Peanut Tissue Sampling

How to Sample

- Pull a representative sample. Do not sample end rows or next to gravel roads.
- Send leaf blade only for tissue analysis.
- Send at least a softball size amount of plant tissue for analysis.
- Ship as soon as possible in paper bags. NEVER use plastic bags.
- Ensure samples arrive within one shipping day. Never ship samples on a Friday.

When to Sample

A peanut tissue sampling program should correspond to important developmental growth stages or times of peak nutrient uptake.

Peanut Tissue Sampling Program:

Prior To Or At Bloom Stage: First mature tetrafoliate leaf from 25 plants.

Pegging To Harvest: First mature tetrafoliate leaf from 25 plants.

Dan Anco, Clemson University Peanut Specialist

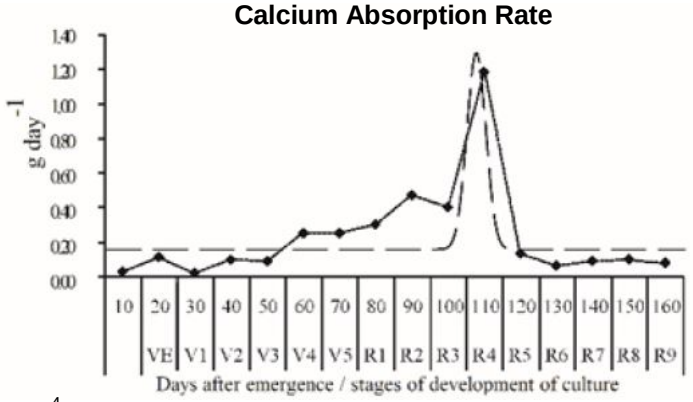
Bloom Stage

http://www.soilcropandmore.info/crops/Peanut/PGD.htm

Pegging Stage

- Proper pH between 6.0-6.5 is essential for optimal nutrient uptake.[3]
- Below 6.0 risks Zn and Al toxicity.
- Zn toxicity often occurs when soil test Zn levels are high and soil pH is low.[3]
- Above 6.5 risks Mn or B deficiency.
- Mo is an essential element in biological N fixation, and can be limiting at low soil pH.[1]
- Peanuts fix up to 264 lbs of N per acre through a symbiotic association with *Bradyrhizobium* bacteria.[4] Always apply a liquid commercial inoculant at planting.
- A peanut plant with 15 nodules on the tap root by 40 DAE has adequate nodulation.
- P and K should be applied to the previous crop by soil test to the high level.
- Excess K in the pegging zone can potentially interfere with Ca uptake and cause pod rot.
- Ca is critical for pod development and quality. Adequate Ca uptake increases yield and grade by reducing pod rot (*Pythium*) and preventing unfilled pods or "pops".[1]
- Ca can only enter the kernel by direct diffusion through the pod wall and adequate soil moisture is required for absorption. **Foliar Ca applications are not effective.**
- Critical period for Ca absorption begins about 20 days after pegs first enter the soil and extends for at least 40 days after that. The first 10 days of this interval are particularly critical.[2]

Calcium Absorption Rate



[4]Silvia, et al. Peanut Plant Nutrient Absorption and Growth, 2017

- If rainfall exceeding 5 inches occurs over a short period of time within a few weeks after gypsum is applied, consider applying a rate of 0.5 times the normal use rate to make sure sufficient Ca is in the soil during the entire period of reproductive growth.[1]

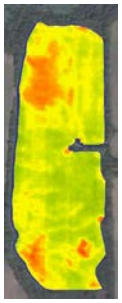
Peanut Tissue Samples

- To assess the need for supplemental Ca in **runner type** peanuts, soil samples should be taken before bloom to a 3 inch depth in the pegging zone.[3]
- If either 500 lbs/a (Mehlich I) Ca and Ca:K of at least 3:1 are not met, then apply 1,000 lb/a gypsum at early bloom stage.[3]

  Ca:K = Ca saturation (%) / K Saturation (%)
- Even if the above criteria are met, peanuts grown for seed should receive 1,000 lb/a of gypsum at early bloom and Virginia type peanuts should receive 2,0000 lb/a.[3]
- Yield reductions are more likely if Mn deficiency symptoms occur early in the growing season so early detection by tissue sampling and multiple sprays may be needed.[3]
- Soil application of Mn has been ineffective in providing this element to peanuts.[2]
- B plays an important role in kernel quality and flavor. Deficient kernels are referred to as having "hollow hearts" with the cotyledons being depressed and darkened so they are graded as damaged kernels.
- Since B is needed during kernel development, applications of B should be made at or immediately after bloom.
- 0.5 lb B/a is recommended, preferably split in 2 applications of 0.25 lb/a with early fungicide applications.[3]

Crop Notes

- Plant tissue nutrient levels should be maintained between the upper half of the sufficiency range for maximum yield. This helps prevent "hidden hunger" due to sampling and in-field variation.
- Nematodes, pH and fertility problems can be identified with NDVI imagery. For a diagnostic sample, take a soil and plant tissue sample from a "good" area and a "bad" area. Indicate on the submittal form that the additional soil tests accompany the tissue. If a plant-mobile deficiency is suspected, sample the lower leaves in both samples.



- Note that crop stress can impact nutrient levels in the plant. For example, too much or too little soil moisture will impact the crop's uptake of soil nutrients.

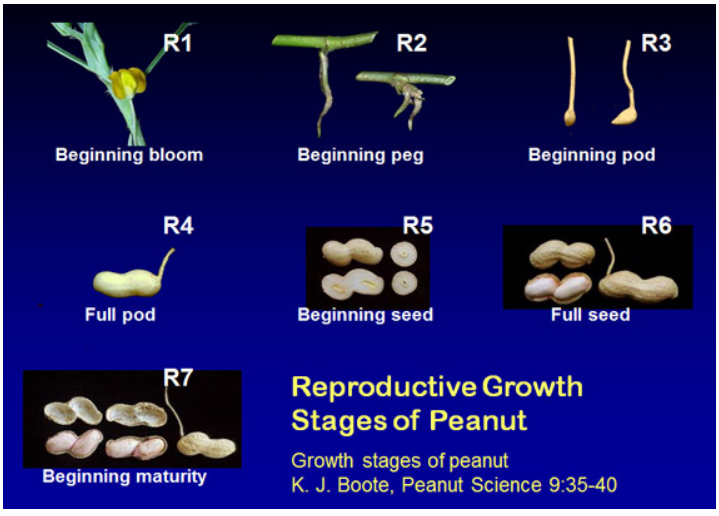
Staging Peanuts

- Peanuts grow when the average daily high and low temperature is above 56°F. (DD-56)
- Pod maturation generally ceases in the fall when night temps are in the mid- high 40s for two consecutive nights.

PEANUT GROWTH STAGES

Approx. days after planting*	Growth Stage	Description
7	Emergence	Seedling "cracking" the ground and cotyledons visible
35	Bloom (R1)	Half of the plants with a bloom
45	Peg (R2)	Half of the plants with a visible peg
50	Swollen peg (R3)	Half of the plants with a peg tip swollen to twice the peg diameter
60	Full size pod / begin pod-fill (R4 – R5)	Half of the plants with a full size pod (R4) and a visible seed beginning to form (R5)
75	Full size seed (R6)	Half of the plants with a seed filling the pod cavity
100	Early maturity (R7)	Half of the plants with a pod having interior hull color and orange to brown mesocarp
130 – 140	Harvest maturity (R8)	70% of harvestable pods have an orange, brown, or black mesocarp, with 30% in brown / black category. For runners, 75-80% in orange, brown, black; with 40% brown/black. (based on pod blasting)
150	Over-mature (R9)	Kernels in oldest pods develop tan-brown seed coat and pegs may have deteriorated; over-mature pods have coal-black mesocarp color.

Clemson Universtiy, Peanut Money Maker 2018 Production Guide, 2018.



[1] NC State Extension, 2018 Peanut Information
[2] Virginia Cooperative Extension, 2016 Virginia Peanut Production Guide
[3] University of Georgia Extension, UGA Peanut Production Quick Reference Guide, 2018