

## Studies on the behaviour quantitative and qualitative character of varieties cultivated apple in the Valea Anilor plantation, Mehedinți County

Scedei Daniela Nicoleta<sup>1</sup>, Iordănescu Olimpia Alina<sup>1</sup>, Constantinescu Ligia<sup>1</sup>, Blidariu Aurelia<sup>1</sup>, Popescu Otilia<sup>1</sup>, Danci M.<sup>1</sup>

<sup>1</sup>Banat's University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania” from Timișoara;

\*Corresponding author. Email: [dana\\_olaru78@yahoo.com](mailto:dana_olaru78@yahoo.com)

**Abstract** Nowadays, the studies on apple biology and crop technology become more and more intensive, and apple becomes the main fruit tree species. The researches of genetic amelioration have become amplified, so that there are over 10,000 apple varieties in the world at the moment.

Apple tree occupied the first position in terms of importance, among the fruit tree species of temperate climate, and this importance is given by the areas cultivated.

In our country, the apple tree is cultivated everywhere, from sea level up to the pre-mountain regions (about 75.000 ha).

The main counties where the apple tree is cultivated are: Argeș, Suceava, Mureș, Maramureș, Dâmbovița, Iași, Cluj, Bihor, Bistrița, Năsăud, Bacău, Sălaj and Vâlcea.

Due to the seasonal character of the apple yield, to the imbalance between yield and consumption during some periods and to the request for fruit during the whole year, the fruit processing industry has significantly developed. The apple fruit and its derivatives are transformed in more diversified assortments: concentrated natural juice, apple squash, syrups, alcoholic drinks (light and strong), stewed fruit, jellies, jams, marmalades, candies, ice-creams, dehydrated fruit, frozen fruit, etc.

The current tendency in fruit consumption, not desired from a physiological perspective but imposed by other factors, is to increase the proportion of processed fruit proportion compared with the fresh fruit.

In our country, at the moment, the structure of fruit consumption is consisted of 77% fresh fruit and 23% processed fruit (of which 21% preserved, 0.5% frozen and 1.5% dried fruit).

According to F.A.O. database, the apple tree is cultivated in 84 countries, on a surface of over 4.500.000 ha. The world apple yield was, in the last two decades, about 55.095.000 tons, representing about 13.2% of total fruit yield. The apple occupies the third world position successive to oranges and bananas, and together with these covers 41.2% of total world fruit yield.

### Key words

apple, variety, quality, weight, diameter, dry matter

### Material and Method

The researches were carried out in 2016 in the orchard Robachus Rogova from Valea Anilor, Mehedinți County. This plantation covered an area of 450 ha and included several apple tree varieties. For a long period of time, this plantation has significantly developed, becoming a very efficient business. Compared with the years 1980-1985, this plantation covers about 100 hectares at the moment, and the most cultivated varieties are: Golden Delicious, Jonathan and Starkrimson, and Florina and Generos on small areas.

The trees were planted with 4 m between rows and 2 m between the trees within a row, generating a density of 1250 trees/ha. The conducting system selected was the free palmet, and the cultivation technology was the one used for all varieties.

As regards the biometric aspects, we took fruit samples (25 pieces for each variety) from different sides of the corona, and determined the following parameters: fruit weight, dry matter content and fruit acidity. The fruit weight was determined by weighing. In the case of these indices, the data achieved was statistically processed with the method of variance analysis, and the control variant was represented by the mean value of the varieties (1, 2, 3, 4).

## Results Obtained

The results obtained in the apple tree varieties analyzed from the plantation from Valea Anilor, in 2016, are presented in tables 1.1 – 1.6.

According to the data included in table 1.1, we may notice that the fruit yield achieved in 2016 presented values of 20.00 kg – 35.00 kg/tree, and the experimental mean had a value of 27.40 kg/tree. The

biggest yields were achieved in the case of the varieties Generos (35.00 kg/tree) and Florina (30.00 kg/tree), and they were very significantly positive compared with the control variant (experimental mean).

The smallest yield value was achieved from the apple variety Jonathan (20.00 kg/tree), followed by Starkrimson (25.00 kg/tree); these values were very significantly negative compared with the control variant.

Table 1

**Fruit Field achieved in the apple varieties studied in 2016 (kg/tree)**

No.	Variety	Yield Kg/tree	Relative value (%)	Difference compared to control	Significance
1	Jonathan	20,00	72,99	-7,40	000
2	Florina	30,00	109,49	2,60	XXX
3	Generos	35,00	127,74	7,60	XXX
4	Starkrimson	25,00	91,24	-2,40	000
5	Golden Delicious	27,00	98,54	-0,40	-
6	Experimental mean	27,40	100,00	0,00	control
DL 5%=1,26 kg		DL 1%=1,70 kg	DL 0,1%=2,27 kg		

Regarding the estimative fruit yield (table 1.2), we may observe that the variety Generos generated the biggest production, of 29.10 t/ha, being

very significantly positive compared with the experimental mean (control variant).

Table 2

**Estimative fruit yield obtained from the apple varieties studied in 2016 (t/ha)**

No.	Variety	Yield t/ha	Relative value (%)	Difference compared to control	Significance
1	Jonathan	16,66	73,10	-6,13	000
2	Florina	24,90	109,26	2,11	XX
3	Generos	29,10	127,69	6,31	XXX
4	Starkrimson	20,82	91,36	-1,97	00
5	Golden Delicious	22,49	98,68	-0,30	-
6	Experimental mean	22,79	100,00	0,00	control
DL 5%=1,40 kg		DL 1%=1,89 kg	DL 0,1%=2,52 kg		

The variety Jonathan recorded the smallest yield value in the experimental year 2016, namely

16.66 t/ha, being very significantly negative compared with the experimental mean (control variant).

Table 3

**Fruit mass in the apple varieties studied in 2016**

No.	Variety	Fruit mass g	Relative value (%)	Difference compared with control	Significance
1	Jonathan	138,00	92,62	-11,00	000
2	Florina	152,00	102,01	3,00	XXX
3	Generos	187,00	125,50	38,00	XXX
4	Starkrimson	133,00	89,26	-16,00	000
5	Golden Delicious	135,00	90,60	-14,00	000
6	Experimental mean	149,00	100,00	0,00	control
DL 5%=1,37 kg		DL 1%=1,85 kg	DL 0,1%=2,46 kg		

Regarding fruit mass of the apple varieties studied, in 2016, this parameter had values between 187.00 g in the variety Generos and 133.00 g in the variety Starkrimson, the experimental mean having the value of 149.00g (table 1.3).

The biggest values were recorded in the apple varieties Generos (187.00 g) and Florina (152.00 g), and they were very significantly positive compared with the control variant (149.00 g).

On the contrary, the smallest fruit mass values were obtained in the case of the varieties Starkrimson

(133.00 g), Golden Delicious (135.00 g) and Jonathan (138.00 g), being very significantly negative compared to the experimental mean.

In table 1.4, we may observe that, in 2016, the dry matter presented values comprised between 16.00 in the variety Jonathan, with a very significantly positive difference compared with the control variant, and 12.90 in the variety Florina, with a very significantly negative difference compared with control.

Table 4

**Fruit dry matter content in the apple varieties studied in 2016**

No.	Variety	D.M. %	Relative value (%)	Difference compared to control	Significance
1	Jonathan	16,00	111,27	1,62	XXX
2	Florina	12,90	89,71	-1,48	000
3	Generos	14,40	100,14	0,02	-
4	Starkrimson	13,80	95,97	-0,58	000
5	Golden Delicious	14,80	102,92	0,42	XX
6	Experimental mean	14,38	100,00	0,00	control
DL 5%=0,27 %		DL 1%=0,37 %	DL 0,1%=0,49 %		

Regarding the sugar content, in 2016, in the varieties studied (table 1.5), we may observe that the biggest values were recorded in the varieties Jonathan (14.50 g/l) and Golden Delicious (13.22 g/l), being very significantly positive compared with the experimental mean (control variant).

The apple varieties Starkrimson and Florina had the smallest values, of 12.16 g/l and 11.20 g/l, being very significantly negative compared with the control variant.

Table 5

**Fruit sugar content of the apple varieties studied in 2016**

No.	Variety	Sugars g/l	Relative value (%)	Difference compared with control	Significance
1	Jonathan	14,50	113,55	1,73	XXX
2	Florina	11,20	87,71	-1,57	000
3	Generos	12,80	100,23	0,03	-
4	Starkrimson	12,16	95,22	-0,61	000
5	Golden Delicious	13,22	103,52	0,45	XXX
6	Experimental mean	12,77	100,00	0,00	control
DL 5%=0,25 %		DL 1%=0,34 %	DL 0,1%=0,45 %		

According to the data included in table 1.6, we may conclude that, in the experimental year 2016, fruit acidity presented values comprised between 0.16% in the variety Starkrimson and 0.20% in the variety Generos, and the experimental mean was 0.18%.

Compared with the control variant (experimental mean), the apple variety Generos was very significantly positive.

Table 6

**Fruit acidity of the apple varieties studied in 2016**

No.	Variety	Acidity %	Relative value (%)	Difference compared with control	Significance
1	Jonathan	0,17	94,44	-0,01	0
2	Florina	0,18	98,15	0,00	-
3	Generos	0,20	111,11	0,02	XXX
4	Starkrimson	0,16	88,89	-0,02	000
5	Golden Delicious	0,19	105,56	0,01	X
6	Experimental mean	0,18	100,00	0,00	control
DL 5%=0,01 g/l		DL 1%=0,01 g/l	DL 0,1%=0,01 g/l		

## Conclusions

• According to the results obtained, we may conclude that the fruit yield obtained in 2016 had values of 20.00 kg/tree and 35.00 kg/tree, and the experimental mean was 27.40 kg/tree. The biggest yields were obtained from the varieties Generos (35.00 kg/tree) and Florina (30.00 kg/pom), being very significantly positive compared with the control variant (experimental mean).

The smallest yield value was obtained from the apple variety Jonathan (20.00 kg/tree), followed by Starkrimson (25.00 kg/pom); these are very significantly negative compared with control.

• Regarding the estimative fruit yield, we may observe that the Generos variety had the biggest yield, namely 29.10 t/ha, being very significantly positive compared with the experimental mean (control variant).

The Jonathan variety recorded the smallest yield value in the experimental year 2016, namely 16.66 t/ha, being very significantly negative compared with the experimental mean (control variant).

• As regards the fruit mass of the apple varieties studied, in 2016, this parameter was between 187.00 g in the variety Generos and 133.00 g in the variety Starkrimson, the experimental mean having the value of 149.00 g.

The biggest values were recorded in the apple varieties Generos (187.00 g) and Florina (152.00 g), these being very significantly positive compared with the control variant (149.00 g).

On the contrary, the smallest fruit mass values were obtained in the case of the varieties Starkrimson (133.00 g), Golden Delicious (135.00 g) and Jonathan (138.00 g), being very significantly negative compared with the experimental mean.

• The dry matter had values comprised between 16.00 in the variety Jonathan, with a very significantly positive difference compared with the control, and 12.90 in the variety Florina, with a very significantly negative difference compared to control.

• Regarding the sugar content, in 2016, in the varieties studied, we may observe that the biggest

values were recorded in the varieties Jonathan (14.50 g/l) and Golden Delicious (13.22 g/l), being very significantly positive compared with the experimental mean (control variant). The apple varieties Starkrimson and Florina had the smallest values, of 12.16 g/l and 11.20 g/l, being very significantly negative compared with the control variant.

• Fruit acidity in the experimental year 2016 had values between 0.16% in the variety Starkrimson and 0.20% in the variety Generos, and the experimental mean was 0.18%.

Compared with the control variant (experimental mean), the apple variety Generos was very significantly positive.

According to the results achieved, we may say that the apple variety Generos behaved very well under the pedo-climatic conditions of the year 2016.

## Bibliography

1. Baci A., 2005 – Pomicultură generală, Editura Universitaria, Craiova
2. Cocu V., 1990 – Soiuri noi factor de progress în pomicultură. Ed. Ceres, București
3. Constantinescu N., Negrilă A., Ghena N., Mihăescu G., 1967 – Pomicultură, vol. I, Editura Agrosilvică, București
4. Constantinescu N., Negrilă A., Ghena N., Mihăescu G., 1967 – Pomicultură, vol. II, Editura Agrosilvică, București
5. Drăgănescu E., 1996 – Pomologie, Editura Mirton, Timișoara
6. Drăgănescu E., 1998 – Pomicultură, Editura Mirton, Timișoara
7. Ghena N., Braniște N., 2003 – Cultura specială a pomilor, Editura Matrix Rom, București
8. Ghena N., Braniște N., Stănică Fl., 2004 – Pomicultură generală, Editura Matrix Rom, București
9. Grădinaru G. și col., 1998 – Pomicultură, Editura Moldova, Iași
10. Iordănescu Olimpia Alina, Micu Roxana, 2011 – Pomicultură generală și specială, Edit. Eurobit, Timișoara

11. Iordănescu Olimpia Alina, Olaru Daniela Nicoleta, 2014, Pomologie. Ed. Agroprint, Timișoara (Curs pentru studenții IFR)
12. Mihuț E., 1996 – Lucrări practice de pomicultură, Lito U.S.A.B., Timișoara
13. Negrilă A., 1971 – Pomicultură, Editura Didactică și Pedagogică, București
14. Popescu M. și col., 1992 – Pomicultură generală și specială, Editura Didactică și Pedagogică, București
15. Ropan G., 2000 – Pomicultură generală, Ed. Academic Pres, Cluj-Napoca
16. [http://pomiiifructiferi.blogspot.ro/2012/02/marul\\_29.html](http://pomiiifructiferi.blogspot.ro/2012/02/marul_29.html)
17. [http://www.uaiasi.ro/ro/files/doctorat/Rezumat\\_Ungureanu\\_Catalina.pdf](http://www.uaiasi.ro/ro/files/doctorat/Rezumat_Ungureanu_Catalina.pdf)