בס"ד

**Using spatial analysis of ANR and Nia transcription rates for detecting Nitarte irregularities in cherry tomatoes organic greenhouses**

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*Abstract*

The organic fertilizers cause to different available nutrient concentrations patches along the fertilized field due to their complexity and inconsistency mineralization rates. Additionally the requirements of the plant to nutrients are been changed due to it's physiological state. As a case study we took cherry tomato (*Solanum lycopersicum* var. cerasiforme) organic greenhouse in the Netzer Hazani village. We spatial analyzed the available Nitrate concentrations in the greenhouse soil together with the transcription rates of the Nia and ANR genes in 'flag leaves' belonging to cherry tomatoes plants located in the greenhouse. The results are emphasizing the use of Nia and ANR transcription rates using spatial schemes in order to locate Nitrate irregularities plots. The presented methodologies can be suited to other crops and nutrients.

*Key words*

Nia and ANR genes; Spatial analyses of transcription rates; nutrient patches in organic fields; Cherry tomatoes (Solanum lycopersicum var. cerasiforme)

*Introduction*

The organic farming requires use of fertilizers from organic source (compost, animal manure, animal urine etc. (**Diacono and Montemurro, 2010**). Due to the complex structure of most of these fertilizers and the differences among their types, origin and composition, it is hard to assess their nutrients mineralization rates, which cause to wide amplitude of nutrients concentrations in available soluble molecular state in a given field and at tested

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*Article*

# Tools for Optimizing Management of a Spatially Variable Organic Field

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**Abstract:** Geostatistical tools were used to estimate spatial relations between wheat yield and soil parameters under organic farming field conditions. Thematic maps of each factor were created as raster images in R software using kriging. The Geographic Resources Analysis Support System (GRASS) calculated the principal component analysis raster images for soil parameters and yield. The correlation between the raster arising from the PC1 of soil and yield parameters showed high linear correlation (r =0.75) and explained 48.50% of the data variance. The data show that durum wheat yield is strongly affected by soil parameter variability, and thus, the average production can be substantially lower than its potential. Soil water content was the limiting factor to grain yield and not nitrate as in other similar studies. The use of precision agriculture tools helped reduce the level of complexity between the measured parameters by the grouping of several parameters and demonstrating that precision agriculture tools can be applied in small organic fields, reducing costs and increasing average wheat yield. Consequently, site-specific applications could be expected to improve the yield without increasing excessively the cost for farmers and enhance environmental and economic benefits.

**Keywords:** GRASS; raster images; principal component analysis; organic farming; precision agriculture; geostatistics