



Supplement of

Drought reduces tree growing season length but increases nitrogen re-sorption efficiency in a Mediterranean ecosystem

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Supplemental material

Table S1. Meteorological conditions

	Temperature (° C)			Precipitation (mm)		
	1971-2000	2004	2005	1971-2000	2004	2005
Autumn	13.5	12.6	12.0	249	331	277
Winter	10.7	10.0	7.1	187	198	51
Spring	16.6	18.3	18.5	98	51	78
Summer	22.6	24.1	23.9	45	26	4
Year	15.9	16.3	15.3	579	607	410

Table S2. Timings of the different phenophases (DOY or number of days for duration) and statistical significance between years (p-value).

	Mild year (2004)			Dry year (2005)			
Timings	Min	Max	Mean ± SE	Min	Max	Mean ± SE	p-value
Bud development							
Bud active	78	104	89 ± 2	90	112	105 ± 2	<0.0001
Budburst	97	118	107 ± 2	112	132	120 ± 2	<0.0001
Duration	4	32	18 ± 2	5	29	16 ± 2	0.258
Shoot elongation							
Onset	97	125	108 ± 2	112	132	121 ± 2	<0.0001
Cessation	169	181	175 ± 2	132	153	145 ± 2	<0.0001
Duration	44	77	66 ± 2	8	36	24 ± 2	<0.0001
Trunk growth							
Onset	78	111	93 ± 3	90	103	96 ± 2	0.135
Cessation	181	181	181 ± 0	153	153	153 ± 0	<0.0001
Duration	70	103	88 ± 3	50	63	57 ± 2	<0.0001
Growing season length	77	103	92 ± 2	41	63	48 ± 2	<0.0001
Leaf senescence							
Onset	91	97	95 ± 1.3	103	103	103 ± 0	0.031
Cessation	147	153	149 ± 1.3	181	181	181 ± 0	0.031
Duration	50	56	54 ± 1.3	78	78	78 ± 0	0.031

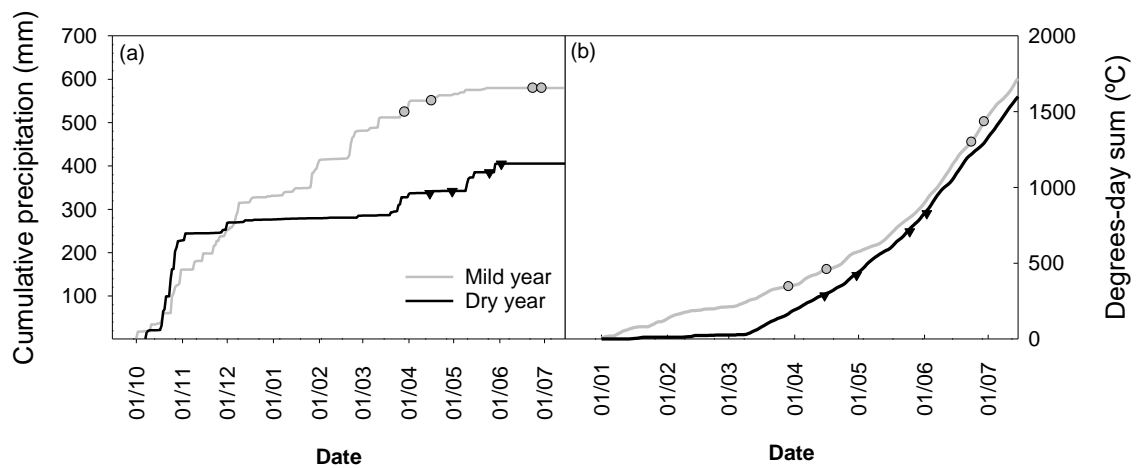


Figure S1. (a) Cumulative precipitation (mm) and (b) degrees-day sum (°C) until the end of the growing season. Symbols represent sequentially the mean days of bud activation, bud burst, shoot cessation and trunk cessation.

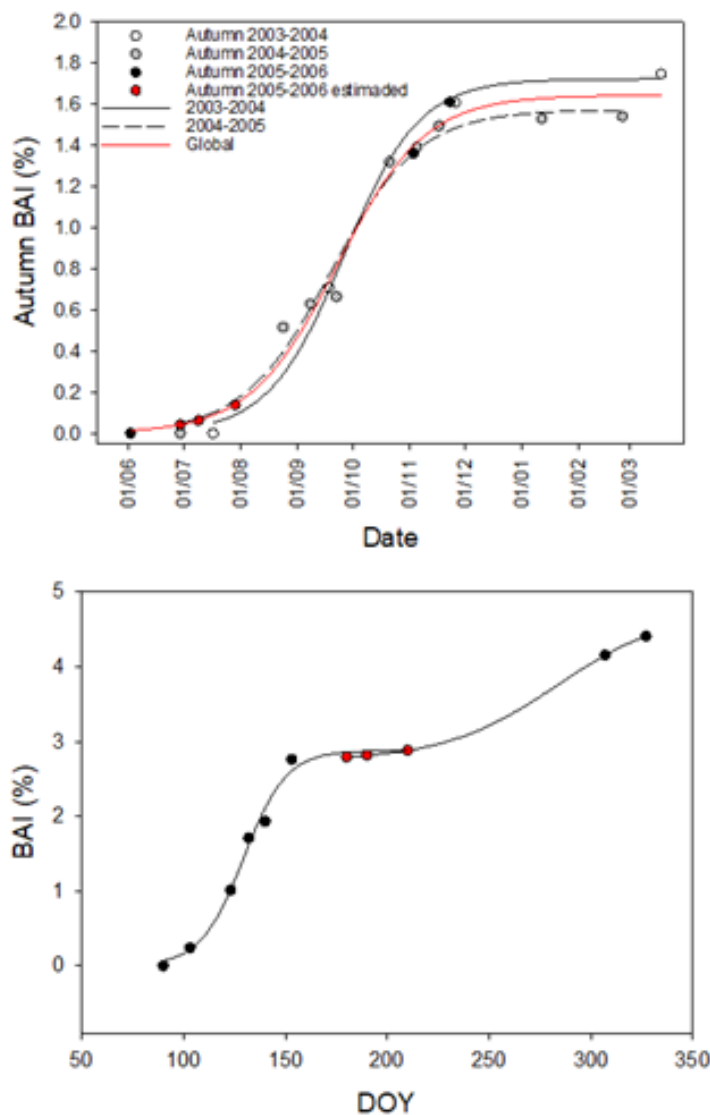


Figure S2. BAI estimation at the end of the growing season of the dry year. (a) Autumn BAI (%). (b) Overall pattern of BAI (%) in the dry year. Autumn BAI was considered since dbh increments were lower than 0.05 \% day^{-1} until the next spring growth. BAI showed a sigmoidal pattern over time and significant regressions were obtained for each year ($p < 0.0001$). Since the slopes were similar, data was pooled and a general curve (red line) was obtained ($f = a/(1 + \exp(-(x - x_0)/b))$), where $a = 1.6434$, $b = 23.7431$ and $x_0 = 262.9882$; x_0 is DOY). Basal area increments were then estimated to confirm the end of spring trunk growing season. The overall pattern of BAI resulted clearly in the combination of two distinct growing periods, spring and autumn.

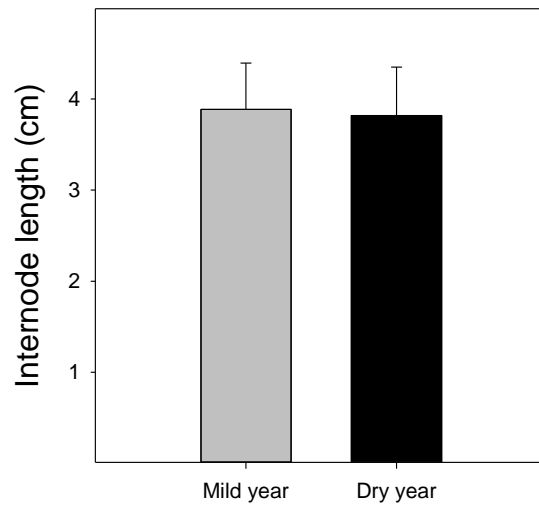


Figure S3. Internode length (cm) obtained as the ratio between shoot length and number of leaves in the two studied years.

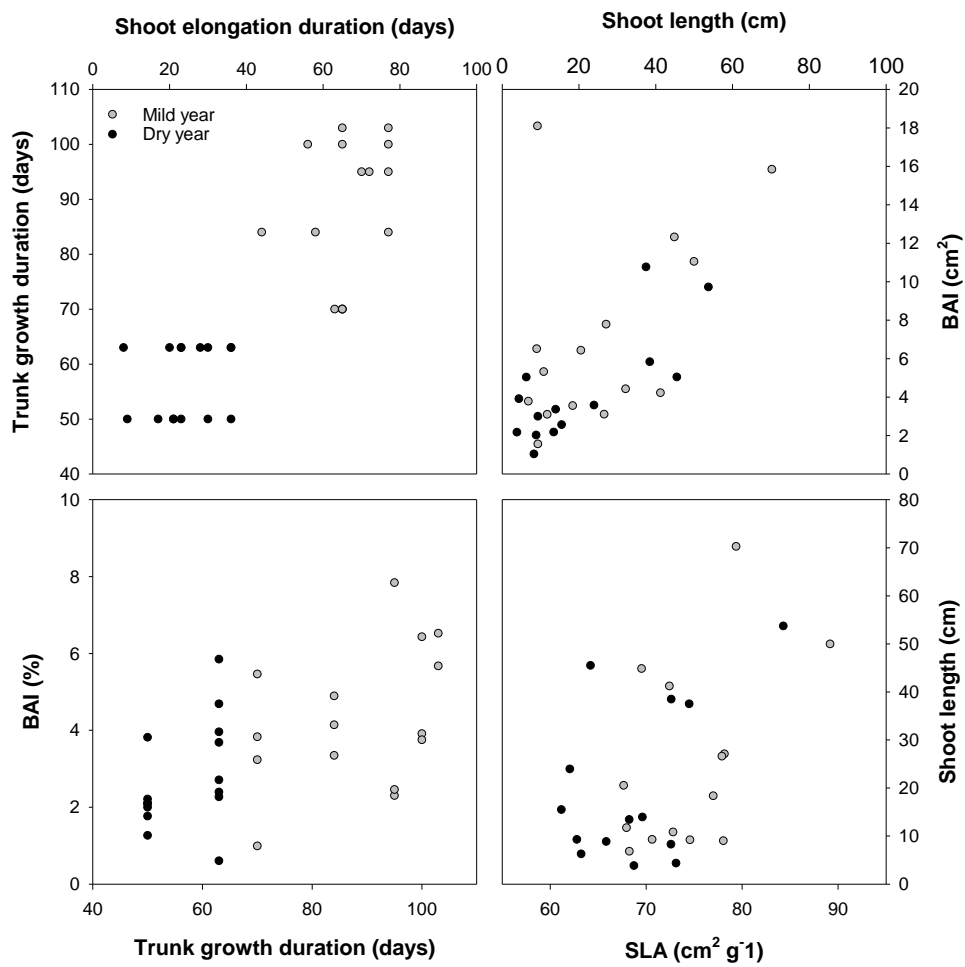


Figure S4. Some correlations between growth variables.

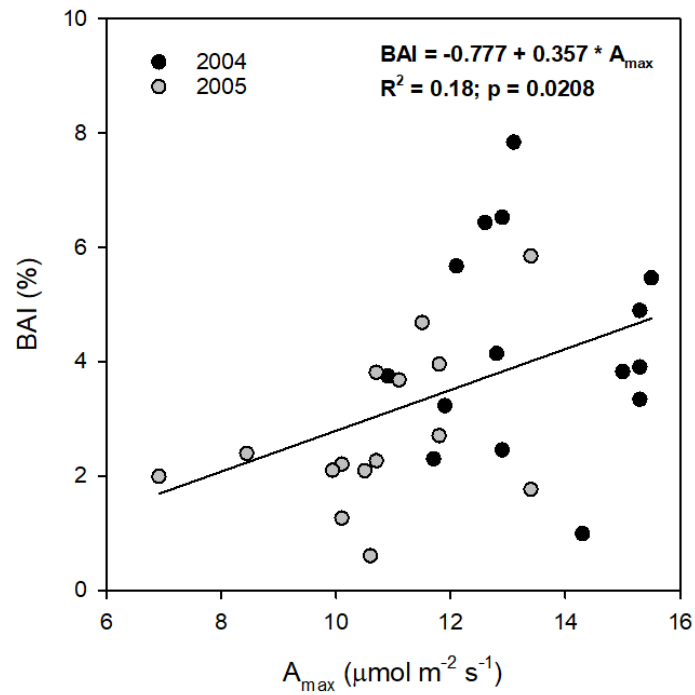


Figure S5. Relationship between carbon assimilation (A_{max}) at the onset of the growing season (March) and BAI (%).

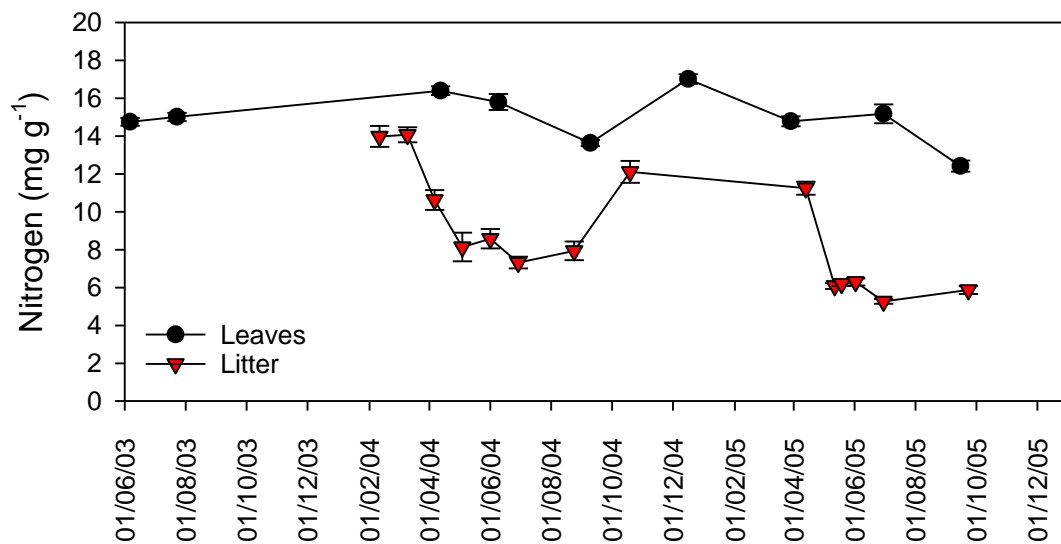


Figure S6. Nitrogen dynamics in green and senescent leaves (litter leaves) over the study period.

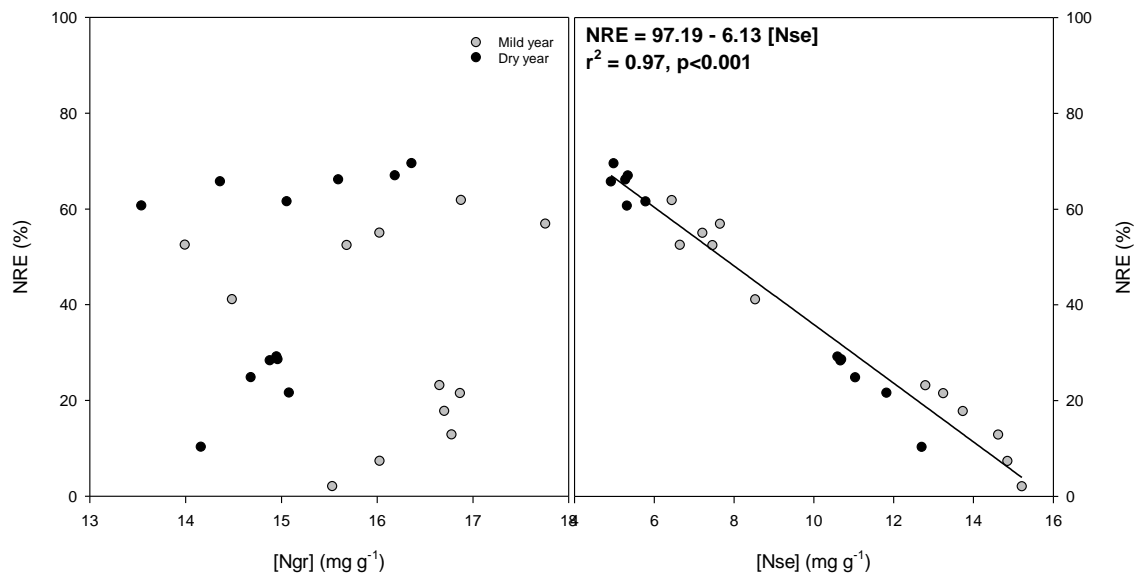


Figure S7. Relationships between Nitrogen resorption efficiency (NRE) and **(a)** N concentration in green [Ngr] and **(b)** senescent leaves [Nse].

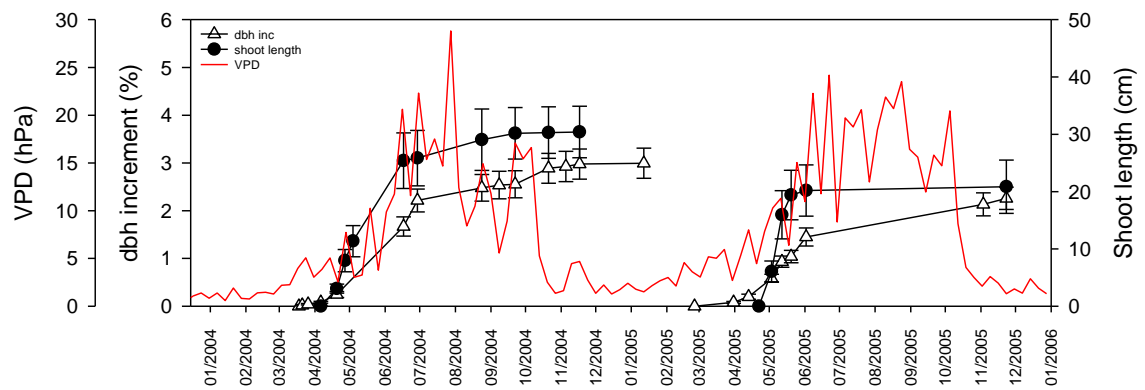


Figure S8. Vapour pressure deficit (VPD, hPa), dbh increment (%) and shoot length (cm) in the mild year (2004) and in the dry year (2005). VPD is the average of the previous 7 days.