

Supplementary material of ‘Herbaria collections as cues of leaf trait adjustments in *Senecio pyrenaicus* subsp. *carpetanus* in response to environmental aggravation,’ by Rosina Magaña Ugarte. *Mediterr. Bot.* 43, e70622. <https://doi.org/mbot.70622>

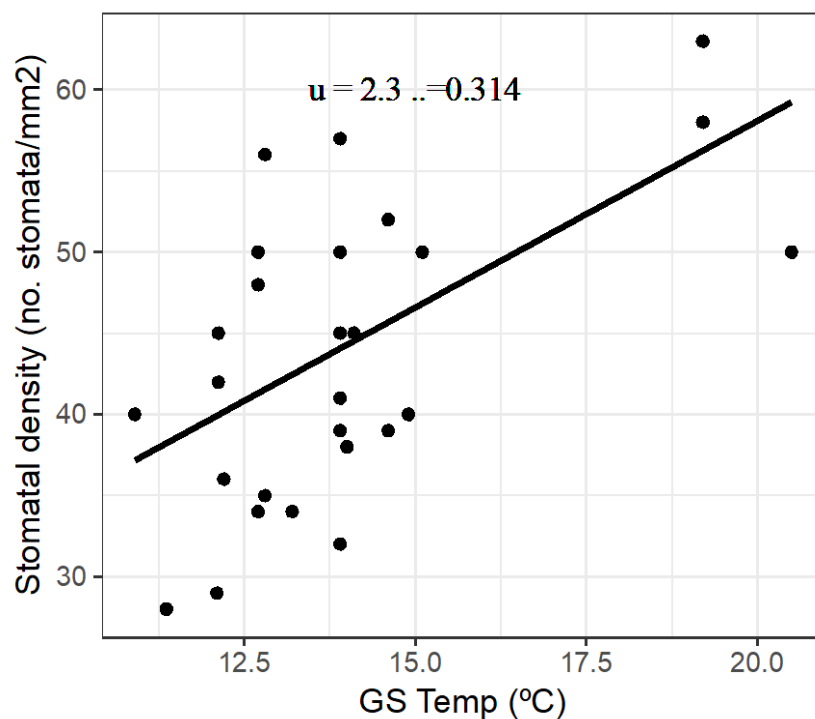


Figure S1. Linear regression of the relationship between the stomatal density (no. stomata/mm²) and the variation in temperatures during the growing season (°C) of *Senecio pyrenaicus* subsp. *carpetanus* found in conserved specimens.

Table S1. Ozone threshold values and concentration-based ozone critical levels (CLE_c) for plant protection established within the CLTRAP (2011), and the ozone objective values designated by the EU Air Quality Directive (2008/50/CE).

Group	Parameter	CLE _c (μL L ⁻¹ h)	Period	Effect
Annual pastures	3-month AOT40	3	May – July	Growth reduction (-10%) Low seed production
Perennial grasslands	6-month AOT40	5	April – September	Growth reduction (-10%)

Table S2. Herbaria data of the studied *S. carpetanus* specimens selected for the present study, coupled with the mean morphological parameters measured per herbarium record. Herbaria data includes the respective location and information of each consulted sheet. Significant effects of summer temperature and summer rainfall are represented by asterisks and letters (a), respectively: *** and ^{aaa}, *p* value < 0.001; ** and ^{aa}, *p* value < 0.01; * and ^a, *p* value < 0.05.

Herbarium/ Institution	Herbarium ID	Year	Sampling point	No. stomate	Stomate length (μm)	Stomate width (μm)	Stomatal density (no.stomate/ mm^2)	Stomatal pore index (pore length ² \times SD)	Leaf Area (cm^2)	Leaf width (cm)	Leaf length (cm)
MAF/ Universidad Complutense de Madrid	MAF 79092	1947	Peñalara	61	50.2	40.6	57 ± 6.3	0.14	15.9	2.3 ^a	6.7
	SALAF 3139	1947	Peñalara	54	53.0	41.8	50 ± 1.3	0.14	18.7	2.1 ^a	6.9
SALA/ Universidad de Salamanca	SALAF 3139	1947	Peñalara	62	56.2	40.4	57 ± 2.1	0.18	14.9	2.0 ^a	5.9
	SALAF 3139	1947	Peñalara	35	61.0	40.5	32 ± 2.1	0.12	16.6	2.0 ^a	6.2
	SALAF 3139	1947	Peñalara	49	57.9	39.5	45 ± 6.5	0.15	14.2	2.4 ^a	5.3
Herbarium of the Universitat de Valencia	VAL 130497 (= VALF 2473)	1947	Peñalara	44	55.6	37.9	41 ± 6.0	0.13	16.8	2.2 ^a	6.7
	VAL 130497 (= VALF 2473)	1947	Peñalara	43	57.4	41.9	39 ± 4.0	0.13	15.1	2.5 ^a	5.2
MAF/ Universidad Complutense de Madrid	MAF 120334	1956	Bola del mundo	30	52.9	37.0	$28^{a*} \pm 4.9$	0.08	15.8	2.0	7.1
	MAF 69199	1967	Navafria	46	47.0	34.6	$42^{a*} \pm 4.1$	0.09	17.7	2.8	5.7
	MAF 102378	1967	Navafria	49	64.0	53.6	$45^{a*} \pm 2.9$	0.19	17.2	2.6	6.2
	MAF 102379	1967	Navafria	45	51.3	36.4	$42^{a*} \pm 2.8$	0.11	30.8	3.3	8.4
	MAF 152975	1971	Cabeza de hierro	43	54.6	42.6	$40^{a*} \pm 2.1$	0.13	23.0	2.4	7.5
MAF/ Universidad Complutense de Madrid	MAF 115664	1973	Peñalara	39	41.0	31.6	$36^{a*} \pm 1.8$	0.06	19.6	2.5	6.0
	MAF 119859	1974	Navacerrada	32	50.7	37.7	29 ± 1.2	0.08	8.7	5.6 ^a	1.9
	MAF 134292	1989	Peñalara	49	55.6	38.6	45 ± 1.7	0.14	15.2	2.0 ^a	5.7
	MAF 146691	1990	Peñalara	42	70.9 ^{a*}	60.3 ^{a*}	$39^{a*} \pm 1.2$	0.19	24.0	2.6 ^{a*}	7.4

	MAF 144434	1992	Valdesqu i	36	53.0 ^{a*}	43.3 ^{a*}	34 ^{a*} ± 1.4	0.09	9.4	1.9 ^{a*}	4.4
CSIC-Real Jardín Botánico. Colection of Vascular Plants (MA)	MA 515384	1992	Peñalara	52	60.4 ^{a*}	37.1 ^{a*}	48 ^{a*} ± 1.6	0.18	6.7	1.2 ^{a*}	6.5
Herbarium of the Universitat de Valencia	-	1995	Pto. Cotos	36	53.5 ^{a*}	40.3 ^{a*}	34 ^{a*} ± 5.5	0.10	22.7	2.4 ^{a*}	6.6
MAF/ Universidad Complutense de Madrid	MAF 157077	1999	Peñalara	41	57.4 ^{a*}	44.2 ^{a*}	38 ^{a*} ± 2.3	0.12	11.5	1.9 ^{a*}	5.1
CSIC-Real Jardín Botánico. Colection of Vascular Plants (MA)	MA 750233	2005	Puerto de la Morcuera	44	53.2 ^{a*}	41.1 ^{a*}	40 ^{aa**} ± 2.6	0.11	12.6 ^{aaa***}	2.7 ^{a*}	6.6
CIEMAT	-	2007	Bola del mundo	60	50.0 ^{a*}	37.7 ^{a*}	56 ^{aa**} ± 1.9	0.14	4.3 ^{aaa***}	2.6 ^{a*}	9.3
CSIC-Real Jardín Botánico. Colection of Vascular Plants (MA)	MA 773457	2007	Cumbre el Nevero	38	56.6 ^{a*}	39.2 ^{a*}	35 ^{aa**} ± 3.9	0.11	11.4 ^{aaa***}	2.7 ^{a*}	7.8
	-	2008	Bola del mundo	54	52.4 ^{a*}	40.2 ^{a*}	50 ^{aa**} ± 1.1	0.14	11.6 ^{aaa***}		
	-	2008	Bola del mundo	56	47.1 ^{a*}	39.7 ^{aa**}	52 ^{aa**} ± 3.9	0.12	11.6 ^{aaa***}		
CIEMAT	-	2009	Bola del mundo	54	51.3 ^{aa*}	40.1 ^{aa*}	50 ^{aa**} ± 4.4	0.13	11.7 ^{aaa***}		
	-	2009	Bola del mundo	62	52.5 ^{aa*}	40.6 ^{aa*}	57 ^{aa**} ± 2.0	0.16	2.9 ^{aaa***}		
	-	2011	Bola del mundo	60	50.8 ^{aa*}	38.6 ^{aa*}	56 ^{aa**} ± 4.0	0.14	10.3 ^{aaa***}		
CSIC-Real Jardín Botánico. Colection of Vascular Plants (MA)	MA 906955	2015	Lozoya del Valle	76	58.1 ^{a*}	38.1 ^{a*}	70 ^{aa**} ± 4.0	0.24	4.6 ^{aaa***}	1.7 ^{a*}	5.2

MAF/ Universidad Complutense de Madrid	MAF 178101	2018	Bola del mundo	47	57.7 ^{a*}	40.3 ^{a*}	43 ^{aa**} ± 2.4	0.14	9.8 ^{aaa***}	2.9 ^{a*}	8.0
	MAF 178101	2018	Bola del mundo	50	60.7 ^a	41.4 ^a	47 ^{aa**} ± 2.5	0.17	13.7 ^{aaa***}	2.9 ^{a*}	8.1