Among the plant characters that were examined, higher potential growth rate of the grain increased simulated yields considerably. On the other hand, more rapid root growth had a small effect on grain yields. Higher nitrogen turnover in the leaf, as well as greater leaf longevity, had negligible effects on crop performance.

A set of appropriate agrotechnical practices and plant characters was selected and tested over the same period. Simulated grain yields were improved by 30% from 1331 kg/ha with a standard deviation (SD) of 1131 kg/ha to 1735 kg/ha with an SD of 1473 kg/ha (grain yields expressed as dry matter).

Some of the simulation results are supported by experience, others are tentative. The more promising indications should be examined in greater depth in order to determine whether it would be advantageous to put them into practice.

Key Words: Wheat model, spring wheat, water relations, nitrogen relations, semi-arid conditions, dryland agriculture, crop simulation.

A COMPARISON BETWEEN LINEAR AND MULTIPLE REGRESSION OF WHEAT YIELD COMPONENTS

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Data on various wheat growth parameters, yield components and agrometeorological conditions were collected over a 10-year period from three sources: commercial field plots in the Bet She'an Valley; a cultivar trial carried out by The Volcani Center; and a cultivar trial by the Ministry of Agriculture's Extension Service. In several linear regression analyses the effects were mostly non-significant, but they were highly significant when a multiple regression analysis (GLM) was used.

The effects of various inputs on wheat yield variation were considered. Considerable influence on wheat yield is attributed to the "farm effect," which is represented by the total human-management and agroecological factors which characterize the single farm. Large and significant differences were found among various farms concerning crop inputs, average yield and profitability. To understand better the reasons for these differences, and to determine the steps to be taken in handling these non-profitable farms are goals of the Extension Service.

In the course of the statistical analysis of the data, various interactions between different growth components were made. Interpretation of the data is closely related to the type of statistical analysis used; multiple regression (GLM) was found to be the most efficient.

Key Words: Wheat; statistical analysis.