Resistant Oats Varieties Insure Against Rust Loss

By

T. E. Stoa, Agronomist

INSURING THE NORTH DAKOTA OAT CROP against serious loss from rust, thru the larger use of rust resistant varieties now available, is the object of a more aggressive educational program being sponsored this fall and winter by several agricultural agencies, including the North Dakota Agricultural Experiment Station and the Extension Division. Much leaf (crown) rust damage has occurred the last three years in much of eastern North Dakota. Leaf rust has come early, developed rapidly and reached epidemic proportions before the oat crop could ripen. Early varieties which usually have been sufficiently early to "escape" injury have been seriously damaged, though to a less extent than later ripening oats. The oat crop may also be injured by stem rust, but this rust has been less common the last few years than leaf rust.

The recent development and introduction of varieties that resist both stem and leaf rust, and the increasing availability of this seed, now makes it possible for farmers who wish to acquire seed to do so and thus protect their oat crop against such losses. Since rust and rust losses occur most frequently in eastern North Dakota, where summer rainfall and humidity is usually higher, the need for rust resistant varieties is more urgent in that section than elsewhere in the State. Then too, the more resistant varieties now available are early ripening and have short straw. Because rust losses are a lesser hazard in the western counties, and because varieties with taller straw are generally preferred there, it is felt that the seed stocks now available should first be used in eastern North Dakota. Further tests and observations will soon determine how desirable these varieties may prove in other parts of the State.

*For a more complete discussion of oats varieties see Bimonthly Bulletin Vol. 5, No. 3. Reprints of this will be sent on request to the Information Department, State College Station, Fargo, N. Dak. See also Farmers' Bulletin No. 1941, U. S. Department of Agriculture.*
The varieties that are most rust resistant are Vicland, Boone and Tama. These are all early, short strawed, yellow oats, resistant not only to the rusts but to smut. Fair acreages of Vicland and Boone were sown in North Dakota in 1943 and considerable seed is available for further sowing next year, provided it is saved for that purpose and made available to other growers. There are several other early yellow selections from the same cross which resulted in the above varieties. These are in less extensive production. However, they are rust resistant and where certified, or otherwise recognized pure seed is available, they can be used.

Marion, a white oat, has satisfactory resistance to stem rust and is resistant to many races of leaf rust, but susceptible to some races which are present. In our 1941 trials, Marion was relatively free from leaf rust, but carried considerable infection in both 1942 and 1943. Marion grows taller than most of the other early varieties, and may, therefore, be preferred on the lighter soils where the longer straw is desired and in sections where the rust hazard is not so great.

Rainbow, already grown quite extensively, having been introduced several years ago, also has good resistance to stem rust and like Marion is resistant to a number of races of leaf rust but susceptible to other races which appear to have become increasingly prevalent in this area the last two years. Rainbow is slightly later in ripening than the varieties referred to above, usually yields well and grows taller. It has a yellowish white kernel.

Familiar varieties like Gopher and others are very satisfactory and excellent yielders when rust is not severe. The newer varieties should not be expected to show superior yields when rust is not present, but their introduction and use will make production much more sure in those years when rust is damaging.

In the accompanying tables are the yearly yield comparisons since 1939 for Fargo and Edgeley, representing the eastern sections of North Dakota where these early rust resistant varieties have shown to the best relative advantage, and are likely to do so in future years. Trials at Langdon have not generally included early ripening varieties since observations in earlier years have indicated that somewhat later ripening varieties have generally yielded better in that section. However, when grown at Langdon in 1943 these comparable yields were obtained: Vicland 89.7; Rusota 88.5; Rainbow 88.2; Vanguard 77.5; Anthony 68.1; Victory 59.4 bushels per acre, indicating the advantage of rust resistance and earliness in that section this year.

Differences favoring the resistant varieties have been particularly outstanding in the Fargo trials, representing a section where rust injury has been most severe (Table 1). These differences can be noted especially for the years 1941 to 1943. Rust was also present these years at Edgeley, but was most damaging in 1942. In the usually drier sections of the State, as repre-

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*Control, Cedar and Vikota are other named selections.*
Table 1. How Resistant Varieties have Compared in Yield with Gopher and others at Fargo and Edgeley for the years grown

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yield, bushels per acre</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1939</td>
<td>1940</td>
</tr>
<tr>
<td><strong>FARGO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gopher</td>
<td>58.2</td>
<td>37.8</td>
</tr>
<tr>
<td>Rainbow</td>
<td>63.0</td>
<td>26.3</td>
</tr>
<tr>
<td>Marion</td>
<td>62.9</td>
<td>32.3</td>
</tr>
<tr>
<td>Boone</td>
<td>56.4</td>
<td>32.0</td>
</tr>
<tr>
<td>Vieland</td>
<td></td>
<td>60.2</td>
</tr>
<tr>
<td>Tama</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanguard</td>
<td>58.1</td>
<td>21.3</td>
</tr>
<tr>
<td>Victory</td>
<td>60.1</td>
<td>15.4</td>
</tr>
<tr>
<td><strong>EDGELEY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gopher</td>
<td>27.5</td>
<td>10.4</td>
</tr>
<tr>
<td>Rainbow</td>
<td>33.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Marion</td>
<td>14.2</td>
<td>69.0</td>
</tr>
<tr>
<td>Boone</td>
<td>76.4</td>
<td>82.6</td>
</tr>
<tr>
<td>Vieland</td>
<td>61.9</td>
<td>83.9</td>
</tr>
<tr>
<td>Tama</td>
<td></td>
<td>89.1</td>
</tr>
<tr>
<td>Vanguard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Presented by the Dickinson and Williston stations (Table 2), rust has been less a factor in influencing yields and the advantage of rust resistance in that section has generally not been so apparent. Gopher, an early, and Victory a mid-early variety resistant to stem rust but not to leaf rust.

Early sowing of oats, to permit the crop to develop and approach maturity before the higher temperatures of late July and early August, will usually result in more satisfactory oat yields. Earliness too is a factor often helpful in enabling a field of oats to "escape" disease damage, including damage from the

Table 2. Showing Comparative Yields obtained when Grown at the Dickinson and Williston substations

<table>
<thead>
<tr>
<th>Variety</th>
<th>Dickinson 1940 to 1943</th>
<th>Williston Dry land 1942-1943</th>
<th>Irrigation 1941-1943</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gopher</td>
<td>47.8 54.6 84.0 73.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainbow</td>
<td>50.8 54.2 84.0 74.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marion</td>
<td>46.0</td>
<td>85.2</td>
<td>74.1</td>
</tr>
<tr>
<td>Boone</td>
<td>42.3 47.1 85.2 74.1</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Vieland</td>
<td>43.9</td>
<td>87.4</td>
<td>75.5</td>
</tr>
<tr>
<td>Vanguard</td>
<td>51.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victory</td>
<td>50.9 49.8 87.4 75.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Vieland grown in 1943 yielded very satisfactory. Boone not grown.
* Marion grown only two years. Vieland and Tama one year, 1943.
rursts which usually is most se-
vere on the later ripening sus-
sceptible varieties. Good cultural
practices and a wise selection of
the variety to grow will go a
long way towards insuring a
satisfactory crop.

Seed of New Rust Resistant
Durums Available

By
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TWO DURUM WHEATS, CARLETON AND
STEWART, were released by the North Dakota
Agricultural Experiment Station in the spring of 1943.
These new durums are products of the durum wheat improve-
ment program carried on cooperatively with the Division of
Cereal Crops and Diseases, Agricultural Research Admin-
istration U. S. Department of Agriculture.¹ Both varieties
are from Mindum x Emmer (“speltz”) crosses, made to
obtain the high rust resistance of the emmer parent and back-
crossed twice with Mindum to recover the more desirable
characteristics of Mindum, particularly kernel type, color
and semolina quality. Carleton and Stewart are highly
resistant to the durum “races” of stem rust commonly
found in this area on Mindum and Kubanka, and in tests to
date have appeared to be very satisfactory in semolina
quality.

About 395 bushels of Carleton
were released in lots up to 10
bushels each to 40 farmers who
cooperated in its increase in
1943. From this initial distribu-
tion about 6000 bushels are now
available for sowing in 1944.
Farmers report an average yield
of about 20 bushels per acre.
Carleton is slightly later in rip-
ening than Mindum, has a
stronger, coarser straw and car-
ries its head more erect. The
kernel is shorter and more
plump than Mindum and like
Mindum is without brush. Its
outstanding merits over Min-
dum are higher rust resistance
and stronger straw.

A total of 1160 bushels of
Stewart was available for dis-
tribution last spring. This was
released in lots up to 20 bushels
each to 61 cooperating farmers.
Reports on hand indicate that
from this distribution about
18,000 bushels will be available
for sowing in 1944. The average
farm yield reported for 1943,
including several fields partially
hailled or drowned out, was
about 20 bushels per acre. Stew-
art is slightly later in ripening
than Mindum, is less subject to

¹Bimonthly Bulletin, March 1943.