

PARTIAL RESULTS ON BASIL CROP IN INTERCROPPING SYSTEM

REZULTATE PARȚIALE ÎNTR-O CULTURĂ DE BUSUIOC ÎN SISTEM DE INTERCROPPING

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Abstract The paper presents the behavior of basil (*Ocimum basilicum* L.) crop in two intercropping systems with runner bean (*Phaseolus coccineus* L.) and cherry tomatoes (*Lycopersicon esculentum* L.). The obtained results were evaluated based on morphological and phenological characteristics of the chosen species, revealing the agrophitotechnological character of alimentary basil and its productivity in the two intercropping systems. Due to the decorative valences that basil presents, which were highlighted in the intercropping systems, this species brings unity and harmony to the specific ornamental vegetable garden of our country.

Key words: Alimentary basil, Agrophitotechnological, Decor.

Rezumat. Lucrarea prezintă comportamentul speciei *Ocimum basilicum* L. în cazul a două sisteme de cultură, intercropping alături de fasolea mare (*Phaseolus coccineus* L.) și tomate cherry (*Lycopersicon esculentum* L.). Rezultatele obținute au fost evaluate conform caracteristicilor morfologice și fenologice ale speciilor alese, scoțând în evidență caracterul agrofitehnic al busuiocului alimentară și productivitatea acestuia în cadrul celor două asocieri. Datorită valențelor decorative pe care busuiocul le prezintă, evidențiate în cadrul sistemelor de cultură, această specie contribuie la unitatea și armonia unei grădini legumicole ornamentale specific țării noastre.

Cuvinte cheie: Busuioc alimentară, Agrofitehnic, Decor.

INTRODUCTION

The legend says that basil grew for the first time, in a sacred place, where the Holly Cross was found by Emperors Helen and Constantine. Basil is also known in folk culture as basic, "bosioc" or "mădăcină" and presents numerous religious, medicinal and aesthetic valences. *Ocimum basilicum* L. is considered the king of spices and it is used in kitchens around the world, from spacing of salads to flavoring juices. In Italy basil is the base of the well-known pesto sauce (Fălticeanu and Munteanu, 2003).

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Basil is used in the treatment of medical problems such as infections of the respiratory tract, digestive tract, liver diseases and not least problems of the nervous system. (Fălticeanu and Munteanu, 2003). From a religious point of view basil is used in the sanctifying of holy water and adornment of icons.

From a vegetable point of view *Ocimum basilicum* L. is considered a spice, but in the same time an aromatic plant, which is renowned for its essential oils, in a percentage of 0,1-0,4 %. Due to these basil is used in cosmetic and perfume industry, giving products a special character. Among its essential oils, basil also has in its composition mineral salts, carotene, vitamin C, phytoncides and many more (Stan *et al.*, 2003).

Aesthetically speaking, basil was used for its numerous ornamental valences, being one of the recommended species using in creating a vegetable korb (Sima, 2009). This species is mentioned from ancient times in writings due to its habitus, and benefic effects on the human body. In Medieval Europe basil was a part of the medicinal herb garden, among other plants (mint, poppy, fennel) which was situated near the apotheque and medical building (Kluckent, 2007).

Beside the beauty of *Ocimum basilicum*'s L. port, it is also renowned for the repellent effect on pests that can appear in a crop or in a family garden.

Due to the qualities that the basil presents it is a species frequently used in biological agriculture (Fălticeanu and Munteanu, 2003). At the same time, numerous studies present the benefits that this species has on the agro system in crops in intercropping systems. Among these benefits, we can recollect increased soil quality, nutrients and soil activity, a decreased of pest attacks and a better taste of the vegetables that were associated with basil (Wu Hong Ying *et al.*, 2010).

This paper presents the behavior of *Ocimum basilicum* L. in two intercropping systems, with runner bean (*Phaseolus coccineus* L.) and cherry tomatoes (*Lycopersicon esculentum* L. var. *cerasiforme*). The necessity of this study is given by the desire to produce healthy vegetables, by eliminating insecticide and chemic fertilizer, which have a toxic afterglow in vegetables or fruits, dangerous for the human body. The objects of this study are to identify the benefits that the basil brings in the two intercropping systems and its productivity.

MATERIAL AND METHOD

For the fulfillment of the established purpose and objects, an experience was organized in the experimental field of the Department of Vegetable growing, in 2015, in "V. Adamachi" farm of USAMV Iași.

The biological material used in the experience was represented by two varieties of basil (*Ocimum basilicum* L.), one with green leafs (f. *bulatum*) and a local population with purple leafs; runner bean (*Phaseolus coccineus* L.) for dried beans; and cherry tomatoes (*Lycopersicon esculentum* L. var. *cerasiforme*).

The experience was conducted between 06.05-11.10. The establishment was realized in intercropping system, using standard seedlings, for basil and cherry tomatoes and seeds for runner bean.

In the first intercropping system, basil with runner bean, the basil seedling were placed at a distance of 30 cm between plants, one purple, one green and 70 cm from the runner bean row. The runner bean crop was realized in the shape of a pyramid, with 10 nests.

In the second intercropping system, basil with cherry tomatoes, the distance between basil seedlings was 25 cm and of 50 cm from the cherry tomatoes row.

The experience was established respecting the crop technology found in the reviewed literature (Stan *et al.*, 2003, Fălticeanu and Munteanu, 2003, Sima, 2009, Ciofu *et al.*, 2003). The crops were established on leveled ground, well stocked with nutrients and organic matter.

The applied methods in the study were bibliographic study, experiment and observation, based on the performances of basil the two intercropping systems were evaluated.

RESULTS AND DISCUSSIONS

Basil is an annual plant and a part of aromatic and spiced vegetables, next to dill, thyme and cicely.

The obtained results from a morphological point of view showed that basil is a well branched species, with an erect port and a taproot, which can be found at the surface of fertile soil. The plants have a strong flavor, with the purple basil having a much more intense perfume. The leaf lamina is an oval-arrow shape, whole for green basil (Fig. 1) and slightly serrate for purple basil (Fig. 2). The flowers are small, zygomorphic, white for green basil and pink for purple basil.

In the first intercropping system, basil with runner bean, based on the conducted research we found that green mass was situated between 2,857 t/ha for purple leafed basil and 4,523 t/ha for green basil, the average of dried mass was situated between 1,346 t/ha for purple basil and 2,190 t/ha for green leafed basil. The average height was situated between 49-61 cm and the diameter of the plants has varied between 40 cm for the local population of basil and 45 cm for green basil (Tab. 1).



Fig. 1 - Green leafed basil



Fig. 2 - Purple basil

Table 1

Biometric aspects for first intercropping system with runner bean

First establishment			Basil Production t/ha		Height (cm)	Plant diameter (cm)
no	Specifications		Green sprig	Dried sprig		
1	Intercropping with runner bean	V1	2,857	1,346	49	40
2		V2	4,523	2,190	61	45

V1- *O. basilicum*, f. *bulatum*V2- Local population of purple *O. basilicum*

The second intercropping system, basil with cherry tomatoes, based on the conducted research the green sprig productivity varied between 3,6 t/ha for the local purple population and 8,3 t/ha for the bulatum form. The diameter of the varieties was 27.33 cm for purple basil and 38 cm for green basil, while the plant height was between 41 for purple basil and 62,66 cm for green leafed basil, dimensions that can be seen in Table 2.

Table 2

Biometric aspects for the second intercropping system with cherry tomatoes

Second establishment			Basil Production t/ha		Height (cm)	Plant diameter (cm)
no	Specifications		Green sprig	Dried sprig		
1	Intercropping with cherry tomatoes	V1	3,600	1,492	41,00	27,33
2		V2	8,332	3,408	62,66	38,00

V1- *O. basilicum*, f. *bulatum*V2- Local population of purple *O. basilicum***Fig. 3 - Green basil sprigs**

In what concerns the sprigs, the average was 10,66 first degree sprigs, for green basil (Fig. 3), and 9 for purple, in the first intercropping system. In the second intercropping system with cherry tomatoes the average sprig was 7, for purple basil and 8,16 for green basil. The values of the second, third, fourth and fifth sprig average are represented in table 3.

Table 3

Number of sprigs in the two intercropping systems

no	Specification		R I	R II	R III	R IV	R V
1	Intercropping with runner bean	V1	10,66	20,66	20,66	7,00	2,66
		V2	9,00	18,00	18,00	3,66	0,00
2	Intercropping with cherry tomatoes	V1	8,16	18,33	23,66	13,83	2,16
		V2	7,00	17,33	8,00	1,66	0,00

V1- *O. basilicum*, f. *bulatum*

V2- Local population of purple *O. Basilicum*

R1- First degree sprig

R2- Second degree sprig

R3- Third degree sprig

R4- Forth degree sprig

R5- Fifth degree sprig

CONCLUSIONS

1. In both intercropping systems, basil had significant and benefic contributions, regarding pests and soil activity.
2. The quality of taste for the associated species with basil was significant.
3. Regarding green sprig production, the quantity was double in the second intercropping system with cherry tomatoes for both basil varieties.
4. The biometric indicators such as diameter and height presented larger values in basil intercropping with runner bean.
5. The obtain result for first degree sprigs, did not present significant differences between the two intercropping systems.

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