

Supplementary material



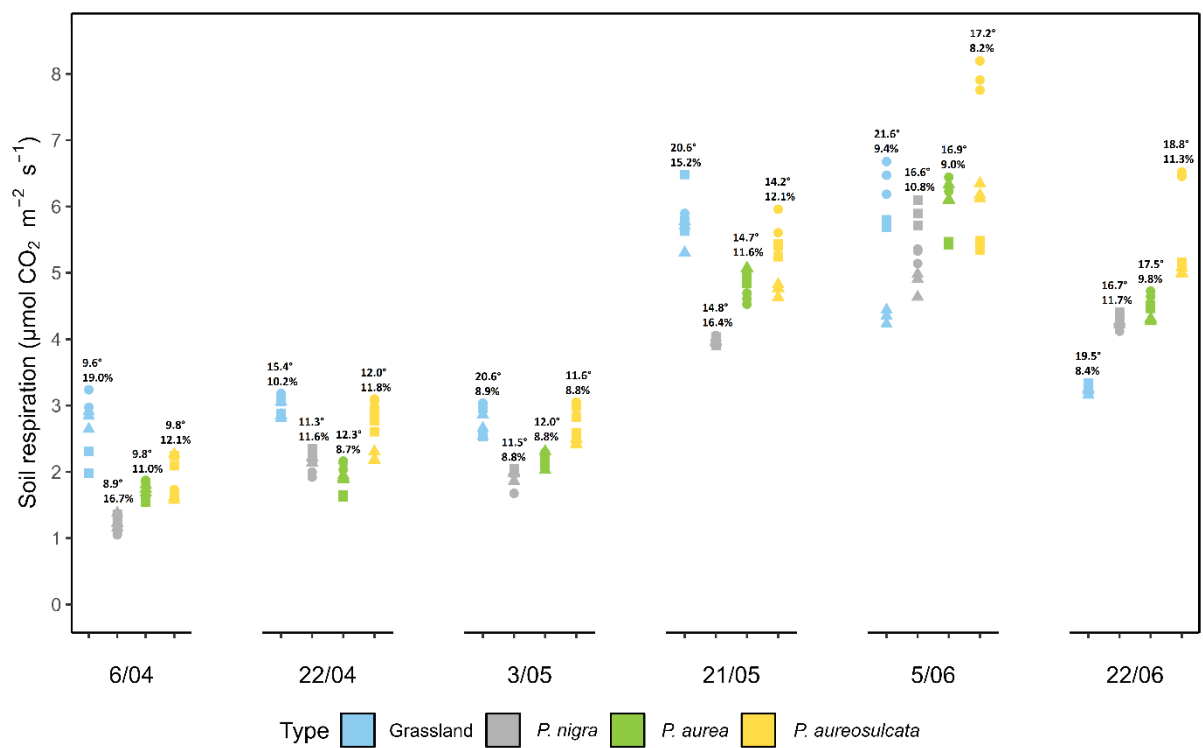
Supplementary Fig. 1. Illustration of the three bamboo plots (*P. nigra*, *P. aurea* and *P. aureosulcata*).

6 Supplementary Table 1. Raw data of SOC stocks (kgC m⁻²) per depth layer, as well as
7 total SOC stock values calculated using the fixed depth and the ESM approaches.

	Grassland	<i>P. nigra</i>	<i>P. aurea</i>	<i>P. aureosulcata</i>
SOC 0 – 10 cm (kgC m ⁻²)				
	1.64	1.49	6.20	2.85
	2.55	2.03	1.66	1.21
	2.18	2.01	0.97	3.05
	1.98	2.24	1.01	2.05
	1.37	2.32	1.71	2.81
	2.43	2.63	1.78	3.02
	2.57	2.35	1.79	1.18
	1.47	1.98	1.26	2.52
	2.36	1.23	3.14	2.95
	2.48	3.40	1.73	6.90
SOC 10 – 20 cm (kgC m ⁻²)				
	2.21	1.72	3.31	3.11
	2.93	2.24	1.70	1.60
	2.82	2.81	1.64	6.18
	2.08	1.55	1.60	1.93
	1.04	2.98	2.03	2.98
	2.65	2.04	1.85	5.89
	2.18	2.35	1.28	2.84
	2.47	2.00	1.91	5.69
	2.77	1.71	2.18	1.23
	2.54	1.68	2.86	3.69
SOC 20 – 30 cm (kgC m ⁻²)				
	2.15	1.99	3.03	1.74
	2.11	1.96	2.20	1.86
	2.18	2.75	2.42	1.59
	1.61	2.25	3.75	1.44
	1.98	1.96	2.56	2.42
	2.11	2.16	2.38	3.34
	1.35	1.96	1.81	1.47
	1.84	1.83	1.55	2.12
	2.10	1.53	2.90	1.15
	1.40	1.91	1.85	1.62
SOC 30 – 40 cm (kgC m ⁻²)				
	1.83	1.76	2.61	2.32
	1.96	1.72	2.23	2.25
	1.55	3.05	2.47	1.77
	1.48	2.17	2.07	2.59
	1.27	2.19	2.83	2.18
	2.23	2.11	2.21	2.42
	1.23	1.54	2.18	1.90
	1.43	1.65	2.05	1.82
	1.37	1.39	2.13	1.59
	1.33	2.17	1.86	2.00

	Grassland	<i>P. nigra</i>	<i>P. aurea</i>	<i>P. aureosulcata</i>
SOC top 40 cm (kgC m ⁻²)				
	7.84	6.96	15.15	10.03
	9.56	7.95	7.79	6.92
	8.74	10.61	7.50	12.59
	7.14	8.21	8.44	8.01
	5.66	9.45	9.13	10.39
	9.41	8.93	8.21	14.66
	7.33	8.20	7.06	7.39
	7.21	7.46	6.78	12.15
	8.60	5.86	10.35	6.91
	7.76	9.16	8.30	14.22
SOC ESM (kgC m ⁻²)				
	4.79	5.39	12.86	10.03
	6.30	6.42	5.82	6.92
	6.16	7.89	5.33	12.59
	4.69	6.27	6.62	8.01
	3.55	7.49	6.64	10.39
	5.70	7.05	6.27	14.66
	5.29	6.82	5.14	7.39
	4.83	5.99	4.97	12.15
	6.32	4.62	8.48	6.91
	5.55	7.22	6.66	14.22

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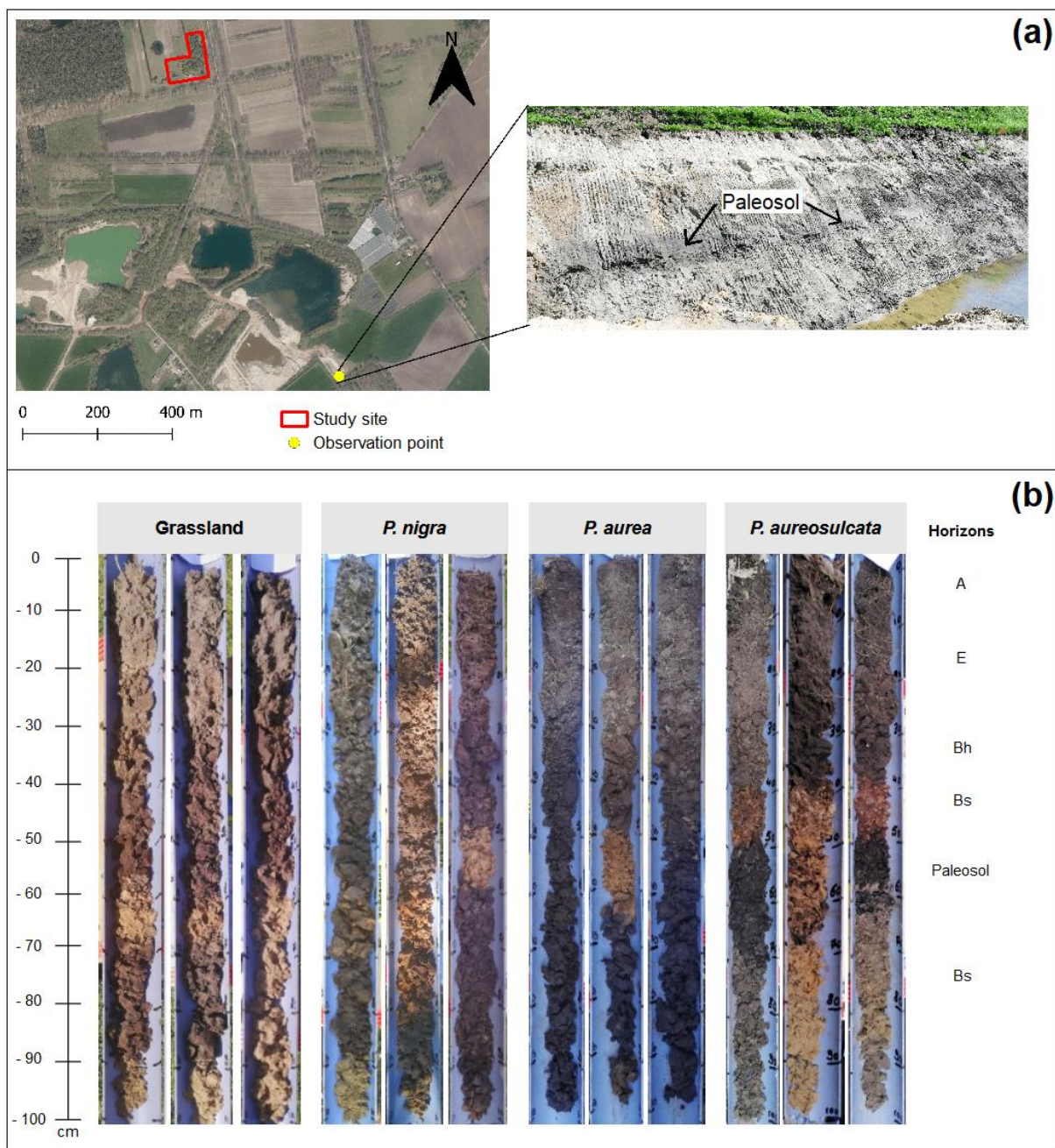
Supplementary Fig. 2. Comparison of CO_2 efflux ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$) between grassland, *P. nigra*, *P. aurea* and *P. aureosulcata* over six days. Each colour represents a vegetation type ($n = 9$) within which each symbol (i.e. circle, square or triangle) is associated with a series of 3 repeated measurements of the same collar. Each temperature ($^{\circ}\text{C}$) and volumetric water content (%) is the mean of three measures.

18 Supplementary Table 2. Summary of the nested analysis of variance (nested ANOVA) for
 19 the effects of vegetation type and collar on soil respiration.

	<i>Df</i>	<i>F</i>	<i>p</i>
Soil respiration (6/04)			
Vegetation type	3	25.84	< 0.001
Collar	8	15.52	< 0.001
Soil respiration (22/05)			
Vegetation type	3	62.76	< 0.001
Collar	8	16.87	< 0.001
Soil respiration (21/05)			
Vegetation type	3	58.86	< 0.001
Collar	8	8.44	< 0.001
Soil respiration (22/05)			
Vegetation type	3	162.10	< 0.001
Collar	8	3.63	< 0.01
Soil respiration (5/06)			
Vegetation type	3	3.65	0.06
Collar	8	106.45	< 0.001
Soil respiration (22/06)			
Vegetation type	3	1.74	0.24
Collar	8	93.27	< 0.001

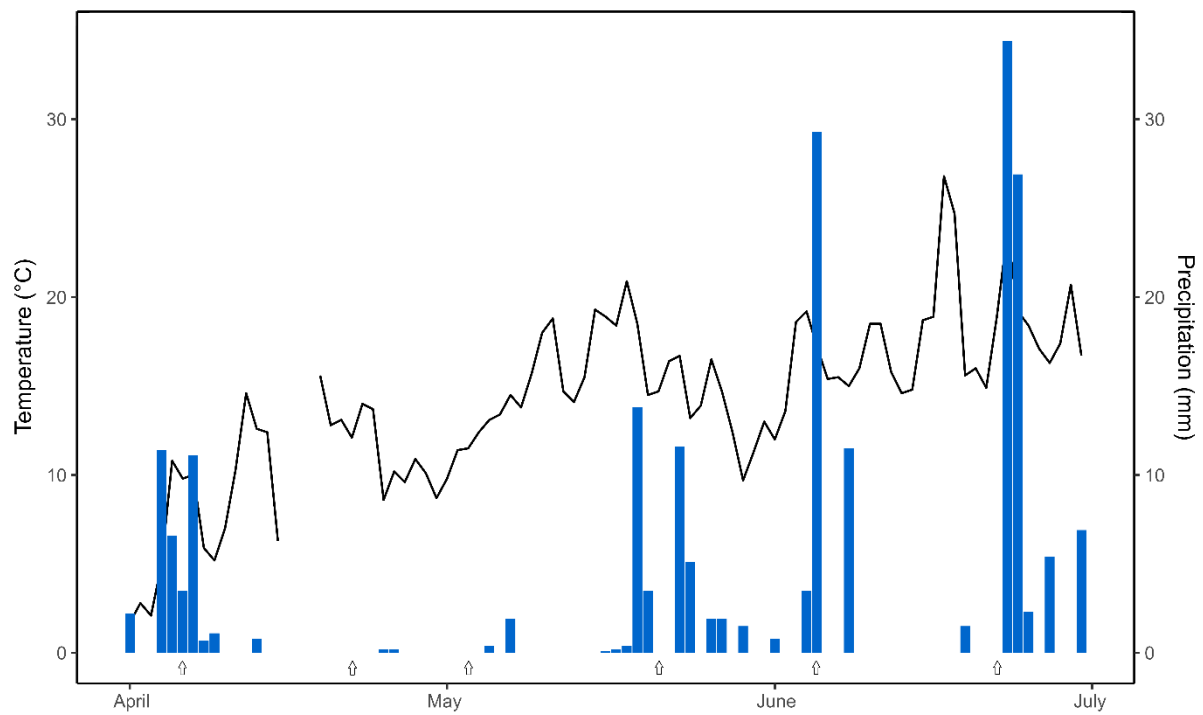
Supplementary Table 3. Summary of the uni- and bivariate linear regression analysis for predicting soil respiration by independent variables (soil temperature T_S and water content S_w). β represents the standardised coefficient of the variable with its associated level of significance ($\bullet p < 0.1$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$).

Regression	Vegetation	Variables (β)	R^2_{adj}
Univariate	Grassland	$T_S (+ 0.57) *$	0.28
Univariate	<i>P. nigra</i>	$T_S (+ 0.95) ***$	0.91
Univariate	<i>P. aurea</i>	$T_S (+ 0.88) ***$	0.76
Univariate	<i>P. aureosulcata</i>	$T_S (+ 0.87) ***$	0.74
Univariate	Grassland	$S_w (- 0.02)$	- 0.06
Univariate	<i>P. nigra</i>	$S_w (- 0.16)$	- 0.04
Univariate	<i>P. aurea</i>	$S_w (+ 0.12)$	- 0.05
Univariate	<i>P. aureosulcata</i>	$S_w (- 0.36)$	0.07
Bivariate	Grassland	$T_S (+ 0.98) ***$, $S_w (+ 0.63) *$	0.48
Bivariate	<i>P. nigra</i>	$T_S (+ 0.97) ***$, $S_w (+ 0.06)$	0.90
Bivariate	<i>P. aurea</i>	$T_S (+ 0.91) ***$, $S_w (+ 0.23) \bullet$	0.80
Bivariate	<i>P. aureosulcata</i>	$T_S (+ 0.83) ***$, $S_w (- 0.16)$	0.75



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29 Supplementary Fig. 3. (a) Study area and observation point (in yellow) of the paleosol from a
 30 quarry. (b) Photographs of the podzol profiles (World Reference Base classification) of the
 31 grassland, *P. nigra*, *P. aurea* and *P. aureosulcata*. The soil horizons (on the right) vary in
 32 thickness and depth. There is also spatial heterogeneity, as *P. aurea* has two profiles (out of
 33 three) where podzolisation is less advanced. Please note that colours between vegetation types
 34 on the photos may vary due to different shade conditions, as the photos were taken with a non-
 35 professional camera.



Supplementary Fig. 4. Average daily temperature (°C) and daily precipitation amount (mm) at Retie meteorological station during the experiment. Arrows indicate days of soil respiration measurement.