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Evaluation of the SALTMED model for sorghum under saline conditions in an arid region

G.H. Ranjbar[a], H. Ghadiri[a,*], F. Razzaghi[b],
A.R. Sepaskhah[b], M. Edalat[a]

[a]*Department of Crop Production and Plant Breeding, College of Agriculture, Shiraz University, Shiraz Iran.*
[b]*Department of Water Engineering, College of Agriculture, Shiraz University, Shiraz, Iran.*
*Corresponding author. E-mail: ghadiri@shirazu.ac.ir

Abstract

SALTMED model has been developed to predict yield, soil salinity and water content under saline conditions. A two year field experiment was carried out during 2012-13 to calibrate and validate the model for sorghum. Plants were irrigated with salinity levels of 2, 6, 10 and 14 dS m^{-1}. Results showed that there were significant differences between the observed and simulated sorghum dry matter (SDM) and yield. Absolute mean differences between the observed and simulated SDM values for 2, 6, 10 and 14 dS m^{-1} were 0.45, 1.53, 0.04 and 1.07 Mgha^{-1}, respectively. Soil water contents (SWC) were overestimated at different soil depths. Mean differences between the simulated and observed SWC at 0.0-0.3, 0.3-0.6, 0.6-0.9 and 0.0-0.9 m soil depths were 0.02, 0.04, 0.02 and 0.03 m^3m^{-3}, respectively. As salinity increased the mean differences between the observed and simulated SWC were increased. There were no significant differences between the observed and simulated soil salinities at 0.0-0.3, 0.3-0.6, 0.6-0.9 and 0.0-0.9 m soil depths. The Willmott index of agreement value of the observed and simulated EC_e at different soil depth were between 0.92-0.96. It is concluded that following successful calibration, the SALTMED model could predict soil salinity and SWC with reasonably good accuracy at different water salinity levels. Although, SALTMED model reasonably well predicted soil salinity at different soil depth, there was a weak agreement between the observed and simulated soil water content at different soil depths. There was a fair agreement between the observed and simulated dry matter and grain yield at different water salinity levels.