

Enhanced potassium applications in table grapes improved fruit quality and net income by 80% in Mexico

To assess the response of table grape to potassium fertilisation, a field test was performed to evaluate the effect of 3 doses of potassium, applied with Ultrasol[®] NKS and Ultrasol[®] SOP on fruit yield. The experiment took place at the Agrícola Viñedos Costa in the locality of Hermosillo, Sonora State, Mexico. The tested crop was a 13 years old Flame Seedless variety, planted on ungrafted rootstock with a density of 1.730 plants/ha. The soil was designated as clay with a pH of 7,67, an EC of 2,35 mS/cm and 1,74 meq K/100 g (sampled at a depth between 0 and 30 cm). The 3 different potassium fertiliser treatments under study (Table 1) were arranged in a randomized complete block design with 10 repetitions; the plant being the experimental unit.

To apply the treatments, a 12 V Flojet[®] pump with a flow of 6,1 l/min was used. To reach every selected plant, a pipe system was installed to bring the nutrition solution to every selected plant (Figure 1). The additional water volume did not exceed 10% in order to eliminate the irrigation effect on the results of the treatment.

Table 1. The 3 treatments with potassium.

Treatment Tratamiento	Farmer Agricultor	Treatment / Tratamiento kg K ₂ O/ha	Total
T1	90	0	90
T2	90	100	190
T3	90	200	290

Figure 1. The applied irrigation system.



The application moment of the treatments was started at mid bud break with an interval of approximately 3 days and ended 2 weeks before harvest.

There were 3 fruit harvests, starting on 20/05/2011 and ending on 03/06/2011. The harvest was hand-picked and each time an inventory was made of grapes fit for commerce and wasted grapes. The calibres and the degrees Brix were measured also.

Grape yield, calibre and degrees Brix were analyzed according to the ANOVA test and the mean of one group was compared with the mean of another using the LSD test (0,05). To evaluate the effect of potassium on the degrees Brix of the grapes, the average value of the measures degrees Brix of the 3 grape harvests was used.

Agronomic analysis and economic results.

- Fertilization T2 (100 in kg K₂O/ha) applied on table grape of the Flame Seedless variety had a positive effect on both total and commercial grape yield (Figure 2).
- Treatment resulted T2 in far more total and commercial grape yield than the treatments T1 and T3.
- Treatment also T2 resulted in the highest earliness in grape harvesting.

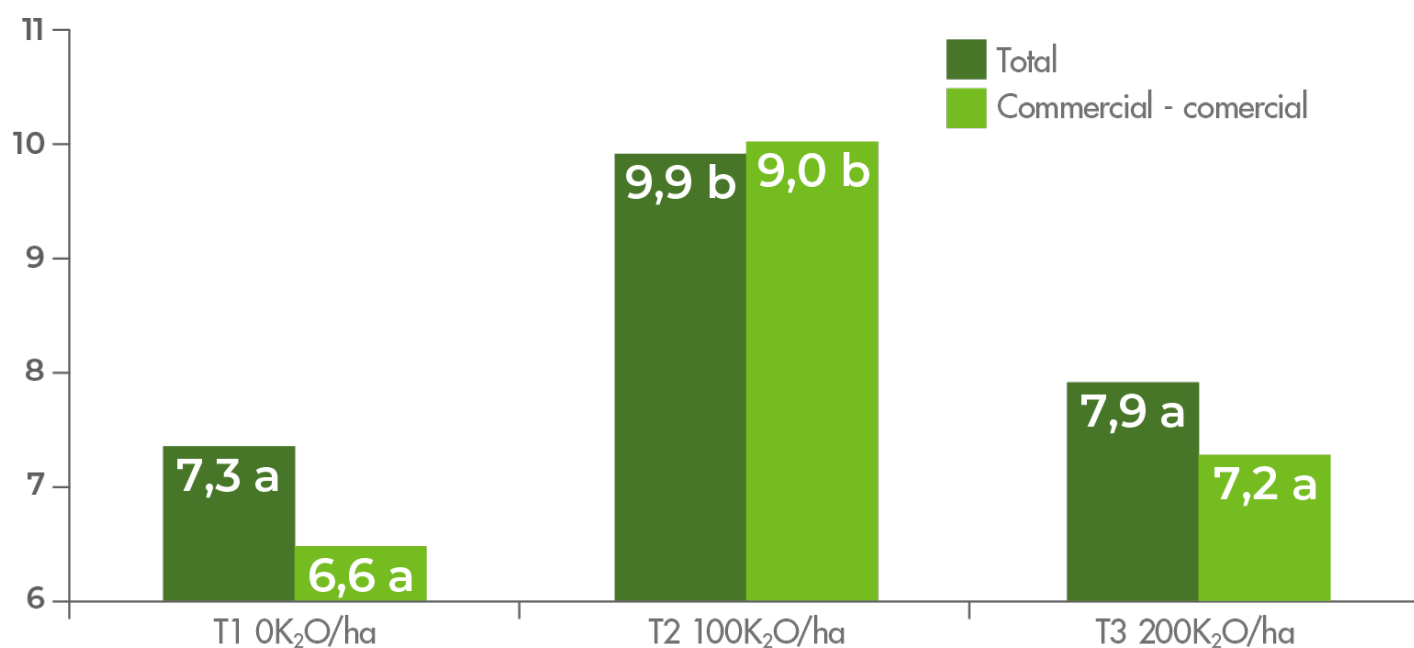
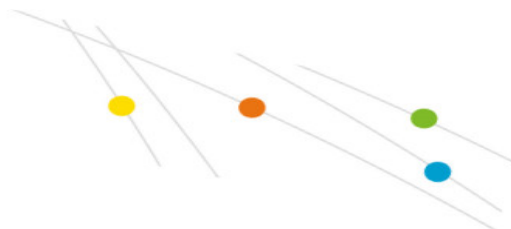


Figure 2. Total and commercial grape yield (kg/plant).

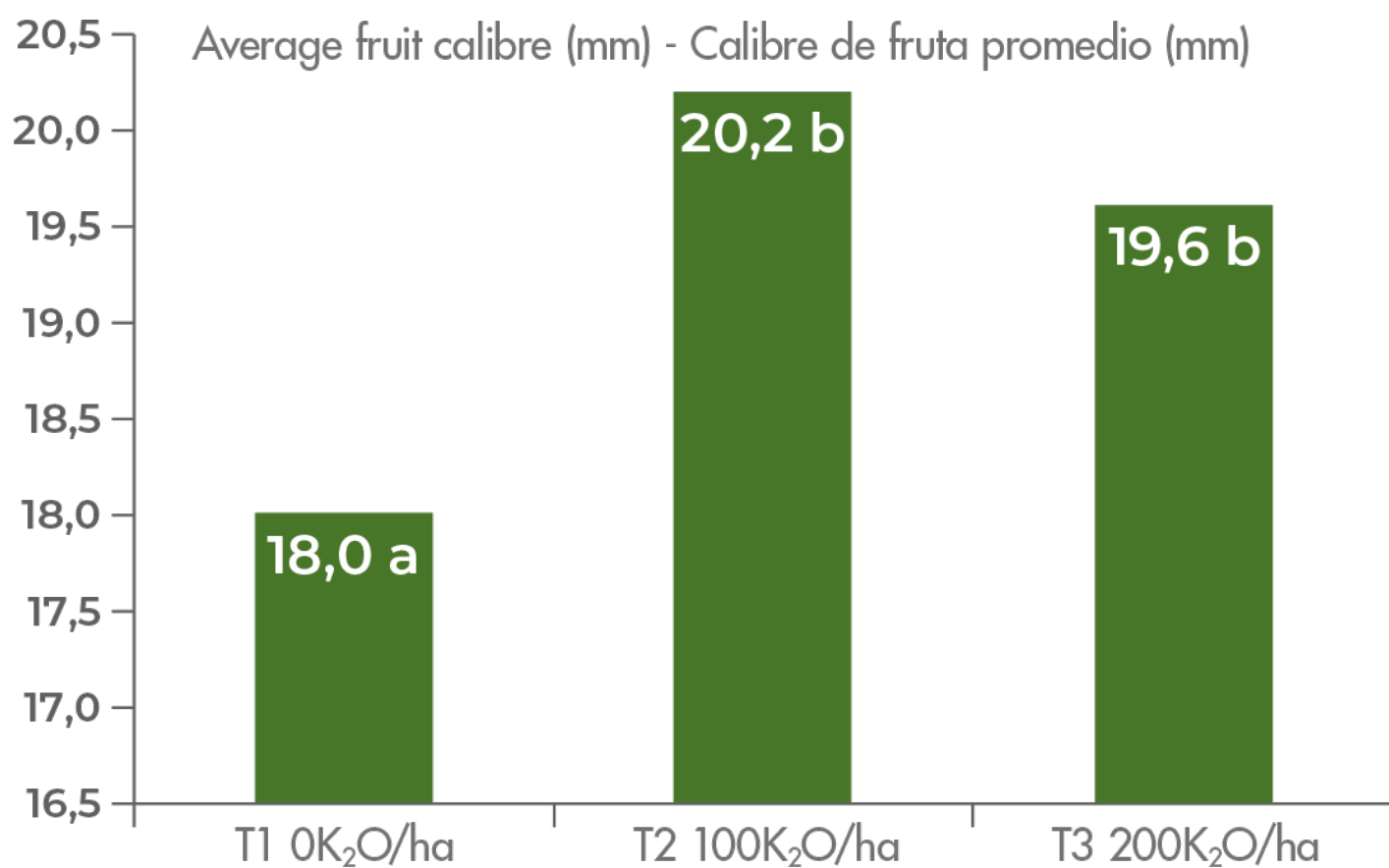


Figure 3. The average fruit calibre of the 3 harvests.

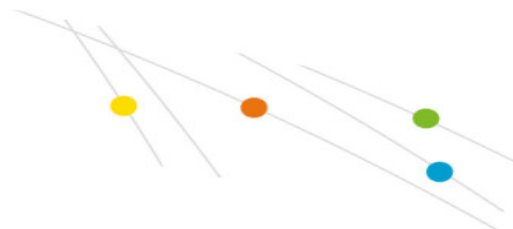
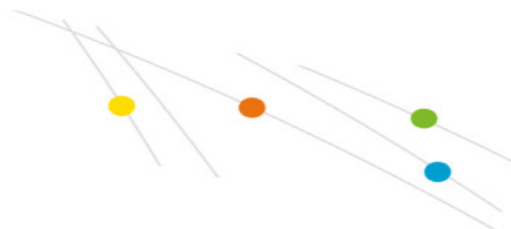
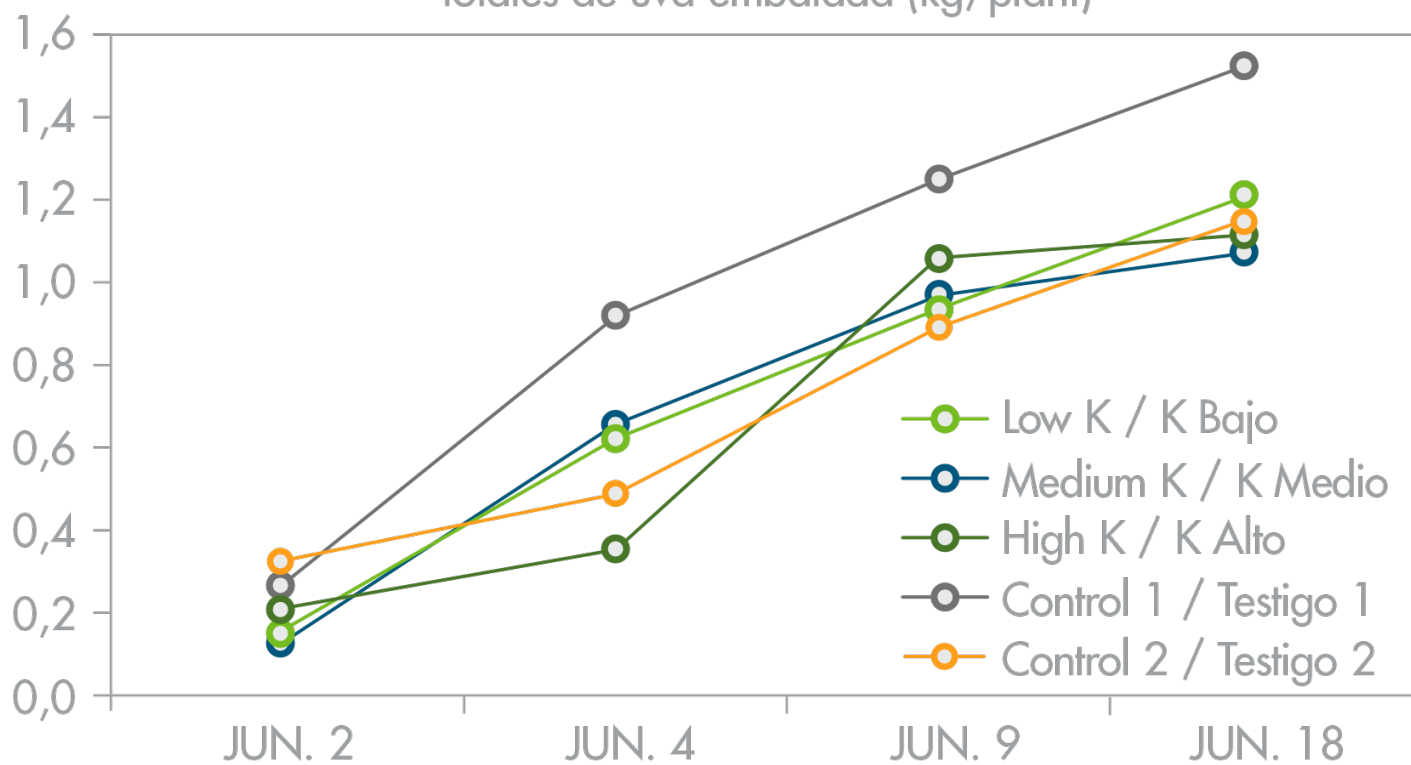


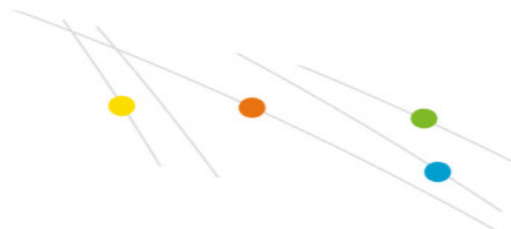
Table 2. Economic analysis - comparison between T1 (control, 0 kg K₂O/ha) and T2 (100 kg K₂O/ha))

		Treatments		Difference	
		Control T1	Control T2	Absolute	Relative (%)
Cost fertilisers / Costo fertilizantes	US\$/ha	1,600	1,890	290	18,1
Other costs / Otros costos	US\$/ha	14,400	14,400	0	0
Total costs / Costos totales	US\$/ha	16,000	16,290	290	1,8
Total costs fertilisers / Costos totales fertilizantes	%	10	12	2	16
Box yield [1 box = 8,2 kg (18 lbs)] Rendimiento cajas [1 caja = 8,2 kg (18 lbs)]	boxes/ha	1,403	1,898	495	35
Price per box / Precio por caja	US\$/kg	20	20	0	0
Gross income / Ingresos brutos	US\$/ha	28,060	37,960	9,900	35
Net income / Ingresos netos	US\$/ha	12,060	21,670	9,610	80
Margin / Margen	%	43	57	14	33
Cost: benefit ratio / Relación costo: beneficio	1:33				
Break-even point: extra yield needed to cover the costs of the T2 programme (100kg K ₂ O/ha) Punto de equilibrio: rendimiento extra necesario para cubrir los costos del programa T2 (100 kg K ₂ O/há).			15 boxes/ha (1%) 15 cajas/há (1%)		



Cumulative now-marketable grape yield (kg/plant)
Totales de uva embalada (kg/plant)





Cumulative marketable grape yield (kg/plant)
Totales de uva de desecho (kg/plant)

