RESEARCH CONCERNING THE INFLUENCE OF THE NITROGEN FERTILIZING ON THE SPROUTING AND GROWING VIGOU UNIFORMITY IN THE MAIN MAIZE SEEDS HYBRIDS CULTIVATED IN TRANSILVANIA

CERCETĂRI PRIVIND INFLUENȚA FERTILIZĂRII CU AZOT ASUPRA UNIFORMITĂȚII DE RĂSĂRIRE ŞI VIGORII DE CREŞTERE LA SEMINȚELE DE PORUMB LA PRINCIPALII HIBRIZI CULTIVAȚI ÎN TRANSILVANIA

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Abstract: *The study of the nitrogen fertilizing influence during maize seeding on the sprouting and growing vigor uniformity in the main hybrids cultivated in Transylvania, using different calibers seeds, is presented in this paper. This study was performed starting from the assumption that ammonium nitrate dissolution near maize seeds is an endothermic process and this could influence the germination processes and manifestation of their vigor. Experimental results obtained shows that nitrogen application on the sowing line may have contradictory effects. Nitrogen large seed induced a reduction in the rate of sprout vigor and growth, and seed size smaller growing stimulates growth and vigor of plants.*

Rezumat: *Lucrarea se ocupă cu studiul influenței fertilizării cu azot concomient cu semănatul porumbului asupra uniformității de răsărire şi vigorii de creştere la principalii hibrizi cultivați în Transilvania, din seminţe de calibre diverse. Scopul acestui studiu a pornit de la faptul că solubilizarea azotatului de amoniu lângă seminţele de porumb se face cu absorbție de căldură şi acest fapt ar putea influența procesele de germinare şi de manifestare a vigorii acestora. Rezultatele experimentale obținute ne arată că aplicarea azotului pe rândul de semănat poate avea efecte contradictorii. La seminţele de dimensiuni mari azotul (LL şi LR) induce o reducere a ritmului de răsărire şi a vigorii de creştere, iar la seminţele de dimensiuni mai mici (ML şi MR) stimulează răsărirea şi vigoarea de creştere a plantelor*

Key words**:** *maize, hybrid, calibration and nitrogen fertilizing*
Cuvinte cheie: *porumb, hibrid,calibrare şi fertilizare*

INTRODUCTION

The size of the seeds has special importance for the agricultural practice because compared to small and middle size seeds, the big ones have higher content in nutritional substances, better developed embryos, succeed to deliver plantlets with better start and superior penetration power, good growing and development rhythm, and through this, a faster development of the vegetative apparatus, finally reflected into higher production (BUCURESCU et al, 1992).

By sorting and calibration high maize seed uniformity is supplied and this allows more correct seeding, seed economy, as well as uniform sprouting, with lots of favorable consequences for the culture maintaining and protection (MOLDOVAN, 2001).

The solidification of the ammonium nitrate can be explained by its considerable hygroscopic capacity and high solubility in water, which increases with temperature. The

solubilization is an endothermic process, and for this reason the presence of the ammonium nitrate close to sprouting maize seeds could produce harmful effects during their germination.

MATERIALS AND METHOD

The biological material taken into study was obtained at SCDA Turda, among the hybrids from the production site and in perspective, the hybrids TURDA 201, TURDA 200.

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

Table 1

Weight of 1000 seeds depending on the hynbrid, the calibre of seed

Hybrid	Calibre	Descrier	Calibration sizes	MMB
HT T-201	LL	Large wide	oblong shape passes through 7 mm sieve, but not on 5 mm sieve	357,58
	LR	Large round	round shape does not pass through 7 mm sieve	328,09
	ML	Average wide	oblong shape passes through both 7 mm and 5 mm sieve	308,57
	MR	Average round	round shape passes through 7 mm sieve, but not on 5 mm sieve	290,09
HD T-200	LL	Large wide	oblong shape passes through 7 mm sieve, but not on 5 mm sieve	411,46
	LR	Large round	round shape does not pass through 7 mm sieve	375,23
	ML	Average wide	oblong shape passes through both 7 mm and 5 mm sieve	349,32
	MR	Average round	round shape passes through 7 mm sieve, but not on 5 mm sieve	326,35

The both hybrids maize seeds, calibrated by experimental sizes were seed at 6 cm depth simultaneously with application of 50, 75 and 100 kg/Ha nitrate doses as ammonium nitrate.

The sprouting uniformity was estimated by counting the sprout plants, and plant vigor was scored from 1 to 9, the mark 9 corresponding to maximum vigor at 7 days after sprouting (in two leaves phase) and in 11 leaves phase.

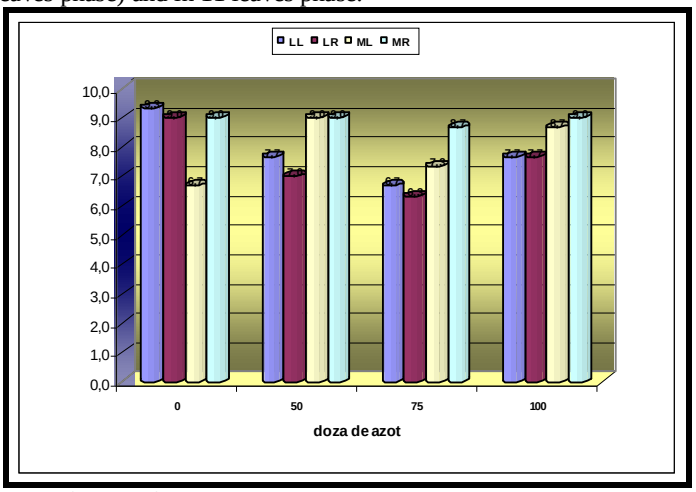

Figure 1. The influence of amonium nitrate and seed size with T 201 hybrid upon the emergence rhythm

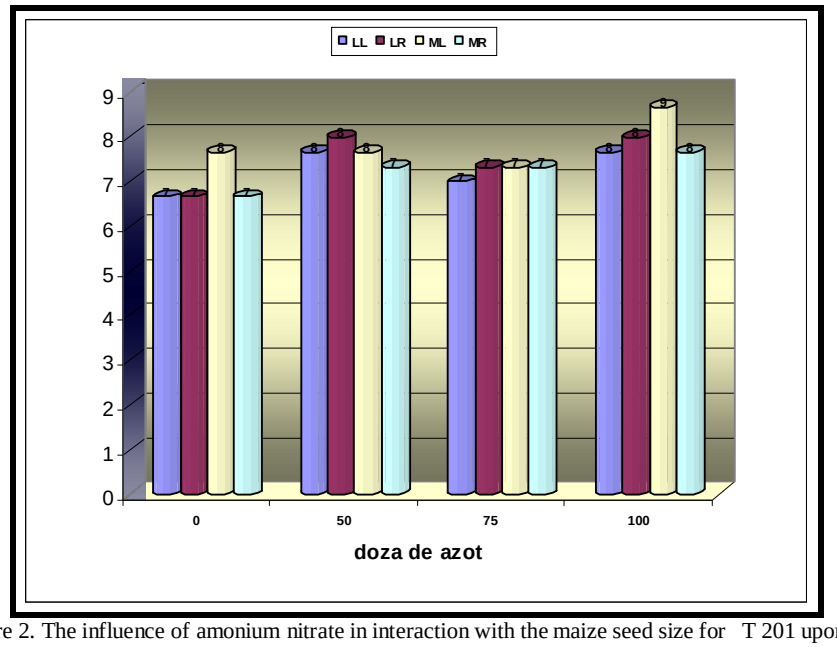

Figure 2. The influence of amonium nitrate in interaction with the maize seed size for T 201 upon the vigor of growth 7 days after emergence

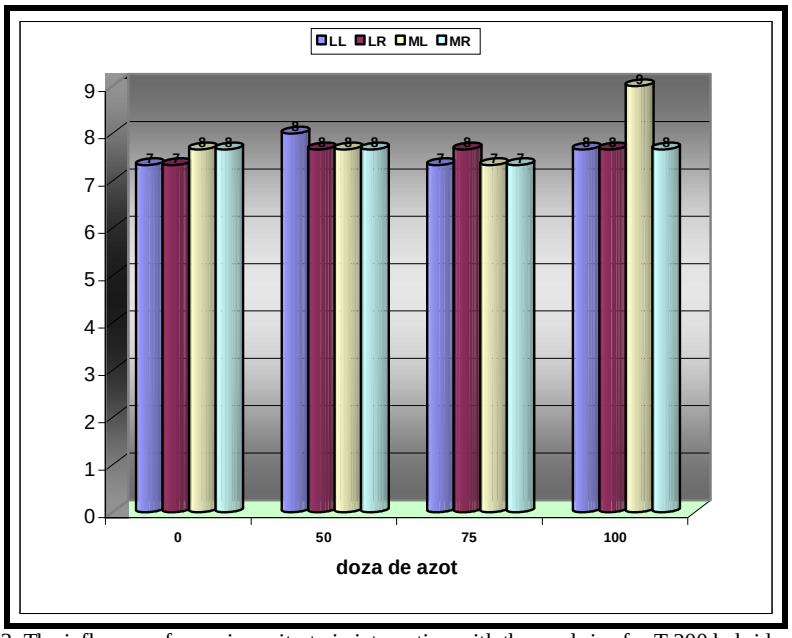

Figure 3. The influence of amonium nitrate in interaction with the seed size for T 200 hybrid upon the vigor of growth in the 7th day from the emergence

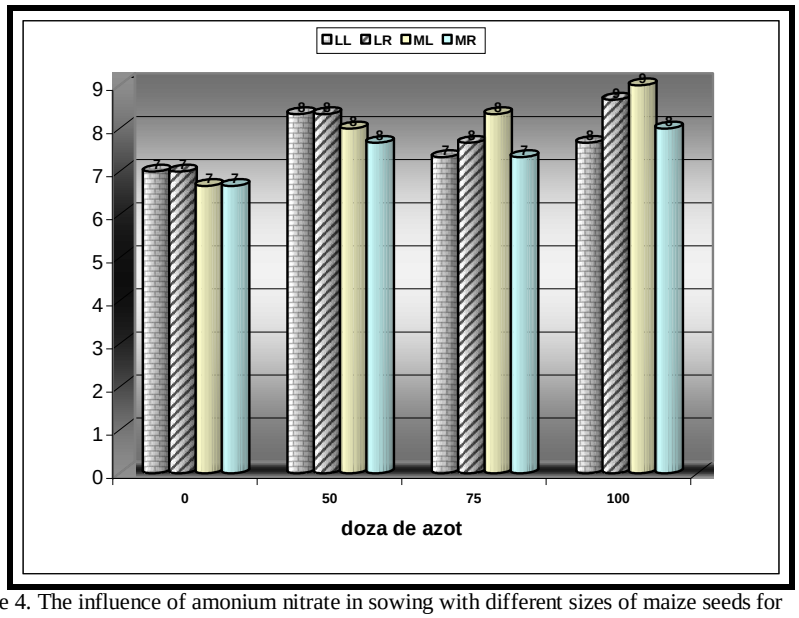

Figure 4. The influence of amonium nitrate in sowing with different sizes of maize seeds for T 201 hybrid upon the vigor of growth in the phase of 11 leaves

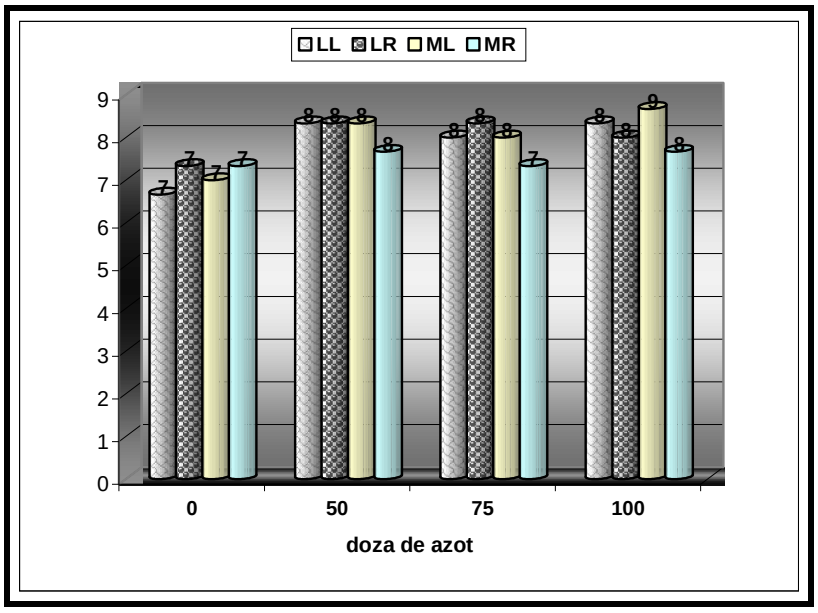

Figure 5. The influence of amonium nitrate in sowing with different sizes of seeds for T 200 hybrid upon the vigor of growth in the phase of 11 leaves

RESULTS AND DISCUSSION

Compared to the values of the sprouting rhythm recorded in the nitrogen unfertilized plot, where maximum values are recorded, in big width (LL) and big round (LR) calibers, ammonium nitrogen closet o the germ with cooling effect upon the micro zone or slight phytotoxicity, seems to reduce the sprouting rhythm which germinate first and where the ammonium nitrogen effect could be stronger (figure 1). The effect is visible and 2 - 2.5 points less scored compared to the unfertilized variants.

The smaller calibers, medium width (ML) and medium round (MR), respectively, with a slight late germination could be stimulate for germination is the ammonium nitrate is solved in soil water with 1 - 2 days later than the phase of maximum germ sensitivity.

In this way, the high sprouting rhythm recorded in nitrogen fertilized variants in plots seed with maize seeds of medium width (ML) and medium round (MR) can be explained (figure 1).

The ammonium nitrate fertilization by seeding row does not produce visible major effects on the growing vigor at 7 days from sprouting whatever applied nitrogen doses. The score differences are small, and could be hardly take into consideration (figures 2 and 3).

The visible increase of the vigor was recorded in the fertilized variants within the third degree interaction - seeding row x seeds caliber x maize hybrid - when the ammonium nitrogen was applied on the soil, where up to the phase when the plants form 11 leaves, the supplying of the nitrogen from fertilizer applied by row begins to be visible.

As consequence, the plant vigor is determined by this supplementary nitrogen supplying for all doses applied in both hybrids T-201 (figure 4) and T-200 (figure 5).

CONCLUSIONS

The nitrogen application as ammonium nitrate in the mean time with seeding had a contradictory effect on seeds sprouting and vigor. While in big seeds of big wide (LL) and big round (LR) calibers, which faster and more robust germinate, it induces a reducing of the sprouting level and slightly influences the vigor, in smaller seeds of middle wide (ML) and middle round (MR) calibers, that lately germinate, it stimulates the sprouting because slowly sprouting they find the toxic ions more diluted in the soil solution without phyto-toxic effect, even stimulating after 1 – 2 days delaying of the fertilizers dissolving in soil.

The effect of nitrogen application on the different calibers and hybrids seeds is smaller after 7 days from sprouting, the plants vigor being similar for all interactions.

LITERATURE

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