THE BEHAVIOR OF SOME APPLE VARIETIES IN BIHOR COUNTY

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RESEARCH ARTICLE

Abstract

The apple tree is a rustic species, very well adapted to the temperate climate; it withstands the winters characteristic of this climate better than any other tree species and behaves well on a wide range of soils. If superior agrotechnics are applied in orchards, the highest yields per hectare are obtained compared to other fruit tree species. The apple can be grown in very different pedoclimatic conditions and lends itself to any of the cultivation systems. In this study, we proposed the analysis of some apple varieties grown in the pedoclimatic conditions of Tăuteu commune, Bihor County. The main objectives of the study concerned the biometric characteristics of the fruits and the determination of dry matter and sugars. In order to fulfill our proposed objectives, we studied four varieties of apple: `Remo', `Relinda', `Rewena' and `Red Delcious'. Among the four apple varieties studied, the best results were obtained with the Remo variety.

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INTRODUCTION

The apple is the most well-known and widespread fruit crop of a temperate climate. It has been cultivated in Europe and Asia since ancient times. As for surface area, on the territory of Romania, the apple occupies over 50,000 ha, being the second most cultivated tree species after the plum (Iuga et all, 2022)

The wide geographical dissemination of this fruit tree species was possible due to its impressive genetic variety and adaptability. These characteristics allowed the selection of numerous varieties with great ecological plasticity, adapted to the most diverse cultivation areas around the globe (Chira & Pasca, 2008; Cociu et all, 1999;).

The share occupied by apple culture in the world economy of fruit production is primarily due to the role that apples play in human nutrition (Ilie & Stănică, 2012).

Apples contain a rich source of phytochemicals, which have properties in reducing the risk of certain types of cancer, cardiovascular disease, asthma and diabetes. There are also studies that have found that apples have a very strong antioxidant activity, inhibit the proliferation of cancer cells, decrease lipid oxidation and lower cholesterol. Apples contain a variety of phytochemicals, including quercetin, catechin, phloridzin and chlorogenic acid, all of which are powerful antioxidants [Sesso et al, 2003; Boyer & Liu, 2004; Bondonno et al, 2017; Ferretti et all, 2014; Iordănescu et al, 2021].

In this work we have proposed the analysis of some apple varieties cultivated in the pedoclimatic conditions of Tăuteu commune, Bihor County, in the ecological/biological culture system. The main objectives of the study were the biometric characteristics of the fruit and the determination of dry matter and sugars.

MATERIAL AND METHOD

In order to achieve our proposed objectives, we took into account four varieties of apple: three lesser-known varieties, namely 'Remo', 'Relinda', 'Rewena' and a variety more common in the 'Red Delcious' culture, hemmed in a family orchard in Tăuteu commune, Bihor County. The plantation is in year VII and its maintenance is carried out as ecologically as possible, in the sense that, except for winter treatments, no other control measures are applied of diseases and pests. In order to establish the biometric characteristics of the fruits, 15 apples (5 apples/repetition) were analyzed, on which measurements of their height, large meter and small diameter were

made, measurements made with the help of electronic screed. The determination of the mass was done by weighing with the electronic balance. The determination of the dry matter was carried out using the digital refractometer and the sugar content was calculated using the formula: (N*4.25)/4–2.5 where N represent the dry matter content. As a control the average version of the experience was chosen. The data obtained were interpreted statistically using variance analysis.

RESULTS AND DISCUSSIONS

The experimental results obtained on the height of the fruit and the statistical analysis of the data (Table 1) lead to the conclusion that no semnification is recorded between the four varieties studied in relation to the control.

The small diameter of the fruits in the studied apple varieties is between 4.34 cm in the 'Red Delicious' variety and 4.82 cm in the 'Remo' variety with an average experience of 4.49 cm. Analyzing the behavior of the varieties in relation to the average of the experience it can be said that no semnification is recorded in relation to the control. (Table 2)

Table 1

The height of fruits in the studied apple varieties (2021)

Variety	The height of the fruit Cm	Relative value %	Difference from the control	Significance
`Remo`	6.00	107.33	0.41	-
`Relinda`	5.00	89.45	-0.59	-
`Rewena`	5.54	99.11	-0.05	-
`Red Delicious`	5.82	104.11	0.23	-
Average of the varieties	5.59	100.00	0.00	control
LD 5%		LD 1%		LD 0.1%
1. 45 cm		1. 96 cm		2. 61 cm

Table 2

Small diameter of fruits in the studied apple varieties (2021)

Variety	Small diameter of fruits Cm	Relative value %	Difference from the control	Significance
`Remo`	4. 82	107.29	0.33	-
`Relinda`	4. 45	99.05	-0.04	-
`Rewena`	4. 36	97.05	-0.13	-
`Red Delicious`	4. 34	96.61	-0.15	-
Average of the varieties	4. 49	100.00	0.00	control
LD 5%		LD 5%		LD 1%
1. 40 cm		1. 89		2.52

The large diameter of the fruits in the four varieties of apple studied is between 5.58 cm in the 'Rewena' variety and 6.48 cm in the 'Red Delicious' variety with an average experience of 6.00 cm. Analyzing the behaviour of the varieties, it appears that no significance is recorded in relation to the control. (Table 3)

The results of the measurements regarding the average mass of the fruits and the statistical analysis of the data lead to the conclusion that of the four varieties of apple studied, three varieties show statistical differences compared to the average considered as a control.

As seen in Table 4, compared to the average, the variety `Red Delicious' recorded very high values with a mass of 129.84 g being very significantly positive compared to the control, and the varieties `Relinda' and `Rewena' with a mass of 90.98 g and 88.67 g values below the average being very significantly negative to the control.

Table 3

Large diameter of fruits in the studied apple varieties (2021)

Variety	Large diameter of fruits Cm	Relative value %	Difference from the control	Significance
`Remo`	5.94	99.00	-0.06	-
`Relinda`	6.00	100.00	0.00	-
`Rewena`	5.58	93.00	-0.42	-
`Red Delicious`	6.48	108.00	0.48	-
Average of the varieties	6.00	100.00	0.00	control
LD 5%		LD 1%		LD 0.1%
0.85		1.14		1.52

Table 4

The mass of fruits in the studied apple varieties (2021)

Variety	Fruit mass g	Relative value %	Difference from the control	Significance
`Remo`	102.97	99.86	-0.15	-
`Relinda`	90.98	88.23	-12.14	000
`Rewena`	88.67	85.99	-14.45	000
`Red Delicious`	129.84	125.92	26.73	XXX
Average of the varieties	103.12	100.00	0.00	control
LD 5%		LD 5%		LD 1%
1.38		1.86		2.48

Figure 1 **The analyzed apple varieties**

The dry matter content of the studied apple varieties was between 11.01 ^{0}Brix for the variety `Red Delicious' and 17.77 $^{0}$Brix for the variety `Remo'. Compared to the control, the 'Remo' variety recorded very high values, being very significantly positive, and the 'Red Delicious' variety recorded values below the average being very significantly negative compared to the control. .(Table 5)

The sugar content of the apple varieties studied was between 16.38 g/l in the 'Remo' variety and 9.20 g/l in the 'Red Delicious' variety with an experience average of 13.00 g/l. Compared to the average, the 'Remo' variety recorded higher values, being very significant positive compared to the control, and the 'Red Delicious' variety recorded values below the average being very significantly negative compared to the control. The varieties 'Relinda' and 'Rewena' did not get meanings in comparison with the control.(Table 6)

Table 5

Dry matter content of fruits in studied apple varieties (2021)

Variety	Dry matter ºBrix	Relative value %	Difference from the control	Significance
`Remo`	17.77	121.80	3.18	XXX
`Relinda`	15.10	103.50	0.51	-
`Rewena`	14.48	99.25	-0.11	-
`Red Delicious`	11.01	75.46	-3.58	000
Average of the varieties	14.59	100.00	0.00	control
LD 5%		LD 1%		LD 0.1%
0.80		1.08		1.44

Table 6

Sugar content of fruits in the apple varieties studied (2021)

Variety	Sugars g/l	Relative value %	Difference from the control	Significance
`Remo`	16.38	125.98	3.38	XXX
`Relinda`	13.54	104.13	0.54	-
`Rewena`	12.89	99.13	-0.11	-
`Red Delicious`	9.20	70.76	-3.80	000
Average of the varieties	13.00	100.00	0.00	control
LD 5%		LD 1%		LD 0.1%
0.71		0.96		1.28

CONCLUSIONS

As a result of the analyses carried out, no significance was recorded in terms of the height of the fruit, the small diameter and the large diameter of the fruit.

The results obtained regarding the mass of the fruit indicate that the 'Red Delicious' variety is much higher compared to the 'Relinda' and 'Rewena' varieties , which recorded results well below the control average.

The dry matter content had very significantly positive values in the apple variety 'Remo', and the 'Red Delicious' variety recorded the lowest values.

In terms of sugar content, the highest values were recorded in the 'Remo' variety and in the 'Red Delicious' variety the lowest values

In conclusion, among the four apple varieties studied in the pedoclimatic conditions of Tăuteu commune, Bihor County, the best results were obtained for the 'Remo' variety.This paragraph will briefly present the results of the research. Conclusions will be concise and clear, no hypothesis and probability. Each conclusion will start on a new row. The text will be edited not numbered or bullet lists. This section can be skipped, but should be added if the results and discussion part is long.

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