

1 **Supplementary material**

2 **Table S1. Forage quality indicators (mass-% of dry weight). Analysis performed in the Department of Animal**  
 3 **and Food Science, Autonomous University of Barcelona, according to standard methods: Carbon (C) and**  
 4 **nitrogen (N) content (Elemental Analyser EA1108, Carlo-Instruments, Germany); crude protein (CP,**  
 5 **according to Kjeldahl method N x 6.25, on a Kjeltect<sup>TM</sup> 8400 analyser, FOSS, Denmark); neutral detergent**  
 6 **fibre (NDF, Van Soest et al., 1991); acid detergent fibre (ADF) and acid detergent lignin (ADL) according to**  
 7 **Goering and Soest (1970) on an ANKOM analyser (Ankom Thechnology, 2005). Mean  $\pm$  standard error (SE).**  
 8 **Not available (NA) data when there was not enough sample to perform the corresponding analysis or there**  
 9 **was only one sample.**

Species	Sampling date	C		N		CP		NDF		ADF		ADL	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Barley	01/07/2011	46.10	0.02	0.815	0.007	5.10	0.05	56.9	NA	32.5	NA	4.2	NA
Triticale	26/04/2012	45.5	0.5	2.46	0.01	15.41	0.09	37.2	0.4	19.3	0.4	1.6	0.1
Oat		45.3	0.2	1.64	0.04	10.2	0.2	NA	NA	NA	NA	NA	NA
Triticale	07/05/2013	45.0	0.1	1.40	0.05	8.7	0.3	48.8	NA	26.0	NA	1.8	NA
Vetch	11/06/2013	45.2	0.2	3.18	0.06	19.9	0.4	35.1	0.2	25.2	0.2	5.40	0.02
Triticale and oat		45.6	0.1	0.97	0.02	6.1	0.1	53	1	29.9	0.8	2.6	0.1
Vetch		45.3	0.2	2.63	0.07	16.5	0.4	34.4	0.3	25.7	0.2	5.6	0.3
Barley	20/05/2016	46.2	0.4	1.200	0.003	7.50	0.02	46.6	NA	24.9	NA	2.0	NA
Barley	16/06/2016	45.79	0.07	1.061	0.002	6.63	0.01	46.1	NA	24.3	NA	2.4	NA

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12 **Table S2. CO<sub>2</sub> fluxes data coverage and data retained. Estimated over total potential data (1 value every**  
13 **30 minutes).**

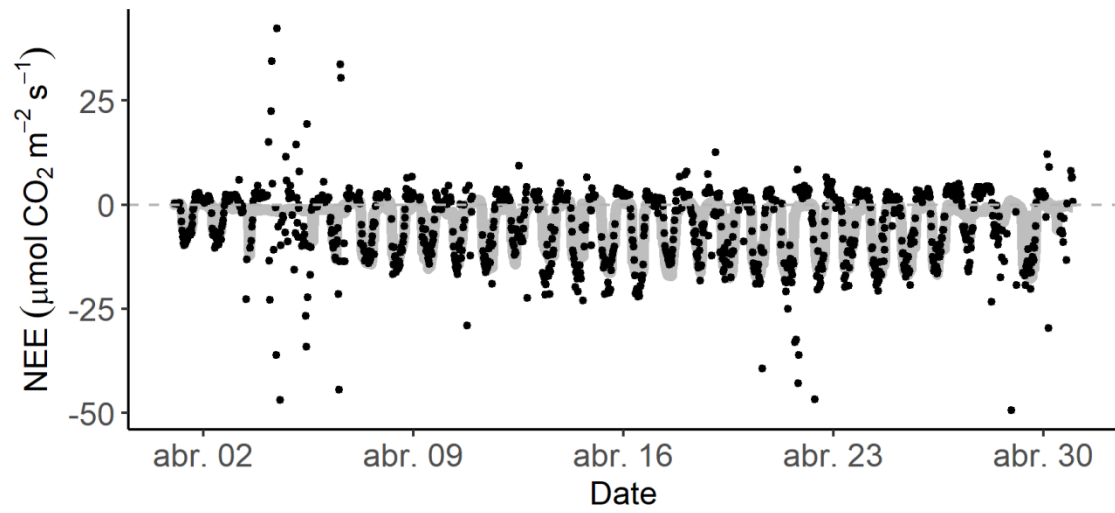
<b>Year</b>	<b>% Data coverage</b>	<b>% Data retained</b>
2011	0.80	0.69
2012	0.93	0.81
2013	0.77	0.67
2014	0.64	0.56
2015	0.68	0.57
2016	0.62	0.53
2017	0.85	0.72
Average	0.76	0.65

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16 **Table S3. Light response parameters Eq. (3): apparent initial quantum yield ( $\alpha$ ); asymptotic gross primary**  
 17 **production ( $GPP_{sat}$ ); and average daytime ecosystem respiration ( $R_{eco,day}$ ) ANOVAs as function of forage type**  
 18 **and period. Forage type with cereal monoculture as reference level, and period with growth as reference level.**

	$\alpha$ (dimensionless)		$GPP_{sat}$ ( $\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$ )		$R_{eco,day}$ ( $\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$ )	
	F	p	F	p	F	p
<b>Forage type</b>	0.13	0.7	9.41	0.002	0.28	0.6
<b>Period</b>	26.60	< 0.001	38.60	< 0.001	7.78	0.005
<b>Forage type x period</b>	4.78	0.03	7.13	0.008	3.15	0.08



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20 **Figure S1. Example (April of 2012) of observed net ecosystem exchange (NEE) data (black dots) and their**  
21 **theoretically predicted NEE data by gap-filling (grey line), by the sMDSGapFill function (Reichstein et al.,**  
22 **2005).**

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