

WHEAT VARIETIES

for **1958**

By T. E. Stoa

THE relative behavior of any variety is influenced by the environmental conditions under which it is grown. All varieties have some merit, also some limitations—limitations which show up more in some seasons than in others. In eastern North Dakota crop diseases are more common and the need for disease resistance is usually a first consideration in the choice of a variety. In drier sections of the state crop damage from disease is less frequent, and some characters other than disease resistance may appear more desirable.

Stem rust was not a large factor influencing yields in 1957, and yield differences among most varieties, due to this disease, were of little consequence (table I). Exceptions to this were some of the older and less resistant varieties, especially Ceres and Mindum durum, which in the test plots at Fargo carried considerable rust and showed damage to the yield.

High temperatures during the ripening season may have been a factor for some varieties. Conley among the hard red spring wheats and Towner among the durums, both relatively late, appear to have been injured more than varieties maturing earlier. However, the yield damage from the high temperatures turned out to be less than was expected at the time.

Low summer rainfall and inadequate moisture reserves accounted for the relatively lower yields at Williston. Excessive rains at harvest time in some sections of the state resulted in some loss of test weight and quality to an otherwise good wheat crop.

Rust Resistance and Race Prevalence

In the areas where the stem rust hazard is considerable there is constant concern of possible important changes in the rust race prevalence. Races which can attack Selkirk are known. However, up to now there does not appear to have been any large change in

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TABLE I.—How the Leading Varieties Compared in Yield in 1957.

Variety	Fargo	Edgeley	Langdon	Minot	Mandan ¹	Dickinson	Williston	Average
Selkirk	42.0	32.4	40.5	35.8	36.2	23.0	19.9	32.8
Lee	43.2	26.7	41.2	41.7	34.0	32.6	22.4	34.5
Conley	35.6	28.6	40.3	35.3	27.8	25.3	21.1	30.6
Thatcher	39.9	30.1	30.7	41.3	33.0	30.1	21.5	32.4
Mida	41.1	29.9	40.5	34.4	31.7	27.2	22.1	32.4
Mindum	38.2	30.1	46.0	39.4	35.4	31.5	21.9	34.6
Sentry	44.9	31.6	52.8	45.3	36.2	30.8	20.8	37.5
Langdon	50.7	30.8	53.0	48.3	37.6	32.8	18.8	38.9
Ramsey	43.7	32.0	50.8	39.6	32.5	36.6	21.0	36.6
Towner	39.6	27.2	45.3	39.3	.....	34.4	20.2	.....
Yuma	43.5	24.9	44.0	33.3	31.6	30.0	18.7	32.3

¹Data courtesy Northern Great Plains Field Station.

the prevalence of these races in this area and Selkirk has continued to show about the same degree of rust resistance, that is, relatively light infection. However, the rust race situation is never static, as recalled by the introduction into this area and rapid increase of race 15B in 1950.

In the spring of 1956 Ramsey durum in Texas test plots showed a lot of rust, and later that year carried more than the usual amount of rust in some North Dakota test plots. This suggested that we might be faced with a further and rapid buildup of this rust on Ramsey in 1957. For some unknown reasons this did not happen. The 1957 test plots of Ramsey showed less rust than the previous year. On the other hand, Langdon, which had remained relatively free from rust in 1956, showed considerable rust in 1957. Some other lines, previously relatively free from rust, also showed some rust in 1957, indicating another varia-

tion in the rust race situation. In this instance the rust on Langdon came on late so caused no injury to yields.

To become established and increase in prevalence a "new" race (or races) must infect susceptible wheat or other host plants in southern wheat growing areas, and thus overwinter in the uridial (or red) stage. As the wheat plant resumes growth in the spring new urideo (red) spores are soon produced—spores capable of infecting other susceptible wheat plants, setting up new infection centers. As the season advances the infected areas increase and more and more spores are produced, many to be carried by air currents to distant fields. Viable red spores, favorable moisture and temperature for germination, and a large acreage of susceptible host plants are factors necessary to any important buildup. A late sown and late ripening northern wheat crop will, if lacking in resistance to the race of rust, further en-

hance the increase of such "new" races, much as it did for race 15B in 1950. That a "new" race can thus increase and become a serious threat to varieties once regarded as resistant is therefore a matter of much concern, not only to the plant pathologist, the plant breeder and the farmer, but to everyone interested in the northern wheat crop.

Variety Yield Comparisons

How the varieties now available differ in some of the more important agronomic characteristics and disease reaction is shown in table IV.

Variety yield differences may be due to one or more of several factors. Some of these factors may differ considerably from year to year. To evaluate the relative yielding ability of a number of varieties, such yield comparisons over a period of years are, therefore, more dependable than for any one year.

Yield comparisons for the last 3 years, for the several stations in eastern North Dakota, are

presented in table II. During these years stem rust did not appreciably influence the yield differences, thus reflecting better the relative yielding ability of the varieties. Note that the Selkirk yields compared favorably with other varieties. Selkirk, therefore, would appear to be a satisfactory choice even in years when severe rust conditions would not be a serious factor.

In western North Dakota, too, without any particular rust damage, Selkirk yields, as shown in table III, compared favorably with the yields of Mida, Thatcher and Lee. Only at Dickinson did Selkirk yields fail to average up with Lee. There has been some concern that under high temperatures, or drouth and high temperatures, that Selkirk would not yield as satisfactorily as other varieties.

Conley, susceptible to "black chaff" and a leaf condition, suffered considerable damage in

TABLE II.—Comparing average yields of the leading varieties of wheat for the 3 years, 1955-57, from station trials in eastern North Dakota.

Variety	Fargo 1955-57	Edgeley 1955-57	Langdon 1955-57	Minot 1955-57	Weighted average 12 sta. yrs.
Selkirk	35.9	25.2	35.2	37.8	33.5
Lee	34.6	22.9	35.7	36.7	32.5
Conley	29.9	25.1	34.2	33.0	30.6
Thatcher	32.0	21.4	28.0	37.4	29.7
Mida	33.0	22.5	32.1	33.1	30.2
Mindum	31.7	23.4	38.3	36.8	32.6
Sentry	35.7	25.2	45.9	39.3	36.5
Langdon	40.2	25.7	48.5	43.2	39.4
Ramsey	36.0	27.0	47.3	37.6	37.0
Towner	32.8	25.0	39.5	34.2	32.9
Yuma	35.2	23.8	38.3	33.9	32.8

TABLE III.—Comparing average yields of the leading varieties of wheat for the 3 years, 1955-57, from station trials in western North Dakota.

Variety	Mandan ¹ 1955-57	Dickinson 1955-57	Williston 1955-57	Weighted average 9 sta. yrs.
Selkirk.....	34.9	21.3	19.1	25.1
Lee.....	33.3	24.2	17.0	24.8
Conley.....	29.6	20.8	19.9	23.4
Thatcher.....	31.3	22.6	20.6	24.8
Mida.....	31.9	22.6	20.4	25.0
Mindum.....	31.6	21.9	19.7	24.4
Sentry.....	32.5	23.4	15.9	23.9
Langdon.....	35.6	23.3	17.1	25.3
Ramsey.....	.....	21.8	18.7	.....
Towner.....	.....	.....	18.3	.....
Yuma.....	30.4	21.2	16.8	22.8

¹Mandan data courtesy Northern Great Plains Field Station.

1955, particularly in eastern North Dakota. "Black chaff" appeared also in 1956 and 1957 but the damage to yields, if any, was not apparent. Conley has not always yielded up to expectations. Being later to ripen than other hard red spring varieties, Conley may in some years have suffered more in yield from late drouth or high ripening temperatures than varieties which headed and ripened earlier.

When yield comparisons for rust years like 1954 are included, the advantage for the more resistant varieties becomes more pronounced. For the 5-year comparison, 1953 to 1957, the data show Selkirk outyielding Lee from 2 to 4 bushels at all dry-land stations in North Dakota where tested, except at Dickinson. For this period, including 35 comparisons, the average Selkirk yield was 29.8 and Lee 26.9 with Rushmore, Mida and Thatcher, having less resistance, averaging below Lee.

Recommendations

Considering the difference in the resistance to stem rust and those other agronomic characteristics that go to make a desirable variety, including ability to yield satisfactorily under a range of conditions, the following variety recommendations for 1958 are made:

For rust areas:

Hard Red Spring— Selkirk, Lee, Conley

Durums—Langdon, Ramsey, Yuma, Towner, Sentry

Where rust is less common:

Hard Red Spring—Selkirk, Lee, Conley, Thatcher

Durums—Langdon, Ramsey, Mindum, Sentry

For sawfly areas:

Rescue and Chinook offer some sawfly resistance, but are lacking in resistance to 15B and are not capable of yielding as well as other varieties unless damage and losses from sawfly are severe. Chinook is superior to Rescue mainly in flour quality.

TABLE IV.—How Present Varieties Differ in Some Important Characteristics.

Variety	Beards	Height	Strength of straw	Relative maturity	Relative resistance to:				Yield-ability ³	Remarks
					Stem rust ¹	Leaf rust ²	Loose smut	Bunt		
Hard Red Spring:										
Selkirk.....	no	short	med.	m.early	good	good	good	good	good	Resistant to prevalent rust races. Satisfactory yield.
Lee.....	yes	med.	med.	m.early	fair	good	poor	fair	good	Good leaf resistance. Some tolerance to 15B.
Conley.....	yes	m. tall	med.	m. late	good	mod.	good	good	good	Resistant to prevalent races of stem rust. Susc. to "black chaff".
Thatcher.....	no	short	strong	m.early	poor	v. poor	good	poor	good	Recommended for northwestern counties only.
Rushmore.....	no	short	strong	m.early	poor	poor	good	good	fair+	Lacking in resistance to 15B. Early.
Mida.....	yes	tall	strong	m.early	poor	poor	poor	good	good	Lacking in resistance to 15B.
Rescue.....	no	short	weak	m. late	poor	poor	mod.	poor	fair	Only for sawfly area. Lacks rust resistance.
Chinook.....	no	med.	weak	m.early	poor	poor	poor	poor	fair	Only for sawfly area. Lacking in rust resistance.
Durum:⁴										
Langdon.....	yes	med.	m.weak	med.	mod.	fair	good	good	v. good	Combines moderate resistance to 15B, with good yielding ability.
Ramsey.....	yes	m. tall	med.	late	mod.	good	good	good	v. good	Moderate resistance to prevalent races, yields good.
Towner.....	yes	tall	med.	late	mod.	good	good	good	good	Moderate resistance, late ripening, erratic in yield.
Yuma.....	yes	med.	weak	med.	good+	good	good	good	good	Best for rust resistance. Moderate yields. Hard to thresh.
Sentry.....	yes	med.	strong	early	fair	good	good	good	fair+	Early, some tolerance to 15B. Strong straw.
Mindum.....	yes	tall	m. weak	late	poor	good	good	good	v. good	Lacking in resistance to 15B.
Vernum.....	yes	tall	weak	m. late	poor	good	good	good	good	Mid-early, some tolerance to 15B. Weak straw.

¹Reference to races prevalent since 1950, mainly 15B.

²Many varieties once regarded as resistant are lacking in resistance to races now prevalent in this area.

³On the basis of no damage from rust.

⁴Durum breeding cooperative with USDA.