VALIDATION OF *Arachis pintoi* AS A FORAGE LEGUME IN COMMERCIAL DUAL PURPOSE CATTLE FARMS IN FOREST MARGINS OF COLOMBIA

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ABSTRACT
An on-farm pilot project was initiated in the Andean piedmont of the Amazon basin in Caquetá, Colombia to determine the contribution of the forage peanut *Arachis pintoi* (CIAT 17434) introduced in degraded pastures to animal production and soil improvement. Early results show that milk production in dual purpose cattle farms can be increased by 20% with *A. pintoi*-based pastures. However, to enhance adoption of the legume by farmers there is a need to make adjustments on pasture management and assure supply of high quality seed in the region.

KEYWORDS
Amazon basin, milk yield, grazing, pasture management, pasture degradation, botanical composition

INTRODUCTION
The study located (0˚ and 2˚N and 71˚ and 76˚W) in the Andean piedmont of the amazon basin in Caquetá, Colombia is part of American tropical rainforest. The region with 3500 mm/year of annual rainfall and acid (ultisol) and low fertility soils has been subjected in the last 50 years to an intensive process of colonization driven by socio-political and economic reasons. As a consequence, there are 0.7 million ha totally deforested which are covered by native and degraded introduced grasses (Ramírez and Seré, 1990).

The predominant production system in the region is dual-purpose cattle, which is favored by a reliable market for over 60 million liters of milk produced/year on pastures dominated by grasses (i.e. *Homolepsis aturensis*, *Brachiaria decumbens*) of low nutritive value and carrying capacity (Michelsen, 1990). As a consequence, daily milk production per cow (3 liters) and per ha (1000 liters) is low and unsustainable. Over the period 1987-90, CIAT's Tropical Forages Program collaborated with several institutions present in the region in the on-station evaluation of forage germplasm adapted to acid soils with potential for reclaiming degraded pastures. This effort resulted in the selection of *Arachis pintoi* cv. Maní Forrajero (CIAT 17434) to associate with native and introduced grasses. To follow-up this effort an inter institutional project was initiated to define and quantify the role of *A. pintoi*-based pastures on dual purpose cattle farms in already cleared forest land.

METHODS
In 1995 the project initiated activities by planting *A. pintoi* in association with commercial grasses (*Brachiaria* spp.) in selected dual purpose cattle farms in the region. A total 45 ha of grass-legume associations were planted in 5 farms in paddocks ranging from 6 to 15 ha. In addition, a control grass alone pasture was also established in each farm. Following conventional mechanical land preparation, the grass seed was broadcast (3 kg/ha) while the legume seed (6 kg/ha) was hand-planted with no application of fertilizer. Post-establishment management (i.e. weed control, grazing) of the grass-legume associations has been the responsibility of the farmers after receiving guidelines from technicians in the project.

Measurements carried out in the newly established grass alone and grass-legume pastures includes biomass on offer and botanical composition every two months. Milk yield of cows is being measured every 4 to 6 weeks in the grass alone and *Arachis*-based pasture in a sequential manner, a system which is compatible with the normal rotational grazing practiced by the farmers. Following an adjustment period of 7 to 10 days in each pasture, milk from individual cows is weighed on 3 consecutive days.

RESULTS AND DISCUSSION
This paper reports some of the early lessons learned in the process of introducing *A. pintoi* in association with grasses in dual purpose cattle farms in forest margins of Caquetá, Colombia. Even though germination of *A. pintoi* was excellent in all farms, the legume was completely lost in one farm because the owner resisted grazing the pasture early. According to this farmer and other farmers in the region, the grass has to flower before grazing the pasture in order to build-up soil seed reserves. The fast growth rate of *B. decumbens* resulted in excessive competition for light and thus *A. pintoi* seedlings were unable to develop and produce stolons. In contrast in another farm where the same association was periodically grazed after the second month of establishment, legume development was excellent as shown in table 1. In a 7 months period, the proportion of *A. pintoi* doubled in the pasture, with no deleterious effect on grass development. Increase in legume content in the associated pasture was accompanied by greater reduction of weeds as compared to the grass alone pasture. In a humid forest site in Costa Rica, legume content in a *B. brizantha*/*A. pintoi* association was 6 times greater (6 vs 34%) in pastures stocked at 6 hd/ha than at 3 hd/ha (Hernández et al 1995). In that study including *A. pintoi* in the pasture increased LWG by 30% at the high stocking rate and by 11% at the low stocking rate.

Up to now milk yield measurements have been carried out in two of the 5 farms participating in the project. Results from one farm with 56 milking cows indicate that at the same stocking rate (1.5 cows/ha) daily milk yield increased by 1 liter (4.9 to 5.9 liters/cow) in the *A. pintoi*-based pastures relative to the grass alone. Assuming that the farm had *A. pintoi*-based pastures (37 ha) for the 56 milking cows, this represents 1680 more liters of milk/month and 20,160 additional milk/year. At current prices of milk (US$0.23/liters) the extra milk results in US$4600 yearly gross benefit to the producer. Additional calculations showed that with the extra milk in the grass-legume association it would take about 2 years to pay for the cost of planting the legume. Other benefits of *A. pintoi* not yet measured are likely increases in reproduction and calf weaning weights due to better nutrition of the cows and a more stable pasture over time due N input from the legume.

Early results on validation of *A. pintoi* based pastures in dual purpose cattle farms in Caquetá, Colombia indicate that milk yield can be increased by 20% in well established pastures. However, for this technology to be adopted there is a need to work closely with farmers

on pasture management and to assure a supply of good quality *A. pintoi* seed in the region.

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Table 1. Botanical composition of the vegetation in contrasting pastures sown in a farm in Caquetá, Colombia.

Pasture components	Pastures[1/]	
	B. decumbens	*B. decumbens/ A. pintoi*
	(%)	(%)
Seven months after planting (Oct, 1995)[2/]		
Brachiaria decumbens	48	42
Arachis pintoi	-	11
Weeds[3/]	52	47
Fourteen months after planting (May, 1996)		
Brachiaria decumbens	64	58
Arachis pintoi	-	20
Weeds[3/]	36	22

[1/]Management with intermittent heavy grazing during establishment
[2/]Pastures sown in March, 1995
[3/]Includes native grasses and broad leaf weeds

Table 2. Milk yield in constrasting pastures sown in a farm in Caquetá, Colombia.

Item	Pastures	
	B. decumbens[1/]	*B. decumbens/ A. pintoi*[1/]
No. of milking cows	56	56
Liters/cow/day[2/]	4.9	5.9
Liters/month	8.232	9.912
Liters/year	98,784	118,944

[1/]Stocking rate: 1.5 cow/ha