

## TABLE GRAPES PRODUCTION SECTOR IN ROMANIA - EVALUATION, THE CURRENT STATE AND PERSPECTIVES

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### **Abstract**

*This paper presents the results of the study on the dynamics of the surfaces and table grapes productions in Romania, depending on the favourability of the various wine-growing areas, as well as the main stages of the wine sector evolution over the last 3 decades. There are also stated issues related to the evolution of fresh grapes consumption, the evolution of imports and the structure of the assortment. Over the last three decades, Romania's total table grapes surface under production decreased by 73.47%, while the production decreased by 63.34% in the same period. It is noted that although Romania has valuable seeded and seedless table grape varieties, as a result of the last 4 decades in the field of table grape breeding, they have a share of only 4% of the total area cultivated with table grape varieties, which indicates insufficient and inefficient use of Romania's genetic resources. Compared to 2000, the volume of imports increased by + 125% in 2004, reaching in 2014 29,000 tons of imports (an increase by +625% compared to 2000 and by + 163.7% compared to 2010).*

**Key words:** grapevine, fresh consumption, Romania, trends.

### **INTRODUCTION**

Due to their chemical composition, fresh grapes are part of a very valuable and important food category for the human body. In the last decades, the public's focus and attention towards a balanced, healthy diet has led worldwide to a constant concern of medical and food science specialists, nutritionists about their value and the benefits of grape consumption on the human body (FAO-OIV, 2016; Watson & Preedy, 2010). Scientific research in recent years underlines the therapeutic value of eating fresh grapes or grape juice, especially in the treatment of diseases such as diabetes, cardiovascular, liver and kidney diseases, anemia, due to the antioxidant properties (Yldirim et al., 2005; Iriti & Faoro, 2010), antithrombosis (Carrieri et al., 2013), antihyperglycemic effect (Pinent et al., 2004; Montagut et al., 2010), alkalizing (Schwalfenberg, 2012), hepatoprotective (Buchner et al., 2014; Gonçalves et al., 2018) and vitaminizing effect.

The high production per hectare (over 15-20 t/ha), of which over 80% of the production of commodities, as well as the high sales price of fresh grapes, make the table grape variety a profitable crop (Dobrei et al., 2009; Olteanu et al., 2002; Rotaru et al., 2011).

Consumers' preferences are constantly changing, they differ from one country to another, and these are important aspects of marketing strategies (Ma et al, 2016). Ensuring a varied supply of table grape varieties, with different sizes and shapes of clusters and berries, with different colours of the skin (Bucur & Dejeu, 2018), with crispy texture (Fillion & Kilcast, 2002), seedless (Sonego et al., 2002; Vargas et al., 2013; Cichi & Popa, 2017), with specific taste and flavour characteristics (Rolle et al., 2015), with different maturity times (Ciobotea et al., 2014; Costescu, 2013; Muntean et al., 2013), with increased resistance to diseases, pests and adverse environmental factors (Bunea et al., 2009; Rotaru et al., 2010; Stroe, 2016; Vujović et al., 2017), with good transport and storage resistance (Piazzola et al, 2016), they are

constantly in the attention of specialists and researchers in the field of table grape varieties improvements.

Four areas of favorability for the table grape crops were delimited in Romania, on the basis of detailed and systematic studies on the bioproductive and qualitative performances of different table grape varieties in relation to the climatic conditions in different areas (Oşlobeanu et al., 1991; Cichi et al., 2013), as follows: *very favourable table grape growing regions*, *medium favourable table grape growing regions* and *tolerant table grape growing regions*. The very favourable table grape growing regions include areas along the Danube's terraces and some areas in Dobrogea. The favourable table grape growing regions include mainly vineyards and wine-growing centers in Dobrogea, as well as vineyards and wine-growing centers in Muntenia and Oltenia (Dealul Mare, Dealurile Buzăului, Dealurile Craiovei vineyards etc.). The medium favourable table grape growing regions include wine areas in the southern and central areas of Moldova, northern Oltenia (Gorj, Vâlcea counties), in the eastern part (Argeş County) and western Muntenia (Brăila County), as well as in Banat areas. The tolerant areas include the areas of Transylvania, Crişana, Maramureş and north-east of Moldova (Olteanu et al., 2002).

The requirements and exigencies of the increasing Romanian consumers regarding the diversified supply of table grape varieties and their nutritional and health quality plus the socio-economic changes that have taken place in the wine-growing sector in the last 3 decades in Romania, require a detailed analysis of the table grapes production and marketing sector during this period, in order to identify solutions for its dynamism and efficiency.

## MATERIALS AND METHODS

In order to conduct this study, we have used and processed statistical data obtained from different sources, namely: official reports of international organizations (International Organization of vine and Wine - O.I.V., Food and Agriculture Organization of the United Nations- FAO, Statistical Office of the European Union - EUROSTAT), official national sources (National Institute of Statistics

of Romania-NIS, Ministry of Agriculture and Rural Development-MARD), as well as reports of some national and international non-governmental bodies in the vitiviniculture sector.

We analyze the dynamics of the surfaces and table grapes productions in Romania, depending on the favourability of the various wine-growing areas, as well as the main stages of the wine sector evolution over the last 3 decades. There are also stated issues related to the evolution of fresh grapes consumption, the evolution of imports and the structure of the assortment.

The four areas of favourability for table grape varieties crops were abbreviated as follows: VFTG for very favourable grape growing regions, FTG for favourable table grape growing regions, MFTG for medium favourable table grape growing regions and TTG for tolerant table grape growing regions. For statistical analysis XLSTAT-Pro Addinsoft for Microsoft Excel were used.

## RESULTS AND DISCUSSIONS

In 1979, Romania had 35,214 ha cultivated with table grape varieties, representing about 19% of the total wine-growing area (Oşlobeanu M. et al., 1980). Although for the 1981-1985 period, according to socialist policy, a considerable increase (up to 65,000 ha) of the area planted with table grapes was foreseen, it represented only 12% of the total vineyard plantations in 1990, followed by a continuous decrease up to 4% in 2017 (Figure 1).

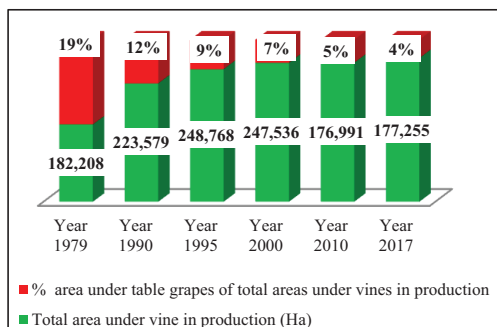


Figure 1. The crop share of the cultivated areas with table grapes in Romania (Data Sources: NIS of Romania; MARD of Romania)

The total area cultivated with table grapes for production of Romania was 25931 Ha in 1990, with a balanced territorial distribution in areas of favorability, namely 36% in the very favourable area, 25% in the favourable area, 27% in the medium favourable area and 11% in tolerant areas (Table 1, Figure 2.a).

Since the '90s, we have witnessed a continuous decrease of the surface cultivated with table grapes in Romania, with the highest decrease recorded in the 2000-2009 period (-46.89% total area in 2009 compared to 2000). In the same interval, we also notice a significant decline of the areas cultivated in the very favourable areas (-75.5%) and in the favourable area for the cultivation of table grapes varieties (-65.23%).

On the basis of the processed data, we observe that in 2017 Romania has in production a total

area cultivated with table grapes of 6879 Ha (-73.47% compared to 1990). There is a massive decline in very favourable grape growing regions (only 536 ha, decreasing by 94.21% compared to 1990) and in the favourable grape growing regions (-81.00%), Table 1.

Regarding the distribution of surfaces in relation with the favorability areas of cultures in Romania in 2017, the imbalance is obvious (Figure 2b). Thus, the area of table grapes in production in very favourable regions for table grapes represents only 8% of the total table grapes vineyards under production in Romania (for 2017) and 18% in the favourable regions for table grapes (Figure 2b). By contrast, in 2017, the *medium favourable regions for table grapes* surface represented 68% of the total surface for table grapes under production in Romania (Figure 2b).

Table 1. The evolution of table grapes surfaces within the Romania vineyards \* (Ha)

Suitability classes of viticoles areas	1990	1990-1999		2000-2009		2010-2017		2017	2017/1990 (%)
		Average	1999/1990 (%)	Average	2009/2000 (%)	Average	2017/2010 (%)		
VFTG	9258	6129	-59.65	2054	-75.55	736	-46.35	536	-94.21
FTG	6534	5778	-29	3533	-65.23	1348	-35.20	1255	-81.00
MFTG	6929	8070	+25.49	6881	-21.52	5286	-24.30	4684	-32.40
TTG	2988	1943	-55.86	998	-48.89	443	-11	397	-86.71
Other areas	222	-	-	-	-	-	-	7	-96.84
<i>Total Romania</i>	<i>25931</i>	<i>22141</i>	<i>-28.39%</i>	<i>13552</i>	<i>-46.89%</i>	<i>7817</i>	<i>-28.18%</i>	<i>6879</i>	<i>-73.47%</i>

\*Table grape vineyards, in production

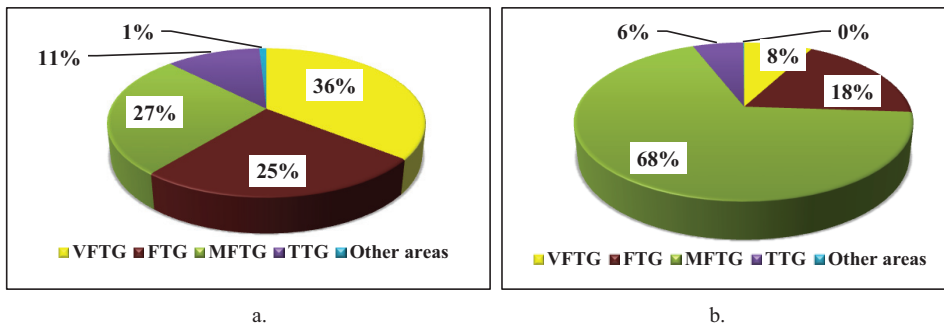


Figure 2- Distribution of vineyards (%) by class suitability of Romanian table grapes growing region (a.1990; b.2017)

This decline is due, on the one hand, to the legislative changes (Dascălu et al., 2017; Rusu & Enia, 2018) on land restitution (that were collectivized in the communist period) to the old owners and the change in the use of these lands previously cultivated with table grape varieties (replanting with direct producer

hybrids, other types of horticultural crops, cereals, etc.) and, on the other hand, the lack of a national strategy for the recovery of the table grape production sector, especially after 1997.

*The production of table grapes.* In 1990 the production of table grapes in Romania was 130,064 tons, 60.5% of this being obtained in

the very favourable and favourable growing regions for table grapes in Romania (Table 2). After 1990, with the exception of *medium favourable growing regions* for table grapes (between 1990 and 1999), *very favourable growing regions for table grapes* and *tolerant areas* (during the 2010-2017 period) there has been a considerable decrease in the production of table grapes in all vineyards in Romania. In 2017, the total table grape production in Romania was 47,678 tons, decreasing by 63.34% compared to 1990. Compared to 1990, the yields decreased by 87.50% in very favourable areas for table grapes and by 86.78% in favourable areas for table grapes (Table 2).

This is due, on the one hand, to the decreasing of the wine-growing areas cultivated with table varieties (Table 1), to the large share of aging vineyards (56% of vineyards are 30 years old or above, Figure 3), to the less favourable climatic conditions of certain years (exceptional cold winters, drought, etc.) but also to the poor implementation of the various national legislative measures regarding the extension and zoning of the new table grape

varieties created in the last decades in Romania, superior in terms of quantity and intrinsic and extrinsic qualities compared to the old varieties that are already cultivated. Additionally, especially after the 90's, there is a lack of a real strategy to support the Romanian wine sector for the production of table grapes varieties seedlings, as well as a lack of financial funds directed to support the establishment of new table grapes plantations.

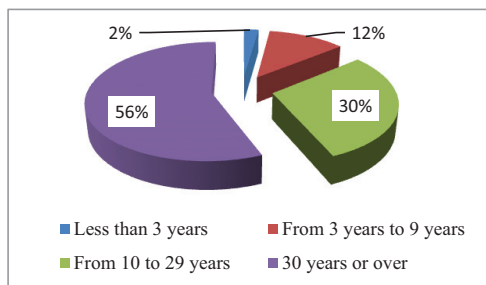


Figure 3. Main vine varieties by vineyards age class in Romania, 2015 (Data Sources: EUROSTAT, <https://ec.europa.eu/eurostat/fr/web/agriculture/data/database>; NIS of Romania)

Table 2. The evolution of fresh grapes production in Romania (tonnes)

Suitability classes of viticoles areas	1990	1990-1999		2000-2009		2010-2017		2017	±2017/1990 (%)
		Average	±1999/1990 (%)	Average	±2009/2000 (%)	Average	±2017/2010 (%)		
VFTG	32658	26424	-59.36	9892	-75.78	3254	+16	4135	-87.50
FTG	46025	33859	-47.66	19733	-70.36	8044	-11	8366	-86.78
MFTG	38821	47517	+66.15	46546	-11.85	33172	-7.5	32395	-16.55
TTG	12043	7509	-54.38	4762	-20.72	2325	+62.89	2748	-77.20
Other areas	517	-	-	-	-	-	-	34	-93.42
<b>Total Romania</b>	<b>130064</b>	<b>115909</b>	<b>-17.2%</b>	<b>81136</b>	<b>-37.7%</b>	<b>46819</b>	<b>-4%</b>	<b>47678</b>	<b>-63.34%</b>

*The assortment of table grape varieties* in Romania is in a continuous dynamics, depending on the preferences and requirements of consumers, as well as on the progress achieved in the field of breeding and genetic researches.

Since the 1970s, the programs of improvement in Romania for table grape varieties aimed to the: diversification of the range and rescheduling the consumption of fresh grapes for as long as possible during the year, creation of new genotypes with qualities for fertility, productiveness and superior quality, the production of seedless or partially seedless varieties with increased resistance to diseases, pests or unfavourable environmental factors

(frost, drought, etc.). Thus, in the 1970-2018 period in Romania 32 new grape varieties for fresh consumption were obtained, of which 28 seeded and 4 seedless varieties.

Analyzing the structure of the table grape variety assortment in Romania, according to the latest regulations at national level according to the Ministry of Agriculture and Rural Development of Romania (Order of the MARD, No. 225 of 31 March 2006 - approving *Zoning noble grape varieties of fruitful vines admitted in culture in growing areas in Romania* and the *Official Catalog of varieties of crop plants in Romania for 2018*-<http://istis.ro/Catalog-ISTIS>) and the favourability of crop areas, there is a lack in the

assortment of varieties with very early and very late ripening, which leads to an inefficient use of the potential for early maturation in very

favourable and favourable table grape growing regions (Table 3 and Table 4).

Table 3. The structure of table grape assortment by class suitability of table grape growing regions in Romania\*
























Class Suitability of the table grape growing regions	Very Early	Early	Mid-season	Late	Very late
Very favourable table grape growing regions	-	Cardinal	Muscat Hamburg	Afuz Ali	Greaca <sup>1</sup>
		Augusta	Muscat Adda	Italia	
		Centenar Pietroasa <sup>a,1</sup>	Alphonse Lavalee <sup>1</sup>	Select	
		Victoria	Sultanina <sup>a,1</sup>	Tamina	
		Timpuriu de Pietroasa <sup>a,1</sup>	Istrița <sup>1</sup>	Xenia	
		Otilia <sup>a,1</sup>			
Favourable table grape growing regions	-	Cardinal	Muscat Hamburg	Afuz Ali	-
		Augusta	Muscat Adda	Italia	
		Timpuriu de Pietroasa <sup>a,1</sup>	Chasselas de Băneasa <sup>1</sup>	Select	
		Centenar Pietroasa <sup>a,1</sup>	Alphonse Lavalee <sup>1</sup>	Tamina	
		Victoria	Istrița <sup>1</sup>	Xenia	
		Otilia <sup>a,1</sup>	Milcov <sup>1</sup>		
		Napoca <sup>1</sup>	Transilvania <sup>1</sup>		
			Silvania <sup>1</sup>		
			Azur		
			Călina <sup>a,1</sup>		
Medium favourable table grape growing regions	-	Cardinal	Chasselas doré	Coarnă neagră selecționată	-
		Napoca <sup>1</sup>	Chasselas rose	Xenia	
		Victoria	Gelu <sup>1</sup>	Afuz Ali	
		Augusta	Paula <sup>1</sup>	Tamina	
		Centenar Pietroasa <sup>a,1</sup>	Muscat de Hamburg		
		Otilia <sup>a,1</sup>	Muscat Adda		
		Timpuriu de Pietroasa <sup>1</sup>	Silvania <sup>1</sup>		
			Transilvania <sup>1</sup>		
			Milcov <sup>1</sup>		
Tolerated table grape growing regions	-	Timpuriu de Cluj <sup>1</sup>	Transilvania <sup>1</sup>	-	-
		Napoca <sup>1</sup>	Splendid <sup>1</sup>		
		Victoria	Someșan <sup>1</sup>		
			Cetățuia <sup>1</sup>		
			Chasselas doré		
			Gelu <sup>1</sup>		
			Paula <sup>1</sup>		
			Muscat de Hamburg		
			Silvania <sup>1</sup>		

\* In accordance with Order of the MARD, No. 225 of 31 March 2006 and the Official Catalog of varieties of crop plants in Romania for 2018; <sup>a</sup> Seedless; <sup>1</sup> is not advised to multiply and commercialize since 2018; Very early- about 4 weeks before Chasselas doré; Early ripening- about 2 weeks before Chasselas doré; Mid-season- ripening at the same time as Chasselas doré or 1-2 weeks after; Late- 3-4 weeks after Chasselas doré; Very late-5-6 weeks after.

However, although Romania has valuable seeded and seedless table grape varieties, as a result of the last 4 decades in the field of breeding researches (Martin et al., 1974; Oprea& Moldovan, 2007), with all the regulations foreseen in the 1980-1991 period regarding their extension to culture, they had a

share in 2013 of only 4% (Figure 4) of the total area cultivated with table grape varieties. In 2013 the highest share in the assortment (40%) is the Chasselas doré (mid-season) variety, followed by Afuz Ali (late-season) and Muscat de Hamburg with 12% (Figure 4).

Table 4. The table grapes varieties and clonal selections authorized for planting in Romania since 2018 \*

Very Early	Early	Mid-season	Late	Very late
Auriu de Ștefănești <sup>3</sup> 	Augusta 	Chasselas roz 	Afuz Ali, Afuz Ali 14 Gr., Afuz Ali 93 Mf. 	-
	Aurana 	Muscat Hamburg, Muscat de Hamburg 32 Mf., Muscat de Hamburg 424 Gr. <sup>2</sup> 	Italia, Italia 25 Gr., Italia 93 Mf. 	
	Cardinal 74 Mf. 	Muscat Adda 22 Șt. <sup>2</sup> 	Xenia 	
	Victoria 	Calina <sup>1</sup> 	Tamina 	
	Mihaela 	Norocel <sup>1</sup> 	Select 	
	Perlette 10 Șt. <sup>1,2</sup> 	Silvania 	Oltean 	
		Putna 	Coarnă neagră selecționată 	
		Perla de Feredeau 		
		Memory 		

\*According to the Official Catalog of varieties of crop plants in Romania for 2018 (by Minister of Agriculture and Rural Development of Romania and State Institute for Testing and Variety Registration); <sup>1</sup>Seedless grapes; <sup>2</sup> Authorized until 30 June 2018; <sup>3</sup> Authorized until 2020.

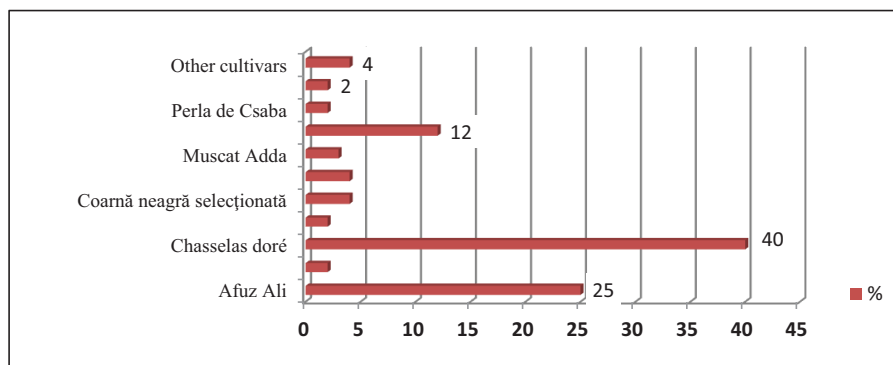


Figure 4- The main table grape varieties grown in Romania in 2013 (Data Source: NIS of Romania)

We also note that Victoria variety, very valuable in terms of early ripening, productive and qualitative performances, highly appreciated by Romanian and worldwide consumers (FAO-OIV, 2016; Ferrara et al., 2017; Gougoulis et al., 2015), occupies in 2013 only 2% (about 85 ha) of the total area cultivated with table grape varieties in

Romania, whereas in Italy, the Victoria variety occupied an area of 3968.35 ha in 2000, being the second variety as percentage in the assortment of table grapes in Italy (AA.VV., 2010).

According to the Official catalog of crop plants varieties in Romania for 2018 (by the Ministry of Agriculture and Rural Development of

Romania and the State Institute for Testing and Registration of Varieties), 20 varieties of grapes for fresh consumption and 9 clonal selections are authorized for multiply and commercialize in Romania (Table 4). Out of these, two varieties (Călina and Norocel) and Perlette 10 Șt. clone are seedless grapes. Auriu de Ștefănești, the only variety with very early ripening, very valuable in terms of precocity of maturation and commercial appearance, quality and productive qualities (Popa et al., 2008) has been approved for breeding and marketing only until the end of June 2018.

We appreciate that due to its qualities, this variety still deserves particular attention in terms of its testing in areas with the maximum favourability for the precocity of table grape maturation as well as the identification of optimal technology solutions to maximize its productive, qualitative performances, of economic efficiency in different areas.

In the absence of a real national strategy on the conservation, evaluation and use of the existing table grape genetic heritage in Romania, there is a risk of loss of valuable sources of germplasm, particularly useful in the selection and breeding programs, which will have effects on long term.

*The consumption of fresh grapes.* The grape consumption in Romania has recorded significant quantitative fluctuations in the last forty years (Figure 4). In 1979 the consumption of fresh grapes was 12 kg/capita (Oșlobeanu et al., 1980). Almost the same consumption was recorded in 1995 and 1996, after which an almost continuous decrease (excluding 2002 and 2004) was observed, reaching in 2005 the lowest level in the last 40 years of only 2.5 kg/capita. After 2010, there is a constant upward trend of fresh grapes consumption, which reaches 7.9 Kg per capita in 2017 (Figure 5).

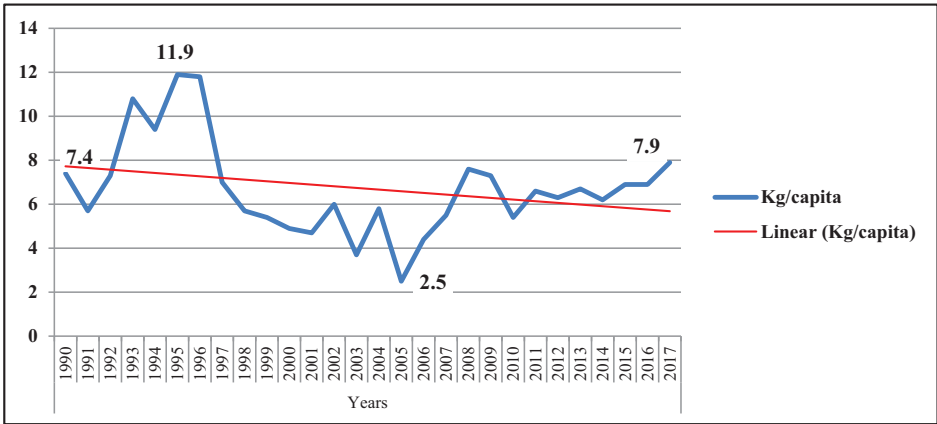


Figure 5. The Romanian consumption of fresh grapes (Data Sources: NIS of Romania; OIV; FAO-OIV, 2016)

*Imports.* As a consequence of the massive reduction of the domestic production of fresh grapes during the last decades, of the lack of variety of very early and very late maturation varieties, adding also the poor conservation and storage infrastructure under controlled conditions of the fresh grapes, Romania has permanently imported (Figure 6). Compared to 2000, the volume of imports increased by + 125% in 2004, + 250% in 2009, reaching in 2014 29,000 tons of imports (an increase by +625% compared to 2000 and by + 163.7% compared to 2010).

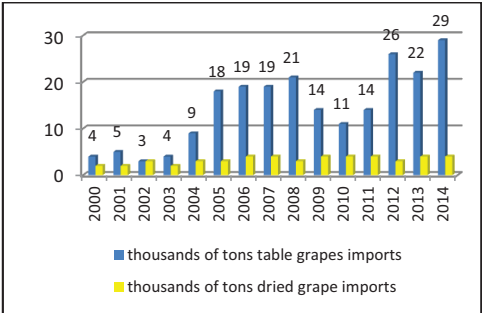


Figure 6- The evolution of fresh grapes imports (Data Sources: NIS of Romania; OIV; FAO-OIV, 2016)



The average import value (including dried grapes) has increased considerably between 1991 and 2017 (Figure 7).

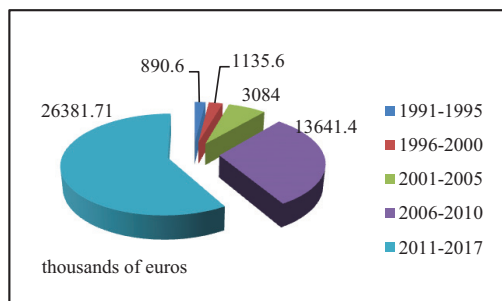


Figure 7. The import value of table grapes and dried grapes in Romania (Data Sources: NIS of Romania; OIV; FAO-OIV, 2016)

If during the 1991-1995 period, the average value of imports in Romania was 890.6 thousand Euros, there is a fulminant increase after 2005, reaching in the 2011-2017 period an average of 26381.71 thousand Euros import value, increasing with +1432 % in the 2006-2010 period and +2862% respectively in the 2011-2017 period compared to 1991-1995. This is explained both by the massive increase in the volume of Romania's imports of fresh grapes and by the increase in the price per kg.

## CONCLUSIONS

Over the last three decades, Romania's total table grapes surface under production decreased by 73.47%, while the production decreased by 63.34% in the same period. Regarding the distribution of the table grape areas in relation to the favourability of the Romanian growing areas in the last three decades, there is an obvious imbalance in the drastic reduction of the table grapes surfaces of *very favourable* and *favourable regions for table grapes*.

It is noted that although Romania has valuable seeded and seedless table grape varieties, as a result of the last 4 decades in the field of improvement, they have a share of only 4% of the total area cultivated with table grape varieties, which indicates insufficient and inefficient use of Romania's genetic resources.

It is also observed that there is a lack of varieties of very early and very late ripening,

which leads to an inefficient use of the potential for early maturation of the very favourable and favourable table grape growing regions and to the reduction of the period of consumption of fresh grapes.

The fresh grape consumption is steadily increasing after 2010.

Romania's imports of fresh grapes grew by +625% in 2014 compared to 2000. The imports value (including dried grapes) increased by +2862% in the 2011-2017 period as compared to the 1991-1995 period.

In this context, a strategic national alliance, including government, R&D, table grape producers, market sectors will be efficient and will focus on:

- the implementation of an efficient management of the natural resources available in Romania through capitalization of the areas favourable for table grapes and the existing table grape genetic heritage;
- the identification and evaluation of the Romanian breed varieties with high market potential;
- the diversification of the assortment of varieties with very early and very late ripening by the creation of new varieties, including the preservation of the Auriu de Ștefănești variety, the only very early variety and its testing in various areas of the very favourable and favourable regions for table grapes, for the capitalization of maturation precocity and its qualities;
- creation of seedless varieties, with large berries and balanced taste;
- the extension of the Victoria variety crops;
- the increasing of the productivity and efficiency of table grape varieties by optimizing crop technologies according to the area of culture;
- a better information of producers and consumers in Romania on the results of researches and improvement of Romanian table grape varieties;
- financial support for the grapevine nursery sector, in order to ensure producers with table grape quality autochthonous planting material;
- Government programs to support access on the markets (supermarkets) of the Romanian producers.

Thus, it is imperative to provide governmental support and financial support to succeed in the



revitalization and sustainable development of the table grapes production and marketing sector in our country.

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- \*\*\* Order of the Minister No. 225 of 31 March 2006 - approving Zoning noble grape varieties of fruitful vines admitted in culture in growing areas in Romania.
- \*\*\*\*\* OIV World Vitivinicultural Statistics, <http://www.oiv.int/en/technical-standards-and-documents/statistical-analysis/statistical-data>.