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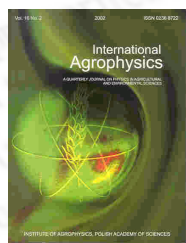
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Soil moisture storage and water-use efficiency of maize planted in succession to different fallow treatments

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F.O. Tijani, D.J. Oyedele, P.O. Aina

Department of Soil Science, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife, Nigeria

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abstract Soil water storage and crop water use efficiency (WUE) were monitored in a randomised complete block design experiment set up on a 0.7 ha field plot with treatments that consisted of five fallow treatments, namely Guinea grass (*Panicum maximum* Jacq.PAF), Kaliko plant (*Euphorbia heterophylla* Linn. EUF), tropical kudzu (*Pueraria phaseoloides* (Roxb) Benth.(PUF), native fallow without fertilizer (NNF), and native fallow with fertilizer applied during subsequent cropping (NFF). The fallow crops were ploughed under and cultivated to maize (*Zea mays*) in the subsequent season and the water storage and crop water use efficiency were monitored. Fluctuations in soil water storage were found to be dependent on rainfall and soil profile characteristics. The amount of water stored in the soil was consistently the highest under NNF (25%) and the least under PUF (19%). Maize dry matter yield (0.46 - 3.38 t ha<sup>-1</sup>) and WUE (0.011 t ha<sup>-1</sup> mm<sup>-1</sup> - 0.030 t ha<sup>-1</sup> mm<sup>-1</sup>) were the highest at 29 days after planting (29 DAP) and at 45 DAP under TPU. At 75 DAP dry matter yield for EUF improved (8.88 t ha<sup>-1</sup>), while NFF was the highest (10.12 t ha<sup>-1</sup>). Water use efficiency calculated in terms of grain yield (WUE-GY) having a value of 0.018 t ha<sup>-1</sup> mm<sup>-1</sup> was found to be the highest under NFF, followed by the results from EUF and PUF (0.015 t ha<sup>-1</sup> mm<sup>-1</sup>), while NNF (0.011 t ha<sup>-1</sup> mm<sup>-1</sup>) was significantly ( $p \leq 0.05$ ) the lowest. Short fallow with *Pueraria phaseoloides*, therefore, appeared to be an attractive alternative for sustaining the water use efficiency of continuously cropped farmlands.

keywords water use efficiency, maize, *Pueraria phaseoloides*, *Panicum maximum*, *Euphorbia heterophylla*, fallow, TDR