THE INFLUENCE OF THE SOIL MULCHING BY POLYETHYLENE FILM ON LETTUCE IN PROTECTED CULTURE

INFLUENȚA MULCIRII SOLULUI CU POLIETILENĂ ÎN CULTURA PROTEJATĂ A SALATEI

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Abstract. *The present paper shows the results of experience concerning the effect of mulching soil with two types of polyethylene films (black and silver) on the growing, production and quality of lettuce in protected culture. The experience followed during two years since 2006 until 2007. Regardless the type of the mulching films, the production increased with 42%, and we obtained a higher quality of the rosette. By mulching the soil with silver polyethylene film, were obtained a rosette with an average weight between 216 and 261g, and an average diameter between 24.5-24.58cm. Compare with the control - no mulching (average weight 136.75-178.66g and rosettes diameter 21.08-22.33cm), a higher results were found in the case of mulching with black polyethylene film, were obtained a rosette with an average weight between 187.25-226 g and an average diameter between 24.66-25.75cm. The results showed also multiple advantages of soil mulching contributing to the extension of an important part in the vegetables crops.*

INTRODUCTION

It is known that soil mulching give better results for all the vegetable species, especially in the first phases of vegetation for the plants with habits reduce: lettuce, spinach, cauliflower and pepper, (R.Ciofu and colab. 2003).
With all the multiple advantages of soil mulching, this technique isn't wildly used in our country, we hope in this paper to contribute for the extension of this methods in a large scale to improve the production and vegetable quality.

Lettuce is cold resistant specie, and it is cultivated in early spring and late autumn, in anticipates, associated and successive culture, in the field glace house and tunnel. It is specie with a short cycle of vegetation which has a high income for the farmers, being one of the first vegetables on the market, reducing the stock deficit in the spring period. Using different types of mulching film amplified the temperature modification of the soil with the implication on the root absorption and on growing and plant development respectively.

MATERIAL AND METHODS

This research was made in interval of two years (2006-2007) in the vegetables department of the University of Agronomic Sciences and Veterinary Medicine Bucharest.

The experiment was carried out in the high tunnel covering with transparent polyethylene films in which was mulched with two types of polyethylene films: silver and black compared with a control (no mulched).

The monofactorial experiment was organized following the linear block method with 4 repetitions, on an area of 120 m^2

The lettuce culture was established following a planting scheme with 2 rows distanced 30+40 /25 cm resulting 12 plant in square meter.

The following variants resulted:

- **V1 - Control - without mulch**
- **V2 - PE silver mulch**
- **V3 - PE black mulch**

The studied specie – had lettuce *Ilona* variety

For all the variants were applied uniform maintenance conform to the technology of growing lettuce in the tunnel.

Observations and measurements

It is known that the lettuce is a sensible specie, with a fast reaction with the micro-climate modifications, by growing these plants in tunnels in mulched conditions with different film types (black and silver), we investigate the mode in which the plant react with the new conditions of development and what are the implications on the production level and vegetable quality. The determinations of the lettuce rosette weight, diameter and root system in the harvest time for each variant separately. In each repetition were analyzed 10 plants.

The statistical analyses we conducted Tukey test.

RESULTS AND DISCUSSIONS

Soil mulching has increased the rosette diameter in those two years of culture with a significant difference (10-22%) compared with the control (non mulched variant) indifferent of the film color.

Between those two types of mulching film, in 2006 was observed a significant increasing of the rosette diameter (6%) for the variant mulched with black film (V3), but in 2007 the difference was non significant - 0.36%, (Fig. 1).

Table 1

The influence of soil mulching on the lettuce rosette diameter

Variant	2006			2007		
	Rosette diameter cm	Takey Test	Differences from the control (%)	Rosette diameter cm	Takey Test	Differences from the control (%)
V1 - Control without mulch	21.08	c	100	22.33	b	100
V2 - PE silver mulch	24.50	b	116	24.58	a	110.07
V3 - PE black mulch	25.75	a	122	24.66	a	110.43
	Sd = 0.5682; GL = 36			Sd=1.3351; GL = 36		

Table 2

The influence of soil mulching on the lettuce rosette weight

Variants	2006			2007		
	Rosette weight g	Tukey Test	Difference from the control (%)	Rosette weight g	Tukey Test	Difference from the control (%)
V1 - Control without mulch	178.66	c	100	136.75	c	100
V2 PE silver mulch	261.58	a	146	216.50	a	158
V3 PE black mulch	226	b	126	187.25	b	137
	Sd = 16.195 GL = 36			Sd = 22.859 GL = 36		

By soil mulching with film PE was observed a significant increasing of the rosette weight in comparison with the control by (26-58%).

Regarding the mulching influence on the lettuce rosette weight was observed the fact that indifferent the year of culture, the mulched variants covered with silver polyethylene film give the best results (261g/piece), with a difference of 46-58% with the control and 16% with the black film (tab. 2).

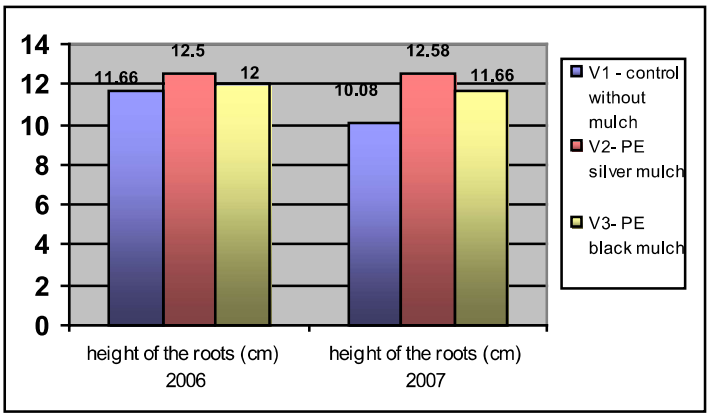

Fig. 1. Influence of soil mulching on the height of the lettuce roots

Mulching the soil influence the growing of the radicular system of the lettuce plants. In those two years, the height and the weight of the root system were superior to the control.

In 2006 the height of the root system had an average of 0.84cm for the silver PE mulched and with 0.34 cm for the black bigger than the control (non mulched), but in 2007 the differences were 2.5cm and respective 1.08cm (fig.1).

The mulching influence on the weight of the root system was much higher than in the case of their height. In 2006 were registries significant difference with the control, 2.59g for the silver film and 2g for the black one. In 2007 differences were significant in

comparison with the control (2.92-3.25g) and between the film types. The best results were obtained for the mulched variant with silver PE (fig.2).

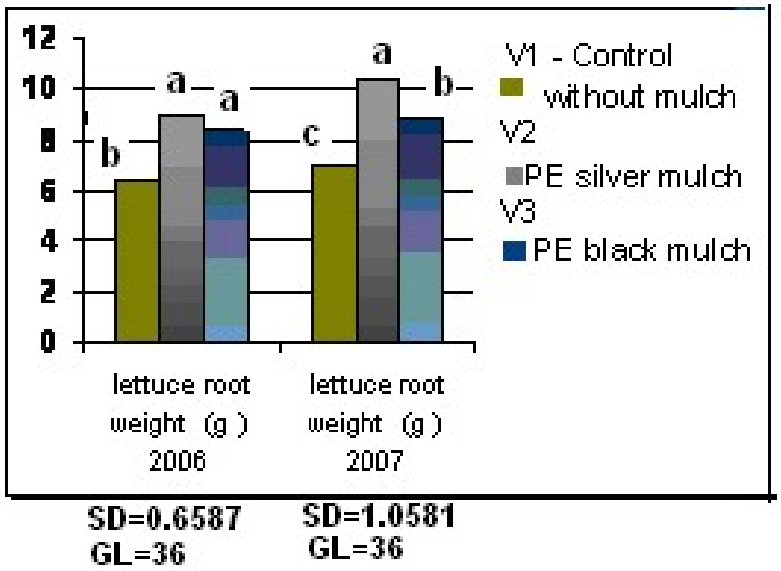

Fig. 2. Influence of soil mulching on the lettuce root weight

CONCLUSIONS

- Indifferent the mulching film type it influence significant the diameter increasing (10-22%) and a weight of the lettuce rosette (26-58%).
- The black film influences the increasing of the rosette diameter, but the silver film determines the increasing of the lettuce rosette weight.
- The mulched soil to favor the increasing of the root system, silver film help to get a good result regarding the height and the weight of the roots.
- By the benefic influence on the increasing the capacity of the root system to help the plant to get water and nutritive elements, soil mulching determine the increasing of the lettuce rosette and implicit the production.

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