

**THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE  
OF ANCIENT ROMANIAN GRAPE VARIETIES  
(*Vitis vinifera* L.) CULTIVATED IN IAȘI VINEYARD**

**VALOAREA AGROBIOLOGICĂ ȘI TEHNOLOGICĂ A UNOR SOIURI  
VECHI ROMÂNEȘTI DE VIȚĂ DE VIE  
(*Vitis vinifera* L.) CULTIVATE ÎN PODGORIA IAȘI**

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**Abstract.** *Global warming, as an extreme climatic phenomenon, shows a strong influence on vine cultivation, leading to the reconsideration of the cultivated grape varieties. The extreme heat during grapes' maturation results in a unbalanced qualitative profile (too high sugar concentration and too low acidity concentration), losing on the way some of the wines specific for certain regions. In this article, ancient Romanian grape varieties were studied, that have been neglected in recent years and that can be reconsidered for the current conditions. The following varieties were studied: Ardeleanca, Braghina, Cruciuliță, Cionic, cultivated in the ampelographic collection of USAMV Iași. These varieties in the past were part of the old varieties of the Romanian vineyards, being cultivated before the phylloxera invasion and bringing the note of originality specific to each vineyard. Many of them have a meritorious behavior, and can be highlighted in the new zoning works of Romanian vines.*

**Key words:** ancient Romanian grape varieties, global warming, new zoning from vineyards

**Rezumat.** *Încălzirea globală, ca fenomen climatic extrem se face resimțită și asupra cultivării viței de vie, ceea ce duce la reconsiderarea sortimentelor de soiuri cultivate. Astfel căldura extremă din timpul maturării strugurilor face ca aceștia să fie la maturarea deplină cu aciditatea totală a mustului diminuată, concentrațiile în zaharuri să fie prea ridicate pentru anumite tipuri de vin specifice unor podgorii. În lucrarea de față au fost studiate soiurile românești vechi, mai puțin cultivate în prezent și care pot fi reconsiderate pentru sortimentele actuale din podgorii. S-au luat în studiu: Ardeleanca, Braghina, Cruciuliță, Cionic, cultivate în colecția ampelografică a USAMV Iași. Aceste soiuri în trecut făceau parte din vechile sortimente ale podgoriile românești, fiind cultivate înainte de invazia filoxerei și dădeau nota de originalitate specifică fiecărei podgorii. Multe din ele au o comportare meritorie, în cât pot fi luate în evidență în noile lucrări de zonare ale viței de vie din România.*

**Cuvinte cheie:** soiuri vechi românești, încălzire globală, noi lucrări de zonare în podgorii.

## INTRODUCTION

Mankind is currently on the brink of unprecedented, unseen crisis in history, which will deepen and persist in the long run. The big problems arise

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from the imminent exhaustion, in the foreseeable future, of vital natural resources - energy, minerals, drinking water, fertile soils, wooded areas and so on. Europe's geographic configuration provides a climate diversity for the vine culture (Cichi, 2006). The climates are subject to fluctuations / permanent changes due to their evolution over time and the action of the anthropic factors (deforestation, lakes, changes in natural water courses, etc). Until recently, grape harvesting periods were clearly defined, it is now unclear when it is optimal to harvest (Țârdea *et al.*, 2001). Experts working with the wine industry are of opinion that temperatures will rise by 1-2 degrees Celsius from now until 2050 and this will increase the incidence of extreme weather events (Dobrei *et al.*, 2017). Some grape varieties are more, others are less affected, it is certain that last years have clearly affected wine production and its quality (Rotaru *et al.*, 2002). In this context, the redefinition of zoning works and the introduction of ancestral varieties that have proven useful over time have to be taken into account.

## MATERIAL AND METHOD

The measurements were carried out in the Ampelographic Collection of the Faculty of Horticulture, situated on a land with a slope of about 5%, on a cambic chernozem soil. The old Romanian varieties from which table wines are frequently obtained are taken into account, namely: Ardeleancă, Braghină, Cruciuliță, Cionic. The rootstock used is Berlandieri x Riparia Kober 5 BB, and planting distances are 2.2 / 1.2 m, with a vertical monoplane trellis system and an average of 3700 plants / ha. The used system in the plantation is semi-high, with a trunk of 0.75 m, bilateral cord with pruning into spur + shoot of 4-7 buds and attribution of 40-42 eye / plant, about 14-16 eyes / m<sup>2</sup>. Soil and vine maintenance works are those specific to the industrial viticultural ecosystem.

## RESULTS AND DISCUSSIONS

Iasi vineyard is situated in a temperate continental climate of forest steppe characterized by harsh winters, warm summers and droughts. The ecological framework meets the biological requirements of varieties for white wines.

***Development of vegetation phenophases*** (tab. 1). It was observed that the Ardeleancă variety (22.04) had an earlier budding than the other observed varieties, Cioinic and Braghină having a difference of one day, and Cruciuliță has a difference of three days. Concluding on the development of the planting phenophase of budding of vine varieties studied in the Copou - Iasi ecosystem, it is observed that this phenophase takes place between 22.04 - 25.04, the differences being given by the biological characters specific to each variety.

Somewhat larger differences arise between Ardeleancă (22.04) and Cruciuliță (25.04). The earlier budding of varieties expose them to the danger of the late spring freeze, which, under the conditions of the N-E Moldavia, occur until the beginning of May. From the data analysis, it was found that this phenophase was carried out within a maximum of 7 days, with no differences between varieties.

In the case of the second phase of vegetation, blooming is observed in the Ardeleancă and Braghină varieties in June 8<sup>th</sup>. For Cioinic variety blooming occurred on June 10<sup>th</sup> and on Cruciuliță on 11<sup>th</sup> June.

The grape veraison begins with the Braghină variety (20<sup>th</sup> of July) and continues with Ardeleancă (August 15<sup>th</sup>), Cioinic (August 17<sup>th</sup>) and the latest is that of the Cruciuliță variety (August 18<sup>th</sup>).

Table 1.

**Development of vegetation phenophases of grape varieties in Iasi vineyard**

Grape variety	Budding	Flowering	Veraison	Grape maturation	Leaf fall
Ardeleancă	22.04	08.06	15.08	20.09	23.10
Cioinic	23.04	10.06	17.08	28.09	28.10
Cruciuliță	25.04	11.06	18.08	30.09	28.10
Braghină	23.04	08.06	20.07	25.08	23.10

The grape maturation of the varieties takes place between August 25<sup>th</sup> and September 30<sup>th</sup>, beginning with the Braghină variety, continued with Ardeleancă (20.09), Cioinic (28.09) and Cruciuliță (30.09).

The cycle of the active vegetation period of the white grape variety ended after 160-170 days, between 23<sup>rd</sup> and 28<sup>th</sup> of October, with the first of autumn frosts, marked by the fall of the leaves.

**Fertility and productivity of varieties** (tab. 2). Generally, the studied varieties have high fertility except for the Cioinic variety, where the percentage of fertile shoots is 66.83%. The other varieties have on average between 79.03% and 82.20% fertile shoots.

Fertility coefficients have high values for the variety Cruciuliță c.f.a. = 1.40; c.f.r. = 1 and Cioinic c.f.a. = 1.37; c.f.r. = 0.92. Instead, productivity indices are higher for varieties that also have a higher weight for a grape, such as Braghină varieties i.p.a. = 234.54; i.p.r. = 196.10 and Cioinic i.p.a. = 237.71; i.p.r. = 158.64.

Table 2

**Fertility and productivity of grape varieties in Iasi vineyard**

Grape variety	% fertile shoots	Abs. fertility coeff.	Relative fertility coeff.	Abs. prod. index	Relative prod. index
Ardeleancă	79.03	1.28	1.01	186.25	147.51
Cioinic	66.83	1.37	0.92	237.71	158.64
Cruciuliță	79.33	1.40	1.00	234.30	188.99
Braghină	82.20	1.31	1.08	234.54	196.10

**Quantity and quality of grape production** (tab. 3). The highest yields are registered for Cioinic varieties of 5.294 kg / plant and Ardeleancă 6.510 kg/vine. The other two varieties with smaller yields Cruciuliță 4.840 kg/vine and Braghină 4.3 kg/vine. The yields per hectare were: Ardeleancă 24.65 t/ha, Cioinic 20.04t/ha, Cruciuliță 18.32 t/ha, Braghină 16.28 t/ha.

Qualitatively, the accumulations in sugars range from 193 g/L to Cioinic and 165 g/L in Braghină. They are specific to varieties for wines without DOC or with GI, since they require harvesting when grapes are fully matured. The total acidity of the must is within the normal range, characteristic of white wine varieties.

Table 3

Quantity and quality of grape production in Iasi vineyard

Grape variety	Average weight of grape (g)	Mass of 100 berries (g)	Total grape production		Sugars (g/L)	Total acidity (g/L H <sub>2</sub> SO <sub>4</sub> )
			kg/plant	Calc./ha		
Ardeleancă	150	265	6.510	24.65	175	4.95
Cioinic	171	226	5.294	20.04	193	4.84
Cruciuliță	166	201	4.840	18.32	184	4.46
Braghină	170	240	4.300	16.28	165	4.89

## CONCLUSIONS

1. The Ardeleancă, Cioinic, Cruciuliță and Braghină varieties have satisfied the biological requirements in ecoclimatic conditions of the Iasi vineyard. They start vegetation in the second part of April, being protected from the danger of late spring freeze, and grapes are matured in the IV-V eras.

2. Fertility of the varieties is generally high, with the exception of the Cioinic variety, with a percentage of 66.83% fertile shoots.

3. Grape yields are high, for Ardeleancă varieties of 24.65 t/ha and Cioinic 20.04 t/ha.

4. Sugar accumulations are specific for grape varieties for wines, since harvesting took place at full maturing, which ensures balanced wines with a freshness characteristic of the more northerly vineyards.

## REFERENCES

1. Cichi Daniela Doloris, 2006 - *Modificările termice din ecosistemul viticol*. Editura Universitaria, Craiova.
2. Dobrei A., Rotaru Liliana, Dobrei Alina, 2017 – *Viticultură, Ampelografie, Oenologie*. Editura Solness, Timișoara.
3. Rotaru Liliana, Țârdea C., Mustea M., 2002 – *Behaviour of some new varieties of table grapes, created at S.C.H. Cluj-Napoca, in the ecoclimatic conditions of the Iasi vineyard*. *Lucrări Științ. U.A.M.V. Iași, seria Hortic.* vol. 1 (45), p. 215-218.
4. Țârdea C., Rotaru Liliana, Mustea M., 2001 – *Precocitatea sau timpurierea soiurilor de viță de vie și calitatea producției de struguri în podgoriile septentrionale*. *Lucrări Științ. U.S.A.M.V. Iași, seria Hortic.* vol. 44, p. 239-242.