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Effect of different regrowth grass silages on dairy cow performance

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Outline

1. Background and Objective
2. Materials and Methods
3. Results
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1. Background and Objective

- Grass represents 40-60% of the total DMI in livestock diets.
- Grass harvesting time is the most important feed value factor affecting intake and milk production.
- There is a lack of studies of dairy cow performance when fed diets based on regrowth grass silages harvested at different growth stages.

Objective:

To evaluate the effect of five regrowth grass silages on dairy cow production performance

2. Materials and Methods

Harvesting Strategies

2 & 3-cut harvesting systems

Early 1st (E), June 10th

Early 2nd (EE), July, 22nd

Late 2nd (EL), August 5th

Third cut (TC), September 3rd

2-cut harvesting system

Late 1st (L), June 24th

Early 2nd (LE), August 6th

Late 2nd (LL), September 2nd

Silage quality (g/kg DM)

	EE	EL	LE	LL	TC
DM, g/kg	262	265	261	311	220
Composition					
CP	**178**	**125**	**137**	**111**	**197**
NDF	523	557	556	524	459
Indigestible NDF	**76.3**	**148**	**143**	**177**	**77.6**
Fermentation quality					
NH_3-N, g/kg total N	31.6	37.2	33.5	74	41.9
Lactic acid	79.3	102	110	82.9	117
Acetic acid	18.2	15.2	19.5	27.1	16.3
Butyric acid	<0.3	<0.3	<0.3	<0.3	<0.4

Animal Feeding Experiment

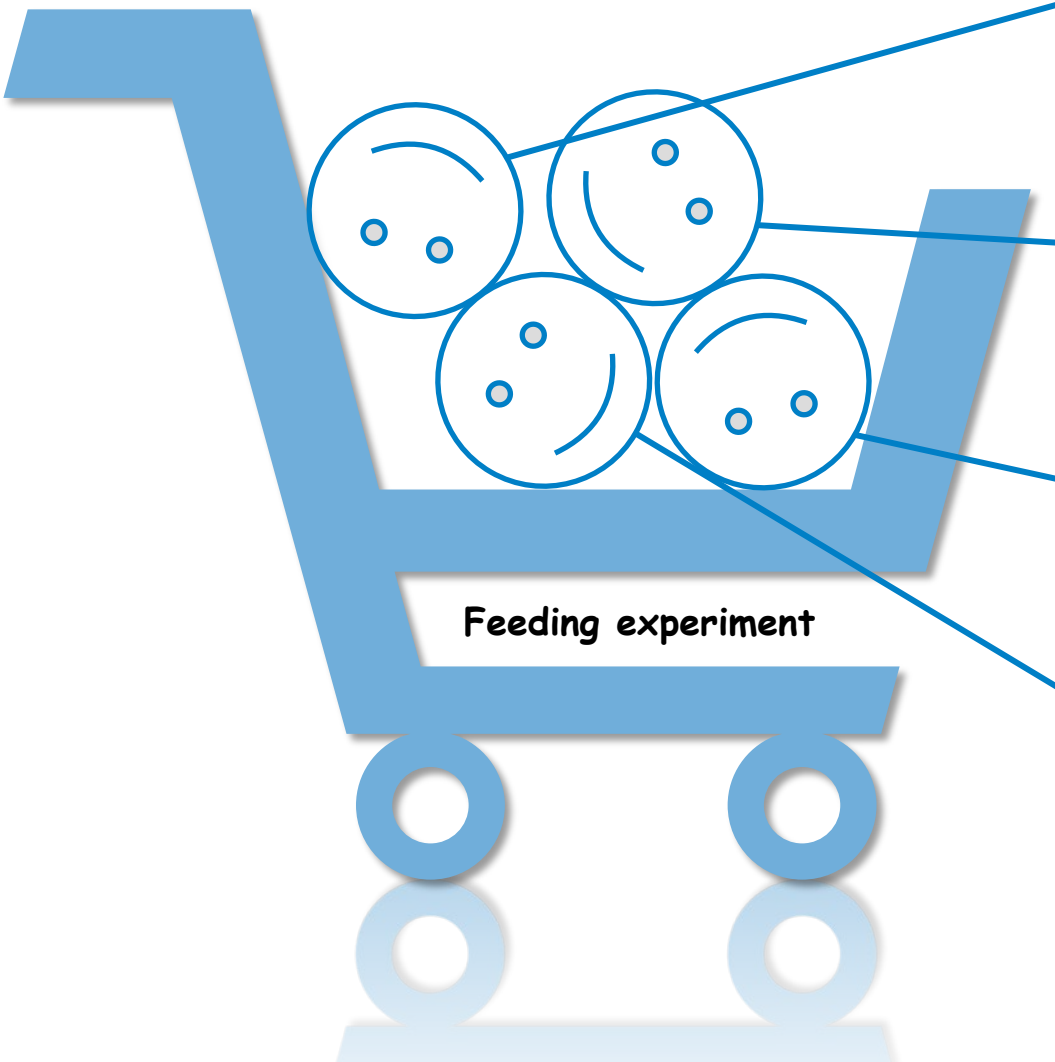
Diets:
5 experimental diets with 58% of grass silage, 34% of crimped barley and 8% of rapeseed meal on DM basis

Experimental Design:
30 Swedish red cows in 5 × 4 unbalanced Latin square design with 21-day periods

Chemical compositions of diets (g/kg DM)

	Silage source				
	EE	EL	LE	LL	TC
DM, g/kg	381	384	379	432	330
CP	171	142	149	135	182
NDF	386	404	403	387	351
Indigestible NDF	72.9	117	112	133	75.6

Samples and Data



Feed samples

Milk & Fecal samples

Intake & milk yield

Gas emission data

3. Results

Intake data (kg/d)

	Silage source					P-value		
	EE	EL	LE	LL	TC	C1	C2	C3
DM	22.4	21.2	20.3	20.6	20.8	<0.01	0.01	0.20
CP	3.9	3.0	3.1	2.8	3.8	<0.01	<0.01	<0.01
pdNDF	6.9	5.9	5.8	5.2	5.6	<0.01	<0.01	<0.01

- ✓ C1 = effect of harvest time of the first cut (EE and EL vs. LE and LL);
- ✓ C2 = effect of growth stage in second cut regrowth (EE and LE vs. EL and LL);
- ✓ C3 = effect of second cut vs. third cut.

Production data

	Silage source					P-value		
	EE	EL	LE	LL	TC	C1	C2	C3
ECM, kg/d	31.3	28.6	28.7	27.6	31.2	<0.01	<0.01	<0.01
Fat, g/d	1284	1162	1172	1114	1247	<0.01	<0.01	<0.01
Protein, g/d	1068	966	947	937	1068	<0.01	<0.01	<0.01
MUN, mM	4.58	4.24	4.43	3.78	5.17	<0.01	<0.01	<0.01

- ✓ Postponing the primary growth harvest, ECM, and milk fat and protein yields decreased.
- ✓ With progressing regrowth, the effects were similar.
- ✓ Feeding third cut silage, ECM, and milk fat and protein yields increased.

Digestibility data (g/kg)

	Silage source					P-value		
	EE	EL	LE	LL	TC	C1	C2	C3
OM	747	694	702	660	738	<0.01	<0.01	<0.01
CP	716	662	674	606	699	0.01	<0.01	<0.01
pdNDF	831	780	797	725	823	<0.01	<0.01	<0.01

- ✓ Postponing the primary growth harvest, digestibility of dietary components decreased.
- ✓ With progressing regrowth, digestibility of dietary components decreased.
- ✓ The second cut silages were less digestible than the third cut silage.

Production efficiency data

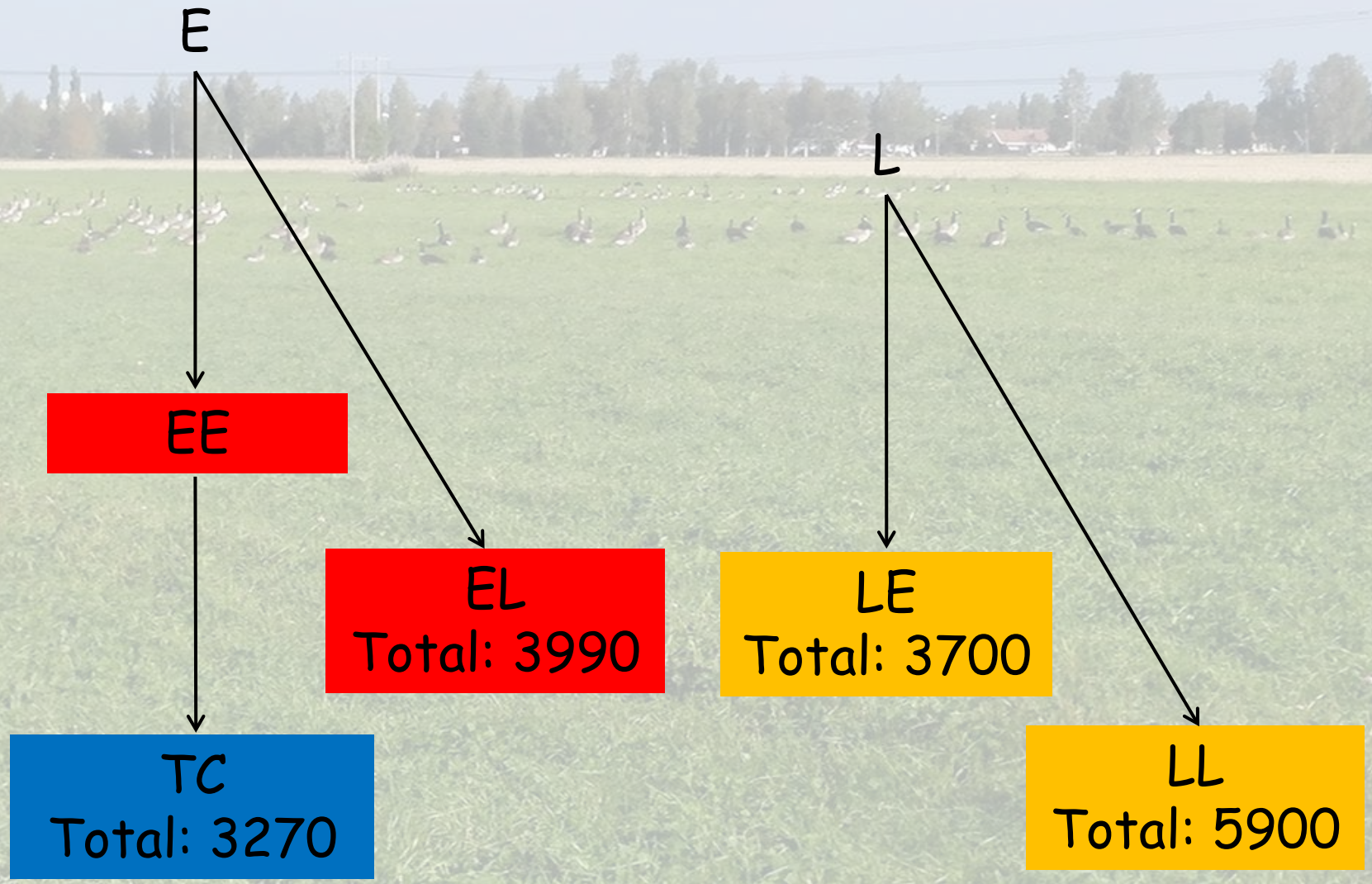
	Silage source					P-value		
	EE	EL	LE	LL	TC	C1	C2	C3
ECM/DMI	1.40	1.35	1.43	1.35	1.50	0.45	0.01	<0.01
N, g/kg	273	310	299	323	273	<0.01	<0.01	<0.01
CH_4,g/kg ECM	14.1	15.4	14.8	15.7	13.7	0.29	0.02	0.01
CH_4,g/kg DMI	20.2	20.7	21.1	21.5	21.3	<0.01	0.17	0.27

- ✓ Postponing the primary growth harvest, N efficiency improved and CH_4 per kg DMI increased.
- ✓ With progressing regrowth, feed efficiency decreased, N efficiency improved and CH_4 per kg ECM increased.
- ✓ Feeding third cut silage, feed efficiency increased, N efficiency and CH_4 per kg ECM decreased.

Grass Yield, kg DM/ha

2 & 3-cut harvesting systems

2-cut harvesting systems



4. Conclusions

- ✓ Feeding regrowth silages from 3-cut harvesting system promoted better dairy performance and higher digestibility compared to 2-cut harvesting systems, but lower grass yield.
- ✓ The practical implication of the results should be based on the individual aim and limitation of each particular farming situation.

Thank you for your attention!