Peanut Irrigation Guide

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Peanuts are a challenging but profitable crop. In 2015, Georgia led the United States in peanut production, followed respectively by Alabama, Florida, Texas, North Carolina and South Carolina. Peanuts are also grown internationally in South Africa and other countries.

Regardless of region, irrigation plays an important role in production. It ensures peanut crops will receive adequate water when most needed. Rainfall is random and does not provide the consistency and control in water application needed to achieve high production and quality.

> "Irrigation is critical to achieve yield and quality especially in arid regions such as the Southwest."
>
> — Jason Woodward, Texas A&M University state peanut specialist

Peanuts undergo several growth stages. Understanding each stage and providing the correct amounts of water during those stages allows the crop to thrive. Depending on region and climate, peanuts typically require between 20 to 28 inches of water throughout the growing season (Lee & Lemon). In the high plains and rolling plains of Texas, 95 percent of peanut acres are irrigated, said Woodward. Irrigation is most critical during first bloom when the plant transitions from a vegetative to a reproductive phase.

Peanut growth stages:

Prebloom/Bloom

Peanut seeds must absorb 50 percent of their weight in water before germination can begin, so soil should be kept moist. After germination, vegetative growth begins and lasts for approximately 25-40 days. Blooms appear next, which signal the plant has reached its reproductive phase. Water stress at bloom can delay formation of flowers, extreme water stress can completely inhibit blooming (Lee & Lemon).

Pegging/Pod Set

Irrigation aids growth during this period by maintaining soil moisture and keeping soil temperature low. Adequate soil moisture is required for pegs to penetrate the soil and a cool soil temperature, between 68 and 80 degrees, also helps (Baughman et al., 2007). Consistent moisture should be available during this period. High moisture can improve calcium uptake necessary for pod filling.

Kernel Fill/Maturity

After approximately 105 days, limited growth occurs. The peanut crop's water requirements reduce; however, irrigation may still be applied on an as-needed basis. Dry weather promotes the development of spider mites as well as a fungus, Aspergillus flavus, which causes aflatoxin contamination. Irrigation can help negate these blights.

Many farmers use rough estimates of crop water needs to schedule irrigation. Figure 1 illustrates an estimate of water requirements throughout the peanut growth cycle based on historical data in Georgia, with a total seasonal requirement of 23 inches. If rainfall occurs, producers simply subtract rainfall received from the weekly water requirement.

In Texas, many peanut producers irrigate regularly from 45 days after planting until pod maturation, altering irrigation schedules only in the event that significant rainfall occurs, said Woodward.

Irrigation Scheduling and Management

There are several more precise ways to determine and manage peanut water needs. Most calculations require a measurement of evapotranspiration, ET. The amount of water transpired by plant and evaporated from soil equals ET, and that amount should be replaced by irrigation. ET is a function of many variables including solar radiation, wind, air temperature and humidity.

The checkbook irrigation methods compare irrigation to balancing a checkbook, where the soil is the bank account and water is added or taken away. Rain and irrigation are deposits, while water used by the crop and water evaporated from the soil are withdrawals. The

checkbook method can be used with sensors, or estimated with environmental observation and hand sampling of the soil (Melvin & Yonts, 2009). The goal is to estimate the amount of available water in the crop root zone and keep that amount congruent with the crop's needs throughout its growth cycle. Using formulas and coefficients, the checkbook method can help growers determine when and how much to irrigate. The checkbook method relies on key measurements:

- Estimates of current soil water balance and minimum available balance
- Soil texture & water-holding capacity of the soil
- Rooting depth

Current Soil Water Balance:
This is determined by using soil water sensors or hand-feel soil sampling. It determines a starting point for the checkbook method. This measurement should be taken every few weeks. If changes occur, the most recent soil water balance should be used.

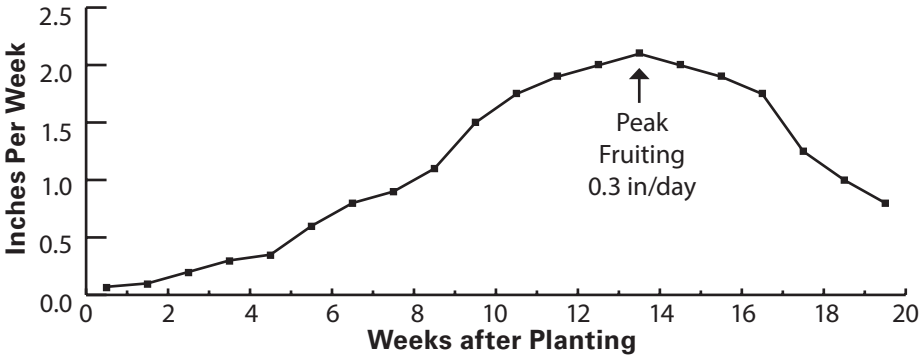
Minimum Balance:
The minimum balance refers to the lowest soil water content the soil should be allowed to have and is set by a management decision. This balance should be set high enough to prevent plants from experiencing water stress.

Soil texture:
Texture and water-holding capacity of soils vary depending on region. Peanuts grow best in well-drained sandy to sandy loam soil. Saline soils and soils with more than 20 percent clay of rocks will inhibit growth and harvest. (Dept. of Agriculture Forestry and Fisheries, 2010). Course-textured or sandy soils hold less water than fine-textures soils such as silt and loam, so sandy soils require more frequent irrigation.

Root depth:
Peanut rooting depth ranges from 1.6 to 3.3 feet (Smith, 2006). This area is considered the crop root zone. The depth of the active root zone increases as the plant matures. Peanuts grow best in well-tilled soil without compaction or other root-restricting layers.

Scheduling tools:
Depending on geographical region, a variety of tools are available to simplify irrigation

WEEKLY WATER USE BY PEANUT



University of Georgia Extension Peanut Team, 2016

scheduling for growers. These tools include online scheduling tools such as USDA's IrrigtorPro (http://irrigatorpro.org/farm/) and University of Florida's Peanut FARM (http://peanutfarm.org/). While such tools can provide a respectable return at little cost, soil sensors that detect soil/water ratio are recommended. In Georgia irrigation trials, soil sensors have consistently provided maximum yields (University of Georgia Peanut Extension Team). These trials spanned from 2014-2016, including years with both insufficient and abundant rainfall.

> "Irrigation helps you get a better grade and increases your yield. It removes your drought risk and also makes your land more valuable."
>
> — Henry Bamberg, South Carolina peanut producer

Whether producers choose the most precise, cutting-edge methods of irrigation scheduling or simply irrigate based on environmental observation and known crop data, production outcomes will generally outperform unirrigated acres.

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