

# IMPROVEMENT OF CAULIFLOWER MALE STERILE LINES WITH *BRASSICA NIGRA* CYTOPLASM



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## INTRODUCTION

In the Research Institute of Vegetable Crops, Skierniewice, Poland, cytoplasmic male sterile lines of broccoli and broccoli-cauliflower have been maintained, selected and investigated since 1976. In these *cms* plants stamens are transformed into petals. Therefore genotypes with *B. nigra* cytoplasm usually have lower ability to sexual propagation by the seeds at a large scale in comparison to fertile cauliflower lines. Cauliflower and broccoli *cms* genotypes with *Brassica nigra* cytoplasm are commonly described as unsuitable for the breeding due to the abnormalities in flower morphology, and lack of nectarines that makes *cms* plants not attractive for the pollinators.



**The aim of work** was the improvement of the seed effectiveness and curd quality of cauliflower genotypes with *B. nigra* cytoplasm. In 1999 four selected cauliflower genotypes with *B. nigra* cytoplasm as well as their maintainers were crossed with three good quality fertile cauliflower lines. In the consecutive generations back-crosses maintenance of sterility in *cms* lines and identification of homozygous, recessive *ms,ms* genes in the maintainer lines followed by the selection of the good quality traits. Simultaneously improvement of *B. nigra* cauliflower lines for flower structure, larger nectarines and screening for effective seed formation through selection process was performed.



No	Line	Flowers morphology	Mass of seeds/plant (g)	Seed effectiveness of male sterile plants in comparison to their fertile component (%)
1	AD2Y6	male sterile <i>B. nigra</i>	0,81	4,74
	BD2Y6	fertile maintainer	17,10	
2	AP417	male sterile <i>B. nigra</i>	9,70	35,50
	BP417	fertile maintainer	27,30	
3	AP36	male sterile <i>B. nigra</i>	5,20	13,47
	BP36	fertile maintainer	38,60	
6	AD294	male sterile <i>B. nigra</i>	4,04	9,18
	BD 294	fertile maintainer	44,00	
7	AD274	male sterile <i>B. nigra</i>	2,22	4,40
	BD274	fertile maintainer	50,40	
8	AD2Y2	male sterile <i>B. nigra</i>	1,70	3,72
	BD2Y2	fertile maintainer	45,60	
9	AD2Y7	male sterile <i>B. nigra</i>	1,54	4,83
	BD2Y7	fertile maintainer	31,86	
10	AP119	male sterile <i>B. nigra</i>	2,49	11,81
	BP119	fertile maintainer	21,10	
11	AP601	male sterile <i>B. nigra</i>	1,99	4,39
	BP601	fertile maintainer	45,28	
12	AP640	male sterile <i>B. nigra</i>	2,44	5,73
	BP640	fertile maintainer	42,66	
	APLA368	male sterile	10,59	27,44
13	BPLA36	fertile maintainer	38,60	
	APLA51113	male sterile	20,30	78,68
14	BPLA511	fertile maintainer	25,80	
	APLA5412	male sterile	5,20	17,45
15	BPLA54	fertile maintainer	29,80	

Seed effectiveness of cauliflower male sterile lines with *B. nigra* cytoplasm in comparison to their fertile maintainer

## RESULTS

In 2009 most of cauliflowers with *B. nigra* cytoplasm were vigorous with good commercial value. Generally, lines that possessed cytoplasm from *B. nigra* had lower seed productivity than the fertile lines. Most of the *cms* lines were characterized by smaller or more significant abnormalities in flower and seed stalk morphological structures that probably influenced their lower ability to set seed. However, male sterile lines with relatively higher seed setting effectiveness may be used in the future as parental components for breeding  $F_1$  hybrids. According to obtained results, *cms* system with *B. nigra* cytoplasm is reliable and feasible to maintain, however, *cms* lines with higher ability for generative propagation should be checked for their stability in consecutive generations.

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