МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

Державний біотехнологічний університет
State Biotechnological University

НАУКОВІ ЗАСАДИ ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ СІЛЬСЬКОГОСПОДАРСЬКОГО ВИРОБНИЦТВА

SCIENTIFIC BASIS TO RAISE AGRICULTURAL PRODUCTION EFFECTIVENESS

МАТЕРІАЛИ/MATERIALS

VI Міжнародної науково-практичної конференції

VI International scientific and practical conference

присвячена ювілейним річницям професорів
О. М. Можейка, В. В. Милого, Ю. В. Будьонного, І. І. Назаренка

There are dedicated to the anniversaries of professors
O. M. Mozheyk, V. V. Mylo, Y. V. Budyonny, I. I. Nazarenko

29–30 листопада 2022 р./ 29–30-th of noviembre, 2022
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Казахський науково-дослідний інститут ґрунтознавства і агрохімії
ім. У. У. Успанова

НАУКОВІ ЗАСАДИ ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ СІЛЬСЬКОГОСПОДАРСЬКОГО ВИРОБНИЦТВА

МАТЕРІАЛИ

VI Міжнародної науково-практичної конференції,
присвяченої ювілейним річницям професорів О. М. Можейка, В. В. Милого,
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Харків
ДБТУ
2022

Storage

For short term storage use gunny bag or cloth bag. For long term storage use polythene bag of > 700 gauge and dry the seeds to 8% moisture content. When compared with varieties, the hybrids and parental lines A & B lines are poor in storability. The order of the storage potential is R > F1 > B > A.

Seed Yield:-2,000kg-3,500kg/ha.

UDC 643.543.1:634.23(477)

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PRODUCTIVITY OF SWEET CHERRY IN SOUTHERN UKRAINE UNDER STRESS CONDITIONS

Introduction. Sweet cherry is one of the most important stone fruit crops in Ukraine, with production level of 60-85 thousand t annually, with most of the industrial production concentrated in the Steppe zone [1]. The question of optimal cherry rootstock for intensive orchards is still very open, and the tendency of climate change observed throughout the world makes it more pressing nowadays. According to the meteorological data, in recent years, mean daily air temperature and sum of active temperatures in Melitopol increased compared to mean long-term values, while hydrothermal coefficient and air humidity decreased, more spring frosts in April-May are observed, and precipitation distribution shifted to heavy rains followed by prolonged periods of draught [2]. Thus, cherry rootstocks should be adaptive to a wide range of possible abiotic stress factors. The aim of our research was to assess the main production indices of sweet cherry trees grafted on different clonal rootstocks.

Materials and methods. The research was carried out in sweet cherry orchard planted in 2015 in Melitopol, Zaporizhzhia region, on 'Melitopolska chorna' and 'Krupnoplidna' cultivars. Trees were planted with a scheme of 5 x 3 m and trained as spindle bush canopies. The soil of the experimental site is southern light loamy chernozem. The field experiment had four replications with 8 trees in each replication. Due to Russian aggression against Ukraine, experimental orchard was not irrigated and fertilized, which further added to the stress of the plants. To analyse the results, 2-way ANOVA was conducted using Minitab 19 software with Tukey's range test with an accuracy of 0.05 to determine the significant differences between the means.

Results and conclusions. Weather conditions of the winter of 2021-2022 were generally favourable for sweet cherry. The minimum air temperature was recorded at the level of minus 14.2 °C on 24.12.2021, and the damage to generative buds in winter amounted to 6-9%. Frosts after the restoration of plant vegetation, which were observed in March (up to minus 4.6 °C on 28.03.2022) and April (up to minus 2.5 °C on 05.04.2022) damaged 15-20% of flower pistils, which is not critical for this crop under favourable conditions for flowering and fruit setting.

The flowering of experimental cherry orchard in 2022 was observed from late April to early May. As of the seventh leaf, cherry trees grafted on CAB 6P rootstock formed 4.6 thousand flowers/tree on average for both cultivars, which exceeded the trees of variants with Gisela 5 (control) and Gisela 6 rootstocks by 1.6-1.9 times (table 1). Trees of 'Melitopolska chorna' cultivar formed an average 1.5 times more flowers than trees of 'Krupnoplidna'. The degree of fruit set in 2022 was high, 33-36%, and did not depend on the variants of the experiment.

Table 1 – Productivity indices of sweet cherry trees, 2022

Variant	Flowers per tree	Fruit set, %	Yield, t/ha	Specific yield, kg/cm^2 of TCSA	Fruit weight, g
Mean for **rootstocks**					
Gisela 5 (c)	2927 *b**	33.9	5.2 *b*	0.21 *a*	8.2 *b*
Gisela 6	2561 *b*	35.2	4.8 *b*	0.16 *b*	8.8 *a*
CAB 6P	4600 *a*	36.9	8.8 *a*	0.18 *ab*	8.1 *b*
Mean for **cultivars**					
Melitopolska chorna	3935 *a*	34.9	6.7 *a*	0.20 *a*	7.5 *b*
Krupnoplidna	2790 *b*	35.7	5.8 *a*	0.17 *b*	9.3 *a*

*Different letters in the same column indicate significant difference between the means according to Tukey's test ($p < 0.05$).

The analysis of yield indices revealed the same trends that were observed during the flowering: the yield of the trees on CAB 6P rootstock was 1.7-2.0 times higher than when using Gisela 6 and Gisela 5 rootstocks. At the same time, the specific yield per unit of trunk cross-sectional area (TCSA) was the highest in the control variant – 0.21 kg/cm^2. The yield of trees of 'Melitopolska chorna' cultivar was 6.7 t/ha on average and exceeded 'Krupnoplidna' cultivar by 17% (5.8 t/ha), regardless of the rootstock used. While our previous research suggests that trees of 'Krupnoplidna' and on Gisela rootstocks enter fruit production earlier compared to 'Melitopolska chorna' and CAB 6P rootstock [3], the latter seem to be more adapted to stress, induced by extreme weather conditions, observed recently due to climate change. Other trials performed in similar climate conditions, also report higher yield of the trees grafted on CAB 6P rootstocks compared to more dwarfing Gisela 5 and 6 rootstocks [4].

The highest fruit quality was recorded in trees on Gisela 6 rootstock on both cultivars, which exceeded the other variants of the experiment by 7-9% in terms of mean fruit weight. Generally, the fruit size in this trial was lower than reported in other research, especially for 'Krupnoplidna' cultivar [5]. This can be explained by the lack of irrigation and fertilization in 2022.

In general, according to the range of indices of the formation of crop productivity, in 2022 the cultivar-rootstock combination 'Melitopolska chorna' / CAB 6P stood out, the yield of which was at the level of 9.5 t/ha, as well as 'Krupnoplidna' / CAB 6P with a yield of 8.2 t/ha. The highest fruit quality for both cultivars was observed in the trees grafted on Gisela 6 rootstock.

References

1. Areas, gross harvests and yields of agricultural crops, fruits, berries and grapes (final data) in 2019: Statistical bulletin. Kyiv: State Statistics Service of Ukraine, 2020. 159 p.

2. Bondarenko P. Intensive sweet cherry orchard systems for the Southern Steppe of Ukraine: PhD thesis. Kyiv: Institute of Horticulture of NAAS, 2019. 190 p.

3. Topov V.D. The influence of introduced rootstocks on the growth and development of young sweet cherry trees. *Materials of the All-Ukrainian scientific and technical conference of TSATU students* (*dedicated to the 80th anniversary of the Zaporizhia region)*. Faculty of Agritechnologies and Ecology. Melitopol, November 19-23, 2018. P. 73.

4. Sotirov D. ‘Summit’ sweet cherry cultivar on different rootstocks. *Journal of Agricultural, Food and Environmental Sciences.* 2018. 72(3). Pp. 163-168.

5. Bondarenko P. Influence of rootstock-scion combinations and conditions of the year on sweet cherry fruit quality in the conditions of the Southern Steppe of Ukraine. *Visnyk LNAU: Agronomy*. 2018. 22(2). Pp. 96-102.

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CHANGES IN THE FATTY ACID COMPOSITION OF MILLET GRAIN DURING ITS STORAGE

Millet grain is characterized by valuable biochemical and medicinal properties. One of the problems of using millet flour in the food industry is its very short storage period due to the rapid "aging" of the grain, which leads to the so-called rancidity of millet and millet flour [1]. It is known that during the storage period of millet grain or products of its processing (groats of millet, millet flour) changes occur in their biochemical composition, organoleptic properties deteriorate, and an unpleasant smell appears. One of the reasons is that during the storage of grain, millet or millet flour, the acid value of the oil increases, which is associated with increased lipase activity. Such millet cannot be used for food purposes. Another reason for organoleptic changes in millet during storage, according to scientists, is a change in the quantitative composition of fatty acids in it [2, 3]. In Ukraine, this issue has not been studied practically on common sorghum (*Panicum miliaceum L.*).

In order to determine the biochemical changes in millet grain that occur during the storage period and that negatively affect grain rancidity, millet grain grown in 2010, 2015 and 2020 was used. The fatty acid composition of the grain, the total oil content and the acid value of the oil were studied on variety Kharkivske 57, which was the national standard of Ukraine from 1987 to 2014. The seeds were stored at a temperature of 20°C in the dark. Determination of total fat content, acid number of