

FORAGE CROP YIELDS AT THE WINTER GARDEN STATION, 1930-46

E. Mortensen, Horticulturist  
Winter Garden Experiment Station, Winter Haven, Texas

The Winter Garden station has been primarily concerned with fruits and vegetables. But the wide diversity of agricultural crops, including livestock, in this area, along with high labor costs in the production of vegetables, has created an interest in better legumes, grasses and other forage crops. The information given in this publication was collected over a period of 17 years and will be used as a basis for further experiments.

Small Grains for Forage

There was a large increase between 1940 and 1946 in the acreage planted in the Texas Winter Garden to winter oats for grazing. The variety most widely planted was Texas Red Rustproof, but other varieties were shipped in at times because of scarcity of seed.

Several varieties of oats, wheat and barley were planted on Webb fine sandy loam soil in the fall of 1943, 1944 and 1945. These varieties were clipped periodically in an effort to measure their grazing value. The seed were drilled in 14-inch rows at the rate of 80 pounds per acre. Green weights were taken at each harvest and the forage allowed to dry for dry-weight determination.

Forty varieties were planted in at least 1 of the 3 years. Yields are given only on those varieties planted in 2 of the 3 years. Comparable yields of small grain varieties are given in Table 1. These were calculated to eliminate differences in average yields due to seasonal effects. Also in Table 1 is given the average percent of forage produced prior to February 10 of each year.

There was a wide range in the amount of total forage produced as well as the time of year in which it was produced. Such varieties as Boone and Lega oats and Tunis barley produced more than 60 percent of their total forage prior to February 10. These data show that more than 5,000 pounds of air-dry forage may be obtained from the better producing varieties of small grain when harvested four or five times during the cool part of the year.

Figure 1 gives the relative yield of four varieties of small grain for different seasons of the year.

Row plantings of Italian ryegrass gave yields of four tons of dry matter per acre in 1936 and 1937.

30.72  
35m  
21

Table 1. Comparable yields of air-dry forage production from small grains, 1944-46

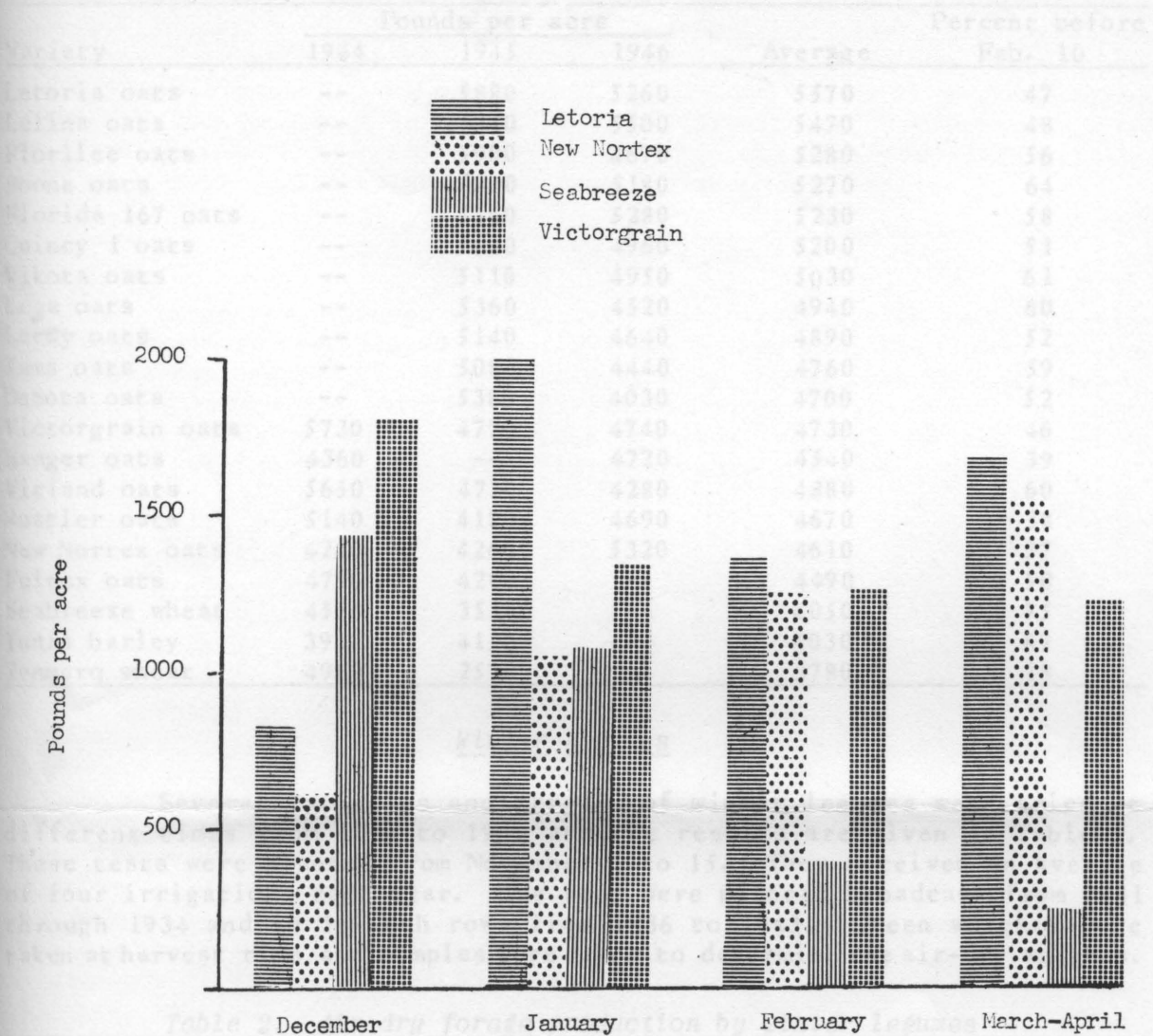


Figure 1. Yield of small grain varieties by seasons, 1944-46.

Variety	1944	1945	1946	Average	Percent before Feb. 16
Austrian winter pea	--	--	--	9460	3920
Alaska clover	--	--	--	6000	--
Black Ladak	--	--	--	3920	--
Canada field pea	--	--	4660	6740	4580
Purple vetch	3860	3900	4020	3680	3320
Common clover	2540 <sup>1/2</sup>	3660	3040	3820	3580
Hairy vetch	3040	2710	--	5320	5720
Crimson clover	--	--	--	3800	4840
Four clover	--	1740	3380	2100	5040
Blue lupine	--	--	--	--	--
Smooth Peruvian alfalfa	3540 <sup>3/4</sup>	--	--	--	--
White bar clover	--	--	--	--	3280
Common alfalfa	4080 <sup>2/4</sup>	--	--	3020	1320
Hairy Peruvian alfalfa	2280 <sup>2/4</sup>	--	--	4040	1360
Winter pea	2680	3040	--	--	--

<sup>1/2</sup> Two cuttings.  
<sup>3/4</sup> Four cuttings.

Table 1. Comparable yields of air-dry forage production from small grains, 1944-46

Variety	Pounds per acre			Average	Percent before Feb. 10
	1944	1945	1946		
Letoria oats	--	5880	5260	5570	47
Lelina oats	--	5440	5500	5470	48
Florilee oats	--	5900	4670	5280	56
Boone oats	--	5360	5180	5270	64
Florida 167 oats	--	5180	5280	5230	58
Quincy 1 oats	--	5440	4960	5200	51
Vikota oats	--	5110	4950	5030	61
Lega oats	--	5360	4520	4940	60
Leroy oats	--	5140	4640	4890	52
Tama oats	--	5080	4440	4760	59
DeSota oats	--	5380	4030	4700	52
Victorgrain oats	5730	4720	4740	4730	46
Ranger oats	4360	--	4720	4540	39
Vicland oats	5650	4720	4280	4880	60
Rustler oats	5140	4180	4690	4670	38
New Nortex oats	4240	4260	5320	4610	37
Fultex oats	4790	4200	--	4490	50
Seabreeze wheat	4570	3530	--	4050	75
Tunis barley	3910	4150	--	4030	87
Tenmarq wheat	4990	2570	--	3780	18

Winter Legumes

Several varieties and strains of winter legumes were tried at different times from 1931 to 1943 and the results are given in Table 2. These tests were planted from November 1 to 15. They received an average of four irrigations each year. The seed were planted broadcast from 1931 through 1934 and in 18-inch rows from 1936 to 1943. Green weights were taken at harvest time and samples were taken to determine the air-dry weights.

Table 2. Air-dry forage production by winter legumes

Variety	Pounds per acre					
	1931	1932	1934	1936	1937	1943
Austrian Winter pea	--	--	--	9460	5920	--
Alsike clover	--	--	--	6000	--	--
Black Medic	--	--	--	5920	--	--
Canada field pea	--	--	4660	6740	4580	--
Purple vetch	5860	3800	4020	3680	5320	5600
Hubam clover	2540 <sup>1/</sup>	3660	3040	5820	5580	5800
Hairy vetch	3040	2740	--	5520	5720	--
Crimson clover	--	--	--	3800	4040	--
Sour clover	--	1740	5580	2100	5040	--
Blue Lupine	--	--	--	--	--	3540
Smooth Peruvian alfalfa	3540 <sup>2/</sup>	--	--	--	--	--
Calif. bur clover	--	--	--	--	--	3280
Common alfalfa	4080 <sup>2/</sup>	--	--	3020	1320	--
Hairy Peruvian alfalfa	2280 <sup>2/</sup>	--	--	4040	1460	--
Tangier pea	2680	2040	--	--	--	--

<sup>1/</sup> Two cuttings.

<sup>2/</sup> Four cuttings.



Purple vetch, Hubam clover and hairy vetch had consistently good yields over a period of years. Hubam clover and hairy vetch produce most of their growth in the spring and are therefore of little value for winter forage. Purple vetch, California bur clover, Canada field peas and sour clover produce most of their growth in the winter. Austrian Winter peas and Crimson clover are late maturing, with most of their growth in the spring. In one season, a strain of Hubam clover obtained from Yuma, Arizona, produced considerably more winter forage than the ordinary Texas strain. Singletary peas failed to produce enough forage to harvest.

### Miscellaneous Summer Legumes

Lespedeza produced the highest total forage yields among the miscellaneous summer legumes, as shown in Table 3, but only the Korean variety was consistent because of difficulty in getting stands from Kobe and Common. Korean is a very quick-maturing, short-lived crop. Alyce clover and guar also had good forage yields. Soybeans and guar are well adapted to heavy limy soils where many of the summer legumes become chlorotic and fail.

Table 3. Air-dry forage production by miscellaneous summer legumes

Variety	Pounds per acre				
	1931	1932	1933	1934	1942
Korean lespedeza	6140	7980	2240	--	2540
Kobe lespedeza	8040	failed	--	--	--
Common lespedeza	7240	failed	--	--	--
Alyce clover	--	--	--	106	3560
Guar	--	2360	4140	--	--
Spanish peanuts	2400	--	--	--	--
Brown Tepary bean	--	--	2340	--	--
White Tepary bean	--	--	2300	--	--
Ey. spec. velvetbean	--	2120	2340	--	--
Laredo soybean	4300	980	--	640	--
Ottootan soybean	3640	1120	--	440	--
Biloxi soybean	--	2280	--	720	--
Mam. yel. soybean	--	1600	--	720	--
Mungbean	700	1080	--	--	--

### Cowpeas

Cowpea variety tests were conducted from 1930 through 1934 without irrigation. Results are given in Table 4. Brabham and Chinese Red were tested 4 and 5 years, respectively, and averaged from 2,020 pounds for the Chinese Red variety to 2,800 pounds for Brabham. Cowpeas are adapted only to sandy or sandy loam soils.

### Summer Annual Grasses

The summer annual grass tests were conducted with irrigation. Water was applied on the average of eight times each summer. Results of these tests are given in Table 5. The different varieties of Sudan produced from 9,400 pounds per acre for the Tift variety to 10,950 pounds for Common Sudan.

Table 4. Air-dry forage production by cowpeas, 1930-34

Variety	Pounds per acre				
	1930	1931	1932	1933	1934
Iron	--	--	3860	--	--
Groit	1300	4820	--	--	--
New Era	2540	3480	--	--	--
Brabham	--	4020	2480	3500	1220
Blackeye	2220	--	--	2780	1980
Whippoorwill	1400	3180	--	--	--
Black	--	--	2220	--	--
Early Buff	2200	--	--	--	--
Purple Hull	--	--	--	2640	1760
Clay	--	--	--	2460	1820
Chinese Whippoorwill	2060	--	--	--	--
Chinese Red	2060	1780	1820	2600	1840
Red Wonder	--	1400	1280	--	--

Table 5. Air-dry forage production by summer annual grasses<sup>1/</sup>

Variety	Pounds per acre		
	1942	1944	1946
"Wonder forage"	14840	--	--
Common Sudan	--	12040	9860
Calif. 23 Sudan	10080	--	10660
Sweet Sudan	--	10640	9000
Tift Sudan	--	10620	8200
Pearl millet	7180	8900	4900
Teosinte	--	4400	--

<sup>1/</sup> Four harvests annually for all except Pearl millet and "Wonder forage," which were harvested three times.

### Sorghums

Sorghum variety tests were conducted on both irrigated and dry land. Many of the varieties in these tests are grown primarily for grain, therefore, the yield of forage would not be expected to be as high as the varieties grown for forage. The results from these tests are given in Table 6. Hegari, Schrock and Darso are commonly grown for forage and these varieties produced the highest forage yields.

### Perennial Grasses

A test involving 16 species of perennial grasses was initiated in the spring of 1942. The seed were sown in three-foot rows and the plants irrigated 18 times in 1942 and 11 times in 1943. These grasses were clipped periodically for 2 years. The results are given in Table 7.

Australian Beardgrass produced an average of 22,570 pounds of air-dry forage per acre. Rhodesgrass and South African bluestem produced 17,130 and 16,935 pounds per acre, respectively. Results showed a definite weakening of Blue Panic and Yellow Beard grasses under frequent clippings.

Table 6. Air-dry forage production by sorghums

Variety	Dryland			
	Pounds per acre			
	1931	1932	1933	1943
Hegari	--	15180	2280	1660
Schrock	6540	5640	2540	--
Darso	8340	4900	1620	--
Texas milo	3360	5340	1700	960
Caprock	--	--	--	1920
Plainsman	--	--	--	1660
Quadroon	--	--	--	1440
Martin	--	--	--	1360
Westland	--	--	--	1300
Early Hegari	--	--	--	1100
Sooner milo	--	--	--	800

Variety	Irrigated					
	1938	1939	1940	1941	1943	1944
Schrock	--	--	--	--	--	10800
Hegari	--	--	10940	2600	15240	12400
Dalhart	--	--	--	--	--	9200
Darso	--	--	11820	2800	--	11000
Texas milo	--	5140	10900	2800	12260	8800
Bonita	--	--	--	--	6980	8800
Sooner milo	--	4280	--	--	5260	--
Westland	--	--	--	--	7260	--
Early Hegari	--	--	6960	2800	10600	7400
Martin	--	--	--	--	8160	5400
Quadroon	7640	3660	9000	2600	8420	--
Plainsman	--	--	--	--	4460	7400

### Summary

The results of the tests conducted with forage crops at the Winter Garden Station from 1930 through 1946 show that good forage yields may be obtained from several crops.

Some varieties of small grain gave yields above 5,000 pounds of dry matter per acre per year. Certain varieties produced more than 60 percent of the year's total dry matter prior to February 10, while others produced less than 40 percent of the total year's production by that date. Italian ryegrass produced an average of 4 tons of dry matter per acre. Purple and hairy vetch and Hubam clover were the most consistent producers among the winter legumes tested for a period of years. Cowpeas can be expected to produce an average of 2,000 to 3,000 pounds of dry matter per acre without irrigation on sandy soils.

Of the 16 perennial grasses tested, Australian Beardgrass gave the highest annual yield of 22,570 pounds of dry forage per acre. Rhodesgrass produced an average of 17,130 pounds. Australian Beardgrass, African bluestem, Rhodesgrass, Lehmann's lovegrass and Weeping lovegrass withstood



frequent clippings without showing signs of reduction in stands. Stands were reduced by frequent clipping on Blue Panic, Yellow Beardgrass, slender grama and Guineagrass. Under neglect and no irrigation Australian Beardgrass, Yellow Beardgrass, slender grama, Lehmann lovegrass and African bluestem survived and invaded other areas.

Table 7. Air-dry forage production by perennial grasses

Species	1942		Pounds per acre		
	Date planted	Date emerged	1942	1943	Average
Australian Beardgrass <i>Andropogon intermedius</i>	2/18	4/24	20470	24660	22570
Rhodesgrass <i>Chloris gayana</i>	3/18	4/3	15190	19070	17130
South African bluestem <i>Hyparrhenia hirta</i>	3/18	4/4	15120	18750	16940
Guineagrass <i>Panicum maximum</i>	5/22	5/22 <sup>2/</sup>	16970	14010	15490
Rhodesgrass <i>Chloris gayana</i> (T-3862) <sup>1/</sup>	4/10	4/22	11400	11900	11650
Blue panicgrass <i>Panicum antidotale</i>	4/10	4/20	13920	7880	10900
Yellow Beardgrass <i>Andropogon ischaemum</i>	3/18	4/5	10590	8760	9670
Natal grass <i>Tricholaena rosea</i>	3/18	4/4	14170	4020	9100
Lehmann lovegrass <i>Eragrostis lehmanniana</i>	3/18	4/4	6730	11350	9040
Weeping lovegrass <i>Eragrostis curvula</i>	3/18	4/1	5570	9200	7380
King Ranch bluestem <i>Andropogon ischaemum</i> (T-3872) <sup>1/</sup>	4/10	4/27	6820	4060	5440
Slender grama <i>Bouteloua filiformis</i> (T-3451) <sup>1/</sup>	4/10	4/27	4370	3680	4020
Blue grama <i>Bouteloua gracilis</i> (T-15207) <sup>1/</sup>	4/10	4/20	2380	--	--
Boer lovegrass <i>Eragrostis chloromelas</i> (T-3968) <sup>1/</sup>	4/10	4/20	3640	3550	3590
Bahia grass <i>Paspalum notatum</i>	3/18	4/23	1620	2720	2170
<i>Tricholaena repens</i>	3/18	4/4	7800	--	--

<sup>1/</sup> SCS accession numbers.

<sup>2/</sup> Planted sod.

MISCELLANEOUS PUBLICATION 87

Conclusions

By using an adapted variety of oats with Hubam clover for winter pasture, and Sudan grass with Chinese Red cowpeas for summer grazing, along with an acreage of Australian Beardgrass or Rhodesgrass, it seems feasible that a farmer could develop a year-long grazing program under irrigation in the Winter Garden area. Continuous grazing throughout the year will require careful planning and management.

Cooperative Cotton Gins in Texas

Acknowledgments

The help of Ide P. Trotter and E. S. McFadden of the Department of Agronomy was freely given in planning the first clipping experiments in 1943. Seed of small grains were supplied by various experiment stations and by the U. S. Department of Agriculture. Perennial grass seed were supplied by R. L. Hensel of the Department of Agronomy and by the Soil Conservation Service grass nursery at San Antonio. Sorghum seed were sent by R. E. Karper, in charge of Texas sorghum breeding, with headquarters at the Lubbock station.

- 0 -



○ Cooperative Cotton Gins  
January 1, 1950

Department of Agricultural Economics and Sociology

TEXAS AGRICULTURAL EXPERIMENT STATION, COLLEGE STATION, TEXAS