

TOTAL CHANGE IN GERMINATION AND VIGOR OF CERTIFIED COMMERCIAL SEEDS OF THREE ZP MAIZE HYBRIDS DURING FIVE YEARS (2018-2022)

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INTRODUCTION

Maize is the most widely cultivated plant species in Serbia, and it is used both to satisfy domestic needs and to supply the foreign market. It is in the interest of every company to produce high-quality seed that it will then be able to market. It is known that corn seeds maintain their initial quality for a very long time and, under controlled conditions, can maintain germination for up to 10 years. When stored in good storage conditions, corn seeds retain high germination for 2 to 4 years (Jevtić, 1986). Seed germination refers to the tested and determined germination energy and germination of seeds from a sample of one lot of seeds in laboratory conditions. Germination energy represents the number of normal seedlings in relation to the number of seeds placed for germination, determined after the expiration of the time provided for the first evaluation, that is, the determination of germination energy. The quality of the seed lot is important for production, processing, seed storage, commerce, and farmers, as well as for agencies responsible for seed quality control and state authorities (Lekić, 2001).

MATERIAL AND METHOD

In the research, three commercial hybrids of the Maize Research Institute "Zemun Polje" (ZP 600, ZP 704, ZP 873) were used, in which germination and vigor were examined in five years (2018-2022). The standard germination test was used, which serves as an indicator of seed behavior in optimal conditions for germination. Germination was tested using the filter paper method where 100 seeds from each lot were germinated in the incubator in 4 replicates. The treatments were exposed to an alternating temperature of 20°C<=>30°C, with the lower temperature lasting 16 hours and the higher temperature lasting 8 hours. The light regime was also applied alternately (16h dark/8h light). Germination energy was assessed after four days by determining the number of normally developed seedlings from the total number of seeds placed on the filter paper. Total germination was determined on the seventh day from the beginning of germination.

DISCUSSION

The germination and vigor of all tested corn hybrid seed lots were tested once a year. The results are presented in the form of the average values of the lots for each hybrid for five years. At the beginning of the examined period (2018), all three hybrids had high vigor and germination (ZP 600 – 98.30%, ZP 704 – 98.80%, and ZP 873 – 100.00%). In the following year (2019), vigor and germination decreased by 0.30% in hybrids ZP 600 and ZP 704, and hybrid ZP 873 by 2.00%. During 2020, a slight decrease in germination and vigor was found in all three hybrids (ZP 600 - 97.60%, ZP 704 - 98.50%, ZP 873 - 98.00%), i.e. by 0.70%, 0.30%, and 2.00%, respectively, from the initially determined germination during the first year (2018). In 2021, vigor and germination decreased in hybrids ZP 704 (96.20%) and ZP 873 (95.00%), while in hybrid ZP 600, the values did not change.

At the end of the examined period (2022), the total vigor and germination in the hybrids ZP 704 (92.70% / 93.70%) and ZP 873 (88.00% / 94.00%) significantly decreased compared to the beginning, while in the hybrid ZP 600, both values were above 95% (96.00%). Hybrid ZP 600 showed the smallest change in total germination and vigor during the examined period, which was 2.30% (98.30% in 2018 and 96.00% in 2022).

The regression curve for all three hybrid trials shows a linear decrease in germination and germination energy from 2018 to 2022 (Fig. 1). The hybrid ZP 600 had the lowest regression coefficient ($b=-0.5$) of all tested hybrids, indicating a gradual and small decrease in the germination and vigor of its seeds. In the first three years of testing, the hybrid ZP 704 showed a very small decrease in germination and vigor, but they started to decrease rapidly in the fourth year (Figure 1). The hybrid ZP 873 saw the greatest decrease in vigor and germination, as seen by the steep regression curve, especially over the last two years of testing ($b = -1.5$ and $b = -2.7$ for germination and vigor, respectively).

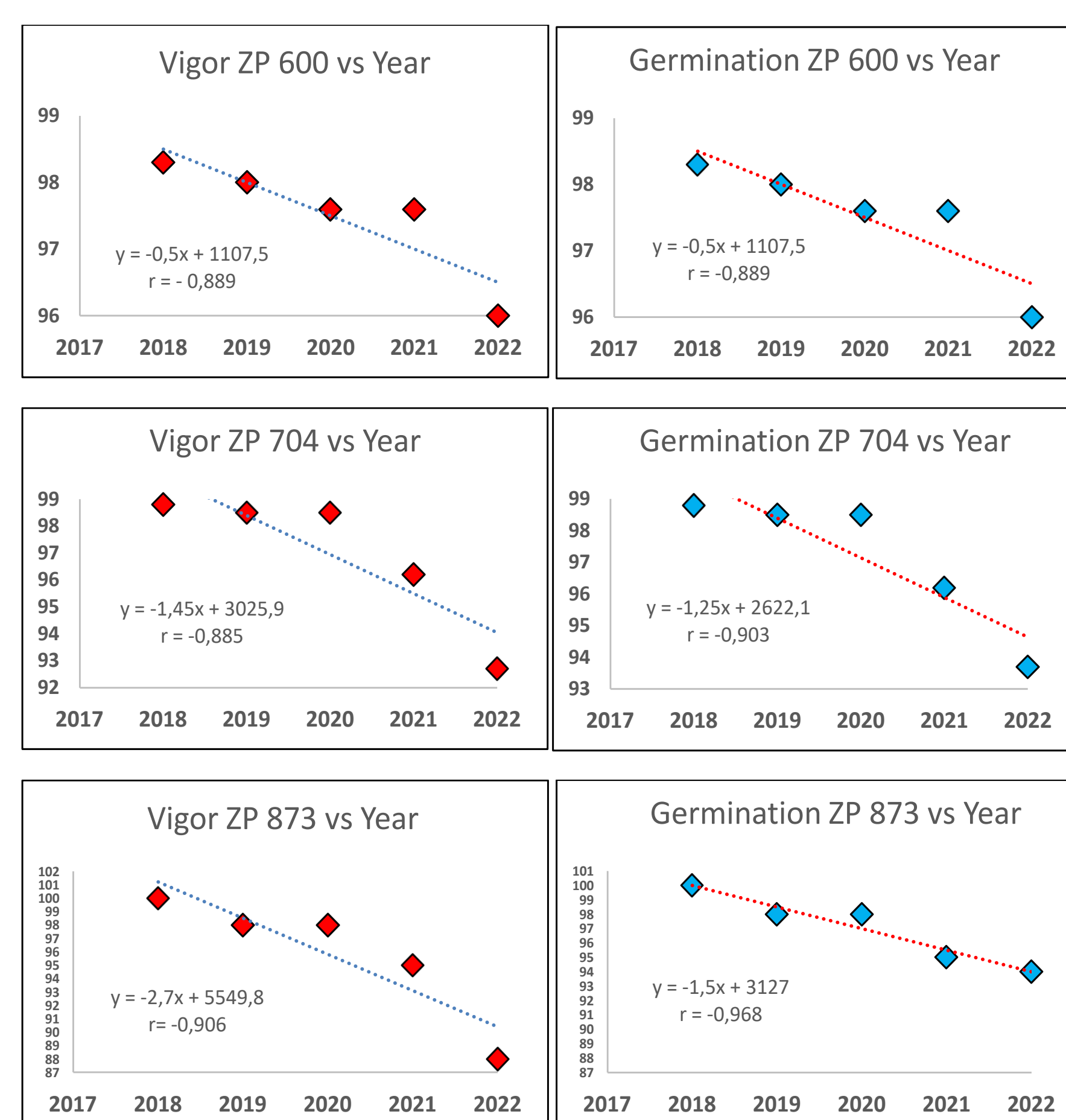


Fig.1. Change in germination and germination energy of ZP hybrids in the period from 2018-2022

CONCLUSION

Storage conditions for five years were suitable for corn seeds, which led to the fact that germination and vigor did not fall below the permitted values for seed trade.

Key words: maize, germination, vigor.