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An Investigation on the Effect of Leaf Feeding on the Vegetative Growth and Yield of *Vine plants cv. pamid* Grown on Different levels of Basic Fertilization

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Abstract: The investigation was carried out from 1990-1993 with vines of the cv. Pamid. The vines were planted in spaces 3.4-1.2 m and trained on Mozer. The loading of the vines was 42/bds vine. Together with the ordinary plant protection management of the vineyard, which was grown under different levels of basic fertilization with nitrogen, phosphorus and potassium, 0.2% solution of Sal-12, Foliar and Biofert-3 were also applied. There were 4 sprays in 14-day intervals in the following periods: pre-bloom, after-bloom, berry set and before vegetation.

It was established that the foliar fertilizers, applied together with the basic fertilization serve as an extra source of nutritive substances which are necessary for the growth and fruiting of the vine.

For its growth and field formation, the vine plant uses a definite quantity of nutritive elements showing an obvious eligibility towards them.

Key words: vine, foliar fertilization, SAL-12, Foliar, Biofert-3,

Introduction

The nutritious regime is one of the basic factors on which the growth and the yield of the vine plants depend. The excessively increased fertilizer norms do

not lead to adequate simulating of the growth and generative performances of vine plants. The low norms of fertilization cannot provide the necessary quantities of nitrogen, phosphorus and potassium either. Besides, in the different types of soil even the independent mineral fertilization cannot ensure the basic nutritive element (1, 2, 3, 6) for the plants. Some authors (7, 8, 9, 10) argue that this insufficiency could be compensated to a great extent by leaf feeding. However, this argument is not firmly supported. That is why we carried out this investigation which aims to find out the effect of leaf feeding on the growth and yield of vines, grown on different levels of basic fertilization.

Material and methods

The investigation was carried out during the years 1990-1993 in a vineyard of Pamid cultivar. The vines trained on improved Mozer planted in spacing 3,40 x 1,20, the loading was 42 bds per vine. We have tested the effect of foreign leaf fertilizers used for vine leaf feeding having different basic mineral fertilization with nitrogen, phosphorus and potassium - 6 kg/dka doubling this norm in the separate variants. The leaf fertilizers Sal-12, Foliar and Biofert-3 were used. Four sprayings were applied with 2% solution of the corresponding fertilizer in every 14 days in the following phases: pre-bloom, after-bloom, pea phase and berry variegation. Indicators characterizing the growth and the fruitbearing of vines were studied, as well as the content of nitrogen, phosphorus and potassium in their organs.

Results and discussion

Data of the effect of leaf feeding applied to different basic fertilizations on the growth performances and the yield of vines is presented in Table 1.

The greatest general length and mass of the annual growth, as well as best yield from a vine, are established when the plants are leaf-fed with Sal-12, applied to $N_{12}P_6K_6$ norm of basic mineral fertilization. When Foliar is sprayed, the variant with the $N_6P_6K_6$ norm of mineral fertilization has the maximum values of general length and weight of the annual growth. The best yield from a vine is established with the variant using this leaf fertilizer and $N_{12}P_6K_6$ basic fertilization.

The general length and weight of the annual growth of the vines treated with Biofert-3 have greatest values in the variant with $N_6P_6K_{12}$ fertilization norm, while the best yield is obtained with $N_6P_6K_6$ basic fertilization.

The comparing of the effect of the three investigated leaf fertilizers on the vine yield shows that the feeding with Biofert-3 applied to $N_6P_6K_6$ mineral fertilization increases to a maximum degree the quantity of grape obtained from a vine. In order to establish the ratio between the growth weight and the yield from a vine we calculated the correlation coefficient (r). This coefficient according to (4, 7) is most favorable when it has low values. Among the investigated variants the lowest value is established with Sal-12 leaf fertilization, applied to $N_6P_6K_{12}$ basic fertilization, followed by that of $N_6P_{12}K_6$.

The growth power of vine for the yield formation is effectively used with Biofert-3 leaf feeding and $N_6P_6K_6$ mineral fertilization.

Tab. 1. Effect of leaf feeding on the growth performances and the yield of vine

Elements variants	Indicators			
	General length /Scm/	Mass of the annual growth (g)	r	Yield of 1 vine (kg)
Sal - 12				
$N_6P_6K_6$	207,5	2392	0,180	13,257
$N_{12}P_6K_6$	212,7	2464	0,176	13,942
$N_6P_{12}K_6$	208,2	2310	0,171	13,504
$N_6P_6K_{12}$	204,6	2301	0,171	13,473
Foliar				
$N_6P_6K_6$	247,4	2620	0,189	13,848
$N_{12}P_6K_6$	232,6	2481	0,177	13,972
$N_6P_{12}K_6$	212,3	2423	0,175	13,860
$N_6P_6K_{12}$	208,7	2390	0,174	13,693
Biofert - 3				
$N_6P_6K_6$	213,6	2537	0,172	14,723
$N_{12}P_6K_6$	214,3	2502	0,174	14,315
$N_6P_{12}K_6$	216,9	2587	0,181	14,267
$N_6P_6K_{12}$	211,5	2482	0,175	14,120

Table 2 shows the effect of the leaf fertilizers applied to different basic fertilization on the content of nitrogen, phosphorus and potassium.

Tab. 2. The effect of fertilizers on the content of nitrogen, phosphorus and potassium in the shoots - %

Elements variants	Basic fertilization			
	$N_6P_6K_{12}$	$N_{12}P_6K_6$	$N_6P_{12}K_6$	$N_6P_6K_{12}$
Sal - 12				
N	1,80	1,78	1,75	1,73
P	0,32	0,30	0,29	0,27
K	0,51	0,48	0,46	0,45
Foliar				
N	1,67	1,58	1,53	1,51
P	0,40	0,34	0,31	0,28
K	0,40	0,32	0,29	0,27
Biofert - 3				
N	1,87	1,61	1,96	1,93
P	0,47	0,51	0,54	0,52
K	0,42	0,27	0,23	0,20

When Sal-12 and Foliar are applied to different levels of mineral fertilization, the percentage of nitrogen in the shoots decreases; when Biofert-3 is used this element decreases. The results regarding the content of phosphorus in the shoots are analogous. The highest content of potassium in the three leaf fertilizers is detected in their application to $N_6P_6K_6$ mineral fertilization norm. These results give us ground to think that the nutritive substances from the leaf and mineral fertilizers are absorbed to different degrees. Regardless of the quantity of the introduced elements, the vine plant shows and eligibility to their absorption. It depends on the needs of the plant arisen during the different phases of vegetation.

Conclusions

The leaf fertilizers applied in combination with the basic mineral fertilization serve as an extra source of nutritive substances necessary for the growth and the fruitbearing of the vine plant.

For its growth and yield formation, the vine plant uses a definite quantity from the basic nutritive elements, introduced through the leaves or taken from the soil, and it shows and obvious eligibility towards them.

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**ISPITIVANJE UTICAJA FOLIJARNE ISHRANE NA
VEGETATIVNI RAST I PRINOS VINOVE LOZE KOD SORTE
PAMID, GAJENE NA RAZLIČITIM NIVOIMA OSNOVNE
FERTILIZACIJE**

- originalni naučni rad -

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Rezime

Istraživanja su vršena od 1990-1993 na vinovoj lozi sorte Pamid. Sadnja vinove loze vršena je na rastojanju 3,4-1,2 m a uzgoj na Mozer-u. Opterećenje vinove loze iznosilo je 42 pupoljka po lozi. Pored uobičajenih mera zaštite vinograda uz primenu različitih doza azota, fosfora i kalijuma, 0,2% rastvora SAL-12, Foliar i Biofert-3 su takođe primenjeni. Četiri prskanja je korišćeno u intervalima od 14 dana u sledećim fazama: pre cvetanja, posle cvetanja, plodonošenju i pre vegetacije.

Utvrdeno je da uz osnovnu, primena lisne fertilizacije služi kao dodatni izvor nutritivnih substanci, koje su neophodne za razvoj i prirod vinove loze.

Za svoj razvoj i prinos, vinova loza koristi određenu količinu nutritivnih elemenata, izvanredno ih usvaja i daje odlične rezultate.