RESEARCH REGARDING THE INFLUENCE OF THE SEEDS AGEING AND CALIBRATION ON CORN PLANTS RAISING OBTAINED FROM THE MAIN HYBRIDS CULTIVATED IN TRANSYLVANIA

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Abstract:. *The paper deals with the study of the influence of the seeds ageing and calibration on the percent of the raised plants at the main hybrids cultivated in Transylvania. The age of seed is an important factor which depends on the capacity of germination and seed. During seed aging, significant changes occur from the accumulation of substances inhibiting growth, metabolic breakdown of reserve substances, proteins and lipids distortion, while abnormal increase germs, reduce germination ability and can be reached in Finally the death of all germs. Seed size expressed usually by 1000 grain weight (MMB) that are directly related, is of particular importance to agricultural practice as compared to the seed medium and especially large, having a higher content of nutrients and better embryo develop, manage to give seedlings a better start, with a higher power to travel with a rooting, growth and better development. The correlation between the indications established through laboratory analyses and field raising represents an important part of the control of the seeds vigour. The raising uniformity was made through the daily counting of the plants raised for three days and was expressed through the percent of the plants raised every day, at those three experimental hybrids from four calibrations of the seed derived from different years of obtaining. Research has been conducted in the experimental field of Jucu Research Station during the years 2007-2008, and biologic material taken into study was created at SDCA Turda from hybrids that were in production and on perspective hybrids that were in production and on perspective , namely: Turda 201-trilinear hybrid, semiearly, created at SCDA Turda, group FAO 340, Turda 200 double hybrid, early, registered in 1976, reinscribed in The Official Cataloque in 2000 and Turda 165-trilinear hybrid, early, belonging to group FAO 270. The obtained results show that the ageing of corn seeds and their caliber may influence the raising rhythm of the plants at the hybrids cultivated through the production conditions, maturation and keeping from the production year until the insemination year.*
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Key words: *corn, old, caliber, sunrise*

INTRODUCTION

The seeds ageing is an important factor on which depends the vigor potential, appreciated through cold test. The notion measures the age of the seeds, starting from the moment when they reach the physiological maturity; in this moment the vitality of the seeds is maximum.

During the ageing of the seeds important changes are produced, starting with the accumulation of inhibitory substances of raising, of the metabolic putrefaction of the substituted substances, deterioration of proteins and lipids; meanwhile the number of abnormal germs raises, the germination capacity is reduced and can finally lead to the death of all the germs.

The seeds size has a significant importance for the agricultural practice, because, comparative with the medium seeds and especially with the large ones, having a higher content of nutritive substances and embryos better developed, they succeed to give plantlets with a better start, with a superior power of covering, better raising and development and , as a

consequence a quicker development of the vegetative apparatus that finally leads to a better production (BUCURESCU et colab., 1992).

In the same time with the improvement of the insemination methods there has been created the necessity of using some uniform seeds, fact that imposed the calibration and the division in many classes after 2 or more dimensions of the seeds. Through calibration it has been assured a bigger uniformity of the measure or the density of the seeds, what allows a precise insemination with the help of insemination machines, respectively their distribution at the same distance and depth (MUNTEAN L.S. et colab, 2008).

Through sorting and calibration it is assured a more uniform raising, fact that allows an earlier application of the maintaining and protection works. If when they are sorted ,the separation of the peeled seeds in groups is made based on one of their characteristics: thickness, width, specific mass, length and thickness-at calibration, for the division of groups, there are used 2 dimensions: length and thickness, length and width. The corn calibration is made with the help of the machines equipped with plain sites or circular sites.

The specific technical norms stipulates that the processing of the corn seeds to be made through calibration on 4-6 calibers: 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 calibers(LL<LR<ML<MR).

It can be said that through calibration it is assured a bigger uniformity of the corn seeds, fact that assures a more correctly insemination, an economy of seeds and a uniform raising, with all the favorable consequences which derives from here for the maintenance and the protection of that culture (MOLDOVAN, 2001).

MATERIALS AND METHOD

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, registered in 1976, put back in The Official Catalogue in 2000 and Turda 165-trilinear hybrid, early, belonging to group FAO 270.

The calibres used within the present study are those used in selection and sorting stations for corn in Romania.

LL- large wide

LR – large round

ML – average wide

MR – average round

The raising uniformity was made through the daily counting of the plants raised for three days and was expressed through the percent of the plants raised every day, at those three experimental hybrids from four calibrations of the seed derived from different years of obtaining.

RESULTS AND DISCUSSION

Analyzing the influence of the seeds caliber on the percent of raising plants we notice that ,on average ,on those three experimented hybrids the highest values of the raising at those three dates of appreciation is registered at the wide large caliber (LL), and finally at the last date of appreciation of the percent of the raising plants the differences between the calibers vanish. Still the seeds size from the medium round caliber (MR) doesn't succeed to reach the percent level of raising plants at the calibers with bigger dimensions (table 1).

Table 1

Influence of size of maize seeds upon the percentage of plant emergence in the two experimental years

Calibre	% sprang plants					
	Experimental year 2007			Experimental year 2008		
	07.06.06	08.06.06	09.06.06	07.06.06	08.06.06	09.06.06
LL	65 a	90 a	96 ab	56 a	70 a	82 a
LR	50 b	70 b	93 ab	50 b	66 a	80 a
ML	49 bc	76 b	96 a	43 bc	56 b	73 b
MR	43 c	70 b	93 b	40 c	50 c	68 b

LL – mare lat (large wide)
LR – mare rotund (large round)
ML – mediu lat (average wide)
MR–mediu rotund(average round

Table 2

The springing rythm of maize hybrids of seeds from different years of production in the two experimental years

Experimental year	Year of seed obtaining	Hybrid	% sprang plants		
			07.06.06	08.06.06	09.06.06
2007	2005	T-201	42 cd	69 c	90 b
		T-200	62 a	89 a	98 a
		T-165	50 bc	78 b	98 a
	2006	T-201	61 a	80 b	98 a
		T-200	59 ab	86 ab	96 ab
		T-165	37 d	66 c	96 ab
2008	2006	T-201	77 a	83 a	89 a
		T-200	56 c	63 b	75 b
		T-165	32 f	44 c	70 d
	2007	T-201	67 b	82 a	89 a
		T-200	45 d	59 b	75 b
		T-165	37 e	40 c	77 c

From the practical point of view this aspect can have special significance. If at the medium round caliber (MR) there are added unfavorable climatic conditions during the raising period, the using at the insemination of the calibrated seeds, from the wide large (LL) and large round (LR) calibers can have a decisive influence on the raising and the development of the corn plants.

The wide large caliber (LL) presented the highest values of germination and in laboratory conditions for all the experimented hybrids, fact which makes us consider that in the conditions of sufficient quantities of hybrid corn seeds, the using of the wide large caliber (LL) leads to corn lots quickly and completely raised (table 1).

In the interaction between the provenience year of the seed X the experimental hybrid under the aspect of the percent of the raised corn plants ,we notice an obvious difference between the values of the two experimental years (2006 and 2007) (table 2).

Comparing with hybrid T-201 taken as a witness, the hybrid T-200 registers significant differences of raising at those three consecutive dates of appreciation, the values

being progressively higher with the duration of the appreciation interval, in this year the hybrid T-200 being the most constant and the most consequent during the raising rhythm.

Table 3

Influence of the age of maize seeds in interaction with seed size upon the percentage of emerged plants in the two experimental years

Experimental year	Year of seed obtaining	Calibre	% sprang plants		
			07.06.06	08.06.06	09.06.06
2007	2005	LL	61 ab	87 ab	99 b
		LR	53 bc	74 c	95 ab
		ML	52 c	79 bc	98 a
		MR	39 d	74 c	92 b
	2006	LL	68 a	93 a	95 ab
		LR	47 cd	71 c	99 ab
		ML	47 cd	73 c	99 a
		MR	47 cd	71 c	95 ab
2008	2006	LL	60 a	69 ab	86 bcd
		LR	56 a	71 a	80 abc
		ML	46 b	57 c	74 cde
		MR	44 bc	56 c	70 de
	2007	LL	58 a	71 a	87 a
		LR	44 bc	63 bc	83 ab
		ML	45 bc	60 c	72 cde
		MR	39 c	47 d	67 e

LL – mare lat (large wide) ML – mediu lat (average wide)
LR – mare rotund (large round) MR–mediu rotund(average round)

Table 4

Influence of genotype in interaction with seed size in the two experimental years upon the percentage of emerged plants

Hybrid	Calibre	Experimental year 2007			Experimental year 2008		
		07.06.06	08.06.06	09.06.06	07.06.07	08.06.07	09.06.07
T-201	LL	64 ab	87 ab	98 ab	82a	91 a	95 a
	LR	54 bcd	72 cde	94 abc	71 b	89 a	90 ab
	ML	46 def	72 cde	96 abc	67 bc	75 b	89 ab
	MR	41 ef	67 e	90 c	69 bc	74 b	82 bc
T-200	LL	74 a	97 a	94 abc	61 cd	71 bc	81 bc
	LR	55 bcd	81 bcd	98 ab	55 de	65 c	79 c
	ML	61 bc	87 ab	99 ab	48 e	63 c	78 cd
	MR	51 cde	83 bc	99 ab	37 f	44 de	62 e
T-165	LL	55 bcd	85 ab	99 ab	34 f	49 d	68 de
	LR	40 ef	66 e	97 ab	24 g	47 d	73 cd
	ML	41 ef	71 de	96 a	23 g	37 e	52 f
	MR	38 f	67 e	92 bc	19 g	37 e	61 ef

LL – mare lat (large wide) ML – mediu lat (average wide)
LR – mare rotund (large round) MR–mediu rotund(average round)

The plants raised from the seeds of the hybrid T-165 from those three years of production and in those 2 experimental years are significantly negative to the hybrid T-201, after the first appreciation intervals, and in the years favorable to the production of the hybrid seeds, like 2004, can finally germinate as well as hybrids T-201 and T-200.

The hybrid T-165 remains a more sensitive hybrid at the germination factors, and field experiences confirms the research made in laboratory and the fact that this hybrid has the lowest vigor values and that it has to be inseminated in very good agrofitotechnique conditions at the end of the insemination period..

We can say that hybrid T-200 proves to be one of the most valuable hybrids created at Research Station Turda because it answers even from the raising point of view to the requests of the corn producers for consuming. His value and constancy in production determined its maintenance for over 20 years in the system of seed production from Transylvania and Moldavia (table 2).

The corn seeds ageing and their caliber can influence the raising rhythm of the plants at the hybrids cultivated through the conditions of producing, maturation and keeping from the production year till the insemination year.

We may notice that the plants derived from the seeds of the large wide (LL) and large round (LR) calibers have a better raising rhythm at all those three appreciation dates, than the plants derived from medium large (ML) and medium round (MR) calibers, what makes us consider that the separation of the seeds on calibers can have a beneficial effect on the raised plants and the evolution of the corn culture (table 3).

Analyzing the influence of the seeds calibers on the percent of raised plants in 2006, we notice that the highest values of the raising at all those three appreciation dates it is registered at large wide caliber (LL) , and finally at the last date of appreciation of the percent of the raised plants, the differences between the calibers disappear, remaining insignificant comparing with the large wide caliber (LL) and the only differences of raising appreciated with values significant negative it is registered the medium round caliber (MR) from the hybrids T-201 and T-165 (table 4).

CONCLUSIONS

The percent of the raised plants on the field as a mark of the seeds vigor is correlated with their calibers, the highest values of the raising at those three appreciation dates being registered at the large wide caliber (LL) .

Although after 3 days of appreciating the raising of the plants the differences between the calibers mostly vanish, the caliber with the smallest size of the seeds, medium round (MR), doesn't succeed to recover the level of the percent of the raised plants from the calibers with larger dimensions.

The large wide (LL) and large round (LR) calibers have a decisive influence on the percent of the raised plants, and the using of some larger seeds at insemination would lead to the forming of some corn lots raised completely and quickly.

From the experimented hybrids, T-200 proved to be the most constant one and T-165 remains more sensitive to the germination and raising factors, having the lowest value regarding the vigor and the raising and as a consequence it will have to be inseminated at the end of the optimal period in some better agrofitotechnique conditions.

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