SUPPLEMETRY TABLES

Table S1

Analysis of variance for the influence of Zn application on the soil bulk density and total soil porosity after wheat harvest in conventional and conservation tillage systems

Source of variation	DF	Soil bulk density				Total soil porosity			
		2016-17		2017-18		2016-17		2017-18	
		0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm
Replication	3	0.00053	0.00057	0.00009	0.00061	5.51	2.83	0.67	1.90
Tillage system (TS)	1	0.00605*	0.02000**	0.10238**	0.04575**	207.01**	54.96*	50.07*	7.38*
Error	3	0.00048	0.00091	0.00029	0.00030	1.72	5.30	4.00	0.44
Zinc application (Zn)	3	0.00073ns	0.00079ns	0.00039ns	0.00043ns	2.35ns	0.73ns	1.81ns	0.84ns
TS × Zn	3	0.00046ns	0.00066ns	0.00006ns	0.00009ns	5.49ns	2.25ns	1.00ns	1.39ns
Error	18	0.00034	0.00058	0.00065	0.00014	3.12	1.83	2.60	2.52
Total	31								

DF = Degree of freedom; ns = non-significant; * = significant at p ≤ 0.05; ** = significant at p ≤ 0.01

Table S2

Analysis of variance for the influence of Zn application on the total organic matter and soil organic carbon after wheat harvest in conventional and conservation tillage systems

Source of variation	DF	Total soil organic matter				Soil organic carbon			
		2016-17		2017-18		2016-17		2017-18	
		0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm
Replication	3	0.0366	0.0370	0.0511	0.0045	0.210	0.243	0.251	0.096
Tillage system (TS)	1	9.0312**	6.3012**	6.9378**	5.6112**	8.415**	14.458**	4.255**	1.715*
Error	3	0.0312	0.0070	0.0361	0.0245	0.143	0.142	0.018	0.102
Zinc application (Zn)	3	0.0191ns	0.0420ns	0.0061ns	0.0004ns	0.406ns	0.024ns	0.102ns	0.095ns
TS × Zn	3	0.0237ns	0.0420ns	0.0378ns	0.0120ns	0.079ns	0.099ns	0.130ns	0.109ns
Error	18	0.0320	0.0456	0.0236	0.0556	0.341	0.081	0.164	0.250
Total	31								

DF = Degree of freedom; ns = non-significant; ** = significant at p ≤ 0.01

Table S3

Analysis of variance for the influence of Zn application on the microbial biomass nitrogen and microbial biomass carbon after wheat harvest in conventional and conservation tillage systems

Source of variation	DF	Microbial biomass nitrogen				Microbial biomass carbon			
		2016-17		2017-18		2016-17		2017-18	
		0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm	0-10 cm	10-20 cm
Replication	3	11.53	15.88	19.11	24.36	420.2	228.8	682.1	35.8
Tillage system (TS)	1	913.78**	2951.04**	5025.03**	399.03**	83557.8**	43370.1**	40713.7**	24141.2**
Error	3	4.36	38.27	18.28	11.44	1154.6	32.3	527.8	25.7
Zinc application (Zn)	3	23.11ns	1.90ns	23.53ns	19.44ns	1119.1ns	602.6ns	412.5ns	130.2ns
TS × Zn	3	21.78ns	11.91ns	9.36ns	13.36ns	936.3ns	504.4ns	512.4ns	268.2ns
Error	18	15.08	19.38	7.81	6.26	441.2	210.3	458.9	310.9
Total	31								

DF = Degree of freedom; ns = non-significant; ** = significant at p ≤ 0.01

Table S4

Analysis of variance for the influence of Zn application on the soil nutrients status after wheat harvest in conventional and conservation tillage systems

Source of variation	DF	Total nitrogen		Available phosphorus		Exchangeable potassium		Zinc	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Replication	3	0.00022	0.00013	0.00429	0.009	4.406	9.20	0.00008	0.00079
Tillage system (TS)	1	0.00945**	0.00451**	0.00690ns	11.822**	0.003ns	82.27**	0.00451ns	0.00195ns
Error	3	0.00015	0.00017	0.00210	0.004	1.440	2.13	0.00127	0.00052
Zinc application (Zn)	3	0.00110**	0.00048ns	0.05379ns	0.029ns	5.098ns	5.43ns	0.03622**	0.00779**
TS × Zn	3	0.00039ns	0.00021ns	0.00088ns	0.025ns	0.252ns	9.75ns	0.00075ns	0.00073ns
Error	18	0.00026	0.00041	0.02383	0.028	1.797	3.59	0.00040	0.00033
Total	31								

DF = Degree of freedom; ns = non-significant; ** = significant at p ≤ 0.01

Table S5

Analysis of variance for the influence of Zn application on the morphological/yield parameters of wheat planted in conventional and conservation tillage systems

Source of variation	DF	Productive tillers		Grains per spike		1000-grain weight	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Replication	3	18.88	56.78	10.19	1.91	17.18	0.35
Tillage system (TS)	1	1176.12*	270.28ns	0.10ns	0.21ns	1.78ns	2.58*
Error	3	53.71	69.28	9.49	2.61	0.90	0.08
Zinc application (Zn)	3	7775.21**	5562.78**	154.70**	123.32**	99.28**	206.71**
TS × Zn	3	126.21**	240.61**	42.85**	8.24*	21.56*	22.11**
Error	18	20.32	37.06	6.72	2.16	4.73	0.24
Total	31						

DF = Degree of freedom; ns = non-significant; ** = significant at $p \leq 0.01$; * = significant at $p \leq 0.05$

Table S6

Analysis of variance for the influence of Zn application on the morphological/yield parameters of wheat planted in conventional and conservation tillage systems

Source of variation	DF	Grain yield		Biological yield		Harvest index	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Replication	3	0.0046	0.0010	0.0462	0.0809	1.15	1.67
Tillage system (TS)	1	0.1012**	0.3200**	0.0621ns	0.7750*	18.46**	97.76**
Error	3	0.0018	0.0024	0.0143	0.0726	0.51	1.36
Zinc application (Zn)	3	6.0753**	6.2618*	7.7366**	2.3646**	365.13**	407.17**
TS × Zn	3	0.0227*	0.0706**	0.3610**	0.2485*	13.13**	17.24**
Error	18	0.0064	0.0055	0.0165	0.0764	0.31	3.08
Total	31						

DF = Degree of freedom; ns = non-significant; ** = significant at $p \leq 0.01$; * = significant at $p \leq 0.05$

Table S7

Analysis of variance for the influence of Zn application on the grain and straw Zn concentration, grain protein and grain fat of wheat planted in conventional and conservation tillage systems

Source of variation	DF	Grain Zn concentration		Straw Zn concentration		Grain protein		Grain fat	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Replication	3	6.72	0.37	2.90	3.33	0.49	0.25	0.00124	0.00429
Tillage system (TS)	1	1.64ns	45.19ns	2.39ns	1.31ns	0.04ns	0.03ns	0.00300ns	0.00001ns
Error	3	0.76	13.63	0.48	0.18	0.25	0.13	0.01511	0.00205
Zinc application (Zn)	3	192.88**	146.99**	49.16**	13.97**	1.86**	1.42**	0.02116*	0.00158ns
TS × Zn	3	26.32**	34.11**	7.06*	4.74**	0.08ns	0.04ns	0.00412ns	0.00295ns
Error	18	4.52	3.97	1.99	1.29	0.36	0.10	0.00669	0.00278
Total	31								

DF = Degree of freedom; ns = non-significant; ** = significant at $p \leq 0.01$; * = significant at $p \leq 0.05$

Table S8

Analysis of variance for the Influence of Zn application on zinc use efficiencies of wheat planted in conventional and conservation tillage systems

Source of variation	DF	Agronomic efficiency		Physiological efficiency		Agro-physiological efficiency		Apparent recovery efficiency		Use efficiency	
		2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Replication	3	4114	1349	995	38	142	286	1.52	0.10	47722	7132
Tillage system (TS)	1	17539ns	83437ns	113053**	2059*	76478**	24435**	0.40ns	25.42**	12348ns	1432097**
Error	3	5393	12874	780	142.7	974	555	2.63	0.68	16241	15528
Zinc application (Zn)	2	$1.10 \times 10^{+07}$**	$2.89 \times 10^{+07}$**	10895**	12538**	139724**	7327**	1737**	1499**	$4.13 \times 10^{+07}$**	6399357**
TS × Zn	2	20141ns	52402**	35779**	15984**	42131**	3143**	0.76ns	16.98**	55367ns	1418373**
Error	12	5534	6539	592	248	347	145	1.53	0.50	33894	10229
Total	23										

DF = Degree of freedom; ns = non-significant; ** = significant at $p \leq 0.01$