THE NUMBER OF REPLICATED SMALL PLAT TESTS REQUIRED IN REGIONAL VARIETY TRIALS

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The present trend in the comparative testing of new varieties or treatments is toward having a large number of tests well distributed. The many combinations of climatic, soil, and topographical conditions which occur in any large agricultural area are represented very roughly at the best by the results obtained on the existing experiment stations. The station tests give results which apply precisely to only the very limited environments of the stations and therefore serve satisfactorily only the few farmers who reside close by. The remaining farmers, possibly 90% of the total number, have to be satisfied with more or less misleading approximations, unless, in addition to the station tests, supplementary local tests are conducted.

The situation is well illustrated in the Province of Saskatchewan. There are five experiment stations in the Province serving a block of farming country roughly 400 miles by 300 miles with a large diversity of soils and climates and a total of nearly 20,000,000 acres devoted annually to grain crops. It is generally considered that the results obtained at the experiment stations, augmented occasionally by some cooperative tests with farmers, are inadequate, particularly when information on the comparative performance of new varieties is desired urgently by farmers in all parts of the Province.

It is felt that supplementary tests are valuable, but opinions vary considerably as to how many are needed. Considering the cost of the tests, it is desirable to conduct the minimum number that will provide the necessary information. Recently, several hundred well-distributed tests were run in Saskatchewan and the present paper makes use of the data in dealing with the question of how many tests are required.

PROCEDURE

In 1934, the Saskatchewan Wheat Pool, realizing the need for more tests, conceived the ambitious scheme of financing a program of variety testing on a large scale. After considerable effort and expense a series of 355 five-variety Latin square tests of barley was conducted in 1935. These tests were so successful that the same organization promoted in 1936, in addition to 50 barley tests, a series of 321 tests of wheat varieties, and in 1937 and 1938 a further 684 tests of wheat varieties. Altogether these series totalled 1,410 tests containing 27,573 plats and 110,292 separately labelled rows.

The summarized data on each successful test of 1935, 1936, and 1937 were published by the Saskatchewan Wheat Pool (3, 4, 5).