

NAME OF TEST: Management of Angletongrass for hay production, Angleton.
 OBJECTIVES: To determine the effect of height and frequency of clipping Angletongrass on the following: (1) Total forage yield (2) Leaf percent (3) Protein content of the forage (4) Stand survival

EXPERIMENTAL PROCEDURE:

Location: Substation No. 3, Angleton, Texas

Soil type: Lake Charles clay

Experimental design: Factorial design with two clipping heights (2 and 5 inches) and four clipping frequencies (2, 4, 6 and 8 weeks) and with four replications.

Description of sward: The angletongrass sod used for this study was seeded in the spring of 1954. At the time this study was initiated in the spring of 1958, ground cover was excellent.

Fertilizer treatment: Fertilizer applied in 1958 was as follows: 32-40-0 on June 1, 45-0-0 on July 25 and 45-0-0 on September 22 with the exception that plots cut at six week intervals were fertilized on October 3 instead of September 22. Fertilizer applied in 1959 was as follows: 50-60-0 on April 30 and 56-0-0 on August 17.

RESULTS:

Effect of height and frequency of clipping on total yield (pounds per acre oven dry forage), percent leaf and percent protein of Angletongrass, Angleton, Texas, 1958-59.

Clipping treatment		Total yield		Percent leaf ^{1/}		Percent protein
Freq.	Height	1958	1959	1958	1959	1958
2 week	2 inch	3250	7320	86	86	10.85
2 week	5 inch	2570	6760	85	83	10.25
4 week	2 inch	5030	10040	75	67	9.22
4 week	5 inch	4870	10780	72	69	8.78
6 week	2 inch	4660	14660	64	55	7.18
6 week	5 inch	4150	13480	66	58	7.75
8 week	2 inch	7960	15880	58	54	6.57
8 week	5 inch	8940	15840	53	51	6.28
LSD .05	Ht.	NS	NS	NS	NS	NS
	Freq.	536	1267	4.1	3.2	.57
	Ht.XFreq.	758	NS	NS	NS	NS

^{1/} Percent leaf was determined only on reps 3 and 4.

DISCUSSION: Some discussion of the 1958 results was given in the 1957-1958 Summary: Forage Crops Research Data, Texas Agricultural Experiment Station.

There was a significant interaction of height clipping with frequency of clipping on total yield in 1958 but not in 1959. Frequency of clipping had a highly significant effect on total yield, leaf percentage and the protein content of the forage. Height of clipping did not effect any of these measures.

A fairly dense sod has formed on the plots cut every two weeks. A more open stubble is in evidence with less frequent clipping, particularly with the every eight weeks cuttings.

Neither height nor frequency of clipping has, as yet, affected stand survival.

The relationship between percent leaf and percent protein for reps 3 and 4 in 1958 was determined. A correlation of .925 with 14 degrees of freedom was found.

PROJECT: 388

DATE SUBMITTED: January 25, 1960

WORKER: Marvin E. Riewe

NAME OF TEST: The effect of harvesting at several stages of maturity on yield of four sorghum varieties and upon physical characteristics of the forage.

OBJECTIVES: (1) to determine the yield of four sorghum silage varieties as influenced by stage of growth at harvest (2) to determine the influence of stage of maturity where harvested upon leaf, head, stem and moisture percentages and (3) to determine the protein content at the various stages of growth.

EXPERIMENTAL PROCEDURE:

Location: Brazos River Valley Lab near College Station.

Soil type: Miller clay

Experimental design: A randomized block split-plot design with varieties as main plots and stage of maturity at harvest as sub-plots, 6 replications. The plots were 3 40-inch rows, 20 feet long, the center row harvested for yield. The four varieties were Atlas, Tracy, Silo King and Beef Builder. Stages of harvest were (1) Boot-when most of the plants were in the boot stage (2) Full head - when most of the heads were fully emerged and (3) medium dough.

Crop Management: The test was planted April 30, 1959, fertilized with 48-60-0 prior to planting and top dressed with 40-0-0 on June 5, 1959. The area was flood irrigated as needed to maintain adequate moisture for growth, June 25, July 3, and August 8, 1959.

RESULTS: See tables.

DISCUSSION: Almost complete dehydration of these plots resulted from a desiccant applied to a nearby cotton field on September 11. This was after the second harvest of Atlas, Silo King and Tracy in the boot stage and Atlas and Silo King in the full head stage but prior to the second harvest on all other plots. The degree of damage was dependent on the stage of growth. Plots which had been harvested about 10 days earlier and had made very little recovery growth were not seriously damaged. Plots which had 3 feet or more of growth at the time of damage were harvested about 3 weeks later when it was apparent that they would not recover from the damage. Growth of less than 3 feet was lost and recovery growth on all plots was no doubt retarded.

The only information of value obtained in the study is the influence of stage of maturity on first cutting performance and recovery information on the 5 plots listed above.

Dry matter yield increased with delayed harvest with all varieties. Green yields generally did not increase and in some cases actual decreased. Moisture content was extremely high at the earlier stages of growth. All plots which had any appreciable growth on October 29 were harvested regardless of stage of growth. Moisture content was high at this time even though growth had essentially stopped.

Atlas and Silo King had been cut the second time in the Boot and Full head stages before the desiccant damage was encountered. Stage of development at the second harvest did not materially influence yield. The plots to be cut in the boot stage had advanced beyond this stage at the first cutting, thus no differential effects of first cutting was expected.

PROJECT NO: Hatch 388

DATE SUBMITTED: December 2, 1959

WORKER: E. C. Holt.

Harvest dates of four varieties of silage sorghum harvested at three stages of maturity, Brazos River Valley Lab, 1959

Variety	Boot Harvest			Full head Harvest			Medium dough Harvest		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Atlas	7/7	8/19	10/29	7/7	8/31	10/29	7/31	10/2	
Silo King	7/3	8/19	10/29	7/3	8/31	10/29	7/24	10/2	
Tracy	7/7	8/31	10/29	7/14	10/2		8/4	10/2	
Beef Builder	7/14	10/2		7/30	10/2		8/19	10/29	

Total yield of four varieties of silage sorghum harvested at three stages of maturity, Brazos River Valley Lab, 1959

Variety	Boot		Full head		Medium dough	
	Green	Dry	Green	Dry	Green	Dry
Atlas	79390	12120	94820	15260	56900	12090
Tracy	113990	16500	81950	14600	66430	13730
Silo King	87920	14420	92220	13920	57480	12270
Beef Builder	89400	16140	--	--	72570	18870

Performance of Four Silage Sorghums Harvested at Three Stages of
Maturity, Brazos River Valley Lab
1959

Variety	Stage	Date of harvest	Green		% Moisture	Percentage of forage		
			Green	Dry		Heads	Leaves	Stems
<u>First harvest</u>								
Atlas	Boot	7/7	18.2	2.4	86.6	3.0	51.8	45.2
	Full head	7/7	21.2	3.6	83.1	5.1	43.0	51.9
	Med. dough	7/31	18.5	4.4	76.4	13.1	33.1	53.8
Tracy	Boot	7/7	26.6	4.0	84.6	2.5	44.6	52.9
	Full head	7/14	25.3	4.3	83.1	4.4	38.5	57.1
	Med. dough	8/4	21.3	5.1	76.3	6.7	26.7	66.6
Silo King	Boot	7/3	18.6	2.6	85.8	4.2	51.2	44.6
	Full head	7/3	19.9	2.6	86.8	7.1	42.1	50.8
	Med. dough	7/24	20.6	4.7	77.4	17.9	49.1	33.0
Beef Builder	Boot	7/14	32.9	5.2	84.1	1.3	47.4	51.3
	Full head	7/30	Missing			6.3	33.5	60.2
	Med. dough	8/19	29.5	7.9	73.3	13.0	26.9	60.1
<u>Second harvest</u>								
Atlas	Boot	8/19	16.8	2.6	84.3	4.9	31.3	63.8
	Full head	8/31	19.0	2.9	84.5	6.7	36.4	56.9
	Med. dough	10/2	10.0*	1.7	66.1			
Tracy	Boot	8/31	23.0	3.1	86.4	2.4	38.9	58.7
	Full head	10/2	15.6*	3.0	80.7			
	Med. dough	10/2	11.9*	1.8	84.8			
Silo King	Boot	8/19	19.8	3.4	83.0	5.8	28.0	66.2
	Full head	8/31	18.7	3.1	83.4	9.8	34.5	55.7
	Med. dough	10/2	8.1*	1.5	81.9			
Beef Builder	Boot	10/2	15.2*	2.8	81.3			
	Full head	10/2	27.1*	1.7	93.8			
	Med. dough	10/29	6.8**	1.7	77.0			
<u>Third harvest</u>								
Atlas	Boot	10/29	4.8**	1.0	79.2			
	Full head	10/29	7.2	1.1	84.8			
	Med. dough							
Tracy	Boot	10/29	7.4	1.1	85.0			
	Full head							
	Med. dough							
Silo King	Boot	10/29	5.6**	1.2	83.6			
	Full head	10/29	7.6**	1.2	83.6			
	Med. dough							
Beef Builder	Boot							
	Full head							
	Med. dough							

Desiccant spray damage on September 11 stopped growth on all plots that had any appreciable growth* and reduced regrowth on other plots**.

NAME OF TEST: The effect of harvesting at several stages of maturity on the yield of four silage Sorghum varieties and upon the chemical and physical characteristics of the forage produced, Angleton, 1959.

OBJECTIVES: (1) To determine the forage yield of four varieties of silage sorghum harvested at four stages of maturity; (2) to determine the percentage of forage as leaves, stems and heads at each stage of maturity for each variety; (3) to determine the percent moisture in the forage at each stage of maturity for each variety; and (4) to determine the percent protein in the forage at each stage of maturity for each variety (incomplete).

EXPERIMENTAL PROCEDURE:

Location: Substation No. 3, Angleton, Texas

Soil type: Lake Charles clay

Source of materials: E. C. Holt

Experimental design: A split-plot design with varieties as main plots and stage of maturity at harvest as subplots with four replications. Plot size was three 40-inch rows, twenty feet long. The center row was harvested for yield data. The four varieties used were Atlas, Silo King, Beef Builder and Tracy. Stage of maturity at harvests were (1) early boot - approximately 1/3 of the stalks in boot; (2) flowering - with about 80% of the stalks headed out and flowering; (3) milk - most of the grain in milk stage, some more advanced, others less; and (4) hard dough with few hard seed, some yet in the milk to medium dough

Crop management practices: Test planted on April 28, 1959. Fertilized with 24-30-0 at planting, side-dressed with 50-0-0 on June 5 and with 32-40-0 on August 10.

Table 1. Harvest dates of four varieties of silage sorghums harvested at four stages of maturity, Angleton, 1959

Variety	<u>Early boot</u>		<u>Flowering</u>		<u>Milk</u>		<u>Hard dough</u>	
	1st har.	2nd har.	1st har.	2nd har.	1st har.	2nd har.	1st har.	2nd har.
Atlas	6/15	8/10*	6/27	9/11	7/8	10/3	7/20	10/18
Silo King	6/15	8/10*	6/27	9/6	7/8	10/3	7/17	10/14
Beef Builder	7/1	9/16	7/15	10/7	7/22	10/21	storm	11/6
Tracy	6/26	9/11	7/8	10/4	7/22	10/24	storm	11/6

*A third harvest on Atlas and Silo King in the boot stage of maturity was made on 10/4.

Table 2. Performance of four silage sorghums harvested at four stages of maturity, Angleton, 1959

Variety	Stage of Maturity	Yields in		Percent Moisture	Percentage of forage		
		Green	Dry		Stalk	Leaf	Head
<u>FIRST HARVEST</u>							
Atlas	Early boot	17.0	2.2	87.2	34	65	1
	Flowering	25.5	4.4	82.9	51	37	12
	Milk	27.2	6.0	77.8	57	27	16
	Hard dough	24.9	7.0	72.1	56	20	24
Silo King	Early boot	19.5	2.7	86.1	39	60	1
	Flowering	25.2	5.1	80.0	54	34	12
	Milk	25.6	6.0	76.5	55	28	17
	Hard dough	27.2	7.4	72.9	46	19	35
Beef Builder	Early boot	33.4	5.6	83.2	57	42	1
	Flowering	37.5	8.4	77.5	61	32	7
	Milk	37.8	9.9	73.7	66	26	8
	Hard dough	--	11.8 ^{1/}	--	--	--	--
Tracy	Early boot	29.2	4.7	83.8	54	45	1
	Flowering	29.2	5.9	79.7	68	30	2
	Milk	30.9	7.8 ^{1/}	74.9	70	23	7
	Hard dough	--	9.2 ^{1/}	--	--	--	--
<u>SECOND HARVEST</u>							
Atlas	Early boot	4.3	1.0(.2)*	76.7	**	**	**
	Flowering	8.6	2.1	76.1	51	39	10
	Milk	9.2	2.7	71.0	57	39	4
	Hard dough	6.8	2.0	70.4	56	36	8
Silo King	Early boot	7.0	1.7(.8)*	75.5	**	**	**
	Flowering	10.1	2.3	77.5	56	37	7
	Milk	10.7	3.2	70.1	59	34	7
	Hard dough	7.9	2.3	71.4	57	32	11
Beef Builder	Early boot	10.8	2.4	77.6	48	50	2
	Flowering	12.5	3.4	73.0	51	46	3
	Milk	8.5	2.5	71.0	54	35	11
	Hard dough	7.7	2.5	67.4	49	42	9
Tracy	Early boot	5.9	1.0	77.2	49	48	3
	Flowering	6.9	1.9	72.2	57	38	5
	Milk	6.6	1.9	70.8	59	37	4
	Hard dough	4.0	1.3	67.6	54	38	8

* Yield for third harvest. Only Atlas and Silo King in the early boot stage harvested three times.

** Separation data was not obtained. Samples discarded by mistake.

^{1/} The yield for the first harvest of Beef Builder and Tracy in the hard dough stage was estimated. The estimate was based upon the increase in yield of the hard dough stage of maturity over the milk stage of maturity for Atlas and Silo King.

Table 3. Total yield of four varieties of silage sorghum harvested at four stages of maturity, Angleton, 1959.

Variety	Early boot	Flowering	Milk	Hard dough
Total dry matter yield - tons per acre				
Atlas	3.4 ^{1/}	6.5	8.7	9.0
Silo King	5.2 ^{1/}	7.4	9.2	9.7 _{2/}
Beef Builder	8.0	11.8	12.4	14.3 _{2/}
Tracy	5.7	7.8	9.7	10.5 _{2/}

^{1/} Total of three harvests

^{2/} Yield estimated from percentage increase in yield from milk to hard dough stages for Atlas and Silo King. Actual first harvest was lost.

DISCUSSION: The hard dough harvest for Beef Builder and Tracy was lost in the tropical storm of July 24. The growth was removed from these plots on August 4. An estimated yield for these two varieties at the hard dough stage of maturity is included in the total yield data. Actually, these plots would have been harvested about July 28.

A killing frost on the night of November 5 preceded the second harvest of both Beef Builder and Tracy at the hard dough stage of maturity. Had the frost not occurred, the second harvest should have been made about November 7, only two days later.

Except for the tropical storm on July 24 and the earlier than normal frost on November 5, weather conditions were almost ideal. The yields obtained indicate almost ideal growing conditions.

Atlas and Silo King attained a height of about 7.5 feet; Beef Builder attained a height of about 10.5 feet; and Tracy attained a height of about 9.5 feet during the first growth period. Both Silo King and Beef Builder were subject to lodging. This faulty characteristic was no doubt aggravated by the application of 74 pounds of nitrogen per acre during the first growth period. Lodging became a problem with Silo King as it reached the milk stage of maturity, becoming badly tangled in some plots as it reached the hard dough stage of maturity. Beef Builder had lodged enough to be a slight problem in harvesting by the time it reached the flowering stage. Lodging became an even more serious problem thereafter. Lodging of Atlas and Tracy was slight. Lodging was not a problem with any variety during the second growth period. There was no lodging of any variety until after the plants had headed.

Seed head fill was good for the first growth period; poor during the second. Considerable web-worm damage was experienced during the second growth period with practically no grain formed in Atlas or Tracy. Silo King and Beef Builder did have some grain development during the second growth period.

Analysis of variance of data has not been completed. However, certain interesting observations can be made. While dry matter yields increased as the sorghum became more mature up to the hard dough stage, delaying the first harvest till then resulted in a reduced yield at the second harvest. There actually is very little difference in total dry matter yield for two harvests at the milk stage of maturity and the hard dough stage. Sorghum harvested at the milk stage of maturity contained more moisture.

There was a very marked reduction in yield when the sorghum was cut in the early boot stage. The regrowth was very erratic following the first harvest in the boot stage. In a matter of two to three weeks, some stalks began heading

out even if only two feet high. To determine the time for the second harvest in the early boot stage virtually became a matter of guessing. This erratic growth behavior following harvest was not noted when the sorghum was cut after it had headed out. The yield at the second harvest when cut in the early boot stage was decidedly better for the hybrids, Silo King and Beef Builder, than for either Atlas or Tracy.

There were certain distinct differences between varieties and between stage of harvests in percent stalk, leaf and head (Table 2). There was a rather marked difference in percent head. The data indicate a strong possibility of an interaction of variety with stage of maturity with regard to the feeding value of the silage.

PROJECT NO.: 388

DATE SUBMITTED: December 15, 1959

WORKER: M. E. Riewe