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## WE PRESERVE THE QUALITY OF SEED CORN

Sturko M.O.

*c. agricultural s., acting associate professor*

ORCID: 0009-0001-1159-636X

*Lviv National Environmental University, Dublyany, Volodymyra Velykoho, 1, 80381*

**Abstract.** Growing corn is an important component of the grain industry of any agricultural country. Corn is characterized by versatility of use and high yield. One of the most important prerequisites for obtaining high yields is sowing with high-quality seed material. Similarity is the main indicator of seed quality. The formation of germination depends on a number of factors affecting the plant and grain during ripening. An important indicator that affects the quality is the humidity at which the seeds are collected. During the research, the characteristics of the ripening of corn hybrids were established and the humidity at which conditional germination of seeds was formed was determined. Conditional similarity (according to DSTU 2240-93, DSTU 4138-2002, not lower than 92%) was already formed at a humidity of 47–53% and below. At a moisture content of 32–40%, the seeds already reach high field germination and productivity, depending on the maturity group of the hybrids.

**Key words:** corn, seeds, seed moisture, quality, similarity, yield.

**Introduction.**

In recent years, there has been a dynamic growth of market relations in the world, which directly affects agriculture and its development. Growing corn is an important component of the development of agriculture and the grain industry of any country. Corn is a unique raw material for the food, medical, microbiological, and processing industries, and a high-energy raw material in bioethanol production.

Sowing with high-quality seeds is one of the main prerequisites for obtaining high yields. According to the main regulatory and legal documents operating in the field of seed production, seed that is conditioned, i.e. meets the requirements of the regulatory and legal documents in the field of seed production, is allowed for sowing [1].

One of the main indicators of seed quality is its germination – the percentage of seeds capable of producing healthy, strong seedlings that will form into productive plants. Similarity mostly characterizes sowing suitability, productivity and has important practical significance among all sowing indicators. The formation of germination depends significantly on the biotic and abiotic factors involving in the process of its ripening, harvesting and post-harvest processing. One of the main factors is the humidity at which the seeds are collected [2, 3, 4].

The maximum ability to germinate appears when the seed reaches physiological maturity. It, first of all, depends on the conditions of the external environment during the development and ripening of seeds on the mother plant. Seeds are the carrier of biological and economic properties of plants, therefore, the yield that can be obtained when sowing them largely depends on its quality. In the process of germination, the seed needs the presence or creation of life factors that ensure its quality formation and further development. Life factors are environmental objects that directly (materially) affect the growth and development of plants [5, 6]. A wide range of abiotic factors and other conditions can affect the period of harvesting seeds.

The quality can change as a result of collecting wet seeds (especially mechanized), post-harvest processing, as well as during storage (under the action of microorganisms and insects). Changes, as a rule, are aimed at worsening the quality and germination of seeds. Immature seeds, unlike fully matured ones, are severely damaged by pathogenic microflora, especially when sowing in insufficiently warmed soil.

In recent years, the climatic conditions for growing agricultural crops have changed significantly. Also, many different factors affect the timing of sowing, timely care and the predicted timing of harvesting seed crops. Spring may be cold and protracted, which will shift the timing of sowing, or dry, which will not provide the seeds with enough moisture for friendly seedlings; dry summer or early cold autumn. This directly affects the formation of grain, the process of seed formation and the formation of its similarity.

The formation of seed qualities by corn grain in cold (autumn) weather can negatively affect the quality, including grain germination. The purpose of our study was to determine the humidity at which conditional germination of corn seeds and plant productivity are formed.

The research was conducted at the Institute of Agriculture of the Steppe Zone of the National Academy of Sciences of Ukraine. The ripening process was studied on corn hybrids selected by the Institute, which belonged to different maturity groups: Dniprovsky 181 SV, Kremin' 200 SV, Lyubava 279 MV, Rozivskyi 311 SV.

Corn cobs for experiments were selected with the onset of milk-wax maturity, starting with a moisture content of 47,2–53,5% (Table 1), depending on the hybrids. The collected cobs were immediately freed from the wrappers and the moisture content of the seeds was determined. Next, the cobs were dried at a temperature of 30°C with subsequent threshing on a laboratory thresher and seed samples were prepared for analysis. In laboratory experiments plant similarity determined by the laboratory and cold methods [1]. Similarity in the field and grain yield were studied in accordance with the requirements of the methodology for conducting experiments with corn.

The formation of germination by corn seeds was recorded starting from a moisture content of 47,2–53,5%.

Conditional similarity of at least 92% has already been formed, depending on the hybrids. The similarity was determined according to the standard method, which is carried out under ideal germination conditions. We state with confidence that such similarity indicates to a greater extent the viability of the seeds and may be completely different in field conditions.

According to the standard method of germination, the seeds were practically of the same germination within the at humidity harvesting 20,4–53,5%. During cold germination, germination was more differentiated and depended on the hybrids. For the hybrids Dniprovskyi 181 SV and Rozivskyi 311 SV, high similarity was already at harvest with a moisture content of 45,9 and 40,5%, for the hybrids Kremin' 200SV and Lyubava 279 MV – 31,7 and 32,3%, respectively. Similarly, field germination and seed yield were formed.

**Table 1. Sowing and yield properties of corn hybrid seeds**

Hybrid	Grain moisture,%	Germination, %			Seed yield, t/ha
		standard-method	cold test	field	
Dniprovsky 181 SV	53,5	91	41	57	3,8
	45,9	99	90	83	6,4
	30,9	98	90	85	6,0
	20,4	98	93	85	6,5
NIR <sub>0,5</sub>				3,2	0,2
Kremin' 200 SV	51,4	99	41	65	5,3
	45,2	100	56	80	6,3
	31,7	98	85	84	6,9
	22,6	98	88	84	7,1
NIR <sub>0,5</sub>				2,8	0,4
Lyubava 279 MV	51,3	96	43	63	5,9
	40,0	95	75	75	5,8
	32,3	96	78	78	7,6
	22,7	95	80	81	7,5
NIR <sub>0,5</sub>				2,1	0,3
Rozivskyyi 311 SV	47,2	95	78	80	6,9
	40,5	98	86	81	6,9
	29,8	98	84	81	6,6
	21,3	98	86	82	6,7
NIR <sub>0,5</sub>				2,7	0,2

### Conclusions.

It was established that the conditional germination of the seeds of the studied corn hybrids is reached already at a humidity of 47–53 %. High field similarity and productivity at a humidity of 32–40 %, depending on the hybrids. With the onset of early autumn frosts, it is recommended to harvest seed crops of corn hybrids of different maturity groups, starting at a humidity of 38–40 %, when the indicators of seed quality have already been formed. But with further high-quality post-harvest treatment of the seeds, which will preserve its sowing quality at the highest level.

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