

Plant Propagation Protocol for *Populus deltoides*

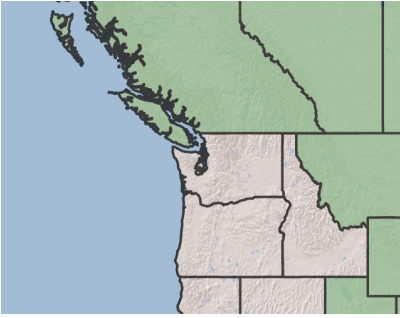
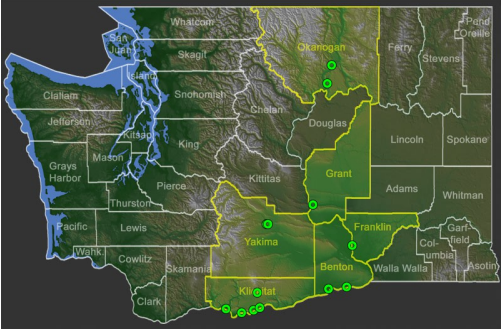
ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2022/PODE3.pdf>



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TAXONOMY	
Plant Family	
Scientific Name	Salicaceae
Common Name	Willow family
Species	
Scientific Name	
Scientific Name	<i>Populus deltoides</i> W. Bartram ex Marshall
Varieties	<i>Populus deltoides</i> var. <i>angulata</i> (Aiton) <i>Populus deltoides</i> var. <i>missouriensis</i> (A. Henry) <i>Populus deltoides</i> var. <i>pilosa</i> (Sarg.) <i>Populus deltoides</i> var. <i>virginiana</i> (Foug.) <i>Populus deltoides</i> var. <i>occidentalis</i> (Rydb.) ³
Sub-species	<i>Populus deltoides</i> ssp. <i>deltoides</i> (W. Bartram) <i>Populus deltoides</i> ssp. <i>monilifera</i> (Aiton) <i>Populus deltoides</i> ssp. <i>wislizeni</i> (S. Watson) ¹
Common Synonym(s)	<i>Populus angulata</i> Aiton var. <i>missouriensis</i> A. Henry <i>Populus balsamifera</i> L. var. <i>virginiana</i> (Foug.) Sarg. <i>Populus canadensis</i> Moench var. <i>virginiana</i> (Foug.) <i>Populus deltoides</i> W. Bartram ex Marshall var. <i>angulata</i> (Aiton) <i>Populus virginiana</i> Foug. var. <i>pilosa</i> (Sarg.) F.C. Gates ¹
Common Name(s)	Eastern cottonwood Plains cottonwood Rio Grande cottonwood ¹ Texas cottonwood River cottonwood Western cottonwood Plains poplar ³

Species Code (as per USDA Plants database)	PODE3
GENERAL INFORMATION	
Geographical range	 
Ecological distribution	Found in south-easterly from the southern prairie provinces of Canada into the high plains of northern Texas, and extend south to central Texas, and east to northwestern Florida and Georgia. ³
Climate and elevation range	Distinctly continental, the region is characterized as dry sub-humid to semiarid, with extremes and rapid fluctuations in temperature, unpredictable and limited precipitation, frequent and cyclic droughts, and strong persistent winds. Temperatures range from lows of 5° F in winter to highs of 114° F in summer. Seen in elevations of about 1,000 ft near its eastern limit to about 6,000 ft in the foothills of the Rocky Mountains. It is rarely found above 7,000 ft. ³
Local habitat and abundance	Plains cottonwood can grow in pure stands, but it is frequently found associated with these species: Bur Oak, Cottonwood, and Cottonwood-Willow, Black willow and Peachleaf Willow. ³
Plant strategy type / successional stage	Populus deltoides is a pioneering species that needs full sun. It is gradually replaced with broadleaf species. It often does not regenerate unless overstory is broken up to allow for needed sun exposure. It is intolerant to shade and root stress, and is somewhat tolerant to flooding and high water stresses. ³
Plant characteristics	Populus deltoides usually attains maximum development in about 40 to 50 years. Mature trees can be 80 to 90 ft tall, with diameters of 6 to 8 ft, and with clear holes for 30 ft or more. The trees are usually single-stemmed with an open, spreading, symmetrical crown of massive horizontal branches and stout, more or less angled branchlets and twigs.

	While plains cottonwood is relatively short-lived, it can remain vigorous for 80 to 90 years under favorable conditions. ³
PROPAGATION DETAILS	
Seed Propagation	
Propagation Goal	Plant
Propagation Method	Seed
Product Type	Bare root
Time to Grow	1 year for sturdy plants to develop from seed and to have adequate timing to replanting. ³
Target Specifications	One-year-old, bare-root seedlings, 18 to 24 inches tall are used in plantings. ⁴
Propagule Collection Instructions	Seed dispersal occurs from May through mid-July in the South and June through mid-July in the North. ³
Propagule Processing/Propagule Characteristics	Seed density ranges from 250,000 to 479,000 per lb. Seeds have a tuft of "cotton like " hairs attached and are dispersed primarily by wind, but also by water, over long distances a few days after ripening. ³
Pre-Planting Propagule Treatments	Poplar seeds can be stored successfully and viability is prolonged if the moisture content is reduced to 4 or 5 percent. Air-dried <i>P. deltoides</i> seeds, stored in sealed containers at 34° to 39° F, were 100 percent viable after 6 months. Seeds of some poplar species have been similarly stored in vacuum-packed jars at 32° F for as long as 3 years. Eastern cottonwood seed should always be stored at below freezing temperature, even for short-term storage. ³
Establishment Phase Details	After dispersal on appropriate mediums (moist silt, sand, or fine gravel) in full sunlight, seeds will quickly germinate. The aboveground portion of the seedling develops rapidly and vigorously. Constant moisture is required for at least several weeks to ensure the establishment and survival of the slower developing root systems of the seedlings. ³
Length of Establishment Phase	Plains cottonwood seeds can germinate within 48 hours, but normally establish within 5 days. Following this the fragile seedling grows slowly for about 3 weeks. ³
Active Growth Phase	After the first establishment weeks full sunlight for a substantial part of each day is required as it is not shade tolerant. Given its nature as a pioneering species, its growth phase extends through the growing season of its first year during the growing season. Lasting 3-5 months given the right conditions. ³
Hardening Phase	The hardening phase happens at the end of the growing season, as light levels drop at the end of summer if appropriate root establishment has been made transition into hardening begins. ³
Harvesting, Storage and Shipping	Seedlings can be stored in greenhouses over winter and replanted in spring with open space to allow for maximum growth during the entirety of the growth season. ³

Vegetative Propagation	
Propagation Goal	Plant
Propagation Method	Vegetative
Product Type	Bare root and Container Propagules
Time to Grow	Full growth cycle and stability of the plant is normally marked at 1 year, however primary establishment (roughly 2 months), and growth(roughly 4 months) are shorter. ^{5,6}
Propagule Collection Instructions	Collect 8-12" length secondary cuttings from established trees. ⁷ Use newer growth of branches with multiple nodes, remove any leaves. Collection is best done fresh in late winter during the dormant phase (February-March). ⁶
Propagule treatment	If Bare root: Plant directly into soil in mid to late May, ensure the area is well irrigated to allow for ample rooting. If container propagules: plant into polythene bags and host in nursery, ensure ample irrigation. In both cases leave 2-3 nodes above the soil line. Growth hormones can be used to aid in rooting, this has been seen to aid plant growth mainly in initial days of establishment. ¹⁰
Establishment Phase Details	About 3 to 6 weeks are required for rooting and subsequent field establishment. Larger cuttings establish grater root systems in initial weeks. (Seed root establishment is often more successful than vegetative) ⁶ Leaves grow out in one to two months. ⁵ Early stage root growth is relatively slow, which can be overcome with continuous access to moisture. ⁸
Guidelines for Outplanting / Performance on Typical Sites	For plant container propagules, after root growth in establishment phase, outplanting to the field site in mid April-May. ⁵ Survival rates of 70 to 90 percent are normally achieved, depending on the genetics of the clones, quality of cuttings, and field conditions. In cases where Outplanting is done in a commercial or non-conservation context, soil should be deep plowed well in advance of planting to compensate for stunted root growth. ⁹
Active Growth Phase	Leaves will begin to emerge when trees normally break dormancy, or within two weeks for summer cuttings. ⁵ Growth phase will continue through-out the growing season (around 4 months). As there is already a primary source of nutrients within the plant, there is not as drastic of growth compared to seed propagation. ⁶
Hardening Phase	Hardening phase happens at the end of the growing season before temperature drops in the winter season. Trees can be held over for up to a year if necessary, as long as they continue to receive adequate water. If not outplanted they do become quite rootbound, and have a tendency to root out of the bottom of the pot. ⁵
Harvesting, Storage and Shipping	Artificial propagation of the species normally involves use of cuttings from 1-year stem growth from nursery trees.

Propagation from the resulting material is often satisfactory. Clones tracing back to older trees normally have the smooth, somewhat thin, bark characteristics of the tops of older trees.⁶

INFORMATION SOURCES

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Date Protocol Created or Updated	05/03/22