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Appendix 1

Table A1. Datasets used for analyzing relationships between constitutive and induced chemical responses of conifers for (A) a common garden study, (B) individuals within forest populations, and (C) across species. All studies in (**A)** and (**B)** were included in (**C)** as mean responses (i.e. mean constitutive monoterpenes across all trees in the common garden was included in (**C**). NR indicates not reported. Green shaded boxes denote studies that reported stereochemistry.

Tree species	Population I.D.	Study	Location	N	DBH (cm)	Bark beetle	Fungal inoculation
A. Common garden study							
Pinus contorta	A1.1-A1.2	(Ott et al. 2011)†	Central British Columbia	762	11	*Dendroctonus ponderosae*	*Grosmannia clavigera*
B. Forest trees with tree-level data							
Pinus banksiana	B1	(Raffa and Smalley 1995)	South-central Wisconsin	12	15.83	*Ips pini*	*Ophiostoma ips*
Pinus contorta	B2.1-B2.6	(Boone et al. 2011)‡	Southern British Columbia	180	22.65	*D. ponderosae*	*G. clavigera*
P. contorta	B3	(Powell et al. 2012)	Northwestern Wyoming	38	>15	*D. ponderosae*	*G. clavigera*
P. contorta	B4.1	(Raffa et al. 2013)	Northwestern Wyoming	50	>20	*D. ponderosae*	*G. clavigera*
Pinus albicaulis	B4.2	(Raffa et al. 2013)	Northwestern Wyoming	50	>20	*D. ponderosae*	*G. clavigera*
Pinus ponderosa	B5	(Keefover-Ring et al. 2016)	Southwestern Montana	19	40.6	*D. ponderosae*	*G. clavigera*

Pinus resinosa	B6	(Mason et al. 2017)	South-central Wisconsin	13	24	*I. pini*	*O. ips*
P. contorta	B7.1	(Raffa et al. 2017)	Southwestern Montana	47	39.7	*D. ponderosae*	*G. clavigera*
P. albicaulis	B7.2	(Raffa et al. 2017)	Southwestern Montana	82	55	*D. ponderosae*	*G. clavigera*
C. Forest populations with mean-level data§							
Pinus taeda	C1.1-C1.2	(Cook and Hain 1988)	North Carolina	4	35	*D. frontalis*	*Ceratocystis minor (O. minus)*
Pinus echinata	C2.1-C2.2	(Cook and Hain 1988)	North Carolina	4	26.9	*D. frontalis*	*C. minor (O. minus)*
P. resinosa	C3	(Klepzig et al. 1995)	Wisconsin	24	NR	*I. pini*	*Leptographium terebrantis*
P. resinosa	C4	(Raffa and Smalley 1995)	Wisconsin	14	14.3	*I. pini*	*O. ips*
P banksiana	C5	(Wallin and Raffa 1999)	Wisconsin	16	4.5	*I. grandicollis*	*O. ips*
Picea abies	C6	(Zhao et al. 2011)	Southern Sweden	50	20.7	*I. typographus*	*Endoconidiophora polonica*
Pinus sylvestris	C7	(Villari et al. 2014)	Northern Italy	50	NR	*I. acuminatus*	*O. brunneo-ciliatum*
P. contorta	C8.1-C8.2	(Goodsman et al. 2013)	Southern Alberta	9	16.85	*D. ponderosae*	*G. clavigera*
Picea abies	C9	(Novak et al. 2014)	Northeastern Slovenia	20	21.9	*I. typographus*	*E. polonica*
Picea abies	C10	(Baier et al. 2002)	Northern Austria	30	35	*I. typographus*	*E. polonica*
Pinus contorta	C11	(Raffa and Berryman 1982)	Central Oregon	31	>18	*D. ponderosae*	*G. clavigerra*

†Tree-level data was split into two sites and considered separately for population-level analyses

‡Tree-level data was split into five sites and considered separately for population-level analyses

§For purposes of standardization, included studies had the following attributes: A) Mature trees, at least 20 years old; B) standardized fungal induction methods; C) reported data of total monoterpene concentrations; D) assayed the same trees for both constitutive and induced monoterpenes; and E) no more than seven fungal inoculations per tree.

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Zhao, T. et al. 2011. Induced terpene accumulation in Norway spruce inhibits bark beetle colonization in a dose-dependent manner. - PLoS One in press.

Figure A1. Regressions for testing relationships between constitutive and inducible defenses. Letters correspond to biological scale: (A) across half-siblings, (B) among individuals in common gardens, (C) among individuals in forest populations, (D) across populations of *Pinus contorta*, (E) across populations of multiple species, and (F) across multiple species. Regression line for (A) represents predicted values from the mixed effects model (Fig. A2B) when DBH is 0 (the mean scaled value) and grey lines represent the predictions for each family when family is included in the model†. Solid regression line for (D) represents the slope with all points included while the dotted regression line represents the slope with four points removed (squares).

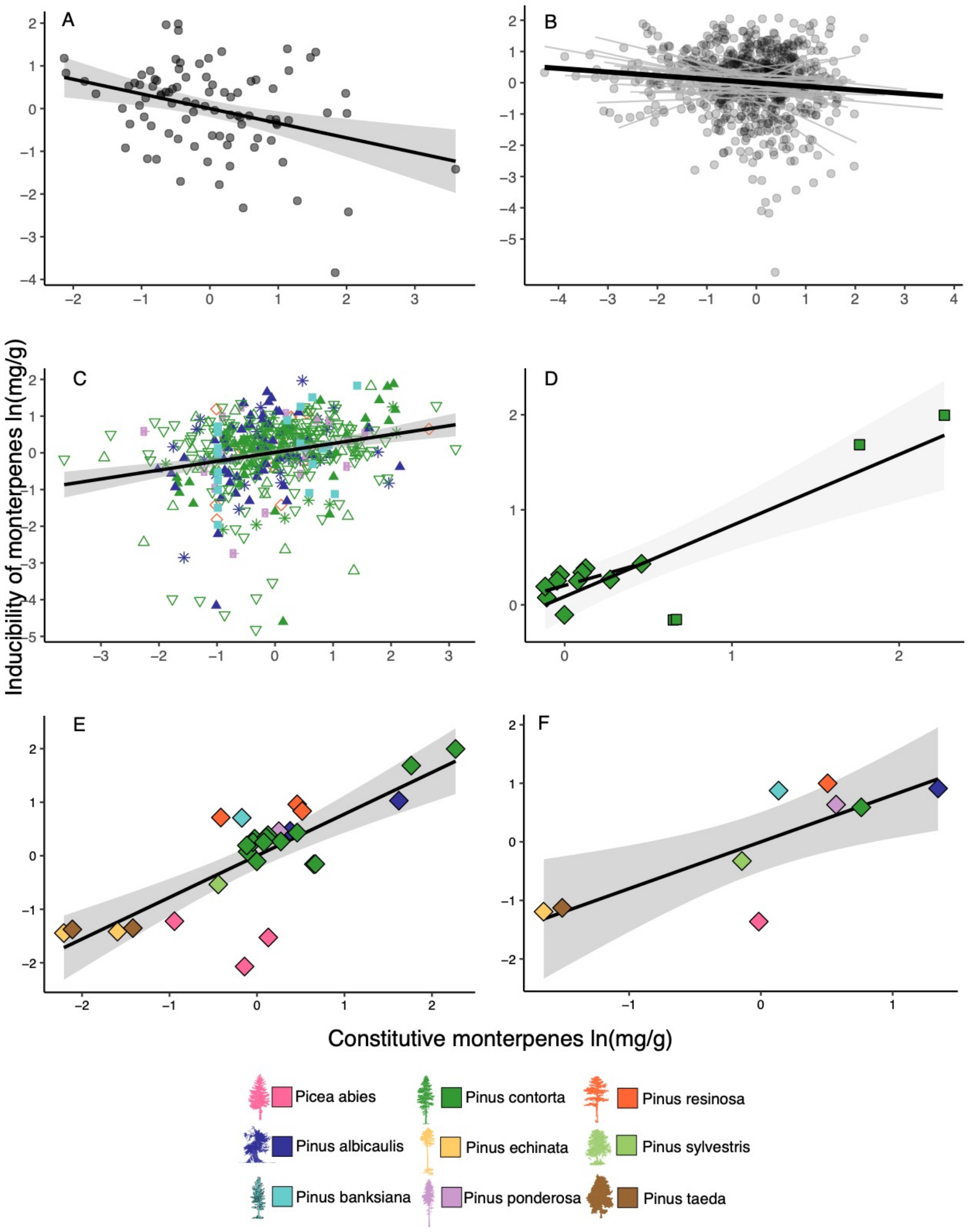

Table A2. Models for testing relationships between constitutive and inducibility of defenses. I corresponds to *ln*(inducibility) and C corresponds to *ln*(constitutive) and regression models do not contain intercepts because all data are centered around 0,0. Letters correspond to biological scale: A) across half-siblings, B) among individuals in common gardens, C) among individuals in forest populations, D) across populations of *Pinus contorta*, E) across populations of multiple species, and F) across multiple species. Site(block) denotes that block was nested within site.

	Level	**Slope**	**Model**	**Notes**
A	Across half-sib families	-0.34	I~C	§Sites were not combined to add variability but were not significantly different (p-value=0.98).
B	Among individuals in a common garden	-0.11	I~C+DBH+site(block)	‡Sites were combined because they were not different (p-value=0.86)
C	Among individuals in forest populations	0.24	I~C	DBH was not included because it was reported on a per/tree basis for every study
D	Across populations of *P. contorta*	0.80	I~C	
E	Across populations of multiple species	0.78	I~C	
F	Across multiple species	0.80	I~C	

†Model= I~Family × C+dbh+(1|site:block)
‡Model= I~Site × C+dbh+(1|block), p-value represents the interaction of site and C.
§Model= I~C × Site, p-value represents the interaction of site and C.