

ARACHIS PINTOI : A MULTIPURPOSE LEGUME FOR SUSTAINABLE LAND USE

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ABSTRACT

Perennial peanut (*A. pintoii*) is a multiple-use tropical legume that can be used in association with a grass or as a cover crop in tree plantations. As a forage plant it has high forage quality and persistence under heavy grazing. As a cover crop and for erosion control it forms a dense cover under shade, excludes weeds and contributes to soil improvement.

KEYWORDS

Arachis pintoii, ground cover, soil conservation, persistence

INTRODUCTION

A. pintoii is a prostrate, stoloniferous, perennial tropical legume indigenous to Brazil. It is well adapted to a range of tropical environments from 0 to 1800 masl and to soils of low fertility. In this paper we focus on the multipurpose uses of the legume.

Arachis as a pasture legume: *A. pintoii* - grass based pastures have proved persistent and productive in different ecosystems of the tropics and under a wide range of grazing management (Lascano, 1994). Persistence of this legume is associated with rooted stolons with growing points protected from grazing, and the ability to compete with grasses for nutrients (Rao, 1996) and high seed set under grazing, that allows regeneration from seedlings following long dry periods (Argel and Pizarro, 1992). Leaf of *A. pintoii* has 60 - 70 % dry matter digestibility, 13 - 25 % crude protein and low levels of condensed tannins. Animals select a high proportion of the legume independent of the season of the year (Lascano, 1994). This can be attributed to high palatability and to a close canopy structure formed in the mixture.

The proportion of *A. pintoii* in the pasture increases with grazing pressure, particularly in humid areas. In the humid tropics of Costa Rica, the mean dry weight percentage of *A. pintoii* cv. Amarillo grown with *B. brizantha* cv. Marandú, averaged 44% at an estimated stocking rate of 6 an/ha, and 8% at 3 an/ha after 3 years of grazing (Hernandez et al., 1995). In the savannas of Colombia, a high proportion of the legume was maintained for 8 years with various *Brachiaria* species grazed at 3 steers/ha (Lascano, 1994).

It is not common that legume content in a pasture increases by increasing stocking rate. *A. pintoii* may even become dominant under very heavy grazing. Failure to establish well is often due to lenient grazing.

Animal production in *A. pintoii* - grass based pastures has been high both in terms of individual animal gains and production per hectare compared to grass alone. Table 1 shows increases in liveweight gain per animal unit and per hectare compared to *Brachiaria* spp. in monoculture, and milk increases in dual- purpose cows relative to nitrogen fertilized *Cynodon nlemfuensis* (van Heurck, 1990).

A. pintoii as ground cover: *A. pintoii* is an alternative cover crop for coffee, citrus, banana, oil palm, macadamia, and 'harts of palm' plantations in humid environments. Generally it establishes slowly, but this depends on available nutrients, soil moisture, seeding rate and type of planting material (De la Cruz et al., 1994). Once established, the need for weed control is minimal and this reduces maintenance costs compared to traditional covers species such as centro and kudzu. *A. pintoii* is suited as a cover crop because it

tolerates shade and forms a dense mat of rooted stolons that reduce weed invasion and protect the soil from high intensity rainfall (Dwyer, 1989; Fisher and Cruz, 1994).

It also has been shown to reduce root knotting of coffee plants produced by the nematode *Meloidogyne exigua* and root galling of tomato caused by *M. incognita* (Marban- Mendoza et al., 1992).

A. pintoii responds to rhizobia inoculation (CIAT strain 3101 or QA 1091- Australia) in some soils and if not inoculated can compete for N during establishment with the companion plant (Domínguez and De la Cruz, 1990). Once established decomposition of leaf and root litter of *A. pintoii* is faster than many other tropical legumes which can increase nutrient cycling (Thomas, 1994). In coffee plantations, the need for N fertilization is reduced (De la Cruz et al., 1994), and as cover plant in banana, *A. pintoii* favored plant growth of cv. Gran Enano in a very humid environment of Costa Rica (Pérez, 1996).

Other potential uses of A. pintoii: Since *A. pintoii* develops a strong mat of rooted stolons it is suitable for erosion control and soil conservation on steep slopes. This quality, added to the intense green foliage colour and the continuous yellow flowering of the legume, makes it attractive as an ornamental plant and useful for erosion control along the exposed benches of city and country roads.

A. pintoii regenerates profusely from stolon fragments and from seed, and for this reason special management is needed in ley farming systems to prevent competition to a subsequent crop. However, weed potential is reduced as it only spreads slowly beyond the immediate area in which it is planted.

More information would be desirable on its management in crop-pasture systems, on the contribution to N fixation and nutrient cycling in tree plantations, and its use as a protein source for pigs, horses and chickens.

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Table 1

Animal liveweight gains (3 hd/ha) and milk yield per cow in *A. pintoii*-grass based pasture (Adapted from Lascano, 1994; van Heurck, 1990; Barcellos et al., 1996).

Site	Grass	Liveweight gains			
		Grass alone		Grass + <i>Arachis</i>	
		(kg/hd)	(kg/ha)	(kg/hd)	(kg/ha)
Carimagua, Colombia	<i>B. dictyoneura</i>	122	366	152	456
	<i>B. humidicola</i>	96	288	130	390
Guápiles, Costa Rica	<i>B. brizantha</i>	126	378	183	549
Planaltina, Brazil	<i>P. atratum</i>	--	--	--	630
Milk yield (kg/day/cow)					
		Grass + 100 kg/ha of N		Grass + <i>Arachis</i>	
Turrialba, Costa Rica	<i>C. nlemfluensis</i>	7.7		8.8	