Fractal dimension of leaves from three species of Solanaceae

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Fractal analysis has been applied to describe various aspects connected with the complexity of plant morphology. In this work we determined the fractal dimension of leaves from three species of Solanaceae in order to characterize the structure/architecture of the these leaves. Samples for every species (pepper, tomato and eggplants) have been collected from the greenhouse of the University of Agricultural Sciences and Veterinary Medicine from Iasi. The leaves were pressed, scanned and processed with the Corel Photo-Paint 1 in order to use the HarFA soft to determine the fractal dimension. Our results showed that the fractal dimension of these vegetable leaves increases from pepper to tomato. But the fractal dimension is a fractional quantity and it is a direct measure of the relative degree of complexity of the leave. Tomato leaves have multiple sinuses and we suggested that this complexity is related to the necessity of light penetration through the plant. The eggplant leaves have a medium fractal dimension between pepper and tomatoes. This means that this structure assure eggplant needs of light and temperature. From this it follows that tomatoes need a higher complexity to develop by comparison with the other studied species.