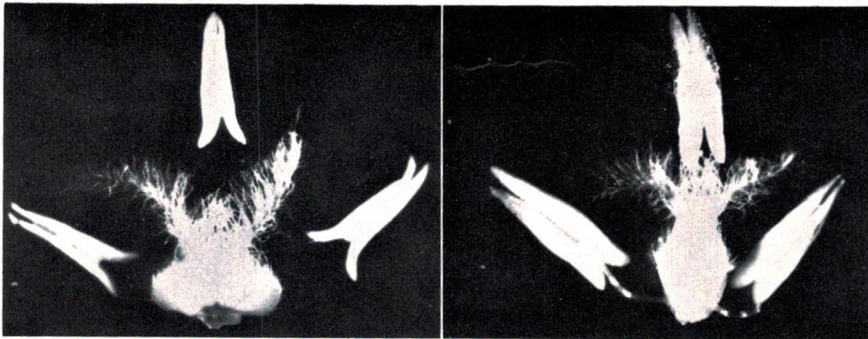


M. Feldman



Male and female parts of a male-sterile hybrid wheat plant flower. Left picture shows the three anthers, or male parts, shriveled and containing no pollen. Anthers on the right are fully developed and contain normal pollen.

Hybrid Wheat

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The discovery of an apparent male-fertility restorer for a male-sterile bread wheat may have removed the first hurdle on the road to hybrid wheat.

Research leading to the discovery of this particular male-fertility restorer-male sterility combination in bread wheat was the cooperative work of the Agricultural Research Service, U.S.D.A., and the Nebraska Agricultural Experiment Station. Impetus for this research came from earlier reports of male sterility in wheat by wheat workers in Japan and at the Fort Hays Branch Station of the Kansas Agricultural Experiment Station by Wilson and Ross. The latter indicated that with continued backcrossing of *Triticum timopheevi* with Bison as a male parent they had obtained a cytoplasmic type male sterile.

First Hint

The first hint of the presence of the hybrid wheat possibilities among Nebraska-developed wheats came in the spring of 1962 with the discovery of male-sterile and male-fertile plants in Nebraska wheat

No. 542437, a *Triticum timopheevi* derivative (1279A9-III-4) crossed to Nebred.

Appropriate test crosses were made immediately. In June the crossed seeds were planted in a growth chamber, then vernalized and, finally, transferred to another growth chamber to bring the plants into head by late September.

Crosses of the male sterile with Bison winter wheat did not shed pollen at heading and were sterile as expected. In contrast, crosses of the male-sterile plant with fertile plants of the same line shed pollen normally and set seed well under growth chamber conditions as anticipated. The same fertile plants when crossed with two of the Fort Hays male sterile lines also resulted in fertile hybrid plants. However, some of these exhibited some chromosomal irregularity not seen in the Nebraska materials. The first hurdle on the road to hybrid wheat had been cleared.

Further hurdles to be cleared are the demonstration of superiority of hybrid over conventional varieties and the techniques and economics of successful hybrid seed production.

How soon will hybrid wheat

take its place beside hybrid corn and hybrid sorghum on Nebraska farms? Since the tools for doing this now appear to be available, preliminary trials could begin in a few years. Whether and when the farmer will have the choice of growing hybrid wheat will depend upon additional research information.

Already some information on the amount of hybrid vigor in common wheat crosses has been obtained at the Nebraska Agricultural Experiment Station. In limited studies with 4 crosses, the hybrid yielded from 3 percent below to 31 percent above the better parent. This suggests that certain current combinations could be outstanding in yield. The most extensive report on hybrid vigor in wheat was reported some 30 years ago by Dr. C. E. Rosenquist, University of Nebraska.

Advantages

What additional advantages may hybrid wheat have over conventional varieties? They undoubtedly will add greater flexibility to the attack on problems connected with wheat production on Nebraska farms. When an array of male sterile-male fertile combinations are available, a hybrid can be produced more quickly than a conventional pure line that will fit varying environmental and market needs. It may, for example, allow more rapid varietal shifts to combat the build-up of threatening new rust races.

Finally, the male-fertility restorer with male-sterile counterpart will provide a long-sought-for tool for basic genetic and breeding studies.

Because this research involved only a very few plants, no seed is available for distribution. Seed of the line from which these plants came also has been exhausted in further research now in progress.

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