THE IMPROVEMENT OF SMALL GRAINS AT MACDONALD COLLEGE.

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Three systems are employed at Macdonald College in an attempt to maintain the purity, increase the yield and improve the quality of small grains. Head-selection is practiced annually to keep standard varieties free from mixture; the centgener system is used to isolate and multiply promising mother plants; cross-breeding is employed to combine into one individual the desirable qualities existing in two or more pure-line strains of proven worth.

These systems constitute progressive stages in the improvement of small grains. Careful head-selection must precede intelligent centgener tests. Cross-breeding cannot be most advantageously employed unless pure-line strains of proven efficiency are used as foundation stock.

In this paper I shall confine myself to a discussion of our method of employing the centgener system and then deal briefly with some of the results obtained by this means during the past five years.

When the improvement of a given variety is undertaken, a hand selection is made of the most typical heads from the standing plot. During the winter a careful laboratory study is made of the heads and grains and the most typical are used the next spring for planting the foundation beds.

These beds, for convenience of planting and for facilitating a study of the resulting plants, are 100 links by 10 links. Only the most uniform parts of the experimental grounds are used for this purpose. The preparation of the seed bed is largely performed by hand labor. When properly fined and levelled each bed is marked off into squares four inches each way and a single seed is dibbled in at the corner of each square. This distance between plants has been decided upon because, so far as space is concerned, it approximates field conditions