

Supplementary Material

Table 1. Biomass production measured at harvest (t DM ha⁻¹) for the different treatments included in the study. Cells in bold correspond to the situations monitored for N₂O emissions. See Table 1 for treatment abbreviations.

Treatments	2007		2008		2009		2010		2011		2012		2013		2014		Average during N ₂ O Monitoring
Mis E N+	22.7	(3.1)	26.2	(3.7)	27.7	(0.9)	28.4	(0.2)	26.9	(1.1)	25.2	(1.6)	28.4	(2.1)	25.7	(1.8)	27.7
Mis L N+	15.4	(3.5)	19.5	(2.3)	20.5	(1.9)	22.0	(2.9)	19.5	(1.9)	17.7	(2.2)	17.0	(0.6)	20.3	(1.2)	20.4
Mis L N-	14.3	(4.5)	18.5	(1.7)	20.9	(1.9)	22.2	(2.2)	20.9	(2.5)	17.9	(3.6)	16.7	(1.5)	20.8	(0.9)	20.5
Swi E N+	19.3	(4.8)	20.1	(1.3)	19.5	(2.7)	18.2	(3.8)	13.6	(4.7)	16.3	(1.7)	17.0	(3.0)	14.0	(0.1)	16.6
Swi L N+	17.5	(2.6)	19.4	(1.6)	17.5	(1.1)	16.0	(0.8)	15.8	(1.5)	14.9	(3.0)	16.3	(2.0)	11.7	(1.1)	15.6
Fes-Alf N-	16.2	(1.0)	7.5	(0.1)	3.3	(0.2)	12.7	(1.9)	7.5	(1.1)	10.7	(0.4)	8.1	(0.4)	4.5	(1.4)	7.8
Alf-Fes N-	14.6	(0.9)	15.8	(0.2)	5.8	(1.1)	6.0	(0.4)	3.0	(0.2)	12.6	(0.5)	12.6	(1.2)	9.2	(2.2)	4.9
Sor-Tri N+	14.5	(0.4)	14.6	(0.5)	12.4	(1.1)	12.0	(1.6)	3.9	(0.9)	14.6	(0.8)	12.8	(0.2)	11.0	(1.6)	13.7
Tri-Sor N+	13.1	(1.1)	12.6	(1.9)	10.6	(0.7)	13.5	(5.6)	9.8	(0.8)	3.1	(0.9)	12.3	(1.9)	19.8	(1.1)	7.7

Table 2. Soil characteristics (0-30 cm) of the 15 plots of the B&E experiment used for N₂O measurements. Paired plots are plots under the same treatment monitored simultaneously (see Table 1). See Table 1 for treatment abbreviations.

Treatment	Paired Plots	Measurement Periods						Soil Characteristics (0–30 cm)						
		1	2	3	4	5	6	Clay (g kg ⁻¹)	Loam (g kg ⁻¹)	Sand (g kg ⁻¹)	CaCO ₃ (g kg ⁻¹)	pH in water ^a	Organic C ^b (g kg ⁻¹)	WFC ^c (g kg ⁻¹)
Mis E N+	1			x	x			164	791	43	2	7.6	10.5	243
	2				x			193	757	45	4	8.0	9.6	243
Mis L N-		x						185	770	41	3	7.5	9.8	252
			x	x				219	714	63	4	8.0	10.7	241
Mis L N+		x						170	779	49	2	7.6	9.1	249
	1		x	x	x			205	725	66	4	7.9	10.5	246
	2			x	x			153	794	52	1	7.6	9.5	238
Swi E N+	1					x	x	216	719	63	2	7.8	10.4	248
	2						x	129	812	59	0	7.6	10.5	254
Swi L N+	1					x	x	208	740	51	1	7.4	10.8	254
	2						x	193	760	46	2	7.9	9.8	247
Alf-Fes N-			x	x	x			144	816	36	3	8.0	9.4	246
Fes-Alf N-			x	x	x			133	835	29	4	8.1	9.4	249
Sor-Tri N+						x	x	166	787	45	3	8.0	9.5	244
Tri-Sor N+						x	x	149	809	41	1	7.7	9.7	241
Mean								170	780	49	2	7.8	9.9	247
Standard deviation								31	39	11	1	0.2	0.6	5

^a Measured in 2006; ^b Measured in 2006 with the Anne Method (AFNOR X 31-109); ^c Water content at field capacity (median of field measurements made in March over the period 2007-2013).

Table 3. Cumulative N₂O emissions for the different periods of monitoring for each treatment. Values between brackets are standard deviations between chambers. Different letters indicate significant difference ($p < 0.05$) between periods for a given treatment. See Table 1 for treatment abbreviations.

Treatment	Fertilizer rate (kg N ha ⁻¹)	Period	Start	End	Duration (days)	Rainfall (mm)	Mean Soil temperature (°C)	Mean WFPS (%)	N ₂ O eMissions Mean SD (g N ha ⁻¹)		
Mis E N+	120	3	18/05/2010	03/03/2011	290	583			-36	(28)	a
	120	4	04/03/2011	18/10/2011	229	341	14.5	53	138	(133)	a
Mis L N+	120	1	23/04/2008	05/03/2009	317	632	10.8	72	2145	(551)	a
	120	2	06/03/2009	04/03/2010	364	604	10.6	67	1344	(619)	a
	120	3	05/03/2010	03/03/2011	364	650	10.2	68	1364	(658)	a
	120	4	04/03/2011	18/10/2011	229	341	13.8	61	1040	(523)	a
Mis L N-	0	1	23/04/2008	05/03/2009	317	632	10.8	72	277	(32)	a
	0	2	06/03/2009	04/03/2010	364	604	10.7	70	-157	(35)	b
	0	3	05/03/2010	03/03/2011	364	650	10.2	70	361	(70)	a
Swi E N+	120	5	23/03/2012	06/03/2013	349	689	9.7	67	1862	(532)	a
	120	6	07/03/2013	12/03/2014	371	808	10.5	73	1702	(177)	a
Swi L N+	120	5	23/03/2012	06/03/2013	349	689	10.3	73	2663	(766)	a
	120	6	07/03/2013	12/03/2014	371	808	10.7	75	3362	(904)	a
Fes-Alf N-	0	2	22/04/2009	04/03/2010	317	533	11.9	54	370	(46)	b
	0	3	05/03/2010	04/03/2011	365	650	10.5	60	246	(42)	c
	0	4	05/03/2011	04/09/2011	184	271	14.7	61	987	(108)	a
Alf-Fes N-	40	2	22/04/2009	04/03/2010	317	533	12.0	53	1339	(346)	a
	120	3	05/03/2010	04/03/2011	365	650	10.7	57	390	(242)	b
	0	4	05/03/2011	04/09/2011	184	271	15.1	71	740	(86)	ab
Sor-Tri N+	120	5	06/03/2012	05/03/2013	365	698	10.5	65	2059	(348)	a
	120	6	06/03/2013	05/03/2014	365	809	11.0	72	1325	(474)	a
Tri-Sor N+	120	5	06/03/2012	05/03/2013	365	698	11.1	63	2319	(1190)	a
	120	6	06/03/2013	05/03/2014	365	809	10.6	60	1281	(201)	a