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**Abstract :** Infiltration is an important part of the hydrological cycle, and it is one of the main abstractions accounted for in the rainfall-runoff modeling. The main purpose of this study is to compare the infiltration models that were used to assess the infiltration rate of the Mitidja Plain in Algeria. Field infiltration tests were conducted at 40 different sites using a double ring infiltrometer. Five statistical comparison criteria including root mean squared error (RMSE), normalized root mean squared error (NRMSE), coefficient of correlation (CC), Nash-Sutcliffe efficiency (NSE), and Kling-Gupta efficiency (KGE) were used to determine the best performing infiltration model and to confirm anomalies between predicted and observed values. Then we evaluated performance of five models (i.e., the Philip model, Kostiakov model, Modified Kostiakov model, Novel model, and Horton model) in simulating the infiltration process based on the adjusted performance parameters cited above. Results indicated that the Novel model had the best simulated water infiltration process in the Mitidja Plain in Algeria. However, the Philip model was the weakest to simulate the infiltration process. The conclusion of this study can be useful for estimating infiltration rate at various sites using a Novel model when measured infiltration data are not available and are useful for planning and managing water resources in the study area.

**Key words :** Infiltration rate; Infiltration model; Double ring infiltrometer; Mitidja Plain; Novel model

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