Table S1: Table of the species and their respective families on which the effects of fire and frost were measured. Additionally, the habitat description, growth-form, branching architecture and leaf phenology of each species are provided. Information for the latter four columns were obtained from Palgrave (2015), Schmidt et al. (2002) and Van Wyk & Van Wyk (2013).

Family	Species	Habitat description	Growth-form description	Typical branching architecture	Leaf phenology
Rubiaceae	*Canthium inerme* Kuntze	Coastal and montane forest, in woodland, along streams and high-altitude grasslands among rocks	Small to medium-sized tree	Single stem, branching low down	Evergreen
Combretaceae	*Combretum kraussii* Hochst.	Evergreen forest and forest margins	Medium to tall densely leafy tree	Single-stemmed (to 0.8 m diameter) or multi-stemmed, branching low down	Deciduous or semi-deciduous
Combretaceae	*Combretum molle* R.Br. ex G.Don	Open woodland and bushveld	Small to medium-sized tree	Single upright stem	Deciduous or semi-deciduous
Malvaceae	*Dombeya rotundifolia* Hochst.	Bushveld and woodlands, often with termite mounds	Small erect tree	Single upright stem	Deciduous
Sapotaceae	*Englerophytum magalismontanum* (Sond.) T.D.Penn.	Rocky outcrops, also occurring in forest, wooded ravines and along river banks	Small to medium-sized tree	Single short, stout, twisted stem	Evergreen
Ebenaceae	*Euclea crispa* (Thunb.) Gürke	In bush clumps in open grasslands, open woodland and bushveld, often among rocks, at forest margins	Shrub or small tree	Multi- or single-stemmed, stems crooked, densely branching low down	Evergreen
Anacardiaceae	*Harpephyllum caffrum* Bernh.	Occurring in forest	Medium to large tree	Single clean, straight stem	Evergreen
Sapindaceae	*Hippobromus pauciflorus* Radlk.	Riverine thicket and scrub, along stream banks and margins of evergreen forest	Shrub or small, densely leafy tree	Stem single, branching low down	Semi-deciduous
Myrsinaceae	*Myrsine africana* L.	Wide range of altitudes, among rocks, in open woodland and margins of evergreen forests, often a pioneer species	Shrub or small tree	Multi- or single slender stem	Evergreen
Ochnaceae	*Ochna natalitia* Walp.	Bushveld and grassland, in understorey of forested kloofs and margins of evergreen forests	Shrublet, shrub or small tree	Single-stemmed, occasionally rhizomatous	Evergreen
Pittosporaceae	*Pittosporum viridiflorum* Sims	Wide range of altitudes, in deciduous woodlands, scrub, riverine thicket and evergreen forest, also on rocky outcrops	Small to large tree	Single-stemmed	Deciduous or evergreen
Fabaceae	*Pterocarpus angolensis* DC.	Grassland and open bushveld	Medium to large tree with wide spreading crown	Single-stemmed	Deciduous
Rhamnaceae	*Rhamnus prinoides* L'Hér.	Widespread and locally common at medium to high altitudes, along watercourses, in riverine forest and margins of evergreen forest	Scrambling shrub or small tree	Stem single, branching low down	Evergreen
Rubiaceae	*Rothmannia capensis* Thunb	Wide range of altitudes (sea level to 1600m) in evergreen forest, wooded ravines, and on rocky hillsides	Small to medium-sized tree, occasionally large (to 15 m) in tall forest	Single upright stem	Evergreen
Rhamnaceae	*Scutia myrtina* (Burm.f.) Kurz	Coastal and scrub forest and margins of evergreen forest	Liane, climbing shrub or small to medium-sized tree	Usually multi-stemmed or single stem branching low down	Evergreen
Anacardiaceae	*Searsia lucida* (L.) F.A.Barkley	Occurring in scrub and forest, from sea level to 2000m	Shrub or small tree	Single stem, highly branched low down	Evergreen

Table S1 cont.

Myrtaceae	*Syzygium cordatum* Hochst.ex C.Krauss.	Almost always occurring near water, in riverine thicket and forest, sometimes forming stands in swamp thicket	Medium to large tree	Single upright stem	Evergreen
Rubiaceae	*Vangueria infausta* Burch.	Occurring in bushveld, open woodland, among rocks and in coastal scrub	Small, stout tree	Usually single stemmed, branching low down	Deciduous or semi-deciduous
Rhamnaceae	*Ziziphus mucronata* Willd.	Wide variety of habitats, in open woodland, often in alluvial soils along rivers, frequently on termite mounds	Shrub or small to medium-sized tree	Usually single stemmed	Deciduous or semi-deciduous

Table S2: Summary of total number of individual tree seedlings subjected to fire and frost, number of living and dead individuals at the end of the experiment, number of individuals with live foliage remaining 2 weeks after treatment and the number of individuals that resprouted after total destruction of aboveground biomass after treatment by fire and frost. The number of control seedlings by species, used for measurements of functional traits, are also shown.

	Fire					Frost					Control
	Total individuals	Surviving green material	Resprouts	Alive	Dead	Total individuals	Surviving green material	Resprouts	Alive	Dead	Total individuals
Canthium inerme	15	2	10	12	3	15	0	15	15	0	15
Combretum krausii	2	0	0	0	2	2	0	2	2	0	3
Combretum molle	6	0	5	5	1	9	0	9	9	0	8
Dombeya rotundifolia	8	5	2	7	1	9	0	6	6	3	9
Englerophytum magalismontanum	2	0	1	1	1	1	1	0	1	0	2
Euclea crispa	14	0	14	14	0	15	9	5	14	1	15
Harpephyllum caffrum	8	0	6	6	2	8	0	0	0	8	8
Hippobromus pauciflorus	11	2	7	9	2	10	2	7	9	1	9
Myrsine africana	12	2	2	4	8	11	7	1	8	3	11
Ochna natalitia	7	0	7	7	0	7	5	2	7	0	8
Pittosporum viridiflorum	13	1	0	1	12	14	13	0	13	1	15
Pterocarpus angolensis	1	0	1	1	0	1	0	0	0	1	1
Rhamnus prinoides	14	5	4	9	5	13	12	0	12	1	10
Rothmannia capensis	14	0	11	11	3	15	1	14	15	0	15
Scutia myrtina	11	1	0	1	10	11	4	0	4	7	11
Searsia lucida	15	3	7	10	5	15	1	4	5	10	15
Syzygium cordatum	7	1	2	3	4	7	0	0	0	7	7
Vangueria infausta	15	1	14	15	0	15	0	13	13	2	15
Ziziphus mucronata	2	0	2	2	0	2	2	0	2	0	2

Table S3: Summary of models run. Model equations represent best subset models after selection by BIC. Family and link function specifications, data transformations, list of predictors dropped by best subset selection (NA indicates no best subset model was used), model R^2 values associated with fixed effects (marginal) and random effects (conditional), and model significance for linear mixed-effects models (LMM) or generalized linear mixed-effects models (GLMM) are shown. (1|Species) indicates random effect. NS: not significant; *: $p \leq 0.05$; **: $p < 0.001$; ***: $p < 0.0001$.

Data used	Model	Model equation	Family	Link function	Response variable transformations	Predictors dropped by BSS model	Marginal R^2	Conditional R^2	Model p-value
All (Fire, Frost)	Species survival (GLMM)	SurvivalF ~ Age0 + Leaves0 + Diam0 + (1|Species)	binomial	logit	none	Hgreenmat0	0.080	0.386	***
Survivors (Fire, Frost)	Survival strategy (GLMM)	Strategy ~ StemL0 + Leaves0 + Treatm × Leaves0 + (1|Species.name)	binomial	logit	none	Diam0; Treatm × Diam0; Treatm × Age0; Treatm × StemL0	0.201	0.620	***
Survivors (Control, Fire, Frost)	Stem regrowth (LMM)	Regrowth~Treatm + (1|Species)	NA	NA	logit (on fraction data)	NA	0.0001	0.507	NS
Survivors (Control, Fire, Frost)	Plant height (LMM)	Height2 ~ Treatm + Height0 + Age0 + (1|Species)	NA	NA	square-root	NA	0.363	0.674	***
Survivors (Control, Fire, Frost)	Stem diameter (LMM)	Diam2 ~ Treatm + Diam0 + Age0 + (1|Species)	NA	NA	log	NA	0.239	0.602	***
Survivors (Control, Fire, Frost)	Lateral branches (GLMM)	Latbranch2 ~ Treatm + StemL0 + Age0 + (1|Species)	Poisson	log	none	NA	0.049	0.772	***
Survivors (Control, Fire, Frost)	Plant height:diameter ratio (LMM)	Height:Diam2~ Treatm + Age0 + (1|Species)	NA	NA	log	NA	0.182	0.493	***
Survivors (Control, Fire, Frost)	Plant height:stem tip ratio (LMM)	Height:stemtip ~ Treatm + AgeF + (1|Species)	NA	NA	square-root	NA	0.013	0.536	*
Resprouts (Fire, Frost)	Plant height (LMM)	Height2 ~ Treatm + Height0 + Age0 + (1|Species)	NA	NA	log	NA	0.289	0.526	***
Resprouts (Fire, Frost)	Stem diameter (LMM)	Diam2 ~ Treatm + Diam0 + (1|Species)	NA	NA	square-root	NA	0.071	0.827	***
Resprouts (Fire, Frost)	Lateral branches (GLMM)	Latbranch2 ~ Treatm + StemL0 + Age0 + (1|Species)	Poisson	log	none	NA	0.137	0.539	***
Resprouts (Fire, Frost)	Plant height:diameter ratio (LMM)	Height:Diam2~ Treatm + Age0 + (1|Species)	NA	NA	log	NA	0.069	0.533	**
Resprouts (Fire, Frost)	Plant height:stem tip ratio (LMM)	Height:stemtip ~ Treatm + AgeF + (1|Species)	NA	NA	log	NA	0.017	0.330	NS

SurvivalF = Species survival status at end of experiment; Age0 = baseline seedling age at time of treatment; Leaves0 = baseline number of leaves below 1 cm; Diam0 = baseline stem diameter; Species = Species name; Strategy = Resistor/Tolerator; StemL0 = baseline stem length; Regrowth = stem recovery at end of experiment; Treatm = Treatment; Height2 = plant height two months after treatment; Height0 = Baseline plant height; Diam2 = stem diameter two months after treatment; Latbranch2 = number of lateral branches two months after treatment; Height:Diam2 = height to diameter ratio two months after treatment; Height:stemtip = height to stem tip ratio; AgeF = seedling age at end of experiment

Table S4: Correlation matrix showing Pearson correlation coefficients between trait values. Shaded cells indicate correlations at r ≥ |0.7|.

	Height0	StemL0	Diam0	Leaves0	Height:Diam0	Height2	Diam2	Latbranch2	AgeF	HeightF	StemLF	DiamF	LeavesF	Stemtips	Height:stemtip	Height:Diam2
Height0	1.000	0.956	0.739	0.127	0.238	0.739	0.738	0.115	0.090	0.388	0.332	0.212	-0.193	-0.220	0.341	0.148
StemL0	--	1.000	0.617	0.174	0.286	0.753	0.668	0.227	0.031	0.384	0.353	0.185	-0.163	-0.126	0.266	0.228
Diam0	--	--	1.000	0.159	-0.140	0.441	0.834	-0.030	0.069	0.215	0.127	0.356	-0.062	-0.270	0.241	-0.314
Leaves0	--	--	--	1.000	-0.046	0.053	0.234	-0.064	-0.195	-0.064	-0.057	0.001	0.220	-0.098	0.080	-0.168
Height:Diam0	--	--	--	--	1.000	0.251	0.019	0.206	0.192	0.210	0.241	-0.064	-0.241	0.083	0.006	0.311
Height2	--	--	--	--	--	1.000	0.679	0.374	0.305	0.734	0.696	0.289	-0.195	-0.048	0.277	0.521
Diam2	--	--	--	--	--	--	1.000	0.163	0.207	0.456	0.394	0.416	-0.125	-0.174	0.195	-0.200
Latbranch2	--	--	--	--	--	--	--	1.000	0.136	0.294	0.309	0.108	-0.030	0.530	-0.373	0.244
AgeF	--	--	--	--	--	--	--	--	1.000	0.329	0.336	-0.020	-0.165	-0.026	0.121	0.147
HeightF	--	--	--	--	--	--	--	--	--	1.000	0.980	0.369	-0.169	0.022	0.262	0.530
StemLF	--	--	--	--	--	--	--	--	--	--	1.000	0.332	-0.156	0.067	0.201	0.543
DiamF	--	--	--	--	--	--	--	--	--	--	--	1.000	0.142	-0.082	0.108	-0.034
LeavesF	--	--	--	--	--	--	--	--	--	--	--	--	1.000	0.082	-0.174	-0.122
Stemtips	--	--	--	--	--	--	--	--	--	--	--	--	--	1.000	-0.557	0.147
Height:stemtip	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.000	0.198
Height:Diam2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.000

Height0 = Baseline plant height; StemL0 = baseline stem length; Diam0 = baseline stem diameter; Leaves0 = baseline number of leaves below 1 cm; Height:Diam0 = baseline height to diameter ratio; Height2 = plant height two months after treatment; Diam2 = stem diameter two months after treatment; Latbranch2 = number of lateral branches two months after treatment; AgeF = seedling age at end of experiment; HeightF = plant height at end of experiment; StemLF = stem length at end of experiment; DiamF = stem diameter at end of experiment; LeavesF = number of leaves below 1 cm at end of experiment; Stemtips = number of stem tips; Height:stemtip = height to stem tip ratio; Height:Diam2 = height to diameter ratio two months after treatment.

Table S5: Results for linear mixed-effects models (LMM) or generalized linear mixed effects models (GLMM) determining how a selection of architectural traits of surviving tree seedlings are affected by fire and frost damage. All response variables were measured two months after treatment, except diameter:stem tip ratio which was measured at the end of the experiment. Variance inflation factors (VIF) indicates multicollinearity of predictor variables. R^2 and model p-values are given in Appendix Table 3 and pairwise comparisons in Appendix Table 6. Significance codes: NS: not significant; *: p<0.05; **: p<0.01; ***: p<0.0001.

Response	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
Plant height (LMM)	Intercept	4.303	3.189	13.490	***	-
	Treatment	-	-	-	***	1.922
	Baseline plant height	2.847	6.007	4.740	***	1.559
	Seedling age	1.464	3.324	0.044	NS	3.796
	Random effects:	Variance	Std. dev.			
	Species ID	0.882	0.939			-
	Residual	0.924	0.961			-

Response	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
Stem diameter (LMM)	Intercept	1.049	0.149	7.044	***	-
	Treatment	-	-	-	***	1.863
	Baseline diameter	0.072	0.019	3.814	***	1.562
	Seedling age	0.002	0.002	0.954	NS	3.788
	Random effects:	Variance	Std. dev.			
	Species ID	0.192	0.438			-
	Residual	0.210	0.458			-

Response	Fixed effects:	Estimate	Std. error	z-value	p-value	VIF
Number of lateral branches (GLMM)	Intercept	0.488	0.268	1.821	NS	-
	Treatment	-	-	-	***	2.205
	Baseline stem length	0.006	0.003	2.039	*	1.763
	Seedling age	0.007	0.002	3.691	***	4.855
	Random effects:	Variance	Std. dev.			
	Species ID	0.908	0.953			-

Response	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
Plant height: diameter ratio (LMM)	Intercept	1.431	0.123	11.596	***	-
	Treatment	-	-	-	***	1.804
	Seedling age	0.003	0.001	2.280	*	3.256
	Random effects:	Variance	Std. dev.			
	Species ID	0.107	0.327			-
	Residual	0.174	0.417			-

Response	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
Plant height: stem tip ratio (LMM)	Intercept	13.707	2.491	5.502	***	-
	Treatment	-	-	-	*	1.000
	Seedling age	-0.001	0.007	-0.140	NS	1.000
	Random effects:	Variance	Std. dev.			
	Species ID	9.964	3.157			-
	Residual	8.710	2.951			-

Table S6: Pairwise comparisons for linear mixed-effects models (LMM) or generalized linear mixed-effects models (GLMM) detailed in Appendix Table 4 testing differences in seedling architectural traits between treatments for all survivors. Significance codes: NS: not significant; *: p<0.05; **: p<0.001; ***: p<0.0001.

	Fixed effects:	Estimate	Std. error	t/z-value	p-value
Plant height (LMM)	Control - Fire	2.921	0.239	12.220	***
	Control - Frost	1.763	0.445	3.960	***
	Fire - Frost	-1.158	0.294	-3.942	***
Main stem diameter (LMM)	Control - Fire	1.043	0.114	9.143	***
	Control - Frost	0.833	0.210	3.963	***
	Fire - Frost	-0.210	0.134	-1.568	NS
Number of lateral branches (GLMM)	Control - Fire	0.804	0.150	5.353	***
	Control - Frost	0.995	0.280	3.551	**
	Fire - Frost	0.191	0.171	1.122	NS
Plant height: diameter ratio (LMM)	Control - Fire	0.747	0.103	7.240	***
	Control - Frost	0.809	0.185	4.382	***
	Fire - Frost	0.061	0.115	0.535	NS
Plant height to stem tip ratio (LMM)	Control - Fire	0.5097	0.3641	1.400	NS
	Control - Frost	1.7779	0.3483	5.104	***
	Fire - Frost	1.2682	0.3937	3.221	**

Table S7: Results for linear mixed-effects models (LMM) or generalized linear mixed effects models (GLMM) determining how a selection of architectural traits of resprouted tree seedlings are affected by fire and frost damage. All response variables were measured two months after treatment, except diameter:stem tip ratio which was measured at the end of the experiment. Variance inflation factors (VIF) indicate multicollinearity of predictor variables. R^2 and model p-values are given in Appendix Table 3. Significance codes: NS: not significant; *: $p<0.05$; **: $p<0.01$; ***: $p<0.0001$.

Response	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
Plant height (LMM)	Intercept	0.405	0.298	1.361	NS	-
	Treatment	-0.200	0.204	-0.983	NS	3.846
	Baseline plant height	0.018	0.005	4.027	***	1.513
	Seedling age	0.004	0.002	1.891	NS	4.101
	Random effects:	Variance	Std. dev.			
	Species ID	0.115	0.339			-
	Residual	0.230	0.479			-
Stem diameter (LMM)	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
	Intercept	1.145	0.146	7.845	***	-
	Treatment	-0.029	0.050	-0.575	NS	1.008
	Baseline diameter	0.050	0.011	4.426	***	1.008
	Random effects:	Variance	Std. dev.			
	Species ID	0.216	0.465			-
	Residual	0.050	0.223			-
Number of lateral branches (GLMM)	Fixed effects:	Estimate	Std. error	z-value	p-value	VIF
	Intercept	0.296	0.383	0.774	NS	
	Treatment	-0.212	0.241	-0.878	NS	3.765
	Baseline stem length	0.014	0.005	2.668	**	1.418
	Seedling age	0.003	0.003	1.243	NS	3.971
	Random effects:	Variance	Std. dev.			
	Species ID	0.228	0.477			-
Plant height: diameter ratio (LMM)	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
	Intercept	0.366	0.289	1.268	NS	
	Treatment	-0.193	0.161	-1.198	NS	2.855
	Seedling age	0.005	0.002	2.682	**	2.855
	Random effects:	Variance	Std. dev.			
	Species ID	0.187	0.432			-
	Residual	0.188	0.433			-
Plant height: stem tip ratio (LMM)	Fixed effects:	Estimate	Std. error	t-value	p-value	VIF
	Intercept	5.133	0.622	8.249	***	-
	Treatment	-0.149	0.104	-1.428	NS	1.002
	Seedling age	0.0003	0.002	0.173	NS	1.002
	Random effects:	Variance	Std. dev.			
	Species ID	0.108	0.329			-
	Residual	0.231	0.481			-