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Article

Screening Almond Cultivars for Water Stress Tolerance Using Multiple Diagnostic Parameters

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Table S1. Climatic and edaphological values obtained from two experimental plots (Les Borges Blanques and Constantí) during the three-year study period (2004-2006) and the experimental period (March to September).

	Les Borges Blanques				Constantí			
	2004	**2005**	**2006**	**Three-year period**	**2004**	**2005**	**2006**	**Three-year period**
Climate								
Mean temperature (º C)	18.3	19.0	19.2	18.8	18.9	19.0	19.9	19.2
Mean relative humidity (%)	71.8	69.8	69.1	70.2	74.5	75.4	77.0	75.6
Mean wind speed (m/s)	1.0	0.9	1.0	0.9	1.8	1.6	1.3	1.6
Reference ET (ET0, mm)	892.7	929.3	939.0	920.3	822.6	889.4	902.5	871.5
Total precipitation (mm)	216.0	90.7	149.6	152.1	326.8	281.7	350.5	319.6
Climatic Water Deficit (CWD)	676.7	838.6	789.4	768.2	495.8	607.7	552.0	551.9
Soil								
Soil classification	Typic Xerorthent				Calcixerollic Xerochrepts			
Chemical characteristics								
pH	8.4 (Slightly alkaline)				8.5 (Slightly alkaline)			
CE (dS/m)	0.3 (Normal)				0.2 (Normal)			
Organic Matter (%)	2.2 (Normal)				1.5 (Normal-low)			
Nitrate Nitrogen (ppm)	16.0 (Normal)				10.0 (Normal)			
Phosphorous (ppm)	4.5 (Low)				78.0 (Very high)			
Potassium (ppm)	246.0 (Normal-high)				243.0 (Normal-high)			
Calcium carbonate equiv. (%)	22.5 (Calcareous)				31.5 (Very calcareous)			
Magnesium (ppm)	439.0 (High)				117.0 (Normal)			
Calcium (ppm)	8367.5 (Very high)				6389.5 (High)			
Sodium (ppm)	72.5 (Normal)				47.0 (Normal)			
Physical characteristics								
Soil texture class	Silty clay loam (Fine)				Clay loam (Fine)			
Porosity (%)	51.9				48.0			
Soil depth (m)	> 1				> 1.2			
Root depth (m)	> 0.6				> 0.7			
Water conditioning factors								
Water retention, 0.3 bars (%)	38.0 (Field capacity)				40.0 (Field capacity)			
Water retention, 15.0 bars (%)	17.0 (Permanent wilting point)				18.0 (Permanent wilting point)			
Useful Water Reserve (L/m3 soil)	210.0				220.0			

Table S2. Values for: crop evapotranspiration (ETC), effective precipitation (PE), net water needs (Nn). Total water needs (NT), controlled deficit irrigation (CDI) at Les Borges Blanques) and water deficit (Dw) on both plots, during the experimental period (March-September), with annual and three-year average values for the period 2004-06.

	2004	2005	2006	Average
Les Borges Blanques				
ETC (mm)	372.9	389.6	391.0	384.5
PE (mm)	42.5	12.5	64.0	39.6
Nn (mm)	328.4	377.1	327.0	344.9
NT (mm)	364.8	419.0	363.3	383.2
RDC (March,3-June,15) (mm)	12.3	78.2	76.1	55.5
RDC (March,3-June,15) (mm)	136.7	171.2	166.0	158.0
RDC (March,3-June,15) (mm)	48.0	23.6	0.0	23.9
RDC total (mm)	197.0	273.0	242.0	237.4
DW (mm)	167.8	146.0	121.3	146.2
Constantí				
ETC (mm)	331.9	364.6	364.9	353.8
PE (mm)	71.0	117.0	20.0	69.3
Nn (mm)	260.9	247.6	344.9	284.5
DW (mm)	260.9	247.6	344.9	284.5

Table S3. Dates of full bloom (annual and mean values) for the experimental period (2004-2006), corresponding to six cultivars of almond tree under irrigated and rainfed conditions.

Plot	Cultivars	Date of Full Bloom			Average Date of Full Bloom
		2004	2005	2006	
Les Borges Blanques (Irrigated)	Ferragnès	15 March	27 March	20 March	21 March
	Francolí	15 March	24 March	25 March	21 March
	Glorieta	10 March	24 March	18 March	17 March
	Masbovera	15 March	24 March	18 March	19 March
	Guara	15 March	24 March	18 March	19 March
	Lauranne	17 March	27 March	20 March	21 March
	Average date	15 March	25 March	20 March	20 March
Winter temperature (0C)		7.37	5.67	7.10	6.71
Constantí (Rainfed)	Ferragnès	21 March	23 March	11 March	18 March
	Francolí	14 March	22 March	8 March	15 March
	Glorieta	15 March	17 March	7 March	13 March
	Masbovera	22 March	23 March	9 March	18 March
	Guara	21 March	19 March	9 March	16 March
	Lauranne	20 March	23 March	11 March	18 March
	Average	19 March	21 March	9 March	16 March
Winter temperature (0C)		10.01	8.04	9.47	9.17

Table S4. Phenological processes observed in the almond tree cultivars studied and their stage of development and level of activity in the process during the period considered.

Period	Phenological process	Level of activity
First fortnight in March	Sprouting	-
End of March/beginning of April	Setting	-
March to mid-May	Vegetative growth	Strong
Mid-May to end of June		Weak
April to mid-June	Lengthening of the shell	Strong
Mid-June to mid-September		Weak
End of April to end of June	Lengthening of the kernel	Strong
July to September		Weak

May to mid-August Mid-August to September	Maturation of the kernel (drying)	Strong Weak
July to October	Floral differentiation	-

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