

FORESTRY FACTS



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Walnut Tips – Soil and Site Selection

Sites for black walnut plantations must be carefully selected; soil, landscape position and climate all must be considered. Soil, however, is the single most important factor and should be thoroughly investigated in choosing a planting site. Sites with deep, well-drained, fertile soils produce the best growth. Soils that are wet, contain excessive clay or gravel, or are shallow and droughty should be avoided. Floodplains, depressions, frost pockets and steep slopes may also present problems.

WHAT SOIL PROPERTIES ARE IMPORTANT?

Soil properties that can be evaluated in the field include depth, drainage class and texture (see Table 1). The upper 3 to 4 feet of soil should be free of gravel, clay layers and bedrock. The best black walnut sites are well drained to moderately well drained; excessively drained or poorly drained sites are unsuitable.

A soil's texture is determined by the amounts of sand, silt and clay particles it contains. A soil with moderately fine texture (more silt than clay or sand), such as a silt loam, will generally have sufficient amounts of nutrients, yet will be reasonably well drained. Sandy soils often are low in nutrients and are excessively drained; heavy-textured soils, such as clays, may limit water movement and rooting of black walnut.

Black walnut is demanding in terms of soil nutrients. In general, a soil that is suitable for nonirrigated corn will be suitable for black walnut. The upper 6 inches of soil should have a near-neutral pH (6.5 - 7.5), at least 3.5% organic matter, and an adequate supply of nutrients (see Table 2). The Soil and Plant Analysis Laboratory in Madison can analyze soil samples and make recommendations on their suitability for walnut based on their pH and their organic matter and nutrient content (see other side for address).

WHAT SITE FACTORS ARE IMPORTANT?

In addition to the soil properties mentioned already, there are other site factors important to walnut growth and success. North- or east-facing slopes tend to be less droughty, and thus better, than south- or west-facing slopes. Lower slopes, coves and well-drained bottomlands are often the best sites. Be sure, however, to avoid wet soils and frequently flooded sites. Seasonally wet soils will be mottled with patches of different colors, while soils that are periodically flooded will have a sticky, gray to bluish-gray clay layer formed in the upper 3 to 4 feet. Sites that are flooded for only a few days of the year are suitable if they are normally well-drained.

WHAT CLIMATE FACTORS ARE IMPORTANT?

Black walnut occurs naturally only in the southwestern counties of Wisconsin where the growing season ranges from 140 to 170 days per year. Other areas may be suitable, but the winters of northern Wisconsin are generally too severe for walnut to survive. Local "frost pockets" are difficult to identify, but should also be avoided. At night and during the early morning, cooler air moves down slope and settles in these pockets, causing early fall and late spring frosts. A late spring freeze can damage tender new vegetative growth.

Walnut Tips is produced in cooperation with the Wisconsin Walnut Council. *Soil and Site Selection* was written by Dale Parker, Jim Bockheim and Dan Meyer.

CONVERTING FARMLAND TO WALNUT

Old fields can be converted to black walnut plantations, but it is important that the soil on these sites be thoroughly cultivated. A soil test report may suggest which soil amendments, if any, are necessary for successful black walnut growth. See Forestry Facts #57, *Walnut Tips - Retired Cropland Plantings*, and Forestry Facts #52, *Walnut Tips - Weed Control*, for important information on conversion of old field sites and weed control.

USING SOIL SURVEYS

Soil surveys are the single best source of information for judging the suitability of a tract of land for growing walnuts. Detailed soil map units are shown on photographic base maps. Descriptions of each soil and interpretations for their use are given in the text of the report.

Most soil surveys contain a section on “woodland suitability” where the soils are grouped according to their suitability for different tree species. Site indices are given along with yield estimates in board feet per acre for the major species. Site index is a measure of the productivity of a site for a given species, measured as the height of the dominant trees in a stand that is 50 years-old. Walnut should be managed only where its site index is 50 feet or more.

Soil survey reports are available for most counties where black walnut can be grown and can be obtained from local Soil Conservation District offices, from County Extension offices or from a Wisconsin DNR District Forester.

Table 1. Soil and site factors important for black walnut growth.

Soil Property/Site Factor	Desired	Unsuitable
Slope exposure	North or east	South or west
Position on slope	Middle, or lower with good drainage	Upper, or lower with poor drainage
Depth to bedrock, gravel or clay layer	> 3 to 4 feet	< 3 to 4 feet
Drainage class	Well drained to moderately well drained	Excessively drained, poorly or very poorly drained
Soil texture	Loam, silt loam, silty clay loam, silt, clay loam, sandy clay loam, sandy loam	Clay, silty clay, sandy clay, loamy sand, sand

Table 2. Soil analyses used to determine suitability of a site for walnut plantings.

Soil Tests:	pH	Organic matter %	N (%)	P* (lbs/a)	K* (lbs/a)	Ca (lbs/a)		Mg (lbs/a)	
						Sandy	Silty	Sandy	Silty
Acceptable Levels*	6.5-	2.0-	0.25-	60-	225-	2000-	3000-	250-	375-
	7.5	3.5	.3	80	275	3000	4000	500	600

*Optimum levels are in bold face type.

*Phosphorous (P) and potassium (K) levels will be reported in terms of their naturally occurring forms (P₂O₅ and K₂O, respectively). Recommendations given by the Lab will explain which fertilizers to use and at what rate to apply them to raise the nutrient levels to the acceptable range.

*Information on collecting and processing soil samples for black walnut analysis can be obtained from the University of Wisconsin Soil and Plant Analysis Laboratory, 5711 Mineral Point Road, Madison, WI 53705 (608-262-4364).