1. Appendix A

1.1. Table A.1

All fitted models made with the glmmTMB R function in the R syntax

Number	Sampling	Response variable	Explanatory variables	Random efects	family	ziformula
1	Seedbank	Total seedling density	Tillage x Residue exportation * Depth	1| length: width	nbinom2	
2	Seedbank	MATCH seedling density	Tillage x Residue exportation * Depth	1| length: width	nbinom2	
3	Seedbank	ALOMY seedling density	Tillage x Residue exportation * Depth	1| length: width	nbinom2	
4	Seedbank	Shannon diversity index	Tillage x Residue exportation	1| length: width	tweedie	
5	Seedbank	Species Richness	Tillage x Residue exportation	1| length: width	gaussian	length+ width
6	winter wheat crop	weed density	Tillage x Residue exportation*crop stages	crop stages| ID /length: width	nbinom1	
7	winter wheat crop	ALOMY density	Tillage x Residue exportation*crop stages	1| ID /length: width	nbinom2	
8	winter wheat crop	MATCH density	Tillage x Residue exportation*crop stages	1| ID /length: width	nbinom2	
9	winter wheat crop	log(Weed biomass+1)	Tillage x Residue exportation	1| length: width	gaussian	
10	winter wheat crop	log(MATCH+1)	Tillage x Residue exportation	1| length: width	gaussian	
11	winter wheat crop	log(ALOMY+1)	Tillage x Residue exportation	1| length: width	gaussian	
12	winter wheat crop	Biomass.ALOMY^-1	Tillage x Residue exportation	1| length: width	gaussian	
13	winter wheat crop	Yield	Tillage x Residue exportation	1| length: width	gaussian	
14	winter wheat crop	Yield	Weed biomass + Tillage x Residue exportation	1| length: width	gaussian	
15	winter wheat crop	Shannon diversity index at wheat tillering	Tillage x Residue exportation	1| length: width	gaussian	
16	winter wheat crop	Shannon diversity index at wheat flowering	Tillage x Residue exportation	1| length: width	gaussian	
17	winter wheat crop	Species Richness at wheat tillering	Tillage x Residue exportation	1| length: width	compois	
18	winter wheat crop	Species Richness at wheat flowering	Tillage x Residue exportation	1| length: width	gaussian	

Deviance table analysis (Wald chi-square tests) of Type III. If no significant effect was observed in Type III and so no interaction effect was observed an Deviance table analysis of type II was made because of more robust test when no interaction are observed. Significant p-value (<0.05) are highlighted in bold.

Response variables	Explanatory variables	X²	df	p.value	Type ANOVA
Total seedling density	Tillage	14.8429	1	**0.0001168**	
	Residue exportation	0.252	1	0.615688	
	Depth	5.1946	1	**0.0226577**	
	Tillage X Residue exportation	0.9821	1	0.3216828	
	Tillage X Depth	15.1185	1	**0.000101**	
	Residue exportation X Depth	1.1321	1	0.2873343	
	Tillage X Residue exportation X Depth	3.8653	1	**0.0492949**	
MATCH seedling density	Tillage	6.1542	1	**0.01311**	
	Residue exportation	0.0118	1	0.913547	
	Depth	2.1891	1	0.138989	
	Tillage X Residue exportation	0.4383	1	0.507937	
	Tillage X Depth	10.0855	1	**0.001494**	
	Residue exportation X Depth	0.4194	1	0.517213	
	Tillage X Residue exportation X Depth	2.6192	1	0.10558	
ALOMY seedling density	Tillage	6.4418	1	**0.01115**	
	Residue exportation	3.0136	1	0.08257	
	Depth	4.1367	1	**0.04196**	
	Tillage X Residue exportation	2.9929	1	0.08363	
	Tillage X Depth	5.8087	1	**0.01595**	
	Residue exportation X Depth	0.3508	1	0.55367	
	Tillage X Residue exportation X Depth	0.5923	1	0.44151	
Shannon diversity index (based on seedbank)	Tillage	6.8644	1	**0.008793**	
	Residue exportation	1.4849	1	0.223006	
	Tillage X Residue exportation	1.9941	1	0.157913	

Species Richness (based on seedbank)	Tillage	5.4403	1	**0.01968**	
	Residue exportation	0.1865	1	0.66581	
	Tillage X Residue exportation	0.1377	1	0.71057	
Weed density	Tillage	27.6501	1	**1.45E-07**	
	Residue exportation	0.6646	1	0.415	
	Crop stages	1.207	1	0.2719	
	Tillage X Residue exportation	0.0147	1	0.9036	
	Tillage X Crop stages	0.0828	1	0.7736	
	Residue exportation X Crop stages	0.0451	1	0.8319	
	Tillage X Residue exportation X Crop stages	0.0076	1	0.9306	
ALOMY density	Tillage	7.608	1	**0.005811**	
	Residue exportation	1.1339	1	0.286953	
	Crop stages	0	1	0.998457	
	Tillage X Residue exportation	0.486	1	0.485704	
	Tillage X Crop stages	0.0056	1	0.94041	
	Residue exportation X Crop stages	0.0606	1	0.805524	
	Tillage X Residue exportation X Crop stages	0	1	0.995959	
MATCH density	Tillage	30.4963	1	**3.35E-08**	
	Residue exportation	1.9161	1	0.16628	
	Crop stages	6.2924	1	**0.01213**	
	Tillage X Residue exportation	2.0479	1	0.15242	
	Tillage X Crop stages	0.5559	1	0.45592	
	Residue exportation X Crop stages	0.0217	1	0.88292	
	Tillage X Residue exportation X Crop stages	0.0142	1	0.90515	
log(Weed biomass+1)	Tillage	6.8241	1	**0.008994**	Type II
	Residue exportation	0.4253	1	0.51432	
	Tillage X Residue exportation	0.0142	1	0.905149	
log(ALOMY+1)	Tillage	1.8074	1	0.1788	Type II
	Residue exportation	0.2648	1	0.6069	

	Tillage X Residue exportation	0.1602	1	0.689	
log(MATCH+1)	Tillage	10.1092	1	**0.001475**	Type II
	Residue exportation	0.0032	1	0.95477	
	Tillage X Residue exportation	0.2089	1	0.647641	
Biomass.ALOMY^{-1}	Tillage	1.1294	1	0.2879	Type II
	Residue exportation	1.3937	1	0.2378	
	Tillage X Residue exportation	2.5038	1	0.1136	
Yield	Tillage	4.0851	1	**0.04326**	Type II
	Residue exportation	0.086	1	0.7693	
	Tillage X Residue exportation	0.0237	1	0.87773	
Yield	Weed biomass	7.7916	1	**0.005249**	
	Tillage	1.05	1	0.305518	
	Residue exportation	0.3287	1	0.566435	
	Tillage X Residue exportation	0.0046	1	0.946005	
Shannon diversity index at wheat tillering	Tillage	0.9762	1	0.3231	Type II
	Residue exportation	0.0005	1	0.9815	
	Tillage X Residue exportation	0.0039	1	0.9503	
Shannon diversity index at wheat flowering	Tillage	3.4112	1	0.06476	Type II
	Residue exportation	0.2364	1	0.62685	
	Tillage X Residue exportation	0.3346	1	0.56296	
Species Richness at wheat tillering	Tillage	5.8203	1	**0.01584**	
	Residue exportation	0.8549	1	0.35518	
	Tillage X Residue exportation	0.054	1	0.81616	
Species Richness	Tillage	19.407	1	**1.06E-05**	
	Residue exportation	0.7763	1	0.3783	
	Tillage X Residue exportation	0.097	1	0.7554	

1.1.S.Table A.3

Weed density per species (expressed per m²) at wheat tillering and at wheat flowering as well as the percentage of total weed density

		Tillering stage				Flowering stage		
Species EPPO code	Species Latin names	weed density	% of total weed density		Species	Species Latin names	weed density	% of total weed density
ALOMY	*Alopecurus myosuroides* Huds.	106.75	50.5		ALOMY	*Alopecurus myosuroides* Huds.	115	66.9
MATCH	*Matricaria chamomilla* L.	94.75	44.9		MATCH	*Matricaria chamomilla* L.	41.8	24.3
POLAV	*Polygonum aviculare* L.	3.4	1.6		POLAV	*Polygonum aviculare* L.	11.9	6.9
GALAP	*Galium aparine* L.	3.3	1.6		VERHE	*Veronica Hederifolia* L.	1.35	0.8
VERHE	*Veronica Hederifolia* L.	1.8	0.9		GALAP	*Galium aparine* L.	0.6	0.3
CIRAR	*Cirsium arvense* (L.) Scop.	0.45	0.2		CIRAR	*Cirsium arvense* (L.) Scop.	0.3	0.2
POAAN	*Poa annua* L.	0.25	0.1		POAAN	*Poa annua* L.	0.25	0.1
CAPBP	*Capsella bursa-pastoris* (L.) Medick	0.15	0.1		EQUAR	*Equisetum arvense* L.	0.25	0.1
PAPRH	*Papaver rhoes* L.	0.15	0.1		SONAR	*Sonchus arvensis* L.	0.2	0.1
BRSNN	*Brassica napus* L.	0.1	0.0		PAPRH	*Papaver rhoes* L.	0.15	0.1
LAMPU	*Lamium purpureum* L.	0.05	0.0		VIOAR	*Viola arvensis Murray*	0.1	0.1
POATR	*Poa trivalis* L.	0.05	0.0		CAPBP	*Capsella bursa-pastoris* (L.) Medick	0.05	0.0
VERAR	*Veronica arvensis* L.	0.05	0.0					