

Table 1: Localization, physico-chemical and biological characteristics of the six derelict soils. Means  $\pm$  standard deviations (n=5, except F where n=4). Means with different letters are significantly different ( $P < 0.05$ ) using one-way ANOVA or Kruskal-Wallis test. Localization in Lambert 93 projection in m; age is the time lapse from the last anthropogenic action (years); clay and WHC in %, CEC in  $\text{cmol}^+ \cdot \text{kg}^{-1}$  dry soil; Olsen Phosphorous in  $\text{mg} \cdot \text{kg}^{-1}$  dry soil; bacterial and fungal density in 16S and 18S rDNA gene copy numbers  $\cdot \text{g}^{-1}$  dry soil, respectively; bacterial and fungal diversity are expressed as ribotype numbers; mycorrhizal colonization is the frequency of colonized roots (%); Collembola and macrofauna density are the numbers of individuals  $\cdot \text{m}^{-2}$ ; Collembola, macrofauna and plant diversity are taxonomic richness; plant biomass is in kg of shoot dry weight  $\cdot \text{m}^{-2}$ ; the relative density of GP and GN PAH-RHD  $\alpha$  are the ratio between GP or GN PAH-dioxygenase genes and the 16S rDNA gene copy number  $\cdot \text{g}^{-1}$  dry soil respectively in %; the proportion of the meso- and macro-decomposers is in %; AMC in  $\text{ppm CO}_2 \cdot \text{mg}^{-1}$  dry soil  $\cdot \text{h}^{-1}$ . Statistical test: 1 for one-way ANOVA test; 2 for Kruskal-Wallis test.

	A	B	C	D	E	F		
Site type and name	Experimental constructed soil (Biotechnosol)	Non-hazardous waste landfill (Retonfey)	Coking plant site (Homécourt)	Settling pond site (Moyeuivre-Petite)	Coking plant site (Micheville)	Experimental constructed and contaminated soil (Jeandelaincourt)	Statistical test	P-value
Localization	E:918202 N:6905686	E:942352 N:6897630	E:918487 N:6905891	E:920222 N:6911528	E:942262 N:6897475	E:938477 N:6864617		
Age	8	4	35	34	40	2		
Texture	Silt loam	Silty clay loam	Loamy sand	Sandy loamy	Loam	Silt loam		
Clay	11	40	6	4	27	15		
Water holding capacity (WHC)	95 $\pm$ 7 a	59 $\pm$ 8 b	63 $\pm$ 5 b	58 $\pm$ 4 b	70 $\pm$ 1 b	64 $\pm$ 1 b	1	0.02
Cation exchange capacity (CEC)	22.0 $\pm$ 2.9 a	17.2 $\pm$ 3.3 b	17.2 $\pm$ 1.8 b	11.3 $\pm$ 0.7 c	15.5 $\pm$ 1.4 b	10.1 $\pm$ 0.4 c	2	0.01
pH	7.9 $\pm$ 0.2 a	7.9 $\pm$ 0.1 a	7.9 $\pm$ 0.1 a	8.4 $\pm$ 0.2 b	7.2 $\pm$ 0.2 c	8.3 $\pm$ 0.4 b	2	<0.001
Olsen phosphorous	62 $\pm$ 5 a	25 $\pm$ 17 c	39 $\pm$ 16 bc	44 $\pm$ 10 b	36 $\pm$ 2 bc	44 $\pm$ 10 bc	2	<0.001
C:N	30 $\pm$ 6 bc	28 $\pm$ 6 c	26 $\pm$ 5 c	65 $\pm$ 20 a	20 $\pm$ 3 e	37 $\pm$ 16 b	2	<0.001
Organic matter (%)	39.7 $\pm$ 5.9 a	3.2 $\pm$ 1.4 c	16.7 $\pm$ 6.3 b	13.3 $\pm$ 2.8 b	4.8 $\pm$ 3.0 c	2.8 $\pm$ 0.8 c	2	<0.001
Ca <sub>exchangeable</sub>	292 $\pm$ 44 d	713 $\pm$ 144 c	903 $\pm$ 405 c	2031 $\pm$ 240 a	786 $\pm$ 84 c	1123 $\pm$ 130 b	2	<0.001
K <sub>exchangeable</sub>	706 $\pm$ 105 a	491 $\pm$ 24 b	155 $\pm$ 36 e	377 $\pm$ 30 c	131 $\pm$ 50 e	218 $\pm$ 36 d	2	<0.001
Mg <sub>exchangeable</sub>	84 $\pm$ 14 cd	152 $\pm$ 38 b	103 $\pm$ 6 c	312 $\pm$ 47 a	47 $\pm$ 15 e	72 $\pm$ 34 d	2	<0.001
N <sub>total</sub>	25 $\pm$ 10	24 $\pm$ 20	11 $\pm$ 1	10 $\pm$ 1	14 $\pm$ 1	25 $\pm$ 20	2	<0.001

<b>Pollutants</b>	$\text{mg} \cdot \text{kg}^{-1}$ dry soil														
	Cd <sub>available</sub>	0.22±0.05	b	0.03±0.01	e	0.16±0.05	c	0.15±0.01	c	0.10±0.03	d	9.07±1.5	a	2	<0.001
	Pb <sub>available</sub>	13±3	b	14±10	b	46±14	a	18±5	b	14±6	b	110±60	a	2	<0.001
	Zn <sub>available</sub>	29±9	c	8±6	d	45±20	ab	25±6	c	7±2	d	308±189	a	2	<0.001
	Cd <sub>total</sub>	1.1±0.5	b	0.1±0.2	b	0.1±0.7	b	1.4±0.1	b	0.1±0.1	b	23.6±6.9	a	2	<0.001
	Pb <sub>total</sub>	150±53	c	41±26	d	346±106	ab	339±50	b	37±10	d	460±73	a	2	<0.001
	Zn <sub>total</sub>	345±37	c	131±2	d	1162±396	b	1196±122	b	116±23	d	1813±302	a	2	<0.001
Σ16 PAH (US-EPA)	170±49	a	12±12	b	179±136	a	97±54	a	142±90	a	10±4	b	2	0.03	
<b>Microorganisms</b>	Bacterial density ( $\times 10^{10}$ )	5.4±1.2	a	2.2±0.7	b	4.8±0.7	a	1.4±0.5	b	2.6±1	b	1.5±0.4	b	1	<0.001
	Bacterial richness	9.6±0.9	d	13.2±1.8	ab	15.2±0.8	a	15.8±1.9	ab	14.0±3.5	bc	9.0±2.4	cd	1	<0.001
	Fungal density ( $\times 10^8$ )	10.9±4.5	a	3.4±0.7	b	4.9±0.6	b	1.7±0.5	c	5.1±1.2	b	1.2±0.4	c	2	<0.001
	Fungal richness	3.6±0.9	b	4±1.2	b	7.4±1.1	a	4.4±0.5	b	3.6±0.5	b	3.3±1.5	b	1	<0.001
	Mycorrhizal colonization	76±20	ab	92±8	a	86±12	ab	82±9	ab	96±4	a	71±7	b	1	0.04
<b>Fauna</b>	Collembola density ( $\times 10^3$ )	21±15	c	17±8	c	48±29	a	91±41	a	22±10	bc	41±22	ab	2	0.004
	Collembola richness	3.4±1.3	b	4.2±0.8	ab	6±1.4	ab	7±0.8	a	7±2.2	a	5.8±1	a	1	0.005
	Macrofauna density	611±219	a	668±205	a	314±138	b	214±37	bc	118±108	c	205±15	bc	1	<0.001
	Macrofauna richness	10.2±2	a	11.6±4	a	6.8±3	b	6.4±1	b	3.0±2	c	6.5±1	b	2	0.001
<b>Flora</b>	Plant biomass	3.0±1.2	a	3.2±1.2	a	0.6±0.2	b	0.7±0.4	b	0.7±0.4	b	0.6±0.2	b	2	<0.001
	Plant richness	2.2±0.8	b	4.4±0.9	b	10.2±1.6	a	7.2±1.8	a	13.0±3.7	a	12.3±1	a	2	<0.001
<b>Functional parameters</b>	$\text{mU} \cdot \text{g}^{-1}$ dry soil														
	FDA hydrolysis	4.3±1.0	a	2.1±0.6	b	1.8±0.6	b	1.0±0.6	b	2.8±0.7	b	2.7±0.9	ab	1	<0.001
	Alkaline phosphatase activity	1.7±0.4	a	1.3±0.3	ab	1.6±0.4	a	0.9±0.4	b	0.5±0.2	b	1.0±0.2	ab	1	<0.001
	Urease activity	175±55	a	75±32	b	172±47	a	78±6	b	155±20	a	71±21	b	2	0.002
	Average mineralization capacity (AMC)	2654±501	a	1714±521	b	1880±289	b	820±395	c	879±247	cd	380±96	d	1	<0.001
	Relative density of GP PAH-RHD $\alpha$ genes	1.2±0.3	a	0.3±0.1	c	0.7±0.1	bc	1±0.4	ab	0.9±0.2	ab	0.3±0.1	c	1	<0.001
	Relative density of GN PAH-RHD $\alpha$ genes	0.010±0.003	a	0.001±0.000	b	0.001±0.000	b	0.001±0.002	b	0.077±0.037	a	0.001±0.001	b	2	<0.001
	Proportion of mesodecomposers	85±10	a	80±9	a	84±7	a	88±3	a	92±4	a	82±9	a	1	0.170
Proportion of macrodecomposers	42±11	a	37±18	a	27±12	ab	7±7	b	37±18	a	25±1	ab	2	<0.001	