



Foliar sprays with potassium nitrate outperformed potassium sulphate in terms of increasing fruit size and yield of clementine

The effects of various rates and frequencies of foliar potassium nitrate and potassium sulphate on fruit production and quality parameters of citrus clementine were studied. The experiment was located in the Gharb plain of Morocco. The soil type was clay and the citrus clementine variety used was

Cadoux

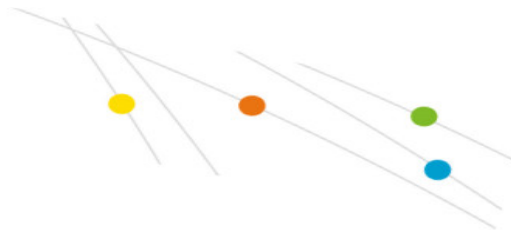
, grafted on

citrangue Carizzo

, trees were 23 years old. Application rates of tested foliar fertilizers were 5% and 8% KNO_3 , and 2,5% and 4% K_2SO_4 , applied either two or three times during fruit growth on orchards of three planting densities (D_1 : 6 m x 6 m, D_2 : 5 m x 6 m and D_3 : 6 m x 3,5 m tree spacing). The control was sprayed with water alone. The dates of foliar applications were as follows: July 16, August 3 and August 21, 2007. At a given application date, each tree was sprayed with ten liters of the foliar K fertilizer.

The high K concentration treatments in three sprays were most effective in increasing fruit size of clementine fruit. At low density (D_1), 8% KNO_3 in two or three foliar applications, proved most effective in improving average fruit weight compared to the control. The treatment 8% KNO_3 in 3 applications gave the highest percentage of fruit in the extra-large sized class in all planting densities (table 1). Trees sprayed with only two foliar sprays were markedly less effective in improving fruit size compared with three applications.

Table 1. Distribution of fruit number (%) of clementine in the largest size class in



response to foliar K fertilization for the low (D_1), medium (D_2) and high (D_3) planting density.

Treatment	Cal 1 - 3: 57 to 63 mm					
	D_1	D_2	D_3	D_1	D_2	D_3
Control	8	9	8	-	-	-
	2 sprays			3 sprays		
5% KNO_3	22	17	14	63	61	54
8% KNO_3	21	16	13	73	63	57
2,5% K_2SO_4	20	22	16	62	55	49
4% K_2SO_4	24	19	15	63	56	48

Potassium nitrate applications were more effective than potassium sulphate in terms of improving fruit color and total soluble sugar (TSS) content of the fruit. Concerning the effect of foliar K fertilisation, the results clearly demonstrated that raising the K concentration and the number of foliar sprays increased tree fruit yield. 8% KNO_3 and 4% K_2SO_4 treatments were most effective in improving fruit yield. The largest gain in production of 12-13 MT/ha over the control was found with 3 sprays of 8% potassium nitrate (Figure 1). Spraying 8% KNO_3 resulted in the highest yield for all three planting densities compared to other K treatments with three applications.

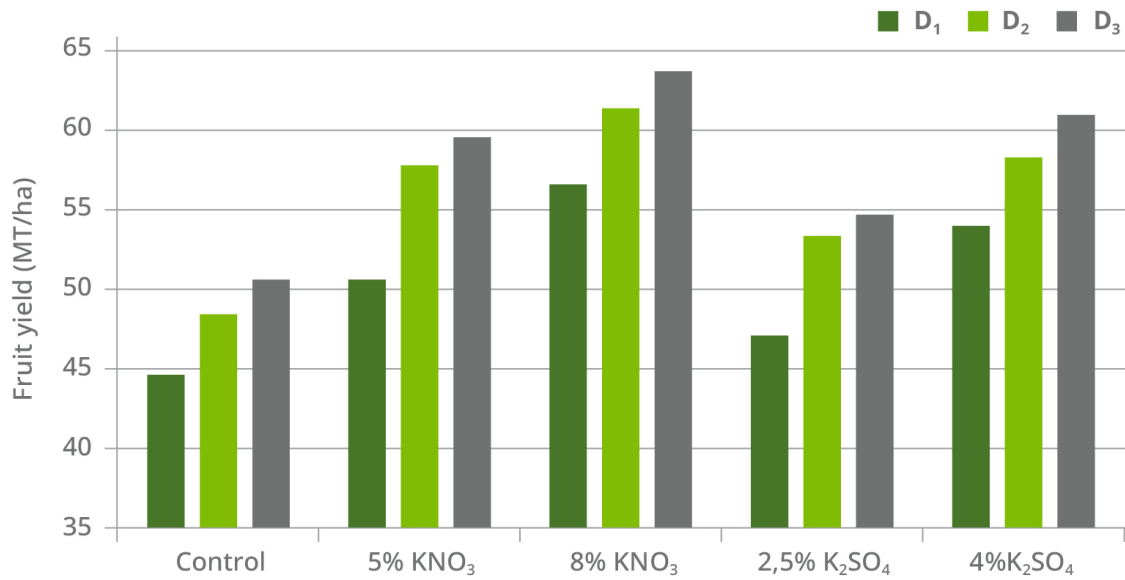
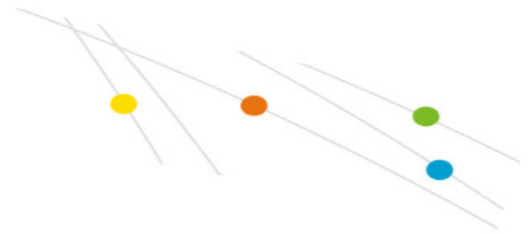


Figure 1. The effect of three foliar applications on clementine fruit yield for the low (D₁), medium (D₂) and high (D₃) planting density.