



Understanding the Pecan Tree: Growth, Flowering and Life Cycle

Overview

This publication will cover:

1. **Understanding Tree Types and Their Implications:** Native versus improved (grafted) varieties, how to identify them and why it matters for orchard planning.
2. **How Pecans Flower and Set Nuts:** Monoecious flowering, Type I versus Type II cultivars, pollination timing and how to recognize flower receptivity.
3. **Recognizing and Interpreting Nut Drop:** Stages of nut drop, causes and how to distinguish normal shedding from stress-related issues.
4. **Alternate Bearing in Pecan Trees:** Why pecans alternate between heavy and light crop years, and how homeowners can reduce its impact.
5. **Tree Longevity and Implications for Home Orchard Planning:** Lifespan, mature size, spacing needs and long-term considerations for cultivar selection and maintenance.

1. Understanding Tree Types and Their Implications

If you're planning to grow pecans in your yard or small orchard, it helps to understand how the tree grows, flowers and produces nuts over time. Pecan trees (*Carya illinoensis*) are native to the Mississippi River valley and are well adapted to Louisiana's climate. They're part of the hickory family and are known for their long lifespan, often living and producing for over 100 years.

These trees grow upright with a spreading canopy and develop a deep taproot along with wide lateral roots. This root system supports their large size and makes them resilient once established, but it also means they need plenty of space and good soil drainage from the start.

Native Versus Improved Varieties

When choosing pecan trees for your home orchard, it's important to understand the difference between **native (seedling)** trees and **improved (grafted)** cultivars. These two types behave very differently in terms of nut quality, consistency and long-term performance.

Native (Seedling) Pecans

Native pecans are grown from seed meaning each tree is genetically unique. These trees are often found in pastures, along fence lines or in older yards where they may have sprouted naturally or been planted decades ago.

- **Nut quality varies widely.** Some native trees produce excellent nuts, but many have small, thick-shelled or poorly filled kernels.
- **No two trees are alike.** Even trees growing side by side can differ in yield, disease resistance and harvest timing.
- **Seedlings aren't true-to-type.** A seedling tree will not reliably produce nuts like its parent, even if the original nut came from a good cultivar.

How to spot a native tree: Look for tall, upright trees with a strong central trunk and variable nut size. If you don't see a graft union near the base, it's likely a seedling.

Genetic Diversity and Resilience

Native pecans represent a broad genetic pool that has adapted to Louisiana's climate, pests and diseases over centuries. This diversity is important for:

- **Breeding programs** that develop new cultivars
- **Resilience** in the face of changing environmental conditions
- **Preservation of local ecotypes** that may be uniquely suited to specific regions

In some cases, exceptional native trees have even been selected and propagated as improved cultivars.

Improved (Grafted) Cultivars

Improved pecans are grafted from known cultivars, which means they are genetically identical to a tested parent tree. These cultivars have been selected for traits that matter to home growers:

- **Larger, better-filled nuts**
- **Resistance to scab and other diseases**
- **More consistent yields**
- **Known flowering type for pollination planning**

Grafted trees are the best choice for new plantings because they offer predictable performance and are easier to manage over time.

Look for the graft union — a visible swelling or scar near the base or lower portion of the trunk. This confirms the tree is grafted and true-to-type.

Papershell Pecans: What the Term Really Means

The term “**papershell**” originally referred to pecans with **very thin shells** — so thin they could be cracked by hand. In the early 1900s, this was a prized trait, and only the thinnest-shelled varieties earned the label.

Today, however, the term is used much more loosely. Most improved (grafted) cultivars are now called papershells, even though many have shell thicknesses similar to wild types. Papershell is more of a marketing term than a guarantee of shell thinness. If easy cracking is important to you, look for cultivars specifically noted for thin shells and high kernel percentage.

Why It Matters for Home Orchards

If you're planting new trees or managing older ones, understanding the difference between native and improved pecans can help you make better decisions.

- **For new plantings**, improved (grafted) cultivars are almost always the better choice. They offer more reliable nut quality, better disease resistance and known pollination traits — all of which reduce the need for spraying and guesswork.
- **For existing trees**, knowing whether a tree is grafted or a seedling can help you decide whether to renovate, topwork or replace it. A native tree that produces poor-quality nuts or has heavy scab pressure may not be worth keeping.
- **For long-term planning**, grafted trees give you a clearer picture of what to expect in terms of yield, growth habit and maintenance needs.

In short, if your goal is consistent, high-quality nut production with minimal inputs, start with grafted trees. Native trees can still have value, but they're best appreciated for their shade, wildlife benefits or historical significance unless proven to be good producers.

2. How Pecans Flower and Set Nuts

Pecan trees are **monoecious**, meaning they produce both male and female flowers on the same tree but in different locations. Understanding how these flowers develop and interact is key to successful nut production.

- **Male flowers (catkins)** form on one-year-old wood and release pollen in spring. Pollen sacs split open and turn brown when pollen is actively shedding.
- **Female flowers (pistillate flowers)** emerge at the tips of new shoots and are receptive to pollen for only a short window. Each flower has a rough, horned stigma surface designed to catch airborne pollen.

Pecans also exhibit **dichogamy**, a flowering system that helps prevent self-pollination and encourages cross-pollination between trees. There are two flowering habits:

- **Type I (protandrous):** Male flowers release pollen before female flowers are receptive.
- **Type II (protogynous):** Female flowers become receptive before male pollen is shed.

Pollination Success Depends on Timing

To ensure good nut set, plant at least two cultivars with **complementary flowering types**. Even healthy trees may fail to produce nuts if flowering types are mismatched or bloom periods don't overlap. For example, one tree may have already shed its pollen while another is just becoming receptive.

Flowering Intensity and Nut Set

During mid-May, scout for pistillate flower clusters at the ends of new shoots. A high number of clusters often signals a strong nut crop ahead. While catkin production is essential for pollen availability, it does **not** predict nut yield. Fortunately, pollen is rarely limiting in Louisiana during the bloom period.

Recognizing Flower Receptivity

Pistillate flowers are located at the tips of new shoots and play a critical role in pecan pollination. Each flower features a rough, horned stigma surface designed to catch airborne



Protogynous: stigmas are receptive before pollen is shed. These cultivars typically display green stigmas during the receptive phase, though some may show reddish hues depending on the cultivar. Photos by William Reid



Protandrous: Pollen is shed before stigmas become receptive. These cultivars often exhibit deep red or wine-colored stigmas during the receptive phase. Photos by William Reid

pollen grains. When receptive, the stigma secretes a sticky fluid that glistens in sunlight. This **stigmatal fluid** is the most reliable indicator that the flower is ready for pollination. Once pollinated, the fluid disappears, and the stigma tips begin to brown.

Stigma color varies by cultivar and flowering type, and while it can offer clues, it should not be used alone to judge receptivity:

- Cultivars with **protogynous (Type II)** flowering habits often display **green stigmas** when receptive. Some cultivars can have reddish colorations instead.
- Cultivars with **protandrous (Type I)** flowering habits tend to show **deep red or wine-colored stigmas** during receptivity.

Other cultivars may exhibit orange or yellow stigmas. However, **color alone is not a dependable indicator**. Always look for the presence of sticky fluid to confirm that the flower is receptive and ready to be pollinated.

Identifying Flowering Type in Your Orchard

You can estimate flowering type by examining catkin shape before pollen release:

- **Protandrous cultivars** tend to have short, fat catkins.
- **Protogynous cultivars** produce long, narrow catkins.



Short, thick catkins are typical of protandrous cultivars, which shed pollen before stigmas become receptive. This shape often precedes early pollen release. Photo by William Reid



Long, slender catkins are characteristic of protogynous cultivars, which display stigma receptivity before pollen shed. This shape is a useful early indicator of flowering type. Photo by William Reid

3. Recognizing and Interpreting Nut Drop

Nut drop is a natural part of the pecan tree's life cycle, but not all drop is normal. Understanding when and why pecans fall can help homeowners distinguish between healthy shedding and signs of stress, poor pollination or pest damage. This publication outlines the typical stages of nut drop, what each one means and how to respond when drop seems excessive or untimely.

June Drop (Self-Thinning and Pollination Failure)

Timing: Late May to early June.

Normal? Yes. This is the tree's way of shedding excess nuts it cannot support.

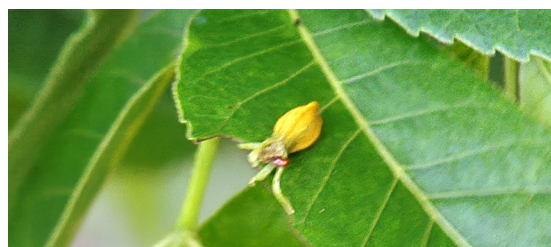
When to be concerned: If drop is unusually heavy or begins earlier than expected, it may signal poor pollination, drought stress, or nutrient deficiency. Nuts that were never fertilized may abort shortly after flowering.

Midsummer Drop

Timing: July to early August.

Normal? Sometimes. A few nuts may drop due to natural thinning or minor stress.

When to be concerned: If green nuts are dropping in large numbers, especially if they're poorly filled or undersized. This often points to drought, boron deficiency or poor pollination. Check nuts for stink bug damage and scab to determine if that is a major cause as well.



Timing: Late May to early June. June drop is a normal self-thinning process where pecan trees shed excess nuts they cannot support. However, heavy or early drop may indicate issues such as poor pollination, drought stress or nutrient deficiency. Nuts that were never fertilized often abort shortly after flowering. Photos by William Reid



Timing: July to early August. A small amount of nut drop during midsummer can be normal, but heavy drop of green, undersized or poorly filled nuts may signal problems. Common causes include drought stress, boron deficiency, poor pollination or stink bug damage. Scab infection may also contribute. Photo by William Reid

Late Summer/Early Fall Drop

Timing: August to September.

Normal? No. This is typically a sign of trouble.

When to be concerned: If large green nuts fall before shucks begin to split, especially if kernels are blackened, shriveled or missing. Common causes include:

- **Insect damage** (pecan weevils, stink bugs)
- **Disease** (pecan scab affecting shucks)
- **Overbearing** (trees shedding nuts they cannot finish developing)
- **Severe drought or nutrient stress**

Preharvest Drop

Timing: Late September to October.

Normal? Yes. This is part of the ripening process.

When to be concerned: Only if nuts are dropping before they're fully mature or if kernel quality is poor.



Timing: August to September. Large green nuts falling before shuck split may indicate stink bug or pecan weevil damage. Kernels are often blackened, shriveled, or missing. Photos by William Reid



Timing: August to September. Pecan scab infections on shucks can cause premature nut drop. Affected nuts may fall before maturity and show dark lesions or shriveled kernels. Photos by William Reid



Timing: August to September. Severe drought can trigger early nut drop. Trees may shed nuts they cannot finish developing, especially during prolonged dry spells. Photos by William Reid

What Can You Do?

Observe leaf color and nut fill. Pale or yellowing leaves may indicate nutrient deficiencies, especially nitrogen, zinc or boron. Poorly filled nuts or blackened kernels often point to stress during nut development.

Water deeply during dry spells. Drought stress is one of the most common causes of premature nut drop. Trees benefit from slow, deep watering that reaches the root zone, especially in sandy soils or during extended dry periods.

Consider soil or foliar testing. If nut drop is severe, recurring or accompanied by poor leaf color, testing can help identify nutrient imbalances. Foliar samples taken in July can guide next year’s fertility plan, while soil tests can be done in fall or winter.

Monitor for insect and disease pressure. Check dropped nuts for signs of stink bug or pecan weevil damage such as puncture marks or internal rot. Watch for scab symptoms on shucks, especially in wet years or on susceptible cultivars.

Plan ahead for next year. Trees that overbear one year often struggle the next. Thinning heavy crops early in the season can reduce stress and improve nut quality. Evaluate pollination partners if nut fill is consistently poor. Isolated trees may need compatible cultivars nearby.



Timing: Late September to October. This type of nut drop is normal and part of the ripening process. Be concerned only if nuts fall before full maturity or show poor kernel quality. Photo by William Reid

Nut drop timing and interpretation table.

Drop Type	Timing	Normal?	Common Causes	When To Be Concerned
June drop	Late spring to early summer	Yes	Natural self-thinning	Heavy drop with poor leaf color may signal drought or nutrient deficiency
Midsummer drop	July to early August	Sometimes	Minor stress, poor pollination, boron deficiency	Large numbers of green nuts dropping, especially if undersized or poorly filled
Late summer/early fall drop	August to September	No	Insect damage (weevils, stink bugs), scab, overbearing, drought, nutrient stress	Green nuts falling before shuck split; blackened or shriveled kernels
Preharvest drop	Late September to October	Yes	Natural ripening	Only a concern if nuts drop immature or kernel quality is poor

4. Alternate Bearing in Pecan Trees

If you've ever had a pecan tree that produced a bumper crop one year and almost nothing the next, you've seen alternate bearing in action. This is a natural tendency in pecans — especially in older trees or certain cultivars — and it can be frustrating if you're hoping for consistent harvests year after year.

What It Is

Alternate bearing means the tree swings between “on” years with heavy nut production and “off” years with lighter crops. It's common in both native and improved trees, though some cultivars are more prone to it than others.

Why It Happens

Several factors contribute to alternate bearing, but the biggest is stress during the growing season, especially from a heavy crop load. When a tree puts all of its energy into filling nuts, it may not have enough left to form next year's flowers. Here's what's going on behind the scenes:

- **A heavy crop load** suppresses flower formation for the following year.
- **Kernel fill** drains the tree's carbohydrate reserves, which are needed to support return bloom.
- **Developing nuts** release hormones that can block new flower buds from forming.
- **Premature defoliation**, often caused by scab or drought, reduces the tree's ability to produce floral promoters in the leaves.

When It Starts

The tree begins preparing for next year's crop in **August**, while the current season's nuts are still developing. This process is called **floral induction**, and it's when the buds are deciding whether to become flowers or just leaves next spring. If the tree is overburdened or stressed during this time, it's less likely to set a strong crop the following year.

How Cultivar and Tree Age Affect It

- **Young trees** tend to alternate because of hormonal suppression, not because they're out of energy. Even one nut per shoot can prevent that shoot from flowering again next year.
- **Mature trees** are influenced by both crop load and carbohydrate depletion. If they lose too many leaves or overbear, return bloom suffers.
- **Cultivar matters:** Some varieties like Elliott and Lakota are more prone to alternate bearing, while others like Woodman and McMillan tend to be more consistent.

What Homeowners Can Do

While you can't eliminate alternate bearing entirely, you can reduce its impact with good care and smart planning:

- **Choose cultivars** known for consistent production in home settings.
- **Keep foliage healthy** with proper fertilization and disease control, especially zinc and potassium.
- **Avoid premature defoliation** by managing scab and drought stress.
- **Consider light crop thinning** in heavy years (if feasible) to support return bloom. Even removing a small portion of the crop before August can help the tree reset.

Alternate bearing is part of the pecan tree's natural rhythm, but with the right approach, you can help your trees stay productive and balanced over time.

5. Tree Longevity and Implications for Home Orchard Planning

Pecan trees are not short-term projects. They're long-lived, slow-growing trees that can remain productive for generations. In Louisiana, it's common to find pecan trees that are 80 to 100 years old still producing nuts in yards, pastures and along rural roads. This longevity is part of what makes pecans so valuable, but it also means that planting and managing them requires long-term thinking.

A Lifetime Investment

When you plant a pecan tree, you're not just planting for yourself. You're planting for the next generation. Most grafted cultivars begin producing a small crop in six to 10 years, but full production may not occur until the tree is 15 to 20 years old. Seedling trees may take even longer.

Plan with patience. If you're looking for quick returns, pecans may not be the right fit. But if you're thinking about legacy, shade and long-term value, they're hard to beat.

Size and Space: Planning for a Mature Tree

Pecan trees grow large — both above and below ground. Mature trees can reach **70 to 100 feet tall** with a canopy spread of **50 to 75 feet or more**. Their root systems are equally expansive, requiring deep, well-drained soil and plenty of room to grow.

- **Recommended spacing for home orchards** is 60 to 80 feet between trees.
- **Avoid planting near** buildings, driveways, power lines, septic systems or other trees.
- **Why does it matter?** Crowding leads to poor airflow, increased disease pressure and difficult maintenance later in life.

— **TIP:** It's better to plant fewer trees with proper spacing than to crowd them and face removal or decline in 20 years.

Cultivar Choice Has Long-Term Consequences

Because pecan trees live so long, the cultivar you choose today will shape your orchard for decades. See the Site Preparation, Planting and Establishment publication for guidance on spacing and site layout, which are just as important for long-term success. That's why it's important to select varieties that are:

- **Well-adapted to your region**
- **Resistant to scab and other diseases**
- **Compatible with each other for pollination**
- **Known for consistent bearing and manageable growth habits**

Some cultivars are more prone to alternate bearing or scab, which can become major issues once the tree is too tall to spray effectively. Choosing wisely now can save you years of frustration later.

Maintenance Becomes More Challenging Over Time

Young pecan trees are relatively easy to manage. But as they mature, they become harder to prune, spray or harvest without specialized equipment.

- **Spraying tall trees** becomes impractical for most homeowners.
- **Pruning large limbs** requires ladders, pole saws or professional help.
- **Harvesting** may involve waiting for nuts to drop and competing with wildlife.

Plan ahead: Choose planting sites that are accessible for future maintenance. Leave room for equipment or ladders, and consider how you'll collect nuts as the tree matures.

Pecans as Legacy Trees

Many homeowners plant pecans not just for nuts, but for shade, beauty and the satisfaction of leaving something behind. A well-placed pecan tree can become a centerpiece of the landscape, providing habitat, cooling the yard and anchoring family memories for decades.

If you're planting a pecan tree today, think about how it will fit into your landscape 30, 50 or even 100 years from now. That's the kind of timeline pecans work on, and it's part of what makes them so special.

For more information on pecan care and orchard management, see other titles in the From Soil to Shell: Louisiana Pecan Series and the Louisiana Home Orchard: Pecans publication available through the LSU AgCenter.

Sources Cited or Referenced

Reid, W. (n.d.). Northern Pecan Blog. Retrieved September 2025, from <https://northernpecans.blogspot.com/>. Images from this blog were used with permission.

Wells, L. (Ed.). Pecan Production in the Southeast: A Guide for Growers. University of Georgia Cooperative Extension.



Visit our website: www.LSUAgCenter.com

P1884-C-1 (online) 6/26

The LSU AgCenter and LSU provide equal opportunities in programs and employment.