

EFFECT OF SEEDING RATE OF COWPEAS AND LABLAB ON DRY MATTER PRODUCTION AND NUTRITIVE VALUE

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Background. Rate of seeding often affects seasonal and total dry matter (DM) production of annual forages. The objectives of this experiment were to assess effects of three seeding rates, 25, 50, and 100 lbs/ac, on DM produced, and on nutritive value for leaf and stem components at each harvest. On May 7, 2004, 'Iron-and-Clay' cowpeas, 'Rongai' lablab, and two experimental lablab cultivars, TX 98-1 and TX 98-3, were hand-planted on prepared seedbed. Seeding rates of each legume were made in 10 ft x 20 ft plots with four replicates. A 10 ft non-planted buffer area existed on all sides of plots. Plots were mechanically harvested on July 7 and again on November 11. Leaf and stem separations were made to assess percent protein, NDF, and ADF for each legume at each harvest date.

Research Findings. At both harvest dates, total DM and percent cover were highest at 100 lbs/ac seed. Total seasonal DM production showed distinct advantages for increased seeding rates from 25 to 100 lbs/ac (Table 1). The DM from 100 lbs/ac seed was nearly double that from 25 lbs/ac seed. There were general trends for DM production to be lowest at the 25 lbs/ac rate compared to 50 or 100 lbs/ac seed (Table 2). On the first harvest, cowpea produced more DM than the other legumes at 25 lbs/ac. At the second harvest date, Nov. 11, Rongai seeded at 100 lbs/ac had more than twice as much DM production as the other legumes. Rongai lablab usually does not flower nor set seed at TAMU-Overton nor in any other parts of the continental USA; whereas cowpeas and the experimental lablabs flowered, set seed, and had reduced vegetative growth. These flowering and seed setting characteristics for TX 98-1 and TX 98-3 lablab were the primary objectives in the TAMU-Overton plant breeding program to allow for state and regional seed production of lablab, and thereby reduce the dependency upon seed importation from Australia. Nutritive value analyses were generally similar among legumes with leaf components having significantly higher quality attributes compared to stems (Table 3). One of the most important aspects of nutritive value was the percent protein in leaves at both harvest dates which remained high and relatively constant at about 25 to 28%.

Application. Stands were attained at all seeding rates. Specific seasonal vs. total DM production objectives for these legumes which may include hay, silage, grazing, green manure, or wildlife attractant, will determine the choice of seeding rate to be used. The nutritive value and drought tolerance of both cowpeas and lablab makes them a potentially high demand crop to offset fertilizer N expenses.

Table 1. Yield (DM) and percent cover for four tropical legumes planted at three seeding rates.

Seeding Rate (lbs/ac)	Harvest 1		Harvest 2		Total DM (lbs/ac)
	DM (lbs/ac)	Cover (%)	DM (lbs/ac)	Cover (%)	
25	854 a ¹	37 a	2426 a	67 a	3194 a
50	1452 b	57 a	3324 ab	78 ab	4591 b
100	1932 b	83 c	4223 b	90 b	6064 c

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

Table 2. Dry matter (DM) production from four tropical legumes planted at three seeding rates.

Date	Seed Rate (lbs/ac)	Cowpea	Rongai TX 98-1 TX 98-3		
			-----DM lbs/ac-----		
7/7	25	1554 a ¹	344 b	607 b	910 ab
7/7	50	1649 a	991 a	1155 a	2013 a
7/7	100	2178 a	1971 a	2054 a	1527 a
11/11	25	2654 ab	3933 a	1863 ab	1256 b
11/11	50	2157 b	4030 a	3504 a	3605 a
11/11	100	2892 b	7706 a	2855 b	3437 b
Total	25	4174 a	4255 a	2196 b	2150 b
Total	50	3599 a	4735 a	4733 a	5297 a
Total	100	5015 b	9503 a	5036 b	4702 b

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

Table 3. Nutritive value (NUTR) of leaf and stem components of four tropical legumes.

Date	Plant Part	NUTR	Cowpea Rongai TX 98-1 TX 98-3			
			-----%-----			
7/7	Leaf	Protein	28.7	27.2	27.4	26.0
7/7	Stem	Protein	8.4	9.6	8.9	9.7
7/7	Leaf	NDF	47.0	53.4	50.0	48.6
7/7	Stem	NDF	56.1	57.2	58.1	56.8
7/7	Leaf	ADF	22.0	29.2	28.1	27.9
7/7	Stem	ADF	43.4	42.6	43.2	41.4
11/11	Leaf	Protein	24.0	24.1	25.5	25.5
11/11	Stem	Protein	13.7	10.2	11.4	10.6
11/11	Leaf	NDF	49.6	48.1	47.2	37.5
11/11	Stem	NDF	43.6	49.9	55.5	51.8
11/11	Leaf	ADF	24.4	27.6	26.7	22.2
11/11	Stem	ADF	28.3	35.1	38.7	36.3