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Impact of soil-conserving strip cropping on ground beetle communities

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Electronic Supplementary Material (ESM)

The authors are fully responsible for both the content and the formal aspects of the electronic supplementary material. No editorial adjustments were made.

Table S1. Results of the Tukey HSD post-hoc test following ANOVA, comparing the Shannon–Wiener diversity index of ground beetle communities across different plot types in 2024

	diff	lwr	upr	*P* adj
Newly strip-cropped-Strip-cropped	0.030168	–0.17206	0.232393	0.933852
Conventional 24-Strip-cropped	–0.32019	–0.51596	–0.12442	0.000449
Conventional 24-Newly strip-cropped	–0.35036	–0.60887	–0.09185	0.004551

diff – difference in means; lwr, upr – lower and upper 95% confidence intervals; *P* adj – adjusted *P*-values

Table S2. Results of the Tukey HSD post-hoc test following ANOVA, comparing the abundance of ground beetle communities across different plot types in 2024

	diff	lwr	upr	*P* adj
Newly strip-cropped-Strip-cropped	–45.3540	–81.0684	–9.63952	0.008573
Conventional 24-Strip-cropped	–56.7912	–91.3650	–22.21728	0.000422
Conventional 24-Newly strip-cropped	–11.4372	–57.0919	34.217450	0.824676

diff – difference in means; lwr, upr – lower and upper 95% confidence intervals; *P* adj – adjusted *P*-values

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Table S3. Model parameters of the canonical correspondence analysis (CCA) examining the influence of environmental variables on the species composition of ground beetle communities

Statistic	Axis 1	Axis 2	Axis 3	Axis 4
Eigenvalues	0.15	0.08	0.06	0.04
Explained variation (cumulative)	3.80	5.84	7.43	8.36
Pseudo-canonical correlation	0.73	0.67	0.48	0.46
Explained fitted variation (cumulative)	37.41	57.39	73.01	82.16

Table S4. Results of the simple effects analysis showing the influence of environmental factors on the species composition of ground beetle communities

Simple term effects	Explains (%)	pseudo-*F*	*P*
Oil rape	2.30	5.10	0.002
Soya	2.10	4.60	0.002
Winter crop	1.80	3.90	0.002
Spring crop	1.80	3.90	0.002
Slope tilt	1.70	3.80	0.002
Barley	1.50	3.30	0.002
N_{org}	1.50	3.30	0.002
Relat. altitude	1.40	3.00	0.002
Sunflower	1.10	2.30	0.002
C_{ox} (%)	1.00	2.20	0.002
pH akt	1.00	2.10	0.002
Maize	0.70	1.50	0.006
Erosion	0.60	1.30	0.010

C_{org} – soil organic carbon; N_{org} – soil organic nitrogen

Table S5. Results of the conditional effects analysis showing the influence of environmental factors on the species composition of ground beetle communities

Conditional term effects	Explains (%)	pseudo-*F*	*P*
Oil rape	2.28	5.10	0.002
Soya	1.83	4.10	0.002
Slope tilt	1.39	3.20	0.002
Barley	1.07	2.50	0.002
pH akt	0.84	1.90	0.002
Sunflower	0.60	1.40	0.010
Winter crop	0.45	1.00	0.028
N_{org}	0.32	0.70	0.146
C_{ox} (%)	0.74	1.70	0.002
Relat. altitude	0.50	1.20	0.016
Erosion	0.14	0.30	0.856

C_{org} – soil organic carbon; N_{org} – soil organic nitrogen

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Table S6. List of ground beetle species abbreviations

Abbreviation	Species
AbPara	*Abax parallelepipedus* (Piller & Mitterpacher, 1783)
AmaAen	*Amara aenea* (DeGeer, 1774)
AmaEur	*Amara eurynota* (Panzer, 1796)
AmaNit	*Amara nitida* Sturm, 1825
AmaOva	*Amara ovata* (Fabricius, 1792)
AmaSp.	*Amara* sp.
AnchDo	*Anchomenus dorsalis* (Pontoppidan, 1763)
BadBul	*Badister bullatus* (Schrank, 1798)
BemLam	*Bembidion lampros* (Herbst, 1784)
BemObt	*Bembidion obtusum* Audinet-Serville, 1821
BraCre	*Brachinus crepitans* (Linnaeus, 1758)
BraExp	*Brachinus explodens* Duftschmid, 1812
BraPso	*Brachinus psophia* Audinet-Serville, 1821
CalAmb	*Calathus ambiguus* (Paykull, 1790)
CalFus	*Calathus fuscipes* (Goeze, 1777)
CarHort	*Carabus hortensis* Linnaeus, 1758
CarUll	*Carabus ullrichi* Germar, 1824
CelSp.	*Celia* sp.
DemAtri	*Demetrias atricapillus* (Linnaeus, 1758)
DryDent	*Drypta dentata* (Rossi, 1790)
HapSig	*Harpalus signaticornis* (Duftschmid, 1812)
HarAff	*Harpalus affinis* (Schrank, 1781)
HarAtr	*Harpalus atratus* Latreille, 1804
HarDis	*Harpalus distinguendus* (Duftschmid, 1812)
HarLut	*Harpalus luteicornis* (Duftschmid, 1812)
HarSp.	*Harpalus* sp.
HarTar	*Harpalus tardus* (Panzer, 1797)
LeiFer	*Leistus ferrugineus* (Linnaeus, 1758)
LorPili	*Loricera pilicornis* (Fabricius, 1775)
MicMin	*Microlestes minutulus* (Goeze, 1777)
NotiPus	*Notiophilus pusillus* Waterhouse, 1833
OpLatic	*Ophonus laticollis* Mannerheim, 1825
OpMel	*Ophonus melletii* (Heer, 1837)
PoeCup	*Poecilus cupreus* (Linnaeus, 1758)
PoeSer	*Poecilus sericeus* Fischer von Waldheim, 1824
PseRuf	*Pseudoophonus rufipes* (DeGeer, 1774)
PteMac	*Pterostichus macer* (Marsham, 1802)
PteMel	*Pterostichus melanarius* (Illiger, 1798)
PteStre	*Pterostichus strenuus* (Panzer, 1796)
SynObs	*Syntomus obscuroguttatus* (Duftschmid, 1812)
TreQua	*Trechus quadristriatus* (Schrank, 1781)

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Table S7. Generalised additive models (GAM) results for species showing a statistically significant response to the given factors

Species	Slope tilt		Relative altitude		Erosion		Norg.	
	F	*P*	*F*	*P*	*F*	*P*	*F*	*P*
Amara eurynota	–	–	–	–	–	–	3.4	0.03439
Anchomenus dorsalis	3.7	0.02554	2.1	0.04349	–	–	2.9	0.05673
Bembidion lampros	8.4	0.00027	7.5	0.00066	–	–	3.1	0.04807
Bembidion obtusum	4.1	0.01788	–	–	–	–	–	–
Brachinus crepitans	6.6	0.00152	4.1	0.01755	–	–	3.2	0.04342
Brachinus explodens	–	–	–	–	–	–	3.1	0.04805
Brachinus psophia	–	–	–	–	–	–	3.7	0.02711
Demetrias atricapilus	–	–	–	–	–	–	4.5	0.01227
Harpalus affinis	–	–	–	–	–	–	4.3	0.01534
Harpalus distinguendus	–	–	3.5	0.03017	–	–	3.8	0.02347
Poecilus cupreus	9.2	0.00014	13.0	< 0.00001	6.9	0.00121	11.1	0.00003
Poecilus sericeus	–	–	6.5	0.00166	3.6	0.02000	8.0	0.00043
Pterostichus melanarius	4.4	0.01347	6.3	0.00206	3.7	0.02604	6.5	0.00176