

## Studies upon a Selection of Cauliflower Hybrids Grown in Polyethylene Film Greenhouse

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**Abstract.** Cauliflower get it's name from Latin *caulis* (cabbage) and flower, an acknowledgment of its unusual place among a family of food plants, *Brassica oleracea*, which normally produces only leafy greens for eating. Cauliflower is well known in Romania, being the second most popular culture from cabbage family (after cabbage of course). In this paper work are presented aspects regarding the response of ten cauliflower hybrids (Diadom, Stargate, Opal, Igloo, Snowball, Idol, Cool, Master, Divita, Witki), growed in protected culture in Cluj area conditions. The research took place in spring in a polyethylene film tunnel. The research tried to establish which hybrid is better in these conditions.

**Keywords:** cauliflower, hybrid, polyethylene tunnel, growth, inflorescence, yields

### INTRODUCTION

Cauliflower has a mild energetic value but it can give us a diverse intake of vitamins and minerals that's why it should be present in our diet. Cauliflower contains high quantities of vitamin C (60g/100g fresh matter), vitamins from the B complex (B2, B3, B6), vitamin K and E, minerals (calcium, potassium, magnesium, iron, zinc, selenium, copper). Cauliflower is low on calories so it doesn't make people fat, having only 24 calories/100 g (Indrea and Apahidean, 2004). It also contains some substances that can prevent cancer - it stops some enzymes that activate the agents that cause cancer and also stimulates other enzymes that destroy cancerous substances (Ciofu *et al.*, 2003).

The plants from the cabbage family help to eliminate toxic substances from our organism due to glucosianolate and tiocianate that stimulates liver to neutralize potential toxic substances. People who eat plants from the cabbage family are less likely to suffer from prostate, colon, and lung cancer (Kirsh *et al.*, 2007).

Research also shows that cauliflower juice or the plant it self's have the quality to reduce glucose level in the blood, which allows the persons that suffer from diabetes to keep the illness under control.

There are many types of cauliflower, with different shapes and colors. In the research ten early hybrids were used.

### MATERIALS AND METHODS

The research started in spring in a polyethylene tunnel in Cluj-Napoca. It started in 18 of January by sowing the seeds, then in 23 January the small plants start to appear and at the beginning of March they were planted in the soil from the greenhouse.

Ten early cauliflower hybrids were taken into consideration:

Diadom F1 – It produces well presented white curd with early maturity, foliar system

provides a good protection for the cauliflower heads. It reaches maturity after approx. 60 days after planting. The average weight of cauliflower heads is 0.8 kg.

Stargate F1 – Vigorous hybrid recommended for early growing (cultures). Foliar system provides a good protection for the cauliflower heads. It reaches maturity after approx. 72 days after planting and reaches a medium weight of 1-1.5 kg.

Opal F1 – Recommended for early growing (cultures). Foliar system provides a good protection for the cauliflower heads. It reaches maturity after approx. 62 days from planting. The average weight of cauliflower heads is 0.8 kg.

Igloo F1 – This hybrid can be used to produce ‘small’ vegetables that children like so much. It’s a versatile hybrid that can be grown in early spring or autumn. If the plants are grown at small distances they give small heads but at big distances they give normal sized heads.

Snowball F1 – Early hybrid, that gives big heads with a weight of 0.9-1.2 kg. It is well adapted for our country. For a better inflorescence protection we have to interfere to help the plant. It reaches maturity after 65 days from transplanting.

Idol F1 – Hybrid with a short period of vegetation. It can be grown in spring and autumn. It needs constant soil humidity and it reaches maturity after 55 days after transplanting.

Cool F1 – Well suited for temperate climate, with round heads with an average weight of 1-1.5 kg. It gives good inflorescence protection and it reaches maturity after 55-65 days.

Master F1 – This hybrid is suited for early growing, with heads that can reach a weight of 2 kg. It is recommended to start the culture of this hybrid with seedlings. It reaches maturity after 70-75 days from sowing.

Divita F1 – It has a period of vegetation of 65-68 days with a medium head weight of 1.5 kg. The leaves insure a good head protection and it can be grown at high densities.

Witki F1 – Hybrid well suited for early growing. It reaches maturity after 52 days after transplanting. The heads weight can reach 2 kg, and are well protected by the leaves.

The purpose was to establish which of the hybrids grow better in the conditions that are imposed. Observations regarding the plant growth and yields were made. No problems with pests were reported and no treatments or fertilizations were done, except the main fertilization before planting with a dosage of 350 kg/ha of Complex 3.

## RESULTS AND DISCUSSION

In 2009, early spring (6 of March) the small cauliflower seedlings were planted into the polyethylene film greenhouse. Watering of plants and one manual destruction of weeds as is stated in the growing vegetables literature were done. In 17 of April observations regarding the plants growth were made. As it can be seen in table 1 the hybrid Stargate was the most vigorous (he is a bit latter then the others with almost 2 weeks) with leaves, height and rosette diameter bigger then the others, followed by Diadom and last came Opal hybrid.

V1 – Diadom F1 with 50,000 pl/ha, on 2 rows

V2 – Stargate F1 with 50,000 pl/ha, on 2 rows

V3 – Opal F1 with 50,000 pl/ha, on 2 rows

V4 – Igloo F1 with 50,000 pl/ha, on 2 rows

V5 – Snowball F1 with 50,000 pl/ha, on 2 rows

V6 – Idol F1 with 50,000 pl/ha, on 2 rows

V7 – Cool F1 with 50,000 pl/ha, on 2 rows

V8 – Master F1 with 50,000 pl/ha, on 2 rows

V9 – Divita F1 with 50,000 pl/ha, on 2 rows

V10 – Witki F1 with 40,000 pl/ha, on 2 rows

When picking the cauliflower heads started, it can be noticed that Diadom F1 was the first to make cauliflower heads followed by Opal F1 and the last ones were Stargate F1 and Snowball F1 (being latter then the others).

Concerning the yields, it was noticed (as showed in Tab. 2) that the biggest yields were obtained at Stargate F1 with 50,000 pl/ha, followed by Master F1 with 50,000 pl/ha and Divita F1. Lower yields were found at Cool F1, Idol F1 and Igloo F1.

In table 3 it can be observed that the cauliflower yield is directly influenced by the cultivar. The yields under the influence of cultivar have been between 16.73 at Cool F1 and 41.73 at Stargate F1. Extra yields are very significant positive from the statistics point of view at Stargate F1, Master F1 and Divita F1 were registered.

Tab. 1

Growth measurements made at cauliflower plants in April 2010

Variant	Average height (cm)	Average diameter (cm)	Average number of leaves (cm)
V1	23.67	28.00	6.67
V2	26.70	27.67	8.00
V3	19.00	19.67	8.00
V4	25.67	22.33	7.00
V5	30.33	33.00	7.00
V6	27.00	29.00	6.67
V7	28.67	28.00	7.67
V8	22.33	23.00	6.00
V9	20.00	20.00	6.33
V10	17.67	19.33	5.67

Tab. 2

Yield dynamics (t/ha)

Variant	May			June	Total yield
	Decade 1	Decade 2	Decade 3	Decade 1	
V1	2.49	15.80	7.89	-	26.18
V2	-	2.92	29.08	9.73	41.73
V3	3.51	17.86	10.56	-	31.93
V4	0.16	0.36	16.00	5.32	21.84
V5	-	0.44	7.37	15.18	22.99
V6	0.80	9.60	3.37	3.28	17.05
V7	-	5.16	9.67	1.90	16.73
V8	-	4.70	10.27	22.03	37.00
V9	-	5.33	3.85	26.12	35.30
V10	0.34	10.25	12.63	1.25	24.47

## CONCLUSIONS

It is recommended to use Stargate, Master and Divita hybrids for spring growing.

Stargate hybrid produced the biggest yields at a density of 50,000 pl/ha so we recommend this density.

It is not recommended to use Cool and Idol hybrids for protected culture in polyethylene tunnels.

A farmer can also obtain high cauliflower yields without using too many fertilizers.

Tab. 3

Hybrid influence upon cauliflower yields grown in polyethylene tunnel

Variant	Yields		Difference t/ha	Significance
	t/ha	%		
V1	26.18	100.0	0.00	-
V2	41.73	159.4	15.56	***
V3	31.93	122.0	5.76	**
V4	21.84	83.4	-4.34	00
V5	22.99	87.8	-3.19	0
V6	17.05	65.1	-9.13	000
V7	16.73	63.9	-9.44	000
V8	37.00	141.3	10.82	***
V9	35.30	134.9	9.12	***
V10	24.47	93.5	-1.71	-

DL (p 5%)

2.57

DL (p 1%)

3.70

DL (p 0.1%)

5.82

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