

# **Germination behavior of *Sarcopoterium spinosum* in response to smoke chemicals indicates adaptation to fire in the southeastern Mediterranean**

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## **ABSTRACT**

Germination behavior of the widespread southeastern Mediterranean shrub *Sarcopoterium spinosum* was conducted to assess its respond to post-fire cues. Germination experiments were conducted on 10 populations along a rainfall gradient – from productive, fuel-rich and fire-prone mesic Mediterranean populations, as well as from those in arid and fuel-poor environments. Our results indicate that post-fire cues induced germination of *S. spinosum* only among populations that originated from sites that are prone to wild fires. As wild-fires in this region occur mainly during the long dry

season, but rarely ignited by natural factors, the adaptation to human made fires in natural populations of the southeastern Mediterranean environments is discussed.

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**Supplementary material**

**Table S1.** Final germination (%) in control and smoke-treated fruits, and results of ANOVA with repeated measures of the effect of smoke on germination of the 10 investigated populations.

Population	Control	Smoke	Exact F	Num DF	Den DF	<i>P</i> value
Ramot Naftali	8.0±4.4	56.0±11.5	13.77	1	18	<0.01
Rosh haNikra	10.0±4.5	46.0±9.5	11.25	1	18	<0.01
Tur'an	8.0±3.3	42.0±7.0	15.56	1	18	<0.001
Gazit	24.0±8.8	28.0±6.1	0.09	1	18	0.762
Reihan	32.0±9.5	86.0±8.5	11.35	1	18	<0.01
Bet Oved	18.0±6.3	32.0±10.0	1.89	1	18	0.186
Deir Rafat	6.0±3.1	54.0±11.6	13.76	1	18	<0.01
Tekoa	42.0±9.6	60.0±11.9	2.91	1	18	0.105
Yatir	20.0±5.2	28.0±6.8	0.37	1	18	0.552
Tel Arad	48.0±10.8	54.0±7.3	0.43	1	18	0.522

**Table S2.** Linear regression between environmental parameters (Table 1) and germination. Percent germination and the ratio of seed germination in smoke-treated nutlets to that in controls were arcsine transformed for the statistical analysis.

	Control			Smoke			Effect of smoke (fold change)		
	$R^2$	$F_{1,8}$	$P$	$R^2$	$F_{1,8}$	$P$	$R^2$	$F_{1,8}$	$P$
	Rainfall	0.31	3.56	0.09	0.18	1.74	0.24	0.24	2.58
Elevation	0.16	1.57	0.24	0.07	0.57	0.47	<0.01	0.01	0.91
Minimum temperature (Jan)	<0.01	0.06	0.82	0.16	1.55	0.25	0.05	0.45	0.52
Maximum temperature (Jun)	<0.01	0.01	0.92	<0.01	0.06	0.82	<0.01	<0.01	0.98
Vegetation*	0.28	3.03	0.12	0.31	3.57	0.09	0.53	9.04	0.02

\*Maximum vegetation cover (%) was used for the analysis, c.f. Table 1.