

Artigo com copyright pertencente à revista em que foi publicado.

Pode ser obtido nas plataformas B-On ou Science Direct ou através da página web da revista.

Biosystems Engineering 101 (2) (2008) 183-190

doi:10.1016/j.biosystemseng.2008.07.003

Evaluation of the relationship between maize yield spatial and temporal variability and different topographic attributes

J.R.Marques da Silva;L.L.Silva

Rural Engineering Department, Évora University, Apartado 94, 7002-554 Évora, Portugal; email: jmsilva@uevora.pt; llsilva@uevora.pt

Abstract

Maize yield data were collected in seven agricultural fields irrigated by centre-pivot irrigation systems, in Southern Portugal, from 2002 to 2004. These data were then correlated with different primary and secondary topographic attributes. The attained correlation coefficients were used to evaluate the relationship between yield spatial variability and each individual topographic attribute. In this three-year period applied water was always lower than crop water requirements. The increase of applied water in 2004 resulted in an improvement in average yield and especially in yield spatial stability. Average yield showed a strong dependency on topography, with high correlation coefficients between yield and elevation and slope. It presented also a high correlation with topographic indices that reflect field water availability, such as the wetness index and distance to flow accumulation lines (DFL). The DFL index was the topographic index with higher correlation coefficients with yield. The negative coefficients of correlation between yield and DFL, attained in most fields in the three-year study period, show that, in general, yield increases with the decrease of DFL, i.e., with the increase of water availability. In undulating land areas flow lines are very abundant, which means that, in these conditions, the DFL index can be a good tool to evaluate yield spatial variability.

© 2008 IAgrE. Published by Elsevier Ltd. All rights reserved.