Supplementary Information

Passerine birds as bio-indicators of pesticide levels in farmlands and gardens: mitigation by organic farming and distance from treated fields

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Table S1. This table shows the characteristics of the 111 pesticide compounds screened in passerine birds' blood samples, arranged alphabetically by pesticide class. The laboratory species used for the bird LD50 were: *Colinus virginianus*, *Coturnix. c. japonica*, *Anas platyrhynchos*, *Phasianus sp.*, *Serinus canaria*. The LD50 and the soil degradation DT50 (typical or field) were obtained from the Pesticide Properties Data-Base – PPDB (https://sitem.herts.ac.uk/aeru/ppdb/en/atoz.htm). Two analytical methods were employed: liquid chromatography coupled with tandem mass spectrometry (LC/MSMS) for the least volatile compounds and automated thermal desorption gas chromatography coupled with tandem mass spectrometry (ATD-GC/MSMS) for the most volatile compounds. The limits of detection (LODs) and quantification (LOQs) are provided for each compound. The presence of each compound in at least one individual is indicated in the final column ("yes" means that the compound was detected at least once and "no" means that the compound was not detected at all). * may be authorized at national level under different legislation. "Farm" means farming use, "Dom" means domestic use or products found in urban environments (e.g., non-cropped and utility sites, ornamental plants, lawns), "Vet" means veterinary use on domestic pets.

Compound name	Use	Chemical family	Approval in Europe	Prohibition year in Europe / France	Bird LD50 ($mg.kg^{-1}$)	DT50 (days)	Analytical method	LOD ($mg.kg^{-1}$)	LOQ ($mg.kg^{-1}$)	Detected
FUNGICIDES										
Azoxystrobin	Farm/Dom	Strobilurin	Approved	-	>2000	180.7	ATD-GC/MSMS	0,000750	0,002500	No
Boscalid	Farm	Pyridinecarboxamide	Approved	-	>2000	254	ATD-GC/MSMS	0,000484	0,001613	No
Bupirimate	Farm/Dom	Pyrimidine	Approved	-	>10000	34	ATD-GC/MSMS	0,022556	0,075188	No
Carbendazim	Farm/Dom	Benzimidazole-Carbamate	Disapproved	2016 / 2009	>2250	22	LC/MSMS	0,004200	0,014000	Yes
Chlorothalonil	Farm/Dom	Chloronitrile	Disapproved	2020 / 2019	>2000	17.9	ATD-GC/MSMS	0.045000	0.135000	No
Cyazofamid	Farm/Dom	Imidazole	Approved	-	>2000	4.5	LC/MSMS	0.101000	0.231000	No
Cyproconazole	Farm	Triazole	Approved	-	94	129	ATD-GC/MSMS	0,019182	0,063939	No
Cyprodinil	Farm/Dom	Anilinopyrimidine	Approved	-	>500	45	ATD-GC/MSMS	0,001089	0,003628	Yes
Difenoconazole	Farm	Triazole	Approved	-	>2150	91.8	ATD-GC/MSMS	0,035885	0,119617	No

Dimethomorph	Farm	Morpholine	Approved	-	>2000	44	ATD-GC/MSMS	0,007246	0,024155	No
Dimoxystrobine	Farm	Oximino-acetamide	Approved	-	>2000	22.9	ATD-GC/MSMS	0,003846	0,012821	No
Diphenylamine	Farm	Amide	Disapproved	2012 / 2012	>2250	-	ATD-GC/MSMS	0,001293	0,004310	Yes
Epoxiconazole	Farm	Triazole	Disapproved	2020 / 2019	>2000	97.7	LC/MSMS	0,002727	0,009091	Yes
Etridiazole	Farm/Dom	Thiadiazole	Approved	-	560	20	ATD-GC/MSMS	0,187500	0,625000	No
Fenarimol	Farm/Dom	Pyrimidine	Disapproved	2007 / 2007	>2000	74	ATD-GC/MSMS	0,000517	0,001724	No
Fenpropidin	Farm	Piperidine	Approved	-	1899	49.2	ATD-GC/MSMS	0,007500	0,025000	Yes
Fenpropimorph	Farm	Morpholine	Disapproved	2019 / -	>2000	25.5	ATD-GC/MSMS	0,002778	0,009259	Yes
Fludioxonil	Farm/Dom	Phenylpyrrole	Approved	-	>2000	16	ATD-GC/MSMS	0,037000	0,379000	No
Flusilazole	Farm	Triazole	Disapproved	2013 / -	>1590	94	ATD-GC/MSMS	0,014423	0,048077	Yes
Folpet	Farm/Dom	Phthalimide	Approved	-	>2510	3	ATD-GC/MSMS	0,050000	0,166667	No
Isopyrazam	Farm/Dom	Carboxamide	Approved	-	>2000	72	LC/MSMS	0,011297	0,037656	No
Kresoxim-methyl	Farm	Oximinoacetate	Approved	-	>2150	1.0	ATD-GC/MSMS	0,018750	0,062500	Yes
Metalaxyl-M	Farm	Acylalanine	Approved	-	981	14.1	LC/MSMS	0,000252	0,000840	No
Metconazole	Farm/Dom	Triazole	Approved	-	787	134.7	LC/MSMS	0.098000	0.256000	Yes
Myclobutanil	Farm/Dom	Triazole	Approved	-	510	35	ATD-GC/MSMS	0,021429	0,071429	No
Penconazole	Farm/Dom	Triazole	Approved	-	>1590	89.7	ATD-GC/MSMS	0,011592	0,038640	No
Prochloraz	Farm	Imidazole	Approved	-	662	68.8	ATD-GC/MSMS	0,017045	0,056818	No
Procymidone	Farm/Dom	Dicarboximide	Disapproved	2008 / -	>4092	208.3	ATD-GC/MSMS	0,016393	0,054645	No
Propiconazole	Farm	Triazole	Disapproved	2018 / 2019	>2510	35.2	ATD-GC/MSMS	0,001000	0,003333	No
Pyraclostrobin	Farm	Methoxy-carbamate	Approved	-	>2000	33.3	LC/MSMS	0,011297	0,037656	Yes
Pyrimethanil	Farm/Dom	Anilinopyrimidine	Approved	-	>2000	31.4	ATD-GC/MSMS	0,150000	0,500000	Yes
Quinoxyfen	Farm	Aryloxyquinoline	Disapproved	2020 / 2019	>2250	169.3	ATD-GC/MSMS	0,004839	0,016129	Yes
Spiroxamine	Farm	Spiroketal-amine	Approved	-	565	52.4	ATD-GC/MSMS	0,028000	0,093500	No
Tebuconazole	Farm	Triazole	Approved	-	1988	47.1	ATD-GC/MSMS	0,006757	0,022523	Yes
Tetraconazole	Farm	Triazole	Approved	-	132	430	ATD-GC/MSMS	0,027273	0,090909	No
Tolylfluanid	Farm	Sulphamide	Disapproved	2010 / -	>2000	6	ATD-GC/MSMS	0,007500	0,025000	No
Triadimenol	Farm/Dom	Triazole	Disapproved	2019 / -	>2000	36.5	ATD-GC/MSMS	0,052632	0,175439	No
Trifloxystrobine	Farm/Dom	Oximino-acetate	Approved	-	>2000	1.69	ATD-GC/MSMS	0,039474	0,131579	No

Zoxamide	Farm	Toluamide	Approved	-	>2000	6	ATD-GC/MSMS	0,024351	0,081169	Yes
HERBICIDES										
2,4-D	Farm/Dom	Phenoxycarboxylate	Approved	-	>500	28.8	ATD-GC/MSMS	0,011538	0,038462	No
Acetochlor	Farm	Chloroacetamide	Disapproved	2013 / 2013	928	12.1	ATD-GC/MSMS	0,028000	0,093500	Yes
Aclonifen	Farm	Diphenylether	Approved	-	>2000	80.4	ATD-GC/MSMS	0,044118	0,147059	No
Alachlor	Farm	Chloroacetamide	Disapproved	2006 / 2008	1536	14	ATD-GC/MSMS	0,027778	0,092593	Yes
Bifenox	Farm	Diphenylether	Approved	-	>2000	17.3	ATD-GC/MSMS	0,001154	0,003846	No
Carbetamide	Farm/Dom	Carbamate	Disapproved	2021 / 2021	>2000	8	LC/MSMS	0,005282	0,017606	Yes
Chloridazon	Farm/Dom	Pyridazinone	Disapproved	2018 / 2018	>2000	18.6	ATD-GC/MSMS	0,021277	0,070922	No
Chlorotoluron	Farm	Phenylurea	Approved	-	272	12.5	LC/MSMS	0,007853	0,026178	Yes
Chlorpropham	Farm	Carbamate	Disapproved	2020 / 2020	>2000	13.1	ATD-GC/MSMS	0.056000	0.158000	No
Clomazone	Farm	Isoxazolidinone	Approved	-	>2224	27.3	ATD-GC/MSMS	0,012097	0,040323	Yes
Dicamba	Farm	Benzoate	Approved	-	188	3.9	ATD-GC/MSMS	0,124000	0,436000	Yes
Dichlobenil	Farm/Dom	Nitrile	Disapproved	2008 / 2009	698	5.4	ATD-GC/MSMS	0,015306	0,051020	Yes
Diclofop-methyl	Farm/Dom	Aryloxyphenoxy-propionate	Approved	-	> 2250	19	ATD-GC/MSMS	0,018293	0,060976	No
Diflufenican	Farm	Phenylether	Approved	-	>2150	64.6	ATD-GC/MSMS	0,013043	0,043478	Yes
Dimethachlore	Farm	Chloroacetamide	Approved	-	524	3.2	ATD-GC/MSMS	0,028000	0,093500	No
Dimethenamid-P	Farm/Dom	Chloroacetamide	Approved	-	>1068	15.8	ATD-GC/MSMS	0,028000	0,093500	No
Diuron	Farm/Dom	Phenylurea	Disapproved	2007 / 2003	1104	229	LC/MSMS	0,004190	0,013966	Yes
Ethofumesate	Farm	Benzofurane	Approved	-	>2000	37.8	ATD-GC/MSMS	0,007184	0,023946	No
Flumioxazin	Farm/Dom	N-Phenylimide	Approved	-	>2250	17.6	ATD-GC/MSMS	0,042000	0,112000	No
Flurochloridone	Farm	Organochlorine	Approved	-	>2150	40.6	ATD-GC/MSMS	0,120968	0,403226	No
Foramsulfuron	Farm/Dom	Sulfonylurea	Approved	-	>2000	25.4	LC/MSMS	0,004115	0,013717	No
Isoproturon	Farm	Phenylurea	Disapproved	2016 / -	1401	23	LC/MSMS	0,001807	0,006024	No
Isoxaflutole	Farm	Oxazole	Approved	-	>2150	1.3	ATD-GC/MSMS	0,038462	0,128205	No
Lenacil	Farm	Uracil	Approved	-	>2000	39.8	ATD-GC/MSMS	0,100000	0,333333	No
MCPA	Farm	Phenoxycarboxylate	Approved	-	377	25	ATD-GC/MSMS	0,157895	0,526316	Yes
Mecoprop-P	Farm/Dom	Phenoxycarboxylate	Approved	-	500	21	ATD-GC/MSMS	0,050000	0,166667	No
Metamitron	Farm	Triazinone	Approved	-	1302	11.1	ATD-GC/MSMS	0,057692	0,192308	No

Metazachlor	Farm	Chloroacetamide	Approved	-	>2000	6.8	ATD-GC/MSMS	0,040939	0,136463	No
Nicosulfuron	Farm	Sulfonylurea	Approved	-	>2000	19.3	LC/MSMS	0,007296	0,024319	Yes
Oxadiazon	Farm/Dom	N-phenyl-oxadiazolone	Disapproved	2018 / -	>2150	165	ATD-GC/MSMS	0,008571	0,028571	No
Pendimethalin	Farm/Dom	Dinitroaniline	Approved	-	1421	100.6	ATD-GC/MSMS	0,026577	0,088590	No
Picloram	Farm/Dom	6-Chloropicolinates	Approved	-	> 1944	33.7	ATD-GC/MSMS	0,027076	0,090253	No
Propyzamide	Farm/Dom	Amide	Approved	-	6578	50.5	ATD-GC/MSMS	0,002143	0,007143	Yes
Prosulfocarb	Farm	Thiocarbamate	Approved	-	>2250	9.8	ATD-GC/MSMS	0,098000	0,358000	No
S-Metolachlor	Farm	Chloroacetamide	Approved	-	≥2510	23.17	ATD-GC/MSMS	0,009615	0,032051	Yes
Sulcotrione	Farm	Triketone	Approved	-	>1350	3.6	LC/MSMS	0,002143	0,007143	No
Tebutam	Farm	Amide	Disapproved	2002 / 2002	>5000	60	ATD-GC/MSMS	0,052632	0,175439	No
Terbutryn	Farm	Triazine	Disapproved	2002 / 2003	>4640	52	LC/MSMS	0.012000	0.038000	No
Trifluralin	Farm	Dinitroaniline	Disapproved	2008 / -	>2250	170	ATD-GC/MSMS	0,008427	0,028090	Yes
Triflusulfuron-methyl	Farm	Sulfonylurea	Approved	-	>2250	4.5	LC/MSMS	0,001071	0,003571	Yes
INSECTICIDES										
Acetamiprid	Farm/Dom	Neonicotinoid	Disapproved	- / 2018	98	3	LC/MSMS	0.010000	0.034000	Yes
Bifenthrin	Farm/Dom	Pyrethroid	Disapproved	2021 / 2013	1800	86.8	ATD-GC/MSMS	0,003488	0,011628	No
Carbaryl	Farm/Dom	Carbamate	Disapproved	2007 / 2007	>2000	16	ATD-GC/MSMS	0,028000	0,102000	Yes
Chlorantraniliprole	Farm	Diamide	Approved	-	>2250	204	LC/MSMS	0,000781	0,002604	Yes
Chlorfenvinphos	Farm	Organophosphate	Disapproved	2007 / 2007	80	30	LC/MSMS	0,050000	0,166667	No
Chlorpyrifos	Farm/Dom	Organophosphate	Disapproved	2020 / 2020	39.2	27.6	ATD-GC/MSMS	0,016667	0,055556	No
Chlorpyriphos-methyl	Farm	Organophosphate	Disapproved	2020 / 2020	923	1.24	ATD-GC/MSMS	0,028000	0,093500	No
Clothianidin	Farm/Dom	Neonicotinoid	Disapproved	2018 / 2018	430	121.2	LC/MSMS	0,010326	0,034419	No
Cyantraniliprole	Farm	Diamide	Approved	-	>2250	32.4	LC/MSMS	0,111111	0,370370	Yes
Cypermethrin	Farm	Pyrethroid	Approved	-	>9520	21.9	ATD-GC/MSMS	0,001250	0,004167	No
Deltamethrin	Farm/Dom	Pyrethroid	Approved	-	>2250	21	ATD-GC/MSMS	0,000882	0,002941	No
Diflubenzuron	Farm/Dom	Benzoylphenylurea	Disapproved	2020 / -	>5000	3	LC/MSMS	0,010000	0,003000	No
Fenoxycarb	Farm/Dom	Carbamate	Disapproved	2019 / 2021	>3000	5.94	ATD-GC/MSMS	0,001154	0,003846	No
Flufenoxuron	Farm/Dom	Benzoylureas	Disapproved	2011 / -	>2000	42.9	LC/MSMS	0,011297	0,037656	Yes
Imidacloprid	Farm/Dom/Vet	Neonicotinoid	Disapproved	- / 2018	31	174	LC/MSMS	0.015000	0.043000	Yes

Indoxacarb	Farm/Dom	Oxadiazine	Approved	-	73.5	5.97	ATD-GC/MSMS	0,006944	0,023148	No
lambda-Cyhalothrin	Farm	Pyrethroid	Approved	-	>3950	26.9	ATD-GC/MSMS	0,024194	0,080645	No
Lindane	Farm	Organochlorine	Disapproved	2000 / 1998	122	148	ATD-GC/MSMS	0,035294	0,117647	No
Lufenuron	Farm/Dom	Benzoylurea	Disapproved	2019 / -	2000	256	LC/MSMS	0,010490	0,034965	Yes
Malathion	Farm/Dom	Organophosphate	Disapproved	2020 / 2008	359	1	ATD-GC/MSMS	0,058140	0,193798	No
Nitenpyram	Farm/Dom/Vet	Neonicotinoid	*	-	1124	8	LC/MSMS	0,009000	0,030000	No
Pirimicarb	Farm/Dom	Carbamate	Approved	-	20.9	9	ATD-GC/MSMS	0,011719	0,039063	Yes
Propoxur	Farm/Dom	Carbamate	Disapproved	2009 / 2008	>25.9	28	ATD-GC/MSMS	0.098000	0.352000	No
Pymetrozine	Farm/Dom	Pyridine	Disapproved	2019 / -	>2000	22.6	LC/MSMS	0,021750	0,072500	No
Spinosyn-A	Farm/Dom	Spinosyn	Approved	-	>1333	27.4	LC/MSMS	0,000206	0,000687	No
Spinosyn-D	Farm/Dom	Spinosyn	Approved	-	>1333	25.3	LC/MSMS	0,000888	0,002960	No
Tebufenpyrad	Farm/Dom	Pyrazole	Approved	-	>2000	4.5	ATD-GC/MSMS	0,016667	0,055556	No
Thiacloprid	Farm/Dom	Neonicotinoid	Disapproved	2020 / 2018	35	8.1	LC/MSMS	0,001429	0,004762	No
Thiamethoxam	Farm/Dom	Neonicotinoid	Disapproved	2018 / 2018	576	39	LC/MSMS	0,012379	0,041262	No
SAFENER										
Benoxacor	Farm	Benzoxazine	*	-	-	-	ATD-GC/MSMS	0,021000	0,067000	No
Isoxadifen	Farm/Dom	Unclassified	*	-	-	-	LC/MSMS	0.011000	0.067000	No
SYNERGIST										
Piperonyl butoxide	Farm/Dom	Benzodoxiole	*	-	>2250	13	ATD-GC/MSMS	0,000441	0,001471	No

Table S2. Formal specification of the generalized linear mixed models (GLMMs) fitted to each response variable and dataset. N_C: number of detected compounds; C_T: total concentration; TI: toxicity index. μ_i denotes the conditional mean of the response, and u denotes a random intercept.

Model Response	Distribution (link)	Formal equation
Habitat comparison N_C	Negative binomial (log)	$Nc_i \sim NegativeBinomial(\mu_i, \Theta)$ $\log(\mu_i) = \beta_0 + \beta_1 Habitat_i + \beta_2 Species_i + \beta_3 (Habitat_i \times Species_i) + \beta_4 Sex_i + \beta_5 Date_i + u_{site(i)}$ $\mu_{site} \sim \mathcal{N}(0, \sigma^2_{site})$
Habitat comparison C_T	Gamma (log)	$Ct_i \sim Gamma(\mu_i, \varphi)$ $\log(\mu_i) = \beta_0 + \beta_1 Habitat_i + \beta_2 Species_i + \beta_3 (Habitat_i \times Species_i) + \beta_4 Sex_i + \beta_5 Date_i + \beta_6 Date_i^2 + u_{site(i)}$ $\mu_{site} \sim \mathcal{N}(0, \sigma^2_{site})$
Habitat comparison $Log_{10}(TI)$	Normal (identity)	$log_{10}(TI_i) = \beta_0 + \beta_1 Habitat_i + \beta_2 Species_i + \beta_3 (Habitat_i \times Species_i) + \beta_4 Sex_i + \beta_5 Date_i + u_{site(i)} + \varepsilon_i$ $\mu_{site} \sim \mathcal{N}(0, \sigma^2_{site}), \varepsilon_i \sim \mathcal{N}(0, \sigma^2)$
Hedgerows N_C	Poisson (log)	$Nc_i \sim Poisson(\mu_i)$ $\log(\mu_i) = \beta_0 + \beta_1 \%OF_i + \beta_2 Date_i + \beta_3 (\%OF_i \times Species_i) + u_{species(i)}$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species})$
Hedgerows C_T	Gamma (log)	$Ct_i \sim Gamma(\mu_i, \varphi)$ $\log(\mu_i) = \beta_0 + \beta_1 \%OF_i + \beta_2 Date_i + \beta_3 (\%OF_i \times Species_i) + u_{species(i)}$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species})$
Hedgerows $Log_{10}(TI)$	Normal (identity)	$log_{10}(TI_i) = \beta_0 + \beta_1 \%OF_i + \beta_2 Date_i + \beta_3 (\%OF_i \times Species_i) + u_{species(i)} + \varepsilon_i$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species}), \varepsilon_i \sim \mathcal{N}(0, \sigma^2)$
Gardens N_C	Negative binomial (log)	$Nc_i \sim NegativeBinomial(\mu_i, \Theta)$ $\log(\mu_i) = \beta_0 + \beta_1 Distance_i + \beta_2 Date_i + \beta_3 Municipality_i + \beta_4 (Distance_i \times Species_i) + u_{species(i)}$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species})$

Gardens C_T	Gamma (log)	$Ct_i \sim Gamma(\mu_i, \varphi)$ $\log(\mu_i) = \beta_0 + \beta_1 Distance_i + \beta_2 Date_i + \beta_3 Municipality_i + \beta_4 (Distance_i \times Species_i) + u_{species(i)}$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species})$
Gardens $Log_{10}(TI)$	Normal (identity)	$log_{10}(TI_i) = \beta_0 + \beta_1 Distance_i + \beta_2 Date_i + \beta_3 Municipality_i + \beta_4 (Distance_i \times Species_i) + u_{species(i)} + \varepsilon_i$ $\mu_{species} \sim \mathcal{N}(0, \sigma^2_{species}), \varepsilon_i \sim \mathcal{N}(0, \sigma^2)$

Table S3. Diagnostic summary for the nine GLMM/LMM models used to assess pesticide contamination in passerine birds, including the three habitat-comparison models (hedgerows vs. gardens) and the six mitigating-component models (effect of organic farming in hedgerows; effect of distance to the nearest conventional field in gardens). Diagnostics were obtained using the "DHARMa" package (Hartig et al., 2024) for overdispersion, zero-inflation, residual uniformity and outlier tests (1000 simulations per model), and the "performance" package (Lüdecke et al., 2021) for convergence, singularity, and marginal R^2 (Lüdecke et al., 2021; Nakagawa et al., 2017); where a near-zero random-effect variance precluded direct R^2 computation, the delta method implemented in "MuMIn" (Bartoń, 2010) was used instead. A dispersion ratio close to 1 and $P > 0.05$ indicate the absence of over- or underdispersion; $P > 0.05$ similarly indicates no systematic deviation from the expected residual distribution (uniformity test) and no influential outlying observations (outliers test).

Model	Response	Distribution (link)	N	Random effect	Dispersion (ratio)	Dispersion (p)	Zero-inflation (p)	Residual uniformity (p)	Outliers (p)	Convergence	Singularity	Marginal R^2
Habitat comparison	N_C	Negative binomial (log)	152	Site	1.01	0.86	1.00	0.21	0.12	OK	Yes	0.12
Habitat comparison	C_T	Gamma (log)	152	Site	0.96	0.98	NA*	0.36	1.00	OK	Yes	0.18
Habitat comparison	$Log_{10}(TI)$	Normal (identity)	152	Site	0.89	0.31	NA*	0.88	1.00	OK	Yes	0.05
Hedgerows	N_C	Poisson (log)	67	Species	1.29	0.16	0.90	0.56	0.76	OK	Yes	0.17
Hedgerows	C_T	Gamma (log)	67	Species	1.17	0.56	NA*	0.71	1.00	OK	Yes	0.38
Hedgerows	$Log_{10}(TI)$	Normal (identity)	67	Species	0.88	0.52	NA*	0.79	1.00	OK	Yes	0.11
Gardens	N_C	Negative binomial (log)	142	Species	1.02	0.83	0.38	0.53	1.00	OK	Yes	0.12
Gardens	C_T	Gamma (log)	142	Species	1.08	0.67	NA*	0.08	1.00	OK	Yes	0.26
Gardens	$Log_{10}(TI)$	Normal (identity)	142	Species	0.92	0.52	NA*	0.76	1.00	OK	Yes	0.09

* *ZeroInflation* test applicable only to count models (Poisson, negative binomial) and not applicable (NA) to Gamma and Normal models, which do not predict zero values by construction.

Table S4. Full regression output (fixed-effect estimates, standard errors, test statistics, and p-values) for the three habitat-comparison models: number of compounds (N_C, NB-GLMM), total concentration (C_T, G-GLMM, with a quadratic term for capture date), and $\log_{10}$-transformed toxicity index ($\log_{10}$(TI), LMM). Reference levels: type of habitat = hedgerow; species = Dunnock; sex = F. Statistic = z-value for GLMMs, t-value for the LMM.

Model	Term	Estimate	SE	Statistic	P
Habitat comparison – N_C	(Intercept)	1.9418	0.3269	5.940	$2.86e^{-09}$
	Type of habitat [garden_BSN]	-0.1268	0.3573	-0.355	0.7227
	Type of habitat [garden_FO]	-0.3359	0.3373	-0.996	0.3194
	Species [Eurasian Blackcap]	-0.0591	0.2328	-0.254	0.7996
	Species [Common Blackbird]	-0.2704	0.2369	-1.142	0.2537
	Species [Great Tit]	-0.2150	0.2924	-0.735	0.4622
	Species [European Robin]	-0.4249	0.3232	-1.315	0.1887
	Sex [M]	-0.0538	0.0909	-0.592	0.5537
	Date	-0.0009	0.0016	-0.575	0.5654
	Habitat[garden_BSN]:Species[Eurasian Blackcap]	0.1388	0.4170	0.333	0.7391
	Habitat[garden_FO]:Species[Eurasian Blackcap]	0.3682	0.3883	0.948	0.3430
	Habitat[garden_BSN]:Species[Common Blackbird]	0.1044	0.3935	0.265	0.7907
	Habitat[garden_FO]:Species[Common Blackbird]	0.3470	0.3752	0.925	0.3549
	Habitat[garden_BSN]:Species[Great Tit]	0.4994	0.4748	1.052	0.2929
	Habitat[garden_FO]:Species[Great Tit]	0.7634	0.4296	1.777	0.0756
	Habitat[garden_BSN]:Species[European Robin]	0.0291	0.6084	0.048	0.9618
	Habitat[garden_FO]:Species[European Robin]	0.9647	0.4625	2.086	0.0370
Habitat comparison – C_T	(Intercept)	5.8667	0.4178	14.040	$<2e^{-16}$
	Type of habitat [garden_BSN]	0.2768	0.6938	0.399	0.6899
	Type of habitat [garden_FO]	-0.0223	0.6396	-0.035	0.9722
	Species [Eurasian Blackcap]	0.3045	0.4705	0.647	0.5175
	Species [Common Blackbird]	-0.2071	0.4656	-0.445	0.6564
	Species [Great Tit]	0.3446	0.5659	0.609	0.5426
	Species [European Robin]	-0.7152	0.6000	-1.192	0.2333
	Sex [M]	0.1810	0.1755	1.032	0.3023
	Date (linear term)	0.6587	1.0752	0.613	0.5401

	Date (quadratic term)	-2.4607	1.0729	-2.294	0.0218
	Habitat[garden_BSN]:Species[Eurasian Blackcap]	-0.4854	0.8154	-0.595	0.5517
	Habitat[garden_FO]:Species[Eurasian Blackcap]	-0.0825	0.7477	-0.110	0.9122
	Habitat[garden_BSN]:Species[Common Blackbird]	0.2989	0.7563	0.395	0.6926
	Habitat[garden_FO]:Species[Common Blackbird]	0.1381	0.7047	0.196	0.8447
	Habitat[garden_BSN]:Species[Great Tit]	0.0943	0.9444	0.100	0.9205
	Habitat[garden_FO]:Species[Great Tit]	-0.2633	0.8234	-0.320	0.7492
	Habitat[garden_BSN]:Species[European Robin]	-0.6238	1.0770	-0.579	0.5625
	Habitat[garden_FO]:Species[European Robin]	1.1342	0.8727	1.300	0.1938
Habitat comparison – $Log_{10}(TI)$	(Intercept)	-2.6143	0.6690	-3.908	0.000147
	Type of habitat [garden_BSN]	-0.1555	0.7325	-0.212	0.832170
	Type of habitat [garden_FO]	-0.3320	0.6691	-0.496	0.620532
	Species [Eurasian Blackcap]	-0.1595	0.4953	-0.322	0.747924
	Species [Common Blackbird]	-0.5104	0.4917	-1.038	0.301021
	Species [Great Tit]	-0.0080	0.5969	-0.013	0.989299
	Species [European Robin]	-1.0546	0.6264	-1.684	0.094588
	Sex [M]	-0.1202	0.1851	-0.650	0.517095
	Date	-0.0016	0.0032	-0.507	0.612908
	Habitat[garden_BSN]:Species[Eurasian Blackcap]	0.2230	0.8584	0.260	0.795471
	Habitat[garden_FO]:Species[Eurasian Blackcap]	0.2337	0.7813	0.299	0.765328
	Habitat[garden_BSN]:Species[Common Blackbird]	0.4587	0.7984	0.575	0.566575
	Habitat[garden_FO]:Species[Common Blackbird]	0.3268	0.7404	0.441	0.659667
	Habitat[garden_BSN]:Species[Great Tit]	0.1017	0.9892	0.103	0.918308
	Habitat[garden_FO]:Species[Great Tit]	0.1983	0.8694	0.228	0.819885
	Habitat[garden_BSN]:Species[European Robin]	0.8332	1.1369	0.733	0.464902
	Habitat[garden_FO]:Species[European Robin]	1.2712	0.9185	1.384	0.168652

Table S5. Full regression output (fixed-effect estimates, standard errors, test statistics, and p-values) for the three hedgerow mitigating-component models: number of compounds (N_C, P-GLMM), total concentration (C_T, G-GLMM), and log_{10}-transformed toxicity index (log_{10}(TI), LMM). Reference species level: Dunnock. Statistic = z-value for GLMMs, t-value for the LMM.

Model	Term	Estimate	SE	Statistic	P
Hedgerows – N_C	(Intercept)	2.381	0.3195	7.454	$9.05e^{-14}$
	%OF	-0.00118	0.00355	-0.332	0.7401
	Date	-0.00521	0.00200	-2.597	0.00941
	%OF:Species [Eurasian Blackcap]	0.00434	0.00381	1.138	0.2552
	%OF:Species [Melodious Warbler]	0.00473	0.00393	1.203	0.2288
	%OF:Species [Common Blackbird]	0.00003	0.00367	0.007	0.9944
	%OF:Species [Great Tit]	-0.00323	0.00673	-0.480	0.6315
	%OF:Species [Common Nightingale]	-0.00103	0.00411	-0.250	0.8029
	%OF:Species [European Robin]	-0.00370	0.00504	-0.733	0.4637
Hedgerows – C_T	(Intercept)	6.0638	0.6101	9.939	$<2e^{-16}$
	%OF	-0.00838	0.00632	-1.326	0.185
	Date	0.00259	0.00368	0.704	0.482
	%OF:Species [Eurasian Blackcap]	0.00555	0.00701	0.791	0.429
	%OF:Species [Melodious Warbler]	-0.00516	0.00727	-0.710	0.478
	%OF:Species [Common Blackbird]	-0.00108	0.00654	-0.165	0.869
	%OF:Species [Great Tit]	-0.02151	0.01088	-1.978	0.048
	%OF:Species [Common Nightingale]	0.01087	0.00715	1.520	0.129
	%OF:Species [European Robin]	-0.01141	0.00825	-1.382	0.167
Hedgerows – Log_{10}(TI)	(Intercept)	-3.4319	0.7803	-4.398	$4.73e^{-05}$
	%OF	0.00475	0.00808	0.588	0.5586
	Date	0.00197	0.00471	0.418	0.6778
	%OF:Species [Eurasian Blackcap]	-0.00127	0.00897	-0.142	0.8880
	%OF:Species [Melodious Warbler]	-0.00823	0.00930	-0.885	0.3797
	%OF:Species [Common Blackbird]	-0.00799	0.00836	-0.955	0.3433
	%OF:Species [Great Tit]	-0.01931	0.01391	-1.389	0.1703
	%OF:Species [Common Nightingale]	-0.00272	0.00914	-0.297	0.7676
	%OF:Species [European Robin]	-0.02010	0.01056	-1.904	0.0619

Table S6. Full regression output (fixed-effect estimates, standard errors, test statistics, and p-values) for the three garden mitigating-component models: number of compounds (N_C, NB-GLMM), total concentration (C_T, G-GLMM), and $\log_{10}$-transformed toxicity index ($\log_{10}$(TI), LMM). Reference levels: Species = Dunnock; Municipality = BSN. Statistic = z-value for GLMMs, t-value for the LMM.

Model	Term	Estimate	SE	Statistic	P
Gardens – N_C	(Intercept)	1.4989	0.2210	6.783	$1.18e^{-11}$
	Distance	-0.00247	0.00149	-1.661	0.0968
	Municipality [FO]	0.0768	0.0838	0.917	0.3589
	Date	0.00167	0.00150	1.110	0.2670
	Distance:Species [European Goldfinch]	0.00139	0.00183	0.761	0.4465
	Distance:Species [Eurasian Blackcap]	0.00205	0.00157	1.308	0.1908
	Distance:Species [Common Linnet]	0.00208	0.00177	1.176	0.2396
	Distance:Species [Common Blackbird]	0.00127	0.00148	0.854	0.3930
	Distance:Species [Great Tit]	0.00343	0.00181	1.899	0.0576
	Distance:Species [Eurasian Chaffinch]	0.00157	0.00181	0.864	0.3876
	Distance:Species [European Robin]	0.00049	0.00207	0.238	0.8118
	Distance:Species [Black Redstart]	0.00129	0.00154	0.834	0.4043
Gardens – C_T	(Intercept)	6.4825	0.3923	16.524	$<2e^{-16}$
	Distance	-0.00297	0.00220	-1.354	0.1756
	Municipality [FO]	-0.1426	0.1514	-0.942	0.3462
	Date	0.00117	0.00270	0.435	0.6634
	Distance:Species [European Goldfinch]	-0.00571	0.00287	-1.988	0.0468
	Distance:Species [Eurasian Blackcap]	-0.00019	0.00241	-0.080	0.9362
	Distance:Species [Common Linnet]	-0.00011	0.00283	-0.039	0.9690
	Distance:Species [Common Blackbird]	0.00017	0.00219	0.078	0.9374
	Distance:Species [Great Tit]	0.00161	0.00308	0.523	0.6013
	Distance:Species [Eurasian Chaffinch]	0.00062	0.00291	0.213	0.8314
	Distance:Species [European Robin]	-0.00631	0.00325	-1.943	0.0520
	Distance:Species [Black Redstart]	0.00176	0.00230	0.767	0.4433
Gardens – $\log_{10}$(TI)	(Intercept)	-2.4650	0.4318	-5.707	$7.39e^{-08}$
	Distance	-0.00395	0.00242	-1.634	0.105

Date	-0.00254	0.00297	-0.855	0.394
Municipality [FO]	0.00548	0.1667	0.033	0.974
Distance:Species [European Goldfinch]	-0.00027	0.00316	-0.086	0.932
Distance:Species [Eurasian Blackcap]	0.00259	0.00265	0.978	0.330
Distance:Species [Common Linnet]	0.00107	0.00311	0.345	0.731
Distance:Species [Common Blackbird]	0.00189	0.00241	0.785	0.434
Distance:Species [Great Tit]	0.00138	0.00339	0.406	0.685
Distance:Species [Eurasian Chaffinch]	0.00248	0.00320	0.775	0.440
Distance:Species [European Robin]	-0.00121	0.00358	-0.339	0.735
Distance:Species [Black Redstart]	0.00351	0.00253	1.389	0.167

Table S7. Model-predicted pesticide contamination parameters in hedgerows at different percentages of organic farming (OF) within a 250-m-radius buffer. Predicted values and their associated 95% confidence intervals (Lower CI and Upper CI) are provided for the number of pesticide compounds (N_C), total pesticide concentration (C_T; pg mg^{-1}), and Toxicity Index (TI) at 0%, 50%, and 100% OF. All predictions are presented on the original response scale. Predictions for TI and their 95% confidence intervals were obtained by back-transforming model predictions from the log_{10} scale.

Parameter	%OF	Prediction	Lower 95% CI	Upper 95% CI
N_C	0	4.81	4.00	5.78
	50	4.76	4.25	5.35
	100	4.72	3.87	5.76
C_T	0	643.99	460.27	901.04
	50	400.54	326.13	491.93
	100	249.13	174.49	355.69
TI	0	0.00075	$1.54e^{-4}$	$3.64e^{-3}$
	50	0.00058	$5.40e^{-14}$	$6.21e^{6}$
	100	0.00045	$1.14e^{-4}$	$1.76e^{-3}$

Table S8. Model-predicted pesticide contamination parameters in gardens at different distances from the nearest conventional agricultural field. Predicted values and their associated 95% confidence intervals (Lower CI and Upper CI) are provided for the number of pesticide compounds (N_C), total pesticide concentration (C_T; pg mg^{-1}), and Toxicity Index (TI) at distances of 0, 100, 200, and 300 m. All predictions are presented on the original response scale. Predictions for TI and their 95% confidence intervals were obtained by back-transforming model predictions from the log_{10} scale.

Parameter	Distance	Prediction	Lower 95% CI	Upper 95% CI
N_C	0	5.95	5.23	6.78
	100	5.41	4.98	5.89
	200	4.92	4.48	5.41
	300	4.48	3.86	5.20
C_T	0	713.08	556.34	913.98
	100	518.25	441.93	607.74
	200	376.65	318.38	445.58
	300	273.74	210.01	356.80
TI	0	0.00149	$5.22e^{-4}$	$4.23e^{-3}$
	100	0.00090	$1.06e^{-11}$	$7.65e^{4}$
	200	0.00055	$4.43e^{-10}$	$6.72e^{2}$
	300	0.00033	$9.53e^{-5}$	$1.15e^{-3}$

Figure S1. Effects of the percentage of organic farming on the number of compounds detected for each species caught in farmland hedgerows and included in the analyses (P-GLMM). In these models, %OF, date of capture and the interaction between %OF and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the percentage of organic farming on the number of compounds (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

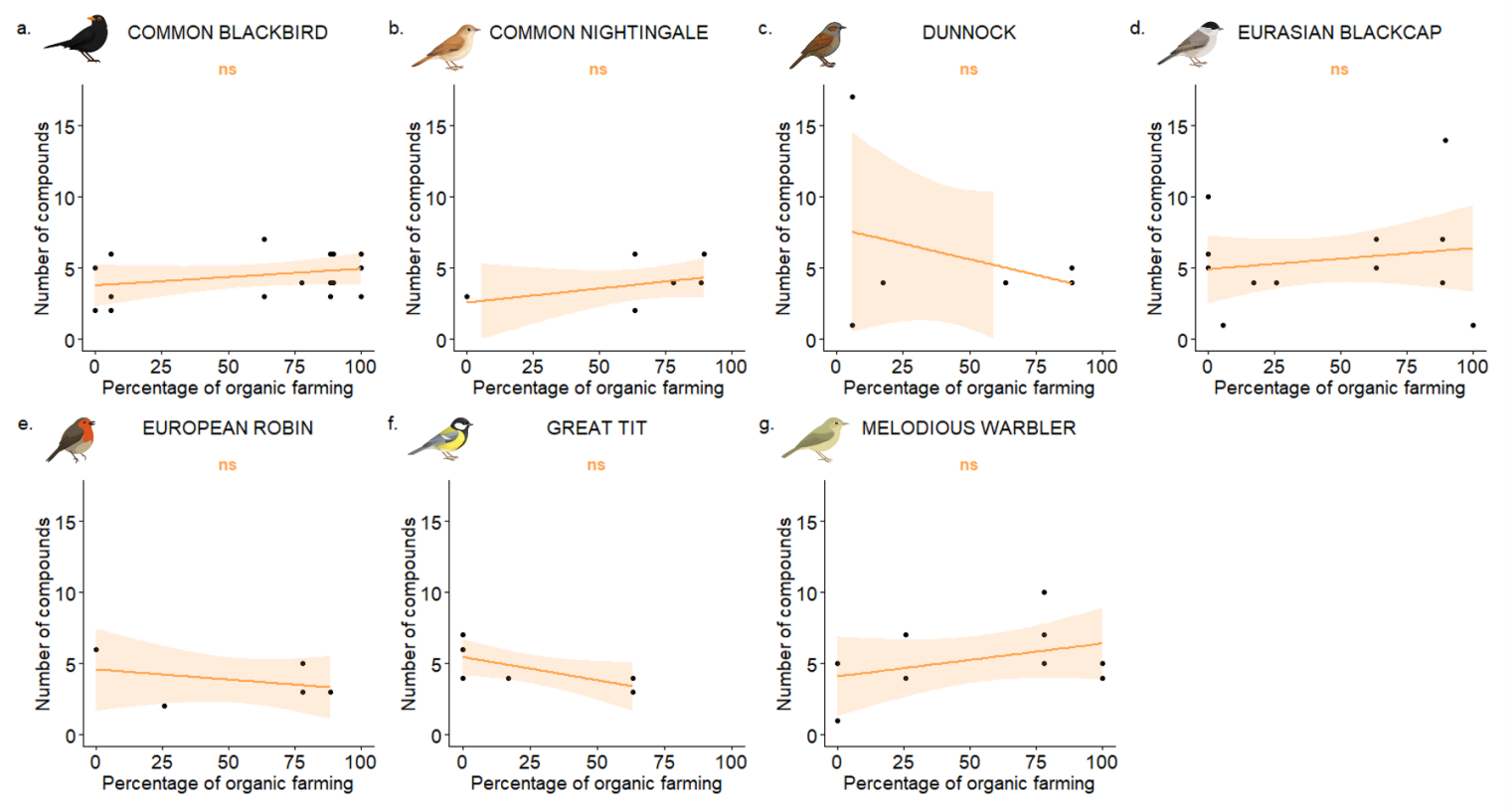


Figure S2. Effects of the percentage of organic farming on the total concentrations (in $pg.mg^{-1}$) for each species caught in farmland hedgerows and included in the analyses (G-GLMM). In these models, %OF, date of capture and the interaction between %OF and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the percentage of organic farming on the total concentrations (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

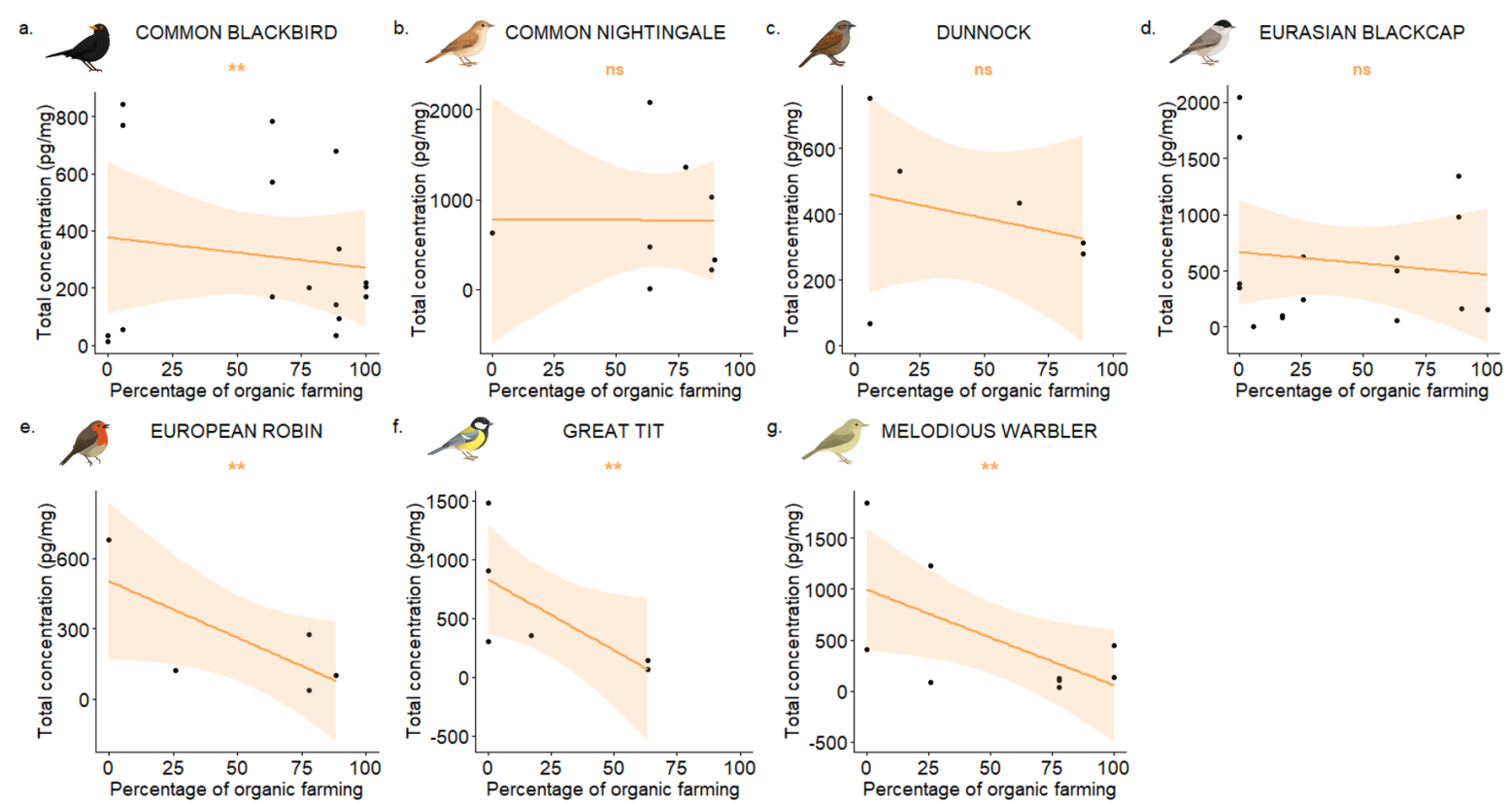


Figure S3. Effects of the percentage of organic farming on the log_{10}-transformed total toxicity index for each species caught in farmland hedgerows and included in the analyses (LMM). In these models, %OF, date of capture and the interaction between %OF and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the percentage of organic farming on the log_{10}-transformed total toxicity index (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

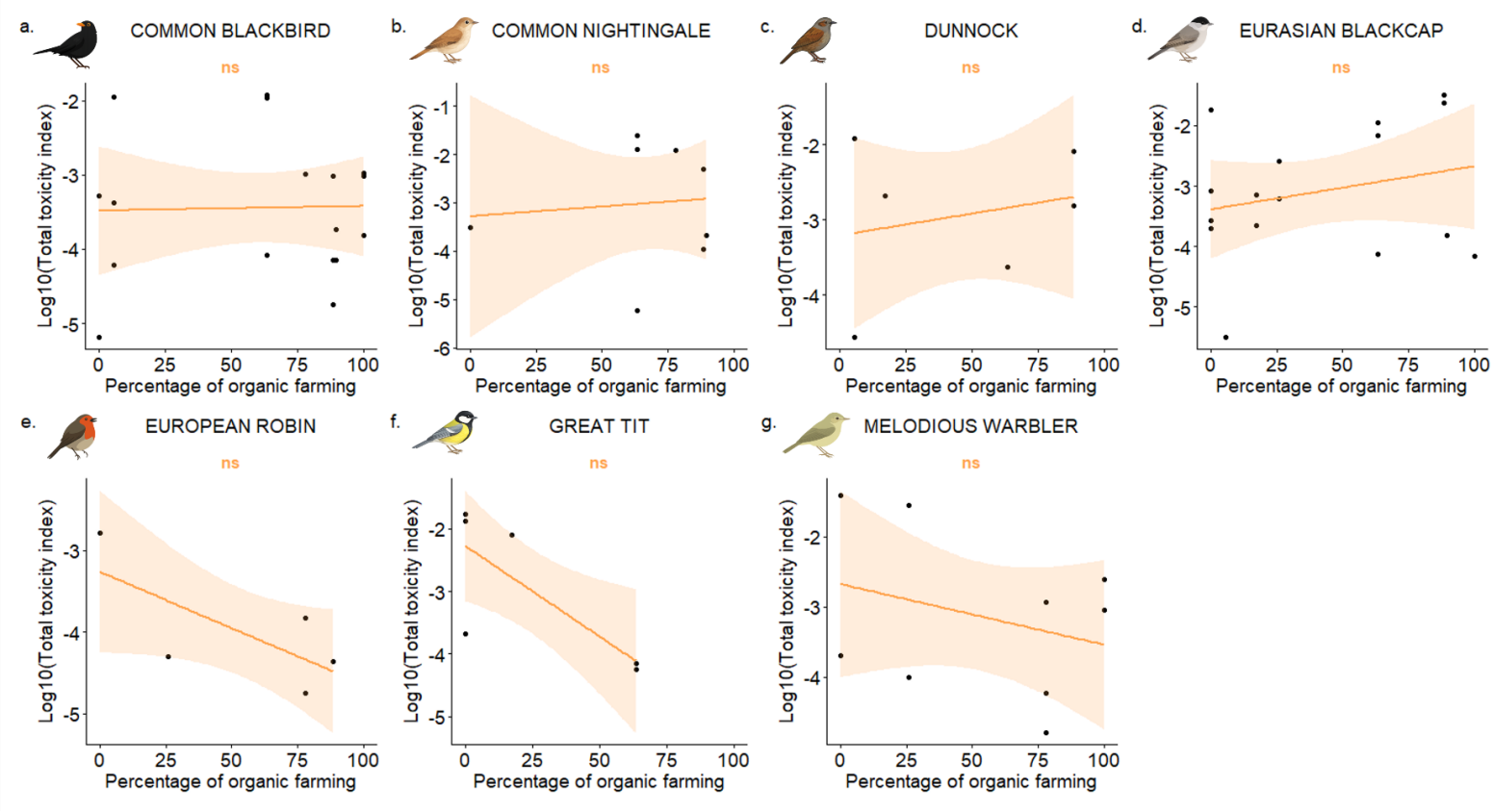


Figure S4. Effects of the distance from the nearest conventional crop on the number of compounds detected for each species caught in gardens of the two municipalities and included in the analyses (NB-GLMM). In these models, the distance from the nearest conventional crop, date of capture, the municipality and the interaction between the distance from the nearest conventional crop and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the distance from the nearest conventional crop on the number of compounds (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

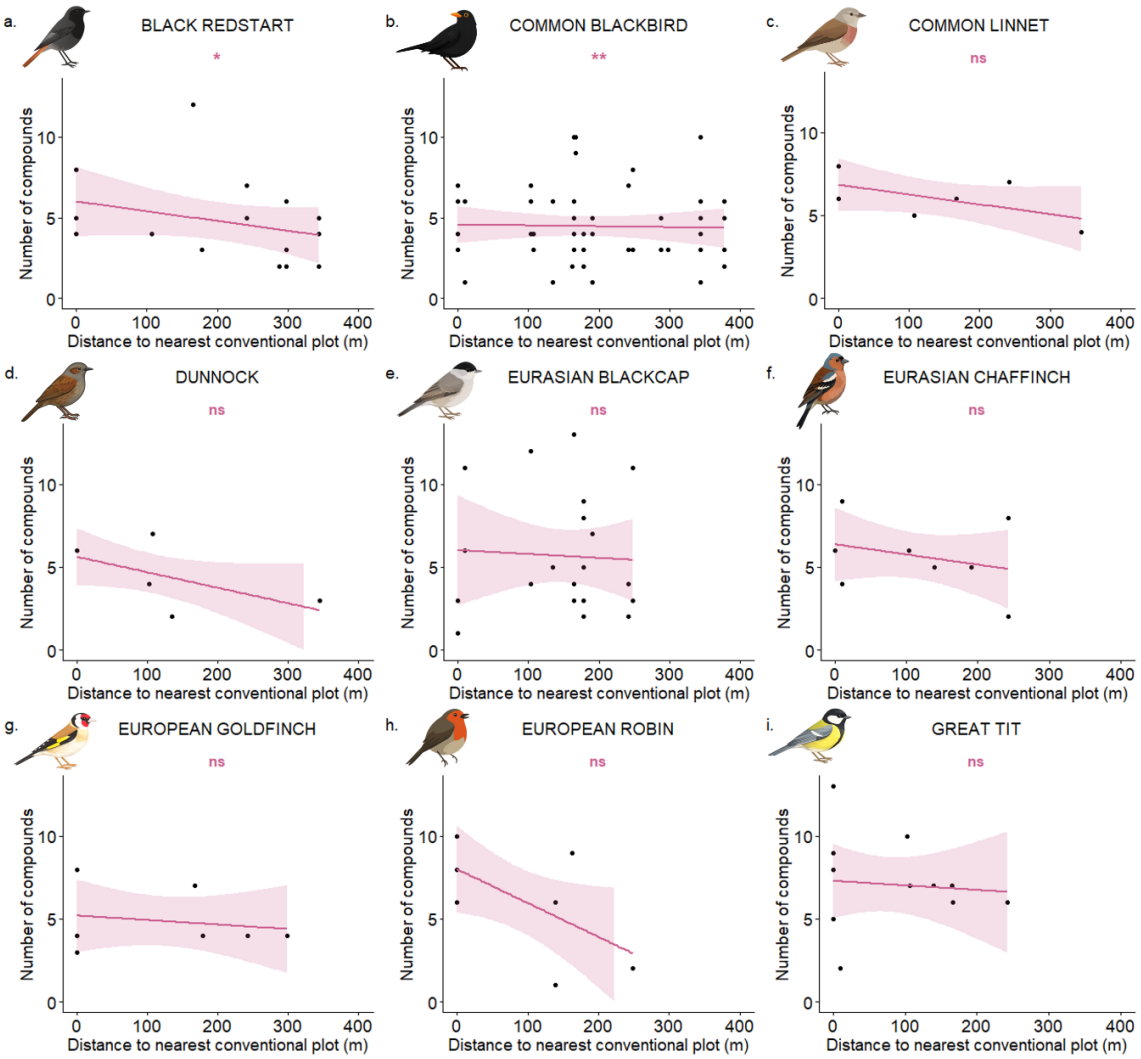


Figure S5. Effects of the distance from the nearest conventional crop on the total concentrations (in pg.mg^{-1}) for each species caught in gardens of the two municipalities and included in the analyses (G-GLMM). In these models, the distance from the nearest conventional crop, date of capture, the municipality and the interaction between the distance from the nearest conventional crop and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the distance from the nearest conventional crop on the total concentrations (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

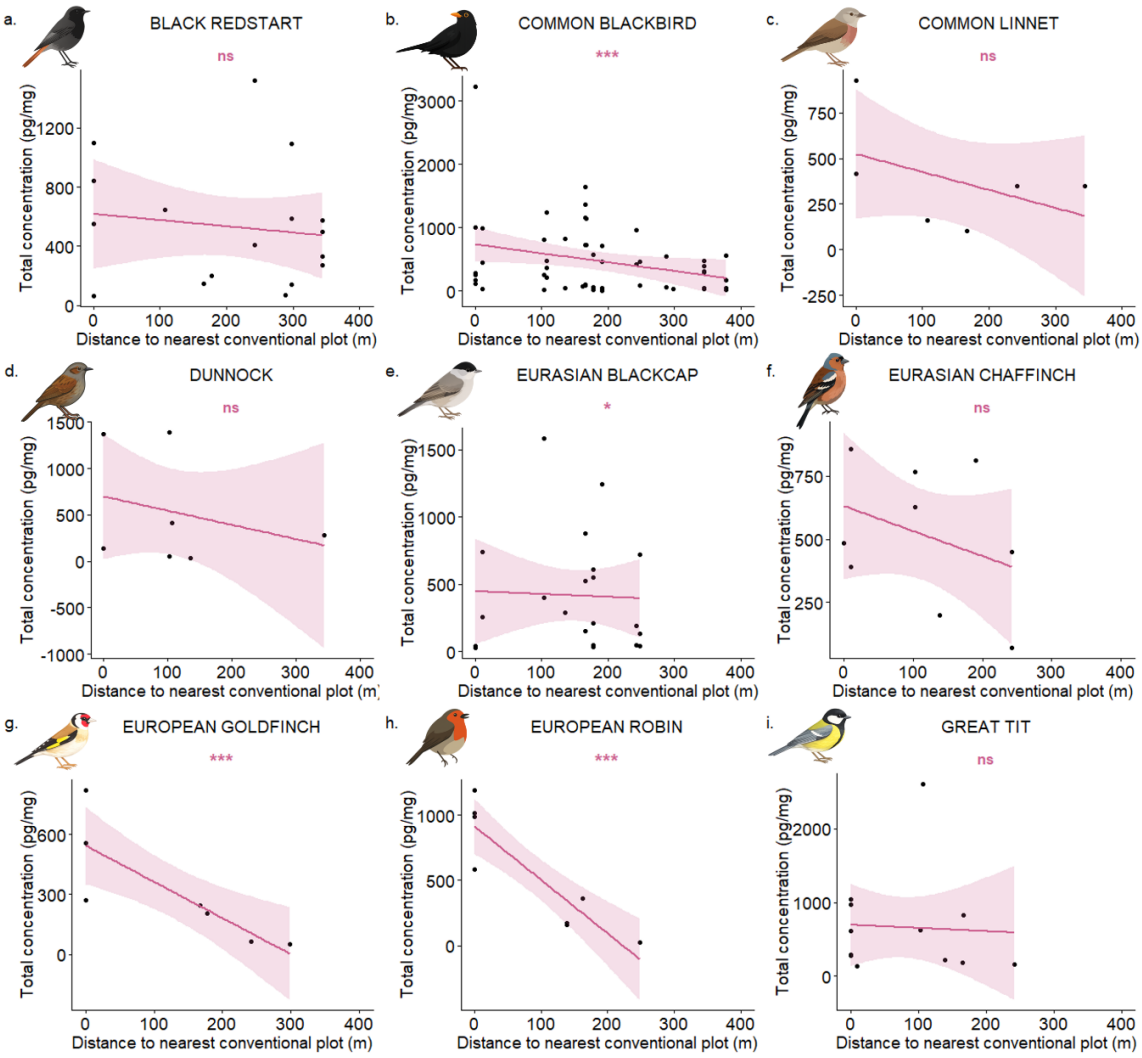


Figure S6. Effects of the distance from the nearest conventional crop on the log_{10}-transformed total toxicity index for each species caught in gardens of the two municipalities and included in the analyses (LMM). In these models, the distance from the nearest conventional crop, date of capture, the municipality and the interaction between the distance from the nearest conventional crop and the species were included as fixed factors, and the species was also added as a random effect. The line and the shading represent the predicted values and 95% confidence interval. The results of the statistical effect of the distance from the nearest conventional crop on the log_{10}-transformed total toxicity index (Figure 7) are indicated with "ns." for non-significant; "*" for p-values < 0.05; "**" for p-values < 0.01; "***" for p-values < 0.001.

