Oikos

o19401

Barto, E. K. and Rillig, M. C. 2012. Dissemination biases in ecology: Effect sizes matter more than quality. – Oikos 121: 228–235.

Appendix A1

Table A1. List of all meta-analyses used and associated *Z*-scores and samples sizes.

								Data quality (variance)			Data quality (sample size)				
Reference	question	predicted effect	observed effect	research field	temporal publication bias (TE vs YP) Z	confirmation bias (TE vs CR) Z	place of publication bias (TE vs IF) Z	quality publication bias (V vs IF) Z	quality citation bias (V vs CR) Z	quality results bias (V vs TE) Z	quality publication bias (N vs IF) Z	quality citation bias (N vs CR) Z	quality results bias (N vs TE) Z	N (IF N)	Overlap[1]
Aerts 2006	effect of warming on litter decompisition	pos	pos	global change biology	-0.15	0.42	-0.64	-0.49	-0.67	-0.22				34	97
Bancroft et al 2007	effect of UVB radiation on growth of aquatic organisms	neg	neg	global change biology	0.12	0.05	0.09	-0.08	0.12	2.35				37	65
Bancroft et al 2007	effect of UVB radiation on survival of aquatic organisms	neg	neg	global change biology	-0.13	0.07	-0.02	-0.27	-0.05	-0.83				80	75

Barto and Rillig 2010	effect of herbivory on arbuscular mycorrhizal fungi	neg	neg	symbioses	0.4	-0.3	-0.29	0.36	0.28	-0.19	0.39	0.36	-0.27	103	92
Beauchamp 2008	effect of group size in birds on time spent vigilant	neg	neg	species interactions	0.16	-0.36	0.07				0.13	-0.02	0.18	52 (49)	40
Beauchamp 2008	effect of group size in birds on scan frequency	neg	neg	species interactions	0.2	0.03	-0.17				0.58	-0.11	-0.1	35 (30)	54
Beauchamp 2008	effect of group size in birds on scan duration	neg	neg	species interactions	0.1	0.27	0.02				-0.12	-0.09	0.36	23 (22)	35
Hyatt et al 2003	effect of distance from parent plant on seedling survival (Janzen-Connell hypothesis)	pos	neutral	population dynamics	-0.24	0.06	0.29	-0.07	-0.28	0.11				152 (139)	93
Kaplan and Denno 2007	effect of one herbivore species on fecundity of another	neutral	neg	species interactions	0.78	-0.25	-0.2	0.82	0.3	-0.98				65 (64)	83
Kaplan and Denno 2007	effect of one herbivore species on body size of another	neutral	neg	species interactions	-0.31	-0.15	-0.11	-0.02	-0.27	-0.09				62 (59)	65
Kaplan and Denno 2007	composite effect of one herbivore species on another	neutral	neg	species interactions	0.29	0.02	0.2	-0.03	-0.16	-0.48				305	85

Kaplan and Denno 2007	effect of one herbivore species on development time of another	neutral	neg	species interactions	0.09	0.04	0.4	0.26	0.01	-0.71		29 (22)	55
Kaplan and Denno 2007	effect of one herbivore species on plant damage by another	neutral	neg	species interactions	-0.16	0.05	0.15	-0.29	-0.41	-0.46		43 (42)	58
Kaplan and Denno 2007	effect of one herbivore species on abundance of another	neutral	neg	species interactions	0.02	0.07	-0.01	-0.24	-0.24	-0.23		115	73
Kaplan and Denno 2007	effect of one herbivore species on survival on another	neutral	neg	species interactions	0.16	0.08	0.05	-0.2	-0.19	-0.3		53	72
Kaplan and Denno 2007	effect of one herbivore species on RGR of another	neutral	neg	species interactions	-0.13	0.1	0.26	0.17	0.64	-0.03		28 (27)	75
Kaplan and Denno 2007	effect of one herbivore species on oviposition preference of another	neutral	neg	species interactions	0.62	0.18	0.16	-0.36	-0.38	0.21		23	52
Kaplan et al 2008	effect of root herbivory on defensive compounds in roots	pos	pos	chemical ecology	-0.05	-0.13	0.1	-0.18	-0.22	0.41		69 (64)	96

Kaplan et al 2008	effect of root herbivory on defensive comopunds in leaves	pos	pos	chemical ecology	-0.21	-0.01	0.13	-0.09	-0.01	0.74					71 (66)	99
Kaplan et al 2008	effect of leaf herbivory on defensive compounds in leaves	pos	pos	chemical ecology	-0.24	0.04	-0.01	-0.53	0.03	0.52					97	96
Kaplan et al 2008	effect of leaf herbivory on defensive compounds in roots	pos	pos	chemical ecology	-0.13	0.14	-0.02	-0.4	0.11	0.51					76	95
Karst et al 2008	effect of ectomycorrhizal fungi on tree shoot to root ratio	pos	neutral	symbioses	-0.34	0.12	-0.3								235	98
Karst et al 2008	effect of ectomycorrhizal fungi on tree biomass when P was applied	pos	neutral	symbioses	0.01	0.19	-0.97								233	100
Karst et al 2008	effect of ectomycorrhizal fungi on tree biomass	pos	pos	symbioses	0.02	0.23	-0.06								459	99
Karst et al 2008	effect of ectomycorrhizal fungi on tree height	pos	pos	symbioses	0.12	0.24	0.05								329	100
Leimu and Koricheva 2006	genetic correlations between resistances to different enemies	neutral	pos	chemical ecology	0.02	-0.04	-0.4				0.1	0.58	-0.03		468	98

Leimu and Koricheva 2006b	genetic correlations between resistance and tolerance in wild plants	neg	neutral	chemical ecology	0.19	-0.1	-0.86	-0.22	0.51	0.32	17	59
Leimu and Koricheva 2006b	genetic correlations between resistance and tolerance in crops	pos	neutral	chemical ecology	-0.12	0.22	-0.1	0.29	-0.18	0.1	29 (27)	62
Meunier et al 2008	correlation between sex allocation and queen number variation	pos	pos	species interactions	-0.3	0.12	-0.39	-0.37	0.15	-0.26	20	40
Meunier et al 2008	correlation between sex allocation and relatedness asymmetry	pos	pos	species interactions	-0.59	0.26	-0.22	0.23	0.13	-0.41	6	0
Nakagawa et al 2007	correlation between reporductive success and bib size of male hous sparrows	pos	neutral	species interactions	0.51	-0.65	-0.17	1.02	0.5	-0.16	11 (6)	45
Nakagawa et al 2007	correlation between cuckoldry and bib size of male house sparrows	neg	neutral	species interactions	0.07	-0.5	0.18	-1.03	0.22	0.18	9 (6)	22
Nakagawa et al 2007	correlation between fighting ability and bib size of male house sparrows	pos	pos	species interactions	-0.46	-0.32	1.08	0.46	-0.02	-0.01	15 (14)	53

Nakagawa et al 2007	correlation between body condition and bib size of male house sparrows	pos	pos	species interactions	0.22	0.27	0.35				1.11	0.42	0.05	20 (18)	65
Nakagawa et al 2007	correlation bewteen parental ability and bib size of male house sparrows	pos	neutral	species interactions	-0.56	0.29	0.76				1.33	0.58	-0.25	8 (5)	25
Nakagawa et al 2007	correlation between age and bib size of male house sparrows	pos	pos	species interactions	0.49	1.18	0.59				0.9	0.78	0.39	11	45
Reed and Frankham 2001	correlation between molecular and quantitative measures of genetic variation	neutral	pos	population dynamics	-0.07	-0.03	0.06				-0.08	-0.11	0.12	67 (51)	66
Srivastava et al 2009	effect of detrital diversity on detrital standing stock	neutral	neutral	population dynamics	0.35	-0.47	-0.75	0.07	-0.03	0.38				14	64
Srivastava et al 2009	effect of detritivore diversity on detrital standing stock	neutral	neutral	population dynamics	0.3	-0.26	-0.92	0.97	0.1	-0.55				14	71
Srivastava et al 2009	effect of detrital diversity on decomposition rates	neutral	neutral	population dynamics	-0.38	-0.16	-0.45	0.89	0.05	-1.49				22	82
Srivastava et al 2009	effect of detritivore diversity on decomposition rates	neutral	pos	population dynamics	0.08	0.19	-0.03	-0.05	-0.1	0.04				27	70

Treseder 2004	effect of N additions on arbuscular mycorrhizal fungi	neg	neg	symbioses	-0.25	-0.16	0.67	0.11	0.33	-0.13	-0.27	0.11	-0.08	23	61
Treseder 2004	effect of elevated CO2 on arbuscular mycorrhizal fungi	pos	pos	symbioses	0.11	-0.1	0.4	0.37	-0.11	0.21	-1.16	-0.3	0.1	13 (12)	38
Treseder 2004	effect of P additions on arbuscular mycorrhizal fungi	neg	neg	symbioses	0.15	0.03	0.98	0.29	0.03	-0.85	-0.49	-0.22	0.21	20	45
Treseder 2008	effect of N additions on microbial biomass	neutral	pos	global change biology	-0.28	-0.09	-0.09	-0.21	0	-0.43	0.12	-0.29	0.42	44	70
Treseder 2008	effect of N additions on fungal biomass	neutral	pos	global change biology	-0.41	0.05	-0.28	0.74	-0.18	0.02	0.04	-0.15	0.23	21	62
Treseder 2008	effect of N additions on bacterial biomass	neutral	pos	global change biology	-0.03	0.34	0.14	0.28	-0.47	-0.26	0.21	-0.17	0.09	18	72
Vazquez et al 2005	correlation between interaction frequency and total effect of animal mutualists on plants	pos	pos	population dynamics	0.54	-0.25	-0.13				0.44	0.08	-0.48	21	33

Vazquez et al 2005	correlation between interaction frequency and per interaction effect of animal mutualists on plants	pos	neutral	population dynamics	0.2	-0.19	-0.13				0.44	0.08	-0.57	21	33
Vesk and Reichman 2009	effect of plant metal content on feeding preferences of herbivores (positive effect indicates that high metal content deterred feeding)	pos	pos	chemical ecology	0.04	-0.32	-0.46	0.36	-0.04	0.6				31	94
Wang and Curtis 2002	effect of elevated CO2 on area based leaf dark respiration	neutral	neutral	global change biology	-0.22	-0.13	0.27							45 (42)	69
Wang and Curtis 2002	effect of elevated CO2 on mass based leaf dark respiration	neutral	neg	global change biology	0.27	-0.06	-0.31							44	82

[1] Percentage of effect sizes within each meta-analysis that were reported in publications which also reported other effect sizes included in the meta-analysis

Appendix 1 Table 2. List of consolidated meta-analyses used to measure historical and prestige citation bias and associated *Z*-scores and samples sizes.

	historical citation bias (year vs citation rate)	prestige citation bias (IF vs citation rate)	
Reference (data subset)	Z	Z	N
Barto and Rillig 2010	-0.16	0.69	32
Karst et al 2008	0.1	0.49	49
Treseder 2004 (N and P additions)	0.65	0.3	23
Treseder 2004 (elevated CO2)	0.08	0	9
Treseder 2008	-0.2	-0.08	37
Bancroft et al 2007	-0.09	0.29	59
Aerts 2006	-0.47	1.04	5
Wang and Curtis 2002	-0.12	0.61	31
Vesk and Reichman 2009	-0.42	-0.04	9
Srivastava et al 2009	-0.3	0.47	27
Kaplan et al 2008	0.23	0.48	19
Leimu and Koricheva 2006	0.06	0.52	28
Meunier et al 2008 (relatedness asymmetry)	-0.22	1.25	6
Meunier et al 2008 (queen number variation)	-0.22	0.32	15
Beauchamp 2008	-0.13	0.47	51
Nakagawa et al 2007	0.02	0.33	25
Kaplan et al 2007	0.11	0.52	122
Vazquez et al 2005	-0.04	0.96	15
Hyatt et al 2003	0.18	0.37	38
Reed and Frankham 2001	0.22	0.45	32
Leimu and Koricheva 2006b (wild plants)	-0.72	0.79	12
Leimu and Koricheva 2006b (crop plants)	0.09	0.09	17

List of meta-analyses used

Aerts, R. 2006. The freezer defrosting: global warming and litter decomposition rates in cold biomes. - J. Ecol. 94: 713-724.

Bancroft, B. A. et al. 2007. Effects of UVB radiation on marine and freshwater organisms: a synthesis through meta-analysis. - Ecol. Lett. 10: 332-345.

Barto, E. K. and Rillig, M. C. 2010. Does herbivory really suppress mycorrhiza? A meta-analysis. - J. Ecol. 98: 745-753.

Beauchamp, G. 2008. What is the magnitude of the group-size effect on vigilance? - Behav. Ecol. 19: 1361-1368.

Hyatt, L. A. et al. 2003. The distance dependence prediction of the Janzen-Connell hypothesis: a meta-analysis. - Oikos 103c: 590-602.

Kaplan, I. and Denno, R. F. 2007. Interspecific interactions in phytophagous insects revisited: a quantitative assessment of competition theory. - Ecol. Lett. 10: 977-994.

Kaplan, I. et al. 2008. Constitutive and induced defenses to herbivory in above- and belowground plant tissues. - Ecology 89: 392-406.

Karst, J. et al. 2008. The mutualism-parasitism continuum in ectomycorrhizas: a quantitative assessment using meta-analysis. - Ecology 89: 1032-1042.

Leimu, R. and Koricheva, J. 2006. A meta-analysis of genetic correlations between plant resistances to multiple enemies. - Am. Nat. 168: E15-E37.

Leimu, R. and Koricheva, J. 2006. A meta-analysis of tradeoffs between plant tolerance and resistance to herbivore: combining the evidence from ecological and agricultural studies. - Oikos 112: 1-9.

Meunier, J. et al. 2008. Split sex ratios in the social Hymenoptera: a meta-analysis. - Behav. Ecol. 19: 382-390.

Nakagawa, S. et al. 2007. Assessing the function of house sparrows' bib size using a flexible meta-analysis method. - Behav. Ecol. 18: 831-840.

Reed, D. H. and Frankham, R. 2001. How closely correlated are molecular and quantitative measures of genetic variation? a meta-analysis. - Evolution 55: 1095-1103.

Srivastava, D. S. et al. 2009. Diversity has stronger top-down than bottom-up effects on decomposition. - Ecology 90: 1073-1083.

Treseder, K. K. 2004. A meta-analysis of mycorrhizal responses to nitrogen, phosphorus, and atmospheric CO_2 in field studies. - New Phytol. 164: 347-355.

Treseder, K. K. 2008. Nitrogen additions and microbial biomass: a meta-analysis of ecosystem studies. - Ecol. Lett. 11: 1111-1120.

Vazquez, D. P. et al. 2005. Interaction frequency as a surrogate for the total effect of animal mutualists on plants. - Ecol. Lett. 8: 1088-1094.

Vesk, P. A. and Reichman, S. M. 2009. Hyperaccumulators and herbivores - a Bayesian meta-analysis of feeding choice trials. - J. Chem. Ecol. 35: 289-296.

Wang, X. and Curtis, P. 2002. A meta-analytical test of elevated CO_2 effects on plant respiration. - Plant Ecol. 161: 251-261.

Appendix A2

Table A1. Correlation coefficients (*r*) and 95 % confidence intervals for tests of quality publication bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
		Variance		
Predicted effect	Negative	0.073	-0.219; 0.353	5
	Neutral	0.145	-0.048; 0.327	16
	Positive	-0.174	-0.356; 0.022	8
Observed effect	Negative	0.034	-0.138; 0.203	14
	Neutral	0.417	-0.145; 0.775	4
	Positive	-0.067	-0.273; 0.145	11
		Sample size		
Predicted effect	Negative	-0.015	-0.290; 0.263	8
	Neutral	0.085	0.004; 0.165	5
	Positive	0.349	-0.024; 0.637	11
Observed effect	Negative	0.073	-0.219; 0.353	6
	Neutral	0.228	-0.215; 0.593	6
	Positive	0.152	-0.074; 0.362	12

Table A2. Correlation coefficients (*r*) and 95 % confidence intervals for tests of quality results bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
		Variance		
Predicted effect	Negative	0.070	-0.756; 0.810	5
	Neutral	-0.337	-0.486; -0.169	16
	Positive	0.328	0.079; 0.538	8
Observed effect	Negative	-0.195	-0.488; 0.137	14
	Neutral	-0.419	-0.826; 0.276	4
	Positive	0.213	-0.021; 0.425	11
		Sample size		
Predicted effect	Negative	0.049	-0.144; 0.239	8
	Neutral	0.130	-0.050; 0.301	5
	Positive	-0.137	-0.302; 0.037	11
Observed effect	Negative	0.147	-0.198; 0.227	6
	Neutral	-0.061	-0.344; 0.232	6
	Positive	0.047	-0.087; 0.179	12

Table A3. Correlation coefficients (*r*) and 95 % confidence intervals for tests of quality citation bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
		Variance		
Predicted effect	Negative	0.138	-0.023; 0.293	5
	Neutral	-0.090	-0.212; 0.035	16
	Positive	-0.136	-0.287; 0.020	8
Observed effect	Negative	-0.011	-0.153; 0.131	14
	Neutral	-0.170	-0.341; 0.011	4
	Positive	-0.115	-0.242; 0.016	11
		Sample size		
Predicted effect	Negative	0.093	-0.093; 0.272	8
	Neutral	-0.011	-0.437; 0.419	5
	Positive	0.136	-0.04; 0.308	11
Observed effect	Negative	0.041	-0.164; 0.243	6
	Neutral	0.192	-0.074; 0.432	6
	Positive	0.086	-0.184; 0.344	12

Table A4. Correlation coefficients (*r*) and 95 % confidence intervals for tests of temporal publication bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
Research field	Chemical ecology	-0.074	-0.163; 0.017	8
	Global change	-0.095	-0.238; 0.052	8
	Symbioses	0.026	-0.137; 0.187	8
	Population dynamics	0.042	-0.166; 0.247	8
	Species interactions	0.103	-0.046; 0.248	20
Predicted effect	Negative	0.118	-0.028; 0.259	10
	Neutral	0.049	-0.078; 0.175	20
	Positive	-0.064	-0.159; 0.033	22
Observed effect	Negative	0.137	0.006; 0.263	18
	Neutral	-0.084	-0.225; 0.060	13
	Positive	-0.044	-0.121; 0.033	21

Table A5. Correlation coefficients (*r*) and 95 % confidence intervals for tests of place of publication bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
Research field	Chemical ecology	-0.165	-0.357; 0.041	8
	Global change	-0.102	-0.290; 0.093	8
	Symbioses	0.002	-0.308; 0.312	8
	Population dynamics	-0.196	-0.445; 0.082	8
	Species interactions	0.091	-0.023; 0.203	20
Predicted effect	Negative	0.051	-0.200; 0.297	10
	Neutral	-0.069	-0.208; 0.073	20
	Positive	-0.045	-0.226; 0.140	22
Observed effect	Negative	0.068	-0.053; 0.188	18
	Neutral	-0.290	-0.556; 0.031	13
	Positive	-0.034	-0.158; 0.091	21

Table A6. Correlation coefficients (*r*) and 95 % confidence intervals for tests of confirmation bias within subgroups.

Moderator	Groups	*r*	95% CI	Number of studies
Research field	Chemical ecology	-0.023	-0.094; 0.050	8
	Global change	0.051	-0.074; 0.174	8
	Symbioses	0.084	-0.043; 0.209	8
	Population dynamics	-0.025	-0.135; 0.086	8
	Species interactions	0.003	-0.104; 0.109	20
Predicted effect	Negative	-0.091	-0.230; 0.051	10
	Neutral	-0.022	-0.074; 0.029	20
	Positive	0.096	0.013; 0.168	22
Observed effect	Negative	-0.038	-0.115; 0.039	18
	Neutral	0.009	-0.103; 0.122	13
	Positive	0.074	-0.021; 0.168	21