Pecan trees exhibit a strong tendency to produce a heavy crop one year, followed by one or more years of little to no production. This may best be characterized as alternate bearing with irregular symmetry. Alternate bearing is the most significant horticultural problem in pecan production.

Alternate bearing is caused by a biennial cycling in flowering that takes place at the shoot level but is recognized at the tree, orchard and regional levels. An interesting aspect of alternate bearing is that it occurs not just on an orchard level, but normally it is expressed throughout the production region. The result is that regional production will be high one year followed by a low year.

Alternate bearing is enhanced by biotic (e.g., aphid or scab) and abiotic (e.g., drought or nutrient stress) stresses. Cultural practices, such as annual fertilization, irrigation and pruning strategies can have pronounced effects on alternate bearing. Intensive management reduces the natural tendency of pecans to alternate bear; however, it does not eliminate it. Cultivars vary in their tendency to alternate bear. Typically, cultivars that yield the most in a short time after establishment have a greater tendency to be more severe alternate bearers.

In pecans, flowers that produce the following year’s crop are initiated in the shoots of the trees during the time of year when the current year’s crop is maturing. Therefore, stress to the trees during this time of year affects the next year’s crop. Unlike other fruit crops, pecan fruit mature late in the season, leaving little time for carbohydrate storage to occur before leaf fall. Carbohydrate reserves stored in the roots and shoots are utilized in the spring flush of shoot growth and in the terminally positioned female flower development. Flower initiation and development is controlled by interactions of several factors including overall tree health, carbohydrate reserves and a balance of plant hormones.

This irregular and often unpredictable production impacts all economic aspects of pecan production and...
marketing. Alternate bearing is typically associated with a lack of return bloom rather than flower or fruit abortion. Researchers have not yet discovered the causes of alternate bearing in pecans. There have been several theories for pecan alternate bearing, including stored carbohydrate, phytohormones or growth regulators, and nitrogen and/or potassium depletion during large crops. To date, many of these previous theories have been proven to not be the cause of alternate bearing in pecans, and further research is being conducted.