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THE FRACTAL DIMENSION OF AGRICULTURAL PARCELS CONSIDERING MAIZE YIELD

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Abstract: Before making any decisions, all farm managers would like to have some indication about the effectiveness of a particular investment, especially when investing in precision agriculture technologies. Usually, the best indicator should be associated with the yield geometric complexity and its spatial and temporal dynamics. The fractal dimension of corn yield in a given year was calculated for six studied parcels, considering the fractal dimension of yield buffer zones above and below average yield. The less complex geometries usually have a fractal dimension close to the unit which can reach a value close to 2 in more complex geometries. This study shows that the number of yield buffer zones, above or below average yield, changes over time, with a different pattern, from parcel to parcel, and that there is a greater change in the smaller yield buffer zones compared to the larger ones. Fractal dimension can be a very strong indicator when the spatial complexity of a particular parcel is considered, and it is therefore a strong indicator of the greater or lesser need for precision agriculture technologies. The higher the fractal dimension of a given parcel, the higher will be the economic and environmental return of that parcel, when using precision agriculture technologies.

Key words: *fractal geometry, yield spatial and temporal variability, maize.*

INTRODUCTION

Before making any decision, all farm managers would like to have some indication about the effectiveness of a particular investment. In most cases, the risk associated with a given farming investment is not fully known and most managers make decisions on the basis of intuitive guesses. When commercial yield mapping began, in the early 1990s,

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