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Perennial Peanut: Summary of animal feeding studies

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The perennial peanut was introduced into Florida from Brazil in 1936, but high yielding cultivars were not released until 1978 (Florigraze) and 1986 (Arbrook). Recent evaluation of the legume with different classes of livestock is reviewed. Unweaned calves, creep fed on perennial peanut pasture gained more, while their mothers lost less weight than when calves stayed with their mothers on bahia grass. Yearling beef cattle grazing the peanut produced twice the ADG per hectare measured from bahia grass alone, while dairy cows fed peanut hay gave similar milk yields, with a higher fat content than when alfalfa hay or corn silage were used. Peanut haylage was also useful for dairy cows. With pigs, peanut forage could replace up to 60% of the soya bean - corn concentrate, while with growing rabbits, it produced results similar to alfalfa. It can be used as a xanthophyll pigment source for chickens, and so has potential for use in extraction industries. It could soon be the most important forage crop in Florida since it is well suited to local climatic and edaphic conditions. (Editor's summary).

Keywords: Perennial peanuts; Animal forage; Peanut hay

Introduction

Perennial peanut (*Arachis glabrata*) is a high quality, perennial forage legume, adapted to well-drained soil, and humid warm climates (Prine et al, 1981). Numerous plantings throughout the state of Florida and the Caribbean have demonstrated that it is ideally suited to these growing conditions. It is unique to Florida because there is no other warm season legume with the desirable forage characteristics, persistence and broad spectrum of uses, including hay and other dehydrated products, pasture, creep grazing, silage, ornamental, conservation cover and living mulch.

Perennial peanut offers several advantages. Being drought tolerant and winter hardy in Florida, this long-lived perennial plant does not require replanting once established. Because there is no annual replanting cost, no nitrogen fertilizer, insecticide or fungicide costs, overall production expenses are kept to a minimum. It can be grown as a monocrop or in mixture with perennial grass. The practice of overseeding small grains into perennial peanut sod, beginning in November or December, has been quite successful, providing additional forage or grain production, while inhibiting emergence and growth of weeds.

Important to the development process of perennial peanut, was the release of high yielding cultivars. In 1978, the first was released in Florida under the name of Florigraze (Prine et al 1981). In 1986 Arbrook became the second named cultivar (Prine et al 1986). Florigraze was particularly important in furthering development of perennial peanut in Florida.

The developmental process, from which perennial peanut and its encompassing technology have evolved, was relatively slow due to lack of a concerted research/extension effort. Work with the crop has been ongoing since its introduction from Brazil into Florida in 1936, but most acreage expansion has occurred since 1982. Interest in perennial peanut has intensified in recent years and is presently being researched within a varied number of disciplines. This paper will discuss the important research carried out with animals.

Beef cattle

Creep grazing

Research was conducted using perennial peanut as a calf supplement in a creep grazing management scheme. Lactating Brahman cows were maintained on bahiagrass (*Paspalum notatum*) pasture. Treatment calves had free access to their mothers in addition to perennial peanut pasture, while control calves remained with their mothers on bahiagrass. The study concluded that cow weight loss was less and calf average daily gain (ADG) was greater when calves were creep fed on perennial peanut (Ocumpaugh, 1979). The results are shown in Table 1.

Beef grazing

In 1985, a trial compared the growth of yearling cattle (initial weight 340 kg) on either Pensacola bahiagrass or perennial peanut (Sollenberger and Jones, unpublished data). Grazing started on 15 May on the grass and 17 July on the legume, ending in both cases on 18 September. The stocking rate was lower on the peanut, but ADG, both per head and per unit area, were much higher. Results are shown in Table 2.

Dairy cows

Hay

Romero et al (1985) studied the effects of hay of alfalfa (*Medicago sativa cv* Florida 77) or perennial peanut, or corn silage mixed with concentrate at two levels (30 and 70 percent) on milk yields and butterfat content. The results are summarized in Table 3. In terms of yield, the peanut was similar to the corn silage, but it produced the highest levels of butterfat.

Haylage

Recent research conducted by Staples et al (1987), consisted of four experimental diets of corn silage, rhizoma peanut haylage and corn-soyabean meal fed *ad libitum* to lactating cows in differing ratios. Maximum milk yield (30.0 kg per day) was attained with a 30:20:50 ratio diet, while greater butterfat yield resulted from 35% perennial peanut haylage in the diet (Table 4).

Table 1 Performance of purebred Brahman cows and calves on Pensacola bahiagrass pasture with perennial peanut creep grazing, 13 June to 5 September, 1985

Pastures	Weight changes		ADG of calf (kg)
	cow (kg)	calf (kg)	
Bahia with calf creep-fed on perennial peanut	- 4.1	69.2	0.78
Cows on bahia	- 24.1	54.1	0.62

Table 2 Performance of yearling cattle on Pensacola bahiagrass (May to September) and perennial peanut (July to September)

Pasture	Stocking rate (animals/ha)	Gain (kg/ha)	Average Daily Gain	
			(per head)	(per ha)
Perennial peanut	2.7	144	0.89	2.30
Pensacola bahia	5.0	144	0.24	1.14

Table 3 Effects of forage source, concentrate level (%) and protein content (CP%) of the diet on milk yields (kg) and butterfat content (%)

	Forage Source					
	Alfalfa hay		Peanut hay		Corn silage	
Crude protein (%)	16	20	14	18	14	18
Concentrate at 30%						
Yield (kg)	14.9	16.9	15.3	15.6	16.5	17.1
Butterfat (%)	3.28	3.26	2.99	3.84	3.64	3.28
Concentrate at 70%						
Yield (kg)	16.7	19.1	18.3	17.9	18.5	18.4
Butterfat (%)	3.21	3.47	3.47	3.77	3.15	3.73

Table 4 Lactation performance for cows fed four ratios of corn silage, rhizoma peanut haylage and corn/soyabean meal

Feed Ratio	Dry Matter Intake (kg/day)	Dry Matter Intake (% of BW)	Milk Yield (kg/day)	Milk Fat (%)	Average Daily Gain (kg/day)
50: 0:50	23.4	4.13	30.4	3.47	0.75
30:20:50	23.9	4.25	30.9	3.43	0.47
15:35:50	22.6	4.05	29.8	3.49	0.29
0:50:50	20.9	3.78	28.8	3.51	0.28

Table 5 Reproductive performance of sows fed perennial peanut during gestation

Percent perennial peanut in diet (%)	Number pigs farrowed	Number pigs born alive	Number pigs weaned
0	8.83	8.50	6.67
40	11.00	10.33	6.50
60	10.60	10.40	5.60
80	11.50	11.17	6.67

Means in columns did not differ significantly ($p < 0.05$).

Table 6 Performance of sows fed gestation diets containing perennial peanut

Dependent variable	Percent perennial peanut in diet 0	40	60	80
Number of sows	6	6	5	6
Sow initial weight (kg)	131.7b	146.6ab	166.9a	132.1b
Sow prepartum weight (kg)	165.1bc	186.6ab	208.9a	151.4c
Sow weight gain (kg)	33.4a	40.2a	42.0a	19.4a
Sow postpartum weight (kg)	155.0bc	169.4b	196.2a	140.2c
Litter birth weight (kg)	11.5a	15.3a	13.7a	11.1a
Placenta weight (kg)	2.1a	1.9a	1.7a	1.9a
Sow weaning weight (kg)	149.4bc	167.2ab	185.1a	134.8c

Means within a row followed by same letter are not significantly different. ($p < 0.05$, Duncan's New Range Test.)

Swine

Recent work using perennial peanut in gestating sow rations in place of soyabean-corn concentrate has produced very positive results (Lopez et al 1986). Diets containing perennial peanut at 0, 40, 60 and 80% of the ration were fed to sows during three gestation periods. Sows fed an 80% diet of perennial peanut farrowed more pigs than the other treatments and yielded an equivalent number of live weaned pigs compared to the 100% corn/soyabean ration (Table 5), but differences were not statistically significant ($p = 0.05$).

Although not statistically significant, body weight gain during gestation was greatest for sows fed 60% perennial peanut (42.0 kg) and least for those fed 80% (19.4 kg) (Table 6).

Rabbits

Research data from Oregon State University has established that perennial peanut is a superior feed source for rabbits (Gomez et al 1983). In one feeding trial, perennial peanut meal was compared to alfalfa and kudzu meal (*Pueraria phaseoloides*). No difference was observed in ADG, but feed conversion by rabbits fed perennial peanut was significantly better (Table 7).

Table 7 Performance of rabbits fed three legume forages (after Gomez et al. 1983)

Feed	Protein (%)	Total gain (g)	Average Daily Gain (g)	Feed intake per day (g)	Feed conversion (feed/gain)
Alfalfa	16.0	1111	39.7	127	3.2
Perennial peanut	16.5	1111	39.7	102	2.6
Kudzu	11.5	884	31.6	111	3.5

Poultry

Perennial peanut meal was compared with yellow corn and alfalfa meal as a xanthophyll pigment source for egg yolk colouring (Janky et al 1986). Lower wavelength properties of perennial peanut resulted in lower percent excitation purity and higher percent luminosity at both 5.5 mg/kg and 11.0 mg/kg feed ratio (Table 8).

These data indicate that perennial peanut contains adequate levels of pigments for use as a commercial feed additive. Extracted protein plus pigments opens a new potential industrial use for the legume, yielding a high value product for poultry.

Conclusions

Much has been achieved in a relatively short time toward developing perennial peanut as a new forage. Efforts are now under way that should expand understanding and use of this species. Present findings confirm the tremendous potential that it has throughout the animal industry. If the involvement of private sector, extension and research

continues its present increasing trend, perennial peanut will soon be the most important forage crop in Florida and potentially in other areas of the Caribbean.

Table 8 Calculated colour values (IDL reflectance colorimeter) for egg yolks from hens fed yellow corn, dehydrated alfalfa meal, or dehydrated perennial peanut leaf meal at two dietary xanthophyll levels

Xanthophyll level and source	Dominant wave length (nm)	Excitation purity (%)	Luminosity (%)
5.5 mg/kg diet			
Yellow corn	575.5b	77.63a	35.26a
Alfalfa	575.2ab	81.67b	35.17a
Perennial peanut	574.8a	77.41a	35.99a
11.0 mg/kg diet			
Yellow corn	577.4b	91.10b	29.34a
Alfalfa	576.6ab	90.63b	31.83ab
Perennial peanut	576.1a	88.49a	33.27b

Means within a column at the same xanthophyll level, and followed by the same letter are not significantly different ($p < 0.05$).

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