

The contribution of groundwater to soil moisture in *Populus euphratica* root zone layer

**YONGHUA ZHU¹, LILIANG REN¹, QICHENG ZHANG¹, HAISHEN LÜ^{1,2},
ZHONGBO YU¹, YANQING WU³ & HUALI FENG⁴**

¹ *State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai University, Nanjing 210098, China*
yonghua321@yahoo.com.cn

² *College of Science, Hohai University, Nanjing, 210098, China*

³ *School of Environmental Science and Engineering, Shanghai Jiaotong University, Shanghai 200240, China*

⁴ *Nanjing Hydraulic Research Institute, Nanjing 210029, China*

Abstract *Populus euphratica* is the predominant tree species forming natural woodlands in the Ejina basin of northwest China. Changes in *P. euphratica* woodlands represent significant changes in the basin's ecology. The growth and development of these woodlands relies on groundwater recharged by flows in the middle reaches of the Heihe River. In recent years reduced flow in the Ejina basin, because of increase of water consumption, has endangered woodland ecology, environmental quality and social development. In order to maintain ecological stability and ecological restoration in the Ejina basin, a certain volume of water should be transported downstream, at the same time *P. euphratica* should be artificially cultivated. Therefore determining the contribution of the current groundwater to the soil moisture in the root zone of *P. euphratica* is required for making ecological restoration plans in the Ejina basin. A HYDRUS-1D model is used to determine the required groundwater and soil moisture conditions during the growing period from 1 May to 31 October for *P. euphratica* woodlands. The results of this study suggest the contribution of groundwater to root-zone soil moisture is 442 mm.

Key words arid region; contribution of groundwater to soil moisture; HYDRUS-1D