

Table 1 Physical and chemical parameters of the sampled soil

Soil parameters	Standard methods		Amount
Soil texture (%)	Bouyoucous hydrometer method (Thien and Graveel, 2003)	Sand	26.9
		Silt	20.1
		Clay	53
Total calcareous (%)	EN ISO 10693		1.39± 0.17
Cation exchange capacity (meq.100g ⁻¹ soil)	NF-X 31-108		19.23 ± 1.16
Conductivity (µS.cm ⁻¹)	X 31-113 (NF ISO 11265)		1157 ± 23
pH	X 31-117 (NF ISO 10390)		8.21 ± 0.01
Organic matter (%)	ASTM D 2974		2.08 ± 0.02
Trace metals concentrations (mg.kg ⁻¹)	ISO 11466: 1995	Cd	1.52 ± 0.05
		Ca	818 ± 33
		Zn	98.6 ± 8.9
		Fe	33230 ± 925
		Al	37100 ± 1178
		Cu	26.1 ± 0.6
		Pb	27.05 ± 0.51

Table 2 Experimental conditions of the eight soil treatments

C	Compacted soil	C-P	Compacted soil + superphosphate*
NC	Non-compacted soil	NC-P	Non-compacted soil + superphosphate
C-Cd	Compacted soil + Cd	C-P-Cd	Compacted soil + Cd + superphosphate
NC-Cd	Non-compacted soil + Cd	NC-P-Cd	Non-compacted soil + Cd + superphosphate

*The Superphosphate used contained 18% P₂O₅

Table 3 Impact of soil compaction, phosphorus fertilizer addition and cadmium contamination and their mutual interactions on morphological traits of lettuces.

	Leaf number	Leaf area (cm ²)	Length (cm)		Dry mass (g.column ⁻¹)	
			Root	Aboveground	Root	Aboveground
C	19.7 ± 1.53 ^{ab}	957.0 ± 121.3 ^{bc}	7.0 ± 0.14 ^{ab}	23.2 ± 1.20 ^b	0.09 ± 0.02 ^{bc}	1.70 ± 0.27 ^{cd}
NC	19.3 ± 2.31 ^{ab}	632.4 ± 24.8 ^{ab}	7.4 ± 0.14 ^{bc}	23.2 ± 0.14 ^b	0.06 ± 0.01 ^a	1.09 ± 0.09 ^b
C-Cd	19.3 ± 1.15 ^{ab}	595.2 ± 175.2 ^{ab}	6.3 ± 0.35 ^a	18.4 ± 0.42 ^a	0.06 ± 0.02 ^{ab}	0.92 ± 0.20 ^{ab}
NC-Cd	17.7 ± 0.58 ^a	399.0 ± 56.7 ^a	7.5 ± 0.50 ^{bc}	16.3 ± 1.11 ^a	0.05 ± 0.01 ^a	0.53 ± 0.08 ^a
C-P	27.7 ± 2.08 ^c	1635.1 ± 321.2 ^d	8.2 ± 0.28 ^{cd}	29.0 ± 0.35 ^c	0.13 ± 0.03 ^c	2.90 ± 0.48 ^e
NC-P	26.3 ± 1.53 ^c	1021.5 ± 110.0 ^c	11.6 ± 0.78 ^f	28.4 ± 1.48 ^c	0.08 ± 0.00 ^{ab}	2.09 ± 0.22 ^d
C-P-Cd	27.0 ± 1.00 ^c	1093.6 ± 313.2 ^c	8.8 ± 0.28 ^d	23.8 ± 1.20 ^b	0.12 ± 0.00 ^c	1.34 ± 0.10 ^{bc}
NC-P-Cd	21.7 ± 0.58 ^b	1080.4 ± 218.4 ^c	10.2 ± 0.85 ^e	25.1 ± 1.98 ^b	0.12 ± 0.02 ^c	2.00 ± 0.23 ^d
Significance						
C	ns	*	**	ns	*	*
P	*	**	**	*	*	**
Cd	ns	ns	ns	*	ns	**
C x Cd	ns	ns	ns	ns	ns	*
C x P	ns	ns	ns	ns	ns	ns
Cd x P	ns	ns	ns	ns	ns	ns
C x P x Cd	ns	ns	ns	ns	ns	*

Note: The averages within columns followed by the same letter do not significantly differ according to Duncan's multiple range test ($\alpha=0.05$).

** : significance at $P < 0.01$; * : significance at $P < 0.05$; ns : not significant.

C : compacted soil ; NC : non compacted soil ; C-Cd : compacted soil + Cd ; NC-Cd : non compacted soil + Cd ; C-P : compacted soil + P ; NC-P : non compacted soil + P ; C-Cd-P : compacted soil + Cd + P ; NC-Cd-P : non compacted soil + Cd + P

Table 4 Variation of chlorophyll content and NRA in various treatments

Treatments	Chlorophyll (a+b) ($\mu\text{g mL}^{-1}$)	NRA ($\text{mol NO}_2^- \text{g}^{-1} \text{h}^{-1}$)
C	13.4 \pm 0.29 ^a	105.5 \pm 12 ^c
NC	13.6 \pm 0.38 ^a	121.5 \pm 2.14 ^c
C-Cd	22.4 \pm 0.2 ^d	63.9 \pm 9.86 ^a
NC-Cd	18.3 \pm 0.48 ^c	99.1 \pm 8.14 ^{bc}
C-P	12.3 \pm 0.48 ^a	162.1 \pm 15 ^d
NC-P	15.6 \pm 0.82 ^b	197.3 \pm 14.14 ^e
C-P-Cd	15.3 \pm 0.86 ^b	67.6 \pm 9 ^a
NC-P-Cd	17.4 \pm 0.75 ^c	75.8 \pm 8.57 ^{ab}
Significance		
C	ns	**
P	**	**
Cd	**	**
C x Cd	*	ns
C x P	**	ns
Cd x P	**	**
C x P x Cd	ns	*

Note: The averages within columns followed by the same letter do significantly not differ according to Duncan's multiple range test ($\alpha=0.05$).

** : significance at $P < 0.01$; * : significance at $P < 0.05$; ns: not significant.

C : compacted soil ; NC : non compacted soil ; C-Cd : compacted soil + Cd ; NC-Cd : non compacted soil + Cd ; C-P : compacted soil + P ; NC-P : non compacted soil + P ; C-Cd-P : compacted soil + Cd + P ; NC-Cd-P : non compacted soil + Cd + P