

Supporting Information

Beketov et al. 10.1073/pnas.1305618110

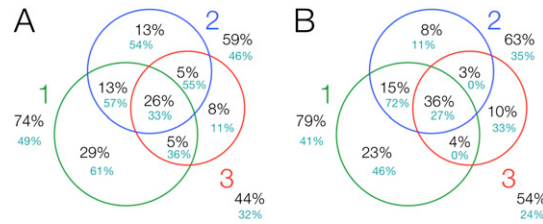


Fig. S1. Distribution of taxonomic richness between the contamination categories and the share of pesticide-vulnerable species-at-risk (SPEAR) taxa. The richness for the data from Europe (A, species level) and Australia (B, family level) is expressed as a fraction of the entire taxonomic pool (large black numbers) and given for the three groups (values outside the circles) and for each subgroup with respect to the overlap between the site groups (values inside the circles). The share of the SPEAR taxa is given as a fraction of the taxa in each (sub)group (i.e., not of the entire pool; small teal numbers). The contamination categories are as follows: 1 (in green)—reference [less than -4 toxic units (TU)]; 2 (in blue)—slightly contaminated (-4 to -2 TU); and 3 (in red)—highly contaminated (greater than -2 TU) (for the calculations of TU values, see the main text). For the number of taxa, see Tables S1 and S2 below.

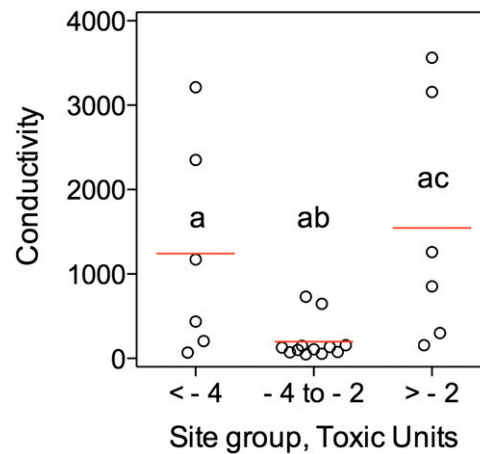


Fig. S2. Water conductivity (in microsiemens per centimeter at 25 °C) in the sampling sites for the Australian data. The sites groups are reference ($TU < -4$), slightly contaminated ($-4 < TU < -2$), and highly contaminated ($TU > -2$).

Table S1. Distribution of the taxonomic diversity (species level) of macroinvertebrates (number of taxa) in the contamination categories for the European data

Contamination category	No. of taxa			
	All taxa		SPEAR taxa	
	Overall	Exclusively in the group(s)*	Overall	Exclusively in the group(s)*
Total	224	—	105	—
Reference sites ($TU < -4$)	165	64	80	39
Slightly contaminated sites ($-4 < TU < -2$)	132	31	60	17
Highly contaminated sites ($TU > -2$)	99	17	32	2

*Number of taxa that are present in the given group(s) but are not present in all of the other groups.

Table S2. Distribution of the taxonomic diversity (family level) of macroinvertebrates (number of taxa) in the contamination categories for the Australian data

Contamination category	No. of taxa			
	All taxa		SPEAR taxa	
	Overall	Exclusively in the group(s)*	Overall	Exclusively in the group(s)*
Total	71	—	26	—
Reference sites (TU < -4)	56	16	23	8
Slightly contaminated sites (-4 < TU < -2)	45	6	16	1
Highly contaminated sites (TU > -2)	38	7	9	2

*Number of taxa that are present in the given group(s) but are not present in all of the other groups.

Table S3. Summary of the environmental parameters at the study sites in Europe

Parameter	Site groups							
	Uncontaminated (TU < -4)		Slightly contaminated (-4 < TU < -2)		Highly contaminated (TU > -2)		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
TU	-4.86	0.24	-2.59	0.45	-0.94	0.42	-2.76	1.54
Temperature, °C	12.08	1.27	12.99	1.33	13.05	1.47	12.77	1.38
pH	7.12	0.60	7.45	0.50	7.79	0.51	7.45	0.57
Ammonium, mg/L	0.06	0.12	0.07	0.06	0.13	0.14	0.09	0.11
Nitrite, mg/L	0.10	0.08	0.11	0.13	0.15	0.05	0.12	0.10
Nitrate, mg/L	11.06	8.03	13.89	6.92	20.73	16.07	15.00	10.86
Orthophosphate, mg/L	0.26	0.16	0.84	0.98	0.39	0.39	0.56	0.73
Oxygen, %	10.15	1.05	10.24	1.03	10.62	0.91	10.32	0.99
Velocity, m/s	0.29	0.20	0.23	0.08	0.19	0.11	0.24	0.13
Width, m	2.07	1.22	2.01	1.02	1.48	0.71	1.88	1.01
Wood, %	11.80	15.60	17.21	15.02	11.48	8.72	14.11	13.67
Free substrate, %	54.08	25.46	60.35	18.52	66.49	11.53	60.31	19.23
Allochthonous leaves, %	11.25	20.92	6.98	5.50	5.04	4.91	7.63	11.73
Stoniness, share	0.68	0.98	0.96	0.94	0.26	0.51	0.69	0.88
Hardness, °dH	5.64	4.76	12.37	8.67	20.87	9.71	13.11	9.68
Conductivity, µS/cm at 25 °C	446	321	612	435	944	479	668	454
Submersed plants, %	16.13	15.84	11.06	14.32	8.63	8.91	11.79	13.46
Immersed plants, %	5.00	4.08	2.79	3.77	6.38	7.12	4.40	5.08
Filamentous algae, %	0.25	0.79	1.60	2.91	1.98	3.25	1.33	2.64

Mean values and SDs are given for each contamination category and for the entire dataset.

Table S4. Summary of the environmental parameters at the study sites in Australia

Parameter	Site groups							
	Uncontaminated (TU < -4)		Slightly contaminated (-4 < TU < -2)		Highly contaminated (TU > -2)		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
TU	-4.36	0.40	-2.70	0.53	-1.42	0.40	-2.80	1.16
Temperature, °C	15.47	2.85	15.28	0.77	15.62	1.01	15.41	1.52
pH	7.35	0.54	7.15	0.19	7.47	0.35	7.28	0.35
Ammonium, mg/L	0.27	0.11	0.59	0.42	1.26	1.61	0.68	0.89
Nitrite, mg/L	0.06	0.14	0.13	0.30	0.07	0.15	0.10	0.23
Nitrate, mg/L	0.63	0.43	0.43	0.37	0.98	1.51	0.62	0.81
Orthophosphate, mg/L	6.66	5.70	9.21	4.80	9.27	7.51	8.58	5.63
Oxygen, %	81.18	6.35	71.86	9.82	60.62	22.19	71.38	14.74
Stoniness, share	1.18	0.94	0.35	0.47	0.48	0.92	0.59	0.78
Conductivity, µS/cm at 25 °C	1,241	1,281	201	232	1,548	1,464	798	1,110
Pool, %	0.72	0.30	0.93	0.17	0.96	0.09	0.89	0.21
Turbidity	6.28	4.83	10.15	3.74	9.11	5.11	8.92	4.48
Depth, m	0.33	0.06	0.43	0.28	0.36	0.21	0.39	0.22

Mean values and SDs are given for each contamination category and for the entire dataset.

Table S5. Pesticides analyzed in the study streams in Europe and Australia

Region	Compounds analyzed
Germany	β-Cyfluthrin, cypermethrin, esfenvalerate, λ-cyhalothrin, lindane, parathion-ethyl, pirimicarb, kresoxim-methyl, epoxiconazole, azoxystrobin, propiconazole, fenpropimorph, tebuconazol, bifenoxy, chloridazon, ethofumesate, isoproturon, metamitron, metribuzin, pendimethalin, prosulfocarb
France	Acetochlor, alachlor, α-endosulfan, carbofuran, chlorfenvinphos, fenpropidin, linuron, oxadiazon, pirimicarb, tebuconazole
Southern Victoria, Australia	4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, α-HCH, atrazine, azinphos-ethyl, azinphos-methyl, azoxystrobin, β-HCH, bifenthrin, boscalid, bupirimate, buprofezin, carbaryl, chlorothalonil, chlorpyrifos, chlorpyrifos-methyl, cis-lindane, cyanazine, cyfluthrin, cyhalothrin, cypermethrin, cyproconazole, cyprodinil, DEA, δ-HCH, deltamethrin, DIA, diazinon, dichlorvos, dieldrin, difenoconazole, dimethoate, dimethomorph, endosulfan sulfate, endosulfan, endrin, esfenvalerate, ethion, fenamiphos, fenarimol, fenchlorfos, fenitrothion, fenoxycarb, fenthion, fenvalerate, fipronil, HCB, HCE, heptachlor, hexazinon, imidacloprid, indoxacarb, iprodione, lindane, linuron, malathion, metalaxyl, methidathion, methiocarb, methomyl, metribuzin, mevinphos, myclobutanol, omethoate, oxadixyl, oxy-chlordane, parathion-ethyl, parathion-methyl, penconazole, pendimethalin, permethrin, pirimicarb, prochloraz, procymidone, prometryn, propargite, propiconazole, propylamide, prothiophos, pymetrozine, pyraclostrobin, pyrimethanil, simazine, spinosad, τ-fluvalinate, tebuconazole, tebufenozide, terbutryn, tetraconazole, thiodicarb, transchlordane, triadimefon, triadimenol, trichlorfon, trifloxystrobin

DEA, desethylatrazine; DIA, deisopropylatrazine; HCB, hexachlorobenzene; HCE, heptachlor epoxide; α-HCH, α-hexachlorocyclohexane; β-HCH, β-hexachlorocyclohexane; δ-HCH, δ-hexachlorocyclohexane; 4,4'-DDD, 1,1'-(2,2-dichloroethylidene)bis(4-chlorobenzene); 4,4'-DDE, 4,4'-dichlorodiphenyldichloroethylene; 4,4'-DDT, 4,4'-dichlorodiphenyltrichloroethane.