UDC 633.15: 631.53.01: 631.56

M. Kirpa,
doctor of agricultural sciences
M. Stiurko, L. Bondar
DU Institute of Agriculture of the steppe zone of NAAS

Influence of postharvest processing on quality of seeds of hybrids of corn in conditions of corn-processing factory

Goal. To determine the influence of post harvest processing technological processes in the conditions of a domestic plant on the crop and yield properties of maize hybrids seeds. Methods. Laboratory-analytical, experimentally field, statistical. Results The basic reasons of deterioration of quality (trauma of seeds and impurities of self-immolation) and high-quality features of hybrids with different stability during processing are established. Conclusions In the conditions of a typical plant, the quality of wreckage was the most degraded in the operations of throwing and cleaning - the sorting of seeds, which need improvement and technical modernization.

Key words: maize, post-harvest processing at the plant, similarity and seed yield, hybrid.

Corn seeds is preparing for a rather complicated after-harvesting technology at special maize factories. The complexity of the technology lies in the large number of operations that must be carried out under mandatory regulations on certain machines. Up to 10 main operations include: purification (clearing) and sorting of cobs; their drying and threshing; primary and secondary purification of seed material; calibration and enrichment of separate fractions; chemical processing, packing and packing of seeds. All operations affect the condition and quality of the seeds, its varietal, crop and yield properties [2, 11].

Domestic maize factories of their time were built on the basis of a single ideological and technological and technological scheme, which provided for a permanent order of operations from the state of acceptance of the ovens to the packaging of the finished products, that is, a typical processing scheme. Therefore, most domestic plants are equipped with identical machines, similar to operating modes. They differed only in seasonal capacity, which was 0.75; 1.5; 2.5; 5 and 10 thousand tons of seeds. Later, plants were constructed with a capacity of 0.25; 0,5 and 1,0 thousand tons for the processing of parental forms of hybrids. For the factories, a manual and methodological recommendations have been developed, based on the technology of seed processing of first generation, varieties and source hybrid components of hybrid maize hybrids [1, 5].

The analysis of the work of the factories shows that during processing, the quality of seeds is significantly altered due to the impact of various technical and technological factors and operations that accompany the process. It is noted that individual operations to some extent affect such important quality indicators as cleanliness, humidity, integrity, germination energy and seed germination. Therefore, the sowing material should be prepared taking into account and improving the very operations that are most closely connected with the formation of the quality of the seed. However, data on the impact of post-harvest processing operations on seed yields and yield properties of seeds are incomplete and contradictory.

The purpose of the research is - to investigate and introduce the quality of maize seed hybrids, to identify the operations that have the greatest impact on the processing process at a corn plant with a typical seed preparation scheme.

Research methodology. The research of the effect of post-harvest processing operations was carried out under conditions of a maize-processing plant with a seasonal capacity of 500 tons of seed located in the State Enterprise "DH Dnipro" (Dnipropetrovsk region). The plant is a type because it has a standard set of machineries and process equipment. During the treatment, after each operation, samples of seeds were selected, which determined the quality indices - humidity and purity, the level of seed trauma, germination energy, germination, yields of the sowing material by the accepted methods [4, 6, 7 - 9] . The trauma and similarity of cold sprouting were determined according to the methodologies developed by the Institute [3,

10]. In the following years, the hybrids of the selection of the Institute were studied: Dniprovsky 181 JV, Khmelnitsky, Soloniansky 298 JV, Zbruch.

Research results. In the process of processing at the plant, the quality of the seeds varied depending on the hybrids and the technological operation (Table 1).

1. Quality of seeds of hybrids of maize depending on processing processes at the plant (2012-2014).

For example, drying did not decrease, but even somewhat increased the similarity and yield properties of seeds of all studied hybrids. The thawing of dry swamps affected the quality negatively, the similarity of cold germinating decreased by 12%, field strength - 10%, yields - by 0.75 t / ha compared with the previous operation - drying.

Purification - sorting according to the hybrids has a different effect on the quality of the seeds. In the hybrids Khmelnitsky and Solonianskii 298 SR, while the similarity and yield properties of the seed increased, the quality of the hybrid Dnieper 181 JV deteriorated; the quality of the Zbruch hybrids did not change in line with the quality of the seeds obtained due to the threshing of the swaths. Such a different effect can be explained by the special condition of the seeds of hybrids, their level of trauma and the content of self-immolation, on which they differed among themselves.

2. Corrosivity of seeds of hybrids of corn during their processing at the plant (2013 - 2014),%

3. Quality of seeds of hybrid maize Dniprovsky 181 SV depending on the process of post-harvest treatment and year of harvesting

Drinking was effective for all hybrids, it increased the field similarity by 4-13%, yields - 0,17 - 0,92 t / ha (2,4 - 15,2%). However, the level of efficiency was different: hybrids of the Dniprovsky 181 and Solonian 298 JI showed that the quality indicators after drilling improved to the level of the indicators at the drying stage, while the quality of the hybrids Khmelnytsky and Zbruch did not reach the conditional level.

Among the hybrids studied, the Solonian 298 SV proved to be the most stable in the processing process at the plant, the similarity and yield properties of which were reduced to the smallest extent compared with others.

One of the main causes of quality deterioration in the post-harvest treatment process was injury to the seeds (Table 2). The most traumatized in the experiments were the hybrids Khmelnitsky and Zbruch, in which the motorcycles made 14,1 and 13,4%, micro-injuries - 40,8 and 39,4% respectively. The hybrid Dnieper 181 CB was significantly damaged as a result of the siliceous-tooth-like structure of the seed. Seeds of this type were more damaged during the drying process, that is, they received a micro trauma during rapid decay in the form of thermal cracking. However, the macrotraum of mechanical nature, it received less, since the silica-seed-like seed is harder and more resistant to mechanical loads.

The quality of the seeds in the post-harvest treatment process also varied depending on the year of harvesting of hybrids (Table 3). During the study of the quality of the seeds of the hybrid Dnieper 181 JI collected in 2010 and 2013, it has been established that the seeds of the 2010 harvest were only 1-4% higher than the standard sprouting, the cold - by 5-16%, the field similarity - by 3 - 14%, despite the fact that it was stored for 3 years. Accordingly, the yields were higher, in spite of the length of storage of the seeds, its yield increased by an average of 0.36 t / ha (0.08 - 0.57%), compared with freshly harvested.

On the example of the hybrid Dniprovsky 181 JV, the influence of self-breaking of swaths, that is, the grain that was removed from them, which appears in the process of acceptance - the transfer of wet corn, is also established. The content of such grains in the total weight of the canopy can be 1.5 - 18.9% depending on the moisture content of the swathes and the intensity of their treatment. It has been found that the quality of self-immersion is arbitrary, the seeds obtained from it have a lower field similarity (by 9 - 13%) and grapevine (1.11 - 1.19 t / ha) compared with the seeds obtained from the cabins after drying. The treatment also did not improve the quality, the similarity to the frost dropped by 4%, the yield - by 0,38 - 0,48 t / hectare compared to the main seed.

Conclusions

Technical and technological operations and factors that have a particular impact on the quality of maize seeds during processing at a typical plant are established. In the acceptance operations - the drying of the swathes, seeds with high crop and yield properties are formed, on the threshing of the swaths and cleaning - the quality of the sort is significantly degraded. The main factors of deterioration of quality are the trauma of

seeds and impurities of self-damaged (dusted from wet moans) grains. Drinking increases the field similarity and yield of the seeds, but not always to the indicators that are present on the reception and drying of the swathes.

The quality of the seeds is determined depending on the varietal characteristics and the years of the yield of the hybrids of corn. Among the hybrids investigated, the hybrid Solonian 298 SV proved to be the most resistant to injury during processing at the plant, and since the years of yield (2010 - 2013), the highest quality was obtained from seeds obtained and processed in 2010.

Bibliography

1. *Инструкция* по обработке гибридных и сортових семян кукурузы на заводах/М.А. Теленгатор, В.С. Уколов, Л.И. Тихонова и др. — М., 1971. — 84 с.

2. *Кирпа М.Я.* Післязбиральна обробка і якість насіння кукурудзи/М.Я. Кирпа//Бюл. Ін-ту зерн. госп-ва УААН. — 2001. — № 17. — С. 31 – 35.

3. *Кирпа М.Я.* Порівняльна характеристика методів оцінки якості насіння кукурудзи/М.Я. Кирпа, Ю.С. Базілєва//Бюл. ДУ Інститут сільського господарства степової зони НААН, 2014. — № 6. — С. 52 – 56.

4. *Методика* проведення польових дослідів з кукурудзою: методичні рекомендації/Е.М. Лебідь, В.С. Циков, Ю.М. Пащенко та ін. — Дніпропетровськ, 2008. — 27 с.

5. *Методические рекомендации* по обработке, сушке и хранению семян родительских форм гибридов кукурузы при промышленном семеноводстве/А.И. Науменко, Н.Я. Кирпа, А.Т. Волощук и др. — М., 1990. — 36 с.

6. *Методические* указания по внедрению научных разработок в производство и определению их экономической эффективности/И.Д. Ткалич, И.Н. Добровольский. — Днепропетровск, 1979. — 35 с.

7. *Методические* указания по проведению производственных испытаний и полевых опытов по определению эффективности пленкообразующих составов для предпосевной обработки семян кукурузы; отв. А.Ф. Квятковский. — Днепропетровск, 1983. — 26 с.

8. *Насіння* сільськогосподарських культур. Методи визначання якості: ДСТУ 4138 – 2002 [Чинний від 2004 – 01 – 01]. — К.: Держспоживстандарт України, 2003. — 173 с. — (Держспоживстандарт України).

9. *Пробы* контроля и управления влажностнотепловыми процессами: справочная книга/ И.Ф. Бородин, С.В. Мищенко. — М.: Россельхозиздат, 1985. — 239 с.

10. *Репин А.Н.* Методы холодного проращивания семян кукурузы/А.Н. Репин, Ф.Г. Крячко, А.И. Науменко//Основные итоги научно-исследовательских работ по кукурузе: сб. науч. работ. — Днепропетровск, 1971. — С. 343 – 346.

11. *Roberts E.* Seed physiology and seed quality in soybeans/E. Roberts, R. Ellis//Advances in Legume Science. Kew. Richmond, Sur. — 1980. — № 1. — P. 247 – 310.