CANEBRAKE

Agricultural Experiment Station,

Uniontown, Alabama.

BULLETIN NO. 5. - - JULY, 1889.

SUBJECTS.

OATS—Upon drained and undrained land.
—With different fertilizers.
—Effects of methods of preparation.

WHEAT—Varieties.
—On drained and undrained land.

METEOROLOGICAL REPORT.
—Relations between rainfall and drainage.
—Water supply for cattle.

THE BROWN PRINTING CO., STATE PRINTERS, BINDERS & STATIONERS.

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BY W. H. NEWMAN.

In the experiments with fertilizers on oats, on drained and undrained land, one-eighth acre plots were used. The land was what is known in the Canebrake as "black slough bottom," and had been in corn the previous year. The plots of oats crossed the fertilized plots of corn of the previous year, and were, therefore, equally affected by them. One peck of seed was sown to each plot, and was plowed in with the fertilizers with a two-horse plow, and then well harrowed with a Thomas harrow. A good stand was obtained on all the plots and all stood the winter remarkably well.

There was no difference in the time of ripening, and all the plots were cut the same day and stood in small shocks until hauled up for threshing. Each plot was weighed as soon as hauled up to obtain the yield of straw and grain combined, and the grain was both measured and weighed to obtain the yield and average weight per bushel. Each plot was threshed separately, and the machine thoroughly cleaned after threshing each plot.

The greatest care was used in measuring and weighing to get the correct yield and average weight per bushel of grain. The grain was free from impurities.

TABLE I.

Experiment with Fertilizers on Oats. (Texas Rust Proof Variety.)

	FERTILIZERS.	DRAINED. Time sowed.		When cut.		Yield of straw and grain in lbs. per acre.	Yield of grain in bushels per acre.	Per cent. of grain.	Average weight of a bushel of grain.	Plots.	UNDRAINED. Yield of straw and grain in lbs. per acre.	Yield of grain in bushel per acre.	Per cent. of grain.	Average weight of a bushel of grain.	Gain in yield by drainage.	Loss in yield by drainage.
1	200 lbs. C. S. M. and 80 lbs. C. S. H. A. and 400 lbs. R. Phos.	Oct.	29	May	23	2,848	39 50	47.17	34.00	1	2,496	32.24	42.22	33.00	7.26	...
2	400 lbs. Raw Phos	"	29	"	23	2,448	33.12	47.75	34.50	2	2,080	32.00	51 53	33.50	1.12	....
3	200 lbs. C. S. meal and 80 C. S. hull ash......	"	29	"	23	2,800	38.00	46.14	34.00	3	2.800	37.39	44.06	33.00	0.61	.
4	No manure..........	"	29	"	23	2,528	33.76	45.40	34.00	4	2,480	37.35	48.94	32.50	......	3.59
5	200 lbs. C. S. meal	"	29	"	23	3,440	48 58	48.01	34.00	6	2,768	35.64	43 77	34 00	12.94	....

On examining the above table it will be seen that the drained land responded more readily to the fertilizers than the undrained. The raw phos. was the only one that fell below no manure on the drained land, and the results simply show that the raw phos. produced no effect. Plot 4, no manure, on the drained land fell below the yield on undrained, while plots 1, 2, 3 and 6 were greater in yield on the drained than on the undrained. The undrained land lying lower down the slough is naturally more fertile than the drained area.

Where C. S. Meal was applied on the drained land it increased the yield in each plot, but fell below no manure on the undrained land.

All the experiments were cut with a cradle, and it was impossible to cut them exactly the same height. The most marked effect of drainage was to increase the effect of the C. S. Meal.

There was a marked difference in the land at the time of preparing ; the drained was dryer and much more easily prepared. The drained land can be worked from two to three days earlier after a rain than the undrained, and is very easy to be kept clean and in a good condition.

The plots in Table II were on drained land, and were sown and treated like the drained land plots in Table I. They all passed the winter well except No. 3, where stable manure was used. This plot showed the effects of the winter, but in the spring no difference could be seen from its effects. All of them show a decided increase over no manure, stable manure making least and green cotton seed the greatest increase. Plots one, two, four and five ran directly over the drains and that caused a little increase in yield of straw and grain. They were all threshed on the same day and treated like the plots in Table I.

TABLE II.

Experiments with Fertilizers on Oats.

	FERTILIZERS.	Time sowed.		When cut.		Yield of straw and grain in lbs. per acre.	Yield of grain in bushels per acre.	Per cent. of grain.	Average weight of a bushel of grain.
1	400 lbs. C. S. Meal.........	Oct.	29	May	22	2,768	43 03	51.30	33.00
2	40 bushels green cotton seed.	"	29	"	22	3,120	47.01	51.98	34.50
3	2,000 lbs. stable manure ...	"	29	"	23	2,800	38.72	47.70	34 50
4	400 lbs. Webb's fertilizer...	"	29	"	23	2,960	43.32	47.56	32.50
5	No manure	"	29	"	23	2,528	33.76	45.40	34.00

TABLE III.

Different Methods of Seeding.

	FERTILIZERS.	Time sowed.	When cut.	Yield of straw and grain in lbs. per acre.	Yield of grain in bushels per acre.	Per cent. of grain.	Average weight of a bushel of grain.
1	Seed plowed in with fertilizers and left rough.....	Oct. 29	May 23	3,360	47.03	45.49	32.50
2	Fertilizer plowed in, seed harrowed in, leaving land very smooth.....	Oct. 29	May 23	3,280	50.90	50.91	33.00

The two plots of Table III were undrained slough bottom, and were fertilized with 200 lbs. C. S. M., and 80 lbs. cotton seed hull ashes per acre. A perfect stand was secured on both plots, and no difference in their appearance could be seen. The winter was so mild, the smooth harrowed plot stood it as well as the one left rough.

No. 2 ran immediately over a drain, and that may have caused the increase of three bushels in the yield.

Tables four and five show the yield of varieties of oats sown in fall and spring.

The fall sowing was on "slough bottom," without manure, and had been in corn the previous year. One-eighth acre plots were used, and one peck of seed sown to plot. The rust proof yielded 19.21 bushels more, stood the winter better and was not attacked by rust, while the Ewing rusted on the leaves and was damaged a little by the winter.

The Ewing tillers very little, and from the start makes an up-right growth.

The spring oats were sown on "red prairie" land that had been in peas the previous year, and the vines allowed to remain on the land. No manure was used in this. Like the other experiments in oats, one-eighth acre plots were used with one peck of seed.

The spring oats were badly damaged by the drouth, the Ewing suffering the most.

TABLE IV.

Testing yield of varieties sown in the fall.

	VARIETIES.	Time sowed.	When cut.	Yield of straw and grain in lbs. per acre.	Yield of grain in bushels per acre.	Per cent. of grain.	Average weight of a bushel.
1	Ewing.....	Nov. 30	May 22	2,160	32.12	47.58	32
2	Rust proof.....	" 30	" 24	3,184	51.33	48.36	30

TABLE V.

Testing yield of varieties sown in the spring.

1	Ewing.....	Jan. 30	May 24	2,160	26 28	34 06	28
2	Rust proof.....	" 30	June 4	2,384	39.12	52.92	32

The Ewing oat ripened twelve days earlier, and was very uneven in ripening. The tops of the panicle seemed to dry up, while the bottom was green and was the only part of the panicle that made good heavy grain. This drying up was the cause of the Ewing averaging four pounds less to the bushel. The Rust proof produced 12.84 bushels more per acre. The Ewing is not a very desirable oat for this section. The test will be repeated next fall and spring.

EXPERIMENTS WITH WHEAT.

One-eighth acre plots were used in these experiments, and one-half peck of seed to plot sown. Purple straw wheat, from Salem, Ala., was the variety used. The seed were plowed in with a two-horse plow, and the land harrowed well. A good stand was obtained on all the plots, except No. 1 on the drained land. In this plot there was one corner on which the stand was scattering. No difference in the growth of the plots could be seen. The drains did not show on the wheat as in the oats, there being no difference in the height of the wheat directly over the drains.

TABLE I.

Experiments with Wheat on "Shell Ridge" Land.

	FERTILIZERS USED.	DRAINED. Time sowed.	DRAINED. When cut.	DRAINED. Yield of straw and grain in lbs. per acre.	DRAINED. Yield of grain per acre in bushels.	DRAINED. Per cent. of grain.	DRAINED. Average weight of a bushel of grain.	UNDRAINED. Plots.	UNDRAINED. Yield of straw and grain in lbs. per acre.	UNDRAINED. Yield of grain per acre in bushels.	UNDRAINED. Per cent. of grain.	UNDRAINED. Average weight of a bushel of grain.	UNDRAINED. Gain by drainage in grain.	UNDRAINED. Loss by drainage in grain.
1	200 lbs. C. S. M. and 80 lbs. C. S. H. Ashes........	Nov. 26	May 22	2,360	16.00	42.11	62.50	1	2,592	16.86	40.32	62	....	.86
2	200 lbs. C. S. M................................	" 26	" 22	3,328	19.46	36.39	62.25	2	2,960	18.06	40.59	61	1.40	....
3	No manure...................................	" 26	" 22	2,544	16.06	40.45	62.00	3	2,448	15.63	39.58	62	0.97	....

All the plots were attacked on the leaves by rust, but the stem was free from it. Cotton seed meal alone on drained and undrained land produced the larger yield.

The addition of cotton seed hull ashes seemed to have lessened the effects of the meal, for on both drained and undrained land it produced less than the meal alone.

TABLE II.

VARIETIES.	Seed From—	Time sowed.	When cut.	Yield of straw and grain per acre.	Yield of grain per acre.	Per cent. of grain.	Average weight of a bushel.
Purple straw.	Salem, Ala......	Nov. 30	May 22	2,704	16	36.09	61
Velvet chaff.....	Auburn, Ala...	Dec. 4	" 18	1,520	8	31.57	60
Velvet chaff..	Uniontown, Ala.	Nov. 30	" 18	1,584	9	34.99	60

The varieties in Table II were planted on "black slough" bottom. One-eighth acre plots were used and one-half peck of seed sown to the plot. A good stand was obtained on all the plots, and no difference in their appearance could be seen until late in the spring. The velvet chaff makes an upright growth and tillers very little, while the purple straw spreads and tillers a great deal. The velvet chaff wheat was damaged by rust on the leaves, stalk and chaff. The purple straw only on the leaves.

The velvet chaff had large heads, but a medium grain.

The purple straw had medium heads and the grains were a little above medium and much plumper than the velvet chaff.

The varieties in Table III were from the U. S. Department of Agriculture, and were planted on small plots in the garden that had been made very rich by broadcasting stable manure, cotton seed meal and green cotton seed.

The following is a short description of each:

Currell's Prolific.—A smooth wheat with red kernels of a medium size, slightly winter killed, attacked very slightly by rust. Straw from 4 to 5 feet long.

Fulcaster.—A bearded wheat with large red kernels, not winter killed, but rusted slightly. Straw from $4\frac{1}{2}$ to $5\frac{1}{2}$ feet.

Improved Rice.—A smooth red wheat with kernels of medium size, slightly winter killed and rusted badly. Straw 4 to 5 feet.

The Mealy.—A smooth wheat with small shriveled kernels, very seriously winter killed and rusted very badly. Straw 3 to 4 feet.

TABLE III.

	VARIETIES.	Seed From	Time sowed.	When cut.	Yield of straw and grain per acre in lbs.	Yield of grain in bushels per acre.	Per cent. of grain.	Average weight of a bushel of grain.
1	Currell's prolific.	U. S. Dept.	Oct. 11	May 16	5,880	27.41	27.97	62
2	Fulcaster.....	" "	" 11	" 21	8,540	36.16	25.40	63
3	Improved Rice..	" "	" 11	" 16	6,020	25.66	25 74	62
4	The Mealy.....	" "	" 11	" 22	5,740	22 16	23.16	58

Experiments with Wheat and Oats planted at different depths.

	DEPTH.	Wheat. per cent. Vegetated.	Oat. per cent. Vegetated.
1	½ inch.....	87	91
2	1 inch.....	75	83
3	1½ inch.....	83	87
4	2 inch.....	75	91
5	2½ inch.....	50	87
6	3 inch.....	62	50
7	3½ inch.....	45	62
8	4 inch.....	62	50
9	4½ inch.....	41	70
10	5 inch.....	58	62
11	5½ inch.....	29	50
12	6 inch.....	25	41

METEOROLOGICAL REPORT,

From October 1st, 1888, to June 30th, 1889, inclusive.

	TEMPERATURE.												
MONTHS.	Monthly Mean.	Maximum.	Minimum.	Mean of Max.	Mean of Min.	Monthly range.	Total precipitation	No. rain days.	Mean relative humidity.	No. cloudy days.	No. fair days.	No. clear days.	Prevailing wind.
October.....	64.86	84	45	73.3	53.2	39	4.54	7	76.73	11	3	17	E.
November.....	56.92	80	29	63.83	47.90	51	2 95	6	79.43	10	6	14	N. E.
December.....	48.25	67	25	55.77	37.16	42	2.80	5	72.28	10	3	18	N. W.
January.....	49 37	66	26	55.77	38.61	40	5 07	11	79.48	18	7	6	E.
February.....	49.28	79	24	56.50	36.14	55	2.06	5	79.94	17	3	8	N. W.
March.....	58 40	81	30	66.77	46.54	51	2.43	6	76 50	12	9	10	N. W.
April.....	67.56	84	41	76.50	55.50	43	5.25	6	71 60	7	1	22	N. W.
May.....	72.94	90	41	82 06	59.54	49	0.10	1	56 39	5	6	20	N. W.
June.....	78.75	95	44	86.23	68 44	51	3 57	10	68.73	14	2	14	S.

RELATION BETWEEN RAINFALL AND DRAINAGE.

In Bulletin No. 3 of January last, the following was reported under this head:

"One of the systems of tile drainage covers just three acres, the limits of which are such as to define quite accurately the area from which the tiles draw their outflow. The tiles are laid 30 feet apart and three feet deep. Measurement of the outflow from this system was made for six consecutive days in October last for the purpose of forming some idea of the extent and rapidity of the discharge of the surplus water by means of the tiles. The rainfall was as follows: October 22d .97 inches, 23d .55, 24th .69, and 25th 1.49, making a total precipitation of 3.70 inches in four days.

"The results obtained, do not profess to be either exact or accurate, but are simply given to *indicate* roughly the relation between rainfall and drainage.

"The total precipitation upon the three acres in the four days was 305,148 gallons, and the outflow *during six days*, from October 24th to 29th inclusive, was 208,353 gallons, or 68 per cent. of the precipitation.

"This, of course, does not cover the whole outflow, but simply indicates the promptness with which the tile withdraws the surplus water from the first three feet of the surface, even in such tenacious soils as that of the Canebrake. No measurements were made on the first two days of the precipitation. That much of the surplus occasioned by these had already been withdrawn when the measurements commenced, is shown by the fact, that the first measurement on the 24th showed an outflow of one gallon to eight seconds.

"That there was still much surplus water in the soil was indicated by the outflow of one gallon to 90 seconds the seventh day.

"The rainfall and outflow were as follows:

	Rainfall in inches.	Outflow—one gallon in.
October 22d	0.97	Not measured.
" 23d	.55	Not measured.
" 24th	.69	8 Seconds.
" 25th	1.49	½ Second.
" 26th	.....	6 Seconds.
" 27th	.....	14 Seconds.
" 28th	.....	45 "
" 29th	.....	65 "
" 30th	.....	90 "

"The promptness with which the drains removed the surplus water from such tenacious soil, is worthy of notice.

"An outflow of 7,200 gallons from three acres of land in one hour, or 172,800 in one day, indicates the importance of drainage. Without the under drains a large portion of this surplus, instead of being filtered through three feet of soil, must have run off from the surface carrying with it soluble plant food needed for the production of crops."

During thirty days previous to these measurements, the precipitation was 1.74 inches, and the soil was covered with

the growth of the season. The rainfall which caused the outflow then was distributed over four days without excessive precipitation either day, so that very little ran off from the surface.

The measurements now recorded were the outflow from excessive rainfall 13th and 14th April, when 3.39 inches fell in twenty-four hours upon land denuded of vegetation by the preparation for spring crops. The surface overflow was, therefore, considerable.

The rainfall during the thirty days previous to April 13th was 1.40 inches, and drying winds prevailed. On the 13th 2.32 inches of rain fell, and on the 14th 1.07 inches. Measurements commenced April 14th to ascertain the outflow from the main tile of a cistern covering three acres—the same on which notes were made in October, 1888.

Measurements were made on the 14th and 15th at 7:30 a. m., and 2:30 and 5:30 p. m. on the 16th, 17th, and 18th, twice daily, and on the 19th, 20th, 21st and 22d, once daily, giving the following results:

Date	Rainfall in inches	Hour of measurement of outflow	Outflow: One gallon in	Outflow: Gallons in 24 hours.
April 13	2.32			
" 14	1.07	7:30 a. m.	3 Seconds	32,472
" 14		2:30 p. m.	2 "	
" 14		5:30 p. m.	3 "	
" 15		7:30 a. m.	4 "	16,200
" 15	0.03	2:30 p. m.	5 "	
" 15		5:30 p. m.	7 "	
" 16		7:30 a. m.	12 "	6,912
" 16		5:30 p. m.	13 "	
" 17		7:30 a. m.	21 "	3,830
" 17		5:30 p. m.	24 "	
" 18		7:30 a. m.	40 "	1,872
" 18		5:30 p. m.	52 "	
" 19		7:30 a. m.	60 "	1,440
" 20		7:30 a. m.	68 "	1,267
" 21		7:30 a. m.	85 "	1,008
" 22		7:30 a. m.	118 "	720

Total outflow in nine days, 65,721 gallons.

Total rainfall on the three acres, 282,056 gallons.

In October, 1888, 68 per cent. of the rainfall, was withdrawn through the drains. In April, 1889, only 23 per cent. was so withdrawn.

POOLS FOR CATTLE.

On many farms in the Canebrake region cattle are watered from pools filled by rainwater.

The water in these pools becomes stagnant in times of drouth, having neither inflow nor outflow, and is daily fouled by deposits of the excrement of cattle. Since eighty-eight per cent. of ordinary milk is water, it is of the utmost importance that the water drank by milch cows should be as pure as possible.

It is a well established fact that impurities in water are transmitted to the milk. Can we not utilize the accumulated outflow from drains to supply wholesome drinking water for stock?

Cisterns dug into the lime rock are used all through the canebrake for collecting and preserving water for domestic purposes. This water is collected during the winter months while cool. It is not necessary that the water for stock should be very cool, but it shoud be *pure.*

Now, suppose each farmer drains one or more acres of land, and empties the main tile into a large cistern. Every rainfall which is sufficient to cause an outflow from the drains will renew the supply in the cistern. A force-pump or wind-mill to lift the water from the cistern completes the outfit. If a tank is raised above the cistern the water could be collected in this for distribution through underground pipes to any desirable points. By such means, pure water and a perpetual supply will be insured, and the health of those who consume milk less endangered.

If tile cannot be purchased, use split cedar logs for the drains.