

**PRELIMINARY RESULTS REGARDING THE
EVALUATION OF THE AGROBIOLOGICAL AND
TECHNOLOGICAL POTENTIAL OF SOME HYBRID ELITE
WITH BIOLOGICAL RESISTANCE OBTAINED AT
S.C.D.V.V. ODOBEȘTI**

**REZULTATE PRELIMINARE PRIVIND EVALUAREA
POTENȚIALULUI AGROBIOLOGIC ȘI TEHNOLOGIC AL UNOR
ELITE HIBRIDE CU REZISTENȚĂ BIOLOGICĂ OBTINUTE LA
S.C.D.V.V. ODOBEȘTI**

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***Abstract.** In the context of practicing a sustainable viticulture, with the reduction of the pesticides applied by phytosanitary treatments, it is necessary to obtain and promote vine varieties with complex biological resistance, with high potential for adaptation to the ecopedoclimatic conditions of each viticultural area, and valuable technological characteristics.*

Responding to this desideratum at S.C.D.V.V. Odobești were studied in order to evaluate the agrobiological and technological potential of two hybrid elites with biological resistance: the hybrid elite 2-5 and the hybrid elite 10-18. This paper presents preliminary data on the agrobiological and technological potential of the elites studied in the climatic conditions of the wine year 2019-2020.

Key words: hybrid elite, biological resistance, agrobiological and technological potential

***Rezumat.** În contextul practicării unei viticulturi durabile, cu reducerea cantităților de pesticide aplicate prin tratamentele fitosanitare se impune obținerea și promovarea soiurilor de vișă de vie cu rezistență biologică complexă, cu, potențial ridicat de adaptare la condițiile ecopedoclimatice ale fiecărui areal viticol, și caracteristici tehnologice valoroase.*

Răspunzând acestui deziderat la S.C.D.V.V. Odobești au fost luate în studiu în vederea evaluării potențialului agrobiologic și tehnologic două elite hibride cu rezistență biologică: elita hibridă 2-5 și elita hibridă 10-18. Această lucrare prezintă date preliminare privind potențialul agrobiologic și tehnologic al elitelor studiate în condițiile climatice ale anului viticol 2019-2020.

Cuvinte cheie: elită hibridă, rezistență biologică, potențial agrobiologic și tehnologic

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INTRODUCTION

The diversification of genetic resources by creating new varieties has an important role in protecting the environment, being known that native varieties have genes of tolerance and resistance to diseases and pests, ensuring its sustainable development at national, regional and local level (Fregoni, 1998). Research conducted in the last four decades in our country has led to several genotypes of vines with increased disease resistance, and the results were expressed by creating a base with valuable genetic material and homologating many varieties (Damian *et al.*, 2012; Culcea *et al.*, 2004). In this context, the capitalization of valuable genetic material with high productive and qualitative potential, with disease tolerance and resistance to stress factors, adapted to the ecopedoclimatic conditions of each wine area, is one of the strategic objectives of research at S.C.D.V.V. Odobești, where only in the last six years, four varieties with different production directions have been approved (Pușcalău *et al.*, 2018).

MATERIAL AND METHOD

The research was carried out at the Research and Development Station for Viticulture and Oenology (RDSVO) Odobești, in 2020. The biological material was represented by two hybrid elites with biological resistance: H.E. 2-5 (Galbenă de Odobești x Lydia) and H.E. 10-18 (Italian Riesling x Siebel 6720). The control variety was 'Fetească regală' cultivated on large surface in the vineyards Odobești.

Hybrid elites were characterized ampelographically, the phenological spectrum was monitored, observations and determinations were made regarding the elements of fertility and productivity, behavior in the main diseases of the vine, established by evaluation with grades from 1 to 9 depending on of the scale of resistance developed by the OIV (2009), quantitative and qualitative potential of grape production.

RESULTS AND DISCUSSIONS

Ampelographic characterization of the hybrid elite 10-18. At budding, the rosette is with prostrate hairs, green with a slight anthocyanin coloration (Fig. 1).



Fig. 1 Hybrid elite 10-18 (rosette, shoot, adult leaf)

The shoot is glabrous, green, with a faint anthocyanin coloration on the sunny side. The adult leaf is medium in size, wedge-shaped to pentagonal,

pentalobate. The upper lateral sinuses are closed with slightly overlapping, lyre-shaped lobes with a sharp base, and the lower sinuses completely open. The petiolar sinus is open, sometimes slightly closed, V-shaped. The grapes are of medium size, have a conical shape, rarely cylindrical with dense and semi-mobile grains. The grains are medium in size, spherical in shape, with greenish-yellow skin, with rust spots on the sunny side. The pulp does not show anthocyanin coloration, it is juicy, soft to slightly firm (Fig. 2).



Fig. 2 Hybrid elite 10-18 (inflorescence, grape, grain)

Ampelographic characterization of the hybrid elite 2-5. At budding, the rosette is with prostrate hairs, white-green with a slight anthocyanin coloration. The shoot is green with red streaks on the sunny side, with slight traces of lint. The adult leaf is medium to large, dark green, wedge-shaped to pentagonal, trilobate, rarely pentalobate, with high perosity on the underside. The upper lateral sinuses are closed with slightly overlapping, lyre-shaped lobes with a slightly rounded base, and the lower sinuses are slightly sketched. The petiolar sinus is closed, V-shaped, with overlapping lobes (Fig. 3).



Fig. 3 Hybrid elite 2-5 (rosette, shoot, adult leaf)

The grapes are of medium size, with an average length of 136 mm, have a conical or cylindrical-conical shape, with dense and semi-mobile grains. The berries are medium in size, spherical in shape, with yellow-green skin, more intense on the sunny side. The pulp is not anthocyanin in color, it is juicy and soft to slightly firm (Fig. 4).



Fig. 4 Hybrid elite 2-5 (inflorescence, grape, grain)

Climatic conditions. The thermal regime of the vegetation period was an excess, the values recorded the average air temperature (19.7°C), the average minimum air temperatures (13.3°C) and the average maximum air temperatures (27.0°C) were much higher compared to the multiannual values for these elements (18.2°C , 8.2°C , respectively 24.5°C) (tab. 1).

Table 1

The climatic conditions during the growing season (SCDVV Odobești, 2020)

| Month | Average temperatures ($^{\circ}\text{C}$) | | Extreme temperatures ($^{\circ}\text{C}$) | | Temperatures sum - $\Sigma^{\circ}\text{t}$ ($^{\circ}\text{C}$) | | | Rainfall sum (mm) | |
|-------------|---|------|---|------|--|--------------------------------------|--------------------------------------|-------------------|-------|
| | multi-annual | real | min. | max. | global ($\Sigma^{\circ}\text{tg}$) | active ($\Sigma^{\circ}\text{ta}$) | useful ($\Sigma^{\circ}\text{tu}$) | multi-annual | real |
| April | 11.2 | 12.2 | 5.3 | 19.2 | 367.1 | 302.2 | 82.1 | 49.1 | 5.2 |
| May | 16.8 | 15.8 | 10.0 | 22.7 | 489.6 | 489.6 | 179.6 | 73.4 | 55.6 |
| June | 20.2 | 21.8 | 15.3 | 29.4 | 653.6 | 653.3 | 353.3 | 85.2 | 85.2 |
| July | 22.1 | 23.5 | 17.0 | 31.2 | 729.1 | 729.1 | 419.1 | 77.9 | 28.2 |
| August | 21.7 | 24.3 | 17.6 | 31.8 | 751.8 | 751.8 | 441.8 | 59.7 | 13.0 |
| September | 17.1 | 20.6 | 14.6 | 27.7 | 617.5 | 617.5 | 317.5 | 45.7 | 31.4 |
| Average/sum | 18.2 | 19.7 | 13.3 | 27.0 | 3608.7 | 3543.5 | 1793.4 | 391.3 | 218.6 |

The rainfall regime was deficient in the vegetation period, the amount of precipitation recorded in this period (218.6 mm) represents about 56% of the multiannual value for this period (391.3 mm). The months of July, August poor in precipitation (28.2 mm and 16.6 mm, respectively) and in September most of the precipitation was recorded in the last three days of the month.

Phenological spectrum (tab. 2.)

Table 2

The phenological spectrum (Odobești, 2020 -average values)

| Elite variety hybrid | Phenological phase | | | | Vegetation period active (days) |
|-----------------------|--------------------|------------|----------|--------------------------|---------------------------------|
| | Disbudding | Flowerin g | Veraison | Physiologi- cal maturity | |
| E.H. 10-18 | 14.IV | 03.VI | 02.VIII | 10.IX | 150 |
| E.H. 2-5 | 13.IV | 05.VI | 04.VIII | 15.IX | 156 |
| Fetească regală (Mt.) | 10.IV | 03.VI | 03.VIII | 09.IX | 153 |

In the climatic conditions of the wine year 2020, the disbudding was recorded earlier to the studied hybrid elites compared to the control variety (14 IV in the hybrid elite 10-18, respectively 13 IV in the hybrid elite 2-5). Full ripening of the grapes was later recorded in the hybrid elite 2-5 (15 IX) and the hybrid elite 10-18 (10 IX) compared to the control variety.

Fertility and productivity. In the conditions of the wine year 2020, the hybrid elites 10-18 and 2-5 demonstrated a medium to high production potential (66.4%, respectively 66.5% fertile shoots), but inferior to the control variety – Fetească regală (91.9% shoots fertile), known for its high fertility (tab. 3).

Table 3

The fertility and productivity (Odobești, 2020 - average values)

| Elite variety hybrid | Fertile shoots (%) | Fertility coefficients | | Average weight of a bunch (g) | Productivity indices | |
|-----------------------|--------------------|------------------------|----------|-------------------------------|----------------------|----------|
| | | Relative | Absolute | | Relative | Absolute |
| E.H. 10-18 | 66.4 | 1.05 | 1.58 | 192,3 | 202 | 303 |
| E.H. 2-5 | 66.5 | 1.07 | 1.60 | 172,4 | 184 | 276 |
| Fetească regală (Mt.) | 91.9 | 1.58 | 1.72 | 154.0 | 243 | 265 |

The fertility coefficients to the two hybrid elites had close values (1.05 and 1.07 for Cfr and 1.58 and 1.60 for Cfa, respectively), but lower than the control variety (1.72 - Cfr and 1.58 Cfa). Determined by the average weight of the grapes and the values of the fertility coefficients, the productivity indices (relative and absolute) varied between 184 (EH 2-5) and 202 (EH 10-18) for Ipr and 276 (EH 2-5) and 304 (EH 10-18) for Ipa.

Biological resistance to major fungal diseases was determined by calculating the degree of attack on leaves and grapes and evaluated according to the resistance scale developed by the O.I.V. (tab. 4).

Table 4

Behavior at the main diseases of the vine (Odobești, 2020)(OIV descriptor list for grape varieties and *Vitis* species, 2nd edition – 2009)

| Elite variety hybrid | Downy mildew (<i>Plasmopara viticola</i>) | | Powdery mildew (<i>Uncinula necator</i>) | | Black rot (<i>Botrytis cinerea</i>) | |
|-----------------------|--|------------------|---|------------------|--|------------------|
| | Leaf OIV 452 | Grape OIV 453 | Leaf OIV 455 | Grape OIV 456 | Leaf OIV 458 | Grape OIV 459 |
| E.H. 10-18 | 9 | 7-9 | 9 | 9 | 9 | 7-9 |
| E.H. 2-5 | 9 | 9 | 9 | 9 | 9 | 9 |
| Fetească regală (Mt.) | 7 | 7-9 | 7 | 7-9 | 9 | 7 |

The weather conditions of 2020 year were not favorable for the appearance and development of pathogens. As a result, in the conditions of application of the treatment scheme, the studied genotypes showed a high and very high degree of resistance to the attack of the main disease of the vine.

Quantity and quality of production. The study of the technological characteristics of the grape production completed the knowledge elements for the hybrid elites studied (tab. 5). Quantitatively the hybrid elite 10-18 achieved a

production of 6.73 kg/vine, 4% higher compared to the control variety, and the hybrid elite 2-5 achieved a production of 5.17 kg/vine, lower by 20% compared with the control variety.

Table 5

Quantitative and qualitative characteristics of grapes and juice

| Elite variety hybrid | Grape production | | Quality of the juice | | |
|-----------------------|------------------|--------|----------------------|--|------------------------|
| | kg/vine | kg/ha | Sugars g/l | Total acidity g/H ₂ SO ₄ | Index glucoacidimetric |
| E.H. 10-18 | 6.73 | 25,490 | 206 | 4.14 | 49.76 |
| E.H. 2-5 | 5.17 | 19,580 | 183 | 4.51 | 40.58 |
| Fetească regală (Mt.) | 6.47 | 24.500 | 181 | 4.15 | 43,61 |

The lack of precipitation and the maximum temperatures higher than 30°C registered for 55 days during the ripening period of the grapes, influenced the optimal development of the biochemical processes of sugar accumulation in the grains. Under these conditions, the two hybrid elites accumulated between 183 g/l (E.H. 2-5) and 206 g/l (E.H. 10-18), under conditions of a good total acidity of 4.14 g/l H₂SO₄, respectively 4.51 g/l H₂SO₄. The glucoacidimetric index had values between 49.76 in the hybrid elite 10-18 and 40.58 in the hybrid elite 2-5.

CONCLUSIONS

1. On the background of the weather conditions of 2020 year, the hybrid elites 10-18 and 2-5 showed a very high degree of resistance to the attack of the main cryptogamic diseases.

2. In the conditions of the wine year 2020, the hybrid elites 10-18 and 2-5 showed valuable agrobiological and agroproductive characteristics, with a productive and qualitative potential superior or close to the control variety.

3. Further evaluation of the agrobiological and agro-productive potential of hybrid elites 10-18 and 2-5 is necessary for the promotion in culture and diversification of the local assortment of varieties with high ecological plasticity.

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