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CROP AND FORAGE NOTES, 1900.

F. C. BURTIS.

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STILLWATER, OKLAHOMA.

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Crop and Forage Notes.

F. C. Burtis.

The following is a progress report on crops under test at the experiment station. Suitable varieties, soils, and the most desirable methods of cultivation are the principal points under investigation.

SEASON.

On the whole, the spring and early summer were quite favorable to plant growth. The spring was as early as usual, no killing frosts occurring after March. The month of May was unusually cool, the mean temperature being 64.5 degrees. The ground contained sufficient moisture for a good growth. Everything made a rapid advancement during June but the rainfall was much below the average for the month, and this shortage was felt in the following months. July followed with a light rainfall and drouthy conditions set in early in the month, a good rain about the middle of the month being all that saved crops from serious damage at that time. The rainfall during August was extremely light for that season of the year and a severe drouth continued through the month until the tenth of September. All crops were cut short and some perished. The almost total absence of hot winds was all that prevented this from being the worst drouth on record here. For the balance of September, the rainfall was unusually heavy, reaching 9.22 inches for the month, the largest record for any month at the station. This greatly revived living vegetation and with continued favorable conditions, the fall growth was unparalleled. Killing frosts did not appear until November 9th and 12th and then only the tenderest plants were injured, and much growth took place after these dates.

SOIL.

The soil of the station farm is described as medium upland of average fertility. The surface soil is four to twelve inches deep. This is finely divided and while it works fairly well, it is inclined to

run together and pack with rain. To obviate this tendency, stable manure is very beneficial. The subsoil is inclined to be too compact and tenacious and not readily penetrated by water or roots.

THE GRASS GARDEN.

The grass garden consists of a small patch of ground laid off in small plats, 10x20 ft. On these plats, new grasses and other crops are tested first and those showing desirable characteristics are then grown on a larger scale in the fields. Along with these in the grass garden, varieties growing elsewhere on the farm are grown for comparison and further investigation. These plats are situated on average soil of the farm, but the land has been manured in former years and is foul with crab-grass.

RESULTS IN 1900.

The following is a list of the grasses seeded on these plats in the spring of 1900.

English blue-grass	<i>Festuca elatior.</i>
Orchard grass	<i>Dactylis glomerata.</i>
Perennial rye-grass.	<i>Lolium perenne.</i>
Italian rye-grass	<i>Lolium Italicum.</i>
Red top	<i>Agrostis alba.</i>
Tall meadow oat-grass	<i>Avena elatior.</i>
Timothy	<i>Phleum pratense.</i>
Bermuda grass	<i>Cynodon dactylon.</i>
Smooth brome-grass	<i>Bromus inermis.</i>
Kentucky blue-grass	<i>Poa pratensis.</i>
Large water-grass	<i>Paspalum dilatatum.</i>

The spring and early summer were very favorable for the starting of grasses. The greatest draw-back at this season was the immense growth of crab-grass. This was mowed off every few weeks but by the next mowing, it would be ten to twelve inches tall and would completely cover the other grasses. As has been stated, July was more or less drouthy and August extremely dry. During July, most of the grasses were very much damaged and in August all, except the few mentioned later, perished.

The best of seed was used in all cases, and if not otherwise stated, the plats were seeded on April 19th. The ground was in fine till and the seed was put in with the greatest care. With few exceptions, the plants were up on the 25th. An excellent stand was obtained of all varieties with the exception of the brome-grass and

Kentucky blue-grass. The latter succumbed in a very few weeks. It has been tried very extensively at the station and in this locality, and while with care a start may be obtained in the spring, it perishes during the hot weather, unless it is watered, or is in an especially favored place. This has made it practically a failure, even as a lawn grass, in this locality.

The smooth brome-grass has given very disappointing results on the station farm, since it is a grass so highly recommended for drouthy regions, and such flattering results are reported from some places. While the last spring's seeding perished, there are plants of several years' standing on the farm and the growth of these has been meager. A great deal of the seed on the market is very inferior, hence it is very difficult to get a stand of this grass.

Timothy, perennial rye-grass, and Italian rye-grass made an extra fine start in the spring and a vigorous growth for a time. In May, the timothy looked fine and had a growth of two to three inches, but the crab-grass overtook it, and by fall not a single plant was alive. Timothy has been tested in years past on the station farm and once or twice, a fair crop has been obtained. It is, however, very uncertain and succumbs to our hot summers, and now only a few scattering plants are alive on the farm.

The start made by the Italian rye-grass on these plats was phenomenal. The stand was thick and the growth very rapid and by the middle of May, it stood six to eight inches tall. On June 13th, it was ten to twelve inches but the crab grass had shot up through it and was as tall as the rye-grass. At this date, all was cut and after this, the crab-grass held sway until the rye-grass perished by the drouth.

The perennial rye-grass made much such a start as the above but not quite so rapid a growth, and met very much the same fate. It was one point ahead in that quite a number of the plants survived the drouth and are now alive. Both of the rye-grasses are growing in other places on the farm and make a very fair showing.

In the seeding trials of the past spring, orchard grass and English blue-grass perished with the rest, but one thing greatly to their disadvantage was that the first seeding was washed out and had to be reseeded a week later. These grasses growing at other places on the farm where the plants are of several years' standing lived all right. They have been grown quite extensively here and are considered to be two of our most desirable tame grasses. They start early in the spring. If the weather is dry, they are quite dor-

nant in the summer, but take a new start in the fall and remain green until hard freezes which sometimes do not occur here until January or February. Usually but one crop of hay is obtained during a season but if the rainfall is good in July and August, a second crop is produced. These grasses make a good mixture as they ripen about the same time. The first crop is ready here the last of May. The past season, a half-acre plat of English blue-grass yielded at one cutting, 700 lbs. of hay, or at the rate of 1400 lbs, per acre.

The Bermuda-grass made quite a meager showing in the spring, but made a steady growth during the summer, and by fall covered the ground with eight to ten inches of growth. The tops were killed with the first frosts in November. This is a well-known grass with great drouth-resisting qualities. It starts late in the spring and the tops die with the first frosts, but it remains green during our hottest and driest weather and furnishes considerable pasture. It is not a desirable meadow grass. It winter-kills to some extent in exposed locations. Further south, there is complaint of its troubling as weed since it spreads so readily taking a start in cultivated places where it is hard to eradicate. Here it spreads quite readily and grows quite persistently in spots in cultivated places, but not to a serious extent. It can be propagated quite readily from the seed or the sod. The seed is very expensive, but if a thin stand is obtained and the weeds and crab-grass kept down until the Bermuda-grass has a start, it will soon cover the ground.

The large water-grass (*paspalum dilatatum*) should be specially mentioned in this test. It was a little slow in coming up and made a small showing during the summer, but the growth was continuous and with the help of the fall rains, reached a height of eight to ten inches and headed. The tops remained green until the winter freezes. This grass has a great reputation as a drouth-resister and has proven itself in this trial to be able to make a start from seed when many other grasses failed.

While this cannot be considered a tame-grass country, there are varieties that will do fairly well here if the proper attention is given and a start obtained. Great care must be exercised in starting them, and success in this will be much surer if the field to be seeded is given a year or two of special cultivation to rid it of weeds and crab-grass prior to the time of seeding. The seeding should be done early in April and the soil put in fine tilth.

Crop and Forage Notes.

THE CLOVERS.

The following list was seeded in the grass garden in the spring of 1900:

Alsike clover	<i>Trifolium hybridum.</i>
Crimson clover	<i>Trifolium incarnatum.</i>
Mammoth clover	<i>Trifolium medium.</i>
Red clover	<i>Trifolium pratense.</i>
Japan clover	<i>Lespediza striata.</i>
Alfalfa	<i>Medicago sativa.</i>

The general notes on the grass garden, given in the report on the results on grasses, apply here. The seeding was made on June 19th and all the varieties came up in seven to eight days, except Japan clover which was several days later and never made a satisfactory growth. The others made a good start but, to state the matter briefly, not one of the list had a live plant on the plot by the middle of August. The plan was to seed the crimson clover again in August but the weather was too dry. In previous trials, seeded at the prescribed time, it has proven of no value for this country. Mammoth clover, red clover, and alfalfa are all that require further comment at this time.

The mammoth clover made a very good growth and on June 13th, stood ten to twelve inches tall and covered most of the ground but there was some crab-grass in it. Soon after this, it bloomed, and was cut. After this, the crab-grass overgrew it and the fine growth that the clover had made perished with the others.

The outcome of the red clover was the same. The growth from the start was not as vigorous as that of the mammoth. From previous experiments on a large scale at this station, and judging from results in like localities, very little can be expected from the red and mammoth clovers in Oklahoma. A good start may be obtained at times, and a fair crop harvested occasionally, but seldom much of it survive the dry, hot spell of the summers. The extra work and expense put on a crop of cowpeas would give better returns.

The alfalfa in the grass garden made an exceedingly fine showing and in a few weeks, was six to eight inches tall, completely covering the ground. It was an exceptionally fine showing but by June 13th it had commenced to wane and turn yellow. At this date, the plants stood ten to twelve inches tall and were about half in bloom. The plot was cut on this date. After this, the crab-grass sprang up and the alfalfa gradually died out.

Three different fields on the station farm that were seeded to alfalfa the past spring gave like results, although the stand was not as good nor the growth so vigorous as on this small plat. The above tests are those in which failures were made to carry the crop through the first year, such experiences being common even in good alfalfa districts and, in many cases, unavoidable. These have been few on the station farm, and if that were all that had to be overcome, we could report that there is some encouragement in trying to grow alfalfa here or on like soils. There is a more serious drawback here than failure to start the crop and that is to keep it alive after it has obtained a start. By spring seeding and by fall seeding, good fields of alfalfa have been started on the station farm and for a year or two, have given promising results. After having had the best of care, they have gradually taken on a sickly growth and the stand dwindled until bunch-grass and crab-grass occupied the ground. Almost every year since the starting of the station, a field of alfalfa has been started on the farm and the above has been the final result.

The following are some of the results obtained :

Field 1 was seeded in the fall of 1898, a good stand was obtained, and a fair growth was made at that time. It looked quite promising the next spring. In the summer of 1900, one and one-fifth tons of hay per acre were secured from four cuttings and part of this was crab-grass. The frequent cuttings were made to prevent the alfalfa or the crab-grass from going to seed. At the present time, this field has only a scattering stand of alfalfa and this makes a weak growth.

Field 2 was seeded in the spring of 1899 and a perfect stand was obtained. In the summer of 1900, one and four-fifths tons of hay per acre were secured from three cuttings and part of this was crab-grass. This field, like the other, is dying out.

Judging from the history of older fields on the station farm, in two or three years more, there will be no alfalfa on these fields except a few scattering plants. Our fields have not been pastured and have been given the spring disking that has proven so beneficial in some localities. Our records substantiate the belief that alfalfa cannot be grown with any degree of success upon the uplands where there is a stiff, tenacious, impervious sub-soil. So far at the station, sub-soiling, manuring the ground, applying fertilizers, alike have failed to give the crop any permanent help. Where the soil is suitable in Oklahoma, alfalfa is giving good results.

MISCELLANEOUS FORAGE CROPS.

RAPE.

This plant was tested under several conditions the past season. One plat was drilled in rows thirty inches apart and cultivated, one drilled in rows six inches apart, and another drilled with oats. The seedings were made in the last week in March. The plats gave the following yields of green forage per acre :

	Tons
Rape, drilled, rows 30 in.	23.5
Rape, drilled, rows 6 in.	11.0
Rape, drilled with oats.	12.5

The yields were determined on June 2d. Part of each plat was left and pastured off with hogs and sheep. They had to learn to like it but when they did, they were keen after it. The plats were on ground that had been well manured the previous winter. The growth ceased with the hot, dry weather of July. Planting so that it may be cultivated seems to be the most suitable for this country where dry spells are frequent. Fall seedings have given fair growth and withstood the freezes of December, 1900. Rape is a plant that does best in a moist, cool climate. Its value lies in the fact that it will produce a large amount of green feed in a short time. Good, rich soil is necessary for large yields. Dwarf Essex was the variety used in these tests.

FIELD PEAS.

This is another plant suitable for early spring planting to furnish green feed. It is very sensitive to drouth, and should be drilled with oats. During the past season, a plat of field peas and oats yielded at the rate of fifteen tons of green feed per acre. The feed is very rich and nutritious.

SUGAR BEETS.

The station grows these for stock feed. During the past season, they were grown on soil that had been manured in previous years and was in good tilth. The seeding was made April 26th. The seed came up readily and the plants were thinned to a perfect stand. The yield was at the rate of nine and three-quarter tons per acre on the plat of 48,152 square feet. A sample taken November 5th and analyzed showed ten per cent of sugar in the juice with a purity of 71.4 which is too low for sugar manufacture.

COWPEAS.

This plant is valuable as a catch-crop after wheat and oats. For several years past, this has proved a very profitable way of util-

izing oat and wheat stubble on the station farm. After the grain crop is removed, the land is furrowed with a lister and the cowpeas drilled in the furrows. Another method is to disk the stubble thoroughly and drill the peas in rows for cultivation, or in rows six inches apart. In the average season, a fine growth will cover the ground in five weeks.

In the past season, wheat stubble disked and drilled to cowpeas on July 3d had a growth of ten to twelve inches on August 24th. This was pastured off with cows and they ate it greedily, as everything else was dry at that time. After eating this growth, the cows were taken off the patch until November 10th. The growth was then much larger than on August 24th and afforded fine grazing for the second time.

The oat plat mentioned elsewhere was disked and drilled to cowpeas on July 6th. The rows were thirty inches apart and the crop was cultivated twice. On November 3d, 920 lbs. of cured hay were weighed from the plat, a yield of 1840 lbs. per acre.

METHOD OF CROPPING.

Several rotation and continuous cropping experiments are under way on the station farm. Most of these were started in the spring of 1900 and it will be several years before results can be compared. The yields for the past summer are given to show the results of the common crops on the farm for the season. Each treatment is duplicated on half-acre plats and on manured and un-manured land.

Following are the average yields per acre in 1900:

Corn:

	Grain, bu.	Stover, tons.
Manured	17.27	2.1
Un-manured	18.93	1.6

Kafir:

Manured	41.00	3.3
Un-manured	31.66	2.3

Castor Beans:

Manured	12.90
Un-manured	11.00

The corn was planted April 18th. The manured plats made much better growth and tillered profusely which was to their disadvantage when the drouth came. The drouth early in July injured

the corn to some extent and a good rain in the middle of the month was all that prevented a complete failure. The August drouth caught it in the roasting ear stage and hastened the ripening and greatly reduced the quality of the grain. That on the manured plats suffered much more than that on the unmanured plats. Adams' white, a medium early variety of corn, was used. This has proved to be one of the most suitable varieties for upland soil in this locality.

The Kafir corn was planted May 5th in drills three and one-half feet apart and the stalks were later thinned to four to six inches apart in the row. The growth was some larger on the manured ground. Although the crop was heading at the time of the July drouth, it did not harm the Kafir. The drouth in August hastened the ripening and all plats were cut and shocked on the 26th of that month.

The castor beans were planted April 19th in rows three and one-half feet apart, with stalks sixteen inches apart in the row. Five pickings were necessary to prevent waste of the crop by popping in the field. The first was made on July 26th and the last on August 17th. Some scattering spikes appeared after this last date. The growth of stalks on the manured ground was somewhat larger than on the un-manured plats. The beans were but little affected by the drouth. The leaves blighted in July checking the crop for but a short time.

The season was somewhat peculiar for cotton. The cool weather in May made it very difficult to get a stand and probably there was not a field but which had to be replanted, in part at least. As the land was well tilled, the dry summer did not damage the crop severely and when the fall rains came, new growth took place, frosts were late, and the crop was greatly increased. It was a season when June plantings gave as large yields as earlier ones. The station plats were planted first on April 21st but this was almost a complete failure. Entire re-seeding was made on May 7th, and many poor places had to be replanted in the last seeding. Two half-acre plats on un-manured ground averaged 717 lbs. of seed cotton per acre. Texas storm proof was the variety used and is one of the best producers. Three pickings were made, September, 11th, October 9th, and November 13th.

The season was very favorable for oats. A half-acre plat seeded on March 2d and cut on June 16th yielded at the rate of seventy two bushels of grain per acre and two and one-fifth tons of straw. Texas red was the variety used.

