

# A Plant Breeder Works With 15B

By L. R. Waldron<sup>1</sup>

The widespread appearance in 1950 of the relatively new race of stem rust of wheat, 15B, has developed difficult problems. Our present ignorance of how this new form is going to behave adds to our difficulty. The more common rust races had their courses well charted but this one may form a pattern of its own. Will the disease again attack the durums more severely than the common wheats or was it somehow an accident that the latter were less injured than their durum relatives? The best opinion seems to be that both groups of wheat are apt to receive major injury. The future will give us the answer to this question and steps are being taken in that direction. Nursery experiments in the southern hemisphere and greenhouse trials in this country form a part of the program.

The program carried on at this experiment station during the past five years for developing varieties of wheat resistant to leaf rust has been described and it so happens this ties in with our present problem. In 1944 we received at this station a few kernels of wheat, developed by Dr. E. R. Sears of Columbia Mo., with a remarkable history in that they had come from a strange wheat from the Caucasus region, known as Timopheevi, crossed with a grass related to wheat called *Aegilops squarrosa*.

This useless hybrid was "ennobled" by treatment with colchicine, which doubled the chromosomes to put it on a par in crossing ability with common wheat. This has been done several times, lastly with the Minnesota variety Newthatch, with the result that there are available a long series of hybrid selections of which some showed much promise in 1950. As indicated, the common wheats were not severely hit last season and more time is needed to learn if this promise will be carried further.

One experiment, series 827, carried 60 of these new amphidiploid hybrids, together with four checks seeded in quadruplicate and with yields ranging from 37.1 bushels per acre to a low of 23 bushels. The eight highest yielding of these 64 wheats came from a single family known as 1.10.24. Lee as the best check variety yielded 32.6 bushels, a value statistically below the average of the eight. These carried some stem rust but this was distinctly less than what was found on most of the other selections in the experiment and also less than found on the Lee variety.

Another experiment, series 830, carried 14 selections from the family 3.6 and these have shown considerable promise previous to 1950. Five of these ranked above all others in yield in experiment 830 in competition with 59 others and averaged 5.7 bushels above Lee grown comparably. These five carried no leaf rust where Mida had 60 per cent. Stem rust on them was eight per cent, with Lee at 14 per cent. Most of the other selections carried more stem rust

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though none of them were heavily infested as were the durums. Some of the 3.6 selections have been so promising in yield and in milling and baking that their future behavior with the new rust race will be watched with much interest. It is to be hoped that some of the selections have definite resistance to the disease even though complete freedom cannot be expected. Three samples of this family are now being grown at Brawley, Calif. for winter increase.

### THE "45" INCREASES

Over 50 selections from the Timopheevi—Aegilops—Newthatch cross of about two pounds each were available for seeding in 1950 and about .03 acre was devoted to each sample, with Mida, Thatcher, and Lee used as checks. These were seeded in quadruplicate in long plots the first days in June. A number were rather heavily attacked by stem rust to which they had shown marked resistance before this last epidemic. And because of occasional straw weakness and some sterility only 26 were harvested and saved.

Included among them were several of the 3.6 family and other lines of promise. In spite of the late date of seeding these small plots returned about 30 pounds of seed each, enough in each case to seed three or four field plots at different stations. Rust readings on the "45" increase trials showed a wide diversity as to amount of rust among the selections, which indicates real differences evidently existing in susceptibility. Such differences should be evident another season.

### OTHER TRIALS WITH RACE 15B

A wheat sample numbered 1.15 from an amphidiploid family was sent to Dr. R. F. Peterson at Winnipeg to be grown in the 15B nursery at the Manitoba cereal breeding laboratory there. Samples of seed from single plants were returned and when grown here in 1948 one at least showed freedom from leaf and stem rust. A second lot of seed was sent to Winnipeg and on their return in 1949, 22 plant samples were increased in the greenhouse and were seeded in rod rows in 1950 where they were subject to a third, natural, attack of 15B. The 22 rows showed differences in incidence of rust with one row scoring 30 per cent. But six rows showed promise, with one row showing five per cent, three rows three per cent and two rows carried but a trace. The six rows are otherwise of promise and while they showed well as to resistance, further information from them will be needed.

The foregoing indicates rather clearly that while we were busily engaged in breeding against leaf rust, certain selections were being located which carried some resistance to this new enemy 15B. Evidently these results have come about by the happy use of the Timopheevi wheat which is remarkable because of its natural high resistance to the two kinds of rust which bother our wheat and other cereal crops.

## CROSSES OF LEE AND MIDA SIBS.

Lee was crossed with two close relatives of Mida in 1946 and from this some selections have been obtained which appear to be rather remarkable in their near freedom from stem rust in 1950. A few of them were markedly less rusted than the Lee parent, grown as a check. If this relative freedom is an actuality it will afford evidence of building up of resistance from this cross, as the two parents used with Lee could not promise more resistance than the Mida variety. But here again clear evidence of the matter must await another season.

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## FARM GRAIN STOCKS AT HIGH POINT

Stocks of wheat on farms in North Dakota Jan. 1, 1951 were estimated at 77,263,000 bushels, 20 per cent more than on that date a year earlier and about three per cent above the 10-year (1940-49) average. Jan. 1 farm holdings of wheat were 64 per cent of the 1950 production, a bigger proportion, of the crop than was on hand a year earlier and also a bigger proportion than is usually carried on farms until Jan. 1. The 10 year average ratio of Jan. 1 stocks to production is 55 per cent.

Jan. 1 stocks of corn, at 6,220,000 bushels, compare with 7,179,000 bushels Jan. 1 last year and the 10-year average of 5,594,000 bushels. Present farm supplies are 13 per cent smaller than those of a year earlier, but 11 per cent above average. Jan. 1 farm stocks were 67 per cent of the 1950 production. This high proportion of stocks is partially due to a larger carry over of old corn.

Farm granaries held 45,241,000 bushels of oats on Jan. 1 this year. Last year on Jan. 1 only 31,853,000 bushels, of this grain, were on farms. In the 10 year period 1940-49 Jan. 1 stocks averaged 47,505,000 bushels.

Barley stocks located on farms were placed at 28,892,000 bushels for Jan. 1, 78 per cent more than the 16,239,000 bushels on hand a year earlier. This year's Jan. 1 stocks were about three per cent below average.

Farm stocks of rye at 1,151,000 bushels on Jan. 1 this year compare with 797,000 bushels on hand a year earlier, and the 10-year (1940-49) average stocks of 3,154,000 on Jan. 1. Farm holdings of soybeans, at 194,000 bushels on Jan. 1, compared with 115,000 bushels a year earlier.

Hay stocks are estimated at 2,580,000 tons compared with 2,221,000 tons on hand the first of last year, and the 10-year Jan. 1 average of 2,422,000 tons. This year's Jan. 1 hay stocks are the largest since 1942 and have only been exceeded twice in the last 14 years of record—Compiled by C. J. Heltemes, USDA Bureau of Agricultural Economics statistician, Fargo, N. D.

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The new soybean variety, Black Hawk, recently released within the Corn Belt Area of the United States is considered to be too late for the Northern Soybean Growing Area including North Dakota.