

Extension Bulletin E-1522

Small Grain Production in Michigan

October 1981

By R. H. Leep and L. O. Copeland
Department of Crop and Soil Sciences

Michigan farmers grow over 1.1 million acres of winter wheat, oats, and barley annually.

Most of the winter wheat varieties are the soft white and soft red types used for pastry flour in making cakes, cookies, etc.

Almost all of the oats are used for livestock feed while barley is used for both malting and livestock feed. Table 1 lists the number of acres planted in Michigan during 1979 for oats and barley as well as winter wheat.

TABLE 1. Acreage of winter wheat, oats, and barley in Michigan — 1979¹

Crop	Acres	Average yield bu/A	Value of production (dollars)
Winter wheat	800,000	47	129,957,000
Oats	350,000	61	23,058,000
Barley	20,000	47	2,117,000

¹From Michigan Agricultural Statistics, July 1980.

Soil and Climatic Requirements

These small grains differ in soil and climatic requirements. Winter wheat, oats and winter barley are best suited to clay loam, loam, and sandy loam soils with pH range of 5.5 to 7.0. Barley can also be grown successfully on these soils, but grows best in soils with pH range of 6.5 to 7.8. Barley is the least tolerant to poor soil drainage.

Selecting the Variety

When selecting small grain varieties, consider maturity, yield, test weight, lodging and disease resistance to fit your management scheme. Use certified seed to insure varietal purity and good germination.

Information on small grain variety performance and comparisons is reported in Extension Bulletin E-1352, E-889 and E-1313 for winter wheat, oats and barley, respectively.

Land Preparation

Plowing is usually necessary when a small grain follows a small grain, corn or a legume crop such as alfalfa or clover. Where a small grain follows field beans, soybeans or corn silage, land can be prepared by

field cultivator, disking, harrowing or combining two or more practices. Only till the seedbed enough to leave it in a smooth, weed free condition for planting.

Soil Testing and Fertilizer Needs

Have a soil test taken to determine the best rate and grade of fertilizer needed. Proper fertilizer placement for small grains is one inch to the side and one inch below the seed. Many grain drills apply the fertilizer directly in contact with the seed. This placement can cause injury when large amounts are applied, especially when the soil is dry. Do not drill more than a total of 100 pounds of plant nutrients (N + P₂O₅ + K₂O) in direct contact with the seed for sandy soils, or more than 140 pounds/acre for fine-textured soils. If additional amounts are needed, apply in a separate operation.

Do not apply nitrogen in the fall to wheat on sandy soils (e.g., sandy loam, loamy sands and sands). Movement or losses may occur if nitrogen is applied on frozen soil, especially where slopes are greater than 3 percent. Where lodging may be a problem, use little or no additional nitrogen. A guide for estimating total nitrogen needed for small grains is given in Table 2.

Manganese is recommended in fertilizer for wheat, oats and barley grown on lake bed soils and dark colored soils where the pH is above 6.5. Apply manganese according to soil test recommendations. In the absence of a soil test, apply 5 to 8 pounds of manganese/acre on soils with pH 6.5 to 7.2 and 8 to 10 pounds for soils having a pH 7.3 to 8.5.

TABLE 2. Guide for estimating total nitrogen needed for small grains.¹

Manure application	Barley	Oats	Wheat ²
	--- Pounds of nitrogen/acre ---		
Legume and 10 tons of manure/acre	10	10	20
Good legume	10	10	30
No legume or manure	40	40	80

¹Adapted from Extension Bulletin E-550, "Fertilizer Recommendations for Vegetable and Field Crops in Michigan."

²Recommendations are for short- and stiff-strawed varieties. For varieties susceptible to lodging, use no more than 60 pounds N/acre on sandy soils and 40 pounds N/acre on fine textured soils.

Planting Management

Winter wheat should be planted 10 to 14 days after the fly-free date to avoid the fall brood of Hessian fly and infection with virus diseases. Information on fly-free dates can be obtained from the local county Extension office. Spring barley and oats should be planted as soon as possible for maximum yields. Small grain seed will sprout at soil temperatures of 40 to 45 degrees Fahrenheit. Information on weight per bushel, seeding rate per acre (lbs.) and planting depth are given in Table 3. A grain drill is the best machine available for seeding small grains because it distributes the seeds evenly at a proper depth.

TABLE 3. Weight per bushel, seeding rate, and planting depth.

Crop	Weight/bushel (lbs.)	Seeding rate/acre (lbs.)	Planting Depth (in.)
Winter wheat	60	90-120	1-2
Oats	32	64-80	1-2
Spring barley	48	72-96	1-2
Winter barley	48	72-96	1-2

Weed Control

Check fields early in the growing season since early detection will enable treatment of problems before significant damage is done by weeds. Cultural practices such as rotations or good tillage will reduce weed competition as well. Suggested herbicides for weed control are given in Extension Bulletin E-434. Always follow recommendations and label instructions.

Insect Control

There have been occasional outbreaks of armyworm and scattered damage by other insects. However, small grains in Michigan have escaped major damage until recent years. The appearance of the cereal leaf beetle and its subsequent spread has changed this situation.

One should check fields by walking or driving through the field and looking for possible problems. Many pests build up in weedy areas of the field. Further information on insect control is available in MSU Extension Bulletin E-829, "Insect Control in Small Grain Crops."

Disease Control

Wheat and barley are susceptible to loose smut, and oats to false loose smut. Both are seedborne diseases and cause yield losses. In addition, winter wheat is susceptible to common bunt (stinking smut), which can cause severe economic losses to growers by heavy discounts or rejection for market. Small grains can be protected from bunt and smut as well as seed rot and seedling blight by treating seeds with carboxin (Vitavax 200). Crop rotation with at least two years between small grains or grass sods will prevent losses from stem and root rot diseases which build up without rotation. For additional information on seed treatment, refer to MSU Extension Bulletin E-1199.

Harvesting and Storage

Small grains are ready to harvest at about 13 to 14 percent moisture. If the weather forecast calls for a prolonged wet period at harvest time, harvest at 14 to 20 percent moisture and dry the grain artificially to prevent sprouting. Set up harvesting equipment according to manufacturer's directions.

For long term storage, small grain kernel moisture should be 13 percent or less. Grain can be stored for a few weeks at slightly higher moisture content, but if too moist, it will heat and mold in storage.

ADDITIONAL REFERENCES

1. Copeland, L. O., E. H. Everson, R. H. Leep and J. L. Clayton. 1980. Wheat variety performance in Michigan. Michigan State Univ. Ext. Bul. E-1352.
2. Grafius, J. E., R. H. Leep, D. E. Wolfe and L. O. Copeland. 1979. Oat variety performance in Michigan. Mich. State Univ. Ext. Bul. E-889.
3. Leep, R. H., J. Grafius, and L. Patrick Hart. 1979. Spring barley production in northern Michigan. Mich. State Univ. Ext. Bul. E-1331.
4. Leep, R. H., L. O. Copeland and J. E. Grafius. 1979. Barley variety performance in Michigan, 1975-1978. Mich. State Univ. Ext. Bul. E-1313.
5. Vitosh, M. L. and D. D. Warncke. 1977. Fertilization of wheat. Mich. State Univ. Ext. Bul. E-1067.

MICHIGAN STATE UNIVERSITY



MSU is an Affirmative Action/Equal Opportunity Institution. Cooperative Extension Service programs are open to all without regard to race, color, national origin, or sex.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U. S. Department of Agriculture. Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824.

This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by the Cooperative Extension Service or bias against those not mentioned. This bulletin becomes public property upon publication and may be reprinted verbatim as a separate or within another publication with credit to MSU. Reprinting cannot be used to endorse or advertise a commercial product or company.

O-13176

1P-20M-10:81-UP, Price 10 cents. Single copy free to Michigan residents.