

**AMPELOGRAPHIC CHARACTERISTICS OF TWO FORMS OF GRAPEVINE
CULTIVAR TRAMINER IN VINEGROWING SUBREGION OF NIŠ**

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Abstract

Traminer is a very old and widespread cultivar with many biotypes characterized by diversity of genetic and phenotypic properties. Researches included two Traminer cultivar forms: Gewürztraminer and Red Traminer. The study was done in the collection vineyard of the Center of Viticulture and Enology of Niš. The collection vineyard was established in 1995, with planting space 3 x 1.2 m. The investigation lasted three years (2004-2006), and it included phenological observations, fertility, grape yield of the examined Traminer cultivar forms, resistance to *Botrytis cinerea* and wine quality. This paper also gives a detailed ampelographic description Traminer cultivar forms, according to OIV descriptors. The purpose of this paper is to determine growth, fertility, yield, and grape and wine quality of the examined Traminer cultivar forms in the viticultural subregion of Niš. Average grape yield varied depending on conditions of the particular year. Red Traminer recorded higher yield. Red Traminer wine has been awarded the average organoleptic grade of 18.44 points, which classifies it in the category of top-level white wines. Wine tasting grade awarded to Gewürztraminer wine is 18.21 points, which classifies it in the category of top-level white wines. According to the results obtained, the examined forms could successfully grow in this region. In addition, the best vines have been selected within the forms, and they will be used in further studies and multiplication.

Key words: *Ampelographic Description, Fertility, Traminer, Variety.*

Introduction

Traminer is an old European grape variety which still has a burden of unanswered questions and attracts attention of scientist in viticulture and enology. The variety, as well as its clones and subvarieties, is described by many researchers, and all of them pointed out to its great variability in quantitative and qualitative traits (Zirojević, 1974; Galet, 1998; Cindrić et al., 2000; Imazio et al., 2002; Kaserer et al., 2003; Santiago et al., 2007). The first written data about this variety go back to XV century (Goethe, 1887). There is an opinion that its origin is Tyrolean town Tramin in Italy, from where it spreaded to many European countries (Goethe, 1887). Traminer is a heterogeneous variety with several clones and sub varieties, and there are some disputes about them. Thus, according to botanical characteristics Gewürztraminer is identical to Red Traminer, but some researchers reported it as a separate variety (Pospišilova, 1981). In many papers Hillebrand (1984) did not mention Red Traminer but Gewürztraminer. On the contrary, Nemeth (1975) did not regard Gewürztraminer as a separate variety but as a variant of Red Traminer. Gewürztraminer showed the greatest success in Alsace. During late XIX century Alsatians used name Gewürztraminer for this variety and wine from it, although the name was officially approved in 1973. Because of its limited popularity and difficulties that follow its production, area under Gewürztraminer is in stagnation throughout the world.

Approximate areas under Gewürztraminer are the following: Alsace 2500 ha; Germany less than 1000 ha; Australia 600 ha; California 690 ha. In the vine growing regions of Serbia this variety can be met only in collection vineyards, while in production vineyards it is almost completely absent. Red Traminer with its more productive subvarieties is dominant, but those genotypes have weaker scent than that usually expected from Traminer (Zirojevi , 1974; Žuni , 1995; Cindri et al., 2000).

This paper has been aimed to establish growth, productivity, grape yield, as well as quality of grapes, must and wine of the variety Gewürztraminer, which can improve knowledge about properties of this variety and its suitability for growing in the conditions of Niš subregion.

Material and Methods

The investigation has been carried out during the period 2004-2006 in the collection vineyard of the Center for Viticulture and Enology at Niš. This grape varieties' collection is located in vine growing subregion of Niš, characterized by moderately continental climate with average annual air temperature of 11.8°C and average vegetational air temperature of 18.1°C. The absolute minimum of air temperature during the study was -18.2°C. The average annual precipitation amount in the observed period was 750 mm, 422 mm of which fell during vegetation. Soil type was eutric cambisol. The vineyard was established in 1995, with planting distance of 3x1.2 m (2777 vines per ha), which was universal value for the all varieties at this collection vineyard. Bud load per vine was 20 buds or 6.6 buds per m². The trial was set in random complete block design with four replications, and the data were processed by analysis of variance. Ampelographic description has been done according to the descriptor list of OIV. Resistance to *Botrytis cinerea* was estimated by means of OIV descriptor, Code 459: 1 – 3 very low resistance, 5 – medium resistance, 7 – 9 high or very high resistance. Must quality, presented through the average content of sugar and total acid, was determined on representative samples during the vintage. Oechsle's scale was used to measure sugar content, while titration with N/4 NaOH was applied in order to measure the total content of acid. Microvinification and chemical analysis of wine were carried out in the enological laboratory of the Viticulture and Wine Production Center of Niš. The quality of the wine produced was determined based on the results of the chemical analysis and organoleptic assessment made by the wine tasting commission of the Faculty of Agriculture, University of Belgrade. The all observed parameters were determined by standard ampelographic procedures.

Results and Discussion

Ampelographic description has been done according to the descriptor list for grape varieties and *Vitis* species by OIV and harmonized with its 2nd edition (OIV, 2009).

Table 1. Ampelographic description of the Traminer forms using OIV descriptor

Code	Gewürztraminer	Red Traminer
OIV 001	5	5
OIV 003	3	3
OIV 004	7	7
OIV 006	3	3
OIV 065	3	3
OIV 067	4	4
OIV 068	2	2
OIV 069	5	7
OIV 080	2	2
OIV 082	1	1
OIV 086	7	7
OIV 093	3	3

OIV 101	2	2
OIV 103	3	3
OIV 353	3	3
OIV 151	3	3
OIV 202	3	3
OIV 204	7	7
OIV 206	1	1
OIV 220	3	3
OIV 222	2	2
OIV 223	3	3
OIV 225	1	3
OIV 236	2	2
OIV 503	1	3
OIV 242	5	5
OIV 243	1	1

The examined Traminer forms did not show any considerable differences based on the acquired data on ampelographic and botanical description of the tip of a young shoot, a leaf, a blossom, a flower, a bunch and a mature shoot (Table 1).

The number of developed and fertile shoots considerably varied between the examined forms of Traminer cultivar (Table 2).

Table 2. The number of developed and fertile shoots

Forms	The number of developed shoots				The number of fertile shoots			
	2004	2005	2006	Average	2004	2005	2006	Average
Gewürztraminer	16.50	14.75	17.92	16.39	12.25	8.67	14.50	11.81
Red Traminer	17.58	16.08	17.17	16.94	13.17	11.17	13.50	12.61
Average	17.04	15.41	17.54	16.66	12.71	9.92	14.00	12.21
Lsd _{0.05}	Years 0.57		Forms 0.65		Years 1.18		Forms 1.36	

The number of developed and fertile shoots was not considerably varied between the examined forms of Traminer cultivar (Table 2). Out of the total number of Gewürztraminer shoots left at pruning, about 16.39 shoots, of which 11.81 fruit bearing ones, developed. As for Red Traminer, 16.94 shoots, of which 12.61 fruit bearing ones, developed out of the 20 shoots left.

In the examination years, meteorological conditions considerably influenced differentiation of fertile buds and the development of fertile shoots.

In both forms, there were approximately as much developed and fertile shoots per vine as in the first and the third year, i.e. considerably more than in the second year of examination.

Yield parameters (yield per bud, grape yield per developed shoot, grape yield per fertile shoot, grape yield per vine, grape yield per hectare, bunch weight) were not varied significantly ($p > 0.05$) between the examined forms, while between the examination years varied significantly ($p < 0.05$) Table 3. The highest yield per vine in Gewürztraminer (2.099 g) was in the third (2006) year, and the lowest (1.196 g) in the second (2005) examination year. Red Traminer had the highest yield per vine (2.581 g) in the first (2004) year, and the lowest (1.267 g) in the second (2005) year. The data obtained clearly indicated that the lowest yield in both forms was in the second year, namely much lower than in the other two years of examination. Grape yield per hectare varied in the same manner as grape yield per vine.

Table 3. Grape yield of the examined Traminer cultivar forms

Form	Gewürztraminer				Red Traminer				Lsd _{0.05}	
	2004	2005	2006	Average	2004	2005	2006	Average	Years	Forms
GYB (g)	91.38	59.83	104.96	85.39	129.0	63.4	97.1	96.5	17.3	20.0
GYDS (g)	106.67	81.52	117.71	101.97	146.4	79.2	112.9	112.9	18.9	21.9
GYFS (g)	145.96	136.60	145.00	142.52	192.5	114.4	142.4	149.8	15.6	18.0
GYV (g)	1.827	1.196	2.099	1.707	2.581	1.267	1.942	1.931	346	400
GYH(kg/ha)	5.074	3.322	5.829	4.742	7.169	3.521	5.395	5.361	-	-
BW (g)	98.39	107.22	97.56	101.05	124.67	98.74	100.34	107.91	11.46	13.23

GYB – grape yield per bud, GYDS – grape yield per developed shoot, GYFS – grape yield per fertile shoot, GYV – grape yield per vine, GYH – grape yield per hectare, BW – bunch weight.

According to the grape yield per hectare, Red Traminer (5.361 kg/ha) and Gewürztraminer (4.742 kg/ha) falls within the scope of low yield (up to 6.000 kg/ha). Gewürztraminer, with the average number of 17 bunches per vine, produced the average bunch weight of 101.05 g. On the other hand, Red Traminer, with the average number of 18 bunches per vine recorded the bunch weight of 107.91 g. Differences in the bunch weight between the examined forms, and examination years as well, were not significant. Bearing in mind that yield is mainly dependent on the number of bunches and the average bunch weight, in our researches the yield was more dependent on the number of bunches than on the average bunch weight. Taking into account biological features of Traminer forms, we can say that the yields during the research period were regular and low.

Red Traminer showed a high level of resistance, while somewhat lower resistance level was registered in Gewürztraminer (Table 4). The highest resistance level was registered in the first (2004) year (8.0), while the strongest *Botrytis cinerea* attack was registered in the second and third (2005) examination year (6.0). Data on the resistance level obtained in our researches are similar to the earlier reported data for Traminer cultivar, but there are certain discrepancies. Zirojevic (1974) stated that Red Traminer has medium sensitivity to the *Botrytis cinerea* attack, while in our examinations it was classified as a highly resistant cultivar.

Table 4. Resistance of Traminer forms to *Botrytis cinerea* (OIV Code 459)

Form	2004	2005	2006	Average
Gewürztraminer	7	5	5	5.6
Red Traminer	9	7	7	7.6
Average	8.0	6.0	6.0	6.66

A high content of sugar (23.03%) was registered in the must of the Gewürztraminer form characterized by a high average yield (Table 5). Red Traminer recorded lower sugar content (20.94%). The lowest grape yield in the second year did not cause the increase of the sugar content in must. Traminer forms had a high content of acids in must (7.82 g/l in average). This indicator was especially prominent in Red Traminer with 8.15 g/l of total acids.

Table 5. Content of sugar and total acid in must of Traminer cultivar forms

Form	Sugar content (%)				Total acid content (g/l)			
	2004	2005	2006	Average	2004	2005	2006	Average
Gewürztraminer	24.40	21.56	23.13	23.03	7.13	7.19	8.20	7.50
Red Traminer	23.02	19.12	20.68	20.94	7.83	8.44	8.20	8.15

Traminer is a grapevine cultivar that produces wine which European winemakers call the king of wine. Table 6 data indicate that the alcohol content in wine appropriately expressed, analogously to the sugar content. A higher alcohol content was obtained in Gewürztraminer wine (14.19%). Content of the total extract varied from 18.95 g/l in Red Traminer wine to 19.95 g/l in Gewürztraminer wine. Content of the total acid varied within the limits of 5.4 g/l in Red Traminer wine to 6.8 g/l in Gewürztraminer wine. Red Traminer wine has been awarded the average organoleptic grade of 18.44 points, which classifies it in the category of top-level white wines. Wine tasting grade awarded to Gewürztraminer wine is 18.21 points, which classifies it in the category of top-level white wines.

Table 6. Chemical composition and organoleptic assessment of wine of the Traminer cultivar forms

Form	Gewürztraminer	Red Traminer
Specific gravity	0.9893	0.9907
Alcohol (%)	14.19	12.67
Total extract (g/l)	19.95	18.95
Reducing substances (g/l)	1.2	1.0
Sugar-free extracts (g/l)	19.75	18.95
Titrateable acidity (g/l)	6.8	5.4
Volatile acids (g/l)	0.51	0.55
Total SO ₂ (mg/l)	59.5	71.0
Free SO ₂ (mg/l)	11.0	13.5
Ash (g/l)	1.82	1.74
Phenolic substances (g/l)	0.14	0.16
Organoleptic assessment	18.21	18.44

Conclusion

According to the ampelographic and botanical description, between two examined Traminer grapevine forms (Gewürztraminer and Red Traminer) were not found big differences.

Average values of yield parameters of the Red Traminer were not considerably higher than those of the Gewürztraminer, excluding the bunch weight. The yield per hectare was small (4.742 kg/ha), and average (5.361 kg/ha) in Gewürztraminer and Red Traminer respectively.

Red Traminer showed high resistance level to *Botrytis cinerea*, while in Gewürztraminer resistance level was slightly weaker.

Chemical composition of wines of the examined Traminer cultivar forms showed that they had high content of alcohol and a favorable content of the total acids. Organoleptic assessment of the wine fluctuated between 18.21 points (Gewürztraminer) and 18.44 (Red Traminer), which could be considered highly satisfactory.

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