

Pecan Varieties for Georgia Orchards

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The most fundamental step in pecan production is the selection of varieties or cultivars to be planted in the orchard. Planting the wrong pecan variety can be a costly mistake, resulting in considerable expense. Each variety has its own strengths and weaknesses and, based on the orchard characteristics, may or may not be suitable for a particular situation. Regardless of the care taken in choosing an appropriate variety, experience has taught many growers that any variety may in due time fail to be as well adapted as it at first appeared. Among the most important factors to consider when selecting a variety are disease resistance, alternate bearing, precocity (the bearing age of the tree), harvest date, pollination type, nut size and nut quality.

Disease Resistance

Pecan scab is by far the most serious challenge facing pecan production in Georgia. Our warm, humid climate is ideally suited to the pecan scab fungus, which can devastate susceptible varieties given the right environmental conditions. Some orchards may require up to 15 fungicide applications in a season, and many varieties are too scab susceptible to be recommended, even with fungicide application.

The scab fungus spreads relatively slowly from one region to the next. A particular variety may seem scab resistant in one location and be very susceptible elsewhere. Research has shown that the scab fungus is composed of multiple races, each suited to grow best on a small number of varieties. Therefore, the resistance level of a particular variety will be influenced by what races are present in the orchard in which it is grown.

For example, an orchard composed largely of ‘Desirable’ trees will probably have a large proportion of scab fungus, which is suited to grow on ‘Desirable.’ If a few trees of ‘Sumner’ are planted in this orchard, ‘Sumner’ may not at first be much affected



Figure 1. ‘Caddo’



Figure 2. ‘Cape Fear’



Figure 3. 'Candy'



Figure 4. 'Creek'



Figure 5. 'Desirable'

by scab. This is because the majority of spores that land on 'Sumner' trees are from 'Desirable' trees and are not suited to infecting 'Sumner' leaves. However, the few that are pathogenic to 'Sumner' will reproduce and, over time, scab may become more of a problem. The greater the number of 'Sumner' trees that are planted, the more quickly this may occur. This leads to the cycle we commonly see, where new cultivars start out seeming highly resistant, but over time appear more and more susceptible.

'Desirable' is an example of a variety that once had good levels of resistance but which now is very susceptible. The variety itself is not changing, rather the pathogen is adapting to the variety. On the other hand, a few varieties like 'Elliot' have had excellent levels of resistance for many years. Currently it is not easy to predict how a variety's resistance will hold up over time.

Alternate Bearing

Alternate bearing is another serious problem facing pecan production. This refers to a tendency for the pecan tree to produce many nuts of poor quality in one crop year, followed by a year in which the tree bears a very light crop. Alternate bearing appears to be controlled by two mechanisms. Growth regulators produced by the developing nuts suppress the induction of flower buds for the next season's bloom. Secondly, excessive crop loads can leave trees depleted of stored carbohydrates, so flower buds are aborted the following spring.

Alternate bearing significantly affects pecan marketing and the price obtained by the grower for his crop. While all pecan trees have a tendency to bear alternately, some varieties are much better at producing regular crops than are others. Probably more pecan varieties have been eliminated from Georgia orchards because of their tendency to alternate bear than for any other reason except scab susceptibility.

Give a lot of thought, therefore, to the alternate bearing tendency of a particular variety before planting. The alternate bearing index (I) is a measure of a cultivar's tendency to produce alternating high and low yields. This can be a valuable tool when making comparisons of varieties. The range is from 0 to 1, with 0 = no alternation and 1 = complete alternation, which would be no yield every other year. The producer can temper the alternate bearing of some varieties with proper management of the crop load and fertility. A detailed discussion of these management practices can be found in the University of Georgia Cooperative Extension publication, *Cultural Management of Commercial Pecans*.

Precocity

Precocity is the ability of a particular variety to begin bearing nuts at an early age. This trait is best determined by comparing the average yield among varieties from years 1-10. A precocious variety like 'Cape Fear' can be of benefit in that the producer can begin to harvest a marketable yield at an earlier point in the life of the orchard than he can with other less precocious varieties.

Unfortunately, precocity is often associated with excessive fruiting or overloading, resulting in poor quality as the tree becomes mature. Again, growers should not let the overloading tendency alone determine their variety choices because there are management tools available that can help reduce the impact of this problem.

Nut Maturity and Harvest Date

Pecans are traditionally marketed and used during the Thanksgiving and Christmas holiday seasons. As a result, early harvest is required to supply nuts for the holiday market. Early maturing varieties usually bring higher prices than later maturing varieties, although this is not always the case. For example, ‘Sumner,’ a late-maturing variety, can often bring a better price than that obtained from poor quality early maturing varieties.

Another benefit of early nut maturity is that nuts can be harvested under favorable conditions of dry weather in the southeastern United States. Cloudy, wet and cool weather can delay harvest and lead to a deterioration of nut quality. Growers should only plant very early maturing varieties like ‘Pawnee’ if they are able to harvest them promptly, otherwise bird and squirrel depredation can be severe.

Pollination Type

Pecan trees bear male and female flowers separately on the same tree. Pecans generally fall into two categories with regard to pollination. Type I varieties are termed *protandrous*. In type I varieties, the pollen matures before the pistil is receptive. Type II varieties, in which the pistil becomes receptive before the pollen matures, are termed *protogynous*.

Viable pollen must be available for the female flowers during the receptive period in order for a tree to set a crop. Self pollination seldom produces large crops and leads to poor nut growth and development, resulting in poor nut quality. Therefore, it is recommended that a combination of compatible varieties be planted to ensure pollen release throughout the pollination period. This can best be accomplished by planting at least two “pollinator varieties” in the orchard. A pollination chart is listed in Table 1 on page 4.

Environmental conditions can have a significant effect on bud break and therefore pollen shed. Delayed pollen dispersal occurs under cool, wet spring conditions, and accelerated catkin development occurs during warm spring weather. This makes the inclusion of more than one pollinator in the orchard vitally important to ensure effective pollen shed at a time when female flowers are receptive.

Research indicates that effective pollination may decrease at distances greater than 150 feet from a pollen source. A rule of thumb is that pollinators should be no more than three rows apart. Pollinators can be blocked in rows, or pollinator varieties with similar nut and kernel characteristics to main varieties can be positioned within main variety rows. An effective alternative to block-



Figure 6. ‘Elliot’

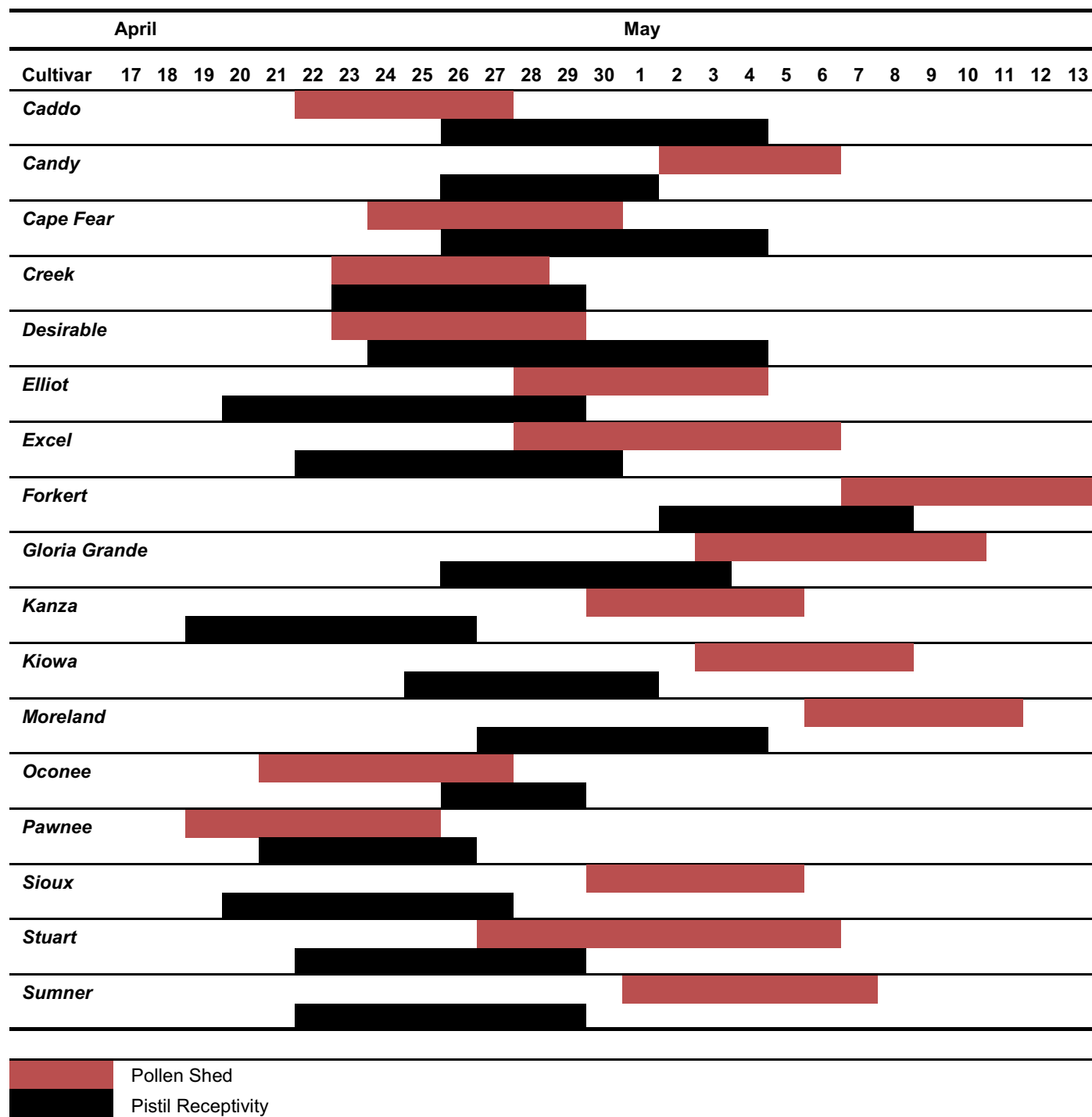


Figure 7. ‘Excel’



Figure 8. ‘Forkert’

Table 1. Pollination chart for pecan varieties recommended for use in commercial pecan orchards in Georgia.



ing varieties is to place a pollinator at every fifth tree within every fifth row. This will provide adequate pollination, and the amount of pollinator nuts will be small enough the crop will not bring lower “blended” prices.

Nut Size and Quality

Nut size is a dominant factor in the selection of a variety and can be important for several reasons. Consumers tend to prefer large pecans; they can be marketed in or out of the shell; a large nut is more economical to shell; and most importantly, large pecan halves generally sell at a higher price than smaller halves.

The disadvantage of a large nut is that it is more difficult to fill and consistently obtain good quality kernels. Nut size is normally measured as the number of nuts per pound. In general, the larger the nut, the fewer nuts per pound. Each variety has a characteristic nut count, with a count of 40 to 50 nuts per pound being ideal.

Nut quality is determined primarily by the percent kernel. Percent kernel is the proportion of the nut that is kernel or meat. Percent kernel varies with soil moisture and crop load; however, each variety has a characteristic kernel percentage. Typically, most cultivars show a drop in percent kernel as the trees age. This is because young trees are producing relatively light crops and have more than enough leaves to support the developing kernels. As the trees mature, however, they set heavier crops and become limited in their ability to fill all the nuts.

Tables 2 and 3 list the recommended commercial pecan varieties for Georgia along with various characteristics of each that may aid in the grower’s decision making process. Varieties recommended for trial are included in Table 4. Figures 1-17 throughout the publication indicate nut size and kernel color for each of the recommended varieties. When choosing a variety, bear in mind that there is no one best variety. All selections have both weak and strong points. The key is to find a variety that will best suit the orchard situation.

Literature Cited

Smith, M. 2005. Understanding alternate bearing. *Pecan South* 38: 32-37.



Figure 9. ‘Gloria Grande’



Figure 10. ‘Kanza’



Figure 11. ‘Kiowa’



Figure 12. 'Moreland'



Figure 13. 'Oconee'



Figure 14. 'Pawnee'



Figure 15. 'Sioux'



Figure 16. 'Stuart'



Figure 17. 'Sumner'

Table 2. Pecan varieties recommended for commercial production in Georgia.

Variety	Nuts/lb	Avg. % Kernel	Maturity Date	Scab Rating ¹	Alt Bearing ²	Precocity ³
Caddo	67	54	Oct. 11	3	0.32	2
Caddo is pollinated by Elliot, Kanza, Moneymaker, Schley, Stuart and Sumner. Caddo is susceptible to black pecan aphid.						
Cape Fear	55	51	Oct. 19	3	0.41	1
Cape Fear is pollinated by Elliot, Kanza, Schley, Stuart and Sumner. This variety should be fruit thinned as a mature tree and should be left uncrowded. Bacterial leaf scorch may be a problem in certain locations when trees are under stress.						
Desirable	48	51	Oct. 16	5	0.40	3
Desirable is pollinated by Elliot, Kanza, Sioux, Sumner and Stuart. This variety cannot be grown in the southeast without an intensive fungicide spray program most years. Produces consistent, high quality crops when scab is controlled. Poor crotch angles often result in excessive limb breakage and require extension training to correct.						
Elliot	77	51	Oct. 15	1	0.68	5
Elliot is pollinated by Caddo, Desirable, Pawnee and Oconee. Needs little to no scab protection. One of the most drought resistant pecan varieties. Early bud break makes Elliot susceptible to late spring freezes. Susceptible to powdery mildew, black aphids and sooty mold accumulation. Mature trees bear alternately, but quality remains high in the "on" year. Elliot is one of the best choices for low input and dooryard plantings.						
Forkert	53	58	Oct. 19	4	0.53	4
Forkert is pollinated by Cape Fear, Elliot, Kiowa, Kanza and Sumner. The shell is very thin and the kernels shell out well, making it a favorite for the in-shell market. Kernel quality declines rapidly when left on orchard floor. Susceptible to black pecan aphid.						
Kanza	74	52	Oct. 8	1	0.72	4
Kanza is pollinated by Caddo, Desirable, Oconee and Pawnee. A small nut, very similar to Elliot, but with better precocity. Should be used as a replacement for Elliot in northern growing regions because of excellent cold tolerance.						
Oconee	48	53	Oct. 12	3	0.37	3
Oconee is pollinated by Cape Fear, Schley and Stuart. Should not be crowded as a mature tree. The nut is large and shells out very well. Very susceptible to black pecan aphid.						
Pawnee	56	54	Oct. 3	5	0.61	4
Pawnee is pollinated by Forkert, Gloria Grande, Kiowa, Schley, Stuart, Sumner and Sioux. Not recommended for areas where scab control is a concern. Will benefit from fruit thinning as a mature tree. Very early nut maturity and excellent quality when scab is controlled. Kernels may develop speckles or dark veins.						
Sumner	56	49	Oct. 29	2	0.56	4
Sumner is pollinated by Cape Fear, Desirable and Oconee. Disadvantages include late harvest date and black pecan aphid susceptibility. Good scab resistance in most locations.						

¹ 1-5 scale with 1 = excellent resistance and 5 = poor resistance.

² 0-1 scale with 0 = no alternation and 1 = complete alternation, which would be no yield every other year.

³ 1-5 scale with 1 = very precocious (bears at early age) and 5 = non precocious (very slow to bear).

Table 3. Pecan varieties with potential merit for Georgia pecan production under certain situations.

Variety	Nuts/lb	Avg. % Kernel	Maturity Date	Scab Rating ¹	Alt Bearing ²	Precocity ³
Candy	78	45	Oct. 6	2	0.62	1
Candy is pollinated by Cape Fear, Desirable and Schley. Alternate bears as a mature tree, but quality does not decline. High percentage of fancy kernels. Candy produces a very small nut.						
Creek	55	48	Oct. 18	2	0.68	1
Creek is pollinated by Elliot, Schley, Sioux and Stuart. Mature Creek trees will need some form of crop load management to alleviate alternate bearing with poor quality in the "on" year. Kernels may have unattractive wrinkling of seed coat at apex of the kernel. Suitable under high density situations as a temporary tree. Sets a good crop on shaded limbs. Good insect resistance. Upright, strong tree form.						
Gloria Grande	48	44	Oct. 20	2	0.19	4
Gloria Grande is pollinated by Cape Fear, Desirable, Elliot, Shley and Stuart. Produces well as a mature tree. Nut quality is poor due to thick shell, inadequate filling and dark kernels. May develop "fuzzy" kernels. Susceptible to black pecan aphid. Good scab resistance in most locations.						
Kiowa	48	53	Oct. 21	3	0.65	2
Kiowa is pollinated by Cape Fear, Desirable, Pawnee and Caddo. May alternate bear as a mature tree. Quality often poor when crop load is heavy. Nuts strongly attached to stem, leading to difficulty with mechanical fruit thinning. Kernel color slightly dark. Better scab resistance in some locations than in others. May be more susceptible to mouse ear than other varieties.						
Moreland	61	52	Oct. 24	2	0.69	3
Moreland is pollinated by Desirable, Pawnee and Caddo. Alternate bears as a mature tree.						
Sioux	73	57	Oct. 23	4	0.64	3
Sioux is pollinated by Caddo, Cape Fear, Desirable, Pawnee and Oconee. Vigorous habit. Mature trees alternate bear, but kernel quality remains high when bearing a heavy crop. Good kernel color. Small nut size is a disadvantage.						
Stuart	55	46	Oct. 16	3	0.47	5
Stuart is pollinated by Cape Fear, Creek, Desirable, Elliot and Schley. Historically, Stuart is the most widely planted pecan variety in the southeastern United States. Marginal nut quality in most years. Often produces dry, fuzzy kernels. Susceptible to yellow aphids and the resulting sooty mold.						

¹ 1-5 scale with 1 = excellent resistance and 5 = poor resistance.

² 0-1 scale with 0 = no alternation and 1 = complete alternation, which would be no yield every other year.

³ 1-5 scale with 1 = very precocious (bears at early age) and 5 = non precocious (very slow to bear).

Table 4. Pecan varieties recommended for trial in Georgia commercial orchards.

Variety	Nuts/lb	Avg. % Kernel	Maturity Date	Scab Rating ¹	Alt Bearing ²	Precocity ³
Excel	45	49	Oct. 1	1	N/A	N/A
Early information available on Excel suggests that it has high resistance to scab. Excel is pollinated by Caddo, Creek, Cape Fear, Desirable, Oconee and Pawnee. Not enough information currently available to comment on alternate bearing or precocity. Nuts have thick shell and very bright kernel color.						

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