

**PRELIMINARY RESULTS REGARDING THE  
DETERMINATION  
OF THE WATER SUPPLY OF EGGPLANTS**

**REZULATE PRELIMINARE PRIVIND DETERMINAREA  
CONȚINUTULUI DE APĂ ÎN PLANTELE PĂTLĂGELE VINETE**

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**Abstract.** *The present paper places plants as a coordinating element in the irrigation ensemble, where they can provide data on moisture and can achieve numerically the limits to which their biological systems operate optimally. The genesis of this system is based on the intensity of the electrical current measured between the two electrodes, intensity which is in relation to indirect proportionality with the hydric deficit measured at the sap level. The plant's water supply was measured using two electrodes, represented by medicinal needles specifically treated to prevent oxidation during use. In order to highlight the currents of low intensity, a galvanometer was used. On the basis of this method were performed measurements demonstrating the decrease of the intensity of electrical conductivity inversely proportionate to the water content, the average in the group subjected to stress hydric (L2) on day 3 with the value of 6.22 Amp, gradually decreasing the As the period during which it was subjected to a hydric deficit increased, reaching 3.92 Amp on day 4, 2.54 Amp on day 5 and 1.67 Amp on Day 6, compared to the normal average of 6.35 Amp. On the last day, the stage in which the group subjected to a lack of water (L2) was hydrated, a return was found in terms of the intensity values at the average of 3.44 Amp, which strengthens the relationship between the variation of the two characteristics.*

**Key words:** *Solanum melongena*, water, irrigation

**Rezumat.** *Lucrarea de față poziționează plantele ca element de coordonare în ansamblul de irigare, unde acestea pot furniza date cu privire la umiditate și pot concretiza la nivel numeric limitele la care sistemele biologice ale acestora funcționează optim. Geneza acestui sistem are la bază intensitatea curentului electric măsurat între cei doi electrozi, intensitate care este în relație de indirectă proporționalitate cu deficitul hidric măsurat la nivelul sevei. Gradul de aprovizionare cu apă al plantei a fost măsurat folosind doi electrozi, reprezentativi de ace medicinale tratate special pentru a preveni oxidarea pe durata folosirii. Pentru punerea în evidență a curenților de intensitate scăzută, a fost utilizat un galvanometru. Pe baza acestei metode s-au realizat măsurători ce au demonstrat scăderea intensității conductivității electrice proporțional cu conținutul de apă, media în lotul supus stresului hidric (L2) în ziua a 3-a având valoarea de 6.22 Amp, scăzând progresiv pe măsură ce perioada în care a fost*

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*supusă unui deficit hidric creștea, ajungând la 3,92 Amp în ziua a 4-a, 2,54 Amp în ziua a 5-a și 1,67 amp în ziua a 6-a, față de de media normală de 6,35 amp. În ultima zi, etapă în care lotul supus lipsei de apă (L2) a fost hidratat, s-a constatat o revenire în ceea ce privește valorile intensității la media de 3,44 Amp, fapt ce întărește relația dintre fenomenul de variație ale celor două caracteristici.*

**Cuvinte cheie:** *Solanum melongena*, umiditate, irigare

## INTRODUCTION

The genesis of this system is based on the intensity of an electric current measured between the two electrodes, intensity which is indirectly proportional to the water deficit measured at the level of the sap (Țenu, 2004; Apahidean and Apahidean, 2007; Asociația Inginerilor de Instalații din România, 2010). This paper positions plants as a co-ordinating elements in the irrigation assembly, where they can provide moisture data and can numerically convey the limits to which their biological systems works best. Thus, by using this system and implementing a software program that integrates all hardware, it is possible to control, through pilot plants, the whole crop irrigation activity and to obtain satisfactory results with the minimum of effort, as the definition of economy is given (Cismaru and Gabor, 2004; Indrea *et al.*, 2012; Stoleru, 2013).

## MATERIAL AND METHOD

The water supply of the plant was measured using two electrodes, represented by medicinal needles, treated to prevent oxidation during use (Bruzo *et al.*, 1999; Butnariu *et al.*, 1992). Previously, electrodes coated with gold or silver films were used, but they did not show satisfactory efficiency in the oxidation processes, reducing the contact surface of the sap with the conductive element, interfering in the electrical conductivity process and thus altering the data obtained for the system (Toma and Jităreanu, 2007; Palamaru *et al.*, 1997; Savu *et al.*, 2005). The  $\mu$ Current GOLD module is a precision adapter, created to extend the measurement range of traditional multimeters. With the adapter, values in the range of nanoamps or even picoamps can be determined, values that are required to be at this level to measure the intensity of the current, but without interfering or modifying in any way the normal physiological processes. To highlight low-intensity currents, a multimeter called galvanometer was used. It acts as a needle actuator, producing a rotary deflection in response to the electrical current flowing through the closed circuit.

## RESULTS AND DISCUSSION

On the third day of measurements, there was a slight decrease in the average of the values but this is irrelevant, the decrease being present in both lots, the average of the lot L1 being 6.25 Amps and the second lot having the value of 6.22 Amps .

At the fourth measurement, respectively on the fourth day, there is a more pronounced decline in the mean of the L2 lot, which is directly correlated with the lack of irrigation. The value of this median is 3.92 Amps.

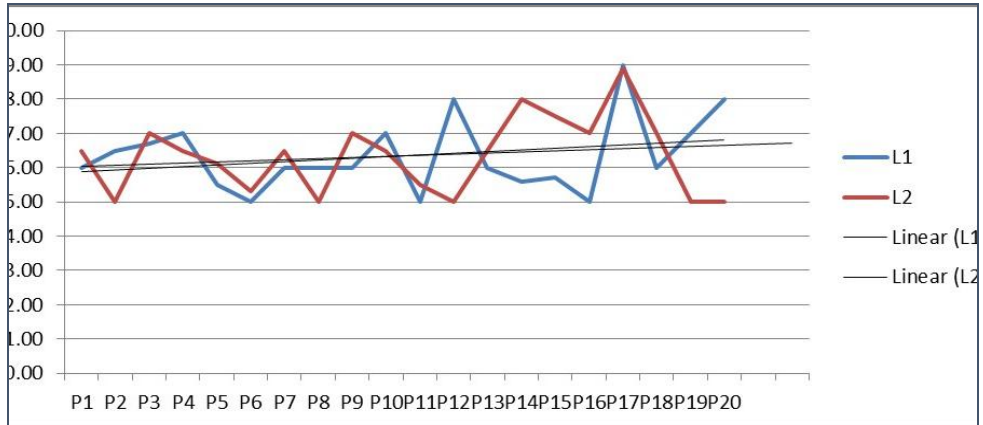


Fig. 1 Values measured in Day 1

On the fifth day, the average of the values obtained from the measurements is 2.54 Amps.

The sixth day shows an accentuated decrease in the values of the intensity, their average being at 1.67 Amps. These values prove the existence of the studied phenomenon, and extrapolating, we can say that the decrease will continue until the plant ceases to exercise physiological functions.

On the last day of the research stage (day 7), both batches were irrigated. At this point, there was a significant increase in the values of the electric current, which reinforces the above statements.

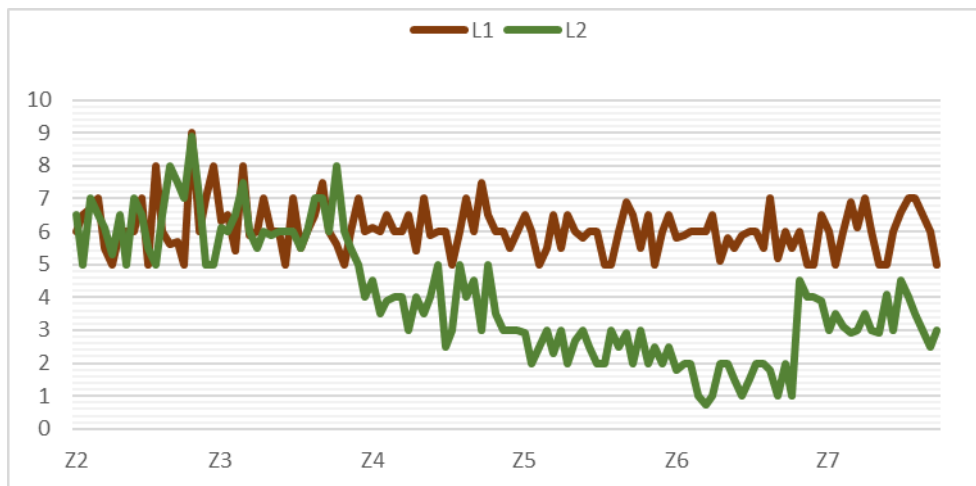


Fig. 2 Variation of the values of the two lots during the whole study period

## CONCLUSIONS

In conclusion, after studying the dynamics of the values, the functionality of the system can be asserted, the intensity gradient having a pronounced decrease between the third day and the sixth day, returning to the initial values when the water saturation condition was fulfilled. Based on the outlined aspect of the two broad lines of the two lots, software can successfully implement an irrigation system that does not depend on the coordination of a human or preprogrammed element.

**ACKNOWLEDGMENT:** *This paper was supported by the project PN-III-P1-1.2-PCCDI-2017-0560 (no. 41/2018) financed by UEFISCDI.*

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