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The Behaviour of some Chestnut Varieties in North - West Conditions of Gorj County

Olimpia Alina IORDĂNESCU[1)], Alina GRIVEI[2)], Daniela OLARU[1)]

[1)]Banat's University of Agricultural Sciences and Veterinary Medicine TimișoaraCalea Aradului, Nr.119 Timișoara, România; olimpia.iordănescu@yahoo.com
[2)]Departament of Agriculture Gorj, Str. Victoriei, nr. 2 Târgu Jiu

Abstract. The chestnut culture in Romania is endangered, one of the reasons being cancer bark – *Cryptonectria parasitica*; in order to combat this disease is implementing its project support by the E.U. and Government of Romania proposing the ecological reconstruction of 60 ha chestnut in Tismana areas. In this paper, we aimed to identify and study seven chestnut varieties (Hobița 1, Hobița 2, Gureni, Polovragi, Tismana 1, Tismana 2, Tismana 3) in conditions of seven localities in Gorj county: Tismana, Peștișani, Gureni, Gomovița, Topești, Procruia and Polovragi. The study was performed in the poor climatic conditions of the year 2012, as a result we found fruit sizes (large diameter and small diameter of the fruit) for all studied varieties except Hobița 1, values below the those quoted in the specialized literature. Also the fruits weight were smaller than the normal ones. Mineral substances contained by fruits ensuring the acid-base balance at the cellular level, adjusting the osmotic process, contributing to the formation of hemoglobin. Those are located in fruits in the form of compounds of the main metals: K, Na, Ca, Fe, Mg, Cu, or salts of carbonic acid, phosphoric acid, hydrochloric. Chestnut fruits are among the main nutritive components consumed also for their caloric value as for their rich and varied content of nourishing substances. In the performed study the values of total sugar, fat and mineral substances were balanced versus the normal ones.

Keywords: chestnut varieties, diameter and height of fruit, sugar, fatty substances, minerals.

INTRODUCTION

Castanea sativa Mill. is a mediteranean species wide spread on a strip on either sides of the parallel 40^0 north latitude, beginning from the Iberian Peninsula and continued to eastward in Balkan Peninsula, northen of Asia Minor, southern Caucasus and Crimea, until Caspian Sea. In our country exist two important spreading areas, one in Carpathian Depression (Gorj County) (Blaja *et al.*, 1984) and another in north-west of the country (Maramureș County) (Nădișan, 2004).

The basic agriculture branch, fruit trees culture it is important first of all for the high value of the fruits but also for a lot of other multiple significations, among which may be mentioned: purifying the atmosphere of dust, smoke and other different pollutants, increasing the quantity of oxygen, attenuate climatic extremes, minimizing the wind speed, contribute at the soil preservation by anti-erosion protection, preventing landslides etc.

The ecological conditions of our country are optimal for fruit growing development, being situate at the nordic limit of profitable cultivation of heat-loving species (Iordănescu, 2008).

We also have natural areas with favorable microclimate for growing nut threes species: walnut, hazelnut, chestnut (Cociu *et al.*, 2003).

MATERIAL AND METHODS

In the present study were followed the behavior of some valuable chestnut varieties, in the conditions of three localities from Gorj county, where this important fruit species found optimal conditions for growth and fruiting.

The varieties studied, respectively the localities where samples were collected are shown in Tab. 1.

Tab. 1

Place of origin and variety in the study

No.	Localities of the county	Variety (Sample)
1		Gureni
2	Pestisani/Gureni	Hobita 1
3		Hobita 2
4	Polovragi/Polovragi	Polovragi
5	Tismana/Gornovita	Tismana 1
6	Tismana/Topesti	Tismana 2
7	Tismana/Procruia	Tismana 3

Gureni Variety

Origin – Natural hybrid selected from Clone 41, from the chestnut populations at Gureni-Gorj. Homologated in 1979 by D. Blaja.

The three – Large size with cylindrical crown rounded at the top, with vigorous skeleton branches. Annual shoots are thick, moderately long, greenish-brown epidermis color.

Leaf – sub middle size, lanceolate-elliptical, serrated regular edge, acute peak and asymmetrical base. Has short petiole, thin, with small sheath, colored red at the top, weakly pubescent. The limb is thin, semi-glossy, semi-slippery colored light green on the top, with dense secondary nerves, prominent on the bottom.

Male flowers - grouped in suitable long aments, thick at the base and narrow at the top, having more pollen and high fertility**.**

Female flowers - three in inflorescence and 2-5 inflorescences on the main spindle.

Hobita Variety

Origin – Natural hybrid selected from Clone 5, from Gureni-Gorj. Homologated in 1979 by D. Blaja.

The three – Small size, with cylindrical-conical crown, with only few skeleton branches, thick, particularly to extremities and with bending secondary branches. Annual shoots are long, thin and with greenish-brown colored bark. Flowering buds are large, elongated, with male inflorescences in the branches bases and with female inflorescences at the top.

Leaf – long, pronounced lanceolate, narrow, with acuminated long peak, attenuated base and serrated pronounced edge. Has variable long petiole, thin and with small sheath.

Polovragi Variety

Origin – Natural hybrid selected from Clone 100, from Crasna-Gorj. Homologated in 1979 by D. Blaja.

The three – Middle size, with conical crown, with a lot of skeleton branches, thick, and with big ramification angles in the lower part. Annual shoots are middle vigor, conical rounded at base and angular to the top on brown color with glossy epidermis and large

lenticels. Flowering buds are very big, usually on the curved annual branches, the ones with male flowers in the lower third and with female flowers on the top.

Leaf –large, elliptical shape, attenuated peak, careened base and serrated edge. Has short thick petiole, with small sheath colored intense red purple covered with few piliferous, gray. The limb is thick, with glossy upper epidermis, slippery, light green, with thin secondary venae, rare and almost parallel.

Tismana Variety

Origin – Natural hybrid selected from Clone 70, from Boroşteni-Gorj. Homologated in 1982 by D. Blaja and I. Tomescu and renewed in 2009.

The three – Middle size, with globulous crown, with multiple skeleton branches, and mixed fruit formations. Annual shoots are middle vigor, brown - reddish with greenish tint and with whitish lenticels.

Leaf – elliptical long, regular serrated edge, acuminated peak and asymmetrical base. Has short petiole, with median groove, enough pubescent and colored purple. The limb is thin, semi slippery, colored dark green, with a lot of secondary venae, parallel and prominent on the lower size.

Male flowers - grouped in middle size aments, thick, conical, with numerous stamens, more and fertile pollen. An important characteristic is earlier fruit maturation (Fig. 1. to 3.).

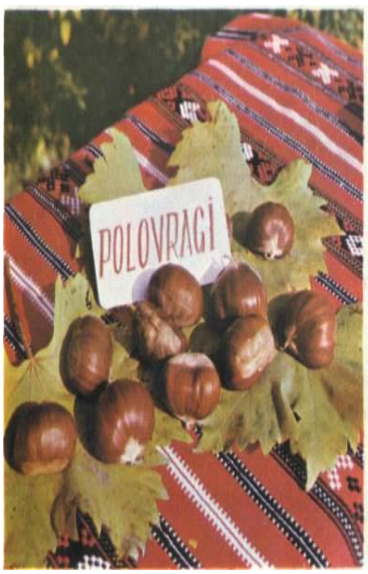

Fig. 1. Polovragi Variety

Fig. 2. Hobiţa Variety

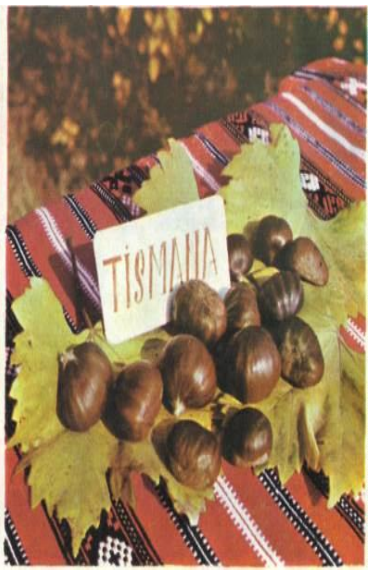

Fig. 3. Tismana Variety

Chestnut trees that were sampled, are placed in the hearth of the above mentioned villages and are aged between 25-50 years. The samples were composed of 50 fruits harvested from different points of the crown during ripening, when involucre came off easily. On the fruits were made both biometric measurements as chemical analysis in the laboratories of fruit growing respectively biochemistry disciplines from Banat's University of Agricultural Sciences and Veterinary Medicine. External characteristics of the fruits have been reported with regard to parameters: large diameter, small diameter, height and weight of fruit, aspects studied by biometric measurements and weighing fruit samples accurately using high precision weighing scale. All the data were statistically processed using variance analysis, as the experiment witness being used the variety average. The chemical composition of the core

assumed determining total sugar, fat and mineral substances using appropriate protocols for such determinations.

RESULTS AND DISCUSSIONS

The largest fruit large diameter was registered on the Polovragi variety fruits (31.77 mm), followed by Hobița1 variety (30.55 mm), in both case the difference to the experiment witness being very significant positive.

The smallest fruit large diameter was registered at Tismana3 variety (21,89 mm), the difference to the experiment witness being significant negative (Tab.2).

Tab. 2

External characteristics of the studied fruit varieties
(Large diameter of the fruit)

Variety	Large diameter (mm)	Relative value %	Difference to the witness	Significance
Gureni	24.44	93.47	-1.71	-
Hobița 1	30.55	116.83	4.4	XXX
Hobița 2	25.89	98.99	-0.26	-
Polovragi	31.77	121.50	5.62	XXX
Tismana1	24.77	94.74	-1.38	-
Tismana2	23.78	90.92	-2.37	0
Tismana3	21.89	83.70	-4.26	000
The experiment average	26.15	100.00	0	Witness

DL5% = 2.19 mm DL1% = 2.95 mm DL0.1% = 3.94 mm

The largest fruit small diameter was registered at Polovragi variety (18.77 mm) the difference to the experiment witness (16.36 mm) being significant positive.

The smallest fruit small diameter was registered at Tismana 3 variety (14.0 mm), the difference to the experiment witness being very significant negative (Tab. 3.).

Tab. 3

External characteristics of fruit varieties and biotypes studied
(Small diameter of the fruit)

Variety	Small diameter (mm)	Relative value %	Difference to the witness	Significance
Gureni	16.44	100.51	0.08	-
Hobița 1	18.33	112.06	1.97	-
Hobița 2	17.89	109.35	1.53	-
Polovragi	18.77	114.77	2.42	X
Tismana 1	17.11	104.59	0.75	-
Tismana 2	14.00	85.57	-2.36	0
Tismana 3	12.00	73.34	-4.36	000
The experiment average	16.36	100.00	0	Witness.

DL5% = 2.18 mm DL1% = 2.94 mm DL0.1% = 3.92 mm

The average fruits weight of the studied varieties was ranging between 5.68-10.20 g, parameter to which all varieties were below those quoted by specialized literature (Tab. 4.).

Tab. 4

The medium weight of fruits for the studied biotypes

Variety	Weight (g)	Relative value %	Difference to the witness	Significance
Gureni	6.77	91.03	-0.67	-
Hobiţa 1	7.07	95.07	-0.37	-
Hobiţa 2	5.68	76.46	-1.75	000
Polovragi	10.20	137.22	2.77	XXX
Tismana 1	8.47	113.90	1.03	XX
Tismana 2	7.77	104.48	0.33	-
Tismana 3	6.13	82.51	-1.3	000
The experiment average	7.43	100.00	0	Witness

DL5% = 0.69 g DL1% = 0.94 g DL0.1% = l.25 g

The highest total sugar content was recorded in fruits of variety Polovragi followed by varieties Tismana 2 and Tismana 1. Lowest sugar content was recorded in fruits of varieties Gureni and Tismana 3 (Tab. 5.).

Tab. 5

The chemical composition of the fruit

	Variety	Total sugar (g%)	Fatty substances (g%)	Minerals (g%)
1	Gureni	20.8	3.62	2.66
2	Hobiţa 1	21.15	3.56	2.79
3	Hobiţa 2	21.0	3.58	2.85
4	Polovragi	22.91	3.75	3.01
5	Tismana 1	22.4	3.8	3.20
6	Tismana 2	21.6	4.1	3.15
7	Tismana 3	20.8	3.6	2.88

CONCLUSION

In the conditions of the year 2012, the chestnut trees varieties studied in the seven locations from Gorj county were behaved as following:

- Concerning the fruit size, except Hobiţa l variety, all the other studied varieties were registered values below the level of those quoted in the specialized literature.
- The fruits weight was smaller than normal ones.
- The chemical composition of the fruits was balanced, registered values being of those quoted in the specialized literature.

Those results are due to climatic conditions of 2012, enough unfavorable conditions, both in the flowering period, but especially during fruit growth and maturation.

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