INFLUENCE OF TIME AND METHOD OF CULTURE ON THE PRODUCTION OF BROCCOLI IN TRANSYLVANIA PEDOCLIMATIC CONDITIONS

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Abstract: Broccoli is grown for hypertrophied inflorescences, less compact than those of cauliflower, which are used to prepare various dishes or for freezing. Value of broccoli inflorescences is high due to the rich content in carbohydrates, vitamins and minerals. Broccoli culture is practiced in open field and in protected areas. Transylvania climatic conditions are favorable for the cultivation of this species. Broccoli cultures are started with seedlings and this is leading to additional costs for their production. Experience was conducted in 2010-2011, in Reghin, Mures County. Experimental factors were time of planting and the culture method. Experimental culture was established at different times (April, May, June) by two methods (by planting seedlings and direct sowing).

Keywords: broccoli, time of planting, culture method

INTRODUCTION

Broccoli is used due to its high food value, it has a high content of carbohydrates-1,6%, cellulose-16%, minerals (calcium, phosphorus, iron) and vitamins (Ciofu, 1996). Broccoli consumption has increased in recent years, after the discovery of anticancer properties, some specific properties favorable in fighting this disease (Finley et al, 2000, 2005, Guo et al., 2001).

Broccoli is grown around the world, except humid tropics. China is the largest country in the world to produce cauliflower and broccoli with 8.5 million tons. India is second with 6.5 million tons, production of the two countries account for 80% of global production, două ţări, reprezintă 80% din producţia la nivel mondial. (FAOSTAT, 2010).

Most often, broccoli cultures are started with seedlings (Ciofu et al., 2003, Indrea et al., 2009, Mohanty and Srivastava, 2002). Direct sowing culture method is practiced to obtain mini vegetables (Chaux and Foury, 1994, Selvakumar et al., 2007).

MATERIAL AND METHOD

The research took place during 2010-2011, in Reghin locality from Mureş County .

The aim was to determine optimum culture time for broccoli and to see if broccoli crops by direct sowing can achieve yields compared with those started with seedlings. Other objectives were to determine plant growth (plant height, rosette diameter, inflorescence size), crop production and achieved efficiency.

Calabrese Natalino variety was used in this experience. This is an early hybrid, wich has a vegetation period of 60 -70 days after transplanting. The inflorescences are medium, with a weight of 300 - 400 g

Experimental factors were culture method (by planting seedlings and direct sowing) and establishing the best time for culture(April, May and June). By combining

experimental factors resulted six experimental variants, that were placed in three repetitions. During vegetation the specific technology was applied.

RESULTS AND DISCUSSION

Average yield for the three times of planting is 23.68 t / ha (Table 1). Of the three planting times used, time II (May) provides a production increase of 26.0%, the differnce in production, compared to the average is distinct significant.

Table 1

Time of planting influence upon broccoli production

Reghin, 2010-2011

Variant	Production		Differnce to control (t/ha)	Significance
	t/ha	%		
Planting time I (April)	23.46	100.0	0.00	-
Planting time II (May)	29.57	126.0	6.11	**
Planting time III (June)	18.02	76.8	-5.44	0
Average	23.68	100.0	-	-
DL (p 5%)			2.04	
DL (p 1%)			3.38	
DL (p 0.1 %)			6.32	

Broccoli production in the two culture methods used, by direct sowing or by planting seedlings, was between 20.85 t / ha and 26.56 t / ha. The average production between the two methods is 23.71 t / ha (Table 2). Compared with the average of the experience, direct sowing method provides a distinct significant difference in production.

Table 2

The influence of how the culture was started upon broccoli production

Reghin, 2010-2011

Variant	Production		Differnce to control (t/ha)	Significance
	t/ha	%		
M1 (direct sowing.)	20.85	87.93	-2.86	00
M2 (seedlings)	26.56	112.02	2.85	**
Average	23.71	100.00	-	-
DL (p 5%)			1.39	
DL (p 1%)			2.70	
DL (p 0.1 %)			4.38	

The highest production of the two methods of culture was in planting time I, version grown by direct sowing of 33.72 t / ha (Table 3). In planting time II, production obtained by direct sowing was superior to all variant grown, without ensuring significant differences. In the third period, production was higher in the variant grown by direct sowing, achieving compared to experience average, a significant difference.

Table 3

Combined influence of culture starting method and planting time upon broccoli production

Reghin, 2010-2011

Variant		Production		Differnce to control (t/ha)	Significance
Culture method	Planting time	t/ha	%		
Average	II (May)	23.46	100	0.00	-
M1 (direct sowing)	II (May)	25.42	108.4	1.96	-
M2 (seedlings)	II (May)	21.50	91.7	-1.96	-
Average	I (April)	29.57	100	0.00	-
M1 (direct sowing)	I (April)	33.72	114.1	4.16	**
M2 (seedlings)	I (April)	25.42	86.0	-4.15	00
Average	I (June)	18.02	100	0.00	-
M1 (direct sowing)	I (June)	20.53	113.9	2.51	*
M2 (seedlings)	I (June)	15.19	84.3	-2.83	0
DL (p 5%)				2.41	
DL (p 1%)				3.64	
DL (p 0.1 %)				5.86	

Compared with the experience average, it was found that the method of direct sowing culture, registered significant differences in production when the culture was established in April while in the seedling culture method obtained a higher production, during planting period II (table 4).

Table 4

Combined influence of planting time and culture method upon broccoli production

Reghin, 2010-2011

Variant		Production		Differnce to control (t/ha)	Significance
Planting time	Culture method	t/ha	%		
Average	M1 (direct sowing)	26.56	100	0.00	-
I (April)	M1 prins.d.)	25.42	95.7	-1.14	-
II (May)	M1 (direct sowing)	33.72	127.0	7.17	***
III (June)	M1(direct sowing)	20.53	77.3	-6.03	00
Average	M2 (seedlings)	20.81	100	0.00	-
I (April)	M2 (seedlings)	21.50	103.3	0.70	-
II (May)	M2 (seedlings)	25.42	122.2	4.61	**
III (June)	M2(seedlings)	15.50	74.5	-5.31	00
DL (p 5%)				2.65	
DL (p 1%)				4.23	
DL (p 0.1 %)				7.43	

CONCLUSIONS

Based on the results obtained after the research conducted in the two years, broccoli culture in terms of Reghin area, at three different planting times and by direct sowing or by planting seedlings in the field, the following conclusions have emerged.

-in terms of culture technology, it was observed that the method of direct sowing in the field ensured higher production values compared to the seedling culture method, due to a better supply of water in the soil, in all ages of establishing culture.

-production was higher when crop establishment was made in April by direct sowing, followed by options set in May, with seedlings, because in this way have been avoided high summer temperatures during the formation of inflorescences.

- in the conditions of Transylvania Plateau, broccoli culture can be started by direct sowing in open field, this method provides the technological mechanization in greater extent compared with the culture started by seedlings.

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