PRELIMINARY RESULTS REGARDING ELECTROSTIMULATION OF THE PHYSIOLOGICAL RITHM BY USING CONTINUOUS ELECTRIC CURRENT IN PEPPER CROPS

REZULTATE PRELIMINARII PRIVIND ELECTRO-STIMULAREA RITMULUI FIZIOLOGIC PRIN UTILIZAREA CURENTULUI CONTINUU LA ARDEIUL GRAS

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Abstract. *The goal of this research was to study the usefulness of the continuous current in a sweet pepper crop, the process that aims to accelerate the rhythm of flowering, fructification and ripening, obtaining more early harvests in conditions of food safety that does not affect consumers' health. Thus, by connecting the plant to a continuous current that will generate a negatively charged mangentic field, it stimulates the absorption from the soil of the essential mineral elements in terms of good development of plant growth and development. The method consists in creating a flow of electrons circulating from the plant's base to the top. This field that will be loaded in turn with negative electrical load, has the property to attract positively charged electrical loads. The most favourable results were achieved in the case of a continuous current of 1.5 V, the positive pole being located in the apical area, and the negative one being inserted at the base of the plant's stem.*
Key words: electrical current, electrostimulation, physiological rithm

Rezumat. *Scopul acestei cercetări a fost acela de a studia utilitatea curentului continuu la o cultura de ardei gras, procedeu prin care se doreşte accelerarea ritmului de formare a florilor, fructificare şi maturare, obținându-se recolte mult mai timpurii în condiții de siguranță alimentară care să nu afecteze sănătatea consumatorilor. Astfel, prin conectarea plantei la un curent continuu ce va genera la rândul său un câmp magnetic încărcat negativ se stimulează absorbția din sol a elementelor minerale cu rol esențial în ceea ce priveşte buna dezvoltare a creşterii şi dezvoltării plantelor. Metoda constă în crearea unui flux de electroni care circulă de la baza plantei către vârf. Acest câmp care va fi încărcat la rândul său cu sarcină electrică negativă, are proprietatea de a atrage sarcinile electrice încărcate pozitiv. Rezultate favorabile au fost obținute în cazul aplicării unui curent continuu de 1,5 V, polul pozitiv fiind situat în zona apicală, iar cel negativ fiind inserat la baza tulpinii plantei.*
Cuvinte cheie: curent electric, electrostimulare, ritm fiziologic

INTRODUCTION

As is already well known, a healthy and balanced diet is the key to getting a healthy body (Stoleru *et al.*, 2014; Caruso *et al.*, 2018).The need for food is due to the need

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of the bodies to feed themselves with nutrients in order to obtain energy for their proper functioning (Munteanu, 2003; Voican and Lăcătuş, 2004).

Applying electricity, magnetism, monochrome light and sound can greatly stimulate plant growth. This little-known technology, called Electro-culture, can accelerate growth and improve product quality. Thus, farmers can get better, better quality produce in a shorter time, with less effort and at a lower cost. Most approaches to Electro-culture include static electricity, direct current and alternative. The energies are applied to seeds, plants, soil or water and nutrients (Black *et al*., 2011; Artem, 2012; Novak *et al.,* 2013; Jeong, 2016).

In this context, the purpose of this paper is to use continuous electric current to improve the absorption of nutrients in the soil in order to obtain superior quality production in a shorter period of time.

MATERIAL AND METHOD

The electrical current is characterized by the orderly movement of an electron stream into a conductor at a given moment under the action of an electric field. These electrons or wearers, as they are called by other authors, do not have a uniform straight rectilinear motion but have a chaotic motion, the accelerations and decelerations being multiple due to the collisions between the charge carriers of the electric current and the film that form the ions of the crystalline network of the conductor (Van Antwerpen and Franklin, 1954; Young and Ratcliffe, 1969).

Moving electric loads in one direction through some medium is called direct current. It can go through semiconductor environments, metal conductors, electrolytic solutions etc. (Young and Ratcliffe, 1969).

As is already well known, plants, to feed themselves, absorb water from the soil along with nutrients. This absorption is achieved both actively due to the phenomenon of sweating as well as passive through its own metabolic energy (Monet *et al.,* 1959; Zwiebel, 1975; Toma and Jităreanu, 2007). The part of the plant that fulfills the absorption roles as well as the primary synthesis of nutrients is the root.

The researches were held in the greenhouse UASVM Iasi, in a randomized block device, in three repetitions, five plants per repetition, Barbara using pepper variety.

Scheme of the sample operating principle where the yield indicating the possibility of a production capacity of a higher level as opposed to the other analyzed situations is shown in figure 1.

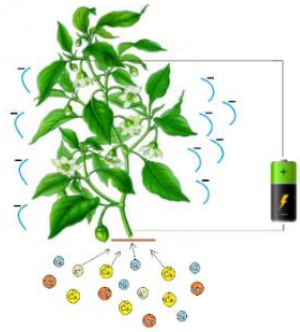

Fig. 1 Operating principle in using 1.5 V continuous current

Thus, by connecting the plant to a direct current which will in turn generate a negatively charged magnetic field, it is desired to stimulate the absorption of mineral elements in the soil, which plays an essential role in the proper development of plant growth and development. Several samples were used in the experience: the appearance of flowers, the formation and evolution of pepper etc.

RESULTS AND DISCUSSIONS

Measurements were made on several samples, three of the most representative determinations being presented below (tab.1).

In the case of the control variant, as can be seen from the data presented in the table, during the period of experience, a maximum of 64 flowers was obtained on 15 September and nine fruits on September 23, some of which were later aborted, at the end of the crop remaining a number of seven fruits.

Table 1

Results on the number of flowers and fruits formed on plants

Data	27	30	1	2	3	5	7	9	13	15	19	21	23	25	29	1	3	5	8	12	15	22
	Aug.		Sept.													Oct.						
Control																						
buds/flower	14	9	8	12	17	33	34	48	62	64	61	57	53	47	48	47	39	23	11	2	0	0
fruits	0	0	0	0	0	0	0	0	2	5	5	5	9	8	7	6	6	6	8	8	7	7
1.5 V in soil																						
buds/flower	13	13	11	11	15	35	40	42	45	44	40	40	36	40	33	30	25	15	7	3	0	0
fruits	0	0	0	0	0	0	0	0	2	5	7	7	5	6	6	6	5	5	5	7	6	6
1.5 V polarity																						
buds/flower	22	19	17	21	23	37	47	52	37	30	20	20	20	19	20	19	11	6	1	0	0	0
fruits	1	1	1	1	1	2	2	2	5	11	15	13	13	12	12	10	8	8	9	9	9	9

In the experience where a 1.5 volt current at ground level has been used, the maximum flowering potential has been achieved by forming 45 flowers (September 13) and tethering seven fruits (September 19). The variation in the number of flowers formed in this sample shows a fairly large amplitude of the total number of flowers formed by linking only seven fruits at the time of fructification, but there were also abortions, leaving only six fruits at the end of the experiment.

If the same 1.5 V current is used, but the poles of the electrical loads are connected one to the base of the package and the other in the apical area has been found to have obtained a fruit from the first reading reaching a maximum number of 15 fruits (September 19) for a maximum of 52 flowers recorded on 9 September.

One reason why the number of aborted flowers and fruits was very high may be that the plants were grown on pots and the amount of soil was insufficient. However, the differences between the studied variants are obvious (fig. 2), with the best results being recorded for the 1.5 V continuous current, with the electric charge poles connected to the base of the package, and the other in the apical area.

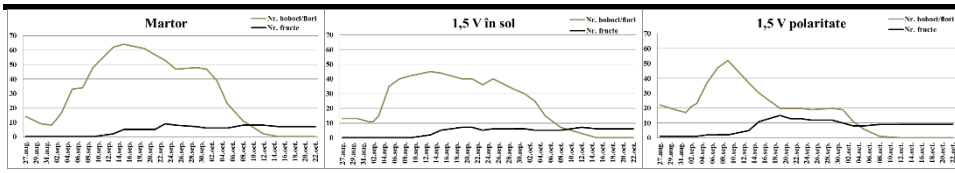

Fig. 2 Values mesured on different samples

CONCLUSIONS

According to the obtained results, it can be stated that by using a continuous electric current, at low voltages, the metabolism of the plants can be stimulated by facilitating the absorption of nutrients in the soil and their assimilation at the cellular level.

Growth of plant production can be stimulated by continuous electric current, but more experiments are needed to better understand the phenomenon, this being a preliminary study.

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