Boron in olive trees

Study details

Research institution: Juan Vilar, Agronomic Research (MSc. Isabel Raya Garcia)
Date: 2023-2026
Location: Jaén, Baeza, Spain
Soil: Clayey
Fertilizers: *Granubor*® and *Solubor*®
Trial design: Randomized complete block with three repetitions in a traditional irrigated olive plantation, with an area of 7.98 hectares.

Field trial: Olives

Boron fertilizer treatments

Trial 2023		Granubor 15%B	Solubor (20.8%)
Treatment 1	Application date	150 g/olivo	
	Aplication dose	Winter emergence	
Treatment 2	Application date	200 g/olivo	
	Aplication dose	Winter emergence	
Treatment 3	Application date		Pre-flowering and Flowering
	Aplication dose		0,3%. Dose per olive 6l/olive tree
Treatment 4	Application date	200 g/olivo	Flowering
	Aplication dose	Winter emergence	0,3%. Dose per olive 6l/olive tree

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Soil test before boron application

Determinación	0-30 CM	30-60 CM	Unidades	Método
pH en agua 1:2.5	8,7	8,7	uds. de pH	Potenciometría
Conductividad eléctrica del extracto de saturación	0,75	0,87	$dS.m^{-1}$	Potenciometría
Nitrógeno Total	0,06	0,04	%	Dumas
Fósforo	0,93	0,15	mg/Kg	Olsen
Materia Orgánica Oxidable	0,82	0,41	%	Dicromato Potásico
Capacidad de Intercambio Catiónico	13,26	17,93	Cmolc/Kg suelo	Acetato sódico
Na cambiable	1,12	0,84	Cmolc/Kg suelo	Acetato Amónico
Ca cambiable	Saturación	Saturación	Cmolc/Kg suelo	Acetato Amónico
K cambiable	1,3	1,0	Cmolc/Kg suelo	Acetato Amónico
Mg cambiable	3,4	3,1	Cmolc/Kg suelo	Acetato Amónico
Mn disponible	1,65	1,85	mg/Kg	DTPA
Cu disponible	4,44	4,06	mg/Kg	DTPA
Zn disponible	0,14	0,18	mg/Kg	DTPA
Fe disponible	1,16	1,23	mg/Kg	DTPA
B disponible	0,20	0,21	mg/Kg	DTPA
Sulfatos	0,17	0,16	meq/100g	Cromatografía Aniónica
Fosfatos	No se detectan	No se detectan	meq/100g	Cromatografía Aniónica
Cloruros	0,11	0,19	meq/100g	Cromatografía Aniónica
Nitratos	0,03	0,06	meq/100g	Cromatografía Aniónica
Nitritos	No se detectan	No se detectan	meq/100g	Cromatografía Aniónica
Carbonatos	53,89	31,35	%	Calcímetro de Bernard
Gravas	2,07	2,93	%	Tamizado
Arenas	15,65	13,45	%	Pipeta Robinson/Barahona
Limos	37,67	41,54	%	Pipeta Robinson/Barahona
Arcillas	46,67	45,01	%	Pipeta Robinson/Barahona
Textura	ARCILLOSA	ARCILLOSA LIMOSA		Pipeta Robinson/Barahona
Caliza Activa	0,39	0,33	%	Calcímetro de Bernard
C / N	7,89	5,72		Cálculo
Porcentaje de Sodio Intercambiable (PSI)	8,47	4,66	%	Cálculo

Source: Olivarum, 2023

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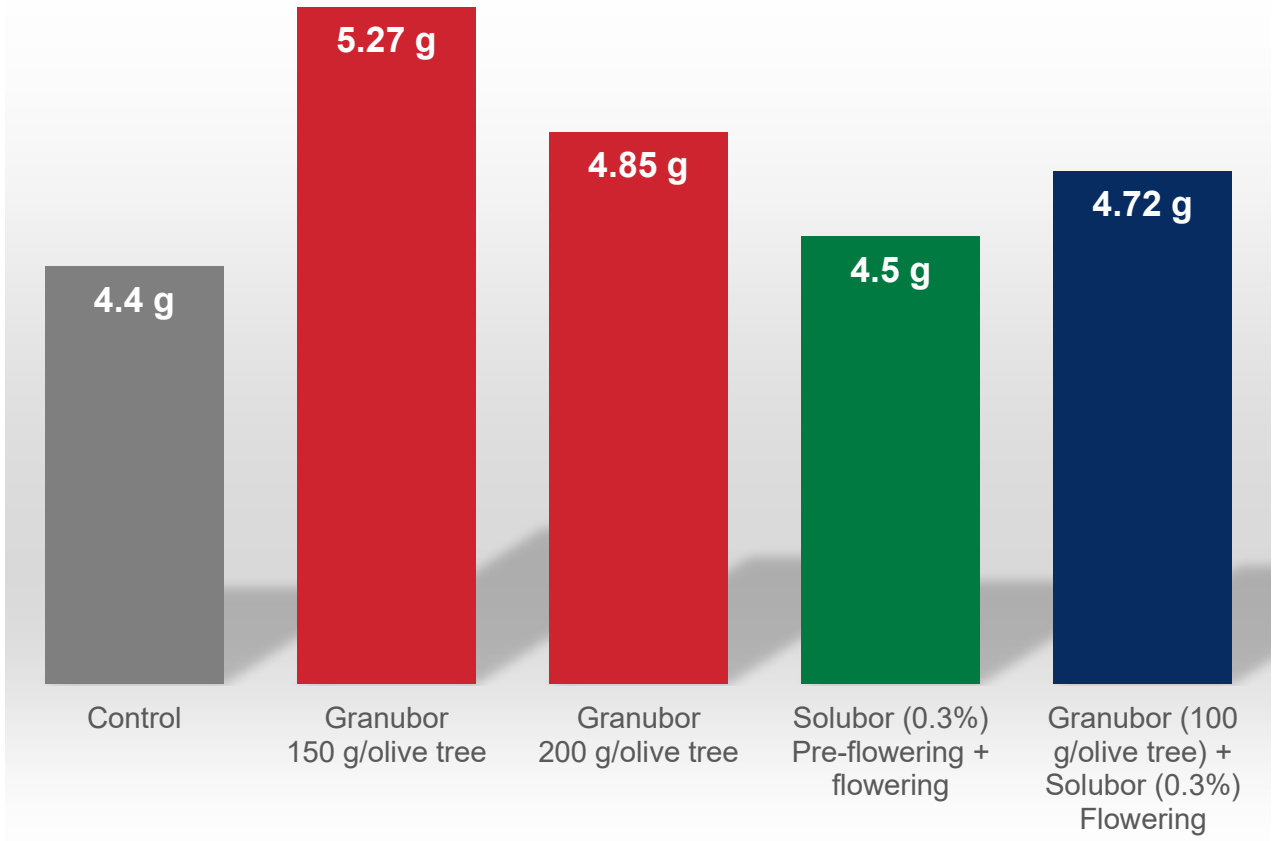
Average weight of 100 olives (grams)

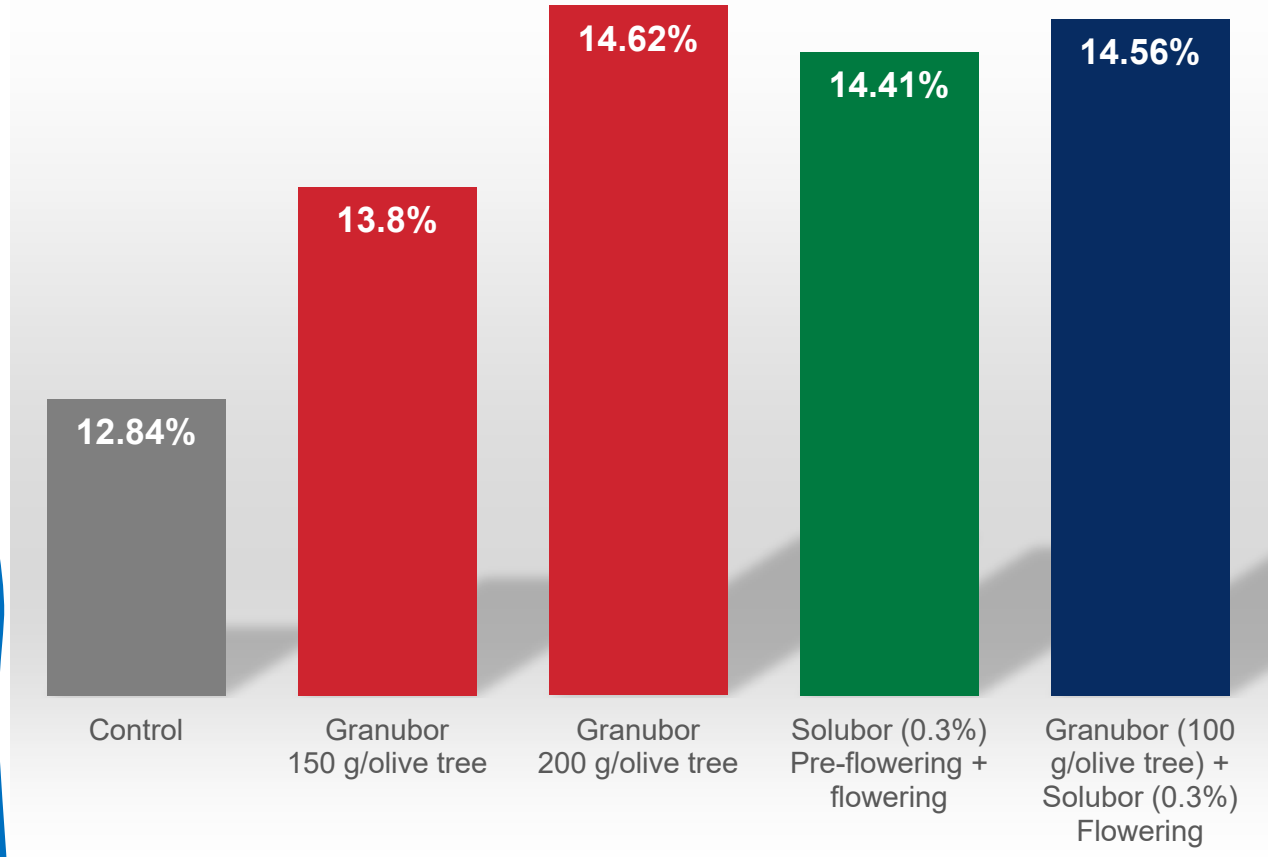
Mean over three years - 2023/24, 2024/25 and 2025/26



Source: Juan Vilar, 2026

Industrial yield

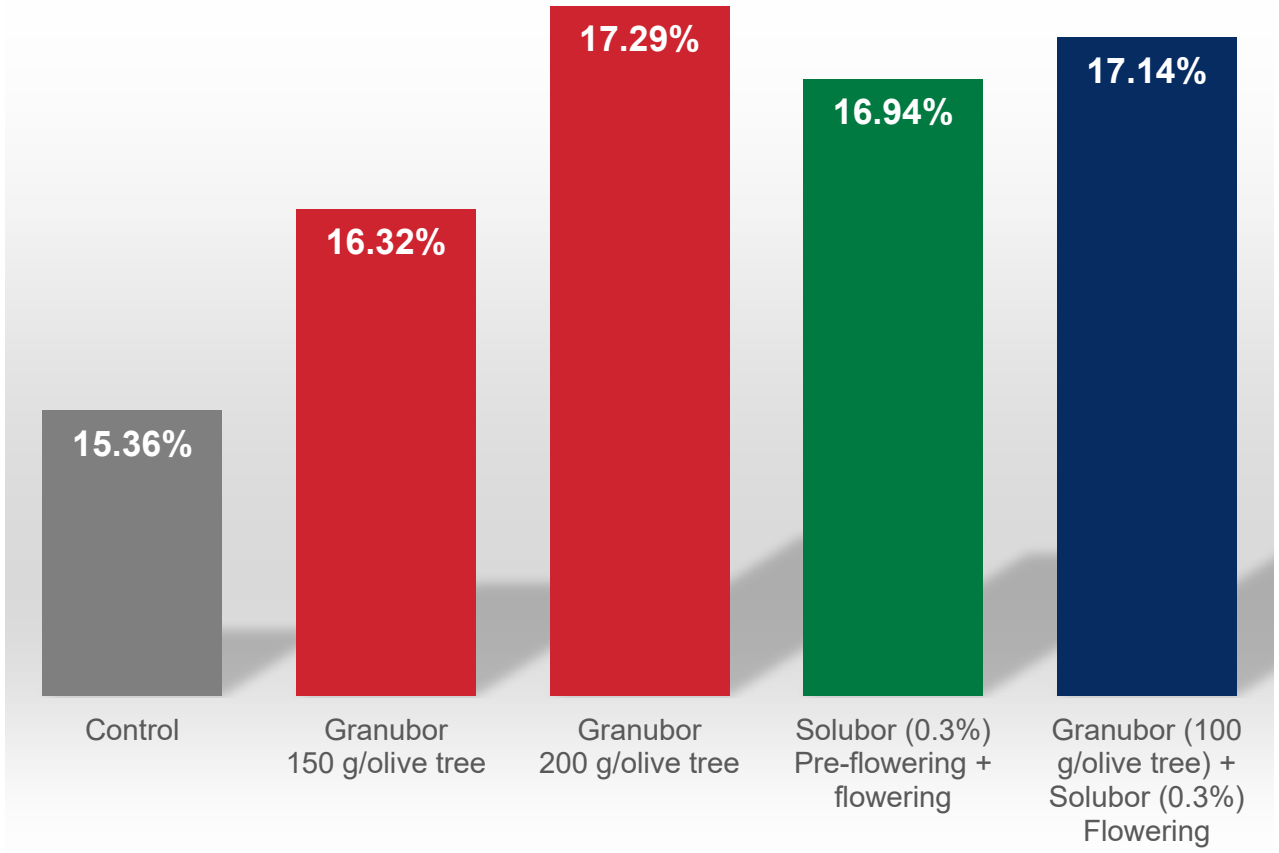
Mean over three years - 2023/24, 2024/25 and 2025/26



Source: Juan Vilar, 2026

Wet fat

Mean over three years - 2023/24, 2024/25 and 2025/26



Source: Juan Vilar, 2026

Boron in olive trees

Characteristics and location of the trial

	Municipal area	**Designation**	**SIGPAC reference**	**Cultivation system**	**Planting density** olive trees/ha	**Water regime**	**Variety**
Olive trees	Baeza (Jaén)	Fuente del Olivar	23/9/25/359	Traditional	100	Rainfed	Picual

Soil type: Clayey loam

Soil pH ($CaCl_2$): 8.51

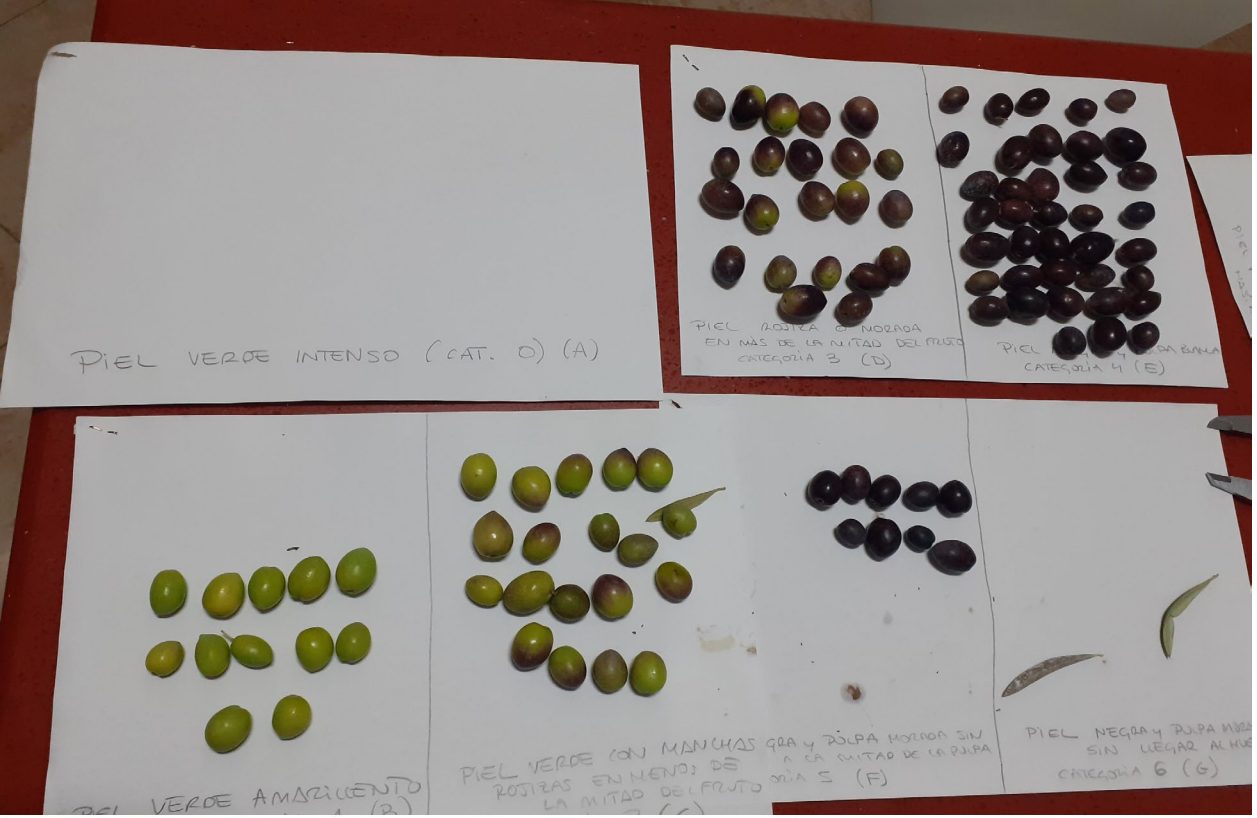
EC: 0.41 Ds/m

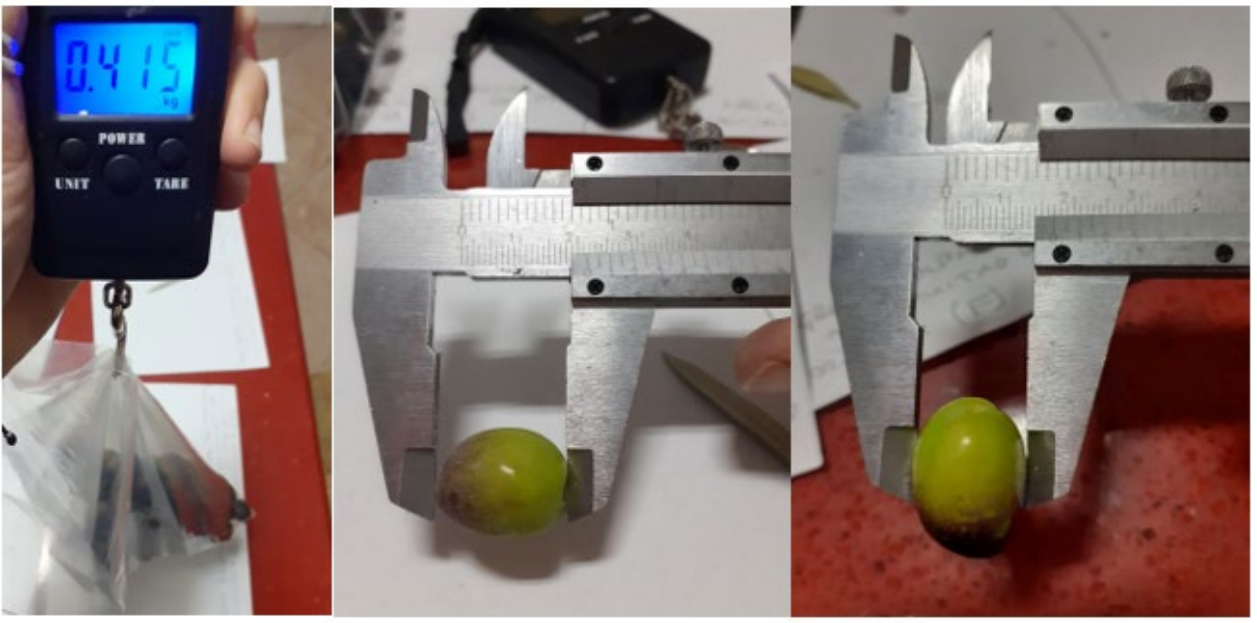
O.M: %: 1.3%

CEC: 29.11 Cmolc/kg soil

C/N 10.68

PSI 2.71%





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Test description

Parameters evaluated:

- Micro and macro nutrients at foliar level
- Fat yield
- Physical characteristics of the fruit (weight/shape index and ripening index)
- General behavior of the crop

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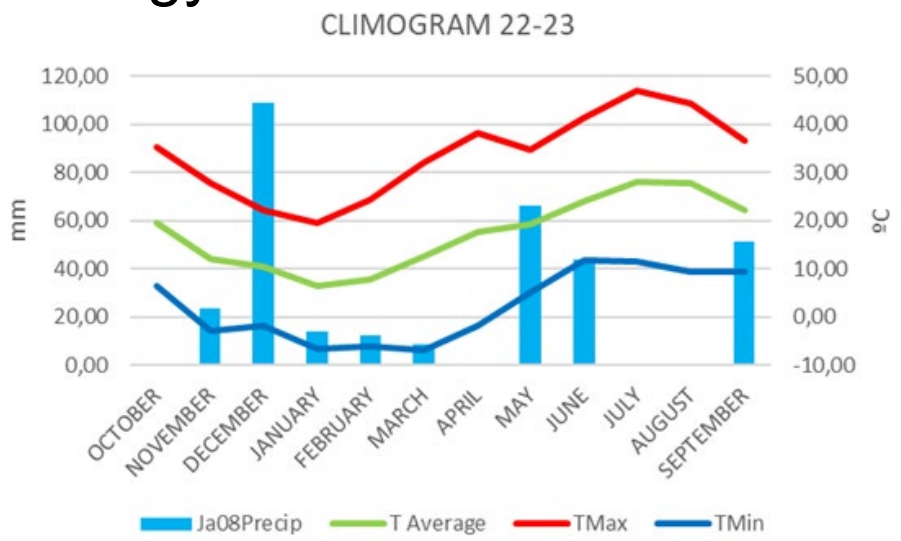
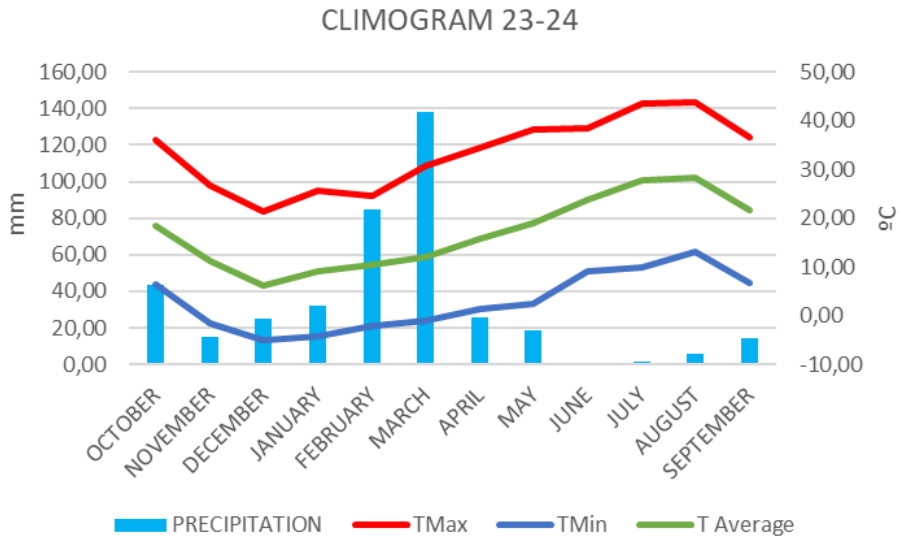
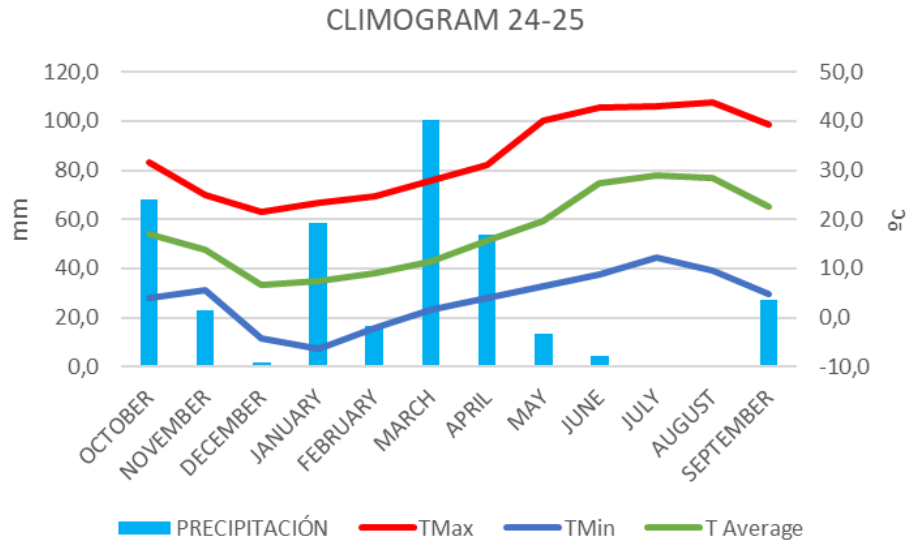
Climatology







- Continental Mediterranean climate, with hot summers with low rainfall and cold winters
- Low rainfalls
- Very high temperatures from May to October
- Very adverse conditions for cultivation

Climogram for the 2022, 2023, 2024 and 2025, season from the Ubeda agroclimatic station
Source: Ifapa 2026

Conclusions

- Boron treatments exhibit higher values of wet fat and industrial yield than the control.
- The *Granubor* (200 g/olive tree), *Solubor* (0.3%), and *Granubor* (100 g/olive tree) + *Solubo*r (0.3%) treatments had the highest oil yields.
- There is an inverse relationship between fruit moisture and fat content—a common behavior in olives during ripening.

These trends suggest that boron could indirectly influence oil accumulation, possibly through its role in:

- Carbohydrate metabolism
- Sugar transport
- Reproductive processes and fruit development

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