NAME OF TEST: Stage of maturity and method of harvesting hybrid sudangrass.

OBJECTIVES: (1) To evaluate the effect of stage of plant development at harvest on total yield,
(2) To evaluate the effect of method of harvest (stripping leaves versus cutting the entire plant) on leaf yield and total yield.

EXPERIMENTAL PROCEDURE:

Experiment No: 048LO-26

Location: A&M Plantation near College Station

Soil type: Miller Clay

Field Procedure: Sudax 11 hybrid sudangrass was planted in 40" rows April 22, 1966 at the rate of 10 pounds of seed per acre. Plots consisted of 3 rows, 12' long, 3' alley between plots 4 replications. The plot area was prefertilized with 350# 12-12-12 per acre and top dressed with 33 pounds of nitrogen in late June.

Harvesting Procedure: (1) 24" growth stage - where initial growth was 24" high, one set of plots and another set was stripped of all leaves. When regrowth on the 'cut' plots reached 24", both sets of plots were harvested as previously. When plants in the 'stripped' plots reached maturity they were cut and the procedure continued as previously. 'Cut' forage was separated into leaf and stem components. Mature stems when removed from the 'stripped' plots were dried and weighed. All forage material was dried, weighed and the data converted to acre yields.
(2) All other stages of maturity were handled in a similar manner except that initial harvest and reharvests were at the indicated stages of maturity for the cut plots.

Results: The detailed data are presented in Table 1. It may be noted from the initial harvest yields that leaf production reached a maximum in the boot stage but that stem growth continued to the mature plant stage. Total leaf yield did not differ greatly and showed no particular pattern in relation to treatment combinations. On the other hand, stem production was drastically reduced by frequent harvest. Total yield increased more than three fold with harvest at maturity versus frequent harvest when 24" high (Table 2). Frequent cutting of young plants (prior to booting) reduced total growth

more than frequent removal of leaves in the immature stage. From booting through blooming total growth was favored slightly by cutting rather than leaf removal followed by cutting at maturity.

Leaf production data in Table 3 show that the leaf production potential of a plant is not altered appreciably by harvest practice. The low yield of the 48" growth stage with leaf removal was apparently due to a poor sample on August 23. Approximately 1600 pounds of leaves per acre is all that can be produced or maintained at one time in 40" rows. There is some indication of a loss in leaf weight after the boot stage which would suggest either a loss of lower leaves or that respiration exceeds photosynthesis in some of the leaves.

Total yields (Table 4) follow closely the pattern of slim yields. Leaves accounted for 50% of the production with cutting 24" plants, 33% of the production of plants stripped where 24" high but only 17% of mature plant production.

DISCUSSION: These data confirm earlier research which indicated maximum leaf development at a fairly early age. The only advantage to allowing plants to develop beyond the early boot stage is in stem growth. If the stem growth is not useable, such as the case would be in a grazing program, there is not particular advantage to the increased growth associated with later stages of maturity. In a silage production program the older and therefore higher producing material can be utilized. Under almost any grazing system some stems develop and where the leaves have been removed, the stems should be removed also to stimulate new leaf growth from tillers. Apparently two tillers developed for each original stem when the stems were removed before the boot stage (Table 5). Apparently, stem removal after the boot stage, whether at the first harvest or following stripping of leaves, did not stimulate tiller development.

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Date: December 1966

Table 1. Dry matter yield of forage components of Sudax 11 hybrid sudangrass harvested at various stages and by two procedure, A&M Plantation, 1966.

Stage of development at harvest	Method of harvest	Forage component	Pounds of dry material per acre											Total leaf & stem
			6/21	6/24	7/11	7/25	8/3	8/11	8/23	8/29	9/12	10/21	TOTAL	
24"	Cut	Leaf	607		410			568			343	88	2016	
		Stem	408		425			867			252	59	2052	4068
	Strip	Leaf	685		914			324			366	103	2392	
		Stem	-		-			4267			-	490	4757	7149
48"	Cut	Leaf		730		952			711			195	2588	
		Stem		641		2343			798			259	4041	6629
	Strip	Leaf		733		834			156			169	1892	
		Stem		-		-			4543			571	5114	7006
Boot	Cut	Leaf			1679					940		245	2868	
		Stem			3847					2548		283	6678	9546
	Strip	Leaf			1640					590		246	2476	
		Stem			-					6188		388	6576	9052
Bloom	Cut	Leaf				1211	-				926	79	2216	
		Stem				6533	-				1565	44	8098	10314
	Strip	Leaf				1708	49				492	155	2249	
		Stem				-	6720				-	671	7391	9640
Mature	Cut	Leaf					1480					740	2220	
		Stem					6944					3706	10650	12870
	Strip	Leaf					1480					740	2220	
		Stem					6944					3706	10650	12870

Table 2. Dry matter yield of Sudax 11 hybrid sudan harvested at various stages and by two procedures, A&M Plantation, 1966.

Stage of growth at harvest	Method of harvest	Pounds of dry matter per acre										
		6/21	6/24	7/11	7/25	8/3	8/11	8/23	8/29	9/12	10/21	TOTAL
24" high	Plants cut	1015		835			1435			595	147	4068
	Leaves removed[1]	685		914			4591			366	593	7149
48" high	Plants cut		1371		3295			1509			454	6629
	Leaves removed		733		834			4699			740	7006
Boot	Plants cut			5526					3488		528	9546
	Leaves removed			1640					6778		634	9052
Bloom	Plants cut				7744	-				2491	123	10314
	Leaves removed				1708	6769				492	826	9640
Mature	Plants cut					8424					4464	12870
	Leaves removed					8424					4464	12870

[1] All leaves were removed from the plants each time other plants were cut at the indicated stage of growth; the stems were left standing until they reached maturity at which time they were cut.

Table 3. Leaf yield of Sudax 11 hybrid sudangrass harvested at various stages and by two procedures, A&M Plantation, 1966

Stage of growth at harvest	Method of harvest	Pounds of dry matter per acre										
		6/21	6/24	7/11	7/25	8/3	8/11	8/23	8/29	9/12	10/20	TOTAL
24" high	Plants cut	607		410			568			343		2016
	Leaves removed[1]	685		914			324			366		2392
48" high	Plants cut		730		952			711			195	2588
	Leaves removed		733		834			156			169	1892
Boot	Plants cut			1679					940		245	2868
	Leaves removed			1640					590		246	2476
Bloom	Plants cut				1211					926		2216
	Leaves removed				1708	49				492		2249
Mature	Plants cut					1480					740	2220
	Leaves removed					1480					740	2220

[1] All leaves were removed from the plants each time other plants were cut at the indicated stage of growth; the stems were left standing until they reached maturity at which time they were cut.

Table 4. Dry matter yield and yield components of Sudax 11 hybrid sudangrass harvested at various stages of maturity by two methods.

Stage of growth at harvest	Method of harvest	Number of harvests	Pounds of dry matter per acre		
			Leaf Yield	Stem Yield	TOTAL (leaf & stem)
24" high	Plants cut	5	2016ab	2052a	4068a
	Leaves removed	5	2392 bc	4757 b	7149 b
48" high	Plants cut	4	2588 cd	4041 b	6629 b
	Leaves removed	4	1892a	5114 b	7006 b
Boot	Plants cut	3	2868 d	6678 c	9546 c
	Leaves removed	3	2476 bcd	6576 c	9052 c
Bloom	Plants cut	3	2216abc	8098 d	10314 c
	Leaves removed	3	2249 bc	7391 cd	9640 c
Mature	Plants cut	2	2220abc	10650 e	12870 d
	Leaves removed	2	2220abc	10650 e	12870 d

Table 5. The effect of harvest practice on stand of Sudax 11 hybrid sudangrass, A&M Plantation, 1966.

Stage of growth at harvest	Method of harvest	Number of stems per 3 row feet at the harvest indicated			
		1st	2nd	3rd	4th
24" high	Cutting	27	54	38	48
	Stripping	27	29	30[1]	26
48" high	Cutting	27	48	36	
	Stripping	27	29	27[1]	
Boot	Cutting	27	26		
	Stripping	28	29[1]		
Bloom	Cutting	24	27		
	Stripping	27	24[1]		
Mature	Cutting	26			
	Stripping	26[1]			

[1] Stems removed

NAME OF TEST: Kleingrass management

OBJECTIVES: To determine the persistence and yield of kleingrass grown on dry land in cultivated rows and solid stands and subjected to various intensities of defoliation.

EXPERIMENTAL PROCEDURE:

Experiment No: 048LO-27

Location: A&M Plantation near College Station

Soil type: Miller Clay

Cultural: Common kleingrass was seeded in two row widths (40" and 10") in the spring of 1965, mowed and fertilized uniformly and allowed to become established. The 40" rows were cultivated but the 1" rows were undisturbed. No irrigation water has been applied since establishment.

Experimental Design: Randomized block split-split plot in 5 replications. Row spacing comprise the main plots, stage of maturity at harvest the sub plots, and height of cutting the sub-sub plots. Harvests were made in the vegetative stage, early boot stage, and flowering to mature stage. The two stubble heights were 2-4 inches and 8-10 inches.

Data: All plots were harvested initially at the same time but at the appropriate height. Thereafter, harvests were made as nearly as possible in the appropriate stage. The data were calculated to dry matter acre yields and total yields were analyzed statistically. All plots were fertilized uniformly.

Results: The data for 1966 are reported in Table 1. Obviously yields decreased with an increase in height of clipping from 2-4" to 8-10". At the time of the first clipping approximately 50% of the forage was below the 8-10" height in rows and 85 to 90% in close drill plots. Even in subsequent clippings production from the tall stubble never exceeded the short stubble production and generally amounted to less than 50% as much.

Yield in cultivated rows exceeded yield in close drill planting by approximately 50%. However, there was no loss of stand in the narrow rows.

Stage of maturity at harvest had much less influence on yield than either of the other two treatments. This is likely accounted for by the limited range in clipping frequencies. The summer was extremely dry resulting in limited growth and there

limited differences in number or time of clipping. Good rains occurred in late August. Thus most of the production was prior to the first clipping and after mid-August.

The test is being continued in 1967 and subsequent years.

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Date: December 1966.

Table 1. Kleingrass yields as influenced by method of planting, clipping height and stage of growth at harvest, A&M Plantation, 1966.

Method of Planting	Stubble height (inches)	Stage of maturity at harvest	Pounds of dry forage per acre May 9	June 23	July 1	July 18	Aug 19	Sept 29	TOTAL
Row	2-4	Immature	2568	1375			1128	1300	6371
		Boot	2210		1477		778	1299	5764
		Flower	2450			1699		2260	6409
Stubble height average									6182
	8-10	Immature	1244	376			271	1011	2902
		Boot	1311		624		220	1100	3255
		Flower	1258			878		1572	3708
Stubble height average									3289
Method of planting average									4736a
Broadcast	2-4	Immature	1365	1089			628	1256	4338
		Boot	1464		1392		385	1585	4826
		Flower	989			2411		1517	4917
Stubble height average									4695
	8-10	Immature	226	191			470	848	1735
		Boot	86		347		146	1043	1622
		Flower	168			165		779	1112
Stubble height average									1491
Method of planting average									3093 b

Height of clipping averages: 2-4" - 5439a
8-10" - 2390 b

Stage of maturity at harvest did not significantly influence yield.