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WHEAT GROWING

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INTRODUCTION

In growing wheat in this state, it must be remembered that soil and climatic conditions vary so much in various parts of Oklahoma that no hard and fast rules can be given to apply to all counties. Consequently the information contained in this circular should be adapted by each person to his own locality. In case of doubt, ask the county agent. He is the representative of the A. and M. College and the U. S. Department of Agriculture in the county and should always be consulted if one does not know just what to do.

KIND OF SOIL

In the wheat growing sections of the state this crop will grow well on almost any kind of soil, except the very sandy type. A fertile soil, of course, will make the highest yield in most cases. Sometimes a soil may be too rich in nitrogen and cause the crop to develop too much straw and as a result the crop will fall over and lodge badly before harvest. Such soils are found mostly in old stack bottoms and where barnyard manure has been applied very heavily.

PREPARING THE SEED BED

Value of Good Seedbed. A good seedbed is one of the most important factors in getting a good crop of wheat. If the wheat is planted on land that has been poorly prepared, it will not be able to stand the severe conditions, such as drought, freezing, etc., that it may encounter before harvest time, as well as grain that has been planted on a good seedbed.

The best seedbed for wheat is one that is firm, fairly deep, and has a good dirt mulch on the surface to keep the moisture from escaping.

PLOWING

Time to Plow. If wheat is to be planted on land on which small grains have been grown the previous year, the ground should be plowed as soon as possible after harvest.

Experiments run by the experiment stations and the experience of many farmers in the wheat sections of this part of the United States have proved that a person who plows his land early will get a higher yield than the farmer who plows his land late.

Almost every year in Oklahoma there is a dry spell during the month of August. The man who gets his ground plowed before this period will have a much better chance to make a good crop than the one who waits for the rains which sometimes do not come until September.

Disking Before Plowing. If a man has a large amount of land to prepare for wheat it will pay him in many cases to disk the ground immediately after cutting the previous crop. At this time the soil is usually in good condition to work. By disking it, a dirt mulch is formed which will hold the moisture until the farmer can get to it with the plow.

Disking also cuts up the stubble and other trash so that it will mix well with the soil and decay more rapidly after plowing.

Depth to Plow. Many farmers make the mistake of plowing their wheat land too shallow. It should be broken to a depth of at least six inches. Eight inches is better in most soils, especially if plowed early.

If the land has been plowed shallow before, it should not be plowed too deeply the first year. The soil that lies below the part that was turned up by the plow does not contain much plant food that is in a form that can be used by a crop. This sub-soil must first be acted upon by the air, sunlight, etc., before it can be used by the plants. For this reason it is best to plow only one or one and one-half inches deeper each year until the required depth is reached.

Turning Under Trash. If the plowing is done early, the weeds and stubble that have been turned under will have a chance to decay somewhat before the wheat is sowed. If, on the other hand, the plowing is done late, this material will cause the ground to dry out too rapidly and a poor crop will be the result. In this case a good disking before plowing would cut up the trash and help make a firmer seedbed.

It is a mistake to burn stubble, straw, weeds, or other material that can be plowed under. This matter adds humus to the soil.

Humus, which is nothing more or less than decaying organic matter such as weeds, straw, etc., is the thing that is most needed in most Oklahoma soils. It benefits the land by making the soil easier to work and by causing it to hold moisture better during a dry season. Soils with plenty of humus are less likely to bake or become cloddy. Humus also adds plant food to the soil. It not only does this, but it also works on the food elements already in the soil and makes them into a form that can be used by the plants.

Green weeds are especially good for plowing under in preparing land for wheat for they decay rapidly and soon become a part of the soil.

The plow should be adjusted so as to turn under all the trash. In a locality where the Hessian fly is doing much damage, care should be taken to bury all the stubble deep enough to keep the insects from coming to the top.

Preparation After Plowing

Harrowing. As was mentioned before, wheat needs a firm, compact seedbed. Such a seedbed cannot easily be made in ground that contains many hard clods. For that reason the land should be harrowed as soon as it is plowed for usually it is in better condition to work down well than it would be later.

A good plan is to harrow each day's plowing before quitting work at night. It usually takes only a short time and is well worth the extra trouble that it causes.

Disking. If the land was dry when it was plowed and is very rough and cloddy, it is sometimes a good idea to go over it with a disk harrow.

The disk harrow will cut up the clods and will help to pack the soil together to form a good seedbed.

If there is danger from the Hessian fly, this implement should also be used to kill out volunteer wheat which may come up before planting time.

Rolling and Packing. If a heavy rain comes soon after plowing, the soil will usually be packed down enough to make a firm seedbed. If, however, as is often the case, there is no rain until late in the season, it will pay to use some means of firming the soil.

A roller can be used for this purpose but does not do the work as well as some other implements.

A corrugated clod crusher or a sub-surface packer will make a better seedbed than a roller, for it tends to pack the soil below the surface and to leave it loose on top.

A disk harrow with the disks set straight and the frame weighted down is sometimes used for this purpose and does fairly good work.

Listing

In the western part of the state, wheat land is often prepared by listing the stubble ground as soon as possible after harvest and then going over it again and "splitting" the ridges. The ground is then worked down with a harrow or disk.

There are some things in favor of such a practice. If a man has a large acreage of wheat land, he can get over it much more quickly than he could with a

plow. The dirt on the ridges will then keep the soil in a moist condition so that it can easily be broken when the ridges are split. It is also claimed that the furrows will catch any rain that may fall and cause it to sink into the soil instead of running off.

While these things are no doubt true, it is best to prepare the ground by plowing where it is at all practicable, for with listing it is difficult to form a good seedbed before planting time. Experiments have proved that early plowed land will grow a better crop than listed land.

Preparing Corn Land for Wheat

Where wheat is to follow corn, very little preparation is needed if the corn has been well cultivated and is free from weeds and grass.

In that case the wheat is seeded between the rows with a one horse drill. Sometimes a small harrow is drawn down the rows before drilling.

Where the corn has been cut for fodder or silage, the ground can be disked before sowing the wheat.

The same method should be used in planting wheat after any other row crop.

As a usual thing, wheat in Oklahoma does not yield as well when planted in this manner after a row crop as it does on land that has been prepared by early plowing.

SELECTING THE SEED

Pure Seed. A great many crop failures are due to the use of poor seed. A man should plant nothing but pure seed of the variety best adapted to his locality.

The seed wheat should be well cleaned and graded before planting. Experiments have shown that plump grains make a much higher yield than small or immature seed. A fanning mill will remove the small grains as well as the weed seeds and trash.

Not only should the seed be free from foreign material and small grains but it should be all of one variety. If the seed is mixed it may grow into plants that will not all mature at the same time. Also, it will probably make a wheat of poor milling quality.

VARIETIES

All wheat grown in Oklahoma is what is known as winter wheat; that is, it is planted in the fall instead of in the spring as is done with certain varieties grown in the northern states.

The varieties of Oklahoma wheat are divided into two classes: hard and soft. Hard wheat is grown in the great wheat belt of the western part of the state, while soft wheat is grown farther east.

It does not pay to try to grow hard wheat in the soft wheat belt or soft wheat in the hard wheat belt.

It usually pays to plant a variety that has proved to be adapted to a person's locality or at least has grown well under similar conditions. Just because a certain kind of wheat will make large yields some other place is no sign that it will do the same in a different locality.

If it is desired to try a new variety, it is usually best to plant only a few acres the first year. If the new variety proves superior a larger acreage may be sown the next year and if it does not do well there has been no great loss.

TESTING SEED

Most wheat that is grown under normal conditions and is not damaged in storage will germinate, or sprout, all right.

If, however, the wheat is stack-burned, sprouted, weevil eaten, or damaged in some other way, it might be well to test it before planting.

The best way to test wheat is to take samples from several parts of the bin, mix them together and then count out one hundred grains. In counting them, a person should try not to pick out either the good or the bad ones but should take them just as they come, good and bad.

A piece of blotting paper should be placed in a plate. The paper is moistened and the one hundred kernels placed on it. Another piece of moistened blotting paper is placed over the grain and a plate inverted over it. If blotting paper cannot be obtained, several pieces of soft paper such as newspaper will do.

The paper should be moistened with warm (not hot) water every night and morning for seven days. At the end of that time, the top plate and paper can be removed and the number of sprouted grains counted.

If all of them have started to grow, the seed will very likely all grow when planted in the field.

If, on the other hand, only half of the grains have sprouted, the wheat should not be used for seed.

If, however, as might be the case, the seed was pure and of a good variety and no other pure wheat of that variety can be obtained, the seed may be planted but twice as much should be used.

SEEDING

Time of Seeding

The time of seeding wheat depends largely upon the locality and the season. In Oklahoma it ranges from about September 10th to October 30th.

The time of planting varies so much with conditions that no set rule can be given for the whole state. A club member or a new farmer should consult his county agent as to the best time to plant. He is familiar with local conditions and is in position to give definite information.

Depth of Seeding

The proper depth of planting wheat is not always the same. It will vary with the kind of soil, the amount of moisture in the ground, and the condition of the seedbed.

Wheat should not be planted as deeply in a clay soil as in a sandy soil. If the ground is dry, the seed should be planted more deeply than if it is moist. If the land is rough and cloddy the seed will have to be sowed rather deeply in order to have all of it covered. From two to three inches is about right for most parts of Oklahoma.

Rate of Seeding

The rate of planting also varies in different parts of the state and with different varieties of wheat. It ranges from two to five pecks to the acre. The less the average annual rainfall of the locality the smaller should be the rate of sowing.

Clay soils usually need less seed than sandy soils.

If the seedbed is well prepared less seed will be needed to make a good stand than if the ground is in poor condition.

Less seed is required for a stand if the wheat is sowed early.

The variety planted also makes some difference in the rate of sowing. It takes more wheat with large grains to make a stand than it does of wheat with small grains. This fact, however, should not by any means be taken to mean that small kernels make the best seed.

Method of Seeding

In sowing wheat, a good drill should be used, one that will distribute the seed evenly, plant it all at the same depth, and cover it uniformly.

There are three general types of wheat drills: hoe drills, shoe drills, and disk drills.

The hoe drill does good work in clean ground but clogs badly in land containing stalks or other trash. It is also harder to pull than a disk drill.

The shoe drill is easier to pull and does not clog as badly in trashy land as the hoe drill.

The disk drill pulls easier and clogs less in trashy land than either of the other two types. However, it does not work quite as well on stony land as the others.

Pasturing

If the wheat makes a good start after it is sowed, it will provide excellent pasture for livestock during the fall and winter months.

If care is taken in pasturing the wheat, little or no damage will be done to the crop.

In fact, pasturing is sometimes an advantage. During a warm fall the wheat sometimes makes so much growth that it is injured during the winter by freezing. Pasturing will keep down this extra growth.

In case the soil is very loose at the time of planting, pasturing will help by

having the animals pack down the ground and make it more firm so that it will hold moisture better.

Pasturing is said to benefit the crop by making the plants stool more.

Pasturing, however, can do considerable damage if a person does not take proper care when allowing his stock to graze on his field.

Stock should never be allowed on a wheat field when the ground is muddy. They will destroy many of the plants and will "puddle" the soil and cause it to "bake" during the dry months that are almost sure to come.

As soon as the crop begins to make a good growth in the spring, the stock should be taken off. It is often a great temptation to leave them on the field for a week or so longer at this time of the year because of the scarcity of other pasture. It is a great mistake, however, to do so, for much damage can be done at this time.

A person should also be careful not to have too many animals pasturing on his field. A large number will eat the plants down so closely that the crop will be damaged. No set rule can be given as to the right number to keep on a field, as it will vary with the condition of the crop.

HARVESTING

Three methods of harvesting wheat are used in Oklahoma: cutting with the binder, with the header, and with the combined harvester-thrasher or "combine."

Harvesting With the Binder

Time to Cut. If the acreage of wheat is small, the field should not be cut until the grain is mature.

In most cases, especially if a person has a large acreage, it is best to start cutting with the binder as soon as the straw turns fairly yellow and the grain is well along in the "hard dough" stage.

Using the Binder. The binder should be thoroughly overhauled several weeks before harvest and all the necessary repairs made, so that it will be in the best of running condition. When harvest once starts, there should be nothing to delay it, for delays are often expensive.

The machine should be run so as to get all the grain, and should be adjusted so as to tie a good, tight, medium-sized bundle. Loose bundles, or bundles not tied at all, cause much loss at thrashing or stacking time.

Shocking. The wheat should be shocked as soon as possible after it is cut.

Poor shocking is often the cause of damaged grain. The shocks should be well built so that they are not easily blown down. If the grain was not fully matured at the time of cutting, the shocks should not be too large. Twelve bundles make a well balanced shock.

If the season is rainy it is best to cap the shock with one or two bundles. These bundles should be placed firmly on the top of each shock so that they will protect the heads of the other bundles and will not easily be blown off.

Write to the Extension Division, A. and M. College, for a copy of Extension Circular No. 94, "Saving the Small Grain Crop." It gives many valuable suggestions for shocking and stacking bundle grain.

Stacking. If the wheat can not be thrashed within three weeks after harvest, it will pay to stack it.

Stacking protects the grain from damage by the weather.

It also removes the wheat from the field so that the ground can be plowed early for the next crop.

The stacks should be well built so as to shed water, and stand up in wind storms.

It also pays to have an experienced stacker do this work. Much loss can be sustained by making poor stacks which will let in the rain.

Extension Circular No. 94 will give the methods to use in making good stacks.

Harvesting With the Header

Where the acreage is very large, it sometimes pays to use a header for cutting.

Time to Harvest. When the header is used, the wheat should be well matured before cutting. If the straw is green, it will heat in the stack and cause the grain to stack-burn.

Running the Machine. The header should be adjusted so as to leave as much straw as possible standing in the field. Care should be taken, however, to have the platform set so as to get all the heads.

Harvesting With the Combine

During the last few years, a number of farmers in the hard wheat section of the state have been using combines. These machines cut and thrash the grain at one operation.

Where a man has an acreage sufficiently large to justify the expense of such a machine, it seems to be a good investment.

When the combine is used, the wheat should be "dead ripe" before cutting. Otherwise the grain might heat in the bin and cause considerable loss.

THRASHING

Where the thrashing is done from the shock, the grain should be fully dried.

All wheat will go through a "sweat" either before or after thrashing. Most shock thrashed wheat goes through this stage in the bin. If it is not dry at the time of thrashing, it may heat too much in the bin when in this stage.

In thrashing stacked wheat, care should be taken not to thrash during the sweating process.

It is always best to see that the separator is well cleaned before starting, so that there will be no danger of having weed seed or inferior wheat from a neighboring farm mixed with the grain.

Most farmers make a practice of selling the first load immediately, even if they intend to bin the entire crop. This practice will help to keep other grain from being mixed with that left for seed or for sale later in the year.

While the thrashing is going on, it is well to note whether or not any grain is being thrown over with the straw. If it is, one should insist on having the concaves raised or the machine otherwise adjusted to prevent this loss.

EXHIBITS

If a person is growing good wheat it will pay him to make an exhibit at his local and county fairs.

In selecting the exhibit, the sample should be well cleaned and graded so that it will contain nothing but the best wheat. Sometimes it pays to go over the sample and pick out all the poor grains that were not separated from it in cleaning.

At most fairs, one peck of wheat is required. A person should have the exact amount called for, no more and no less. The fair catalog should be consulted for the correct amount to exhibit.

The following is the score card by which wheat is judged in Oklahoma:

Score Card for Wheat

		Perfect Score
1.	*Uniformity*—Uniform in size, shape and color	10
2.	*Trueness to Type*—True to the variety represented	10
3.	*Color and Luster*—Should be bright and true to variety	10
4.	*Size of Kernels*—Conform to standard of variety	10
5.	*Plumpness*—Kernels well developed, not shriveled	5
6.	*Texture*—Hard wheat, hard and vitrous. Soft wheat, soft and starchy	10
7.	*Market Condition*—Free from cracked, sprouted, smutty, unsound and musty kernels, weed seed, dirt and other foreign material	15
8.	*Condition of Seed Coat*—Coat should not be cracked, weathered or streaked	5
9.	*Seed Condition*—Clean, unsprouted kernels, free from dampness or injury	10
10.	*Weight per Bushel*—Should weigh 60 pounds per bushel	15
	Total	100

Explanation of Points on Score Card

Uniformity—The kernels should all be of the same size, shape and color.

Trueness to Type—The kernels not only should be all as much alike as possible but should be like the variety which they represent. For instance, if a person is exhibiting Kanred wheat, the sample should look like Kanred and not like some other variety.

Color and Luster—The varieties of hard wheat in Oklahoma have a clear, red appearance. The soft wheat is lighter in color. "Yellow berries" in hard wheat will cut down the score.

Size of Kernels—Some varieties of wheat have larger kernels than others. The grains in the sample exhibited should be up to the standard of the variety they represent.

Plumpness—The kernels should be plump and well developed, not small and shriveled.

Texture—The texture is determined by cutting or biting a kernel into two pieces. In hard wheat the broken surface should be hard and glassy in appearance. In soft wheat it should be white and starchy.

Market Conditions—As most wheat is grown for the market, this point is one of the most important on the score card. The sample exhibited should contain no damaged kernels, such as cracked, smutty, unsound or musty ones. It should also be free from weed seed, dirt, other grains, and all other foreign mateiral.

Condition of Seed Coat—The coat or outer surface of the kernel should not be crushed, weathered or streaked.

Seed Condition—The kernels should be clean and free from dampness or injury. None of them should be sprouted. Ninety-five to ninety-eight percent of the kernels should be capable of germinating.

Weight per Bushel—Wheat should weigh sixty pounds per bushel. The weight can often be judged fairly accurately by the size and condition of the kernels, but in case of doubt or close competition the samples should be weighed.

INSECT PESTS AND DISEASES OF WHEAT

Hessian Fly

This insect does considerable damage to wheat in Oklahoma. It also attacks barley to some extent, but has not been found to do much damage to oats.

The Hessian fly lives over the winter in the crown of the wheat plant inside the leaf sheaths. At this time it is about the size and shape of a flax seed. In this stage it is called a "pupa."

In early spring the pupa changes into an adult insect, which lays eggs on the wheat leaves.

These eggs hatch into little worm-like larvae. This stage is the one in which the Hessian fly damages the wheat.

After a time the larva changes into a pupa, in which stage it lives in the wheat stubble until September or October when it changes into an adult fly which lays its eggs on the new wheat.

The best way to control this pest it to disk the stubble immediately after harvest and then to plow the field as early as possible. Care should be taken to turn under all the stubble. The plowing should be deep.

The volunteer wheat should be kept down by disking and harrowing so as not to furnish a place for the fly to live until the new crop is growing.

Write to the Extension Division, A. and M. College, Stillwater, Oklahoma, for a copy of Circular No. 78, "The Hessian Fly."

Chinchbug

This insect is another pest that sometimes does considerable damage to small grain in Oklahoma.

It not only attacks wheat, oats, barley and rye, but also corn, grain sorghums and similar crops.

The chinchbug lives over winter in the adult form as a full grown insect. It is usually found in bunches of grass down near the surface of the ground.

The best method of control is to plow all the fields in the fall so as to break up the winter homes.

All fence rows and waste places should be burned to destroy the chinchbugs that are living over in the grass.

Get a copy of Circular No. 59, "The Chinchbug," from the Extension Division, A. and M. College, Stillwater, Oklahoma.

Green Bug

During some years much damage is done to small grains by the green bug.

This little insect attacks wheat, oats, rye and barley.

Its presence is usually first noticed by small yellow spots in the field which become larger until they sometimes meet and practically cover the field.

If the field seems to be badly infested with the green bug it is best to plow it up and plant it to some other crop than wheat, oats, barley or rye.

If the spring is warm, the green bug may be kept in control by parasites, or other insects that prey on it.

Wheat Smut

A large loss of wheat is caused every year by smut.

The closed smut is the one that does the most damage to wheat in Oklahoma.

This smut is carried over in the form of small black spores which stick to the grain.

When the seed is planted the spores sprout and grow up inside the plant and when the wheat heads out, the smut plant, as we might call it, fills the place where the wheat kernel should be with a mass of black spores.

This smut can be prevented by treating the seed to destroy the spores before planting.

The method of treating to prevent this smut is as follows:

A solution is made by mixing one pint of a forty percent solution of formaldehyde with forty gallons of water.

Formaldehyde can be purchased at most drug stores. A person should insist on getting a forty percent solution.

Two half barrels or tubs with holes and plugs near the bottom are placed with one a few feet above the other.

The top tub is filled about two-thirds full of the solution. Enough wheat seed is poured into the solution to come almost, but not quite, to the surface. The grain is stirred thoroughly and all smut balls and trash that come to the top are skimmed off. In five minutes the plug is pulled out of the top tub and the solution allowed to flow into the bottom vessel.

The seed is dumped on the floor. The bottom tub which now contains the solution is placed on top and the other one on the bottom so that the process can be repeated with another lot of seed.

When all the seed is treated, it is covered with sacks or similar material for from five to ten hours. The seed should then be spread out and shoveled over occasionally so that it will dry out quickly.

The above treatment will prevent the closed or stinking smut of wheat but will not affect the loose smut. The latter, however, does not cause much damage in this state.

Another method that may be used is to sprinkle the grain with the solution of formaldehyde and water. About one gallon of the solution should be used for each bushel of wheat. The grain should be shoveled over during the sprinkling so as to make sure that each kernel is wet.

The wet grain is then covered with sacks or other material and allowed to stand for from five to ten hours.

In using this method, the grain should first be run through a fanning mill to remove all loose smut balls.

This method is not recommended if the first can be used.

PUBLICATIONS OF INTEREST TO WHEAT GROWERS

The following may be obtained free of charge by writing the Extension Division, Oklahoma A. and M. College, Stillwater, Oklahoma:

Circular No. 30—The Green Bug.
Circular No. 59—The Chinchbug.
Circular No. 66—Control of Grain Smuts.
Circular No. 78—The Hessian Fly.
Circular No. 94—Saving the Small Grain Crop.