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TRITICALE

Proceedings of an international symposium
El Batan, Mexico, 1-3 October 1973

Editors: Reginald MacIntyre/Marilyn Campbell



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This symposium was co-sponsored by the Centro Internacional de Mejoramiento de Maiz y Trigo, the University of Manitoba, and the International Development Research Centre.

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Early Steps on Triticale Breeding at CIMMYT

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Abstract CIMMYT began its triticale breeding work in 1964, faced with overcoming such problems as daylength sensitivity, lodging, fertility, kernel weight, disease resistance, and developing a better plant type. These traits were gradually assembled through breeding. Efforts were then diverted to intercrossing triticales with both bread and durum wheats to broaden the germ plasm base. After genes influencing such traits as a desirable plant type along with high levels of fertility and better seed development were assembled in blocks, a breakthrough resulted and Armadillo and other lines were selected.

Résumé Lorsque le CIMMYT a commencé en 1964 à travailler à la sélection du triticale, il s'est heurté à un certain nombre de problèmes tels que la sensibilité nyctémérole, la verse, la fertilité, le poids du grain, la résistance aux maladies et la création d'un type végétal meilleur. Tous ces points ont été progressivement traités dans le cadre de la sélection. On s'est ensuite orienté vers le métissage triticale/blés de panification et blés durs afin d'augmenter le capital génétique. Une fois assemblés par blocs les gènes influant sur ces caractères et aboutissant aux types végétaux désirés, soit des types dotés d'une fertilité élevée et d'un meilleur développement des semences, la victoire était là et l'on a pu produire l'Armadillo et d'autres lignées intéressantes.

TRITICALE breeding work at CIMMYT got underway in 1964. However, during the crop season of 1962–63, there were some primary triticales grown at our CIANO Station, introduced by Dr C. B. Jenkins, then with the University of Manitoba. These triticale types were excessively tall, light-sensitive, and tillered profusely. Ing. R. Rodríguez made some crosses into bread wheats more as a scientific curiosity than with any specific reason in mind. During the next 2 years, and once it was established that our wheat nursery during the winter could also be used as a tri-

tical nursery, we saw more and more of the breeding materials handled by the University of Manitoba. At that early stage, we were impressed by the tillering ability and ear length of these earlier triticales, and when the breeding materials were returned to Winnipeg, a sample from the best populations was selected and brought to Toluca to be screened under this new environment.

By this time, we had already decided that if we were to take the best from this new crop, we would have to find ways of overcoming daylength sensitivity, reduce height to avoid

serious lodging problems, increase fertility and kernel weight, and better the plant type. The first season at Toluca showed that we would also need stripe rust resistance, since almost 100% of the lines were lost due to this disease.

Through breeding, various traits were assembled. Some daylength insensitivity was recovered from triticale crosses carrying some degree of light insensitivity. This, however, was not enough, but by then, some triticale-bread wheat crosses were advancing rather well, so earliness and light insensitivity were complemented to that present in triticales. Disease resistance was also accomplished rather quickly. This was expected due to the dominant behaviour of such genes in most instances.

We did not have the skills to produce raw materials at that time, and recognizing the

need to broaden the germ plasm base, diverted our efforts to intercrossing triticales with both bread and durum wheats. Moreover, to enhance the potential for a wider genetic base, F_1 wheat crosses were used heavily as female parental material. Eventually this move proved highly rewarding to our efforts insofar as transferring to the newer triticales the genes for dwarfing, earliness, light insensitivity, and high fertility.

Some traits, such as a desirable plant type combined with high levels of fertility and better seed development, are genetically more complex to inherit and for some plant generations we did not see too much progress. It was only after genes influencing such traits were assembled in blocks that a breakthrough came and Armadillo and other lines were selected. Progress from that point onward is reported elsewhere in the proceedings.