

1955 RECOMMENDATIONS

for Wheat and Durum



RUST POSSIBILITIES IN 1955

Serious and widespread stem rust injury to spring wheat occurred throughout North Dakota and the surrounding area in 1953 and 1954. How serious will this rust be in 1955 and what varieties and practices will offer the greatest protection are important questions in making plans for the 1955 season.

No one can forecast what the rust situation or crop conditions will be in 1955 as a rust epidemic requires certain conditions to build up. However, experience indicates that when a race of stem rust becomes as widely established as has 15B, you can expect it to occur to a greater or less extent every year until resistant varieties can limit its build-up. How serious rust injury will be in 1955 will depend upon conditions that develop during the season.

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SEVERAL FACTORS NECESSARY FOR EPIDEMIC

Several factors or conditions are required before a rust epidemic can build up to serious proportions. They are;

1. Rust overwintering in the summer stage in areas of mild winter climate.
2. An early spring build-up of new red spores to provide a source of infection. Experience indicates even a light winter infection in the south can build up rapidly in the spring if conditions are favorable.
3. Red spores blown up from the overwintering area, or from later infected southern winter wheat fields, in time to infect spring wheat fields in the northern states and Canada.
4. Southern winds to carry the red spores up north from the southern winter wheat area and rain showers to precipitate rust spores and aid in their establishment on wheat in this area. Experience the past two years indicates these first four factors are quite certain to occur every year and rust injury in North Dakota will be governed quite largely by the following three factors.
5. Susceptible varieties in this area on which the rust can build up.
6. Infection early enough in the season to allow several generations of rust to occur before harvest.
7. Favorable weather and crop conditions in North Dakota to permit a fast build-up of the rust. These include a lush growth of wheat, frequent showers and heavy dews, high humidity and moderate temperatures.

All the above conditions are necessary for a rust epidemic to build up. Any one or more unfavorable conditions for rust can limit its development. So, while it appears likely 15B rust will be present in North Dakota in 1955, the amount of rust and the injury that occurs will depend upon conditions as they develop.

HOW VARIETIES PERFORMED IN RUST YEARS

Each variety has its own characteristics, such as capacity to yield, relative maturity, strength of straw and reaction to specific races of stem and leaf rust. High yielding varieties in non-rust years may be disappointing in rust years. Likewise, a rust resistant variety which may excel in a rust year may not compare in yield to others in a non-rust season.

Table I shows Experiment Station yield comparisons for leading varieties in non-rust years since 1947. There is little difference in the varieties in reaction to Race 15B of stem rust, all lacking in resistance. Any advantage one might have over another in a rust year is due to earlier maturity or greater resistance to leaf rust or other diseases.

TABLE I.—How the principal varieties have compared in yield when there was little or no stem rust injury, 1947-1952.^a

	Average yield, bushels per acre						
	Fargo 1947-52	Edge- ley 1947-52	Lang- don 1947-52	Minot 1948-52	Dickin- son 1948-52	Willis- ton 1948-52	Weighted average 26 sta. years
<i>Common Wheat:</i>							
Mida	26.5	20.2	33.9	34.0	21.7	19.9	25.8
Rival	25.9	20.1	35.6	31.1	21.4	19.8	25.6
Thatcher	26.6	18.1	29.2	33.6	20.0	21.1	24.4
Rescue	—	—	—	28.8	18.8	20.7	—
Rushmore	26.1	18.1	—	30.5 ^b	17.8	—	—
Lee	27.9	20.1	33.9	32.4	18.7	19.0	25.3
<i>Durum Wheat:</i>							
Mindum	30.5	20.8	38.0	34.0	22.1	—	—
Stewart	28.9	20.3	39.9	35.4	—	—	—
Vernum	30.1	18.9	37.4 ^c	33.3	—	—	—
Nugget	30.4	18.8	33.0	27.9	17.4	—	—

^a 1950, a rust year, omitted

VARIETY PERFORMANCE IN RUST YEARS

In Table II the Experiment Station yield comparisons are shown for the same varieties during three rust years, 1950, 1953 and 1954. Lee has a yield advantage at all stations, indicating its greater tolerance to leaf rust and some tolerance to 15B stem rust and slightly earlier maturity than Mida. Rushmore also shows an advantage over Mida, but to a less extent.

The yield advantage of the good durums is completely reversed in the rust years. Mindum and Stewart were injured even more by 15B rust than Mida, due in part to later maturity. Vernum has shown some tolerance to Race 15B. Nugget is very susceptible, despite its earliness.

TABLE II.—How the same varieties compared in yield in the three rust years.

	Average yield, bushels per acre (1950, 1953, 1954)						
	Fargo	Edge- ley	Lang- don	Minot	Dickin- son	Willis- ton	Weighted average 18 sta. years
<i>Common Wheat:</i>							
Mida	21.4	16.3	26.3	14.7	15.4	24.7	19.8
Thatcher	23.5	14.2	26.4	13.3	14.9	25.8	19.7
Rescue	—	—	—	13.1	16.0	21.2	—
Rushmore	27.2	18.2	—	16.6	17.8	—	—
Lee	31.2	19.5	36.8	17.9	17.8	26.9	25.0
<i>Durum Wheat:</i>							
Mindum	8.6	11.2	21.3	11.4	11.4	—	—
Stewart	6.8	—	19.8	11.7	—	—	—
Vernum	15.7	12.2	30.5	15.0	—	—	—
Nugget	—	—	22.7	8.3	—	—	—

NEW RESISTANT VARIETIES PROMISING

Selkirk: This is the first of the varieties resistant to 15B that is claiming wide attention. Selkirk was bred and selected in Canada from a cross (McMurachy - Exchange) x Redman³. It is beardless, is fairly early, has fairly strong and moderately short straw, has resistance to stem rust, including moderate resistance to 15B and to leaf rust and has satisfactory resistance to covered and loose smut. There is some indication Selkirk may suffer more from late summer drouth or high temperatures than some other varieties. However, it's greater 15B rust resistance will recommend it until varieties with more resistance become available.

Selkirk is not immune to stem rust. In both 1953 and 1954 where rust was heavy, it remained relatively free of rust for a considerable time after heading but developed many small pustules as it approached harvest. This may be the result of less resistance at higher temperatures or infection from a less common race of rust.

About 150,000 to 175,000 bushels of Selkirk should be available for planting in North Dakota in 1955. This includes about 60,000 bushels increased under contract with the experiment Station in 1954 by about 175 farmers in all counties of the state and private increases. Most of this is certified seed.

Other Hard Wheats: The North Dakota Experiment Station has a number of other resistant lines under early increase. Whether these will be approved for further increase and release will be determined after the quality tests on the 1954 crop are complete. If released some of these can be expected to supplement Selkirk. Similarly the Minnesota Experiment Station has under test and early increase new lines from their breeding program. Lines still more resistant than these now are in the early testing and preliminary increase stage. Others can be expected to follow as better sources for resistance are found and this resistance can be incorporated into wheats of the kind suited to this area.

Sentry Durum: Sentry is a new durum variety developed and released cooperatively by the United States Department of Agriculture and the North Dakota Agricultural Experiment Station. This is a selection from the cross, Ld. 308 x Nugget. Ld. 308 was a selection from the double cross (Heiti x Stewart) x (Mindum x Carleton).

Sentry is about six days earlier than Stewart in date of heading, 5 to 9 inches shorter in straw height, and much more resistant to lodging. While Sentry cannot be said to have resistance to Race 15B stem rust, it has a combination of earliness and some tolerance to 15B which gives it an advantage over such varieties as Stewart and Mindum in rust years. (See Tables III and IV). It would not, however, provide sufficient protection against 15B under severe rust conditions. Sentry yields well, considering its early maturity, has high test weight and compares favorably with Stewart in quality of the semolina and macaroni products.

The North Dakota Experiment Station released 1,500 bushels of Sentry in the spring of 1954. About 1,000 bushels were from seed increased in Arizona which returned late, curtailing farm increases. Although this late sown Sentry rusted seriously, cooperating growers felt that it offered considerable promise over other durums.

Other Durums: Four promising 15B resistant lines of durum developed cooperatively by the North Dakota Experiment Station and the United States Department of Agriculture are being increased this winter (1954-55) in Arizona. These increases will get back to North Dakota about mid-May and will be increased under contract in 1955. With favorable increase yields these new varieties should be increased to the point where they will seed a substantial part of the durum acreage in North Dakota in 1957.

TABLE III.—New varieties, Selkirk and Sentry (durum) and how they compared in yield with other varieties in EASTERN North Dakota the last two rust years.

	Yields in bushels per acre										Average 8 com- parisons
	Fargo 1953 1954		Edgeley 1953 1954		Langdon 1953 1954		Minot 1953 1954				
<i>Common Wheat:</i>											
Selkirk	26.1	35.8	29.9	24.3	36.0	44.7	28.8	26.4	31.5		
Lee	25.6	28.7	17.8	17.8	32.0	28.5	13.5	16.3	22.5		
Mida	17.4	14.5	12.5	12.0	21.0	14.0	8.8	10.6	13.9		
Thatcher	21.5	16.6	12.0	11.2	23.5	17.3	10.2	5.6	14.7		
<i>Durum Wheat:</i>											
Sentry (Ld 356)	20.5	17.6	12.9	11.1	38.3	29.0	12.2	6.8	18.6		
Ld 357	22.0	21.1	10.9	13.8	33.7	25.2	7.6	6.9	17.7		
Mindum	13.4	8.6	4.9	4.8	20.3	7.8	5.9	3.6	8.7		
Vernum	19.6	15.7	9.5	7.7	29.5	21.2	10.2	10.4	15.5		
LSD (5%)	3.3	3.4	2.2	3.2	1.2	2.8	3.0	3.4	—		

TABLE IV.—How the same new varieties compared in yield when under test at the WESTERN North Dakota stations.

	Yield in bushels per acre						Average 6 compari- sons
	Dickinson 1953	1954	Mandan ¹ 1953	1954	Williston 1953	1954	
<i>Common Wheat:</i>							
Selkirk	28.2	12.7	37.4	24.2	44.9	20.2	27.9
Lee	22.5	11.9	42.4	15.4	37.0	17.4	24.4
Mida	15.1	10.5	31.4	12.4	30.5	17.9	19.6
Thatcher	16.6	9.9	33.2	11.2	30.4	18.1	19.9
<i>Durum Wheat:</i>							
Sentry (Ld 356)	17.5	12.1	----	----	----	15.5	----
Ld 357	----	10.8	----	----	----	16.6	----
Mindum	7.0	8.0	----	----	----	13.8	----
LSD (5%)	2.3	1.4	----	4.2	7.9	0.8	----

¹Data courtesy Howard Haas, Northern Great Plains Field Station, U.S.D.A.

VARIETIES TO GROW IN 1955

Because the hazards of rust are considerable, especially in the better rainfall areas of the state, it is imperative to grow the variety which promises most protection against rust, provided it is reasonably satisfactory in other respects. Thus the variety choices for 1955 appear about as follows:

For eastern counties, where the rust hazards are the greatest: Selkirk, insofar as the seed supply permits, Lee for the larger acreages and Rushmore.

In the central and southwestern counties: Lee, Rushmore, Mida and Selkirk appear to offer most promise. For the northwestern counties: Selkirk, Lee and Thatcher seem to be the choices, with Rescue or Chinook where sawfly resistance is especially desired.

For the durum grower the choice is between Sentry, insofar as the very limited supply of seed permits, and Vernum for the larger acreage. Mindum is the next choice and Stewart the last because of late maturity.

In all areas early sowing is urged, also the application of a phosphate fertilizer to hasten the development of the crop where such applications have given favorable response.