

EFFECT OF MULCH AND CULTIVAR ON YIELD OF RHUBARB

EFFECTUL MULCIRII ȘI A CULTIVARULUI ASUPRA PRODUCȚIEI DE REVENT

COJOCARU A.¹, MUNTEANU N.¹, STOLERU V.¹, IPĂȚIOAIE D.C.¹.
e-mail: cojocaru.alexandru@yahoo.com

Abstract. *This paper presents the influence of mulch and cultivar on yield of rhubarb. The biological material used was represented by three cultivars: Glanskin's perpetual, Victoria and a local population. Were tested three mulching methods: mulching with straw, mulching with black polyethylene film of 15μ, mulching with black polyethylene film of 30μ and unmulched variant. Applying differential cultivation technology, rhubarb yield varies according to cultivar and mulch. The research was carried out in a rhubarb crop, in a four year production. The highest production was obtained in case of Victoria cultivar mulching with straw. Statistically assured yields were also obtained at Victoria cultivar un-mulched and Glanskin's perpetual cultivar mulching with straw.*

Key words: mulch, cultivars, yield, rhubarb

Rezumat. *Lucrarea prezintă influența mulciului și a cultivarului asupra producției de revent. Materialul biologic utilizat a fost reprezentat de trei cultivare: Glanskin's perpetual, Victoria și o populație locală. Au fost testate trei metode de mulcire: mulcire cu paie, mulcire cu folie de polietilenă neagră de 15μ, mulcire cu folie de polietilenă neagră de 30μ și o variantă nemulcită. Prin aplicarea diferențiată a tehnologiei de cultivare, producția de revent variază în funcție de cultivar și sistemul de mulcire. Cercetările au fost efectuate pe o cultură de revent aflată în anul 4 de producție. Cea mai ridicată producție a fost obținută la cultivarul Victoria mulcit cu paie. Producții, de asemenea, asigurate statistic au mai fost obținute și în cazul cultivarelor Victoria nemulcit și Glanskin's perpetual mulcit cu paie.*

Cuvinte cheie: mulci, cultivar, producție, revent

INTRODUCTION

The rhubarb (*Rheum rhabarbarum* L.) is a less known and spread crop in Romania. It is a perennial vegetable species, adapted to cold temperate climate (Ciofu *et al.*, 2004; Indrea *et al.*, 2007).

Rhubarb is originated in the Himalayas, where its root was an important medicine believed to purge the body of ill humors (Treptow, 1985).

In our country, rhubarb is more cultivated in the western part of the country and it is used for juice, jam and other dessert (Stan *et al.*, 2003).

¹University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

In the last time, rhubarb products are spread by the supermarket on all over the country. So it is a good opportunity for farmers to cultivate this species also in other parts of the country, not only in the traditional ones (Stoleru, 2013).

For this reason, our research was focused to evaluate the possibilities to grow rhubarb in the environmental condition of the North-East part of Romania.

The mulching is a technique through which the surface between cultivated plants is covered with a thin layer of different materials, a process which clearly shows a number of features highlighted by over time through experience and practice: preventing the crust and weeds emergence, keeping moisture in the soil and allowing faster soil warming, improving air system and soil porosity, keeping clean the edible parts in contact with soil, favorably influencing production, precocity and quality (Olson, 2005).

The materials for mulching used in vegetable or other horticulture crops are divided into two main categories: organic materials (straw, hay, leaves, bark, sawdust, compost, newspaper, peat, pine needles, chips of wood, corn stalks, achene of buckwheat, peanut shells, stems of tobacco plants, evergreen trees leaves, polyethylene etc.) and inorganic materials (gravel, crushed stone, sand, volcanic ash etc.) (Dumitrescu, 2001).

To achieve this objective was carried out a study to the influence of the cultivar and mulch on the crop yield.

MATERIAL AND METHOD

Management of experiment. To achieve the goal and objectives of this research work, an experimental was done at "V. Adamachi" Experimental Station of the Agronomic University.

The research was conducted on a culture of rhubarb located on four year production. Harvested area of experimental plots covered the 5 plants.

Considering the importance studying factors in the growing technology, their ability to change and taking into account the possibilities of organizing experience, it was established hierarchy of factors, as follows:

1. A factor – cultivars, with three graduations: Glanskin's perpetual (Gp), local population (Lp) and Victoria (Vt);
2. B factor – mulching system, with three graduations: mulching with straw, mulching with black polyethylene film of 15 μ , mulching with black polyethylene film of 30 μ and an unmulched version.

Collection and processing the experimental data. The experimental data collection was carried out observations and weight measurements, according to the experimental technique used in experiments. During 2016, were made a total of ten harvesting: 07.04, 15.04, 22.04, 29.04, 06.05, 14.05, 22.05, 29.05, 7.06 and 16.06.

The experimental variants were compared with the experimental mean, using the percentage reporting and differences. The influence of experimental factors was assessed using ANOVA. The significance of differences was assessed on the basis of LSD (least significant difference) for three degrees of confidence (95%, 99%, 99.9%).

RESULTS AND DISCUSSIONS

Applying differential cultivation technology, rhubarb production varies according to cultivar and mulching system.

Regarding to the influence of mulch and cultivar, during 2016, it ranged from 21.23 t/ha at Gp mulching with black polyethylene film of 30 μ , to 46.08 t/ha at Vt mulching with straw (tab. 1).

Table 1

Influence of mulch and cultivar at rhubarb crop

Variants	Total yield (t/ha)	% to the average	Difference to average (t/ha)	Significance of differences
a ₁ b ₁	37.80	106.57	2.33	*
a ₁ b ₂	28.07	79.14	-7.40	000
a ₁ b ₃	21.23	59.85	-14.24	000
a ₁ b ₄	32.90	92.75	-2.57	00
a ₂ b ₁	40.01	112.80	4.54	***
a ₂ b ₂	27.80	78.38	-7.67	000
a ₂ b ₃	32.40	91.34	-3.07	00
a ₂ b ₄	40.40	113.90	4.93	***
a ₃ b ₁	46.08	129.91	10.61	***
a ₃ b ₂	36.55	103.04	1.08	ns
a ₃ b ₃	37.48	105.67	2.01	*
a ₃ b ₄	44.96	126.76	9.49	***
x (Average)	35.47	100.00	0.00	-

LSD 5% = 1.56 t/ha; LSD 1% = 2.34 t/ha; LSD 0.1% = 3.79 t/ha

a₁ – Gp; a₂ – Lp; a₃ – Vt; b₁ – mulching with straw; b₂ – mulching with black polyethylene film of 15 μ , b₃ – mulching with black polyethylene film of 30 μ , b₄ – unmulched

The influence of the cultivar and mulch on yield of rhubarb.

Negative significantly differences, compared to the average have been obtained when Gp cultivar is mulching with film of black polyethylene 30 μ (21.23 t/ha), Lp mulching with black polyethylene film of 15 μ (27.80 t/ha) and Gp cultivar when was mulching with black polyethylene film of 15 μ (28.07 t/ha).

Positive differences compared to the average have been obtained when Vt cultivar was mulching with straw (46.08 t/ha), Vt cultivar unmulched (44.96 t/ha), Gp cultivar unmulched (40.4 t/ha) and Gp cultivar mulched with straw (40.01 t/ha).

The differences obtained between experimental variants and experimental mean average, ranged from -14.24 t/ha for Gp cultivar mulching with black polyethylene film of 30 μ , up to 10.61 t/ha for Vt cultivar when was mulching with straw.

The total yield in case of rhubarb crop ranged from 21.23 t/ha, for

Gp cultivar mulching with black polyethylene film of 30 μ , to 46.08 t/ha, for Vt cultivar mulching with straw.

CONCLUSIONS

1. Regarding to the influence of the mulching system and cultivar on total yield of rhubarb, during 2016, it ranged from 21.23 t/ha for Gp cultivar mulching with black polyethylene film of 30 μ , to 46.08 t/ha, for Vt cultivar mulching with straw.

2. In case of Gp cultivar the highest production was obtained for mulching with straw (37.80 t/ha).

3. In case of Lp cultivar the highest production was obtained for un-mulched variant (40.40 t/ha).

4. Very negative differences significantly, compared to the average have been obtained when Gp cultivar is mulching with black polyethylene film of 30 μ (21.23 t/ha) and Lp mulching with black polyethylene film of 15 μ (27.80 t/ha).

REFERENCES

1. Ciofu R., Stan N., Popescu V., Chilom P., Apahidean S., Horgos A., Berar V., Lauer K. F., Atanasiu N., 2004 – *Tratat de Legumicultura*. Editura Ceres Bucuresti.
2. Dumitrescu M., 2001 – *Mulcirea solului în culturile de legume*. Hortiform, nr. 5/105
3. Indrea D., Apahidean S., Apahidean M., Maniutiu D., Sima R., 2007 – *Cultura Legumelor*. Editura Ceres Bucuresti.
4. Stan N., Munteanu N., Stan T., 2003 – *Legumicultura*, Vol III. Editura “ Ion Ionescu de la Brad ” Iasi.
5. Stoleru V., 2013 - *Managementul sistemelor legumicole ecologice*. Editura “Ion Ionescu de la Brad” Iasi.
6. Treptow H., 1985 – *Rhubarb (Rheum species) and its uses*. Flauss. Obst., 52, 8, pp 419-422.
7. Olson S.M., 2005 – *Mulching*. Horticultural Sciences Departament, UF/IFAS, Florida Cooperative Extension Service