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AGRONOMIC EVALUATION AND LABORATORY ANALYSIS OF SEED QUALITY OF THE MAIZE VARIETY ZAGATALA-420 (AZERBAIJAN)

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АГРОНОМИЧЕСКАЯ ОЦЕНКА И ЛАБОРАТОРНЫЙ АНАЛИЗ КАЧЕСТВА СЕМЯН КУКУРУЗЫ СОРТА ЗАГАТАЛА-420 (АЗЕРБАЙДЖАН)

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Abstract. Various quality indicators of Zagatala 420 corn seeds were studied in 4 plots. Zagatala 420 is a high-yielding corn variety cultivated in Azerbaijan. The study was conducted at the Zagatala Regional Experimental Station of the Research Institute of Agriculture. Temperature stress in corn seeds reduces the ability to germinate. The results show that the germination and physical characteristics of Zagatala 420 corn seeds significantly affect the yield. The effect of various soil conditions on corn seed germination and plant development rate was studied. It was found that the use of fertilizers accelerates the germination of corn seeds. This variety is recommended for cultivation in various agro-ecological regions of the country. The results of the study show that Zagatala 420 is resistant to diseases and pests when using an integrated plant protection system. Flat-shaped seeds develop better in the field than seeds of other shapes.

Аннотация. Изучены различные показатели качества семян кукурузы сорта Загатала 420 на 4 участках. Загатала 420 является высокоурожайным сортом кукурузы возделываемым в Азербайджане. Исследование проведено на Загатальской региональной опытной станции Научно-исследовательского института земледелия.Температурный стресс у семян кукурузы снижает способность к прорастанию. Результаты показывают, что всхожесть и физические характеристики семян кукурузы сорта Загатала 420 существенно влияют на урожайность. Исследовано влияние различных почвенных условий на прорастание семян кукурузы и скорость развития растений. Установлено, что использование удобрений ускоряет процесс прорастания семян кукурузы. Данный сорт рекомендуется для выращивания в различных агроэкологических регионах страны. Результаты исследования показывают, что Загатала 420 при применении интегрированной системы защиты растений проявляет устойчивость к болезням и вредителям. Плоские по форме семена на поле развиваются лучше, чем семена другой формы.

Keywords: seed quality, germination rate, emergence, corn.

Ключевые слова: качество семян, скорость прорастания, всхожесть, кукуруза.

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Maize is a plant native to Central America and is widely used in the food industry. Food products such as oil, flour, starch, and others obtained from corn grain occupy an important place in the food sector. Meanwhile, corn is of great importance as feed in animal husbandry, particularly for the livestock and poultry sectors [1, 2]. Corn is also used as one of the raw materials for bioethanol production in the industry. Corn residues, such as stalks, husks, and cobs, are primarily utilized in the industry as animal feed due to their fibrous content and energy value.Maize grain is rich in carbohydrates, fats, fiber, vitamins, and minerals, which makes it a valuable raw material in both the food and feed industries. It has been determined through research that the use of fertilizer accelerates the germination process in corn seeds [3-5].

The storage conditions of corn seeds affect germination capacity, germination energy, and the natural mass price. The purpose of this study is to evaluate the seed quality indicators of the Zagatala 420 corn variety and to investigate the effect of these indicators on the germination and initial development processes of the plant. At the same time, the study aims to determine the differences in seed characteristics of the Zagatala 420 variety cultivated in four different fields, as well as the physical characteristics of these seeds. Another objective is to evaluate the factors affecting seed quality, including moisture content, type (kg/ha), seed size, and the mass of 1000 seeds, and their effects on the germination process. The results of this study will provide important scientific information in the field of maize cultivation and, at the same time, will contribute to the development of optimal cultivation strategies for farmers and breeders. It will help determine the most suitable conditions for increasing seed yield. The results of the research will also provide important fundamental information for the development of maize varieties and for enhancing their productiv [6-8].

Material and methodology

The Zagatala 420 variety was taken as the research object. Seed samples were collected from four different fields: I, II, III, and IV. Germination energy and germination capacity were determined according to AZS 134-2005, moisture content according to AZS 137-2005, and the mass of 1000 grains and natural mass according to AZS 138-2005.

The germination energy, germination capacity, 1000 grain mass, and natural mass of the selected variety were studied. To determine germination capacity, four replicate samples of 1000 seeds each were randomly taken from well-cleaned and sorted seeds. The samples were germinated in a Binder apparatus for five days. Germination energy was assessed during the first three days, while germination capacity was evaluated over the following four to seven days. In cereal seeds, if the length of the normally developed root is equal to or greater than the length of the seed within the first three days, the seed is considered germinated.

The germination energy and germination capacity of maize plant provide necessary indicators for evaluating seed health and success of germination. Both indicatorob play a main role in analyzing the health status and productivity of seeds. Germination energy shows how quickly seeds germinate in the “initial” stage (usually within few days). A good value of germination energy indicates that the seeds are alive and healthy, and their ability of adaptive to the soil is high/ And the germination capacity shows the general germination potential of the seeds.

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Table 1

GERMINATION ENERGY AND ABILITY OF MAIZE VARIETY
OF ZAGATALA 420 IN DIFFERENT FIELDS

Name of the sample	*Germination energy,%*	*Germination,%*
I field	86	90
II field	86	92
III field	70,5	86,5
IV field	88	94

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The results of research show that the germination capacity (higest 94 %) and germination energy (88%) of Zagatala 420 corn variet in the field IV is higher than the other fields. But in the field in germination capacity and energy are at a lover level. Germination ability and germinate energy are very important for the initial stags of plant development, as seeds with high germination energy germinate faster and healthier. The study variety have high germination capacity and healthy growth potential. And this creates favorable conditions for increasing the overall productivity of the variety. Table 2 presents the physical characteristics of seeds obtained from different fields. The moisture content of the seeds ranged between 15.7% and 18.0%**,** while the test weight (natural mass) varied between 76.5 kg/hl and 79.3 kg/hl depending on the field.

Table 2

MOISTURE CONTENT, TEST WEIGHT AND 1000-GRAIN WEIGHT
OF MAIZE FROM FOUR DIFFERENT FIELDS

Name of the sample	*Moisture content, %*	*Test weight, kg/hl*	*1000 grain weight,g.*		
			500	*500*	*1000*
I field	16,6	79,3	177,9	179.0	355,9
II field	18,0	76,5	176,1	174,8	350,9
III field	15,7	76,5	193,7	195,6	389,3
IV field	16,7	77,6	170,8	172,2	343,0

The mass of 1000 grains ranged from 343 g to 389 g across the fields. Soil conditions and cultivation practices can significantly influence seed quality; therefore, attention should be paid to these factors during production. Determining the moisture content of seeds is important for their storage and germination.Too high humidity can cause roting of the seeds but too low humidity can reduce germination. Natural mass is one of the main indicators of seed density and expresses the nass per heclolitr. The natural mass of the experimented areas was determined as follows:

I. Area: 76.3 kg/hl — Average good density.

II. Area: 76.5 kg/hl — Relatively low density.

III. Area: 76.5 kg/hl — (Same density as II Area, average level).

IV. Area: 77.6 kg/hl — (Average density, satisfactory result).

The mass of 1000 seeds is one the biometric indicators of seeds, that movides information about their size and weight. Seeds with a higher 1000 grain weight usually passess higher physiological quality indicators and germination capacity. According to the results, the mass of 1000 grains in field III is 389,3 grams, and it has the highest weight.

Results

This shows that the seeds taken from that field are bigger and healthier. In general, the lowest moisture percentage and the higest mass of 1000 grains were observed in corn grains that obtained from field III.

This shows that the seeds are healthy and have high growth potential. Field I shows moderately balanced results. Field III and Field IV have relatively low results in terms of seed size and density, but they can still be considered satisfactory. Samples taken from field III were evaluated as healthier seeds because of higher growth potentias due to having the lowest moisture content and the highest 1000 grain mass. Field I presents balanced indicators, while the results of field III,IV are relatively laver but still satisfactory.

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