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Pasture intake and milk production of dairy cows rotationally grazing on multi-species swards

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Supplementary Table S1. *Pre-experimental characteristics of Holstein-Friesian cows grazing multi-species swards during the thirteen experimental rotations*

Pre-experimental periods	1 ¹	2	3	4	5	6
Timeline						
start date	29/08/11	06/02/12	06/04/12	27/08/12	25/02/13	23/04/13
end date	04/09/11	19/02/12	15/04/12	16/09/12	17/03/12	10/05/13
Number of cows	36	28	40	32	36	40
primiparous	12	9	17	16	12	12
multiparous	24	19	23	16	24	28
Lactation stage (DIM)	267	68	142	292	132	185
Milk production (kg/day)	24.6	38.1	26.8	16.0	32.7	26.0
Milk fat concentration (g/kg)	42.2	31.9	37.3	39.9	33.8	37.5
Milk protein concentration (g/kg)	33.8	29.5	29.9	34.6	29.3	29.8
Body weight (kg)	644	631	615	613	646	615
Body condition score (scale 0-5)	2.39	2.31	2.16	2.23	2.02	1.86
Experimental rotations	1-2	3	4 ² -7	8-9	10	11-13

¹ Pre-experimental periods considered for determination of pre-experimental dairy cow characteristics.

² The grazing rotation 4 was interrupted from 24/04/12 to 03/05/12 due to heavy rain that did not allow grazing in any of the paddocks.

Supplementary Table S2. Seasonal pasture botanical composition (12 rotations) and pasture characteristics (13 rotations) of multi-species swards rotationally grazed by dairy cows (2 years)

Grazing season	Autumn				Spring				Summer				P-value ³		
	L	LT	LTC	LTCF	L	LT	LTC	LTCF	L	LT	LTC	LTCF	RSD _s ²	s	t × s
Sward treatments ¹															
Botanical composition of pasture offered (proportion of DM)															
<i>Lolium perenne</i> L.	0.62	0.49	0.24	0.18	0.77	0.71	0.59	0.47	0.65	0.50	0.38	0.33			
<i>Trifolium repens</i> L.	0	0.19	0.10	0.09	0.05	0.09	0.08	0.07	0.13	0.17	0.12	0.15			
<i>Trifolium pratense</i> L.	0	0.14	0.12	0.10	0	0.06	0.09	0.06	0	0.10	0.09	0.06			
<i>Cichorium intybus</i> L.	0	0	0.46	0.46	0	0	0.19	0.22	0	0	0.29	0.26			
<i>Festuca arundinacea</i> Schreb.	0	0	0	0.08	0	0	0	0.07	0	0	0	0.11			
Unsown species	0.27	0.14	0.06	0.03	0.15	0.11	0.04	0.04	0.16	0.17	0.07	0.04			
Senescent material	0.16	0.14	0.11	0.09	0.06	0.05	0.03	0.05	0.06	0.06	0.05	0.05			
Pasture mass (kg DM/ha) ⁴	1138	1357	1581	1474	3452	3722	3482	3549	2064	2228	2101	2038	4791.7	0.001	0.946
Pre-grazing sward height (cm)	8.3	8.9	11.3	10.7	17.3	18.8	20.2	20.0	12.3	13.3	15.8	14.9	82.22	0.001	0.998
Pasture allowance (kg DM/day) ⁴	16.5	17.6	18.2	17.8	20.7	20.9	20.3	21.1	18.9	18.8	19.5	19.3	6.88	0.001	0.539
Post-grazing sward height (cm)	3.9	3.9	3.7	3.6	5.4	5.8	5.2	5.3	4.9	5.3	5.1	5.3	8.93	0.001	0.464
Chemical composition and nutritive value of pasture offered ⁴															
DM (g/kg)	182	176	131	133	176	167	140	139	197	175	142	152	133.9	0.003	0.206
OM (g/kg DM)	889	888	849	850	905	902	879	882	897	895	871	874	54.1	0.001	0.001
CP (g/kg DM)	210	206	211	230	164	169	178	183	185	194	178	187	84.6	0.001	0.077
NDF (g/kg DM)	539	527	439	445	525	528	472	498	541	536	497	508	72.5	0.001	0.011
ADF (g/kg DM)	249	256	259	259	255	262	252	263	267	272	278	282	53.8	0.001	0.695
ADL (g/kg DM)	31	38	55	54	32	37	47	44	32	40	50	48	28.9	0.111	0.611
PCd (g/kg DM)	788	763	861	840	756	748	771	741	711	690	697	694	57.1	0.001	0.066
UFL (/kg DM)	0.92	0.89	0.95	0.93	0.88	0.87	0.87	0.84	0.84	0.82	0.80	0.80	0.165	0.001	0.213
PDIE (g/kg DM)	101	98	104	103	95	94	94	90	92	91	88	89	17.4	0.001	0.075

¹ See Tables 1 and 2.

² Residual standard deviation of the model for the effect of the season.

³ P-value: s = season effect, t × s = treatment × season effect.

⁴ Determined above 4 cm.

Supplementary Table S3. Seasonal variation of milk production, milk composition and body weight (13 rotations), pasture DM intake and nutrient balance (5 rotations) of dairy cows rotationally grazing on multi-species swards

Grazing season Sward treatments ¹	Autumn				Spring				Summer				P-value ³		
	L	LT	LTC	LTCF	L	LT	LTC	LTCF	L	LT	LTC	LTCF	RSD _s ²	s	t × s
Milk production (kg/day)	10.5	11.9	12.0	13.2	22.5	23.0	24.0	23.7	15.3	16.5	17.3	17.6	0.27	0.001	0.405
4% FCM production (kg/day)	11.8	13.3	13.1	13.9	21.3	21.8	22.9	22.7	14.7	15.9	16.5	17.1	0.25	0.001	0.431
Milk fat concentration (g/kg)	49.1	48.1	46.9	43.9	36.6	36.5	36.7	37.3	37.4	38.5	37.2	38.1	0.41	0.001	0.001
Milk protein concentration (g/kg)	38.0	37.0	37.3	35.9	29.4	29.7	29.7	29.6	31.0	31.0	30.1	30.4	0.21	0.001	0.010
Milk solids production (kg/day)	0.90	1.00	1.00	1.04	1.48	1.52	1.61	1.58	1.04	1.13	1.16	1.20	0.018	0.001	0.464
Milk fat production (g/day)	506	564	557	574	821	835	889	881	572	621	642	667	10.5	0.001	0.335
Milk protein production (g/day)	396	438	439	470	663	684	717	699	473	505	520	534	8.1	0.001	0.492
Body weight (kg)	598	607	599	603	589	599	593	599	594	592	588	591	2.5	0.001	0.116
Pasture OM digestibility (g/kg)	779	773	790	788	797	800	809	805	789	786	796	789	2.0	0.001	0.307
Pasture OM intake (kg/day)	12.2	12.3	11.9	12.8	13.9	13.7	15.1	14.4	12.8	14.3	16.4	15.7	0.34	0.001	0.010
Pasture DM intake (kg/day)	13.4	13.6	13.7	14.9	15.5	15.2	17.4	16.5	14.4	16.1	18.8	18.0	0.39	0.001	0.019
Digestible OM intake (kg/day)	9.5	9.5	9.4	10.1	11.1	10.9	12.2	11.6	10.2	11.3	13.1	12.4	0.28	0.001	0.028
Milk production (kg/day) ⁴	10.1	9.7	11.3	14.4	19.8	20.5	21.9	22.2	16.0	17.2	18.4	18.8	0.41	0.001	0.578
4% FCM production (kg/day) ⁴	12.1	12.3	12.7	12.5	19.0	19.3	20.8	20.9	15.3	16.3	17.5	17.9	0.38	0.001	0.659
Milk solids production (kg/cow) ⁴	0.94	0.96	0.97	1.18	1.33	1.34	1.45	1.45	1.08	1.14	1.21	1.24	0.027	0.001	0.603
UFL balance (% requirements) ⁴	1.10	1.06	1.02	1.00	1.01	0.98	1.04	0.98	1.03	1.13	1.21	1.19	0.018	0.001	0.001
PDIE balance (% requirements) ⁴	1.32	1.20	1.21	1.40	1.17	1.09	1.16	1.09	1.20	1.29	1.37	1.36	0.064	0.001	0.001

¹ See Tables 1, 2 and 4.

² Residual standard deviation of the model for the effect of the season.

³ P-value: s = season effect, t × s = treatment × season effect.

⁴ Corresponding to the 5 rotations where pasture DM intake is measured.