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Title: DIDAS – User-friendly software package for assisting drip irrigation design and scheduling.

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Source: Computers & Electronics in Agriculture. Jan2016, Vol. 120, p36-52. 17p.

Document Type: Article

Subject Terms: *MICROIRRIGATION
*HYDRAULICS
COMPUTER software
IRRIGATION scheduling
ANALYTICAL solutions (Mathematical analysis)
EVAPORATIVE power

Author-Supplied Keywords: 2D two-dimensional
3D three-dimensional
Irrigation management
MFP matric flux potential
QS quasi steady
RWUR relative water uptake rate
RWUV relative water uptake volume
SS steady state
Trickle irrigation
US unsteady state
Water use efficiency
WUR water uptake rate
WUV water uptake volume

NAICS/Industry Codes: 417310 Computer, computer peripheral and pre-packaged software merchant wholesalers
423430 Computer and Computer Peripheral Equipment and Software Merchant Wholesalers
443144 Computer and software stores
511211 Software publishers (except video game publishers)

Abstract: The DIDAS software package, based on analytical solutions of linearized water flow and uptake problems, assists in drip-irrigation system design and irrigation scheduling. Water flow is described by superposition of solutions for positive sources (on-surface or subsurface emitters) and negative sinks (root systems). Steady water flow is assumed in the design module and unsteady flow in the irrigation scheduling module. The design tool, based on relative water uptake rate (RWUR) criterion, assesses the effects on water use efficiency of geometrical attributes: distances between emitters along drip lines; separation between drip lines; depth of subsurface emitters; and size and depth of root systems. Evaluation of the maximum possible RWUR assumes no plant–atmosphere resistance to water uptake, i.e., the roots are assumed to apply maximum suction and the water uptake rate depends only on the soil capability to conduct water from sources to sinks. The RWUR computations require only three parameters describing the soil texture, the root zone size, and the potential evaporation, in accounting also for evaporation from the soil surface. The optimizing tool for irrigation scheduling is based on a relative water uptake volume (RWUV) criterion. The computations of diurnal variations of water uptake rates and RWUV for a given irrigation scenario require additional information on the diurnal pattern of plant resistance to water uptake and on the soil hydraulic conductivity. DIDAS also contains a diurnal pattern module for evaluating diurnal water-uptake patterns; it assumes quasi-steady flow and accounts for the diurnal variations of plant–atmosphere resistance and evaporation in fine-tuning the design and in preliminary evaluation of scheduling scenarios. DIDAS was programmed in Delphi, runs on a PC under the Windows operating system, and requires no further software. The drip irrigation scenario is constructed via a few GUI windows, which contain also a library of the required soil input parameters, and a best-fitting procedure for determining them. The computed RWURs and RWUVs are displayed graphically and the tabulated output results can be exported to, e.g., Microsoft Excel for further processing. An updated DIDAS version can be downloaded freely from http://app.agri.gov.il/didas . [ABSTRACT FROM AUTHOR]

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ISSN: 0168-1699

DOI: 10.1016/j.compag.2015.11.007

Accession Number: 111527896

Database: Environment Complete