What's All that Gibberish in a Wheat Pedigree Anyway???

(Updated from 2003 Wheat Variety Trial Report)

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A pedigree is the most common way of documenting the parentage of any wheat variety. The composition of a pedigree usually shows what parents were used in crossing and the specific sequence of the crossing scheme. While pedigrees are usually (but not always!) straightforward for most wheat breeders to decipher, the notation used can be confusing and not particularly clear. The principle of "variety complementation" (e.g., selection of more distantly related varieties to minimize production risks) suggests that knowledge of pedigree notation is a useful component of a sound variety selection strategy.

The following types of pedigrees are the most common among the majority of today's wheat varieties.

Parent A/Parent B

This type of cross is known as a single cross. As with all pedigree notation, the parent on the left of the slash (Parent A in this case) is the female parent while the one on the right of the slash (Parent B in this case) is the male parent. A variety from this type of cross would, on average, carry 50% of its genes from each parent. This is generally the most common type of cross that wheat breeders make; common examples of this include Langin (CO050270/Byrd) and Avery (TAM 112/Byrd).

Parent A/Parent B//Parent C

This type of cross is known as a three-way cross or topcross. The double-slash notation represents the point of separation of the parents used in the final cross. Thus, in this example, a plant derived from crossing Parent A and Parent B is used (as female) in a second cross with Parent C (as male). A variety from this type of cross would, on average, carry 50% of its genes from Parent C and 25% from both Parents A and B. Common examples of this type of cross include Breck (Denali/HV9W07-482W//Antero) and Snowmass (KS96HW94//Trego/CO960293).

Parent A/4*Parent B

This type of cross is known as a backcross. The 4* notation in this example indicates that Parent B was used four times (as the “recurrent parent”) in a crossing sequence involving an initial cross with Parent A (as the “donor parent”). This type of cross is usually used to transfer a single trait from the donor parent to the recurrent parent while preserving the desirable attributes of the recurrent parent. The number of backcrosses may vary and thus the percentage of the genes contributed by the donor and recurrent parents varies. Examples of a backcross include Prairie Red (CO850034/PI372129//5*TAM 107) and Above (TAM 110*4/FS2).

Parent A/Parent B//Parent C/Parent D

This type of cross is known as a double cross. The double-slash in this example indicates that a plant derived from crossing Parents A and B was crossed (as female) with a plant derived from crossing Parents C and D (as male). A variety from this type of cross would, on average, carry 25% of its genes from each of the four parents used. Few wheat breeders make a lot of double crosses and, in fact, no varieties in the CSU variety trials in the last 5 years originated from a double cross.

Acknowledgements

The generous support of the Colorado Wheat Administrative Committee (CWAC) and Colorado Wheat Research Foundation (CWRF) is gratefully acknowledged.