

## RESEARCH ON THE VIGOR OF CORN HYBRIDS APPRECIATED BY UNIFORMITY BLOSSOMING AND PRODUCTION OBTAINED

**Todoran Camelia, Teodora Florian, Cristina Moldovan, V. Florian**

*University of Agricultural Sciences and Veterinary Medicine, Faculty of Horticulture,  
3-5 Manastur St., 400372, Cluj-Napoca, Romania; camtod\_2004@yahoo.com*

**Abstract.** This paper deals with the influence of age and calibration study on uniformity of flowering and seed production of hybrids obtained in the main grown in Transylvania. The research was conducted in the experimental field of the Research Station during 2009-2010 Jucu and biological material studied was created at SDCA Turda, including hybrids in production and future, namely: TURDA 201, Turda 200 and T-165. The results obtained show that the uniformity of flowering and yields obtained are not influenced by age and size of seeds, plants and flowering deparce between emergence respectively productions, involved too many growth factors that evens out differences in force.

**Keywords:** vigour, corn, uniformity of flowering, production

### INTRODUCTION

The seeds vigour is the sum of those seed traits that are not in repose and determine the potential level of the activities and performances of the seeds, or seed groups, during germination and germens development. The seeds with good results are named seeds with high vigour, and those with weak results seeds with low vigour (LAVATO et al., 2005).

Seed size is of great importance for agricultural practice as compared to the seed medium and especially large ones with a higher content of nutrients and better developed embryos, fail to give seedlings a better start, with a power of crossed higher growth and better development and thereby faster vegetative development unit, which ultimately reflects in a better production (BUCURESCU et al., 1992).

### MATERIAL AND METHOD

The trials performed during 2009 - 2010 were placed in the experimental field from the Station of Research and Development, Jucu, Jucu de Jos, located at 20 km in the North – Eastern part of the Cluj - Napoca municipality, on the national road Cluj – Dej - Bistrița.

The biological material studied was created la SDCA Turda from the hybrids that were in production and on perspective and namely: Turda 201-trilinear hybrid, semi early, created at SCDA Turda, group FAO 340, Turda 200 double hybrid, early, and Turda 165-trilinear hybrid, early, belonging to group FAO 270.

The specific technical norms stipulates that the processing of the corn seeds to be made through calibration on 4-6 calibres: large wide (LL) , large round (LR) ,Medium large (ML), medium round (MR) small large (SL) small round (SR). Because the seeds of the corn hybrids experimented through their genetic determinism produce only large and medium seeds, there have been taken into study only the first four calibres (LL<LR<ML<MR).

The blossoming uniformity of the corn plants is a qualitative index of the plants development and can be a guaranteed control of the maturation uniformity of these with all the advantages that may come after, for the mechanized harvesting and the uniform maturation of the beans in the process of producing seeds.

The blossoming uniformity was appreciated through grades from 1 to 10 for each hybrid from all the four calibres.

From each experimented parcel there were harvested all the cobs, which were weighted and reported per hectare. From each hybrid and calibre there were taken beans and rachis evidences at which was determined the humidity at harvesting.

After the calculation of the humidity through the classic procedure, the harvested production was corrected for a humidity of 15 %.

## RESULTS AND DISCUSSION

Uniformity of blossoming plant corn is a qualitative indicator of plant development and can be guaranteed uniformity control of their maturation the benefits of it, for mechanized harvesting and uniform maturity of grains in the production of seed.

The blossoming uniformity can reflect the raising uniformity and growth up to a certain point, but during the raising and development process of the plants there take place too much interference, interactions with the environment factors from their raising till blossoming. That's why a tight and direct correlation is hard to identify between calibres, raising vigour, growth and blossoming uniformity.

Table 1

The influence of the seed age in interaction with the genotype when sowing with different sizes of seeds in the two experimental years upon the uniformity of flowering

Experimenta l year	Year of seed obtaining	Hybrid	Calibre			
			LL	LR	ML	MR
2009	2006	T-201	7,25 cdefg	8,75 a	8,25 abc	8,25 abc
		T-200	8,50 ab	8,50 ab	8,25 abc	7,50bcdef
		T-165	7,25 cdefg	7,75abcde	8,25 abc	7,75abcde
	2007	T-201	7,00 defg	7,50bcdef	7,50bcdef	8,50ab
		T-200	6,75 efg	8,00 abcd	8,25abc	7,75abcde
		T-165	7,00 defg	6,75 efg	6,50 fg	7,25cdef
2007	2007	T-201	7,33 bc	7,33 bc	7,66 abc	7,66 abc
		T-200	7,66 abc	8,33 a	8,33 a	7,66abc
		T-165	7,33 bc	7,33 bc	7,33 bc	7,66 abc
	2008	T-201	7,66 abc	7,66 abc	7,66 abc	8,00ab
		T-200	7,00 cd	7,66 abc	7,66 abc	7,33bc
		T-165	7,00 cd	7,33 bc	6,33 de	7,00 cde

Nota 1 -uneven flowering Nota 9 – very uniform flowering

LL –large wide, LR – large round, ML – average wide, MR–average round

The appreciation of the differences after the multiple comparisons test (Duncan test) in the interaction between the year production of the seeds, the experimental hybrid and the seeds calibre, shows that the blossoming uniformity is not significantly influenced by none of these factors. Still in the case of hybrid T-165 the large round (LR), medium large (ML) and medium round (MR) calibres with the year of the seeds production 2007, from the experimental year 2009 and of the medium large (ML), medium round (MR)

calibres in the case of the seeds with the production year 2008 from the experimental year 2010, have lower values compared to the other two hybrids (Table 1).

In the interactions within the same hybrid there is no significant difference between the seeds year production, calibre and the blossoming uniformity (Table 1).

The corn production depends on the quality of the seed used at seeding, by the characteristics of the seeds mass, imposing that the seeds should have a high germinative capacity and a high purity percent.

Like in the case of the relation between the seed size, represented by its calibre and the blossoming uniformity, not even in the relation between the calibre and the obtained production we don't expect to important influences as a following of the complexity of the production factors that intervene between the seeding and the harvesting, period during which some of these plants may have a small advantage in vegetation in the first phytophases, a bigger vigour, these are vanishing, cancelling till the physiological maturation.

Table 2

The influence of the seed age in interaction with the size upon the yield Cluj-Napoca 2009

Year	Calibre	Kg/ha	%	Dif kg/ha	Significance
2006	LL	3779,58	100	0	Mt
	LR	3969,67	105,03	190,08	-
	ML	3690,92	97,65	-88,67	-
	MR	3517,25	93,06	-262,33	-
2007	LL	4044,25	100	0	Mt
	LR	3941,00	97,44	-103,25	-
	ML	3854,67	95,31	-189,58	-
	MR	4010,00	99,15	-34,25	-
DL (LSD) 5%				331	
DL 1%				441	
DL 0,1%				574	

LL – large wide, LR – large round, ML – average wide, MR – average round

The corn production obtained on the experimental parcels raise the productive potential of the hybrids for applied experimented agrophytotechniques. The productions that were between 3000-5000 kg/ha represent an acceptable level taking into consideration the conditions where was more followed the effect of the variability of the germination and raising process in the interaction of the studied factors, without being stimulated ,the intensification factors not realizing big productions: fertilizers, irrigation, density.

The statistic calculation of the obtained production in the experiments from 2009 through the method of analyzing the variation reflects an equalization of the harvested production from the variants seeded on different calibres (table 2), the differences between calibres every year being insignificant. Although the productions values on parcels are influenced by the hybrid with the production potential of each, within each hybrid, the calibre, like it was selected, doesn't modify the productions with significant differences over the limit of the experimental errors (table 3).

In the experimental year 2010 we can notice the same insignificant differences between experimented calibres, not only in the interaction with the seeds provenience year (table 4) and in the interaction of third order (provenience year, hybrid and calibre) (table 5).

Table 3

The influence of seed age in interaction with genotype and seed size upon the crop obtained  
Cluj Napoca 2009

Year of seed obtaining	Hybrid	Calibre	Kg/ha	%	Dif kg/ha	Significance
2006	T-201	LL	3760,25	100	0	Mt
		LR	3749,50	99,71	-10,75	-
		ML	4325,00	115,01	564,75	-
		MR	4076,00	108,39	315,75	-
	T-200	LL	4386,00	100	0	Mt
		LR	4800,50	109,45	414,5	-
		ML	4910,50	111,95	524,5	-
		MR	3875,75	88,36	-510,25	-
	T-165	LL	3192,50	100	0	Mt
		LR	3359,00	105,21	-166,5	-
		ML	3237,25	101,40	44,75	-
		MR	2914,33	91,28	-278,17	-
2007	T-201	LL	3687,00	100	0	Mt
		LR	3800,00	92,21	113,0	-
		ML	3641,00	98,75	-46,00	-
		MR	3176,00	86,14	-511,00	-
	T-200	LL	4877,75	100	0	Mt
		LR	5146,75	105,51	269,00	-
		ML	4699,25	93,34	-178,5	-
		MR	4256,25	87,25	-621,5	-
	T-165	LL	3568,00	100	0	Mt
		LR	3476,25	97,42	-91,75	-
		ML	3023,75	87,74	-544,25	-
		MR	3597,75	100,8	29,75	-
DL (LSD) 5%					573	
DL 1%					763	
DL 0,1%					995	

LL – large wide, LR – large round, ML – average wide, MR – average round

Table 4

The influence of the seed age in interaction with the size upon the yield Cluj Napoca 2010

Year	Calibre	Kg/ha	%	Dif kg/ha	Significance
2007	LL	4088,42	100	0	Mt
	LR	3928,00	96,10	-160,42	-
	ML	3936,50	96,94	-151,92	-
	MR	3902,25	95,44	-186,17	-
2008	LL	4065,50	100	0	Mt
	LR	4230,92	103,50	165,42	-
	ML	3991,58	98,18	-73,92	-
	MR	3907,83	96,12	-157,67	-
DL (LSD) 5%				204	
DL 1%				271	
DL 0,1%				354	

LL – large wide, LR – large round, ML – average wide, MR – average round

Table 5

The influence of seed age in interaction with genotype and seed size upon the crop obtained Cluj Napoca 2010

Seed obtaining year	Hybrid	Calibre	Kg/ha	%	Dif. kg/ha	Significance
2007	T-201	LL	4408,00	100	0	Mt
		LR	4185,75	95	-222,3	-
		ML	4069,25	92,3	-338,8	-
		MR	4118,50	93,43	-289,5	-
	T-200	LL	4787,25	100	0	Mt
		LR	4631,75	105,1	-155,5	-
		ML	4725,50	98,71	-61,75	-
		MR	4775,75	99,75	-11,5	-
	T-165	LL	3070,00	100	0	Mt
		LR	2966,50	96,62	-103,5	-
		ML	2914,75	94,94	-155,25	-
		MR	2812,50	91,61	-257,5	-
2008	T-201	LL	4337,00	100	0	Mt
		LR	4563,75	105,22	226,75	-
		ML	4286,75	98,84	-50,25	-
		MR	4106,50	94,68	-230,5	-
	T-200	LL	4878,25	100	0	Mt
		LR	5085,25	104,24	207,00	-
		ML	4874,25	99,91	-4,0	-
		MR	4784,25	98,07	-94,00	-
	T-165	LL	2981,25	100	0	Mt
		LR	2843,75	95,38	-138,1	-
		ML	2713,75	91,02	-267,5	-
		MR	2732,75	91,66	-248,5	-
DL (LSD) 5%					353	
DL 1%					470	
DL 0,1%					612	

LL – large wide, LR – large round, ML – average wide, MR – average round

## CONCLUSIONS

The blossoming uniformity is not influenced by the calibres or the seeds age within the same hybrid, between the plants raising and the blossoming there intervene too many factors of rising that homogenizes the vigour differences at rising.

A positive correlation between the intensity of the respiratory process and seeds size represented by all four calibres with decreasing values of the respiration intensity with seed reducing, was recorded.

## REFERENCES

1. Bucurescu N., D. Roman, P. Croitoru, C. Negruț, 1992 - Sămânța și pregătirea acesteia pentru însămânțare, Ed. Ceres București.
2. Lavato A, N. Balboni, 2005- Seed Vigour in Maize (*Zea mays*), University of Bologna, Italia.