

The effect of fertilizers on different wine grape varieties in model container trials

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S u m m a r y : Nutrient supply trials were carried out in model container trials with sandy soils adjusted to low and high nutrient levels (P, K, Mg) for 16 varieties with 5 replications as determined from the averages of years and varieties.

The utilization of high nutrient supply in the soil can be summed up as follows:

- Analysis data revealed an increase of P in the leaf and wood but there was no change in the grape. Potassium level increased in the leaf and wood but remained unchanged in the grape. Magnesium level increased in the leaf and wood and also in the grape.
 - Of the production indices an increase was observed in the green mass, wood mass, grape number and grape weight but a decrease in mean grape weight and in the sugar and acid content of the must.
 - Winterhardiness increased slightly.
- It was evident that some varieties differed considerably from the varietal mean in the evaluated parameters.

Key words : fertilizing, soil, nutrient, phosphorus, potassium, magnesium, leaf, wood, berry, yield, must quality, cold hardiness, variety of vine, Hungary.

Trial target

To determine the effect of different P, K, Mg doses at identical N supply on

- the nutrient regime of wine grape varieties
- the development of the vegetative parts
- the quantity and quality of fruit yield
- the winter hardiness of normally developed buds

Material and method

Type of trial:	model trial in containers in plastic tents
Plastic tent:	unheated covered with plastic film from November till May covered with net from May till November
Nutrient supply:	storage supply: prior to planting P (P_2O_5), K (K_2SO_4), Mg ($MgSO_4$) homogenized with the soil maintenance supply: N (NH_4NO_3) in every year
Soil:	sand
Soil parameters:	pH (KCl) 8.1 K _a 25 CaCO ₃ (%) 4-5 H% 0.44-0.50

Available soil nutrient content:

	Origin	After supply	
		low (1)	high (2)
Al P ₂ O ₅ ppm	86	100	200
Al K ₂ O ppm	70	150	300
KCl Mg ppm	25	80	150
Water supply:	irregular (compensating for winter precipitation)		
Number of varieties:	16 (11 white wine grape varieties and 5 red wine grape varieties)		
Number of replications:	5 plants/variety		
Propagation material:	standard cutting on its own root		
Year of planting:	1982		
Location:	Kecskemét-Miklóstelep		

Analysis results

In leaves: This shows the nutrient requirement of varieties and their nutrient absorption capacity.

Phosphorus

- Varieties of high P requirement and good P absorption: Sztyepnyak, Rheinriesling, Chardonnay, Miklóstelep 7
- Varieties of low P requirement and good P absorption: Kunleány, Zalagyöngye, Steifschiller, Medina

Potassium

- Varieties of high K requirement and good K absorption: Rheinriesling, Chardonnay, Steinschiller, Zengö, Zweigelt, F. Kadarka, Blaufränkisch Tf.
- Varieties of low K requirement and good K absorption: Kunleány, Zalagyöngye, Medina, Ezerfürtü, Sztyepnyak

Magnesium

- Varieties of high Mg requirement and good Mg absorption: Chardonnay, Rheinriesling, Sztyepnyak
- Variety of low Mg requirement and good Mg absorption: RF 48

In fruit nutrient elements are generally not localized.

Phosphorus

The surplus P in berries (and leaves) resulting from high nutrient supply was not significant in most varieties.

- P content increased in the varieties: Chardonnay, Rheinriesling

Potassium

At high nutrient supply the increase in K content found in leaves and berries was not significant in the berries.

- K content increased in the berries of Rheinriesling.

Magnesium

- Mg level in leaves has the same tendency as the Mg level in berries
- No such tendency was found in the varieties: Kecskemét 9, Ezerfürtü, Sztyepnyak, Zengö

PLANT PARTS

NUTRIENT ELEMENTS in solids per cent

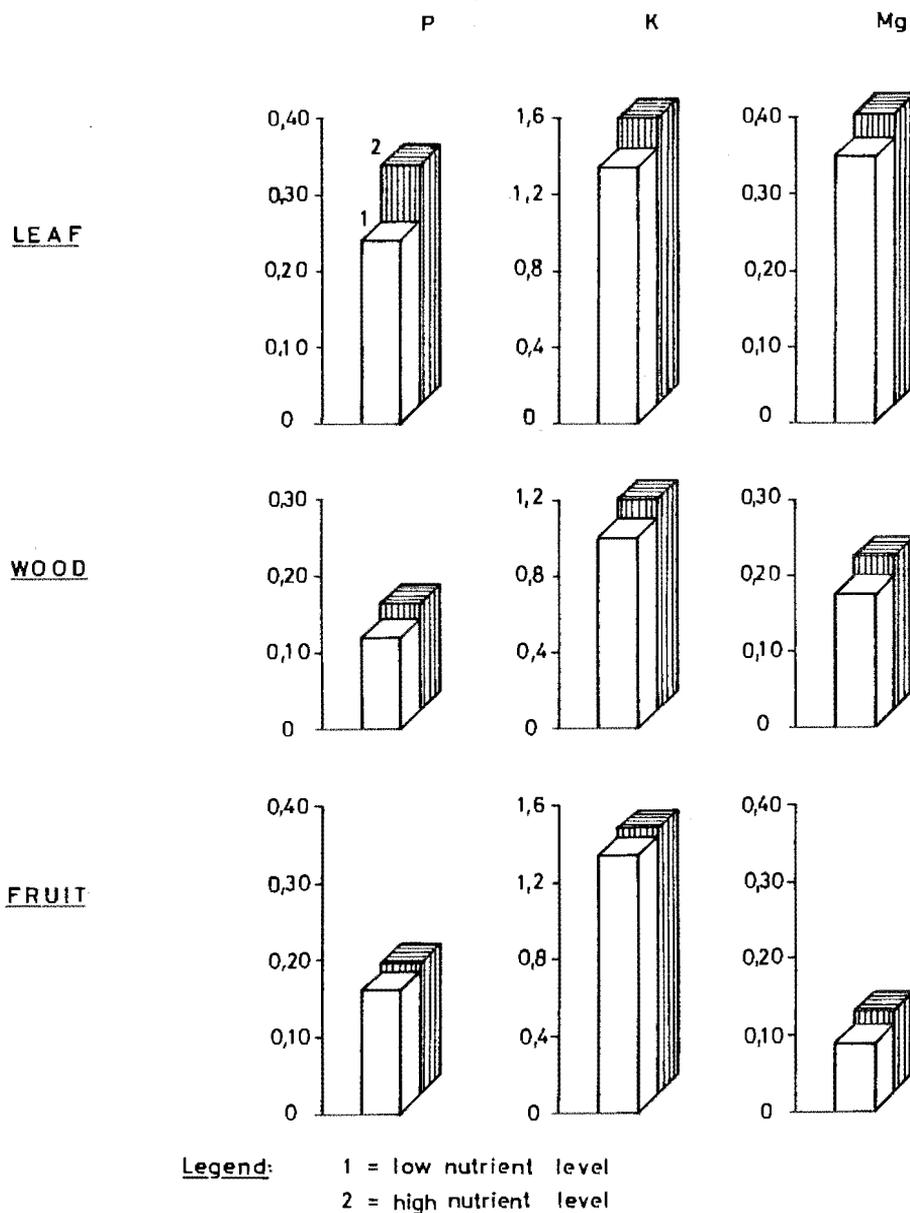


Fig. 1: Analysis data in the mean of 6 years (1982-1987) and 16 varieties.

In wood: This allows conclusions as to nutrient translocation and re-utilization.

Phosphorus

- At low nutrient supply there is no significant difference among varieties
 - At high nutrient supply differences are considerable and specific for the variety
- 20-50 % P increase: Zengő, Jubileum 75, Miklóstelep 7, Blaufränkisch Tf., Zweigelt
 No P increase: Kunleány, Zalagyöngye, F. Kadarka, Medina

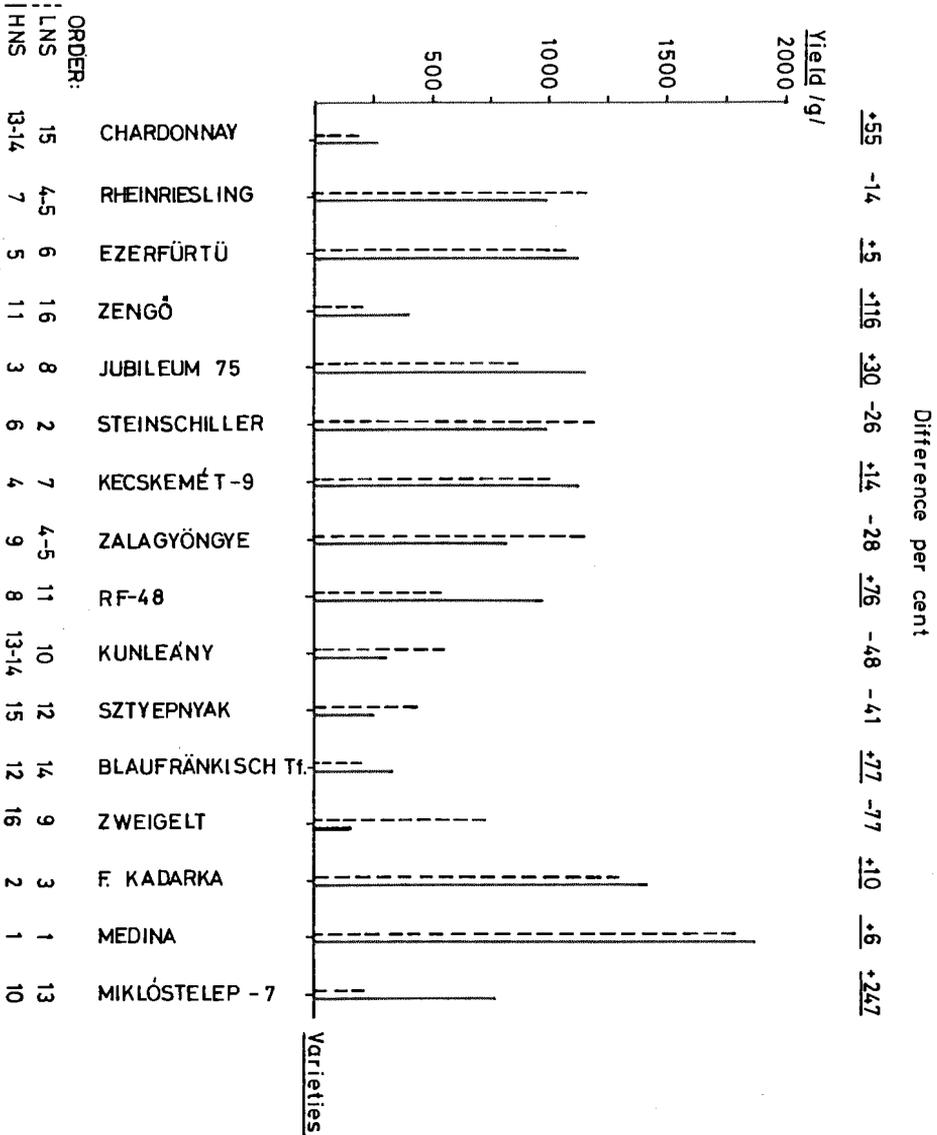


Fig. 2: Cluster yield in the mean of 4 years (1984-1987) at low and high nutrient supply.

Potassium

Even at low nutrient supply the increase of K level is considerable and specific for the variety. In the majority of varieties the K increase in the wood has a tendency similar to that measured in the leaves.

25-35 % K increase: Zengő, Blaufränkisch Tf., RF 48, F. Kadarka, Zweigelt

No K increase: Chardonnay, Keckskemét 9, Steinschiller

Magnesium

At high and low nutrient supply the Mg level in the wood has a tendency similar to that in the leaf with lower absolute values.

- The surplus uptake in leaves cannot be detected in the wood of the varieties: Chardonnay, Szttyepnyak, Kunleány

Measurement results of plant parts

In the mean of 16 varieties, high nutrient availability from the soil in the tested years resulted in the following:

- Increase in green mass, wood mass, cluster number, cluster weight
 - Slight increase in winter tolerance of normally developed buds
 - Decrease in mean cluster weight, sugar content of the must, acidity of the must
- Varieties show considerable difference in means of the characters measured.