



UNIVERSITY OF MISSOURI CENTER FOR AGROFORESTRY

GROWING PECANS IN MISSOURI

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Pecan is a large, beautiful tree that produces bountiful crops of delicious nuts. The largest member of the hickory family, pecan trees often grow to a height of over 70 feet with a spread of greater than 80 feet. Pecans have large, pinnately compound leaves with each leaf bearing seven to 13 leaflets. Nuts are borne on branch terminals in clusters of two to five. A fleshy green husk surrounds the nut during the growing season but splits open in October to reveal a light brown nut that is streaked with black mottles. As husks dry and wither, nuts fall freely from the tree.



Developing nuts on a pecan tree in late summer



Pecan tree in late fall in Missouri. Note the shucks have darkened and split open. This tree is ready to be harvested.

Pecan nuts vary widely in size, shape, and shell thickness. Seedling pecan trees often produce small, thick-shelled nuts while trees grafted to improved cultivars produce large, thin-shelled nuts. Pecans are truly multipurpose trees. In the home landscape, these long-lived and sturdy trees provide ample shade and bright yellow fall color. Wildlife conservationists appreciate the food and cover pecan trees produce for squirrels, turkeys, and deer. In many areas of Missouri, wild pecan trees have been brought under cultivation to provide farmers with an additional source of income. Pecan trees have also been planted into orchards around the world, and pecan nuts have become a global commodity.

Three of the most important factors to consider for a new planting are:

- Soil types and soil qualities
- Water availability
- Cultivar selection

Failure to consider these factors can lead to poor tree growth and/or poor nut production.



Soil Requirements

Plant pecan trees in deep, well-drained soils. Native pecans grow primarily in the deep alluvial soils found along major rivers and streams. These soils are characterized by a clay loam to sandy loam texture, good internal drainage, and a static water table that ranges from 10 to 25 feet below the soil surface. Upland soils are suitable for pecan trees if they have at least three feet of friable, well-drained, topsoil and a sandy-clay or gravelly-clay subsoil that allows free penetration of both water and air.

An example of common upland soils in Missouri that have high potential for pecan production would be the deep, well drained, loess soils. In good upland soils, pecan roots grow throughout both topsoil and subsoil. Pecan trees will not perform well if planted on upland soils having a subsoil impervious to root growth or frequently droughty soils.

Pecan trees will grow and thrive in soils that range from slightly acid to slightly basic (pH 6.0 to 7.5). If trees are grown in sandy soils, or soils with a basic pH (7.0 and above), zinc foliar sprays are often necessary to prevent zinc deficiency.

Three valuable resources that can be used to determine the suitability of soils on a site for pecans are:

- Published NRCS county soil maps
- NRCS Web Soil Survey
- Actual soil sample results from a site

Water Requirements

Pecan trees will grow without irrigation in most areas of Missouri, but ample water throughout the growing season is necessary for maximum tree growth and consistent nut production. Even mild drought conditions can affect nut quality. A shortage of water early in the season causes nuts to be small, while a lack of water in August and September leads to poor kernel filling. Severe drought will cause nut abortion,

premature defoliation, and a decrease in the subsequent year's nut crop. To ensure annual crops of high quality nuts, supplemental irrigation should be considered.

Pecan trees growing in the major floodplains of Missouri are frequently subjected to seasonal flooding. Although pecan is widely known as a flood-tolerant species, trees can not endure water-saturated soils for an extended period of time during the growing season. However, if the flooding occurs when the trees are dormant there are fewer negative effects.

Cultivar Selection

Selecting the proper cultivars for your particular locality will help ensure that your pecan tree planting will be successful. When choosing pecan cultivars, several key characteristics should be considered. These include:

- Length of growing season
- Winter hardiness
- Productivity
- Flowering and pollination
- Nut size and quality
- Alternate bearing
- Disease resistance

Length of Growing Season Pecan trees utilize the entire growing season to develop and mature their nut crop. To be successful in Missouri, a pecan cultivar must produce plump, well-filled nuts before the first fall freeze.



Pecan cultivars should be chosen carefully. The 'Marseme' pecan on the left was grown in a suitable climate. The poorly filled 'Marseme' pecan on the right was grown in a climate that did not provide a long enough growing season.



Nut maturity in pecan is indicated by the splitting of the shuck and separation of nut from shuck. Freezing temperatures before shuck split cause the shuck to remain firmly attached to the nut, so that it never opens. The kernels inside these nuts are often poorly developed or shriveled. This often happens to all the nuts on a tree when cultivars adapted to areas with long growing seasons are grown in areas with short growing seasons. It can also happen when cultivars adapted to areas with very warm growing seasons are grown in areas with cooler growing seasons.

The rate of kernel development in pecan is controlled genetically, but is also influenced by temperatures during the growing season. Summer heat, especially high nighttime temperatures, is necessary for proper nut development. Unusually cool summers will result in a delay of nut maturity. Variation in weather patterns will cause a pecan cultivar to mature on slightly different dates from year to year. To avoid losing a crop to fall freeze damage, it is best to choose cultivars that mature at least one week before the average date of first fall freeze.

Winter Hardiness Pecan trees growing in Missouri are often exposed to severe winter temperatures. "Northern" pecan cultivars have proven cold hardiness and are best adapted for growth in Missouri. These cultivars are termed "northern" because they originated in the northernmost reaches of the pecan tree's natural range. Only a few "southern" pecan cultivars are adapted for growth in the 'bootheel' of Missouri.

Productivity The nut-producing capability of cultivars is a very important contributor to the profitability of a pecan planting. Some cultivars are much less productive than others on a given site over a period of time. There has been much more yield research done on "southern" cultivars than most of the "northern" cultivars. Two very important issues that can detract from long-term yield of quality pecans are



Southern pecan cultivars often suffer severe cold injury when grown in Missouri.

disease susceptibility and alternate bearing.

Alternate Bearing When a cultivar tends to produce above average yields, followed by below average yields, it is said to be alternate bearing. Pecan cultivars with strong alternate bearing tendencies often produce large yields ('on' years) of somewhat lower quality nuts one season, followed by relatively small yields ('off' years) of higher quality nuts in another season. Alternate bearing becomes a severe problem when the nut quality is extremely poor in the 'on' years.

Susceptibility to Disease Pecan scab is often the most damaging disease a Midwestern pecan grower will face. It can reduce pecan yields to zero for some pecan cultivars without management. Page six of this publication will



Check out more pecan resources on the "[Mizzou Agroforestry](#)" YouTube channel!



give an overview of pecan scab and ratings for the "northern" pecan cultivars listed.

Flowering and Pollination

Pecans have separate male and female flowers, which are located on different parts of the same tree (Figure 1). Male flowers or catkins develop along one-year-old wood soon after budbreak.

The three- to four-inch long catkins first appear green, then turn yellow when shedding pollen. After all pollen is released, catkins turn brown and fall from the tree. Female flowers look like miniature pecans and develop on the end of the current season's growth.

On the tip of the pistillate flower is the stigma, which may be red, orange or green in color. The stigma becomes glossy with stigmatal fluid when receptive to pollen. Pollination occurs when pollen is transported by wind to the stigmatal surface.



Pecan Respository at HARC near New Franklin, MO.

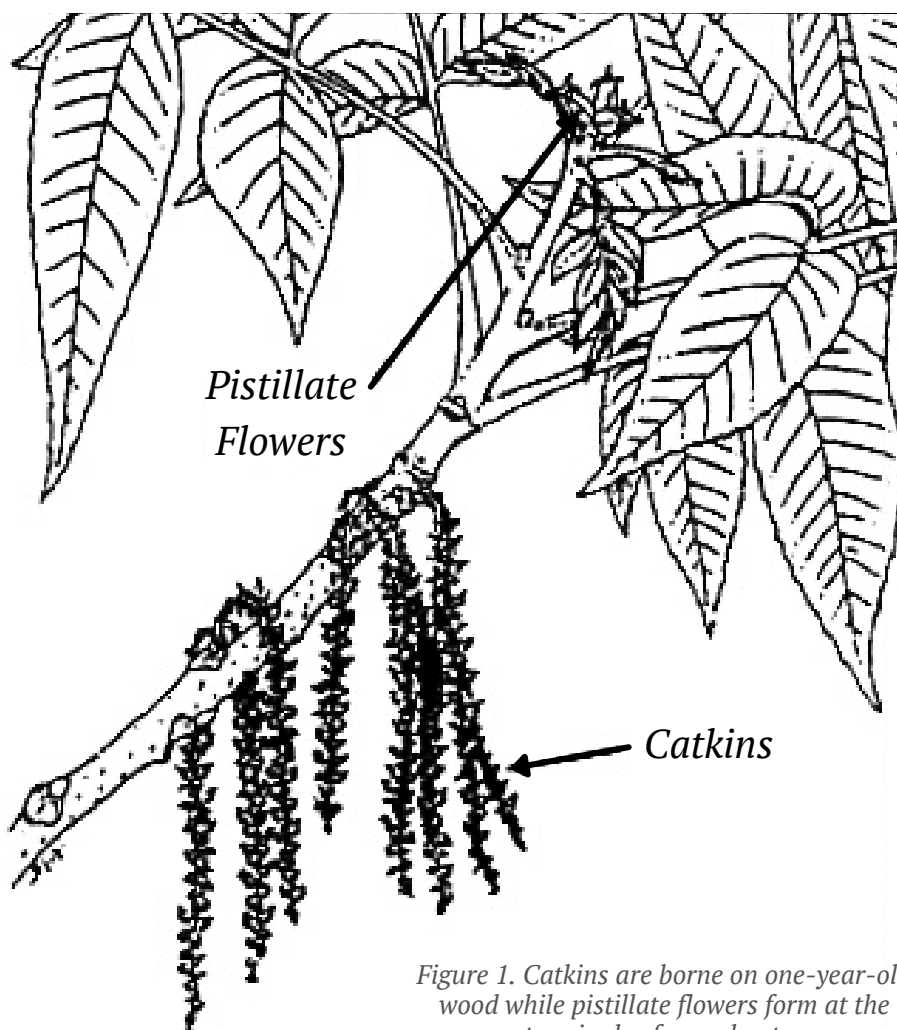


Figure 1. Catkins are borne on one-year-old wood while pistillate flowers form at the terminals of new shoots.

Periods of pollen-shed and stigma receptivity for a single pecan cultivar usually occur at different times. Cultivars that shed their pollen before their stigmas become receptive are called 'protandrous.' Cultivars with stigmas that become receptive before pollen shedding are called 'protogynous.'

A protandrous cultivar should be planted within 250 feet from a protogynous cultivar to ensure pollination of both cultivars. Planting large blocks of a single cultivar without very many pollinators nearby can reduce nut set and nut quality. In areas where native pecan trees are abundant, the pollination requirements may be met with pollen from surrounding native trees.



Nut Size and Quality Nut size and quality are important criteria for selecting cultivars, especially if nuts are grown for retail sale. Extra-large pecans attract the attention of some consumers who buy nuts with their eyes rather than their taste buds. Extremely large pecans can be poorly-filled and dry tasting. Sub-optimal growing conditions can exacerbate these problems for some of the cultivars that produce the largest nuts. Other consumers look for moderately sized nuts that are well-filled and have a sweet oily taste. High-quality pecans have more than 50% kernel, a high oil content, and a light straw-colored kernel.

Recommended Cultivars The state of Missouri can be divided into five zones of pecan cultivar adaptation (Figure 2). For best results, choose from among the cultivars recommended for your area (Table 1). Cultivar performance in any specific location in Missouri will also be influenced by local microclimatic conditions. If cold air seems to accumulate at your site, choose earlier ripening cultivars. For growers who like to experiment, there are several untested cultivars available for all adaptation zones. For more information on cultivar availability, contact Dr. Ron Revord at <r.revord@missouri.edu>.

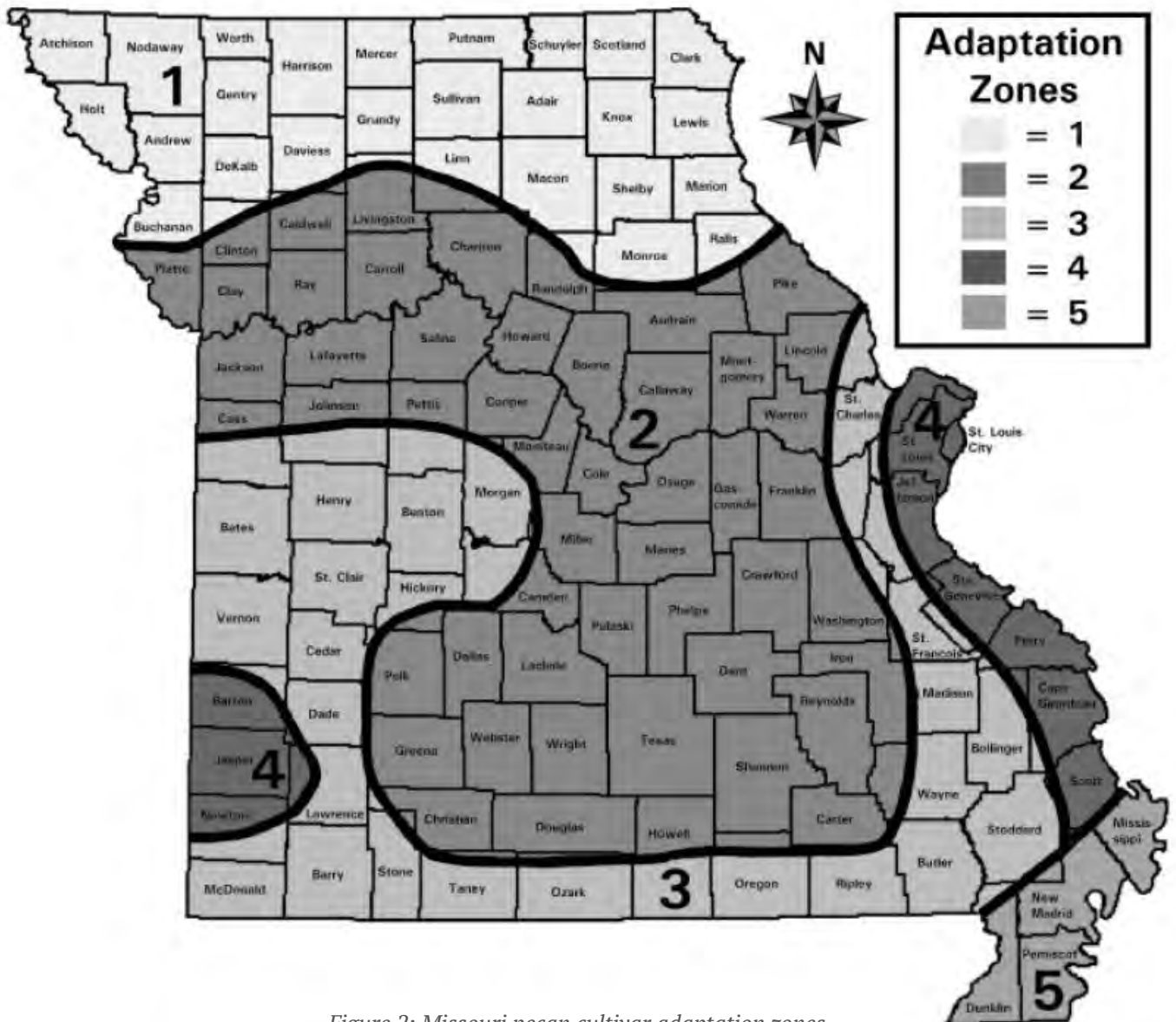


Figure 2: Missouri pecan cultivar adaptation zones



Cultivar	Nut Weight (g)	Percent Kernel	Maturity Date 1	Flowering Type 2	Scab Rating 3	Adaptation Zone
Warren 346	4.78	49.28	-27	I	R	1
Mullahy	5.77	43.77	-11	II	S	1,2
Osage	5.46	52.66	-10	I	R	2
Norton	6.67	43.55	-9	II	VR	2,3
Canton	7.86	47.95	-7	I	S	2,3
Shepard	5.90	51.12	-6	I	VR	2,3
Colby	7.02	44.15	-3	II	VS	2,3
Gardner	7.56	58.97	0	I	S	3,4,5
Pawnee	8.40	57.12	0	I	S	3,4,5
Faith	8.01	56.00	1	I	S	3,4,5
Posey	6.79	53.26	2	II	S	2,3,4
Hark	6.77	56.26	4	I	VR	2,3,4,5
Kanza	6.47	51.82	4	II	VR	2,3,4
Major	6.21	49.35	6	I	VR	2,3,4,5
Yates 68	5.98	56.01	9	I	VR	2,3,4
Jayhawk	6.31	51.71	10	II	R	3,4
Oswego	6.56	51.72	13	II	R	3,4,5
Giles	6.48	52.65	15	I	VS	3,4
Lakota	7.26	56.85	16	II	R	3,4,5
Greenriver	6.75	49.36	17	II	R	3,4,5
Stuart	8.48	46.42	22	II	S	5
Oconee	9.49	56.07	25	II	S	5

Pecan Scab Pecan scab is a fungal pathogen that can appear on the leaves, shucks, and twigs of pecan trees. It is capable of causing everything from slightly lower quality pecans to total crop loss. Very generally, areas with higher rainfall, humidity, and heat, are at the highest risk. Orchards that do not have adequate airflow, or are exceptionally moist and humid, often struggle with pecan scab the most. Additionally, cultivars that have some resistance to pecan scab do not always maintain that resistance forever. Consequently, the pecan scab ratings in Table 1 are only meant to be a snapshot of the cultivar's past and present. In the future, many of the ratings for some of the listed cultivars will slide towards being less resistant and more susceptible.



Top left: Hirschi cultivar with severe pecan scab; top right: Pawnee cultivar with moderate pecan scab; bottom left: Norton cultivar with no pecan scab. All three of these trees are growing in the same orchard at the Horticulture and Agroforestry Research Center, near New Franklin, MO.

Table 1: Pecan cultivars

1 Oct. 1 is the average date of shucksplit for Pawnee at Columbia, MO.

2 Type I = Protandrous, Type II = Protogynous

3 Scab ratings: VR=very resistant, R=resistant, S=susceptible, VS=very susceptible

*Very resistant cultivars require minimal to no fungicide applications at this time to perform well.

*Resistant cultivars may require minimal fungicide applications to perform well.

*Susceptible cultivars require fungicide applications but usually perform well with only one or two cover sprays.

*Very susceptible cultivars will likely require an intensive spray program to perform well in many areas.



Methods For Establishing Pecan Trees

Orchard Establishment Orchard establishment and design depends largely on a grower's objectives, equipment, site, and available capital. A general recommendation is that trees should be planted in a grid no closer than 30 to 35 feet apart. When utilizing 30 or 35 foot (or very similar) spacing, a grower should be prepared to thin half of their trees in the future. Pecans can be established by planting grafted trees, by planting seedling trees then grafting two to three years later, or by planting nuts and grafting them three to four years later. Each of these methods offers advantages and disadvantages. Prospective pecan growers should choose the method suited to their skills and economic situation.

Grafted Trees Transplanting grafted trees of desired cultivars is the simplest way to establish a pecan orchard. Trees should start to bear nuts within five to seven years after transplanting. Unfortunately, some of the cultivars recommended for Missouri are not widely available in large numbers from commercial nurseries, making it difficult to obtain grafted trees. However, cultivars such as 'Kanza' and 'Pawnee' are widely available.



The three-flap graft is a popular method used for propagating pecans. Check out the Center for Agroforestry publication titled 'Propagating Pecan and Black Walnut in Missouri' for more grafting information.

Seedlings Seedling pecan trees are widely available and can be purchased from seedling nurseries or from the Missouri Department of Conservation. Desired cultivars should be grafted to seedling trees two to three years after establishment.

Nut production should begin four to six years after grafting. Starting a pecan planting with seedlings offers the advantages of low initial costs and the opportunity to establish cultivars not available from commercial nurseries. Disadvantages include a delay in the onset of nut production and the time and expense of grafting your trees.

Nuts Pecan trees are easily grown from properly stratified nuts. To start your own trees, choose nuts that are well-filled. Nuts from early-maturing northern cultivars can make good cold-hardy seedlings. Stratify nuts in moist sand or peat moss by placing them in layers about 3 inches deep and holding them in a cool room or refrigerator (35° to 40°F) for 90 to 120 days. Be sure the nuts are kept moist throughout the stratification process to ensure uniform germination after planting.

Plant stratified seeds in the spring after the danger of frost passes. Seedlings can be grown in a nursery row and transplanted the following year or planted directly in the final tree location. Homegrown seedlings can take two to three years to grow large enough for grafting. Starting an orchard from seed has the same advantages and disadvantages as starting with seedlings.

Transplanting Pecan Trees

Bareroot Stock Transplant both grafted trees and seedling trees in March as soon as the soil can be easily dug. After receiving your trees, plant bareroot trees as soon as possible to



prevent roots from drying. Prune each tree before planting by trimming off about 1/3 of the top growth. Prune off broken or rotten roots and cut the tap root back to 24 inches. Taproot pruning of one-year-old seedlings is generally unnecessary.

Dig your planting hole large enough and deep enough to fit the entire root system. Hold the tree in position and fill soil in around the roots making sure the fibrous roots are spread out in their natural positions. The tree should be planted at the same depth as it was in the nursery. Water the tree after transplanting. Do not place soil amendments or fertilizers in the planting hole.

Container Grown Stock Transplant container grown pecan trees in early October or in March. Dig your planting hole twice as wide as the container but no deeper than the depth of the pot. After removing the tree from the container, check for a circling taproot. Use a pair of pruning shears to cut off the taproot at the point the root starts to circle. Next, gently pull out the smaller roots that are circling around the outside of the root ball. Place the tree in the planting hole and spread out the fine roots. Fill in the planting hole with topsoil. The tree should be planted at the same depth as it was in the container. However, be sure to cover the root ball and associated potting soil with about one inch of soil to keep the root ball from drying out. Be sure to water the tree thoroughly after planting.

Weed Control Weeds must be controlled in a five-foot area around the newly transplanted tree for maximum growth. Complete vegetation control can be achieved by shallow cultivation, application of herbicides, or by mulching. Your overall objectives, site conditions, and limitations (such as highly erodible soil) should be considered before beginning any endeavor. If the transplanted tree makes eight to 10 inches of new growth by early June, spread a half-cup of ammonium nitrate fertilizer

around the tree over the entire weed free area. Nitrogen applications to trees slow to establish themselves (less than eight inches of new growth) can cause a leaf burn and should be avoided. To ensure survival, keep the tree well watered throughout the growing season and especially during droughty periods.

Care of Non-bearing Trees

The goal of training a young pecan tree is to develop a strong trunk and healthy root system. Adequate soil moisture throughout the growing season and proper fertilization are keys to strong, vigorous tree growth. Water young pecan trees when conditions become dry by soaking the entire rooting zone deeply once a week. Apply nitrogen fertilizer twice a year, in March and in June, at the rate of one cup ammonium nitrate per inch of trunk diameter. Spread the fertilizer over the entire rooting area. Keep the area around the tree weed-free to ensure maximum benefit from water and fertilizer applications.

Tip pruning of branches helps shape the young pecan tree and promotes the formation of a strong trunk. Tip prune in early March by clipping off three to four inches from all terminal growth. When the tree starts its growth in early spring, these cuts force buds along the entire branch to break. This gives the tree a more dense appearance and greater leaf area. Tip prune again in mid-summer, but this time do not prune the central leader.

Cutting all lateral branches back stops their growth and channels their photosynthetic energy into strengthening the trunk. Lower lateral branches should be left on the tree until they are one inch in diameter. Remove these lower laterals as the tree grows until you have a tree with eight feet of clear trunk.



Care of Bearing Trees

Healthy, vigorous trees produce the highest quantity and quality of pecans. Maintaining a strong growing tree is also the best defense against attacks from insects and diseases. Water, fertilizer, and pest control are all important for healthy tree growth.

The importance of adequate soil moisture throughout the growing season has been discussed. Pecans require an average of one inch of water each week from budbreak to nut maturity. Two inches per week may be closer to optimum during the heat of the summer months. Natural rainfall can be supplemented by flood, sprinkler, or drip irrigation. Soil type also has an impact on irrigation levels and needs to be considered. Annual nut production relies on annual applications of nitrogen fertilizer. A general recommendation is to apply nitrogen just before bud-swell at the rate of 100 pounds actual nitrogen per acre. This total could also be split into spring and fall applications (i.e. 60 lbs applied in spring and 40 lbs applied in fall). Pecans grown on upland soils may require slightly higher nitrogen rates. The best way to customize fertilizer needs to your specific orchard is to have a soil test done and to have leaf samples of your pecans analyzed for nutrients. For more information on where you can have samples tested, contact your local extension office.

Rosette, a disorder caused by zinc deficiency, is more likely to be a problem when pecans are grown in soils with a pH above 7.0, or where soils are sandy with low organic matter. Severe zinc deficiency is relatively uncommon in Missouri, but very common in areas outside of the pecan's native range (i.e. the western United States). Symptoms include a rosetting of the terminal growth and small, misshapen leaves. Insect and disease problems can severely limit the nut production of a pecan tree although no pests are serious enough to cause tree death. In Missouri, three insects pose the most serious threat to the pecan crop:

pecan nut casebearer, hickory shuckworm, and pecan weevil. Pecan growers must learn how to identify the symptoms of pest damage and be able to take effective steps to control important pecan pests. Use the identification keys in this bulletin to help you identify common pecan pests and problems (Table 2).

A permanent groundcover of cool-season grasses and legumes should be established in the bearing pecan orchard. Once the trees start to bear, the shading of the tree canopy helps reduce the competitiveness of a groundcover. Keep this permanent ground cover mowed throughout the growing season. In the home orchard, a well-kept lawn grass serves as the groundcover.

The only pruning needed on bearing pecan trees is the removal of dead or injured limbs. In addition, remove low-hanging branches to allow free movement of people and machinery around the tree. If a pecan orchard is established at a 35-foot spacing, tree thinning will become necessary 10 to 30 years after grafting. Remove trees when the branches of adjacent trees are close to overlapping, or sooner. Delaying thinning too long is common and can reduce yields.

A pecan management schedule for Missouri can be found in Table 4.

Equipment for the Pecan Orchard

As with many agricultural endeavors, the proper equipment can make pecan growing easier and more efficient. The type of equipment purchased for maintaining a pecan orchard should be proportional to the size and age of the orchard. Suggestions for the types of equipment needed for pecan orchard management are given below in Table 3. Further details on harvest equipment are given on page 11 and some sources for pecan harvest equipment are given on page 15.



Table 2: A field key for identifying common pests and problems of pecan trees in Missouri.

Time Damage Observed	Time Damage Initiated	Damage Symptoms and Signs	Pest or Problem
April	April	New growth suddenly turns black	Spring frost damage
April	Previous years	Witches-broom type growth that breaks bud a week before healthy branches	Bunch disease
May	April	New leaves have shot-hole appearance	Sawflies
May	April	Galls on leaves and stems; gall filled with small aphid-like insects	Pecan phylloxera
May	April	Terminal of new growth wilts; olive-green caterpillar tunneling in pith of new shoot	Pecan Nut Casebearer
June	May	Nuts abort shortly after pollination	Lack of pollination
June	June	Olive-green caterpillar tunneling into the base of nuts; webbing and insect frass (debris or excrement resembling sawdust) at the base of infested nuts	Pecan Nut Casebearer
June	April	Leaflets yellowish, mottled, narrowed, and crinkled; reddish-brown spots may appear then later drop out to give leaves shot-hole appearance.	Zinc deficiency
July & Sept.	June and August	Large white webs encasing branches and filled with brownish-yellow caterpillars	Fall Webworm
July & Sept.	June and August	Entire branches defoliated by a large colony of caterpillars; young larvae are dark red while mature larvae are black. All larvae have long white hairs.	Walnut Caterpillar
July or August	July or August	Honeydew covering the surface of leaves; small, yellow insects feeding on the underside of the leaves	Yellow or Black Margined Aphids
August	August	Yellow blotches on leaves; small, black insects feeding on the underside of leaves	Black Pecan Aphids
July	May	Black lesions on leaves and nuts; lesions may coalesce to cover entire nut; kernel quality severely reduced	Pecan Scab
September	August	Small, cream-colored caterpillars with red heads tunneling in nut shucks; kernel quality reduced.	Hickory Shuckworm
October	October	Shucks turn black suddenly and stick to nuts.	Fall freeze damage
Harvest	August	Nut kernels have black, bitter-tasting spots.	Stink Bugs and Plant Bugs
Harvest	August	White, legless grubs feeding inside nuts; grubs exit nut through small round hole in shell after completely devouring nut kernel.	Pecan Weevil



Table 3: Equipment needed to manage pecan plantings in Missouri

Orchard Operation	Size of Pecan Planting			
	2 to 25 Trees	1 to 3 Acres	3 to 40 Acres	More than 100 Acres
General Use Horsepower	Lawn & garden power tools	10 - 20 hp garden tractor	25 - 50 hp tractor	70 - 85 hp tractor
Planting Trees	Shovel	Shovel	PTO-driven soil auger	PTO-driven soil auger
Weed Control	Hand sprayer	Back-pack sprayer	14 gal. battery powered sprayer	14 gal. battery powered sprayer
Orchard Floor Management - New Orchard	Lawn mower, tiller	Garden tractor mower and tiller	Disc, harrow	Disc, harrow
Orchard Floor Management - Mature Orchard	Lawn mower	Garden tractor mower	5 or 6 ft. rotary mower	10 - 15 ft. rotary mower
Pest Control - Non-Bearing Trees	Hand sprayer	Back-pack sprayer	12 - 15 hp high pressure sprayer	100 gal. PTO-driven mist sprayer
Pest Control - Bearing Trees	5 hp garden sprayer	12 - 15 hp high pressure sprayer	100 gal. PTO-driven mist sprayer	500 gal. PTO-driven air-blast sprayer
Nut Harvest	Poles to shake, hand gather nuts	Poles to shake, tarps to gather nuts	PTO-driven trunk shaker, tarps to gather nuts	PTO-driven trunk shaker, nut harvester, nut cleaner

Harvest

Well-adapted pecan cultivars begin splitting their shucks in late-September or early-October. Although the nut is fully mature at this time, it is still "green" and needs to dry further before being gathered. As the nut dries, the shucks will turn brownish-black and curl away from the nut, exposing the pecan. Pecans will fall from the tree when they are fully dry. Begin harvesting when the first nuts drop to the ground. At this point you can hasten the natural drop by shaking the tree or limbs. Pick pecans off the ground as soon as possible and store in a cool, dry place. There is a large variety of equipment that could be used for harvesting pecan trees.

Below are some of the equipment options for harvesting. Whether specific pieces of equipment are right for your operation will depend on the number of trees you have, how large the trees are, how much money you are willing to invest in equipment, and how much time you are willing to spend.

Shaking Pecan Trees

- Poles: used for tapping/shaking small-medium branches
- PTO-driven cable tree shakers: used for shaking small trunks or medium-sized branches
- PTO-driven hydraulic tree shakers: used for shaking small-large trunks



Table 4: Pecan management schedule for Missouri

Pecan Growers Calendar				
Month	Non-bearing Orchard	Bearing Orchard	Native Grove	Pest Management
January				
February	Collect scionwood. Prune trees to central leader.	Prune orchard to remove low limbs and/or narrow crotches.	Prune off low limbs. Thin out unproductive trees. Market wood products.	
March	Fertilize trees. Prune and train last year's grafts. Plant bare root trees.	Fertilize trees.	Fertilize trees.	Control pecan phylloxera on previously marked trees.
April	Apply weed control. Plant stratified pecan seed.			Apply foliar zinc sprays to zinc deficient trees.
May	Graft trees with recommended cultivars.			Monitor casebearer populations with pheromone traps. Continue zinc sprays.
June	Tip prune trees.	Keep groundcover mowed.	Keep groundcover mowed.	Control pecan nut casebearer and pecan scab. Apply final zinc spray.
July	Prune off suckers below new grafts. Support new grafts by tying to stakes.	Collect leaf samples for nutrient analysis.	Collect leaf samples for nutrient analysis. Clean drainage ditches.	Set out pecan weevil traps. Mark trees with significant phylloxera populations.
August	Make sure newly planted trees have adequate water.	Keep groundcover mowed.	Keep groundcover mowed.	Monitor weevils. Spray orchard when weevils emerge.
September	Establish cool season cover crops.	Prepare orchard for harvest.	Prepare orchard for harvest.	Control squirrels and crows with firearms and traps. Encourage hunting (in line with all applicable regulations).
October	Plant container grown trees.		Mark weak and unproductive trees for removal.	
November	Collect nuts for stratification and planting next year.			Collect harvest samples to determine weevil damage.
December		Harvest promptly, clean and market nuts.	Harvest promptly, clean and market nuts.	



Harvesting Pecans Off the Ground

- Tarps: if tarps are laid on the ground under the trees before they are shaken, then most of the nuts will fall onto the tarps.
- Nut gatherers: these tools usually consist of a wire basket on the end of a stick, which is rolled on the ground and picks up nuts that go through the basket wires. They are often rolled around by hand.
- Small pull-behind harvesters: these are lightweight and are not powered by motors or a tractor PTO. These are available in sizes that are small enough to be pushed by an individual up to sizes that will need to be pulled by a lawn mower or ATV.
- Large pull-behind harvesters: these are often used for medium-large scale pecan operations. Many of them are pulled behind tractors and powered via the tractor PTO.

There are many machines that don't fit neatly into the previous mentioned categories. There are some harvesters that are similar to the larger pull-behind harvesters, but they are smaller with fewer features and lower nut holding capacity. They have their own independent motor, so they do not require a tractor PTO. Often they can be pulled behind larger ATV's or lawn and garden tractors. Additionally, in some areas where pecan production is conducted on a very large scale, there are large specialty machines available for shaking and harvesting that are beyond the scope of this writing.

Storage

Over 70% of the pecan kernel is composed of unsaturated fats which can become rancid in room temperature storage. To maintain highest nut quality, shell out all your pecans and store the kernels in the freezer. Kept frozen, pecan kernels remain fresh for 2 years or more.



A PTO driven hydraulic pecan tree shaker facilitates the prompt harvest of the pecan crop.



A mix of northern pecans

Additional pecan resources are available on the UMCA website: <https://centerforagroforestry.org/landowners/resources>



Pecan Tree Materials Source List

Pecan trees can be established by planting seed nuts, planting seedling trees, or planting grafted trees. Both seedling trees and grafted trees can be purchased as either bareroot trees or container-grown trees. Given proper tree care, all tree establishment methods can result in a healthy, vigorous orchard. Orchards established by seed or seedling trees should be grafted one to three years after establishment. Some vendors of plant materials and grafting supplies are listed below.

Pecan Seed Nuts

Horticulture & Agroforestry Research Center

New Franklin, MO
660-848-2268
www.harc.missouri.edu/

Lovelace Seeds

Rob Lovelace
Elsberry, MO
573-898-2103
www.lovelaceseeds.com

Pecan Scionwood

King Hill Farms

Brunswick, MO
660-548-3972
www.kinghillpecans.com

Wilson Pecan Farm

Nevada, MO
417-667-8115

Nebraska Nut Growers Association

www.nebraskanutgrowers.org

Missouri Nut Growers Association

www.missourinutgrowers.org

Seedling Trees

Forrest Keeling Nursery

Elsberry, MO
800-356-2401
www.fknursery.com

Stark Brothers Nursery

Louisiana, MO
800-325-4180
www.starkbros.com

Missouri Dept. of Conservation Nursery

Licking, MO
573-674-3229
www.mdc.mo.gov/trees-plants/tree-seedlings/order-seedlings

Grafted Trees

Forrest Keeling Nursery

Elsberry, MO
800-356-2401
www.fknursery.com

Nolin River Nut Tree

Nursery Upton, KY
502-369-8551
www.nolinnursery.com

Stark Brothers Nursery

Louisiana, MO
800-325-4180
www.starkbros.com

Grafting Supplies

Forestry Suppliers, Inc.

Jackson, MS
800-647-5368
www.forestry-suppliers.com

Hummert International

Earth City, MO
800-325-3055
www.hummert.com

A.M. Leonard

Piqua, OH
800-543-8955
www.amleo.com



Additional Resources on Pecan Growing, Managing, and Marketing

The Center for Agroforestry

The website is an excellent source for information on many nut crops, including pecan.

www.centerforagroforestry.org

Northern Pecan Blog

This website is a collection of articles written by Dr. William Reid, pecan grower and researcher.

www.northernpecans.blogspot.com

Noble Research Institute

Conducts pecan research and outreach in Oklahoma. Some of the information is relevant to growers in Missouri.

www.noble.org/news/publications/ag/horticulture/pecan-production-101

University of Georgia Pecan Grower Resources

This website has some great information for growers in the southeastern U.S. Some of the information is relevant to growers in Missouri.

www.pecans.uga.edu

Resources for Pecan Farming Equipment

Savage Equipment

866-572-8243

Manufacturer of mechanized pecan management, harvesting, and processing equipment.

www.savageequipment.com

Produce Tech

450-994-4567

Distributor of harvesting equipment for fruit and nut trees.

www.producetech.com

Bag-A-Nut

904-641-3934

Producer of small-scale nut harvesting equipment.

www.baganut.com

Nut Wizard

888-321-9445

Producer of small-scale nut harvesting equipment.

www.nutwizard.com

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Instagram: [@MUAgroforestry](https://www.instagram.com/MUAgroforestry)



LinkedIn: [University of Missouri Center for Agroforestry](https://www.linkedin.com/company/University-of-Missouri-Center-for-Agroforestry)



The Agroforestry Podcast

The UMCA's podcast series exploring a wide range of agroforestry topics.

Listen wherever you get your podcasts.

The University of Missouri Extension Pecan Pest Management: Insects and Diseases guide (number MP711) provides additional information on pest management for pecan. The guide is available on the internet at extension.missouri.edu/publications/mp711 and can be downloaded for no charge.

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