SUPPLEMENTARY DATA

Fig. S1. Magnified adaxial leaf surface of *Protea repens* showing stomatal structures visible under (A) a light microscope at 80× magnification, and (B) a SEM image. (A) is an acrylic impression on a cellophane peel, which is the impression type used for stomatal counting in this study. The inside of the epistomatal cavity is visible only in the left-most of the three stomata. (B) is a SEM image of a fresh leaf that was fixed, rapidly dehydrated to 100% ethanol, and then critical point dried. Image Credit for (B): Cynthia Jones, University of Connecticut.
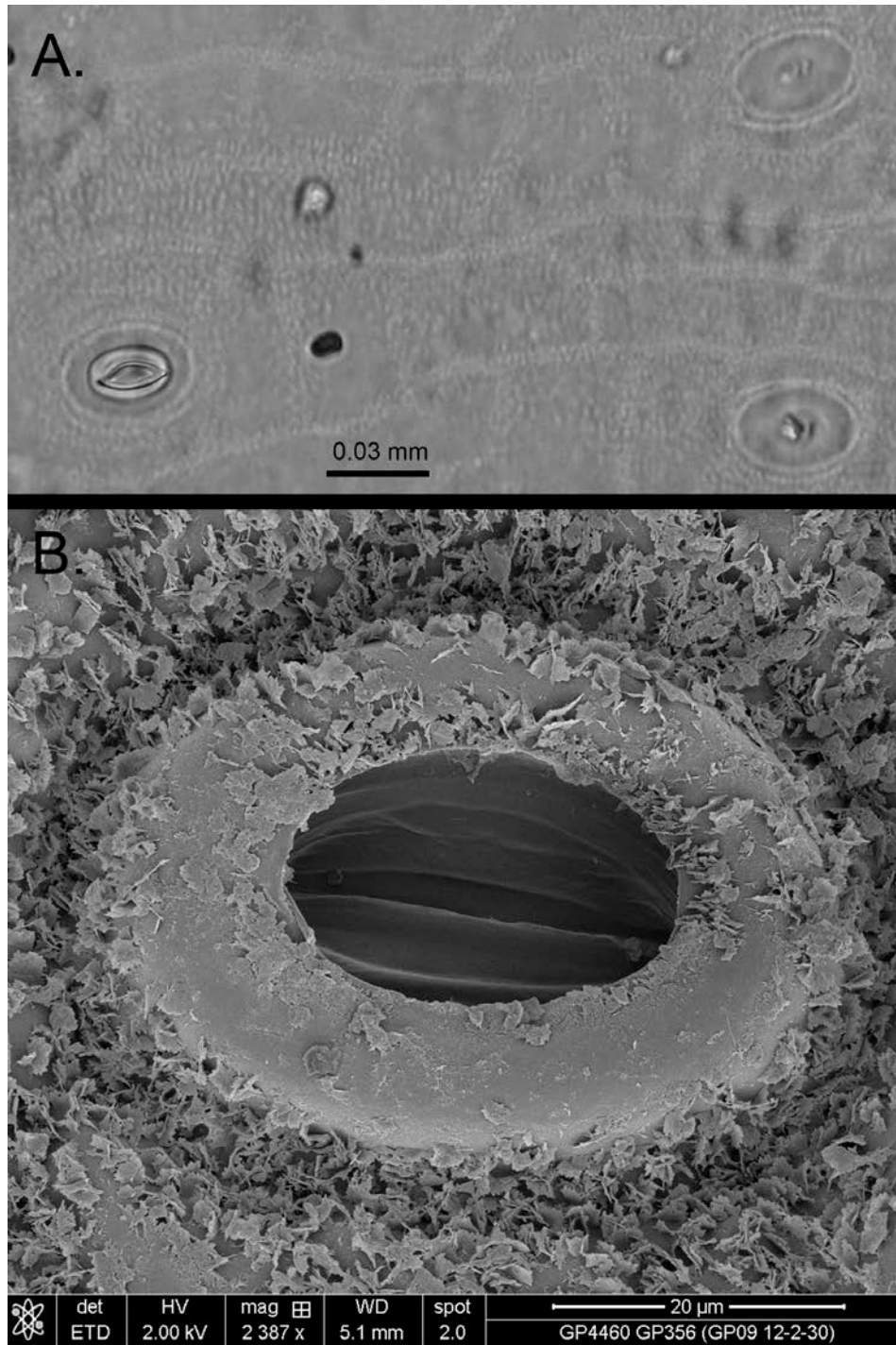
Fig. S2. Traits of *Protea repens* plants from 19 wild populations (ordered east to west) and of their offspring in a common garden at Kirstenbosch Botanical Gardens, South Africa. Traits A-C were measured once in the wild and annually for 3 years in the garden; D and E were only measured in garden years 2 and 3. Bars are means, dotted lines are the range for wild adults (max-min), and solid lines approximate 95% CI (1.96× SE) for wild adults. Different letters below the x-axis line reflect significantly different populations, based on Tukey-adjusted comparisons from an ANOVA for each trait in 2014, with population as a fixed effect. See appendices 1 and 2 for additional details.
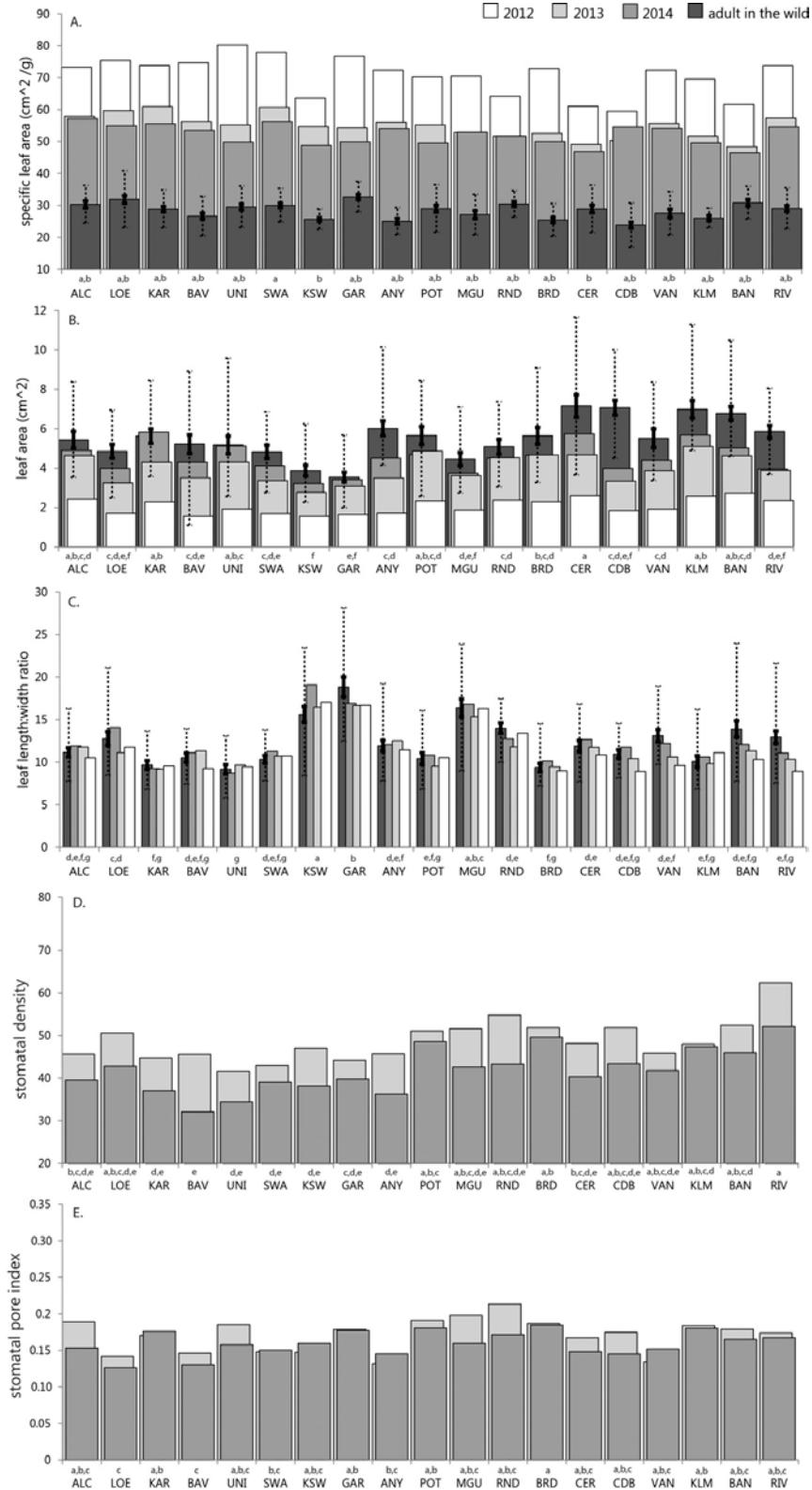
Table S1. Model output to assess whether *Protea repens* leaves in the common garden differ significantly from those of wild plants. The Least Squares Means difference shown here were estimated as part of a linear model of each leaf trait as a response to sample type (2012, 2013, 2014 or wild plants), population (n=19), and their interaction (see Appendix 1 for additional methods). Estimate trait means were compared between the garden the wild using a separate contrast statement for each year, and p-values were Tukey adjusted within models. Differences that are statistically significant are bolded and marked with an asterisk.

population	SLA in wild plants minus garden plants, by year			LWR in wild plants minus garden plants, by year			Leaf area in wild plants minus garden plants, by year		
	2012	2013	2014	2012	2013	2014	2012	2013	2014
ALC	**-43.6***	**-28.2***	**-27.5***	1.9	0.7	0.6	**3.4***	1.2	0.9
ANY	**-47.3***	**-31.0***	**-29.0***	0.2	-0.9	-0.4	**4.5***	**2.7***	**1.7***
BAN	**-30.3***	-17.1	-15.2	3.5	2.5	1.8	**3.7***	1.8	1.4
BAV	**-47.8***	**-29.4***	**-26.6***	1.2	-0.8	-0.7	**3.2***	1.2	0.4
BRD	**-47.6***	**-27.3***	**-24.7***	0.1	-0.4	-1.0	**3.6***	**1.2***	**1.2***
CDB	**-35.5***	**-26.3***	**-30.6***	1.7	0.2	-1.2	**4.7***	**3.2***	**2.6***
CER	**-31.6***	**-19.6***	**-17.4***	0.6	-0.3	-1.2	**3.9***	1.8	0.8
GAR	**-43.6***	**-21.2***	**-16.8***	**2.5***	**2.5***	**2.2***	**1.9***	0.5	0.1
KAR	**-44.2***	**-31.3***	**-26.0***	0.4	0.7	0.6	**4.0***	**1.9***	0.4
KLM	**-44.9***	**-27.0***	**-24.9***	-1.4	-0.1	-0.9	**4.6***	**2.1***	**1.5***
KSW	**-37.7***	**-28.8***	**-22.9***	**-2.3***	-1.7	**-4.4***	**2.4***	**1.2***	0.8
LOE	**-42.5***	**-26.8***	**-22.0***	1.4	2.0	-0.9	**3.2***	**1.7***	1.0
MGU	**-41.5***	**-23.9***	**-24.2***	-1.7	-0.8	-3.1	**2.6***	0.9	1.0
POT	**-41.8***	**-25.4***	**-20.1***	-0.7	0.3	-0.9	**3.6***	1.1	1.2
RIV	**-44.8***	**-28.4***	**-25.7***	**3.8***	2.5	1.7	**3.6***	**2.1***	**2.0***
RND	**-33.8***	**-21.3***	**-21.3***	0.3	1.9	0.9	**2.4***	0.2	0.2
SWA	**-47.8***	**-30.6***	**-26.1***	-0.7	-0.6	-1.2	**3.5***	**1.8***	**1.0***
UNI	**-50.7***	**-25.8***	**-20.3***	0.1	-0.1	0.8	**3.4***	1.0	0.2
VAN	**-43.9***	**-27.2***	**-25.7***	**3.3***	2.3	0.7	**3.5***	**1.6***	1.0

Table S2. Results of a multi-response multiple regression comparing seed source climate to functional traits of *Protea repens* seedlings from 19 populations grown in a common garden. See methods and results of the main text for explanation of variables.

Variable 1	Variable 2	Coefficient estimate	Standard deviation	2.50%	50%	97.50%	** = Significant * = Marginal
Axis 1: Mean annual temperature	SLA	-0.028	0.083	-0.192	-0.027	0.134	
	Leaf area	0.092	0.116	-0.139	0.091	0.321	
	LWR	0.051	0.164	-0.277	0.05	0.378	
	Stomatal density	**0.258**	**0.091**	**0.077**	**0.258**	**0.441**	**** POSITIVE**
	SPI	**0.257**	**0.090**	**0.076**	**0.258**	**0.43**	**** POSITIVE**
Axis 2: Summer rainfall	**SLA**	**0.153**	**0.080**	**-0.002**	**0.153**	**0.317**	*** POSITIVE**
	Leaf area	-0.068	0.113	-0.289	-0.068	0.152	
	LWR	0.085	0.161	-0.236	0.085	0.409	
	Stomatal density	**-0.216**	**0.090**	**-0.394**	**-0.214**	**-0.04**	**** NEGATIVE**
	SPI	-0.037	0.089	-0.218	-0.038	0.144	
Axis 3: Mean annual rainfall	SLA	-0.096	0.087	-0.265	-0.096	0.077	
	Leaf area	**0.269**	**0.124**	**0.031**	**0.267**	**0.518**	**** POSITIVE**
	LWR	-0.276	0.177	-0.629	-0.273	0.072	
	Stomatal density	0.155	0.099	-0.043	0.153	0.349	
	SPI	0.120	0.096	-0.077	0.12	0.309	
SLA	**Leaf area**	**-0.274**	**0.025**	**-0.323**	**-0.274**	**-0.227**	**** NEGATIVE**
	LWR	-0.004	0.019	-0.042	-0.004	0.033	
	Stomatal density	0.026	0.033	-0.039	0.026	0.092	
	SPI	**-0.110**	**0.036**	**-0.181**	**-0.11**	**-0.042**	**** NEGATIVE**
Leaf area	**LWR**	**-0.073**	**0.017**	**-0.107**	**-0.073**	**-0.039**	**** NEGATIVE**
	Stomatal density	**-0.072**	**0.029**	**-0.13**	**-0.072**	**-0.016**	**** NEGATIVE**
	SPI	**0.113**	**0.031**	**0.052**	**0.113**	**0.176**	**** POSITIVE**
LWR	**Stomatal density**	**0.044**	**0.024**	**-0.003**	**0.044**	**0.092**	*** POSITIVE**
	SPI	0.034	0.026	-0.015	0.034	0.085	
Stomatal density	**SPI**	**0.294**	**0.032**	**0.235**	**0.293**	**0.357**	**** POSITIVE**
Differences among populations N=19	**SLA**	**0.113**	**0.054**	**0.044**	**0.102**	**0.252**	****
	Leaf area	**0.245**	**0.104**	**0.112**	**0.222**	**0.501**	****
	LWR	**0.494**	**0.203**	**0.24**	**0.451**	**1.017**	****
	Stomatal density	**0.131**	**0.067**	**0.047**	**0.118**	**0.303**	****
	SPI	**0.135**	**0.067**	**0.05**	**0.121**	**0.303**	****
Difference between years (2014 minus 2013)	**SLA**	**-0.302**	**0.057**	**-0.413**	**-0.302**	**-0.192**	**** DECREASE**
	Leaf area	**0.435**	**0.048**	**0.34**	**0.436**	**0.53**	**** INCREASE**
	LWR	**0.246**	**0.04**	**0.166**	**0.246**	**0.326**	**** INCREASE**
	Stomatal density	**-0.556**	**0.073**	**-0.703**	**-0.556**	**-0.411**	**** DECREASE**
	SPI	**-0.224**	**0.072**	**-0.365**	**-0.224**	**-0.085**	**** DECREASE**

Appendix S1

Comparing leaf traits between wild adults and common garden plants at 1, 2 and 3 years post-planting

Methods: To determine how closely *Protea repens* plants in the common garden resembled reproductive mature adults, we compared leaf traits of 1, 2 and 3-year old garden plants to leaf traits in the wild. We sampled wild plant leaves concurrently with seed collections (March – May 2011), taking one leaf from each seed-source plant in all 19 populations (N= 821; pop mean=43; 31-48 per population). We measured leaf area, SLA, and leaf length:width ratio on wild-collected leaves using the same methods as for common garden plants. These three leaf traits were measured in the garden in July 2012 for 1-year old plants, June 2013 for 2-year old plants and June 2014 for 3-year old plants. The latter two samples were the same as those used in the main study, and hence, they also included measures of stomatal density, pore length, and pore index.

To assess differences between garden and wild plants, we first plotted population means for each trait across the three garden sampling intervals and in the wild. We also plotted the range in values (max-min) and 1.96×SE to approximate 95% CI for adult plants only. Although no stomatal data were present for wild plants, we plotted stomatal trait means in the garden to visually assess change between 2013 and 2014. To ensure that annual population averages in the garden were not influenced by trait-associated mortality, we only plotted data for the 444 garden plants that were measured in 2014, 2013, and 2012 (population mean=23; 10-44 per population). We also only used data for wild adult if their offspring were present in the garden in 2014.

We analysed differences between wild and garden leaves using a linear model in Proc MIXED (SAS 9.1.3). The three leaf traits, SLA, LWR, and leaf area, were each analysed as separate response variables, with the fixed effects of source population and sampling type (2012, 2013, 2014 or wild adults). We determined which garden years differed significantly from wild adults using three Tukey-adjusted contrasts per population: adults minus 2012, adults minus 2013 and adults minus 2014.

Results: For all three leaf traits, garden plants became more similar to wild adults over the 3 years of sampling, although the extent to which garden resembled wild varied among traits (Fig. S2 A-C; Table S1). For SLA, garden plants became more sclerophyllous over time, but even by 2014, they were not as thick and tough as wild plants in any population (Fig. S2 A; Table S1). For leaf area and LWR, in contrast, garden plants closely resembled wild adults in most populations by the 2014 garden measurement, if not earlier. Leaves were smaller in the garden in 2012 for all populations, but by 2013 about half of the populations had leaf areas that were in indistinguishable between garden and wild (Fig. S2 B; Table S1). By 2014, only 6 populations remained smaller in the garden than in the wild (ANY, BRD, CDB, KLM, RIV and SWA; Table S1). Although means were different for leaf area, garden leaves averaged within the range of wild population leaves in 2013, except for ANY and CDB (Fig. S2 B). For LWR, garden and wild leaves were indistinguishable as early as 2012, and they remained that way until 2014 in nearly all populations (Fig. S2 C; Table S1).

Appendix S2

Comparing mean traits values across populations in the common garden

Methods: Using the oldest common garden plants possible (2014), we assessed whether there were significant difference in mean trait values among populations. We limited our analysis to 2014 plants because cross-populational differences in older plants should be driven by genetic differences more than maternal effects, relative to younger plants. Focal leaf traits in these analyses were the same as in the main study: Leaf area, SLA, leaf length:width ratio, stomatal density and stomatal pore index. We tested for significant differences among populations using a separate ANOVA for each trait, with source population as the only fixed effect (Proc MIXED in SAS 9.1.3). To determine which populations were significantly different from each other, we used Tukey adjusted p-values.

Results: Within each of the five traits measured in 2014, at least one population was significantly different from the others ($p<0.0001$ for all traits; Fig. S2 A-E). Even so, most traits revealed a limited degree of among-population divergence, with SLA showing the fewest differences among populations, and LWR showing the most. For SLA, only 3 of the 19 populations were statistically distinguishable from another population in 2014: KSW and CER each had thicker, tougher leaves than did SWA (Fig. S2 A). Leaf area showed an intermediate degree of differentiation, in that several large-leaved populations (CER, KLM and KAR) could be distinguished from several small-leaved populations (KSW, GAR, MGU, and RIV; Fig. S2 B). For LWR, the narrowest leaves were from KSW, followed by GAR (Fig. S2 C). These two populations could be distinguished from each other and from all other populations except MGU. The population with the broadest leaves (lowest LWR) was UNI, but it was only significantly lower than LOE, GAR, KSW, ANY, MGU, RND, CER and VAN. For stomatal traits, pore index was relatively invariant among populations, but stomatal density showed more differences (Fig. S2 D and E). Stomatal density was significantly higher in POT, BRD, and RIV, as compared to the low stomatal density populations of BAV, KAR, KSW, UNI, SWA and ANY.