

## *Cultivar and Germplasm Release*

### **RELEASE OF 'HENORICO' RHIZOMA PERENNIAL PEANUT (ARACHIS GLABRATA BENTH.)<sup>1</sup>**

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Rhizoma perennial peanut (RPP) is a warm season legume introduced into the U. S. from Brazil and Paraguay (Valencia et al., 1997). It does not produce a significant amount of seeds and reproduces through rhizomes. Two cultivars, Florigraze (Prine et al., 1981) and Arbrook (Prine et al., 1985) have been released for commercial use in Florida. At present there are more than 8,000 ha of these cultivars planted in the U. S., mostly in Florida and south Georgia. These rhizoma peanut cultivars are used mostly for hay production.

Unlike most forage legumes, such as alfalfa (*Medicago sativa*), rhizoma peanut is productive and persistent over a wide range of soil types and management practices in the tropics. Commercial cultivars persist perennially in well drained soils. It is considered environmentally friendly because once established it requires little or no application of fertilizers and pesticides. In addition, it can be of great value for erosion control.

Rhizoma perennial peanut has demonstrated a nutritive value higher than that of tropical grasses. Crude protein concentration varies from 13 to 18% for various rhizoma peanuts, including Florigraze, Arbrook, and accessions 262826 and 262839, when evaluated in the tropics (Ruiz and Cancel, 2003). Mean in vivo digestibility of Florigraze peanut was between 61.7 and 64.4% when fed to Holstein heifers (Romero et al., 1987).

Forage of rhizoma peanut is of high quality and can be fed to horses, dairy cattle, beef cattle, goats, sheep, and rabbits. Daily gain of beef steers grazing Florigraze rhizoma peanut over a three-year period was 0.93 kg (Sollenberger et al., 1989). Bodyweight gain obtained with rhizoma peanut was more than double that obtained from Bermudagrass pastures. In general, RPP can be grazed with good persistence over a relatively wide range of grazing management practices (Ortega et al., 1992). It can be harvested to make good silage and excellent hay. Rhizoma perennial peanut hay is considered a good substitute for imported alfalfa hay.

#### *Botanical Description*

Plants of Henorico have a maximum height of approximately 36 cm. The stem is usually as tall as the plant; stipules are narrowly linear, up to 3 cm long, ciliate, pilose at the base; leaflets two pairs oblong to elliptic 4.8 cm long, 1 to 1.5 cm wide, mucronate at apex. Flowers are bright yellow. This plant was originally introduced from Paraguay—USDA PI No. 276233. Rhizomes from cultivar Henorico were introduced into Puerto Rico in 1989 by the Tropical Agriculture Research Service (USDA-ARS) in Mayagüez.

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### Management

Like all rhizoma perennial peanuts, Henorico does not produce seeds and depends on the harvesting and planting of rhizomes for propagation. One hectare of peanut produces enough rhizomes to establish approximately 20 to 30 hectares. When planted in rows, at 0.76 m between rows, full plot establishment of Henorico was achieved at six months (Ruiz et al., 2000a). When planted at a distance of 1.5 m between rows, establishment was achieved at eight months after planting. Henorico achieved significantly higher lateral spread than the average of that of nine accessions and Florigraze and Arbrook (2.8 vs. 2.0 m) after a 16-month growing period (Valencia et al., 1997).

Weed control is needed for a successful RPP establishment. A competition-free growing zone promotes above- and below-ground plant development, which in turn shortens the time required to complete establishment (French et al., 2001). Canudas et al. (1989) and Ruiz et al. (2000a) reported that rhizome peanut ground cover development was faster when both grass and broadleaf weeds were controlled in the first year of planting.

Imazethapyr applied at a rate of 0.07 kg ai/ha and dimethenamid applied at a rate of 1.68 kg ai/ha were used in a herbicide trial with Henorico conducted at Juana Díaz Substation of the Agricultural Experiment Station of the University of Puerto Rico, in a San Antón soil (fine-loamy, mixed, isohyperthermic Cumulic Haplustols). Both herbicides gave good control of broadleaf weeds and purple nutsedge (*Cyperus rotundus*) during the first month post-planting. Dimethenamid, however, controlled grasses better than imazethapyr. The lower effectiveness of imazethapyr in controlling grasses was related to the reduced control of junglerice (*Echinochloa colona*), the most common grass at the trial site. The postemergence application of bromoximil (broadleaf herbicide) at 0.28 kg ai/ha and clethodim (grass herbicide) at 0.28 kg ai/ha gave excellent weed control (92%) in the Henorico plots during the first two months post-planting. At five months after planting, plots receiving preemergence application of dimethenamid at 1.68 kg ai/ha, followed by postemergence applications of bromoximil and clethodim, showed excellent weed control. This herbicide sequence resulted in the highest rhizoma peanut dry weight and the least weed dry weight. Throughout the study, the most common weeds were *Thrianthema portulacastrum* (horse purslane), *Euphorbia heterophylla* (wild poinsettia), *Portulaca oleracea* (common purslane), junglerice and purple nutsedge. These results suggest that dimethenamid at the rate of 1.86 kg ai/ha is a good herbicide for weed control in perennial peanut, whereas imazethapyr may be considered for areas in which junglerice is not a problem. Application of glyphosate using a Rotowiper® at a 20:1 rate is one alternative for controlling weeds after peanut establishment.

Because Henorico is the tallest of the rhizoma peanut cultivars thus far evaluated in Puerto Rico and because of its high yield under irrigation, it is well suited for hay production. Thus, it is recommended primarily for this purpose.

### Pests and Diseases

Since the introduction of Henorico, there have been no insect or nematode pests causing significant damage to it in the field. Two episodes of leaf scorch caused by the fungus *Leptosphaerulina crassiasca* were observed in the spring under cool and excessively wet and humid conditions. Once these conditions subsided, the rhizoma peanut field recuperated quickly. These infections lasted for about three to four weeks and occurred over a period of about 10 years.

### Dry Matter Yield

When grown in an Oxisol (Typic Hapludox) without irrigation, cultivar Henorico had the third lowest fresh rhizome yield among 10 accessions and two cultivars after an

eight-month establishment period (Valencia et al., 1997). However, its forage dry matter (DM) yield was the third highest at a 12-week harvest interval, whereas at a six-week interval its DM yield was the fifth lowest.

In another trial (Ruiz et al., 2000b), yield of cultivar Henorico was evaluated when grown in a San Antón soil (fine-loamy, mixed isohyperthermic, Cumulic Haplustolls) under irrigation. Dry matter yield at six-, nine-, and 12-week intervals was highest for Henorico among four accessions and cultivars Florigraze and Arbrook (Ruiz et al., 2000b). Results showed that Henorico appeared to have a reduced growth after nine weeks of harvesting. Mean DM yield under experimental conditions was higher than 25,000 kg DM/ha for a full 12-month growing season. In the tropics, spring and summer are the seasons of greater productivity with yields on average of twice that during fall and winter. Henorico showed great adaptability and high yield when harvested at regular intervals under irrigation.

*Nutritive Value and Forage Quality*

Although high yielding, Henorico had the lowest crude protein concentration among four accessions and cultivars Florigraze and Arbrook (Table 1), at 14.7% averaged across the two harvest intervals at six and nine weeks (Ruiz and Cancel, 2003). The highest crude protein (CP) concentration tended to occur during spring and summer (seasons of highest yield). On the other hand, neutral detergent fiber (NDF) concentration of Henorico was the highest when averaged across three harvest intervals. Only at the nine-week interval was the NDF concentration not different among the six lines of RPP evaluated.

Typical range values for calcium, phosphorus, and potassium concentrations of RPP planted in the tropics are 2.2 to 2.6; 0.30 to 0.35; and 2.0 to 2.1%, respectively. Mean concentrations of calcium for cultivar Henorico were lower than those for Florigraze. Phosphorus and potassium concentrations were not different when grown under similar conditions in Puerto Rico.

In vitro true DM digestibility (IVTDMD) was evaluated at six-, nine-, and 12-week harvest intervals. Even though digestibility of Henorico was numerically the lowest, differences were not statistically significant (Ruiz, 2003). Average IVTDMD of cultivar Henorico was around 65% at the six- and nine-week intervals. The IVTDMD of Henorico and other rhizoma peanuts appears to be independent of DM yield and chemical compo-

TABLE 1.—Crude protein (CP) and neutral detergent fiber (NDF) of ‘Henorico’, three accessions (USDA PI Nos. 262826, 262833, and 262839) and two commercial cultivars (Florigraze and Arbrook) of rhizoma perennial peanut (RPP) harvested at three intervals during a full year.

RPP Genotype	Harvest Interval					
	6-wk		9-wk		12-wk	
	CP	NDF	CP	NDF	CP	NDF
‘Henorico’	15.4	49.6	14.1	50.9	13.6	52.7
262826	19.4	48.3	16.9	50.8	15.8	52.9
262833	17.7	48.0	17.1	51.1	16.1	52.4
262839	18.4	46.0	17.2	49.7	16.3	51.0
‘Florigraze’	17.4	48.0	15.8	51.0	15.3	51.2
‘Arbrook’	17.3	47.1	16.2	51.7	15.7	50.7

sition differences. This finding is evidenced by the fact that Henorico had the highest dry matter (DM) yield and NDF concentration and lowest CP concentration despite a lack of significant differences in IVTDMD.

Hays of Henorico and Bermudagrass were fed to young rams to determine forage intake and *in vivo* DM digestibility. Both hays were harvested when forage was about eight to nine weeks old. On average, intake of DM and organic matter (OM) was 37.2 and 35.3% higher, respectively, for Henorico than for Bermudagrass. Also compared to that of Bermudagrass, the digestibility of DM, OM, and ADF was higher for Henorico by 20.9, 17.8, and 18.9%, respectively. The OM digestibility of Henorico was 59%. Feeding Henorico resulted in a 65.9% increase in the digestible DM consumption compared to that of Bermudagrass hay. The superior nutritive value and IVTDMD of Henorico, relative to that of tropical grass hays, suggests that Henorico is a viable alternative for the production of high quality hay in the Caribbean tropics.

#### *Availability of Vegetative Material*

The Lajas and Fortuna Substations of the University of Puerto Rico Agricultural Experiment Station have approximately one hectare available for rhizome production. These rhizomes are available to interested farmers for propagation of Henorico in commercial fields for hay production.

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