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YIELD AND OIL CONTENT INDICATORS IN SUNFLOWER CULTIVATION

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ABSTRACT

This article presents the results of selection research conducted in Uzbekistan on sunflower cultivation. It evaluates the adaptability of hybrid and varietal samples imported from abroad to the soil and climatic conditions of the Andijan region, as well as their grain quality, oil content, yield, and other agronomic traits. Based on the analysis, a new variety called “Madina” was developed from the T-14 line due to its several advantages and has been recommended for State Variety Testing. The article substantiates the importance of the new variety as a genetic resource, its economic efficiency, and the prospects for its introduction into production.

Keywords: Sunflower breeding, T-14 line, Madina variety, hybrids, yield, oil content, agrobiological characteristics, breeding results, economic efficiency, seed production.

KUNGABOQAR EKINIDA HOSILDORLIK VA MOY MIQDORI KO‘RSATKICHI

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ANNOTATSIYA:

Maqolada O‘zbekistonda kungaboqar yetishtirish bo‘yicha olib borilayotgan seleksiya tadqiqotlari natijalari yoritilgan. Unda xorijdan keltirilgan duragay va nav namunalarining Andijon tuproq-iqlim sharoitiga moslashuvi, ularning don sifati, moy miqdori, hosildorligi va boshqa xo‘jalik belgilari baholangan. Tahlil natijalariga ko‘ra, T-14 tizmasining bir qator afzalliklari asosida yangi “Madina” navi yaratilib, Davlat nav sinoviga tavsiya etilgan. Yangi navning genetik resurs sifatidagi ahamiyati, iqtisodiy samaradorligi va ishlab chiqarishga joriy etish istiqbollari asoslab berilgan.

Kalit so‘zlar: kungaboqar seleksiyasi, T-14 tizmasi, Madina navi, duragaylar, hosildorlik, moy miqdori, agrobiologik tavsif, seleksiya natijalari, iqtisodiy samaradorlik, urug‘chilik.

INTRODUCTION

Globally, in the last five years, sunflower has been grown on an average of 25-26 million hectares in 72 countries of the world, with an average yield of 40.5-42.0 million tons. The list of the largest sunflower-growing countries in the world is headed by: Ukraine, Russia, Argentina, Romania and China. In Uzbekistan, the area under sunflower has also increased in recent years to 17.5 thousand hectares, and the average yield is 12-15 t/ha. Today, the creation of new biologically early varieties suitable for local conditions, with high yields and quality indicators is an urgent problem.

In the world's leading sunflower countries, great attention is paid to the creation of new sunflower varieties and hybrids with enriched genotypes by identifying donors with positive indicators of valuable economic traits, resistant to various stress factors, and involving them in the selection process. Having achieved some success in this direction, taking into account the frequent recurrence

of extreme situations, many sunflower varieties and hybrids are being created that are early maturing, high-yielding, resistant to sharply changing environmental factors, diseases and pests, suitable for cultivation in adverse conditions, and most importantly, with high quality indicators.

In our republic, one of the most important tasks in obtaining high-quality seed crops from sunflower is the correct selection of zoned sunflower varieties based on the soil and climatic conditions of each region. Also, the selected variety must have high resistance to biotic and abiotic stresses, which will ensure high income. Currently, due to the effective selection work in sunflower cultivation, many hybrids and varieties of sunflower have been created and are being used in production. In our country, with the task of "...expanding research and development work on the creation and introduction into production of new selection varieties of agricultural crops that are highly productive, resistant to diseases and pests, and adapted to local soil, climate and environmental conditions" set out in Section 3 of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021, special attention is paid to the gradual reduction of areas under cotton and grain crops with relatively low soil fertility, heavy water supply, and low profitability by 2021, replacing them with fruits and vegetables, legumes, potatoes, oilseeds and other nutritious crops, and to the fulfillment of many urgent tasks in a coordinated and responsible manner within the established deadlines.

These studies will to a certain extent contribute to the implementation of the tasks set out in the Laws of the Republic of Uzbekistan “On Breeding Achievements” dated August 29, 2002 and the Laws of the Republic of Uzbekistan “On Seed Production” dated February 16, 2019, Decrees No. PF-5853 of 2020 “On Approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030”, as well as Resolutions No. PQ-106 of January 28, 2022 “On Additional Measures for the Further Development of Seed Production of Agricultural Crops”.

Grain number indicators of the studied varieties, hybrids and lines

Varieties, hybrids and ridges	Total grain count	Fully ripened grains, grains	Unripe grains, grains
Olimp F_1	974	951	23
Liniya 1	902	866	36
Liniya 2	933	901	32
T-14	1098	988	24
Yangi zamon (st)	1012	970	128

Figure 1. Appearance of sunflower baskets

The following characteristics are important factors in assessing grain quality, and the assessment is carried out as follows:
- grain shape;
- average weight of 1000 grains (up to 50 grams - low, 51-70 grams - average, more than 71 grams - high);
- oil content in the grain (up to 22% low, 22-40% average, more than 40% high);
- carbohydrate and other nutrients in the grain.

Data on the average weight and color of 1000 grains are presented in Table 17. The weight of 1000 grains in the studied varieties, hybrids and ridges ranged from 55-57 g (Line 1) to 85-88 g (T-14), and it was noted that the newly created Madina variety was 14-15 g higher than the standard Yangi Zamon variety.

In terms of grain color, it was found that the studied varieties, hybrids, and lines differed. The grain color of the created Madina variety was dark gray with stripes, the Andoz Yani Zamon variety had no black stripes, the Olimp F1 hybrid had dark black, and Line 1 and Line 2 had light black.

Average weight and color of 1000 grains

Varieties, hybrids and ridges	1000 seed weight, g	Grain color
Olimp F_1	57-59	Dark black
Liniya 1	55-57	Light black
Liniya 2	60-62	Light black
Madina	85-88	Dark gray striped
New Age (st)	71-73	Black without striped

According to Table 18, the average yield of the lines and the hybrid introduced from abroad, the standard New Age variety, was higher, amounting to 3100 kg/ha. In the T-14 line, the indicator by the sign was 3200 kg/ha, showing a result 100 kg/ha higher than the standard variety.

It was noted that the oil content of the varieties and hybrids ranged from 40% (Line 2) to 49% (T-14), and the oil content of the created Madina variety was 3% higher than the standard New Age variety (46%).

In terms of the amount of oil obtained from 1 hectare of area, results were observed from 1080 kg (Line 2) to 1568 kg (T-14). The standard New Age variety had a weight gain of 1426 kg, and the T-14 variety showed a 142 kg advantage over the standard variety.

18-table **Analysis of yield, oil and meal content of varieties and hybrids**

Variety and hybrid name	Average yield kg/ha	Availability , %	Oil yield per 1 ha, kg	Sunflower meal yield per 1 ha, kg
Olymp F1	3000	47	1410	1500
Line 1	2600	43	1118	1300
Line 2	2700	40	1080	1485
T-14	3200	49	1568	1536
New Era (st)	3100	46	1426	1500

The analysis of sunflower meal obtained from 1 ha of area showed that the Olimp F1 hybrid and the standard New Age variety had 1500 kg, a slightly lower result was observed in the Line 1 line, which amounted to 1300 kg, and a relatively high indicator was observed in the T-14 line, which was equal to 1536 kg. In conclusion, it should be noted that according to the laboratory analysis of sunflower varieties and hybrids and lines, the superiority of the T-14 line was noted in terms of the total number of grains and the number of fully ripened grains, and the weight of 1000 seeds. It was determined that the grain color of this variety was dark gray striped. The studied varieties, F1 hybrids and lines showed superiority in terms of average yield, quality, amount of oil obtained per 1 ha of area, and sunflower meal obtained per 1 ha of area.

The T-14 variety, which excelled in terms of the main valuable economic characteristics, was named "Madina" and submitted to the State Variety Test in 2017.

CONCLUSIONS

Based on the conducted research, the following conclusions can be drawn:

1. The samples of the Line 1 and Line 2 varieties introduced from abroad, the Olimp F1 hybrid, were studied in the soil-climatic conditions of Andijan and evaluated for their adaptability, durability in phenological phases and yield potential, and the adaptability of sunflower hybrids was determined.

2. A number of high-value, early-maturing, high-yield, and high-oil-content sunflower hybrids were selected and sorted by analytical selection method from among the sunflower hybrid and variety samples, among which the T-14 line, which was superior, was involved in further selection studies.

3. A new “Madina” variety was created on the basis of the T-14 line of sunflower isolated by analytical selection method, and the superiority of this variety over the standard New Age variety in terms of a set of valuable economic characteristics was noted.
4. In the wax ripening and full ripening phases of the growing season, the superiority of the Madina variety in terms of the average number of seeds in the baskets and the weight of 1000 seeds was noted, and it is advisable to use this new variety as a starting material for improving the listed characteristics.
5. “Madina” variety testing and production trials were organized, full experimental results were obtained on agrobiological and technological indicators necessary for recommending promising hybrids and varieties for the State Variety Testing, and they were tested at production sites.
6. Resources were created for use in genetic and selection research, the newly created “Madina” sunflower variety was evaluated as a valuable genetic resource in future genetic and selection research.
7. Original seeds of the newly created “Madina” sunflower variety were prepared and opportunities were created to deliver them to the first elite seed farms.
8. The “Madina” sunflower variety is recommended for State variety testing and production trials, and for introduction into farmers and agrocluster farms.
9. According to the economic efficiency indicator, the newly created Madina sunflower variety generated a net income of 27,151 thousand soums, which is 4,213 thousand soums higher than the standard Yangi Zamon variety (22,938 thousand soums), and a profitability of 118.3% was achieved.

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