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ECONOMIC EFFICIENCY OF BIOLOGICAL MATERIAL PRODUCTION TECHNOLOGY VEGETABLE IN POTS

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Abstract
Vegetable, a special field of horticulture, has come in recent decades in a fascinating trajectory identification and promotion of techniques and technologies to promote sustainable agricultural production. Global economic climate and is one of the main threats to sustainable development and is one of the biggest environmental problems, with negative consequences on the national economy. Economic efficiency of tomato culture, especially in the private sector, which holds the largest share of the area can be increased through the development of production technology by planting tomatoes with crop establishment. The paper presents the results obtained from INCDBH between the years 2013-2015, the native varieties of tomatoes: Arges 11, Arges 20, Stefanesti 22, Stefanesti 24. Sustainable agriculture is to raise its productivity, to provide reliable and consistent profits with minimal negative effects on the environment and ensuring food security population.

Keywords*: tomatoes, new variety, economic efficiency, seedling vegetables*

1. INTRODUCTION

Growing vegetables was one of the first practical human activities. With the development of society have continuously developed and methods of cultivation of vegetables. While technologies in field crop vegetables, emergence and development of crops in greenhouses and solariums forced led to a qualitative development and production of vegetables growing. The world is grown about 250 species of vegetable plants. There is currently an ongoing concern for the discovery and introduction of new vegetable plants in culture. In our country a large number of species cultivated for vegetable plants. The vast majority of vegetable plants cultivated in the field, but some of them are very suitable and forced culture and protected.

2. MATERIAL AND METHODS

The experiment was aimed mainly tomato and pepper seedlings production and was organized in greenhouse belonging INCDBH Ştefăneşti. Thus it was organized experience for each species under study: tomatoes and peppers. Seedling production is a complex technological process that requires

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the use of specialized spaces, a large volume of work, conditions that require rational and efficient organization of this process, but the seedlings through the benefits created justifies economic effort involved. In Romania, they are known and used for producing seedlings nutritional blocks formed by pressing, of different mixtures of earth pots and alveolar plastic blades.
The seedlings are young vegetable plants at the beginning of the growing season, obtained under special technical and organizational, that by transplanting are used founding cultures.

3. RESULTS AND DISCUSSION

The variants studied were:
-V_1 picked plants planted in boxes mixed but distances to ensure a space edaphic approximately equal to those in pots;
- V_2 PVC pots with volume of 300 cm^3 x 3 x 28 repetitions plants/rehearsal;
- V_3 biodegradable PVC pots with volume of 300 cm^3 x 3 x 28 repetitions plants/rehearsal
- V_4Jiff - pots with volume 150 cm^3 x 3 x 28 repetitions plants/rehearsal
For experimental model to study vegetable plants were used vegetable seeds certified *Lycoperssicum* species *esculentum* (tomato) with indeterminate growth of the variety and growing Ştefăneşti 24 determined the species and variety Arges 11, *Capssicum anuum* (capsicum) variety Ceres. Provenance seed was secured from its own production.
Choosing a nutrient mix to eliminate possible stress planting and transplanting seedlings must consider it to meet a number of minimum mandatory conditions:
- have a balanced content between macro- and micronutrients to not induce deficiencies mineral nutrition;
- have an organic matter content of between 3-3.5 $^0/_{00}$;
- have a water retention capacity large enough so they can be removed hydric stress caused either by excess moisture or lack thereof;
- to maintain a structure of structural aggregates stable enough so that the air-water ratio is favorable recovery and accelerated growth of plant roots transplanted;
- components of the mixtures do not come from chemically polluted areas or in areas where conventional farming is practiced.

Achieving these minimum requirements of the rooting substrate was made as a result of physico-chemical determinations of nutrient mixtures used in the different horticultural species under study.
Sowing was done in both species in the same period in boxes with nutrient mixture consisting of garden soil, sand and earth celery into parts equal to 1/3 volume, to which was added an amount of peat to increase the water retention capacity for V_1 and pots filled with the same mixture for V_2 and V_3, as in jiffy pots wetted V_4 (Figure 1). Sowing date was 02/03/2016. East seed was produced by species such installments: 05/03/2016 tomatoes and peppers on or around 03/24/2016.

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Figure 1. Aspect seedling after germination phase

Figure 2. Pepper and tomato seedlings in pots

Transplanters planting was carried out only to variants which provided nutritious transplanters in pots with different sizes for the study of stress reduction planting. In order not to plant development according to the embodiment applied to bedding seedlings was carried out on the same day 4/2/2016 (Figure 2, 3). Plant development was influenced in this year period with very cold nights and hot days, on the one hand and on the other hand emissions multiplier which does not have its own heating system and heat amplifies circadian amplitude. Thermal amplitude between transplanters and growth of seedlings in pots varied between 4:35 ^{0}C.

Figure 3. Variant with 0,300 seedlings in pots of it

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Figure 4. Tomato seedlings prior to planting

The plants were placed on tables in the experimental variations, the trays with a capacity of 28 plants (Figure 4, 5); each experimental variant includes three repetitions, each repetition representing one tray. In order to avoid rapid dehydration of the plant and to reduce water stress picked subcultures due to the strong sun rays and low humidity air in the greenhouse multiplier were carried out the following works:
- whitewashing conservatory roof glazing;
- Protection through shading gauze placed over the plants on the metal support (only on sunny days and very hot);
- Sprinkler repeated waterings, so the gauzes and alleys of greenhouse tables;
- Reducing air currents inside the greenhouse multiplier.

Figure 5. Seedling of peppers and tomatoes in the greenhouse multiplier after subculturing procedure

Specific works for the maintenance of seedlings: manual weeding the weeds, foliar fertilization with fresh nettle extract and Bionat product is a herbal extract and seaweed, repeated waterings nutrient mixture for maintaining humidity at 60-70% of field capacity for retention water. Prevention of insect pests attack was carried out with products using repellents and bioinsecticide extract buds of black currant (*Ribes nigrum*) and the dried leaves of horsetail (*Equisetum arvense*) and castor (*Rhus typhyna*).
Choosing biological material for crop establishment constitutes an important sequence in culture technology of vegetables in protected system (Table 1). Establishing criteria for choosing a biological material cultivated a priority objective in research for the determination of earliness, production potential, the adaptability of plants to climate conditions zone, also the determination based on statistical calculation of production increases to be reflected in profits earned and justify the choice.

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Table 1. Tomato varieties tested

Variety	Early production kg/m^2 15.07	Total production kg/m^2 01.09	The average fruit weight (g)
Argeş 11	1,65	16,50	208
Argeş 20	2,20	20,75	286
Ştefăneşti 22	1,92	22,00	334
Ştefăneşti 24	2,40	23,10	387

Establishment of the criteria in choosing varieties grown are a necessity in the work of research, so that determines earliness and production potential and adaptability of plants to climate conditions of the area where it is grown. Grown tomatoes varieties were chosen for a study of economic efficiency in protected culture and beyond. The establishment of the crop planting in pots was found to be the most cost-effective (Table 2).

Table 2. Economic efficiency in the production of seedlings of tomatoes, peppers (lei/1000 pcs.)

Specification		**Tomatoes**		**Pepper**	
		Alternative classic	**Variant in pots**	**Alternative classic**	**Variant in pots**
The workmanship		40	38	45	43
Quotas (CAS, unemployment, health venture fund)		8,6	8,17	9,67	9,24
Materials:	mixture	35	33	40	38
	seeds	20	15	25	20
	foil	10	10	10	10
	insecto-fungicide	8	6	10	8
	fertilizers	5	3	5	3
	the pots	-	50	-	50
Energy		100	80	110	90
Direct expenditure		78	117	90	129
Indirect expenses		7,8	11,7	9,0	12,9
Total expenses		85,8	128,7	99,0	141,9
First cost (lei / thread)		**0,0858**	**0,1287**	**0,099**	**0,1419**

4. CONCLUSIONS

1. Choosing biological material for crop establishment constitutes an important sequence in culture technology of vegetables in protected system.
2. Based on calculation of economic efficiency we propose as an alternative for obtaining planting variant in pots for planting in protected areas.
3. The selection of biological material for crop establishment in protected areas is effectively after its testing in experimental plots in physio-climatic conditions comparable.

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