

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

	N articles (n observations)	Random effect	Comparison to intercept- only (LRT, p)	Contrast±95%CIs	Total variance	Unexplained heterogeneity	Explained variance
Ecosystem - Bare Ground							
Africa Comparison	Intact Africa=5(3), Introduced=34(20)	~1   Citation / Observation ID	0.72, 0.398	0.53±[-0.76,1.82], df=21,21, t=0.85, p=0.404	$\sigma^2_{null}$ =0.85, $\sigma^2_{model}$ =0.82	$I^2_{null}$ =89.37, $I^2_{model}$ =88.78	$R^2$ =3.75, $R^{2*}$ =0.09
Herbivore nativeness	Native=42(16), Introduced=34(20)	~1   Citation / Observation ID	3.06, 0.08	0.45±[0.93,-0.03], df=33,74, t=-1.85, p=0.068	$\sigma^2_{null}$ =0.62, $\sigma^2_{model}$ =0.52	$I^2_{null}$ =86.3, $I^2_{model}$ =83.92	$R^2$ =8.78, $R^{2*}$ =0.27
Invasive	Native=42(16), Invasive=22(13)	~1   Citation / Observation ID	1.93, 0.165	0.34±[0.81,-0.13], df=26,62, t=-1.46, p=0.149	$\sigma^2_{null}$ =0.42, $\sigma^2_{model}$ =0.36	$I^2_{null}$ =81.91, $I^2_{model}$ =79.18	$R^2$ =6.89, $R^{2*}$ =0.12
Ecosystem - CO2 Respiration							
Herbivore nativeness	Native=70(7), Introduced=5(3)	~1   Citation / Observation ID, ~Time Series   Experiment ID	0.87, 0.35	-0.66±[0.95,-2.28], df=8,8, t=0.95, p=0.372	$\sigma^2_{null}$ <0.01, $\sigma^2_{model}$ <0.01	$I^2_{null}$ <0.01, $I^2_{model}$ <0.01	$R^2$ =1.36, $R^{2*}$ =0.39
Invasive	Native=70(7), Invasive=5(3)	~1   Citation / Observation ID, ~Time Series   Experiment ID	0.87, 0.35	-0.66±[0.95,-2.28], df=8,8, t=0.95, p=0.372	$\sigma^2_{null}$ <0.01, $\sigma^2_{model}$ <0.01	$I^2_{null}$ <0.01, $I^2_{model}$ <0.01	$R^2$ =1.36, $R^{2*}$ =0.39
Ecosystem - Dead Vegetation							
Herbivore nativeness	Native=152(33), Introduced=47(17)	~1   Citation / Species ID / Observation ID	3.47, 0.062	-0.35±[0.02,-0.71], df=48,48, t=1.89, p=0.064	$\sigma^2_{null}$ =0.4, $\sigma^2_{model}$ =0.37	$I^2_{null}$ =73.3, $I^2_{model}$ =71.58	$R^2$ =5.47, $R^{2*}$ =2.23
Invasive	Native=152(33), Invasive=17(8)	~1   Citation / Species ID / Observation ID	2.02, 0.155	-0.35±[0.14,-0.85], df=39,39, t=1.44, p=0.158	$\sigma^2_{null}$ =0.39, $\sigma^2_{model}$ =0.37	$I^2_{null}$ =73.49, $I^2_{model}$ =72.04	$R^2$ =2.95, $R^{2*}$ =1.59
Ecosystem - Growth Rates							
Africa Comparison	Intact Africa=35(5), Introduced=20(5)	~1   Citation / Observation ID	2.62, 0.105	0.62±[0.125], df=8,8, t=2.29, p=0.051	$\sigma^2_{null}$ =0.29, $\sigma^2_{model}$ =0.15	$I^2_{null}$ =59.34, $I^2_{model}$ =43.23	$R^2$ =37.36, $R^{2*}$ =16.58

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	N articles (n observations)	Random effect	Comparison to intercept- only (LRT, p)	Contrast±95%CI	Total variance	Unexplained heterogeneity	Explained variance
Herbivore nativeness	Native=129(13), Introduced=20(5)	~1   Citation / Observation ID	3.11, 0.078	0.49±[1,-0.03], df=16,16, t=-2.02, p=0.061	$\sigma^2_{null}=0.31$ , $\sigma^2_{model}=0.26$	$I^2_{null}=70.52$ , $I^2_{model}=66.31$	$R^2=9.65$ , $R^{2*}=5.84$
Ecosystem - Litter Cover							
Herbivore nativeness	Native=91(28), Introduced=38(15)	~1   Citation / Species ID / Observation ID	3.12, 0.077	-0.4±[0.05,-0.85], df=41,41, t=1.81, p=0.078	$\sigma^2_{null}=0.5$ , $\sigma^2_{model}=0.45$	$I^2_{null}=79.34$ , $I^2_{model}=77.37$	$R^2=7.01$ , $R^{2*}=2.97$
Invasive	Native=91(28), Invasive=9(6)	~1   Citation / Species ID / Observation ID	1.76, 0.184	-0.43±[0.22,-1.08], df=32,32, t=1.36, p=0.184	$\sigma^2_{null}=0.5$ , $\sigma^2_{model}=0.46$	$I^2_{null}=80.69$ , $I^2_{model}=78.89$	$R^2=3.23$ , $R^{2*}=2$
Ecosystem - Microbe Abundance							
Herbivore nativeness	Native=29(7), Introduced=24(4)	~1   Citation / Observation ID	0.19, 0.664	-0.18±[0.72,-1.08], df=9,9, t=0.44, p=0.668	$\sigma^2_{null}=0.39$ , $\sigma^2_{model}=0.37$	$I^2_{null}=69.53$ , $I^2_{model}=68.38$	$R^2=2.08$ , $R^{2*}=1.63$
Invasive	Native=29(7), Invasive=22(3)	~1   Citation / Observation ID	0.08, 0.773	-0.13±[0.92,-1.19], df=8,8, t=0.29, p=0.777	$\sigma^2_{null}=0.44$ , $\sigma^2_{model}=0.42$	$I^2_{null}=71.75$ , $I^2_{model}=71.01$	$R^2=1.05$ , $R^{2*}=0.93$
Ecosystem - Root Biomass							
Herbivore nativeness	Native=39(7), Introduced=12(3)	~1   Citation / Observation ID	1.52, 0.218	-0.14±[0.12,-0.41], df=8,8, t=1.23, p=0.253	$\sigma^2_{null}<0.01$ , $\sigma^2_{model}<0.01$	$I^2_{null}<0.01$ , $I^2_{model}<0.01$	$R^2=100$ , $R^{2*}=1.24$
Invasive	Native=39(7), Invasive=12(3)	~1   Citation / Observation ID	1.52, 0.218	-0.14±[0.12,-0.41], df=8,8, t=1.23, p=0.253	$\sigma^2_{null}<0.01$ , $\sigma^2_{model}<0.01$	$I^2_{null}<0.01$ , $I^2_{model}<0.01$	$R^2=100$ , $R^{2*}=1.24$
Ecosystem - Soil C:N							
Herbivore nativeness	Native=19(9), Introduced=11(5)	~1   Citation / Observation ID	0.13, 0.721	0.09±[0.62,-0.44], df=12,12, t=-0.36, p=0.725	$\sigma^2_{null}=0.11$ , $\sigma^2_{model}=0.11$	$I^2_{null}=37.27$ , $I^2_{model}=36.51$	$R^2=1.69$ , $R^{2*}=0.4$
Ecosystem - Soil Compaction							
Herbivore nativeness	Native=32(9), Introduced=15(6)	~1   Citation / Observation ID	0.04, 0.838	0.07±[0.8,-0.66], df=13,13, t=-0.2, p=0.841	$\sigma^2_{null}=0.35$ , $\sigma^2_{model}=0.35$	$I^2_{null}=68.59$ , $I^2_{model}=68.55$	$R^2=0.31$ , $R^{2*}=0.13$

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	N articles (n observations)	Random effect	Comparison to intercept- only (LRT, p)	Contrast±95%CI	Total variance	Unexplained heterogeneity	Explained variance
Invasive	Native=32(9), Invasive=9(3)	~1   Citation / Observation ID	4.04, 0.045	-0.48±[-0.01,-0.96], df=10,10, t=-2.26, p=0.047	$\sigma_{null}^2=0.15$ , $\sigma_{model}^2=0.09$	$I_{null}^2=48.71$ , $I_{model}^2=36.34$	$R^2=31.36$ , $R^{2*}=11.65$
Ecosystem - Soil K							
Herbivore nativeness	Native=26(9), Introduced=9(4)	~1   Citation / Observation ID	0.13, 0.717	0.1±[0.71,-0.51], df=11,11, t=-0.36, p=0.724	$\sigma_{null}^2=0.39$ , $\sigma_{model}^2=0.38$	$I_{null}^2=77.51$ , $I_{model}^2=77.03$	$R^2=0.51$ , $R^{2*}=0.36$
Ecosystem - Soil Labile N							
Herbivore nativeness	Native=94(18), Introduced=22(4)	~1   Citation / Observation ID	0.74, 0.389	0.16±[0.55,-0.22], df=20,20, t=-0.9, p=0.381	$\sigma_{null}^2=0.12$ , $\sigma_{model}^2=0.11$	$I_{null}^2=62.42$ , $I_{model}^2=60.47$	$R^2=3.61$ , $R^{2*}=0.67$
Ecosystem - Soil Mg							
Africa Comparison	Intact Africa=12(3), Introduced=8(4)	~1   Citation / Observation ID	5.5, 0.019	-0.72±[-1.41,-0.03], df=5,5, t=-2.68, p=0.044	$\sigma_{null}^2=0.34$ , $\sigma_{model}^2=0.22$	$I_{null}^2=77.35$ , $I_{model}^2=68.79$	$R^2=36.98$ , $R^{2*}=27.85$
Herbivore nativeness	Native=30(10), Introduced=8(4)	~1   Citation / Observation ID	3.27, 0.07	-0.56±[0.09,-1.21], df=12,12, t=1.89, p=0.084	$\sigma_{null}^2=0.37$ , $\sigma_{model}^2=0.32$	$I_{null}^2=74.84$ , $I_{model}^2=71.25$	$R^2=14.4$ , $R^{2*}=9.32$
Ecosystem - Soil Moisture							
Herbivore nativeness	Native=47(15), Introduced=22(8)	~1   Citation / Observation ID	0.97, 0.324	0.36±[1.1,-0.39], df=21,21, t=-1, p=0.331	$\sigma_{null}^2=0.89$ , $\sigma_{model}^2=0.86$	$I_{null}^2=84.5$ , $I_{model}^2=83.8$	$R^2=3.14$ , $R^{2*}=2.04$
Invasive	Native=47(15), Invasive=13(4)	~1   Citation / Observation ID	0.05, 0.829	0.1±[1.07,-0.87], df=17,17, t=-0.22, p=0.831	$\sigma_{null}^2=0.89$ , $\sigma_{model}^2=0.89$	$I_{null}^2=84.01$ , $I_{model}^2=83.85$	$R^2=0.19$ , $R^{2*}=0.12$
Ecosystem - Soil Organic C							
Herbivore nativeness	Native=30(10), Introduced=30(4)	~1   Citation / Observation ID	0.01, 0.908	0.03±[0.57,-0.51], df=12,12, t=-0.11, p=0.91	$\sigma_{null}^2=0.17$ , $\sigma_{model}^2=0.17$	$I_{null}^2=60.16$ , $I_{model}^2=59.85$	$R^2=0.12$ , $R^{2*}=0.03$
Invasive	Native=30(10), Invasive=26(3)	~1   Citation / Observation ID	0.08, 0.776	0.08±[0.72,-0.56], df=11,11, t=-0.29, p=0.781	$\sigma_{null}^2=0.17$ , $\sigma_{model}^2=0.17$	$I_{null}^2=61.03$ , $I_{model}^2=60.57$	$R^2=1.02$ , $R^{2*}=0.26$

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Ecosystem - Soil Organic Matter							
Herbivore nativeness	Native=22(12), Introduced=16(5)	~1   Citation / Observation ID	0.04, 0.841	0.06±[0.71,-0.58], df=15,15, t=-0.2, p=0.844	$\sigma_{null}^2$ =0.32, $\sigma_{model}^2$ =0.32	$I_{null}^2$ =69.22, $I_{model}^2$ =68.85	$R^2$ =0.29, $R^{2*}$ <0.01
Ecosystem - Soil Respiration							
Herbivore nativeness	Native=107(8), Introduced=10(4)	~1   Citation / Species ID / Observation ID	1.64, 0.201	-0.49±[0.33,-1.31], df=10,10, t=1.33, p=0.213	$\sigma_{null}^2$ =0.6, $\sigma_{model}^2$ =0.54	$I_{null}^2$ =68.88, $I_{model}^2$ =66.11	$R^2$ =3.37, $R^{2*}$ =0.4
Invasive	Native=107(8), Invasive=10(4)	~1   Citation / Species ID / Observation ID	1.64, 0.201	-0.49±[0.33,-1.31], df=10,10, t=1.33, p=0.213	$\sigma_{null}^2$ =0.6, $\sigma_{model}^2$ =0.54	$I_{null}^2$ =68.88, $I_{model}^2$ =66.11	$R^2$ =3.37, $R^{2*}$ =0.4
Ecosystem - Soil Total C							
Africa Comparison	Intact Africa=30(6), Introduced=13(9)	~1   Citation / Species ID / Observation ID	0.02, 0.888	0.04±[-0.54,0.61], df=13,13, t=0.14, p=0.89	$\sigma_{null}^2$ =0.26, $\sigma_{model}^2$ =0.25	$I_{null}^2$ =73.97, $I_{model}^2$ =73.93	$R^2$ =0.12, $R^{2*}$ =0.03
Herbivore nativeness	Native=119(28), Introduced=13(9)	~1   Citation / Species ID / Observation ID	0.01, 0.919	-0.02±[0.39,-0.44], df=34,130, t=0.1, p=0.919	$\sigma_{null}^2$ =0.21, $\sigma_{model}^2$ =0.21	$I_{null}^2$ =61.69, $I_{model}^2$ =61.68	$R^2$ =0.02, $R^{2*}$ <0.01
Invasive	Native=119(28), Invasive=7(5)	~1   Citation / Species ID / Observation ID	<0.01, 0.958	0.01±[0.57,-0.54], df=30,124, t=-0.05, p=0.958	$\sigma_{null}^2$ =0.23, $\sigma_{model}^2$ =0.23	$I_{null}^2$ =64.01, $I_{model}^2$ =64.01	$R^2$ <0.01, $R^{2*}$ <0.01
Ecosystem - Soil Total Ca							
Africa Comparison	Intact Africa=12(3), Introduced=10(4)	~1   Citation / Observation ID	1.51, 0.219	-0.38±[-1.17,0.4], df=5,5, t=-1.26, p=0.265	$\sigma_{null}^2$ =0.42, $\sigma_{model}^2$ =0.38	$I_{null}^2$ =81.06, $I_{model}^2$ =79.23	$R^2$ =9.21, $R^{2*}$ =6.52
Herbivore nativeness	Native=30(10), Introduced=10(4)	~1   Citation / Observation ID	2.73, 0.099	-0.42±[0.12,-0.96], df=12,12, t=1.69, p=0.118	$\sigma_{null}^2$ =0.37, $\sigma_{model}^2$ =0.33	$I_{null}^2$ =75.09, $I_{model}^2$ =72.68	$R^2$ =9.18, $R^{2*}$ =5.83
Ecosystem - Soil Total N							
Africa Comparison	Intact Africa=47(9), Introduced=19(10)	~1   Citation / Observation ID	1.26, 0.262	0.24±[-0.2,0.68], df=17,17, t=1.13, p=0.273	$\sigma_{null}^2$ =0.4, $\sigma_{model}^2$ =0.38	$I_{null}^2$ =71.39, $I_{model}^2$ =70.24	$R^2$ =3, $R^{2*}$ =1.09

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Herbivore nativeness	Native=173(38), Introduced=19(10)	~1   Citation / Observation ID	0.2, 0.655	0.08±[0.44,-0.28], df=45,190, t=-0.45, p=0.654	$\sigma_{null}^2$ =0.26, $\sigma_{model}^2$ =0.26	$I_{null}^2$ =60.02, $I_{model}^2$ =59.88	$R^2$ =0.23, $R^{2*}$ =0.05
Invasive	Native=173(38), Invasive=13(7)	~1   Citation / Observation ID	0.33, 0.563	0.13±[0.56,-0.31], df=42,184, t=-0.58, p=0.561	$\sigma_{null}^2$ =0.24, $\sigma_{model}^2$ =0.23	$I_{null}^2$ =56.98, $I_{model}^2$ =56.76	$R^2$ =0.46, $R^{2*}$ =0.09
Ecosystem - Soil Total P							
Africa Comparison	Intact Africa=46(9), Introduced=13(6)	~1   Citation / Observation ID	0.64, 0.423	-0.19±[-0.66,0.28], df=13,13, t=-0.85, p=0.409	$\sigma_{null}^2$ =0.22, $\sigma_{model}^2$ =0.21	$I_{null}^2$ =62.01, $I_{model}^2$ =60.38	$R^2$ =2.74, $R^{2*}$ =1.12
Herbivore nativeness	Native=60(14), Introduced=13(6)	~1   Citation / Observation ID	1.06, 0.304	-0.26±[0.25,-0.78], df=18,18, t=1.07, p=0.301	$\sigma_{null}^2$ =0.27, $\sigma_{model}^2$ =0.25	$I_{null}^2$ =65.57, $I_{model}^2$ =63.83	$R^2$ =3.89, $R^{2*}$ =1.7
Ecosystem - Soil pH							
Africa Comparison	Intact Africa=13(4), Introduced=14(6)	~1   Citation / Observation ID	0.61, 0.436	0.21±[-0.41,0.84], df=8,8, t=0.78, p=0.455	$\sigma_{null}^2$ =0.33, $\sigma_{model}^2$ =0.32	$I_{null}^2$ =70.94, $I_{model}^2$ =69.68	$R^2$ =3.59, $R^{2*}$ =0.15
Herbivore nativeness	Native=48(14), Introduced=14(6)	~1   Citation / Observation ID	0.23, 0.635	0.25±[1.36,-0.86], df=18,18, t=-0.48, p=0.639	$\sigma_{null}^2$ =1.36, $\sigma_{model}^2$ =1.34	$I_{null}^2$ =88.7, $I_{model}^2$ =88.44	$R^2$ =0.83, $R^{2*}$ =0.22
Invertebrates - Detritivore Abundance							
Herbivore nativeness	Native=116(17), Introduced=16(4)	~1   Citation / Observation ID	2.71, 0.1	0.96±[2.17,-0.26], df=19,19, t=-1.65, p=0.116	$\sigma_{null}^2$ =0.96, $\sigma_{model}^2$ =0.93	$I_{null}^2$ =88.4, $I_{model}^2$ =88.02	$R^2$ =9.49, $R^{2*}$ =10.23
Invasive	Native=116(17), Invasive=11(3)	~1   Citation / Observation ID	3.22, 0.073	1.25±[2.72,-0.21], df=18,18, t=-1.8, p=0.089	$\sigma_{null}^2$ =1.08, $\sigma_{model}^2$ =1.05	$I_{null}^2$ =89.8, $I_{model}^2$ =89.45	$R^2$ =10.66, $R^{2*}$ =12.77
Invertebrates - Herbivore Abundance							
Africa Comparison	Intact Africa=6(3), Introduced=35(5)	~1   Citation / Observation ID	1.12, 0.29	0.38±[-0.45,1.21], df=6,6, t=1.11, p=0.308	$\sigma_{null}^2$ =0.21, $\sigma_{model}^2$ =0.15	$I_{null}^2$ =50.59, $I_{model}^2$ =42.32	$R^2$ =10.53, $R^{2*}$ =6.02

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Herbivore nativeness	Native=148(20), Introduced=35(5)	~1   Citation / Observation ID	1.03, 0.31	0.33±[0.98,-0.33], df=23,23, t=-1.02, p=0.317	$\sigma^2_{null}=0.41$ , $\sigma^2_{model}=0.39$	$I^2_{null}=75.9$ , $I^2_{model}=75.2$	$R^2=4.05$ , $R^{2*}=2.87$
Invertebrates - Invertebrate Abundance							
Africa Comparison	Intact Africa=39(9), Introduced=121(13)	~1   Citation / Observation ID	1.2, 0.273	0.2±[-0.18,0.58], df=20,20, t=1.1, p=0.283	$\sigma^2_{null}=0.15$ , $\sigma^2_{model}=0.14$	$I^2_{null}=61.14$ , $I^2_{model}=59.62$	$R^2=5.13$ , $R^{2*}=0.8$
Herbivore nativeness	Native=511(45), Introduced=121(13)	~1   Citation / Species ID / Observation ID	1.19, 0.276	0.22±[0.62,-0.18], df=56,56, t=-1.1, p=0.278	$\sigma^2_{null}=0.41$ , $\sigma^2_{model}=0.4$	$I^2_{null}=80.76$ , $I^2_{model}=80.4$	$R^2=1.79$ , $R^{2*}=1.03$
Invasive	Native=511(45), Invasive=54(8)	~1   Citation / Species ID / Observation ID	0.66, 0.416	0.2±[0.7,-0.29], df=51,51, t=-0.82, p=0.418	$\sigma^2_{null}=0.43$ , $\sigma^2_{model}=0.43$	$I^2_{null}=82.52$ , $I^2_{model}=82.32$	$R^2=0.81$ , $R^{2*}=0.47$
Invertebrates - Invertebrate Diversity							
Africa Comparison	Intact Africa=15(3), Introduced=49(7)	~1   Citation / Species ID / Observation ID	0.01, 0.941	0.01±[-0.34,0.37], df=8,8, t=0.07, p=0.943	$\sigma^2_{null}=0.06$ , $\sigma^2_{model}=0.06$	$I^2_{null}=36.85$ , $I^2_{model}=36.61$	$R^2=0.04$ , $R^{2*}=0.01$
Herbivore nativeness	Native=111(19), Introduced=49(7)	~1   Citation / Observation ID	0.38, 0.536	0.21±[0.9,-0.48], df=24,24, t=-0.62, p=0.541	$\sigma^2_{null}=0.52$ , $\sigma^2_{model}=0.52$	$I^2_{null}=84.76$ , $I^2_{model}=84.59$	$R^2=1.74$ , $R^2$ $=0.83$
Invasive	Native=111(19), Invasive=6(3)	~1   Citation / Observation ID	0.01, 0.904	-0.06±[0.95,-1.07], df=20,20, t=0.12, p=0.905	$\sigma^2_{null}=0.61$ , $\sigma^2_{model}=0.61$	$I^2_{null}=87.58$ , $I^2_{model}=87.58$	$R^2=0.03$ , $R^{2*}=0.01$
Invertebrates - Predator Abundance							
Africa Comparison	Intact Africa=9(3), Introduced=18(6)	~1   Citation / Species ID / Observation ID, ~1   site_id	0.33, 0.567	0.13±[-0.29,0.56], df=7,7, t=0.73, p=0.487	$\sigma^2_{null}=0.04$ , $\sigma^2_{model}=0.02$	$I^2_{null}=22.06$ , $I^2_{model}=11.31$	$R^2=18.32$ , $R^{2*}=0.22$
Herbivore nativeness	Native=108(18), Introduced=18(6)	~1   Citation / Observation ID	1.18, 0.278	0.2±[0.55,-0.15], df=22,22, t=-1.19, p=0.246	$\sigma^2_{null}=0.09$ , $\sigma^2_{model}=0.07$	$I^2_{null}=38.36$ , $I^2_{model}=34.41$	$R^2=6.36$ , $R^{2*}=0.66$
Vertebrates - Bird Abundance							
Herbivore nativeness	Native=92(9), Introduced=23(4)	~1   Citation / Species ID / Observation ID	1.07, 0.301	-0.25±[0.28,-0.77], df=11,11, t=1.04, p=0.319	$\sigma^2_{null}=0.35$ , $\sigma^2_{model}=0.35$	$I^2_{null}=85.6$ , $I^2_{model}=85.35$	$R^2=2.84$ , $R^{2*}=1.78$

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

	N articles (n observations)	Random effect	Comparison to intercept- only (LRT, p)	Contrast±95%CI	Total variance $\sigma^2_{model}$ =0.34	Unexplained heterogeneity $I^2_{null}$ $I^2_{model}$	Explained variance $R^2$
Invasive	Native=92(9), Invasive=19(3)	~1   Citation / Species ID / Observation ID	0.6, 0.44	-0.22±[0.41,-0.85], df=10,10, t=0.78, p=0.455	$\sigma^2_{null}$ =0.35, $\sigma^2_{model}$ =0.35	$I^2_{null}$ =85.91, $I^2_{model}$ =85.84	$R^2$ =1.91, $R^{2*}$ =1.23
Vertebrates - Bird Diversity							
Herbivore nativeness	Native=39(7), Introduced=18(3)	~1   Citation / Observation ID	1.67, 0.196	-0.13±[0.09,-0.36], df=8,8, t=1.37, p=0.209	$\sigma^2_{null}$ =0.07, $\sigma^2_{model}$ =0.06	$I^2_{null}$ =69.76, $I^2_{model}$ =66.78	$R^2$ =6.43, $R^{2*}$ =1.1
Vertebrates - Mammal Abundance							
Africa Comparison	Intact Africa=115(5), Introduced=11(3)	~1   Citation / Observation ID	2.96, 0.085	0.73±[-0.25,1.72], df=6,6, t=1.82, p=0.119	$\sigma^2_{null}$ =0.36, $\sigma^2_{model}$ =0.28	$I^2_{null}$ =65.85, $I^2_{model}$ =60.01	$R^2$ =13.49, $R^{2*}$ =3.94
Herbivore nativeness	Native=151(14), Introduced=11(3)	~1   Citation / Observation ID, ~Time Series   Experiment ID	1.49, 0.222	0.45±[1.23,-0.33], df=15,15, t=-1.23, p=0.236	$\sigma^2_{null}$ =0.22, $\sigma^2_{model}$ =0.2	$I^2_{null}$ =72, $I^2_{model}$ =70.18	$R^2$ =4.8, $R^{2*}$ =1.28
Vertebrates - Small Mammal Abundance							
Africa Comparison	Intact Africa=115(5), Introduced=11(3)	~1   Citation / Observation ID	2.96, 0.085	0.73±[-0.25,1.72], df=6,6, t=1.82, p=0.119	$\sigma^2_{null}$ =0.36, $\sigma^2_{model}$ =0.28	$I^2_{null}$ =65.85, $I^2_{model}$ =60.01	$R^2$ =13.49, $R^{2*}$ =3.94
Herbivore nativeness	Native=137(11), Introduced=11(3)	~1   Citation / Observation ID	3.13, 0.077	0.61±[1.34,-0.12], df=12,12, t=-1.81, p=0.095	$\sigma^2_{null}$ =0.2, $\sigma^2_{model}$ =0.16	$I^2_{null}$ =65.52, $I^2_{model}$ =61.14	$R^2$ =13.59, $R^{2*}$ =2.55
Vertebrates - Vertebrate Abundance							
Africa Comparison	Intact Africa=121(9), Introduced=37(7)	~1   Citation / Species ID / Observation ID	0.02, 0.874	0.04±[-0.5,0.58], df=14,14, t=0.16, p=0.876	$\sigma^2_{null}$ =0.46, $\sigma^2_{model}$ =0.46	$I^2_{null}$ =78, $I^2_{model}$ =77.66	$R^2$ =0.06, $R^{2*}$ =0.02
Herbivore nativeness	Native=251(27), Introduced=37(7)	~1   Citation / Species ID / Observation ID	1.53, 0.216	-0.24±[0.14,-0.61], df=32,32, t=1.29, p=0.206	$\sigma^2_{null}$ =0.35, $\sigma^2_{model}$ =0.34	$I^2_{null}$ =83.26, $I^2_{model}$ =82.81	$R^2$ =1.8, $R^{2*}$ =0.62
Invasive	Native=251(27), Invasive=30(5)	~1   Citation / Species ID / Observation ID	1.15, 0.283	-0.23±[0.19,-0.66], df=30,30, t=1.13, p=0.269	$\sigma^2_{null}$ =0.36, $\sigma^2_{model}$ =0.36	$I^2_{null}$ =83.69, $I^2_{model}$ =83.32	$R^2$ =1.46, $R^{2*}$ =0.51

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

	N articles (n observations)	Random effect	Comparison to intercept- only (LRT, p)	Contrast±95%CIs	Total variance $\sigma^2_{model}$ =0.35	Unexplained heterogeneity	Explained variance
Vertebrates - Vertebrate Diversity							
Africa Comparison	Intact Africa=14(3), Introduced=19(3)	~1   Citation / Observation ID	1.62, 0.203	-0.28±[-0.9,0.33], df=4,4, t=-1.28, p=0.268	$\sigma^2_{null}$ =0.26, $\sigma^2_{model}$ =0.24	$I^2_{null}$ =83.47, $I^2_{model}$ =81.89	$R^2$ =7.79, $R^{2*}$ =1.1
Herbivore nativeness	Native=57(11), Introduced=19(3)	~1   Citation / Observation ID	2.95, 0.086	-0.16±[0.04,-0.36], df=12,12, t=1.79, p=0.099	$\sigma^2_{null}$ =0.06, $\sigma^2_{model}$ =0.05	$I^2_{null}$ =62.62, $I^2_{model}$ =57.76	$R^2$ =9.13, $R^{2*}$ =0.52