regimes. A year of dry fallow effectively controlled the nematodes, but had no significant effect on the extent of subsequent infection with root rot. Increases in wheat yield similar to those found after dry fallow were obtained in the continuous wheat treatment by means of soil fumigation with the biocide metham and the nematicide aldicarb. The application of aldicarb to plots relatively free of nematodes (dry fallow) also significantly increased the yields, which casts doubt on the supposed association between nematode population and grain yield in wheat grown continuously. The yields obtained in continuous-wheat plots after soil fumigation with metham were similar to those obtained with wheat grown after dry fallow, without any relation to the extent of infection with root rot, which averaged 7% of plants grown in fumigated fields and 33% after dry fallow. The soil biotic factor responsible for the decrease in yields occurring with continuous wheat management has not yet been identified. The soil sanitation factor responsible for significant yield declines under conditions of full irrigation is the "take-all" disease caused by *Gaeumanomyces graminis* var. *tritici*. Soil fumigation with metham at a rate of 200 l/1000 m^2 controlled the disease, and the yield returned to the same level as that obtained before outbreak of the disease. The phenomenon of "take-all decline" appeared with two out of eight cultivation practices.

Key Words: Wheat, dryland farming, continuous wheat, *Pratylenchus mediterraneus, Cochliobolus sativus,* root rot, soil sanitation, *Gaeumanomyces graminis* var. *tritici,* take-all disease.

RESPONSE OF DRIP-IRRIGATED WHEAT TO SOIL SALINITY

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The response of wheat (cv. 'Shafir') to residual soil salinity, as affected by different methods of drip irrigation (surface and subsurface) and distance between drip laterals (1 and 2 m), was investigated at Kibbutz Nirim in the northern Negev. Grain yield began to decrease when the electrical conductivity of the saturated soil paste extract reached 6.0 dS/m, the rate of decrease being approximately 7.1% for every unit increase in salinity above this threshold. At any given soil salinity, there was no difference in plant development due to the drip method. However, lateral spacing had a decided effect: the grain yield was greater and the wetting of the soil surface more uniform when the laterals were spaced 1 m apart, compared with 2 m apart. At the wide spacing there was a linear decrease in yield with distance of the plant row from the drip lateral.

The relation between amount of rainfall plus irrigation and the grain yield obtained in the experiment is expressed by the linear equation Y = -421.63 + 3.36 X, where Y=grain yield, in kg/0.1 ha, and X = total amount of water, in mm. The average yield increase for each additional mm of water above a threshold of 125 mm is 3.36 kg, compared with 1.45 kg as reported for supplemental irrigation by sprinkling. This difference is attributed to the greater efficiency of drip irrigation, in terms of water distribution during the growing season and in reducing surface runoff.

Key Words: Wheat, drip irrigation, subsurface irrigation, soil salinity, salt tolerance, production functions.

LONG-TERM EFFECTS OF AGROTECHNICAL PRACTICES AND PLANT CHARACTERISTICS ON GRAIN YIELD OF WHEAT (*TRITICUM AESTIVUM* L.) GROWING IN A MEDITERRANEAN SEMI-ARID REGION: AN EXERCISE IN CROP SIMULATION

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The effects of agrotechnical practices and of plant characteristics on wheat yields and other aspects of crop performance in a region where drought is common, were analyzed with a simulation model for a period of 21 years. The meteorological data represent an area in the northern Negev of Israel with a mean annual rainfall of 250 mm. The calculated grain yields were checked against measured yields for 6 years of the 21 for which suitable data were available. The model overestimated grain yields in good years and underestimated them in poor years. This could be a consequence of the fact that the model simulates a uniform stand while in reality there is considerable heterogeneity in the field. Site heterogeneity should increase average yields in poor years and decrease them in good years. Despite these discrepancies, the correlation between model results and measured values was rather high ($R^2 > 0.94$) and thus some confidence can be placed in an analysis of the implications that derive from the assumptions on which the model is based.

It was found that sowing rates down to half the standard rate should not reduce yields, provided low stand density is not accompanied by greater weed infestation. It was also found that postponing sowing date from the usual one in mid-November to the end of November could be advantageous to both yield level and yield stability. Nitrogen fertilization, over and above the 100 kg/ha mineral N assumed to be available in the soil at the beginning of each season, had a very small effect on grain yield, as has been found in practice.