Appendix S1. General characteristics of the study sites

Details of the populations studied, including the fire regime (HiFi: with dominant fire-dependent recruitment; LoFi: with dominant fire-independent recruitment), locality and geographical coordinates (latitude and longitude, º), number of trees sampled (n), altitude (m), total annual precipitation (P, mm), mean annual temperature (T, ºC), mean (±SD) diameter at breast height (DBH, in cm), dominant bedrock type (Ca: calcareous, Si: siliceous) and average (and SD) of the minimum and of the maximum distances (m) between trees for each population.

Code	Fire	Locality	Coordinates (º)	n	Altitude	P	T	Bedrock	DBH	Min Distance	Max Distance
P. halepensis											
HH1	HiFi	Alzira	39.12, -0.39	40	147	511	16.9	Ca	26.45 ± 4.42	22.5 ± 4.9	419.4 ± 71.9
HH2	HiFi	Cabanes	40.10, 0.04	40	445	647	15.2	Ca	29.55 ± 8.63	21.2 ± 9	355.6 ± 66.8
HH3	HiFi	Serra Calderona	39.74, -0.48	63	706	574	13.9	Si	28.42 ± 7.28	30.6 ± 32.9	639.9 ± 89.3
HH4	HiFi	Eslida	39.87, -0.29	67	510	589	14.9	Si	27.62 ± 5.47	20.8 ± 18.3	963.7 ± 198.4
HH5	HiFi	Serra d'Irta	40.35, 0.32	40	347	692	15.7	Ca	25.55 ± 3.96	29.8 ± 7.9	964.0 ± 226.1
HL6	LoFi	Montan	40.05, -0.59	40	900	584	13.0	Ca	27.17 ± 4.11	31.2 ± 8	1000.1 ± 48.4
HL7	LoFi	Sinarcas	39.80, -1.20	67	913	471	13.0	Si	32.27 ± 6.29	37 ± 48.5	820.6 ± 142.8
HL8	LoFi	Titaguas	39.89, -1.30	40	880	452	13.1	Ca	26.96 ± 3.62	41.8 ± 11.4	1007.0 ± 173.5
P. pinaster											
PH9	HiFi	Serra Calderona	39.75, -0.50	67	810	582	13.4	Si	21.54 ± 3.26	23.7 ± 19.8	770.6 ± 158.1
PH10	HiFi	Eslida	39.88, -0.30	67	440	580	15.2	Si	27.09 ± 3.56	10.8 ± 5.3	373.1 ± 78.2
PH11	HiFi	La Pobla Tornesa	40.08, 0.01	41	474	644	15.0	Si	21.37 ± 4.93	18.6 ± 6.3	205.6 ± 25.1
PH12	HiFi	Quatretonda	38.97, -0.36	40	463	547	15.1	Si	33.23 ± 7.07	23.7 ± 7.2	499.3 ± 92.8
PL13	LoFi	Olba	40.17, -0.62	40	986	591	12.7	Si	29.39 ± 4.17	23.8 ± 6.4	374.1 ± 77.6
PL14	LoFi	Penyagolosa	40.25, -0.35	40	1365	682	11.3	Si	31.43 ± 4.91	27 ± 9.6	712.1 ± 113.2
PL15	LoFi	Sinarcas	39.79, -1.20	67	890	468	13.1	Si	33.61 ± 4.13	28.5 ± 27.5	728.3 ± 108.6

Appendix S2. Bibliographic review of the relationship between pine serotiny and fire regime

Studies considered in the analysis of the strength between serotiny and fire (Table 2 of the main text), including the definition of serotiny and the fire regimes of the study, and the contrast considered for our analysis. Figures and Tables mentioned in the Contrast column refers to the original article (references in the first column). Studies ordered by decreasing the strength between serotiny and fire (Table 4 of the main text).

#	Species, locality, reference	Serotiny	Fire regime	Contrast
1	*Pinus banksiana,* Pine Barrens (Wisconsin), Radeloff et al. (2004)	% serotinous trees per plot	Indirectly inferred from dominant vegetation and forest structure in each region: North-east have higher crown fire frequency than South-west populations	North-east vs south-west
2	*Pinus halepensis,* Eastern Spain, current study	% closed cones	2 fire regimes, climate inferred + fire statistics last 30 years: High frequency of crown fires (HiFi) vs rare fires (LowFi)	HiFi vs LoFi
3	*Pinus contorta,* Western Montana, Muir & Lotan (1985)	Average proportion of serotinous cones in each site	Last disturbance: No-fire, stand-replacing burn	No-fire vs stand-replacing burn (Table 2c)
4	*Pinus pinaster,* Ciudad Real (Spain), Tapias et al. (2004)	% of serotinous trees, 23 Provenances, Spain, trees of 26 yr	Fire index: % area burned in the last 22 yr	Correlation between serotiny and the fire index (Table 7)
5	*Pinus coulteri,* Southern Coast Ranges of California, Borchert et al. (1985)	% closed cones per tree	Different communities, supposedly with different fire regime: higher fire frequency in chaparral vs *Q. agrifolia* savannas	Chaparral vs Q. agrifolia savannas (Table 3)
6	*Pinus halepensis,* Mt. Carmel (Israel), Goubitz et al. (2004)	% closed cones per tree (mean)	Last disturbance: unburned stands and post-fire regenerated stands	Unburned *vs* burned stands
7	*Pinus pinaster,* Ciudad Real (Spain), Tapias et al. (2004)	% closed cones per tree (mean), 23 provenances, Spain, trees of	Fire index: % area burned in the last 22 yr	Correlation between serotiny and the fire index (Table 7)

		26 yr		
8	*Pinus canariensis,* Canary archipelago (Spain), Climent et al. (2004)	% serotinous trees per population [3%-35%] 21 natural population	Fire frequency index: No fire (0), 1 fire (1), >1 fires (2), in the last 30 years	Correlation between serotiny and the fire index (Table 2)
9	*Pinus pinaster,* Eastern Spain, current study	% closed cones	2 fire regimes, climate inferred + fire statistics last 30 years: High and low frequency of crown fires (HiFi, LowFi, respectively)	HiFi *vs* LoFi
10	*Pinus contorta var. latifolia,* Yellowstone Nat. Park, Schoennagel et al. (2003)	% serotinous trees per site; young stands	2 altitudes with different MFI derived from historical survivorship data: High serotiny at low elevation (high MFI)	Low *vs* High elevation, for old stands (Fig. 4a)
11	*Pinus rígida*, New Jersey, Givnish (1981)	% serotinous trees	Index of inferred fire frequency based on a subjective vegetation fire tolerance	Correlation between serotiny and the fire index
12	*Pinus banksiana* Lamb., Western Québec, Gauthier et al. (1996)	% serotinous cones	Last disturbance: lethal, nonlethal fires	Recruitment <10 yr after lethal fires *vs* recruitment >10 yr after a non-lethal fires (Table 1)
13	*Pinus banksiana* Lamb., Western Québec, Gauthier et al. (1996)	Frequency of serotinous and quasi-serotinous trees (S, SQ)	Last disturbance: lethal, nonlethal fires	Recruitment <10 yr after lethal fires *vs* recruitment >10 yr after a non-lethal fires (Fig. 2a and 2d)
14	*Pinus contorta var. latifolia,* Yellowstone Nat. Park, Schoennagel et al. (2003)	% serotinous trees per site; old stands	2 altitudes with different mean fire interval (MFI) derived from historical survivorship data: High MFI at low elevation	Low *vs* High elevation, for young stands (Fig. 4a)

Appendix S3. Frequency distribution of cone age

Proportion of closed cones in relation to the cone age (in years) for *Pinus halepensis* (left) and *P. pinaster* (right) populations living in HiFi (top) and LoFi (bottom) environments. Frequency distributions are significantly different between fire regimes (HiFi vs LoFi) for each species, and between species for each fire regime ($p<0.0001$, Kolmogorov-Smirnov test).