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TIME OF HARVEST OF LABLAB AND COWPEAS ON PRODUCTION AND NUTRITIVE VALUE OF LEAF AND STEM COMPONENTS

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Background. The use of tropical legumes for grazing, hay, silage, and/or green manure crops has increased in direct response to costs of nitrogen, fertilizer, and fuel. The objectives of this experiment were to quantify the effect of time of harvest on stage of maturity, leaf:stem ratios, yield, and nutritive value of 'Iron-and-Clay' cowpeas, 'Rongai' lablab, and two experimental lablab cultivars, (TX 98-1, TX 98-3). Planting of these topical legumes on well-prepared seedbed areas was delayed until July 13, 2005 due to unseasonably dry conditions. Seed were drilled at 65 lbs/ac for both lablab experimental cultivars, 55 lbs/ac for Rongai, and 30 lbs/ac for cowpeas. Five replications of each variety were established in 5 ft x 20 ft plots with 10 ft alleyways on all sides. Previously non-harvested plots were cut on 9-08-05 and 10-25-05, separated into leaf and stem components, and measured for DM, protein, NDF, and ADF.

Research Findings. Dry matter yields were affected by tropical legume cultivar, harvest date, and plant part (Table 1). When legumes were harvested 58 days post-planting, 9-08-05, cowpea produced the most DM at more than 2600 lbs/ac, followed by lablab cultivars TX 98-3 (2175 lbs/ac), Rongai (1907 lbs/ac), and TX 98-1 (1841 lbs/ac). By delaying the initial harvest until 10-25-05, 104 days post-planting, DM was increased; however, rate of production was much slower during the last 46 days of growth. Unseasonable dry conditions persisted during this period which resulted in a total of 1 to 1½ tons DM per acre. Total DM was not different among cultivars for harvest date, but all cultivars produced more DM when harvest was delayed until 10-25-05. The leaf:stem ratios of all lablab cultivars was relatively similar at about 42:58 and was relatively constant for the two harvest dates. Cowpea leaf:stem was 45:55 for the first harvest and 42:58 for the second harvest date. Thus, with increasing maturity for all four tropical legumes, the leaf and stem components remained similar at about 42:58.

Nutritive analyses of the four tropical legumes at each of two harvest dates show enhanced values of leaves vs. stems (Table 2). There were detectable, but slight differences among these legumes in percent protein. Leaf protein was about 31% at the first harvest and declined to only 26% after another 46 days of growth. Stem protein was usually less than half that of the leaf component regardless of harvest date. The relatively low %NDF and %ADF of leaves and of stems provides outstanding nutritive value credentials for livestock or wildlife. Time of harvest, maturity, had predictable increased levels of %NDF which indicated higher concentrations of cell wall constituents.

Application. The DM production during the last half of the growing season was impressive in light of drought conditions and length of growth period. The nutritive value of all four tropical legumes exceeded requirements of most livestock classes, and were adequate for wildlife such as white-tailed deer. The production-utilization systems for these tropical legumes must be closely evaluated so as to achieve optimum use without excessive DM waste due to trampling, etc. A conserved forage system such as hay or silage may be a better alternative use compared to grazing. And, if grazing, restricted and controlled access such as creep-grazing would be a more efficient use of forage compared to continuous stocking with cows and calves.

Table 1. Dry matter production and percent leaf and stem components of tropical legumes.

Date	Plant Part	Cowpea		Rongai		TX 98-1		TX 98-3	
		%	DM	%	DM	%	DM	%	DM
		-----lbs/ac-----							
9/8	Leaf	45	1179 a ¹	40	769 b	42	774 b	42	919 ab
9/8	Stem	55	1428 a	60	1138 a	58	1067 a	58	1256 a
9/8	Total		2607 a		1907 a		1841 a		2175 a
10/25	Leaf	42	1274 a	41	1295 a	42	993 a	41	990 a
10/25	Stem	58	1762 a	59	1859 a	58	1393 a	59	1421 a
10/25	Total		3036 a		3154 a		2386 a		2411 a

¹Numbers in a row followed by a different letter are different (P < .05).

Table 2. Nutritive value of leaf and stems of four tropical legumes harvested at different dates.

Date	Plant Part	NUTR	-----%DM-----			
			Cowpea	Rongai	TX 98-1	TX 98-3
9/8	Leaf	Protein	30.8 b	31.9 a	31.8 ab	31.4 ab
9/8	Stem	Protein	18.1 a	13.9 b	13.9 b	13.9 b
9/8	Leaf	NDF	37.6 b	41.7 a	38.6 b	39.0 ab
9/8	Stem	NDF	45.1 b	48.2 a	45.7 b	46.5 b
9/8	Leaf	ADF	16.4 c	22.0 a	19.4 b	18.4 bc
9/8	Stem	ADF	32.2 c	35.3 a	33.8 b	34.0 ab
10/25	Leaf	NDF	46.7 a	48.0 a	45.1 a	49.1 a
10/25	Stem	NDF	53.9 a	53.2 a	52.1 a	53.6 a
10/25	Leaf	Protein	27.8 a	25.9 c	26.6 b	26.6 b
10/25	Stem	Protein	13.8 ab	13.1 c	14.4 a	13.6 bc
10/25	Leaf	ADF	17.9 b	20.7 a	17.9 b	19.2 ab
10/25	Stem	ADF	31.3 b	37.8 a	36.5 a	37.5 a

¹Numbers in a row and followed by a different letter are different (P < .05).