

Propagating Black Willow From Cuttings in the Lower Rio Grande Valley, Texas

Robin S. Vora, Robert W. Schumacher, and Chestley L. Miller

Former forest ecologist and present refuge manager, Rio Grande Valley National Wildlife Refuge, Alamo, TX, and farmer, Hidalgo, TX

Cuttings of black willow (Salix nigra) with diameters of 0.9 to 4.5 cm and lengths of about 50 to 150 cm were rooted successfully in the field in the Lower Rio Grande Valley, TX. Tree Planters' Notes 39(4):30-32; 1988

Black willow (*Salix nigra* Marsh.) is common in wet areas that are not permanently flooded in the eastern United States (6). The plant is also referred to as *S. humboldtiana* Willd. in the Lower Rio Grande Valley of south Texas and northeastern Mexico (3, 7). It grows rapidly, reaching 20 m in height, along levees, riverbanks, ponds, and resacas (former river channels that have become oxbow lakes). The Altamira oriole—*Icterus gularis* (Wagler) (2)—and perhaps other species of birds (7) use this tree for nesting sites.

The U.S. Department of the Interior, Fish and Wildlife Service is planting willow cuttings adjacent to resacas and the Rio Grande River in south Texas. Notes in the literature state that most willows can be grown from

Robin Vora is currently with the USDI Fish and Wildlife Service, Brunswick, GA. The authors thank Z. Labus and B.H. Smith for assistance with field measurements, and J.H. Everitt, R.I. Lonard, N.M. Gilbertson, and K. Mancini for editorial review.

cuttings (4, 12). Nokes (11) stated that black willow would root from either root or stem cuttings set out in early spring before the buds leafed out. Maisenhelder and Heavrin (9) advised taking cuttings from 1- to 3-year-old seedlings or sprouts. These cuttings should be 50 cm long and from 1 to 2 cm in diameter at the small end. McKnight (10) also stated that cuttings should be from established young trees, preferably not more than 3 years old.

Briscoe (1) obtained a 67% survival rate with cuttings rooted between September and March, with March the best month (87 to 100% success). He used cuttings 40 cm in length and 0.5 to 4.8 cm in diameter. He had better success with butt-cuts (basal 40 cm) than second-cuts (next 40 cm). The mean heights of cuttings rooted in February and March were 115 to 150 cm after 5 months.

Maisenhelder (8) similarly stated that height growth of black willow averages about 120 cm the first year. Briscoe (1) suggested that cuttings with a large diameter might survive and grow better than smaller ones, and that longer cuttings might survive better than shorter ones.

Past research on black willow propagation has been confined to the lower Mississippi floodplain. A search of 18 files in the DIALOG database produced

no titles on black willow propagation specific to south Texas. We conducted field trials to obtain information on desired diameter, length of cuttings, and expected survival in the Lower Rio Grande Valley.

Methods

Cuttings of black willow were rooted at a site adjacent to a resaca for 2 successive years. The site was located south of McAllen near the Pharr Settling Basin and about 1,100 m north of the Rio Grande River. The soil was a Matamoros silty clay, with the top 38 cm typically a calcareous, moderately alkaline, moist silty clay (5). The slope was less than 2%.

Cuttings were taken from trees of various ages adjacent to the resaca. Three hundred and ninety-four cuttings were placed in the margins of three ditches in late February 1985. The ditches were about 30 to 200 m from the edge of the resaca. One hundred and sixty-two cuttings were placed in the side of the ditch closer to the resaca (15 to 200 m from the edge) in late February 1986. All ditches were about 0.3 m deep.

Cuttings were watered once after planting. Survival checks were made on May 16, 1985, June 9, 1986, and January 9, 1987. Diameter of the cutting and length of the aboveground

portion of the cutting were measured on June 9, 1986. Height of the live growth was measured on January 9, 1987. Precipitation records were kept at the Santa Ana National Wildlife Refuge, which is 10 km to the east.

We did not control the depth to which the cuttings were placed. Most were placed upright, to about 30 cm depth, and cuttings were typically 130 cm in total length. Several cuttings that assumed a more horizontal position after several months rooted nevertheless.

Results

Seventy-five (19%) of the cuttings planted in 1985 were alive after 3 months, but only 18 (4.5%) remained alive at the 16- and 23-month checks (table 1). No cuttings died between the latter two checks in 1985. At the 16-month check, mean diameter of live cuttings was 3.5 cm and mean above-ground length of successful cuttings was 91 cm (table 2). Heights of the live portion of the cuttings ranged from 85 to 200 cm (mean = 158, standard deviation = 42) after 23 months.

Ninety-three (57%) of the cuttings planted in 1986 were alive after 3 months, and 84 (52%) survived 11 months (table 1). At the 3-month check, mean diameter of live cuttings was 2.1 cm and

Table 1—*Survival of black willow cuttings*

Date	Cuttings planted N	Survival							
		3 mo.		11 mo.		16 mo.		23 mo.	
		No.	%	No.	%	No.	%	No.	%
Feb. 85	394	75	19	—	—	18	4.5	18	4.5
Feb. 86	162	93	57	84	52	—	—	—	—

Table 2—*Size of successful cuttings*

Date planted	Diameter (cm)			Above-ground length (cm)		
	Mean	SD	Range	Mean	SD	Range
Feb. 85	3.5	0.6	2.5–4.5	91	12	65–104
Feb. 86	2.1	0.6	0.9–3.0	52	13	20–109

mean above-ground length of successful cuttings was 52 cm (table 2). Heights of the live portion of the cuttings after 11 months ranged from 40 to 320 cm (mean = 165, standard deviation = 62). The plants had not yet dropped their leaves on January 9, 1987.

Discussion

Cuttings with diameters of 0.9 to 4.5 cm, and lengths of about 50 to 150 cm were rooted successfully. We have rooted black willow cuttings of up to 10 cm diameter adjacent to the water's edge at another site. Briscoe (1) suggested that larger and longer cuttings may be preferable, but our results were not as good as those obtained with shorter and smaller diameter cuttings. The smaller diameter cuttings placed

in the ground in 1986 had much greater rooting success (52% vs. 4.5%). A greater portion of the 1986 cuttings were from smaller, presumably younger, trees.

The 1986 plantings had a smaller percentage of subterminal cuttings. Few basal cuts were used in either planting. The 1986 cuttings were placed in a ditch that was closer to the resaca, where soil moisture may have been slightly higher than the site where the 1985 cuttings were planted. Precipitation, however, was 179% greater in 1985 for both the 2-month (66 vs. 37 mm) and 8-month (530 vs. 296 mm) periods after cuttings were placed in the ground.

Other possible reasons for the great difference in rooting success between the 2 years may include differences in physio-

logical conditions of the parent trees when cuttings were taken or other differences in climatic or soil conditions. Overall, results were not as good as that reported for the lower Mississippi floodplain (1, 8, 9).

Additional studies are needed to determine the optimum month for rooting cuttings, diameter and length of cuttings, depth at which to set cuttings, age and size of parent trees, and basal versus subterminal cuttings. Until these studies are completed, we recommend rooting cuttings in January or early February in the Lower Rio Grande Valley, and taking basal cuttings from smaller size seedlings and sprouts. Cuttings should be set 40 cm into the ground, either in a hole punched with a planting rod or in the slit made with a subsoil plow as recommended by Maisenhelder and Heavrin (9).

Literature Cited

1. Briscoe, C.B. 1963. Rooting cuttings of cottonwood, willow, and sycamore. *Journal of Forestry* 61: 51-53.
2. Carter, M.D. 1981. Unpublished data. Santa Ana National Wildlife Refuge, Alamo, TX.
3. Correll, D.S.; Johnston, M.C. 1970. *Manual of the vascular plants of Texas*. Renner, TX: Texas Research Foundation. 1, 881 p.
4. Goodding, L.N. 1940. Willows in region VIII: notes on their classification, distribution, and present significance, with suggestions for their use in erosion control. *Reg. Bull.* 65, Plant Study Ser. 2. Albuquerque, NM: U.S. Department of Agriculture, Soil Conservation Service. 27 p.
5. Jacobs, J.L. 1981. *Soil Survey of Hidalgo County, Texas*. Alice, TX: U.S. Department of Agriculture, Soil Conservation Service. 92 p.
6. Krinard, R.M. 1985. *Black willow: an American wood*. FS-271. Washington, DC: U.S. Department of Agriculture, Forest Service. 6 p.
7. Lonard, R.I.; Everitt, J.H.; Judd, F.W. 1988. *Woody plants of the Lower Rio Grande Valley, Texas*. Austin, TX: Texas Memorial Museum Press.
8. Maisenhelder, L.C. 1957. Propagation of some delta hardwoods by rooting. In: *Proceedings, Fourth southern forest tree improvement conference*; 8-9 January 1957; Athens, GA. Athens, GA: University of Georgia: 55-58.
9. Maisenhelder, L.C.; Heavrin, C.A. 1956. Silvics and silviculture of the pioneer hardwoods-cottonwood and willow. *Proceedings, Society of American Foresters*; 15-17 October 1956; Memphis, TN. Washington, DC: Society of American Foresters: 73-75.
10. McKnight, J.S. 1957. Black willow: hints for management. *Forests & People* (3rd quarter). 3 p.
11. Nokes, J. 1986. *How to grow native plants*. Austin, TX: Texas Monthly Press: 313-314.
12. Vines, R.A. 1976. *Trees, shrubs, and woody vines of the Southwest*. Austin, TX: University of Texas Press. 1.104p.