

Rhizoma Perennial Peanut¹

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Rhizoma perennial peanut (RPP), *Arachis glabrata*, is native to South America and is a relative of the common edible peanut, *A. hypogaea*. RPP has proved to be a forage legume available to Florida producers that combines high nutritive value (protein and digestibility) with persistence under a wide range of management conditions. Nutritive value of RPP is comparable to alfalfa, and RPP can be used for hay production, silage, or grazing, with dry-matter yields ranging between 3–6 ton/acre.

Although bright yellow to orange flowers are often present, most RPP selections evaluated produce essentially no seed. The main reproductive structures of RPP are the rhizomes (underground stems) that occur in a thick mat just below the soil surface. These rhizomes enable the RPP plants to tolerate a wide range of environmental stress, such as drought or periodic overgrazing, and account for the long-term persistence of the RPP stand. Some RPP stands in Florida have been cut for hay and/or grazed every year since they were established and are now over 25 years old without any loss in RPP stands. The rhizomes do limit RPP to the better-drained soils in Florida because the plants are not tolerant of saturated soil conditions for periods greater than one to two weeks.



Figure 1. Perennial peanut hay field.

Credits: Yoana Newman, UF/IFAS

The most planted varieties are Florigraze (PI 421707) and Arbrook (PI 262817), which were jointly released by the University of Florida, Institute of Food and Agricultural Sciences and the United States Department of Agriculture, Natural Resources Conservation Service Brooksville Plant Materials Center in 1978 and 1985, respectively. Florigraze has proved to be the more widely adapted variety, persisting under a twice-a-year hay cutting schedule as far north as Macon, Georgia, and it has been used for both hay production and grazing.

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Arbrook is more erect growing and can have higher dry matter production on well-drained sands of peninsular Florida than Florigraze. Arbrook is less tolerant to grazing than Florigraze and is usually used only for hay production. Also, Arbrook is less cold tolerant than Florigraze and should not be planted on heavy clay soils in north Florida above the peninsula.

UF Tito (PI 262826) and UF Peace (PI 658214) are two new rhizoma peanut cultivars released in 2011. Rhizome material of the new cultivars is being increased by producers who commercially sprig the vegetatively propagated perennial peanut.

Establishment

For producers interested in getting started with RPP, planting material and/or custom planting services are available from commercial sources. The Perennial Peanut Producers Association can provide a list of rhizome producers and commercial sprigger services as well as other products and services related to the RPP (<http://www.perennialpeanut.org/index.php>). Many producers have chosen to get into RPP by establishing a nursery area of 1–5 acres and using this area as their source of planting material as they steadily increase their acreage. There are several benefits to this system. Small nursery areas can often be located at sites where irrigation is available, which aids in the success of establishment. Use of homegrown nursery material cuts planting costs in half.

Planting Material and Rate

Because RPP produces essentially no seed, new stands must be vegetatively established by planting rhizomes. As with vegetatively propagated grasses, quality of the planting material is critical to successful and rapid stand establishment. The rhizomes are a storage system for the plant, and any energy produced in excess to that required for leaf and stem production is temporarily stored in the rhizomes.

Anytime top growth is removed as hay or by grazing, RPP plants draw from the energy reserves in the rhizome to support rapid regrowth of new shoots. When a RPP stand will be used for the production of planting material, the plants should not be cut for hay or grazed in order to maximize energy reserves in the rhizomes. Currently, there is no method to test energy reserves, so use the rules of thumb for managing planting-material sites. In general, the best-quality planting material comes from fields specifically managed for that purpose with no top growth removed for hay or by grazing for a minimum of two growing seasons

prior to digging. This system may be impractical for some producers; therefore, the following suggestions are given:

- Rhizoma perennial peanut that will be dug for rhizomes should have complete coverage the spring of the year before the rhizomes are dug.
- The peanuts should be well fertilized and limed, and all weeds should be controlled.
- The top growth of peanuts should not be cut or grazed after August 1 of the year prior to digging for either winter or summer planting.
- Top growth can be cut close for hay just prior to the first killing frost, or dead top growth can be burned during the winter to minimize problems when digging rhizomes.

The minimum planning rate is 80–100 bu/acre, and the rule of thumb is that 1 acre of well-managed nursery area produces enough rhizomes to plant 15–20 acres of RPP at this rate. If practical, higher planting rates should be used. Rhizomes can be dug using a potato digger or a bermudagrass sprig digger that is adjusted to maximize the length of the rhizome pieces. Good-quality planting material should have a lot of thick (0.25–0.3 in. diameter or greater), long (> 10 in.) rhizome pieces and noticeable numbers of RPP crowns (the portion of the plant that resembles the crown/taproot area of alfalfa). This type of planting material survives the longest after planting when soil conditions are dry.

Site Selection and Preparation

Rhizoma perennial peanuts are adapted to sites that have good surface drainage, which limits RPP plantings to the better-drained flatwood sites and the well-drained soils of the sand ridge and the panhandle areas of Florida. Prior to preparing the site for planting, soil samples should be taken to determine the pH and fertility level of the site. These levels should be adjusted according to soil-test recommendations during site preparation.

Studies have shown that the best RPP stands occur when the planting site is sprayed with a nonselective herbicide such as Roundup® (glyphosate) to kill the existing vegetation, especially bermudagrass, prior to the soil being rotovated or plowed and disked. For winter plantings, herbicide needs to be applied in the fall at least 2 weeks prior to the first killing frost. Less-complete site preparation generally results in fewer numbers of sprouts emerging and poorer post-emergence sprout survival when irrigation is not used. Lower sprout numbers usually result in a slower

rate of cover. All cleanly tilled planting sites should be rolled or cultipacked prior to planting to firm the plant bed.

Planting Methods

Planting material can be broadcast by hand or by using a ground-driven slinger, which is used to plant many of the grasses that do not produce seed. When hand-planting methods are used, the RPP material needs to be covered by disking. In addition to hand-planting methods, bermudagrass sprig planting equipment can be used. Regardless of the planting method used, the planting material should be about 1 inch deep on average. Planting too shallowly may cause the planting material to dry out prior to sprouting. If planted too deeply, the sprouts may not have enough energy reserves to emerge. The final step in the planting operation is to roll or cultipack the area.

Planting Date

When spring rainfall is plentiful after planting or when irrigation is used, late winter (January–February) planting dates result in high numbers of sprouts per square foot. These dates usually produce the most rapid rate of RPP cover, with > 60% ground cover of RPP occurring in as little as 6 months after planting. Late summer plantings (July–August) result in similar numbers of sprouts per square foot as winter planting, but because of the initially shorter growing season the first year, it takes at least 12 months to achieve > 60% RPP ground cover. An additional consideration with summer plantings is the need to remove the top growth on the planting material prior to digging. In most cases, it cannot be used for hay because the rhizomes should be dug as soon as possible after the top growth is removed. Any sprouts that emerge while the hay is allowed to cure will probably not survive the digging/planting operation and be wasted. The excess top growth could be removed and fed to livestock as green forage. Additionally, as with vegetatively propagated grasses, RPP planting material must not be allowed to dry out or go through hot weather prior to planting, so timing of the digging/planting operation in the summer is more critical than in the winter. At any planting date, rate of cover depends on the initial number of sprouts present, and years of experience with winter plantings have shown that sprout survival can be quite low due to the spring drought. Drought is likely to be a greater problem in peninsular Florida (areas south of Ocala) than in north Florida. Summer plantings may result in greater sprout survival because of better rainfall conditions. When deciding between the two planting times, producers must weigh the potential risk of low sprout survival because of drought following winter plantings vs.

the problems associated with handling planting material in the summer heat and the longer time to achieve > 60% RPP cover that occurs with summer plantings.

Stand Management after Planting

Competition by broadleaf weeds and grasses for light and moisture can also affect rate of RPP coverage. When a mixture of grass and peanut is not desired in establishing fields or nursery areas, there are grass-selective herbicides that may be applied to provide adequate control of annual and perennial grasses. See publication SS-AGR 261, *Weed Control in Perennial Peanut* at <http://edis.ifas.ufl.edu/wg216> for additional details on chemical weed control. Non-chemical methods for controlling weeds during establishment include cattle grazing and mowing. Cattle can be used to control the weeds in establishing Florigrade because of the spreading nature of newly planted RPP and its relative height difference with competing plants. Cattle can be turned into a RPP pasture and allowed to graze until they reduce pasture height down to the point where it might damage the perennial peanut foliage. Alternatively, the pasture can be topped with a mower to remove the taller weed growth and allow more light to reach the establishing peanut plants.

Rhizoma perennial peanuts have proved to be very efficient scavengers of soil nutrients because of their deep taproots, and in fertility studies, RPP has not consistently responded to different fertilizer applications. When grazed, annual applications of fertilizer may not be needed. Although, under high-production situations such as frequent hay cutting, soil-test recommendations for RPP production should be followed to ensure that adequate levels of phosphorus and potassium are present. Fertilization recommendations for perennial peanut are included in the *UF/IFAS Standardized Fertilization Recommendations for Agronomic Crops*, available at <http://edis.ifas.ufl.edu/ss163>.

Production Systems with RPP Hay

Rhizoma perennial peanut makes a very palatable hay that is liked by all classes of livestock. The current recommendation in Florida is for three hay cuttings per year as a compromise between yield and quality. This recommendation is based on simulated hay production trials, where it has been found that leaf content of the harvested material declines from 93% to 72% as harvest interval increases from 2 weeks to 12 weeks. This decline in leaf content corresponds with a decline in CP from 21.9% to 14.7% and an in-vitro

digestibility decline from 74.3% to 64.8%. There is no difference in dry matter yield after 6 weeks of regrowth.

Stubble height has been shown to be critical to persistence of RPP stands on flatwood sites in South Florida. Raising the cutting height from 1 inch to 4 inches improved root mass and cover after 4 years of harvesting and did not affect yield or forage quality. Based on these findings, a 4-inch stubble height is recommended to ensure persistence of RPP stands planted on flatwood sites. Lower stubble heights can be used on well-drained fields and may result in slightly higher hay yields.

In Florida's humid climate, curing legume hay is sometimes difficult. A producer should be prepared to save a hay cutting as conventional chopped silage or as roll-bale silage when necessary. Under intensive hay production systems, grass encroachment, particularly common bermudagrass, may be a problem. Premium prices are paid for weed-free, well-cured RPP hay, which can compete with alfalfa for the horse and dairy markets. Rhizoma perennial peanut hay that has been rained on or has significant amounts of grass or broadleaf-weed contamination is suitable for beef cows.

Grazing

Maximum forage yields are achieved when RPP is rotationally grazed, but RPP can be continuously grazed if carefully managed. When rotationally grazed, the stand should be grazed to a stubble height of about 4 inches. Then the stand should be rested for about 5–6 weeks before it is grazed again. If continuously grazed, average stubble height should be maintained at no less than 6 inches throughout the growing season.

Rhizoma perennial peanut is one of the few types of forage produced in Florida with a nutritive value high enough to promote a weight gain of 2 pounds per day in stocker cattle without supplements. Steers finished to slaughter weight directly on RPP without any additional feed have had yield and quality grades similar to feedlot-finished cattle. Additionally, the carcasses of RPP-finished cattle are not discounted for yellow fat.

These types of gains in young, growing beef cattle indicate that the nutritive value of RPP may exceed the nutritive requirements of most beef cows. This, combined with the high cost of establishing RPP, has prompted other methods of using RPP than conventional grazing systems with beef cows. These systems include creep grazing of nursing calves during the summer and limited feeding of RPP hay to beef cattle as a winter supplement.

In creep grazing trials, calves with access to RPP gained more weight than those with access to only bahiagrass. Studies showed that when RPP hay was fed limitedly on a protein equivalent basis, it could substitute for commercial protein supplement. Cost of this “homegrown” supplement was equal to or less than the commercial protein supplement depending on the production cost of the hay. In addition to beef cattle, other types of livestock, including dairy cattle, goats, and horses, performed well when either grazing RPP pasture or when fed RPP hay.