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Supplemental material

Table S1. Amount of C and N added to soil from the incubation of different exogenous organic matters (EOM), amount of EOM C remaining and relative variation of soil organic matter content (SOM) at the end of the incubation experiment for belowground biomass components (plant belowground organs and fine roots) of six different perennial biomass crops.

EOM group	Crop	EOM type	EOM added		Added C remaining		ΔSOM
			(μg C g^{-1})	(μg N g^{-1})	(μg C g^{-1})		%
		DoI			30	63	
Woody PBCs	Black locust	PBO (Stump)	4161	178	3068	2759	0.33
	Poplar		3123	60	2973	2787	0.31
	Willow		3161	47	2822	2582	0.35
Herbaceous PBCs	Miscanthus	PBO (Rhizome)	4245	82	3662	3348	0.51
	Switchgrass		1541	29	1296	1186	0.09
	Giant reed		5564	98	5076	4799	1.10
Woody PBCs	Black locust	Fine roots (FR)	1713	130	1524		0.24
	Poplar		1666	61	1506		0.22
	Willow		1847	60	1643		0.23
Herbaceous PBCs	Miscanthus	Fine roots (FR)	1786	47	1646		0.28
	Switchgrass		2112	35	1816		0.31
	Giant reed		1982	50	1796		0.26

Table S2. Analysis of variance on the effect of crop type for CO_2 efflux and soil parameter (DOC and DON) considered in the incubation experiment of the two components of belowground biomass: plant belowground organs and fine roots. (*, **, *** denote statistically significant differences for $p < 0.05$, $p < 0.01$ and $p < 0.001$, respectively).

Parameter	Plant belowground organs				Fine roots			
	Factor	F	P		Factor	F	P	
CO_2-C after 30 DoI	Crop	52.83	0.001	***	Crop	12.34	0.002	**
CO_2-C after 63 DoI	Crop	23.95	0.001	***	Crop			
CO_2-C % after 30 DoI	Crop	54.15	0.001	***	Crop	5.68	0.007	**
CO_2-C % after 63 DoI	Crop	25.23	0.001	***	Crop			
ΔDOC	Crop	447.88	0.001	***	Crop	0.62	0.68	ns
ΔDON	Crop	2085.19	0.001	***	Crop	15.51	0.001	***

Table S3 Mean values (μg g^{-1}) of dissolved organic carbon (DOC) and nitrogen (DON) in soil at the end of incubation. Different letters show statistically different means among PBCs (Tukey's test, p: 0.05) for each parameter within the same EOM type.

EOM group	Crop	EOM type	DOC (μg C g^{-1})		DON (μg N g^{-1})	
	Control	Soil	57.9	a	37.8	e
Woody PBCs	Black locust	PBO (Stump)	83.1	d	31.5	d
	Poplar	PBO (Stump)	69.0	c	16.0	b
	Willow	PBO (Stump)	63.9	b	8.0	a
Herbaceous PBCs	Miscanthus	PBO (Rhizomes)	76.8	d	10.2	b
	Switchgrass	PBO (Rhizomes)	63.2	b	16.5	c
	Giant reed	PBO (Rhizomes)	97.9	e	10.4	b
	Control	Soil	121.5	a	34.1	b
Woody PBCs	Black locust	Fine roots	135.3	b	42.1	c
	Poplar	Fine roots	127.2	ab	34.2	b
	Willow	Fine roots	124.8	ab	31.8	b
Herbaceous PBCs	Miscanthus	Fine roots	125.9	ab	31.8	b
	Switchgrass	Fine roots	133.4	ab	24.5	a
	Giant reed	Fine roots	129.7	ab	33.2	b

Table S4. Mean values of partitioning factor (*f*) and decomposition rate constant (*K*) for different exogenous organic matter types as obtained by the improved version of the RothC model (Mondini et al., 2017).

EOM group	EOM type	Crop	f_{DEOM}	f_{REOM}	DEOM/REOM	K_{DEOM}	K_{REOM}
Woody PBCs	Stump	Black locust	0.39	0.61	0.64	7.9	0.39
		Poplar	0.04	0.96	0.04	30.9	0.49
		Willow	0.04	0.96	0.04	19.2	0.45
		Mean	**0.16**	**0.84**	**0.19**	**19.33**	**0.44**
Herbaceous PBCs	Rhizomes	Miscanthus	0.08	0.92	0.09	19.6	0.47
		Switchgrass	0.22	0.78	0.28	5.9	0.26
		Giant reed	0.05	0.95	0.05	41.9	0.28
		Mean	**0.12**	**0.88**	**0.14**	**22.47**	**0.34**
Woody PBCs	Fine roots (FR)	Black locust	0.10	0.90	0.11	19.5	0.21
		Poplar	0.10	0.90	0.11	13.4	0.13
		Willow	0.14	0.86	0.16	11.8	0.08
		Mean	**0.11**	**0.89**	**0.12**	**14.90**	**0.14**
Herbaceous PBCs	Fine roots (FR)	Miscanthus	0.12	0.88	0.14	7.3	0.02
		Switchgrass	0.17	0.83	0.20	12.7	0.11
		Giant reed	0.14	0.86	0.16	7.6	0.02
		Mean	**0.14**	**0.86**	**0.16**	**9.20**	**0.05**
PBCs	**PBO**	**Mean**	**0.14**	**0.86**	**0.19**	**20.90**	**0.39**
	FR	**Mean**	**0.13**	**0.87**	**0.15**	**12.05**	**0.10**

PBO: plant belowground organs; EOM: exogenous organic matter; DEOM: decomposable EOM; REOM: resistant EOM; *f*: partitioning factor; *K*: decomposition constant rate (yr^{-1}). DEOM/REOM: f_{DEOM}/ f_{REOM}.