

## Influence of soil fertilization on leaf surface at the variety Italian Riesling grape in conditions of teaching station Timișoara

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**Abstract** Grapes are the most popular fruit to consumers of all ages. Grapes have both high energy levels, food and medicines. Research has been conducted in the years (2002 - 2004), and had as its object of study, the influence of organic and chemical fertilizers on yield and quality, the variety of grapes for white wine 'Italian Riesling' vineyard planting in the Didactic Station Timisoara. The purpose of this study was to track the influence of organic and chemical fertilizers on the leaf surface, resulting from the variety of their applications' Italian Riesling.

Organic and chemical fertilizers are used in viticulture to supplement food needs and improving physical and biological characteristics of soil. These fertilizers in addition to enriching the soil nutrients and humus, they enhance the activity of useful microorganisms in the soil and stimulate more efficient use of fertilizers.

The category of organic fertilizers are: manure, semi-liquid slurry, green manure, compost. Green manure is in organic viticulture conditions safe and clean way to bring large quantities of soil organic matter. Nitrogen from legume plant is easily accessible and is rapidly fermented organic matter in soil, enriching it in humus.

Fertilizers applied to live on fruit plantations have a positive impact on the overall vine vigor with favorable implications for the restoration of vegetative growth and productive capacity, to obtain high yields of grape quality. (7, 8).

Vines stay put for life plantations so that the hubs are bound to a limited space and nutritional consequences in depleting soil nutrients, the grape harvest, which removes elements from dry cutting operations in the green and parts to be added each year to the elements that make up the vine is the amount of nutrients extracted from soil, which must be renewed by fertilization (9,10,12).

Requirements to the main vine nutrient status varies according to soil fertility, rainfall, scion-rootstock, the quantity and quality of the grape harvest is done.

### Biological Material and Method

The research was organized in the vineyard planting Didactic Station Timisoara, vine variety (aged 26) white wine "Italian Riesling.

Soil was placed on experience is a mold drafts, poor gleyed, with a humus content of 3.16%,

### Key words

leaf area, organic fertilizers, chemical fertilizers, vine variety, the vines

moderately supplied with phosphorus, well supplied with potassium, groundwater wet, poorly decarbonated the storage medium leossoide fine, loamy clay medium / medium loamy clay.

The plantation was used to type planting distances between rows of 2,0 m and between 1,2 m logs in turn, ensuring a normal density of 4166 vines / ha (2, 6, 8). The experience lasted three years: 2002, 2003, 2004.

This experience was standing in the field after monofactorial randomized block method (7) with three repetitions and six variants: V<sub>1</sub> - unfertilized; V<sub>2</sub> - N<sub>50</sub>P<sub>50</sub>K<sub>50</sub>; V<sub>3</sub> - N<sub>75</sub>P<sub>75</sub>K<sub>75</sub>; V<sub>4</sub> - Lupin, V<sub>5</sub> - Lolium perennial, V<sub>6</sub> - Manure 50 t / ha. Manure was applied in autumn, once at the beginning of the experimental cycle. Phosphorus fertilizers, nitrogen and potassium were administered annually in autumn, after harvesting the grapes and were incorporated into the soil grower. (1, 2, 3, 4, 5, 6)

Sowing soil with lupine was in the spring (April). The amount of seed was 80 kg / ha and the distance between rows was 12,5 cm. Sowing was in bands with lupine in the intervals between the rows of vines. Being used as green manure that was incorporated into the soil to bind grain, the harvest is

higher and higher fertilizing value. Incorporation in soil was achieved with PCV<sub>2</sub> to 2,2. Green mass produced per hectare was 50,000 kg. Sowing was done in one lane on every side of the line.

Sowing soil in *Lolium* perennial each year was made after the spring plowing, the intervals between the rows of vines, in strips. The amount of seed used was 20 kg / ha. As it has been used as mulch mowing machine to clean pasture with MCP, which carried out mass shredding plant and leaving the soil surface.

Calculation of leaf area. To calculate leaf area were analyzed five hubs in each variant and repetition. From each block, there are leaves, then choose 10 medium-sized leaves. In order to determine with precision the greater leaf area, three methods were used (11).

The first method was to calculate the leaf area by weighing method. His elimination leaf stalks, then weighed in the balance analytical language, noting the weight. Then, with a producea were removed 6 slices of the leaf blade. The six rings were weighed together. Then the surface was calculated according to the diameter disks producelei. Each leaf surface was calculated with the equation:

$$S = (G \times S) / g$$

where:

S = leaf area (cm<sup>2</sup>);

s = surface disks (cm<sup>2</sup>);

G = leaf weight (g);

g = weight disks (g).

After calculating the area of 10 leaves was an average of the areas multiplied by the total number of leaves on the vine and leaf area was the hub value. To determine leaf area per hectare of vine leaf area is multiplied by the total number of existing vines per hectare.

A second method for determining the leaf area was the method of calculation based on the size of the leaf.

## Results and Discussions

The thermal regime of the experimental years (2002 and 2004) was normal for the area studied. In terms of rainfall, experimental years were different. The rainy year was 2004, when there was a precipitation of 706,7 mm.

Vine vigor was assessed on the basis of the area benefits. Knowledge of leaf area has a special importance, because according to its size and its capacity of assimilation depends on production potential and crop quality.

The results in terms of the variety Italian Riesling leaf surface, depending on the level of fertilization leaf area / vine, the variety Italian Riesling, depending on the level of fertilization, according to the year 2002 is presented in Table 1.

Table 1

**The foliar surface/vine in Riesling Italian grape variety, in terms of fertilization level in the climate conditions of 2002**

Variant	Leaf area (m <sup>2</sup> /vine)	Relative value (%)	The difference from the control	Significance
V <sub>1</sub> – Unfertilized	1,83	100,00	Mt.	–
V <sub>2</sub> – N <sub>50</sub> P <sub>50</sub> K <sub>50</sub>	2,32	126,77	0,56	XX
V <sub>3</sub> – N <sub>75</sub> P <sub>75</sub> K <sub>75</sub>	2,39	130,60	0,49	XX
V <sub>4</sub> – Lupin	1,86	101,63	0,03	–
V <sub>5</sub> – <i>Lolium</i> perene	1,84	100,54	0,01	–
V <sub>6</sub> – Manure 50 t/ha	2,30	125,68	0,47	XX

DL<sub>5%</sub> = 0,33; DL<sub>1%</sub> = 0,47; DL<sub>0,1%</sub> = 0,68;

The largest leaf area / vine, is derived from fertilized variants N<sub>75</sub>P<sub>75</sub>K<sub>75</sub> (2,39 m<sup>2</sup>/vine), N<sub>50</sub>P<sub>50</sub>K<sub>50</sub> (2,32 m<sup>2</sup>/vine) and manure 50 t / ha (2,30 m<sup>2</sup>/vine) distinct difference from the control is significantly positive. On versions with perennial *Lolium* and

lupine, were obtained the lowest values, being 1,84 m<sup>2</sup>/vine and 1,86 m<sup>2</sup>/vine not have achieved significance, because these values are close variants of the control value.

Table 2

**The foliar surface/vine in Riesling Italian grape variety, in terms of fertilization level in the climate conditions of 2004**

Variant	Leaf area (m <sup>2</sup> /vine)	Relative value (%)	The difference from the control	Significance
V <sub>1</sub> – Unfertilized	1,61	100,00	Mt.	–
V <sub>2</sub> – N <sub>50</sub> P <sub>50</sub> K <sub>50</sub>	2,30	142,85	0,69	XX
V <sub>3</sub> – N <sub>75</sub> P <sub>75</sub> K <sub>75</sub>	2,39	148,44	0,78	XX
V <sub>4</sub> – Lupin	2,28	141,61	0,67	XX
V <sub>5</sub> – Lolium perene	2,21	137,26	0,60	X
V <sub>6</sub> – Manure 50 t/ha	2,34	145,34	0,73	XX

DL<sub>5%</sub> = 0,46; DL<sub>1%</sub> = 0,66; DL<sub>0,1%</sub> = 0,96;

The data in Table 2 is apparent that leaf area / vine largest variant was obtained from fertilized with N<sub>75</sub>P<sub>75</sub>K<sub>75</sub> (2,39 m<sup>2</sup>/vine) difference from control was significantly distinct positive.

The lower leaf surface was recorded on the V<sub>5</sub> version - Lolium perennial (2,21m<sup>2</sup>/vine) difference from control was significantly positive.

Mean leaf area / vine, the variety Italian Riesling grapes are presented in Table 3.

Table 3

**The foliar surface/vine in Riesling Italian grape variety, in terms of fertilization level (Mean values 2002 and 2004)**

Variant	Leaf area (m <sup>2</sup> /vine)	Relative value (%)	The difference from the control	Significance
V <sub>1</sub> – Unfertilized	1,72	100,00	Mt.	-
V <sub>2</sub> – N <sub>50</sub> P <sub>50</sub> K <sub>50</sub>	2,31	134,30	0,59	XX
V <sub>3</sub> – N <sub>75</sub> P <sub>75</sub> K <sub>75</sub>	2,39	138,95	0,67	XX
V <sub>4</sub> – Lupin	2,07	120,34	0,35	X
V <sub>5</sub> – Lolium perene	2,02	117,44	0,30	–
V <sub>6</sub> – Manure 50 t/ha	2,32	134,88	0,60	XX

DL<sub>5%</sub> = 0,35, DL<sub>1%</sub> = 0,50; DL<sub>0,1%</sub> = 0,73;

The data in table 3, can be concluded that the largest leaf area / vine, is derived from fertilized variants N<sub>75</sub>P<sub>75</sub>K<sub>75</sub>, N<sub>50</sub>P<sub>50</sub>K<sub>50</sub> and manure, recording 2,39 m<sup>2</sup>/vine values , 2,31 m<sup>2</sup>/vine, 2,32 m<sup>2</sup>/vine and difference from control was significantly distinct positive.

The smallest leaf / vine, which is derived variant was applied to perennial Lolium (2,02 m<sup>2</sup>/vine) difference from control was significantly positive.

## Conclusions

1. It is noted that in the experimental 2002, the largest leaf area / vine, is derived from fertilized variants N<sub>75</sub>P<sub>75</sub>K<sub>75</sub> (2,39 m<sup>2</sup>/vine), N<sub>50</sub>P<sub>50</sub>K<sub>50</sub> (2,32 m<sup>2</sup>/vine) and manure 50 t / ha (2,30 m<sup>2</sup>/vine), being distinct difference from the control significantly positive. On versions with perennial Lolium and lupine, were obtained the lowest values, being 1,84 m<sup>2</sup>/vine and 1,86 m<sup>2</sup>/vine not have achieved significance, because these values are close variants of the control value .

2. From the results obtained in 2004, it can be concluded that leaf area / vine largest variant was obtained from fertilized with N<sub>75</sub>P<sub>75</sub>K<sub>75</sub> (2,39 m<sup>2</sup>/vine) difference from control was significantly distinct positive. The lower leaf surface was recorded on the V<sub>5</sub> version - Lolium perennial (2,21 m<sup>2</sup>/vine ) difference from control was significantly positive.

3. After calculating the average values of leaf area / vine for Italian Riesling grape variety, it can be concluded that the largest leaf area / vine, is derived from fertilized variants N<sub>75</sub>P<sub>75</sub>K<sub>75</sub>, N<sub>50</sub>P<sub>50</sub>K<sub>50</sub> and manure, recording two values, 39 m<sup>2</sup>/vine , 2,31 m<sup>2</sup>/vine and 2,32 m<sup>2</sup>/vine, distinct difference from being significantly positive control. The smallest leaf / vine, which is derived variant was applied to perennial Lolium (2,02 m<sup>2</sup>/vine) difference from control was significantly positive.

4. Fertilizers applied to live on fruit plantations have a positive impact on the overall vine vigor with favorable implications for the restoration of vegetative growth and productive capacity, to obtain high yields of grape quality.

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