

INTERACTIVE EFFECTS OF DIFFERENTIAL SUPPLY OF NITROGEN AND WATER ON YIELD COMPONENTS AND GRAIN YIELD OF WHEAT

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ABSTRACT

The study was conducted in a carefully controlled environment with three levels of nitrogen and three levels of water supply to determine mechanism of wheat plant reaction to nitrogen and water stresses during later half of the life cycle and to determine the nature of interaction between nitrogen and water stress effects on yield components and grain yield of spring wheat. Both N and water supply levels exerted strong control on the yield of wheat. There were significant main effects of both N and water stress levels on number of tillers which survived to maturity. In the absence of canopy competition, the effects on tiller initiation and survival were the major mechanisms by which the wheat plants responded to nitrogen and water supply levels. The number of fertile spikelets/ear and kernels/fertile spikelet, and kernels/ear decreased as a result of nitrogen stress. There was significant interaction of N and water supply levels on grain yield, which was due primarily to their interaction on kernels/fertile spikelet and mean kernel weight. Kernel weight increased with decrease in N supply but linearly decreased as a result of water supply level. At medium and optimum water supply levels, the plants responded to varying N levels. At the low water supply, the effects of N supply levels became irrelevant and a 'law of minimum' concept adequately described the response of wheat. At less severe stress, however, it seems necessary to consider the effects of both N and water to describe response of wheat yield.

Key Words: Spring wheat, nitrogen and water stress, interaction, grain yield, yield components.