

EFFECT OF FOLIAR BORON APPLICATION ON GROWTH, PHENOLOGY, YIELD AND OIL QUALITY OF OLIVE TREES (CV. ARBEQUINA) CONDUCTED UNDER A HIGH DENSITY PLANTING SYSTEM

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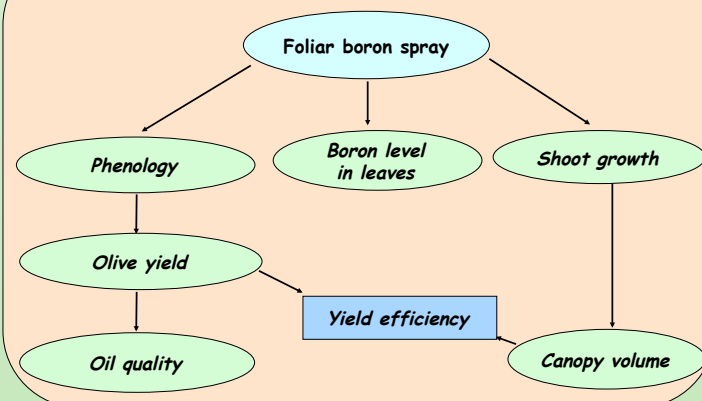
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INTRODUCTION

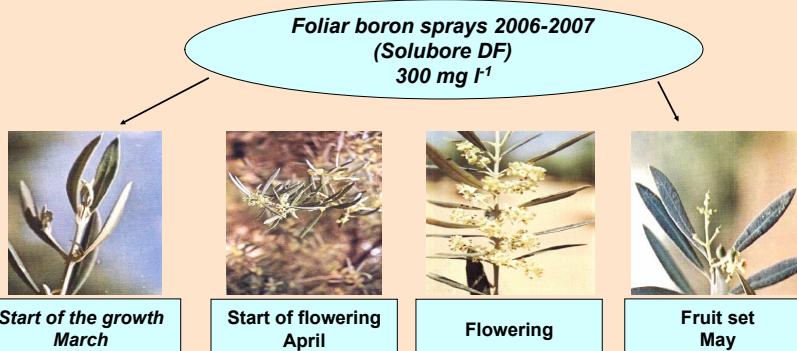
- ✓Irrigated olive orchard surface has increased considerably during the last years in Tunisia.
- ✓The irrigated olive orchards in Tunisia cover about 60,000 ha and will reach 90,000 ha in 2009.
- ✓This evolution of olive plantation was not accompanied with an evolution of irrigation and fertilization techniques.
- ✓Fertilization is applied without taking into account the soil characteristics, the vegetative growth and vigor, the nutritional status of trees, the mineral content of water employed for irrigation and the crop potential.
- ✓Application timing is also ignored in the fertilization program.
- ✓Foliar boron fertilization is commonly used in intensive olive orchards without knowledge about the efficiency of this fertilization on olive production.

OBJECTIVE



MATERIAL AND METHODS

- ✓Commercial olive orchard, located in the centre of Tunisia (Meknassy).
- ✓Arbequina variety (4 years old, 1250 trees/ha).
- ✓Trees having no symptoms of boron deficiency.



RESULTS

- ✓Leaf B level increased after the first application when compared to the controls. At July, leaf B levels in control trees increased when compared to the first sampling date ⇒ a **high B uptake occurred during flowering** (Table 1).
- ✓Foliar B fertilization had no significant effect on vegetative growth during both years (Table 2).
- ✓During the first year of study, considered as an on year, B sprays had no significant effect on fruit set, yield, fruit size and oil content (Table 2).
- ✓In the second year, B sprays improved blooming rate, which increased from 20% in controls to 30% in treated trees, and olive yield, which increased by 27% in response to B sprays (Table 2).
- ✓The increase of yields in response to foliar B sprays was not accompanied by a reduction in fruit size (Table 2).
- ✓In respect to oil quality, no effect of B foliar sprays was observed in oil characteristics such as polyphenols contents, fatty acids composition and oxidative stability (Table 3).

Table 1: Boron leaf concentration (ppm) at May and July

	2006	
	Boron sprays	Controls
Just after the 1 st application	30	24
Standard date July	31	32.5

Table 3: Effect of boron sprays on fatty acid composition (C16:0, C18:1 and C18:2), oxidative stability and polyphenol content of olive oil

	2006	
	Boron sprays	Controls
C16:0 (%)	18.8	19
C18:1 (%)	59.3	58.6
C18:2 (%)	16.4	17.0
Oxidative stability (h)	5.52	5.43
Polyphenols (ppm)	193.7	123.9

Table 2: Effect of boron sprays on phenology, growth, and yield of olive trees

	2006		2007	
	Boron sprays	Controls	Boron sprays	Controls
Blooming rate (%)	33	36	30	20
Fruit set (%)	5.67	6.36	2.39	2.60
Olive yield (kg/tree)	3.70	3.99	2.97	2.16
Olive yield (kg/ha)	4637	4987	3712	2700
Oil content (%) / fresh weight	26.3	26.3	32.5	32.6
Shoot growth (cm)	29.00	29.87	36.42	39.58
Canopy volume (m ³ /tree)	4.9	5.2	4.5	5.3
Yield efficiency (kg/m ²)	0.45	0.40	0.65	0.42
Fruit weight (g/fruit)	2.1	2.1	2.3	2.3

CONCLUSION : The response of olive to foliar boron application was significant only in the off year, characterized by lower production