

## Supplemental Material

**Table S1** Geographic and soil description and management information of the 29 Grasslands sites studied for detailed P fractionation.

Soil ID	Location (County)	Soil Classification		Parental material	Texture class	Farm type
		Irish Soil Classification <sup>1</sup>	World Reference Base			
T01	Wexford	SBE	StagnicCambisol	Bedrock Sandstone and Shales	Loam	Beef
T16	Wexford	TBE	Haplic Cambisol	Drift Siliceous Stones	Loam	Drystock
T82	Wexford	SBE	Stagnic Cambisol	Bedrock Sandstone and Shales	Loam	Beef
S62	Kilkenny	SBE	Stagnic Cambisol	Drift Sandstone	Loam	Dairy
S64	Kilkenny	HBE	Humic Cambisol	Bedrock Shales	Loam	Drystock
M352	Galway	CGWG	Calcic Gleysol	Bedrock Limestone	Clay Loam	Drystock
X07	Cork	TBE	Haplic Cambisol	Bedrock Sandstone	Loam	Dairy
X06	Cork	TSWG	Haplic Stagnosol	Bedrock Sandstone and Shales	Loam	Dairy
X29	Waterford	TSWG	Haplic Stagnosol	Drift Siliceous Stones	Loam	Beef
S31	Waterford	Luv	Haplic Luvisol	Bedrock Sandstone	Loam	Dairy
M90	Roscommon	TBP	Haplic Podzol	Drift Siliceous Stones	Sandy Loam	Drystock
M74	Galway	GBE	Gleyic Cambisol	Bedrock Sandstone	Sandy Loam	Dairy
M56	Galway	TBP	Haplic Podzol	Drift Siliceous Stones	Sandy Loam	Beef
W08	Kerry	HBP	Humic Podzol	Bedrock Sandstone	Sandy Loam	Beef
R04	Kerry	HSWG	Humic Stagnosol	Bedrock Sandstone	Clay Loam	Dairy/Beef
H112	Leitrim	HSWG	Humic Stagnosol	Drift Siliceous Stones	Clay Loam	Beef
O07	Meath	TBE	Haplic Cambisol	Bedrock Sandstone	Loam	Beef
R301	Cork	TSWG	Haplic Stagnosol	Bedrock Sandstone	Clay Loam	Beef
R302	Cork	HSWG	Humic Stagnosol	Bedrock Sandstone	Loam	Dairy
H90	Louth	HBE	Humic Cambisol	Bedrock Sandstone and Shales	Clay Loam	Beef
S19	Tipperary	TBE	Haplic Cambisol	Bedrock Sandstone	Loam	Sheep
M252	Mayo	TBE	Haplic Cambisol	Bedrock Limestone	Loam	Sheep
M15	Mayo	HCB	Humic Calcic Cambisol	Drift Limestone	Clay Loam	Beef
M48	Mayo	HBE	Humic Cambisol	Bedrock Sandstone	Loam	Dairy
M71	Galway	HCB	Humic Cambisol	Bedrock Limestone	Loam	Beef
M79	Roscommon	SBE	Stagnic Cambisol	Drift Siliceous Stones	Loam	Dairy
S04	Tipperary	HSWG	Humic Stagnosol	Bedrock Sandstone	Silty Clay Loam	Dairy
S86	Carlow	CGWG	Calcic Gleysol	Bedrock Limestone	Loam	Dairy
M29	Mayo	TCBE	Haplic Cambisol	Drift Limestone	Sandy Loam	Beef

<sup>1</sup> **Brown Earth:** Stagnic (SBE), Typical (TBE); Humic (HBE); Gleyic (GBE); Humic Calcareous (HCB); Typical Calcareous (TCBE); **Surfacewater Gley:** Typical (TSWG); Humic (HSWG); **Calcareous Groundwater Gley** (CGWG); **Brown Podzolic:** Typical (TBP); Humic (HBP); **Luvisol** (Luv)

**Table S2** Percentage variance explained by each component (PC) and corresponding loadings in a principal component analysis (PCA) of P fractions in 29 grassland soils. Numbers in brackets correspond to the PCA loadings. Bold numbers represent a significant ( $p < 0.05$ ) correlation coefficient ( $r$ ).

	PC1	PC2	PC3
Variation explained (%)	38.90	24.13	21.37
Cumulative variance (%)	38.90	63.03	84.40
Eigenvalue	1.23	0.97	0.91
<b>P fractions</b>	Correlation coefficient (loadings)		
H <sub>2</sub> O Pi	-0.09 (-0.01)	<b>0.88 (0.21)</b>	0.10 (-0.04)
H <sub>2</sub> O Po	0.19 (0.04)	-0.32 (-0.09)	0.08 (0.11)
NaHCO <sub>3</sub> Pi	-0.07 (-0.06)	<b>0.56 (0.37)</b>	<b>0.61 (0.31)</b>
NaHCO <sub>3</sub> Po	<b>0.70 (0.23)</b>	-0.39 (-0.17)	<b>0.50 (0.22)</b>
NaOH Pi	0.44 (0.31)	<b>0.81 (0.67)</b>	0.21 (-0.10)
NaOH Po	<b>0.67 (0.41)</b>	<b>-0.56 (-0.49)</b>	0.40 (0.36)
NaOHsn Pi	0.18 (0.08)	<b>0.74 (0.26)</b>	-0.29 (-0.22)
NaOHsn Po	0.38 (0.10)	-0.03 (0.03)	<b>-0.51 (-0.27)</b>
HCl Pi	<b>-0.86 (-0.73)</b>	0.04 (0.02)	0.37 (0.50)
HCl Po	-0.17 (-0.05)	-0.25 (-0.10)	-0.08 (-0.04)
Residual P	-0.57 (-0.33)	-0.15 (-0.14)	<b>-0.78 (-0.57)</b>