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## Guide To Using Perennial Peanut As A Cover Crop In Citrus<sup>1</sup>

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### Introduction

Rhizome perennial peanut has several potential advantages over grass as a cover crop in citrus grove row middles. As its name implies, perennial peanut is long-lived and doesn't require replanting once established. It is well adapted to the droughty, infertile, sands of Florida. It is a legume that, in association with *Rhizobium*, fixes atmospheric N. This means that it requires no applied external nitrogen source. Phosphorus applications may be unnecessary in Florida sands rich in P. It is highly resistant to plant and soil pests. Like other cover crops in citrus, perennial peanut may suppress weed growth, reduce nutrient leaching and add nitrogen and organic matter to the soil. On the other hand, all cover crops have the potential to compete with trees for water and nitrogen and to reduce air temperatures on cold nights. More information about the perennial peanut and its establishment and maintenance follows.

**Scientific name:** *Arachis glabrata*, Benth

**Origin:** Tropical South America

**History:** The perennial peanut evolved under tropical conditions and is adapted to subtropical and warm temperate climates. In the northern hemisphere, this would include locations below 32° north latitude which have a long, warm growing season.

**Importance:** Perennial peanut is used as a forage legume for grazing, as a high-value hay crop, and has been planted as a cover crop in citrus. Several cultivars are available for use in citrus, but information is lacking on production and development in South Florida.

### Pre-Planting Considerations

**Climatic Information:** Perennial peanut grows best in Florida in full sun and when days are long, hot, and humid. Perennial peanut will persist in partial shade with little or no mowing but production and ground cover will be reduced. Irrigation has proven beneficial during establishment in droughty springs.

**Soil:** Perennial peanut persists in a variety of well-drained soil types and does well in the deep sands of Florida. In northern production regions, clay soils with excess moisture may freeze during

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prolonged periods with temperatures below 32°F. Rhizomes (modified underground stems) located in the zone of frozen soil will be killed. Due to the slow spread of rhizomes in clay soils, the selection of a well-drained soil for planting is particularly important in northern production regions. Perennial peanut has had mixed success in reclaimed phosphatic, highly colloidal clay soil in south central Florida.

**Nutrient Management:** Since perennial peanut is a legume with nitrogen-fixing capability, it does not require the application of nitrogen fertilizer. Soil tests should be made prior to planting to determine need for other nutrients. When the Mehlich-I soil test level is below 30 ppm P, apply 30 pounds  $P_2O_5$ /acre. Do not apply phosphorus fertilizer when the soil tests above 30 ppm P. Potassium should be applied at 60 pounds  $K_2O$ /acre when the Mehlich-I soil test level is below 20 ppm K, and zero potassium fertilizer is recommended when the soil tests above 20 ppm K. Apply 15 pounds magnesium per acre if the Mehlich-I soil test level is below 30 ppm Mg. Nutrition should not be a production-limiting factor on soils with Mehlich-I soil test levels near those suggested. Perennial peanut performs well under a wide range of soil pH. Modify soil pH only if measured pH is outside the range of 5.0 to 7.5. Research has shown that perennial peanut responds positively to applied sulfur at 20 to 30 pounds per acre of the sulfate form per year.

**Weed Control:** Weed problems can be reduced if the production site is carefully selected and prepared prior to planting. Recently-cleared woods, ie. new ground, usually offer a relatively weed-free setting and naturally-accumulated fertility. Poorly-managed weedy areas or old pasture land may require preparation six months or more prior to planting to achieve proper weed control, fertility level, and a well-prepared seed bed. Soils with known disease or nematode incidence do not negatively affect perennial peanut. If perennial broadleaf weeds or grasses are present before planting, use of a herbicide, such as Roundup®, should be considered.

## Planting Material (Rhizomes)

**1. Cultivars:** Florigraze and Arbrook, described in Florida Agricultural Experiment Station Circulars

S-275 and S-332, respectively, were the first two commercial cultivars available. Florigraze, released in 1978, occupies the greater acreage and is well adapted to most well-drained soils in Florida. Arbrook, released in 1986, is recommended for droughty, excessively-drained sandy soils with warm winter temperatures, such as those that occur in peninsular Florida. Arbrook emerges and survives better than Florigraze following planting under dry soil conditions. However, Florigraze spreads laterally more quickly than Arbrook. Arblick and Ecoturf are more recently available varieties being considered for landscape use. Both arlick and Ecoturf were selected for landscape application, due to their lower growth habit, and as a result would fit well as a cover crop in citrus groves where hay harvest is not anticipated. However, planting material for Arblick and Ecoturf is presently not as available as the forage types.

**2. Source:** Perennial peanut is propagated vegetatively using rhizomes (modified underground stems) that concentrate in a 1.5- to 3-inch thick mat, just below the soil surface. Planting has normally been recommended during January-February in north and central Florida, and perennial peanut has been found to establish well when planted during the summer rainy season (July-September) in south Florida. Growers should locate rhizome sources and planting equipment, or contact individuals who can provide a turn-key job to plant well ahead of the anticipated planting date.

**3. Rhizome Harvesting:** Rhizomes are removed from the soil mechanically with a sprig harvester and planted as individual rhizome pieces or as various sized sod pieces with a sod lifter. The method used should result in individual rhizome pieces at least nine inches long with minimal damage from the digging process. Rhizomes should be planted as soon after digging as possible. Rhizomes cannot be stored for more than five days without deterioration, even under the best conditions. Rhizomes should be stored in a shady, cool location and covered with black plastic or a tarp to prevent drying. Aeration should be provided. Rhizomes that are being transported should be covered with a tarp to prevent drying.

## Planting

**1. Time for Planting:** The best time for planting is January through March when peanut is in a quiescent growing state. Winter-planted material emerges from late March to early June, which coincides with low rainfall over most of Florida. Normal spring rains are important for proper root and top development. When soil moisture is low, a percentage of shoots will die due to lack of supporting roots. Irrigation during this initial development period provides insurance against plant loss or complete stand failure. Once a root system has developed, irrigation is not required. If enough plants survive to leave at least one plant every three feet in every direction, complete coverage may be obtained by the end of the second or third year. Although winter is usually the best time to plant perennial peanut, planting may be successful anytime if irrigation is available, or during the summer rainy season in south Florida. Citrus row middles are best planted when establishing a new grove or within one or two years after tree planting.

**2. Planting rate:** If rainfall is satisfactory, a winter planting can provide complete ground coverage in one to two years, using a planting rate of 80 bushels (100 ft<sup>3</sup>) of rhizomes per acre. Under drought and other stresses, such as high weed population, a higher planting rate of 100-120 bushels (125-150 ft<sup>3</sup>) may be desirable to account for plant loss and increase competition. In order to achieve the same ground coverage with Arbrook and Florigrade rhizomes, 25 percent more Arbrook rhizomes should be planted. The reason for this is: a bushel will contain more Florigrade rhizomes than Arbrook rhizomes, and Arbrook grows laterally at a slower rate than Florigrade. Water, fertilizer, and weed control are all important inputs that can maximize plant population during the first growing season.

**3. Planting Methods:** Several systems can be used for planting rhizomes. A Bermuda sprig planter is most commonly used. This planter opens furrows, places rhizomes in the furrows at a determined rate, closes furrows and packs the soil. The fairway type sprig planter is relatively new. It replaces the opening of furrows with two gangs of closely-spaced, blunt-edged rolling disks that push rhizomes into the soil at a prescribed rate and planting depth. This system of planting achieves adequate plant

distribution, but a percentage of rhizomes will not be completely embedded into the soil and will be lost due to drying. Rhizome pieces can be hand-planted by placing them in furrows and covering them. Rhizome pieces can also be broadcast and disk-harrowed into the soil. However, due to the inaccuracy of depth control with the broadcast-disk method, the planting rate should be increased by 25 percent. Whatever planting system is used, rhizomes shouldn't be placed more than 1.5 to 2 inches deep. Planting should be followed by a packing-roller that leaves the field leveled, preserves soil moisture and achieves good rhizome-soil contact. The distance between planted rows of sprigged material will vary with the equipment used, but 18-24 inches will result in a first season coverage, if other factors are not limiting. Coverage time usually will decrease as distance between rows decreases. Like all legumes, perennial peanut obtains its nitrogen from *Rhizobium* species bacteria associated with the plant's root system. Because perennial peanut is propagated by rhizomes that carry the bacteria, it isn't necessary to inoculate the rhizomes at planting under normal conditions.

**4. Planting Costs:** The cost of establishing perennial peanut can range from \$200 to \$500 per acre. That is expensive when compared with other forage crops. Citrus tree row middles have been planted on turn-key job contract for under \$250 per planted acre in citrus. Planting cost is based on actual planted land; thus, two to three acres of citrus grove may be planted when planting an acre of tree row middles.

## Post-Planting Management

**1. Sand Blast:** Late winter and early spring winds can cause significant sand blast damage to new emerging plants in open fields or newly planted groves without vegetation. Severe sand blasting can completely kill all top growth. However, since the rhizomes are not exposed, the plants will regenerate and new vegetative top growth will occur.

**2. Irrigation:** Adequate soil moisture is critical from the time of shoot initiation from the rhizome until a supporting root system develops. When soil

moisture is low, the application of water ensures plant survival and growth. Soil-plant moisture status should be carefully monitored during the spring months following planting.

**3. Weed Control:** Weed control is the major management practice during the first and possibly the second growing season. Eliminating competitive weeds ensures greater survival during the dry months prior to summer rainfall and allows the plants to grow and spread more rapidly. Keeping the perennial peanut canopy clear for maximum sunlight penetration is critical to proper development and speeds establishment of the peanut cover crop. Whenever possible, mow weeds at a level just above the foliage of the developing peanut. Mowing should be done whenever weeds are shading the peanut. Mowing has been found to be the least expensive weed control method. Other weed control methods do not appear to reduce establishment time. For grassy weeds such as crabgrass, bermudagrass and bahiagrass, Fusilade®, Poast®, Select®, and Prism® herbicides are cleared for use during establishment. However, forage should not be harvested in any form for up to one year following application. When Select® and Prism® herbicides are applied at recommended rates forage can be used if not harvested for least 40 days. Basagran® is effective for control of yellow nutsedge as well as a few other select broadleaved weeds. It is approved for use on perennial peanut during establishment, but no forage should not be harvested within one year following application. Herbicide recommendations in this report are contingent upon their continued registration by the Environmental Protection Agency. If a registration is canceled, the herbicide will no longer be recommended. The use of product trade names does not constitute a guarantee or warranty of the products named and does not signify approval to the exclusion of similar products.