

EXTENSION BULLETIN 187

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WINTER  
**WHEAT CULTURE**  
IN MICHIGAN

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By

STAFF MEMBERS OF THE  
FARM CROPS DEPARTMENT

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MICHIGAN STATE COLLEGE  
COOPERATIVE EXTENSION SERVICE

EAST LANSING

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# Winter Wheat Culture in Michigan

By *STAFF MEMBERS OF THE FARM  
CROPS DEPARTMENT*

Wheat was Michigan's first important grain crop and has continued to be an important crop in this state. Since 1866, when the first crop estimates<sup>1</sup> were made, the acreage of wheat has fluctuated between the high of 1,985,000 acres in 1882 and in 1884 to the low acreage of 673,000 in 1943. There has been no definite trend in acreage throughout this period. Such is not the case in yield per acre. There have been year-to-year fluctuations, but there also has been a definite trend upward. The first five-year (1866-70) average was 14.8 bushels per acre. The 1945-49 five-year average was 26.4 bushels per acre.

## CLASSES

The two classes of winter wheat which are grown successfully in Michigan are the soft red winter and the soft white winter types. Although these two types may successfully be grown in nearly all parts of the Michigan wheat area, it is strongly recommended that all growers in a locality produce only red or only white wheat. By so doing, more uniform grain is available for marketing and processing. In general, the soft white wheats have a weaker gluten than the soft red wheats. Grain color, which is in the bran layer, does not affect the quality of gluten but is used as a marker of quality.

A list of the recommended varieties with descriptions and sources of pure seed may be obtained from the local county agricultural agent or the Michigan Crop Improvement Association, East Lansing. A variety to be entered on this list must have demonstrated in comparative tests that it is adapted (has winter hardiness, stiff straw and high yield of grain of acceptable quality) and that it meets high standards as to purity and germination.

## "RUNNING OUT" OF WHEAT VARIETIES

"Running-out" of a wheat variety can nearly always be traced to one, or a combination, of these factors: 1) planting unadapted seed,

<sup>1</sup>The data on acreages and yields were obtained from the Agricultural Statistician of the U.S. Department of Agriculture, Lansing, Michigan, and are as of March 30, 1950.

2) mechanical mixing with wheat of an inferior variety, 3) failure to maintain soil productivity, or 4) a "build-up" of a disease to which the variety is susceptible.

### TYPES OF SOIL FOR WHEAT

The winter wheat acreage is not uniformly distributed over the state. More than 90 percent of the crop is grown south of a line drawn through Bay City and Muskegon. This crop does well when grown on soils with good surface and subsurface drainage and with rather high fertility. The areas of highest yield per acre are generally in the Saginaw Valley and Bay region and in the southeastern Lake-bed counties. These areas have silt and clay loam soils with high organic-matter content.

Winter wheat is not recommended for muck nor for very light sandy soils.

### PLACE IN ROTATION

Winter wheat, because of its winter annual type of growth may follow a small grain, beans or corn. However, at least two other factors should be considered:

1) Time when the land becomes available to the wheat. Planting should be early enough in the fall so that the wheat seedlings make sufficient growth to come through the winter.

2) Disease carry-over. Some diseases of wheat also flourish on other grain crops. This is especially true of scab which lives also on barley and corn. Because of this carry-over from one crop to another or from one season to another, it is recommended that wheat not follow barley, corn or wheat.

### SEEDBED PREPARATION

The cultural practices necessary to obtain a desirable seedbed for wheat will vary from field to field depending upon type of soil, previous crop, weather conditions, and the equipment available. In one case, the operations involved may include plowing, cultipacking, disking, and dragging, while in another case only disking.

When wheat follows a grain crop, the field should be plowed or deeply disked as soon as possible after the grain crop is removed and then disked or dragged shortly before planting to rid the field of weeds. When wheat follows a cleanly cultivated crop, only disking may be required to loosen the top soil sufficiently.

## FERTILIZERS AT TIME OF PLANTING

The kind and amount of fertilizer to apply to a given field depend on the type of soil and its previous management. However, some general recommendations are as follows: For heavy clay and silt loams: 2-16-8, 4-16-8, at 300-400 pounds per acre, if no legume is seeded, and at 400-500 pounds per acre when a legume is seeded. Use the higher nitrogen analysis where straw is turned under.

For loams, sandy loams and sandy soils: 3-12-12, 2-16-8, 4-16-8 or 0-12-6 at 300 pounds per acre at seeding time. Use higher nitrogen analysis where straw is plowed under.

## SEED TREATMENT

Wheat to be used for seed should be thoroughly fanned and screened to remove dirt, weed seeds, chaff, shrivelled, broken, and small kernels, and smut balls. Certified seed has had these impurities and inferior kernels removed. The cleaning process should be followed by chemical seed treatment to control completely bunt (stinking smut) and to aid in controlling seedling blight and Septoria glume blotch. New Improved Ceresan or Ceresan M are equally effective as dust treatments and may be applied with a drum mixer or a Minnesota Seed Grain duster. Follow directions on container as to rate of application.

Treating and sacking the treated grain should be done where there is a draft of air, whether under cover or in the open. Every reasonable effort should be made to avoid inhaling the poisonous dusts or bringing them in contact with the skin. *THESE SEED TREATMENTS RENDER GRAIN UNFIT FOR FEEDING TO ANY CLASS OF LIVESTOCK.* Loose smut may be controlled by the "hot water" treatment of the seed but this treatment is not recommended for ordinary farm use on account of the equipment needed and likely reduction in germination. Mildew, leaf rust and stem rust are not controlled by seed treatment.

## RATE OF PLANTING

Yield of grain per acre is affected to some extent by the rate of planting. This has been shown by tests conducted at East Lansing. As the rate of planting increased from 3 pecks up to, and including, 7 pecks per acre the yield of grain also increased. As the rate of planting was increased still further, the yield actually dropped. Six or 7 pecks per acre gave the best results.

## DEPTH AND METHOD OF PLANTING

On the heavier soils an average depth of one inch is preferable to 2 or more inches; on the lighter soils a depth of 1½ to 2 inches is desirable.

Higher yields of grain are obtained by planting the seed with a grain drill than by sowing the seed broadcast and covering by dragging.

## DATE OF PLANTING

The date of planting winter wheat in the upper peninsula is the third week in August; in the lower peninsula it ranges from the first week in September in the northern portion to the last week of September in the southern part. Two of the factors which should be considered in deciding on the date to plant are 1) the "fly-free" date (after which there is little likelihood of damage from the fall brood of the hessian fly) and 2) the "survival" date (after which the young wheat plants may not be expected to make sufficient growth to survive the winter). It has been found by entomologists that the "fly-free" date varies but little from year to year in a given locality. The larger areas of the lower peninsula with similar fly-free dates are shown in the accompanying figure.

"Survival" dates vary greatly, owing to soil and climatic conditions, hence no averages for sections of the state are given.

Relative yields of grain from a three-year date of planting test at East Lansing were: Sept. 15 to 17—97.4 percent, Sept. 18-22—100.0 percent, September 23-30—74.7 percent, and October 1 to 13—68.9 percent. It is recommended that wheat be sown as soon after the fly-free date as possible.

## FALL PASTURING

If there is a shortage of other fall pasturage and there is an abundant growth on the wheat field, moderate fall pasturing of the wheat may be practiced. Care should be taken not to over-pasture. The seedlings should have several inches of top-growth left to enable them to withstand winter weather.

## TOP-DRESSING

Top-dressing wheat usually involves applying either 1) barnyard manure, or 2) commercial nitrogen, such as, ammonium nitrate or ammonium sulfate. Barnyard manure is recommended for sandy loams



and sandy soils. It is applied while the ground is frozen. It gives some protection to the wheat plants during the winter and stimulates spring growth. Rate of application is about 6 loads per acre.

Ammonium nitrate or sulfate is applied in the spring. It may be done as soon as a tractor and a drill can be driven on the land after the frost has gone out. The usual rate of application is 15 to 30 pounds of nitrogen per acre. This is equivalent to 43 to 86 pounds per acre of ammonium nitrate or 75 to 150 pounds per acre of ammonium sulfate. This type of top-dressing may be expected to give increases in yield of grain on soils with low nitrogen content. If applied on highly fertile soils, lodging of the grain may occur.

### SEEDING WITH WHEAT

Seeding alfalfa or clover in wheat is not recommended on light sandy soils or on soils low in fertility. Good legume seedings are frequently obtained in wheat growing on heavier soils in a good to high state of fertility. The seeding should be made in the spring. If the legume is seeded with the wheat in the fall, severe winter-killing of seeding usually results.

Alfalfa should be seeded on the wheat with a grain drill or grass seeder equipped with disks which will partially cover the seed. Set disks to cut the soil about a half-inch deep. Apply as soon as the ground is firm enough to hold tractor and seeder. Eight pounds of alfalfa seed per acre is sufficient.

Red clover may be broadcast during freezing and thawing in the spring with a fair assurance of a good catch, or it may be applied later by drill. A rate of 6 to 7 pounds per acre is suggested.

Brome grass, for alfalfa-brome grass mixture, may be mixed and planted in the fall with the wheat. Two to three pounds per acre is the recommended rate.

### SPRING PASTURING

If there is need for pasturage in the spring, wheat may, under certain conditions, be pastured without too great a reduction in yield. At the time of early pasturing the wheat field is generally soft. Under these conditions, trampling by livestock may be damaging to the wheat.

If the top-growth has reached a height of 9 inches before the livestock are turned in, pasturing may cause a serious reduction in yield. In any event, close pasturing should be avoided—not closer than 3 to 4 inches.



## CUTTING OUT WEEDS

During the latter part of the growing season thistles, dock, cockle, rye, and chess (also called cheat) should be pulled or spudded out. Much labor in cleaning the grain for seed will be saved by so doing.

## HARVESTING

It is time to begin cutting with a binder when the grain is in the thick to hard dough stage and the straw has lost its green color but is not yet fully mature. When at this stage, the kernel is still immature and has at least 30 percent moisture.

As the grain continues to ripen, whether in the bundle, in a windrow, or as standing grain, the moisture content usually decreases to 14 percent or less and the kernels are as compact as they will get. Any subsequent wetting of this grain will cause a swelling of the kernels. Since there is no shrinkage in size of kernel as the grain dries again, there is a drop in test weight per bushel. If the period of wetting is prolonged by moist air conditions, molding or sprouting will take place.

Once the grain has fully matured (14 percent or less moisture) it is safe to be threshed, either by separator or combine.

Wheat cut with a binder finishes the maturing process while in the bundle. Wheat cut with a combine must be allowed to complete the maturing process before being cut. Wheat which is windrowed and allowed to stay in the windrow a few days before being threshed, completes the maturing process in the windrow.

It has been found by experience that both straw and grain readily absorb moisture from the atmosphere. This means that combining should be done only when the air is dry.

When wheat is combined, either from standing grain or windrow, and the straw is needed for bedding, the straw may be left in a windrow and picked up with a hay loader or a pick-up baler. If the straw is not needed, the combine furnishes a labor-saving means of putting the straw back on the land to maintain the organic content of the soil. When there is a legume seeding in the wheat and the straw is heavy, it is advisable to remove the straw from the field.

## STORAGE

Wheat stored in bulk is subject to two sources of damage:

- 1) Moisture—grain having too much moisture rapidly increases in temperature with a consequent lowering of quality. The

extent of damage will depend on the moisture content of the grain, temperature of the grain, and the length of time the grain is left without further aeration.

- 2) Insects—grain weevils in storage bins can cause losses in grade and quality of grain.

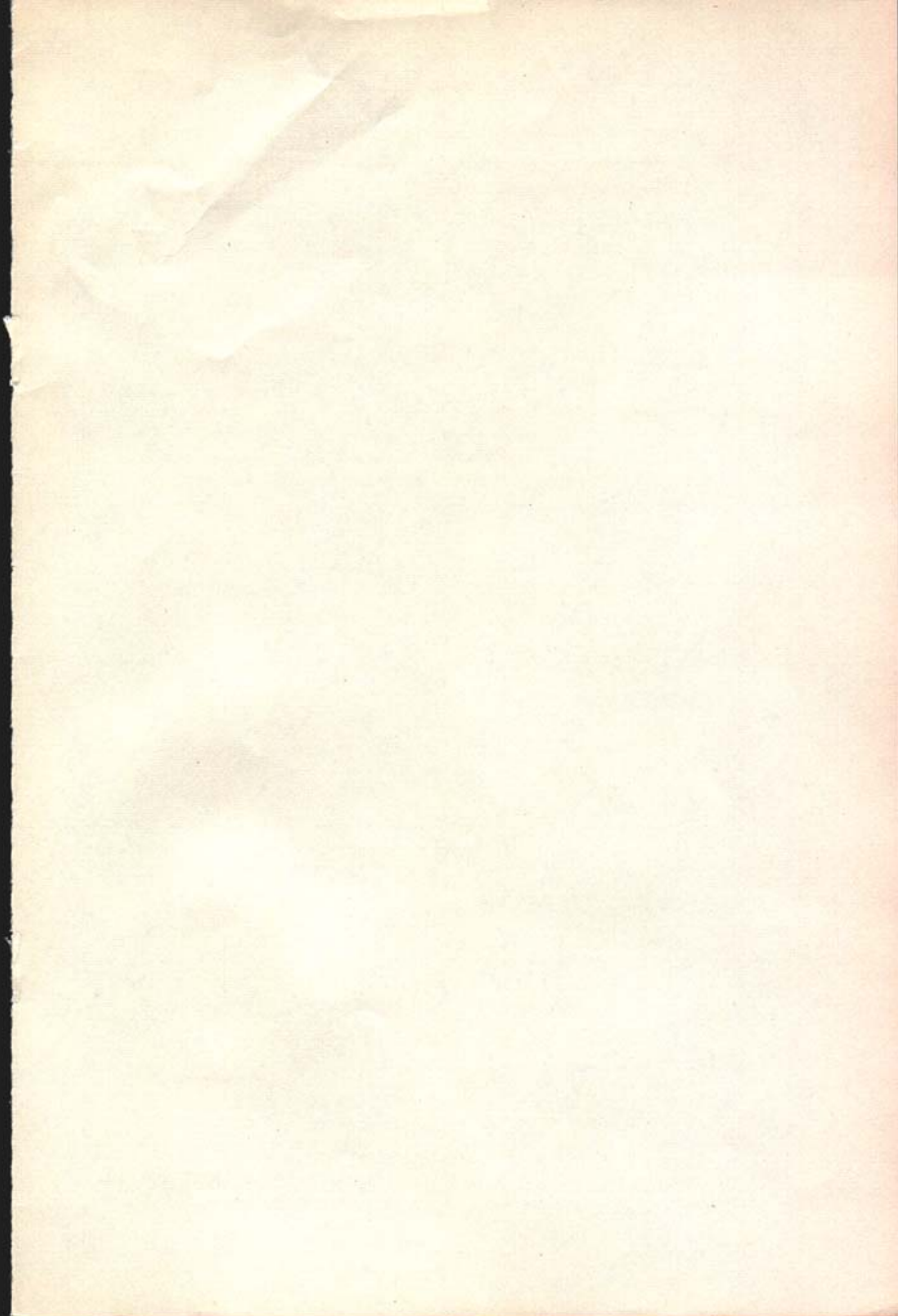
For additional information refer to:

Michigan State College, Extension Bulletin 159, *Fertilizer Recommendations*

Michigan State College, Extension Bulletin 176, *Oat Smut Control* (for description of drum mixer)

Michigan State College, Extension Folder 134, *Prevent Damage to Stored Wheat*

Michigan State College, Plant Pathology, Ext. Mimeo 3, *Wheat and Barley Disease Control Program* (for description of Minnesota seed grain duster)



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