

# STUDY OF A VARIETY OF CAULIFLOWER HYBRIDS BY DIRECT SOWING CULTURE

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**Abstract:** The cultivar is a key factor in vegetable production and the financial result largely depends on it. Cultivar can influence the level of production achieved, the commercial aspect and the period in which production is obtained. Choosing the right cultivar should take into account the specific ecological zone where the culture is performed. Cauliflower cultures are started mainly by seedlings, but there are concerns for its cultivation, in some cases, by direct sowing. Transylvania climatic conditions are favorable for growing cauliflower mostly during spring and autumn when temperatures are favorable for the formation of quality inflorescences. The experience took place in 2012, in the Reghin, Mures County. In the experimental culture, started by direct sowing, the following varieties were used: January Master, Idol, Napolitano Mazartico and Igloo and the planting dates were May, June and July.

**Keywords:** cauliflower, cultivars, planting date, direct sowing

## INTRODUCTION

Cauliflower is grown for its hypertrophied inflorescences that are used to prepare different dishes and for pickling. The energy value of cauliflower inflorescence is low (118.5 kJ/100 g) due to the low content in energetic substances. Cauliflower inflorescences contain small amounts of soluble carbohydrates, 1.16% glucose and 1.05% fructose, 1.12% cellulose, 0.25% starch and organic acids are represented mainly by oxalic acid with a concentration of 4.3 mg/100 g fresh product (Souci et al, 1981 cited by Burzo et al., 2000). Cauliflower inflorescences accumulate a small amount of nitrate, below 100 ppm, but it is 1.6 times higher than that accumulated in flower stalks (Lisiewska and Kmiecik, 1996, quoted by Burzo et al., 2000).

In the climatic conditions of Romania, cauliflower is grown in spring and autumn in open field cultures and to obtain early productions is grown in polyethylene tunnels (Ciofu et al., 2003, Indre et al., 2007, Berar et al., 2012). The cultivar, in vegetable production, is a key factor of production, the financial result largely depends on it. Cultivar can influence the level of production achieved, the commercial aspect and the period in which production is obtained. Choosing the right cultivar should take into account the specific ecological zone where the culture is to be carried.

Seedling cultivation is mostly practiced (Stan and Munteanu, 2001, Ciofu et al., 2003, Indre et al., 2007, 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 experiments took place in Reghin, Mures County. The aim of the experience was to determine which of the studied cultivars give the best results by direct sowing culture in the specific climatic conditions Transylvanian Tableland. Objectives were to

determine plant growth (plant height, rosette diameter, inflorescence size) and the production.

For the experience the following hybrids were used: January, Master, Idol, Napolitano Mazartico and Igloo, which were grown by direct sowing in the open field. Planting dates were May (05.05.2012) June (05/09/2012) and July (13/07/2012). By combining experimental factors, 15 experimental variants resulted, located in three repetitions. Plant emergence was recorded on 10 May, 14 June and 13 July 2012. Inflorescence harvesting was done in the second decade of September, for the first planting date, in the second decade of October for the second planting date and in the first decade of November for the third planting date. During the vegetation period the specific technology for cauliflower crops grown in open field was applied. The observations made were established in the experimental protocol.

## RESULTS AND DISCUSSION

Cauliflower plant growth was affected by crop establishment period due to plant growth under different conditions of temperature and the growth differed from one cultivar to another. After 30 days from the emergence, the height of the plants sown in May (planting date I) was between 5.2 cm and 9.3 cm at hybrid Idol (Table 1). At the planting date II, plant height was between 4.0 cm at Idol hybrid and 7.6 cm at hybrid January. The plants sown in the III planting date had a height 4.6 cm at Idol and 8.4 cm at January. After 60 days after emergence cauliflower plants height was between 10.5 cm at Igloo, in planting date II and 40.2 cm at January, in the planting date III. After 90 days the plants have reached a height between 33.8 cm (hybrid Master, planting date I) and 77.2 cm (hybrid January, planting date III). During the 90 days, the daily increase in height ranged from 0.37 cm / day at hybrid Master at planting date I and 0.85 cm / day at January cultivar, at planting date III.

Table 1  
Influence of sowing time on plant height of five cauliflower hybrids  
Reghin, 2012

Variant		Plant height (cm), after :			
Planting date	Cultivar	30 days	60 days	90 days	Daily growth
Date I	January	8.3	28.7	54.3	0.60
Date I	Master	6.9	19.6	33.8	0.37
Date I	Idol	5.2	19.8	41.4	0.46
Date I	Napolitano M	9.1	28.0	55.8	0.62
Date I	Igloo	9.3	22.9	49.9	0.55
Date II	January	7.6	30.4	59.4	0.66
Date II	Master	4.9	27.1	39.5	0.43
Date II	Idol	4.0	18.7	37.3	0.41
Date II	Napolitano M	7.0	10.9	40.1	0.44
Date II	Igloo	6.9	10.5	48.0	0.53
Date III	January	8.4	40.2	77.2	0.85
Date III	Master	5.6	31.1	61.3	0.68
Date III	Idol	4.6	24.2	45.3	0.50
Date III	Napolitano M	6.2	33.2	60.1	0.66
Date III	Igloo	5.1	19.8	46.1	0.51

After 30 days from emergence the number of leaves / plant at planting date I, was between 3.8 at Idol and 5.5 at Master (Table 2). At planting date II the number of leaves/plant was between 2.4 leaves / plant at Mazartico Napolitano and 4.8 leaves / plant at January. At planting date III the number of leaves was between 2.6 leaves/plant at Idol and 4.1 leaves/plant at January. After 60 days from emergence, cauliflower plants had a leaf number between 5.2 (Mazartico Napolitano, planting date II) and 12.8 (Idol, planting date III). After 90 days, the number of leaves were between 11.4 leaves / plant (Mazartico Napolitano, planting date II) and 18.2 (Mazartico Napolitano, planting date I). During the 90 days, daily increase in the number of leaves / plant ranged from 0.12 at hybrid Napolitano Mazartico (planting date II) and 0.22 at cultivar Master (planting date III).

Table 2  
Influence of planting date on the development of leaf number of five cauliflower hybrids  
Reghin, 2012

Variant		Leaves number, after :			
Planting date	Cultivar	30 days	60 days	90 days	Daily growth
Date I	January	4.9	11.3	17.9	0.19
Date I	Master	5.5	9.9	15.7	0.17
Date I	Idol	3.8	10.0	14.7	0.16
Date I	Napolitano M	5.2	12.6	18.2	0.20
Date I	Igloo	4.7	12.3	15.2	0.17
Date II	January	4.8	12.0	16.8	0.18
Date II	Master	2.7	9.0	16.9	0.18
Date II	Idol	2.8	9.5	14.0	0.15
Date II	Napolitano M	2.4	5.2	11.4	0.12
Date II	Igloo	2.9	5.9	16.7	0.18
Date III	January	4.1	12.6	14.7	0.16
Date III	Master	3.2	10.3	19.8	0.22
Date III	Idol	2.6	12.8	15.4	0.17
Date III	Napolitano M	3.3	8.1	15.8	0.17
Date III	Igloo	2.8	10.0	14.8	0.16

After 30 days from emergence, rosette diameter of cauliflower plants, was between 4.6 cm at Idol and 8.8 cm at hybrid Igloo, when the seeds were sown at planting date I (Table 3). At planting date II, rosette diameter was between 4.6 cm at Idol and 8.9 cm at January and at planting date III, rosette diameter was between 4.6 cm at Idol and 8.4 cm at January. After 60 days from emergence, rosette diameter was between 21.7cm (Napolitano Mazartico, planting date II) and 52.7 cm (Napolitano Mazartico, planting date I). After 90 days, the rosette diameter was between 41.3 cm (Napolitano Mazartico, planting date II) and 90.8 cm (January, planting date II). During the 90 days, daily increase of leaf rosette diameter ranged from 0.55 cm at hybrid Master, planting date I and 1.0 cm at January planting date II and III.

Table 3

Influence of sowing time on developing rosette leaves at five cauliflower hybrids  
Reghin, 2012

Variant		Rosette diameter(cm), after :			
Planting date	Cultivar	30 days	60 days	90 days	Daily growth
Date I	January	7.8	54.3	78.4	0.87
Date I	Master	8.5	37.5	50.3	0.55
Date I	Idol	4.6	44.0	71.0	0.78
Date I	Napolitano M	7.5	52.7	74.2	0.82
Date I	Igloo	8.8	50.4	67.3	0.74
Date II	January	8.9	51.2	90.8	1.00
Date II	Master	6.9	35.5	68.1	0.75
Date II	Idol	4.6	40.5	53.2	0.59
Date II	Napolitano M	5.5	21.7	41.3	0.45
Date II	Igloo	5.2	26.2	54.1	0.60
Date III	January	10.8	56.1	90.7	1.00
Date III	Master	6.9	38.1	80.7	0.89
Date III	Idol	4.5	49.8	65.7	0.73
Date III	Napolitano M	5.7	37.9	65.1	0.72
Date III	Igloo	6.2	24.8	57.7	0.64

Cauliflower different plant growth during the three planting dates have influenced the obtained production from the five hybrids. The average production of cauliflower ranged from 25.39 t / ha in the III planting date and 49.41 t / ha in II planting date (Table 4). Yields in planting period II was 18.4% higher than that achieved in the planting period I and the difference in production is very significant.

Table 4

Influence of planting dates upon the production of cauliflower  
Reghin, 2012

Variant	Production		Differnce to control (t/ha)	Significance
	t/ha	%		
Planting date I (May)	41.73	100.0	-	-
Planting date II (June)	49.41	118.4	7.68	***
Planting date III (July)	25.39	60.9	-16.33	000
DL (p 5%)			1.32	
DL (p 1%)			1.79	
DL (p 0.1 %)			2.43	

Cauliflower production ranged between 32.9 t / ha for hybrid Igloo and 49.54 t / ha at hybrid Master (Table 5). Compared with hybrid Idol, hybrid January achieved a production increase of 10.7% and of 32.7% at hybrid Master.

Table 5

## Cultivar influence upon cauliflower production

Reghin, 2012

Variant	Production		Differnce to control (t/ha)	Significance
	t/ha	%		
Idol	37.72	100.0	-	-
January	41.33	110.7	4.01	-
Master	49.54	132.7	12.22	***
Napolitano Nazarico	33.11	88.7	-4.21	-
Igloo	32.90	88.2	-4.42	-

DL (p 5%)

5.12

DL (p 1%)

7.45

DL (p 0.1%)

11.17

Table 6

## Combined influence of planting dates and cultivar upon cauliflower production

Reghin, 2012

Variant		Production		Differnce to control (t/ha)	Significance
Planting date	Cultivar	t/ha	%		
Date I	January	47.20	100.0	-	-
Date II	January	50.13	106.2	2.93	-
Date III	January	26.67	56.5	-20.53	000
Date I	Master	54.07	100.0	-	-
Date II	Master	66.97	123.9	12.90	***
Date III	Master	27.60	51.0	-26.47	000
Date I	Idol	38.07	100.0	-	-
Date II	Idol	47.73	125.4	9.67	***
Date III	Idol	26.17	68.7	-11.90	000
Date I	Napolitano Mazartico	32.93	100.0	-	-
Date II	Napolitano Mazartico	41.20	125.1	8.27	***
Date III	Napolitano Mazartico	25.20	76.5	-7.73	000
Date I	Igloo	36.37	100.0	-	-
Date II	Igloo	41.00	112.7	4.63	**
Date III	Igloo	21.33	58.7	-15.03	000

DL (p 5%)

2.95

DL (p 1%)

4.50

DL (p 0.1%)

7.34

Generally cauliflower hybrids studied had achieved lower production when sowing was done in the era III (July). Maximum yields were obtained in the date of culture II (Table 6).

## CONCLUSIONS

Based on the results of the research conducted with the five hybrids of cauliflower grown by direct sowing, at three different planting dates, the following conclusions resulted:

- during the 90 days, daily plant growth in height ranged from 0.37 cm / day at hybrid Master (planting date I) and 0.85 cm / day at January (planting date III).
- daily increase of rosette diameter ranged from 0.55 cm at hybrid Master (planting date I) and 1.0 cm at January (planting date II and III).
- Average production of cauliflower ranged from 25.39 t / ha (planting date III) and 49.41 t / ha (planting date II).
- Cauliflower hybrids studied had achieved lower production when sowing was done in the III planting date (July). Maximum yields were obtained in planting date II..

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