

# ‘Mandan’ Pecan

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‘Mandan’ is a new pecan [*Carya illinoensis* (Wangenh.) K. Koch] cultivar released by the U.S. Department of Agriculture (USDA), Agricultural Research Service. ‘Mandan’ was released because of its high nut quality, high yield potential, early nut maturity, scab disease (*Fusicladium effusum* G. Winter) resistance, excellent tree strength, and late bud break. ‘Mandan’ should be adapted to all pecan-growing areas of the world. Pecans from this cultivar can be sold in-shell or shelled to produce a large proportion of halves and large pieces.

## Origin

USDA conducts the only national pecan breeding program. Crosses are made at Brownwood and College Station, TX (Grauke and Thompson, 1996; Thompson and Grauke, 1991; Thompson and Young, 1985). Seedling clones are established on their own roots or budded to pollarded trees for the initial 10-year testing phase at College Station. Superior clones then enter the National Pecan Advanced Clone Testing System (NPACTS), where they are tested across the U.S. pecan belt in cooperation with federal and state researchers and private growers. After several years, the best clones are given Native American tribe names and released to nurseries for propagation to sell to growers. USDA cultivars are never patented, and after release, growers can propagate the new cultivar as much as desired.

The ‘Mandan’ are a Native American tribe and one of the seven tribes that make up the Great Sioux Nation (Hodge, 1975). They speak Lakota, one of the three major dialects of the Sioux language. They are the western-most of the three Sioux groups that

occupy land in both North and South Dakota. Today they are found mostly in the five reservations of western South Dakota.

‘Mandan’, tested as selection 1985-1-2, is a progeny from a 1985 cross between the ‘BW-1’ and ‘Osage’ clones made by T.E. Thompson at Brownwood, TX. ‘BW-1’ originated as an open-pollinated seedling at Brownwood, TX, of unknown parentage. ‘Osage’ is a USDA cultivar released in 1989 from a ‘Major’ × ‘Evers’ cross (Thompson et al., 1991).

‘Major’ is an old native from the Green River, Henderson County, KY (Thompson and Young, 1985). ‘Major’ is scab-resistant and has early nut maturity. It was long considered the best of the northern cultivars but now has been largely replaced by newer superior USDA/state cultivars. It is also the parent of two other USDA cultivars: Kanza and Lakota. It has been a main source of early nut maturity and scab resistance for the USDA Pecan Breeding Program.

‘Evers’ was a seedling tree purchased from J.A. Evans Nursery, Arlington, TX, by W.T. Evers and grown on his farm in Denton County, TX. It was introduced ≈1950. The early-maturing nuts are small, and the tree is very prolific but scab-susceptible. ‘Evers’ is a pollen parent for ‘Cherokee’, ‘Chickasaw’, ‘Shoshoni’, and ‘Osage’ to which it conferred precocity and prolificacy.

## Description

The ‘Mandan’ seedling was initially grown and evaluated at Brownwood, TX. On the

basis of preliminary performance, extensive testing was started in Apr. 1996 by grafting an NPACTS yield and performance test at Brownwood, TX. This test had eight replications (single-tree) with a tree spacing of 9.1 × 10.7 m. Yield data indicate that ‘Mandan’ has adequate precocity, similar to ‘Pawnee’ (Table 1). ‘Mandan’ produced ≈69 kg of nuts per tree compared with 73 for ‘Pawnee’ and 66 for ‘Desirable’. When considering total kernel produced per tree over the life of the test, both ‘Mandan’ and ‘Pawnee’ produced ≈42 kg per tree compared with 34 for ‘Desirable’. Nuts per cluster was 2.3 for ‘Mandan’, 3.3 for ‘Pawnee’, and 2.7 for ‘Wichita’. The alternate bearing tendency of ‘Mandan’ appeared less than ‘Pawnee’ and ‘Desirable’. Like with most cultivars, fruit thinning of ‘Mandan’ in midsummer may be needed in some years.

Average nut weight is ≈9 g for ‘Mandan’ and ‘Pawnee’ compared with 9.6 for ‘Desirable’ and 7.8 for ‘Wichita’ (Table 2). Nuts shell out ≈60% kernel. Kernels are cream to golden in color (Fig. 1; Table 2) with medium, non-trapping dorsal grooves and a rounded dorsal ridge. The nut is oblong elliptic with an obtuse apex and rounded base.

‘Mandan’ has proven to be a consistent producer of high-quality nuts that mature and are ready to harvest 4 d before the early-maturing ‘Pawnee’ (Table 2). Time of spring bud break is very late (later than ‘Pawnee’) (Table 3), contributing to its adaptation to northern sites. ‘Mandan’ is protandrous with early to midseason pollen shed and midseason to late pistil receptivity (similar to ‘Pawnee’) (Fig. 2). ‘Mandan’ should be a good pollenizer for and well pollenized by ‘Kanza’, ‘Wichita’, and ‘Lakota’. Trees are compact columnar in growth habit with strong branch angles. This should allow them to escape shading longer than more spreading trees such as ‘Desirable’ at any tree spacing. Tentative data show that ‘Mandan’ is very resistant to scab disease (Table 4) and has medium susceptibility to yellow and black aphids.

Table 1. National Pecan Advanced Clone Testing System (NPACTS) data from Brownwood, TX, comparing the yield of nuts of the ‘Mandan’ pecan with other cultivars.<sup>z</sup>

Cultivar	Yield (kg/tree)								
	1999	2000	2001	2002	2003	2005	2006	2007	Total
Mandan	0.46	0.63	5.28	6.72	2.91	19.34	12.11	21.34	68.8
Pawnee	0.75	0.37	6.40	11.08	1.91	14.21	11.15	26.87	72.7
Desirable	0.05	0.18	3.15	4.50	10.27	17.79	5.14	24.93	66.0
Wichita	0.65	0.83	12.68	11.33	4.47	24.43	2.85	0.00	57.2

<sup>z</sup>Rootstocks were planted 1983 through 1986, and trees were grafted from 29 April through 30 June 1996. A flood destroyed the yield data in 2004.

Table 2. National Pecan Advanced Clone Testing System (NPACTS) data from Brownwood, TX, comparing nut quality of ‘Mandan’ with other cultivars.

Cultivar	Kernel content (mean %, 1999–2007)	Nut wt (g, mean 1999–2007)	Nut maturity (70% shuck split date, mean 2005–2007)		Kernel color <sup>z</sup> (mean 1999–2007)
Mandan	60.4	8.98	Sept. 16		2.9
Pawnee	57.6	8.84	Sept. 20		2.7
Desirable	51.6	9.55	Oct. 21		2.9
Wichita	57.7	7.83	Oct. 24		3.0

<sup>z</sup>1 = lightest color.

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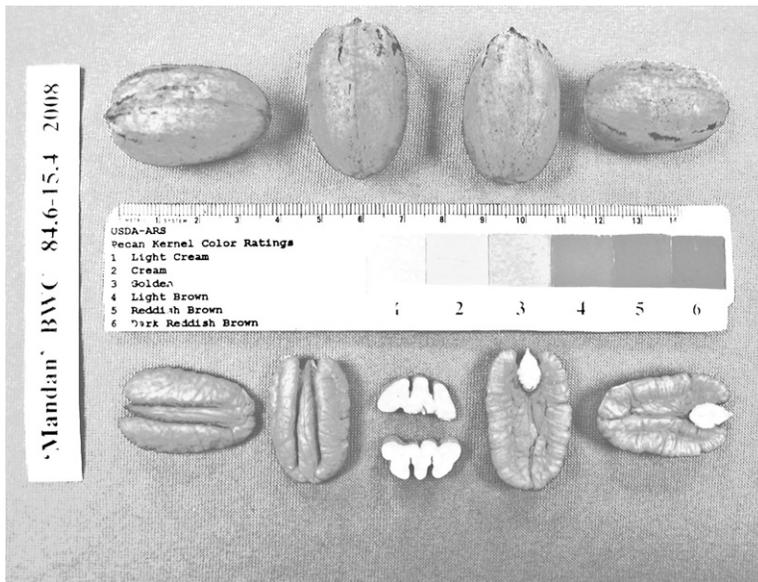


Fig. 1. Nuts and kernels of the 'Mandan' pecan.

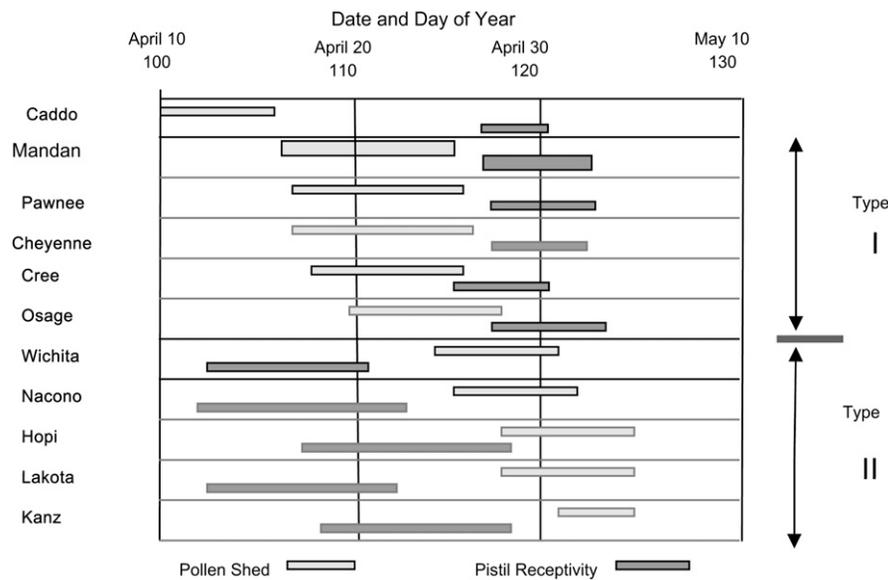


Fig. 2. Pollen shed and pistil receptivity for the 'Mandan' pecan and control cultivars at College Station, TX, in 2007. Type I = protandrous cultivars; Type II = protogynous cultivars.

### Availability

'Mandan' was released 13 Feb. 2009. As stated, 'Mandan' is not patented and can be grafted and budded as much as desired by anyone. Graftwood was supplied to nursery-

men in the spring of 2009. The USDA does not have any trees for distribution. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercializa-

Table 3. National Pecan Advanced Clone Testing System (NPACTS) data from Brownwood, TX, comparing the bud break date of 'Mandan' with other cultivars.<sup>z</sup>

Cultivar	Bud break, 2003	Bud break, 2009
Mandan	2.1 d <sup>y</sup>	3.1 b
Navaho	4.3 a	5.0 a
Wichita	3.5 b	3.3 b
Desirable	2.9 c	3.4 b
Pawnee	2.9 c	3.3 b

<sup>z</sup>Ratings were made 2 Apr. 2003 and 1 Apr. 2009 (1 = dormant, 2 = bud swell, 3 = inner scale split, 4 = leaf burst, and 5 = leaf expansion).

<sup>y</sup>Means within columns followed by a common letter are not significantly different according to Duncan's multiple range test at the 0.05 level.

Table 4. National Pecan Advanced Clone Testing System (NPACTS) data from Brownwood, TX, comparing the scab resistance of 'Mandan' with other cultivars.<sup>z</sup>

Cultivar	Leaf scab	Nut scab
Mandan	1.6	1.4
Pawnee	1.9	1.9
Desirable	1.9	2.0
Wichita	4.0	4.5

<sup>z</sup>Ratings recorded in 2004, 2005, and 2007 using the Hunter-Roberts (Hunter and Roberts, 1978) 1 to 5 scale (1 = no scab and 5 = greater than 50% coverage with scab lesions).

tion of new cultivars. It is requested that appropriate recognition be made if this germplasm contributes to the development of a new cultivar.

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