bud cross-sections under the dissecting scope substantiates your conclusions.



Figure 14: Female flower buds share the rounded shape but are smaller than male buds.

Aspen leaf buds have a pointed appearance in relation to flower buds. This is particularly true with male flower buds, which are quite large in comparison. Flower buds look more rounded than leaf buds. Male and female flower buds share this rounded nature but the female is much smaller than the male.



Figure 15: Flower bud cross-sections with male bud above and female bud below.

Under the dissecting scope it is possible to confirm sex. The distinctive features are the anthers of the male. The anthers are quite numerous within each primordial flower and can be teased out for identification.

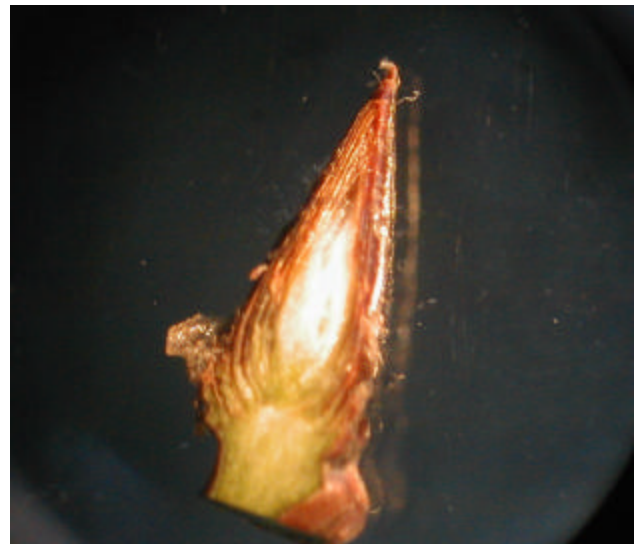


Figure 16: The pointed appearance of the leaf bud is striking in this photograph.

ⁱ Burns, Russell M., and Barbara H. Honkala, tech. coords. 1990. *Silvics of North America: 1. Conifers; 2. Hardwoods*. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. vol.2, 877 p.