

Perennial Peanut as a Potential Living Mulch and Nitrogen Source for Citrus and Other Orchard Crops in Florida¹

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Introduction

The concept of using perennial peanut as a perennial cover crop or groundcover and as a source of biological nitrogen (conversion of atmospheric nitrogen into ammonia by the microbes) in fruit and nut crop orchards is not a new concept. In Central and South America, perennial peanut has long been utilized as a groundcover in perennial cash crops, such as palm, coffee, cacao, plantain, and citrus, as well as in other fruit and nut production orchards. Living mulch is another term given to a cover crop that overlaps for part or the entire season of a cash crop. Perennial peanut can also be considered a green manure crop if the clippings are returned to the soil.



Figure 1. (a) Flowering of *Arachis glabrata* 'Ecoturf' in a north Florida turf field, (b) palm plantation with *A. pintoii* living mulch, and (c) *A. glabrata* as a living mulch in a citrus grove in north Florida.

Credit: Muhammad A. Shahid, UF/IFAS

This publication provides an overview of the use of perennial peanut as a groundcover and nitrogen fertilizer source (green manure) for cold-hardy citrus and nut tree production, particularly in north Florida. The audience includes county and state Extension faculty, growers, homeowners, and students who are interested in perennial peanut.

As members of the Fabaceae family (legumes), various *Arachis* species are capable of dinitrogen fixation (conversion of atmospheric nitrogen N₂ into ammonia). Dinitrogen (N₂) is the form where two molecules of nitrogen are linked with each other. About 78% of the atmosphere consists of dinitrogen. "Rhizoma" perennial peanut (*Arachis glabrata* Benth.), like *A. hypogaea* L. (groundnut), is a member of the *Arachis* (peanut) genus, but in nature, it produces few nuts (seeds). Typically,

rhizoma perennial peanut has been utilized in Florida as a high-quality, warm-season, hay crop, nearly comparable to alfalfa, and is vegetatively propagated by rhizomes (similar to propagating bermudagrass sprigs). In addition to *A. glabrata*, there is a stoloniferous type, *A. pintoii* Krapov. & W.C. Greg. ("pintoii peanut"), which is recognized as a seeded type, propagated either by seed or vegetatively from stolon (horizontal plant stem or runner that takes root at points along its length to form new plants) cuttings.

The *Arachis* genus contains many other species, most of which have not been fully exploited in the southern United States. Rhizoma and pintoii types are currently the most widely planted peanut species used as groundcovers in cold-hardy citrus and other fruit and nut orchards, grown in sandy soils in Florida and throughout much of the Southeastern Coastal Plain (approximately latitude 32° to 34° north). We estimate that over 1,000 acres of citrus and pecan orchards currently use perennial peanut as groundcover for ease of maintenance, aesthetics, ecosystem services for pollinators, and as a biological source of nitrogen.

Ecosystem Services

The term ecosystem services refers to "the benefits that ecosystems and their inhabiting species provide to humans" (Charles 2023). Examples include nutrient cycling, habitat and food for pollinators, water purification, and aesthetics (Dubeux 2018). More specifically, perennial peanut provides flowers for the pollinators and improves pasture forage quality, such as crude protein and digestibility. It is also a great substitute for grass ground covers, as it requires little to no nitrogen fertilizer or pesticide inputs. Citrus field trials have shown that perennial peanut alley plantings improved soil fertility and minimized soil erosion.

Green Manure Contribution

Perennial peanut is a dinitrogen-fixing legume that can be used as a perennial green manure crop in citrus production systems. When grown in citrus row middles and within the tree row in south Florida, it has been observed that perennial peanut adds up to 100 kg N/ha (nitrogen per hectare) to the trees via its mowed clippings. This results in potentially greater quality citrus fruit while reducing commercial nitrogen fertilizer inputs compared to groves with no perennial peanut.

Cultivars

Most perennial peanut types are native to tropical and subtropical South America. Many collections were made and introduced into the United States from Brazil, Paraguay, Argentina, and Columbia. Since the 1930s, a small number of perennial peanut cultivars have been released by the University of Florida and the University of Georgia (Table 1).

Florida Adaptation

Perennial peanut is best adapted to areas in Florida that receive full sun, but it also does well in partially shaded areas, such as fruit or nut orchards. It thrives in a variety of well-drained, sandy soil types. The first fall frosts will usher in perennial peanut (*A. glabrata* and *A. pintoii*) dormancy. Leaves and stems will brown and eventually abscise. Some minor regrowth may be stimulated by a series of warm days, but earnest regrowth will not likely resume until late February to early March in north Florida, depending on temperature. In areas further south that do not receive frosts, plant growth will often subside, due to shorter days, but the canopy will remain green and retain its leaves.

Somewhat lower-growing cultivars require less mowing (every four to eight weeks) than most grass alley groundcovers. For orchard establishment, ‘Ecoturf’, ‘Arblick’, ‘Waxy Leaf’, ‘Pointed Leaf’, and ‘Cowboy’ cultivars are recommended.

Once established, rhizoma perennial peanut is drought tolerant. However, pintoii peanut types are not, and they generally require establishment on wetter sites or irrigated orchards, which are more commonly associated with south Florida growing conditions.

Fertilization in Orchards

Perennial peanut tolerates pH from 5.0 to 6.5. However, there is anecdotal evidence of rhizoma perennial peanut tolerating a somewhat wider pH range. Perennial peanut as groundcover in orchards does not require nitrogen fertilization; the rhizoma perennial plant fixes its own nitrogen through association with the nodule-forming *Bradyrhizobium* bacteria, thus making supplemental nitrogen fertilizer unnecessary. Nodule-forming bacteria are plant beneficial microbes, which develop a symbiotic relationship with the plant roots to improve the availability of nitrogen through atmospheric nitrogen fixation. There are few reports of fertilizer deficiencies, and as long as the clippings are allowed to return to the soil, fertilization frequency will likely be rare, if at all. Find phosphorus and potassium recommendations in EDIS publication [#SL129](#). Generally, 30 lbs P₂O₅/acre and 60 lbs K₂O/acre, respectively, are recommended if the soil tests low or medium.

Pests

Perennial peanut cultivars are resistant to a variety of pests. Occasionally fungal infections, such as peanut rust or pepper spot may occur in plantings that are not routinely clipped (at least every eight weeks). No known diseases are transmitted from perennial peanut to any variety of fruit or nut crops. There are also few insect problems associated with perennial peanut. Occasionally, armyworms, grasshoppers and thrips have been spotted but have caused no economic impact.

Weed Control

When establishing perennial peanut, it is important to start with a clean seedbed by clearing existing alley vegetation, unless establishing into an existing sod within the orchard. Perennial peanut establishes slowly (typically two years), so elimination of competitive weeds is necessary. It is important when using herbicides on perennial peanut that they are approved for the cash crop, as well. For guidance on herbicides suitable for perennial peanut, see EDIS publication [#SS-AGR-261](#). For orchard establishment, the most effective and safe way to control weeds during perennial peanut establishment might be through occasional mowing (1- to 2-inch stubble height) or with spot spraying.

Conclusion

Perennial peanut use as a groundcover in orchards provides an environmentally friendly and aesthetically pleasing approach to reducing mineral nitrogen fertilizer applications. It is already considered an acceptable practice in citrus groves. As environmental concerns related to minimizing fertilizer use increase, perennial peanut (rhizoma and pinto types) might also be a viable groundcover option in other species of Florida fruit and nut production orchards.

References

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Table 1. Perennial peanut cultivars and germplasms released in the United States.

Cultivar/germplasm	Description
'Arblick'	Collected near Bela Vista, Brazil. PI 658528 released as a germplasm in 2008. Low-growing "groundcover" type, slow to establish.
'Arbrook'	Developed from germplasm collections from Paraguay. PI 262817 released in 1985. Recommended for droughty soils with warm winter temperature, not tolerant of poorly drained soils. Erect growth, thick stems, and distinctive larger rhizomes.
'Cowboy'	Collected from volunteer clone in Tifton, GA. PP-1. Originated from either a superior genetic recombination or outcross from an <i>Arachis glabrata</i> introduction. Most closely related to 'Florigraze'.
'Ecoturf'	Collected near Bela Vista, Brazil. PI 658529 released as a germplasm in 2008. Low-growing, quick to establish, and tolerant of grazing. Susceptible to peanut stunt virus, peanut rust, and powdery mildew.
'Florigraze'	Possible outcrossing between two plant introductions or a vigorous seedling from 'Arblick'. PI 421707 released as a cultivar in 1978. Intermediate growth habit, susceptible to peanut stunt virus, and powdery mildew.
'Latitude 34'	An introduction from Paraguay. PI 658497 released as a cultivar in 2009. Upright habit and developed for cool, dry climates. Persistent up to latitude 34° north.
'UF Peace'	An introduction from Paraguay. PI 262839 released as a cultivar in 2008. Upright habit, high DM (dry matter) yield.
'Pointed Leaf'	From Brazil. Introduced in 2002 (NRCS#9056068). Low-growing, produces many flowers. Also called "Brooksville 68 germplasm".
'UF Tito'	An introduction from Paraguay. PI 262826 released as a cultivar in 2008. Upright habit, high DM yield. Named in honor of Dr. Edwin C. "Tito" French, the late associate professor of Agronomy at UF.
'Waxy Leaf'	Collected from Corrientes, Argentina. Introduced in 2002 as PI 262801. Low-growing, producing few flowers and seeds. Also called "Brooksville 67 germplasm".
*PI: Plant Introduction Number assigned to all new plant species for their easy identification.	

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