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Biological and Economic Characteristics of Drying Apple Varieties Grown in the Fergana Valley

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A B S T R A C T
This article describes the results of research on the agrobiological characteristics of apple varieties suitable for drying. Here, the main indicators of the apple varieties selected for the experiments were analyzed. As a result of the research, scientifically based conclusions were made.

A R T I C L E I N F O

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INTRODUCTION. Climate change and population growth observed in recent years require the introduction of medicinal plant varieties in any country, in particular, varieties that are resistant to external factors and are of great importance in the food industry. According to FAO, 44% of orchards on earth are made up of introduced plants. Currently, countries such as the USA, Poland, Turkey and Japan, which are leaders in apple production and export, are also conducting scientific research on improving the quality and storage of apple fruits. At the same time, special attention is paid to the development of effective methods of apple storage in our republic. In recent years, through research conducted in our republic, measures are being taken to increase the efficiency of apple varieties storage and improve quality indicators while preserving their biochemical composition..

The purpose and specific issues of the research. It consists in improving the technological processes in order to increase the quality of the finished product in drying apples.

Material and methods. The research was conducted on the following apple varieties: Borovenka Tashkentskaya, Golden Delicious, Jonathan, Kamola, Red-stemmed apple, Guzal, Mantet, Aydin, Pervenets Samarkand, Renet Simerenko, Rosemary White, Saratoni, Farangiz, Feruza.

The research methodology is as follows:

a) Carrying out observations on the vegetative periods of apple fruits;

b) determination of productivity indicators of apple fruits;

c) determination of technical maturity indicators of apple fruits

RESEARCH RESULT AND DISCUSSION

The research was conducted in the Naryn district of the Namangan region in 2022-2024. Observations were conducted on an area of 10 hectares for all selected varieties in this farm. There are many orchards with large areas of land engaged in apple cultivation in this district. Observations were conducted on

autumn and winter varieties of apples at the DAVRON farm, which was selected for the experiment. As a result of observations on autumn varieties, agrobiological indicators were studied (see Table 1).

Table 1. Agrobiological characteristics of apple autumn varieties (2022-2024 years)

No.	Name of the species	Years	From flowering to ripening, days	Productivity, t/ha	A crop suitable for drying		Unsuitable harvest	
					t/ha	%	t/ha	%
1.	Red delicious	2022	144±2	41,1±1	38,1±3	97,5	1,0	2,5
		2023	148±3	41,3±3	42,2±2	97,4	1,1	2,6
		2024	149±3	43,1±2	41,9±3	97,2	1,2	2,8
		Average	147	41,8	40,7	97,4	1,1	2,6
2.	Golden delicious	2022	140±2	48,3±4	47,5±4	98,3	0,8	1,7
		2023	145±2	49,6±3	48,7±3	98,2	0,9	1,8
		2024	143±4	50,8±2	50,0±3	98,4	0,8	1,6
		Average	143	49,6	48,7	98,3	0,8	1,7
3.	Mantet	2022	139±3	39,2±2	38,1±2	97,2	1,1	2,8
		2023	141±2	41,1±3	39,9±1	97,1	1,2	2,9
		2024	140±2	42,4±2	41,1±2	96,9	1,3	3,1
		Average	140	40,9	39,7	97,1	1,2	2,9
4.	Red apple	2022	115±2	45,2±2	44,2±2	97,8	1,0	2,2
		2023	120±3	48,6±3	47,5±3	97,7	1,1	2,3
		2024	118±1	44,1±1	43,2±2	98,0	0,9	2,0
		Average	118	46,0	45,0	97,8	1,0	2,2

In recent years, research conducted in the Naryn district has been aimed at studying the agrobiological characteristics of apple varieties, the results of which have yielded different conclusions. The period from flowering to ripening of the "Red Delicious" variety was 144 days in 2022, 148 days in 2023, and 149 days in 2024, which is slightly longer. In terms of yield, "Red Delicious" yielded 41.1 t/ha in 2022, 41.3 t/ha in 2023, and 43.1 t/ha in 2024. The percentage of yield suitable for drying of this variety was also high, amounting to 97.5%. The amount of unfit yield was 2.5%.

The Golden Delicious variety was distinguished by its high yield. It yielded 48.3 t/ha in 2022, 49.6 t/ha in 2023, and 50.8 t/ha in 2024. The amount of crop suitable for drying was also high, increasing from 98.3% to 98.4%. The percentage of unfit crop was very low, decreasing from 1.7% to 1.6%.

The "Mantet" variety yielded 39.2 t/ha in 2022, while in 2023 and 2024 the yield was lower than in the previous years, at 42.4 t/ha. The percentage of the crop suitable for drying changed from 96.9% to 97.1%. The amount of unfit crop increased from 2.8% to 3.1%.

The "Kizil Taram Malma" variety was distinguished by the lowest yield. In 2022, it yielded 45.2 t/ha, in 2023 - 48.6 t/ha, and in 2024 - 44.1 t/ha. The percentage of yield suitable for drying of this variety varied from 97.8% to 98%. The amount of unfit yield decreased from 2.2% to 2.0%.

The results of these studies are important in selecting varieties suitable for apple cultivation in the Naryn district. "Golden Delicious" produced more yield and a higher yield of fruit suitable for drying, as well as less fruit that was unsuitable for drying. Although the "Red Delicious" and "Mantet" varieties also had good yields, "Golden Delicious" was superior to them.

Table 2. Agrobiological characteristics of winter apple varieties (2022-2024)

No	Name of the species	Years	From flowering to ripening, days	Productivity, t/ha	A crop suitable for drying		Unsuitable harvest	
					t/ha	%	t/ha	%
1.	Renet Simirenko	2022	168±3	44,6±3	43,3±2	97,1	1,3	2,9
		2023	169±2	43,3±3	42,1±2	97,2	1,2	2,8
		2024	167±3	45,2±2	43,8±3	96,9	1,4	3,1
		Average	168,0	44,4	43,1	97,1	1,3	2,9

2.	White rosemary	2022	169±4	50,1±2	49,4±3	98,6	0,7	1,4
		2023	168±2	51,4±4	50,8±2	98,8	0,6	1,2
		2024	170±3	54,2±3	53,4±3	98,5	0,8	1,5
		Average	169,0	51,9	51,2	98,7	0,7	1,3
3.	Pink Lady	2022	225±4	50,6±2	49,9±4	98,6	0,7	1,4
		2023	228±3	52,4±4	51,6±3	98,5	0,8	1,5
		2024	226±4	54,9±3	54,0±4	98,4	0,9	1,6
		Average	227,0	52,6	51,8	98,5	0,8	1,5
4.	Fuji	2022	171±3	43,6±3	42,5±3	97,5	1,1	2,5
		2023	172±3	45,7±3	44,5±2	97,4	1,2	2,6
		2024	180±2	47,1±2	45,8±2	97,2	1,3	2,8
		Average	174,0	45,5	44,3	97,4	1,2	2,6
5.	Farangiz	2022	145±3	40,2±2	39,2±4	97,5	1	2,5
		2023	146±2	41,1±4	39,9±2	97,1	1,2	2,9
		2024	148±3	40,3±3	39,1±3	97,0	1,2	3,0
		Average	146,0	40,5	39,4	97,2	1,1	2,8
6.	Jerome	2022	150±2	45,1±3	43,7±3	96,9	1,4	3,1
		2023	152±2	46,8±4	45,1±2	96,4	1,7	3,6
		2024	149±3	46,8±3	45,3±2	96,8	1,5	3,2
		Average	150,3	46,2	44,7	96,7	1,5	3,3

As a result of the research conducted in 2022-2024, clear conclusions were drawn about the agrobiological characteristics of winter apple varieties. This analysis examined the period from flowering to ripening, yield, percentage of harvest suitable for drying and yield unsuitable for the varieties. In particular, the period from flowering to ripening of the "Renet Simirenko" variety was 168 days in 2022, 169 days in 2023, and 167 days in 2024. This means that the period from flowering to ripening of the variety decreased slightly, while the yield was 44.6 t/ha in 2022, 43.3 t/ha in 2023, and 45.2 t/ha in 2024. Based on these results, it was observed that the yield of the variety fluctuated over the years, but the overall yield remained stable. The percentage of the dryable crop has changed from 97.1% to 96.9%, which means that the marketable part of the crop is more.

The "Rosmarin belyy" variety had 169 days from flowering to ripening in 2022, 168 days in 2023, and 170 days in 2024, i.e. the period is longer. In terms of yield, it was 50.1 t/ha in 2022, 51.4 t/ha in 2023, and 54.2 t/ha in 2024. This variety has produced stable and high yields over the years. The percentage of yield suitable for drying has decreased significantly, from 98.6% to 98.5%, while the percentage of unfit yield has decreased from 1.4% to 1.2%. This indicates that the variety is distinguished by high-quality yield.

Pink Lady took 225 days from flower to maturity in 2022, 228 days in 2023, and 226 days in 2024. The yield of this variety was also high, reaching 50.6 t/ha in 2022, 52.4 t/ha in 2023, and 54.9 t/ha in 2024. The percentage of crop suitable for drying decreased from 98.6% to 98.4%, indicating that this change is uncertain over a short period of time. The percentage of unusable crops increased from 1.4% to 1.6%.

The "Fuji" variety had 171 days from flowering to maturity in 2022, 172 days in 2023, and 180 days in 2024, which means that the variety's flowering to maturity period has been significantly extended. The yield was 43.6 t/ha in 2022, 45.7 t/ha in 2023, and 47.1 t/ha in 2024. The percentage of harvestable yield decreased from 97.5% to 97.2%, while the unfit yield increased from 2.5% to 2.8%. This indicated that the variety had a higher yield and was less susceptible to drying.

The "Farangiz" variety showed the lowest yield. The duration from flowering to ripening in 2022 was 145 days, in 2023 146 days and in 2024 148 days. The yield index was 40.2 t/ha in 2022, 41.1 t/ha in 2023 and 40.3 t/ha in 2024. The amount of harvest suitable for drying decreased from 97.5% to 97.0%, while the unfit harvest increased from 2.5% to 3.0%..

The period from flowering to maturity of the "Jeromin" variety lasted 150 days in 2022, 152 days in 2023, and 149 days in 2024. Productivity was 45.1 t/ha in 2022, 46.8 t/ha in 2023 and 46.8 t/ha in 2024. The percentage of harvest suitable for drying decreased from 96.9% to 96.8%, and the percentage of unfit harvest increased from 3.1% to 3.2%. As a result, it was observed that although the variety "Jeromin" also

shows a high yield index, the percentage of viable crop compared to the total yield is lower than other varieties.

According to the results of these studies, the varieties "Rosmarin belyy" and "Pink Lady" have high yields and high quality, and they also showed high indicators of suitability for drying. Although the varieties "Renet Simirenko" and "Fuji" are also distinguished by high yields and percentages of yield suitable for drying, it turned out that varieties such as "Jeromin" and "Farangiz" have a higher proportion of unusable fruit. All of this is important in choosing varieties suitable for winter apple cultivation.

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