Successful grazing with automatic milking

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Content

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- Results
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Research setup

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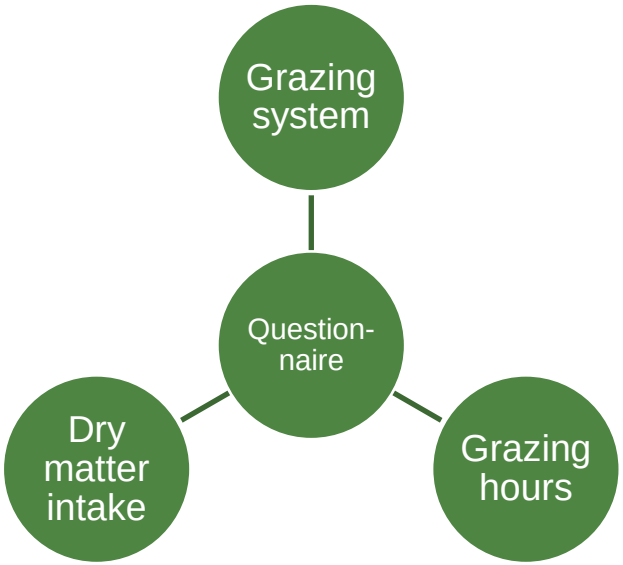
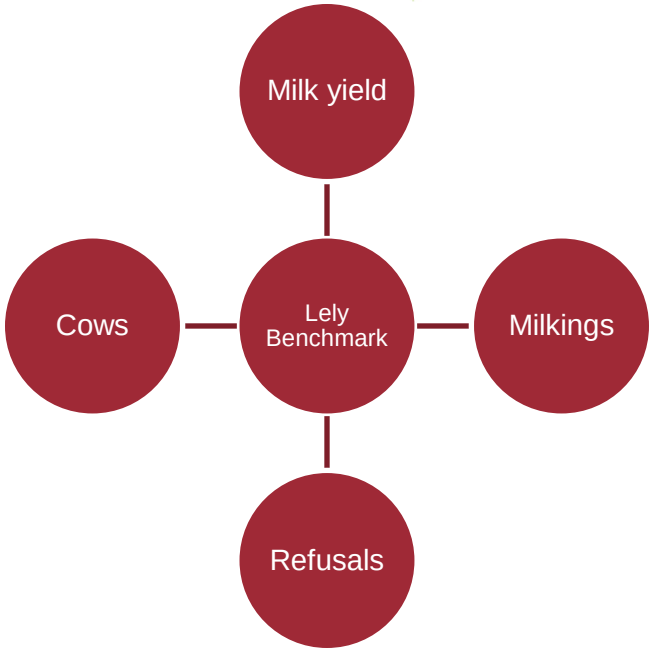
- Questionnaire for 500 Dutch farmers
  - 198 with Lely robot





- R Studio: Linear Mixed-effects modelling

Descriptive stats

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		Summer	Winter
Milk yield	*Average*	27.3	27.4
	Minimum	10.3	13.5
	Maximum	37.8	37.5
Milkings	*Average*	2.55	2.74
	Minimum	1.46	1.47
	Maximum	3.65	3.46
Refusals	*Average*	3	4.1
	Minimum	0.2	0
	Maximum	14.4	17.7
Free time	*Average*	31.9	25.3
	Minimum	3.3	1.6
	Maximum	68.7	72.3

Descriptive stats

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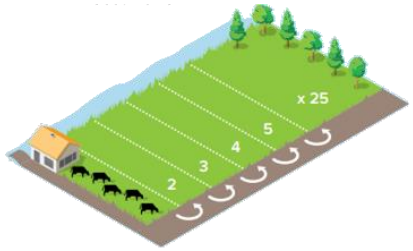

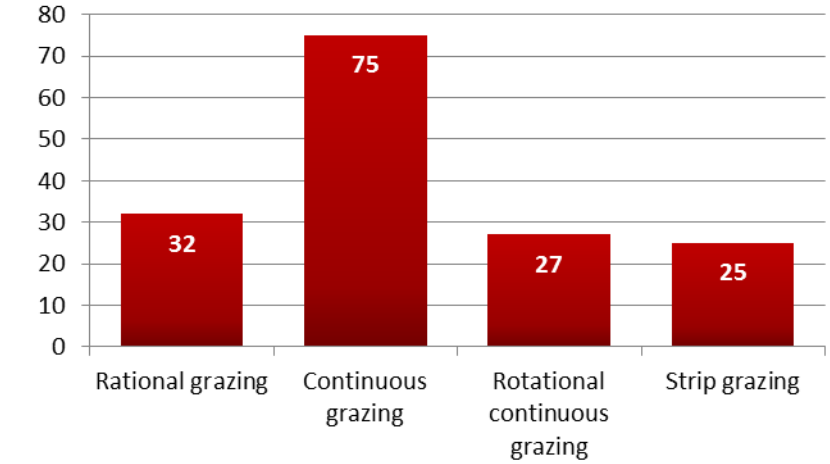

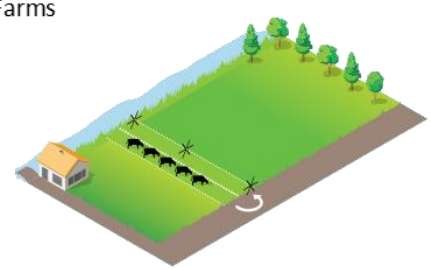

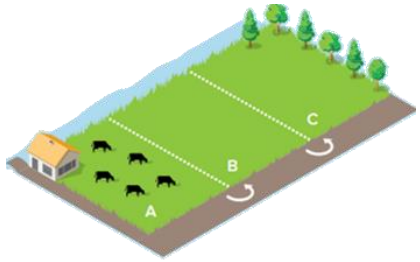

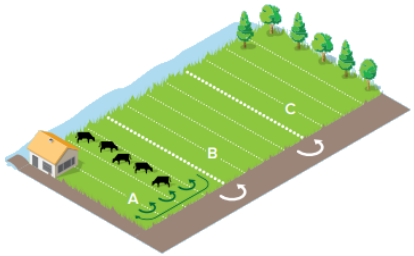

Results

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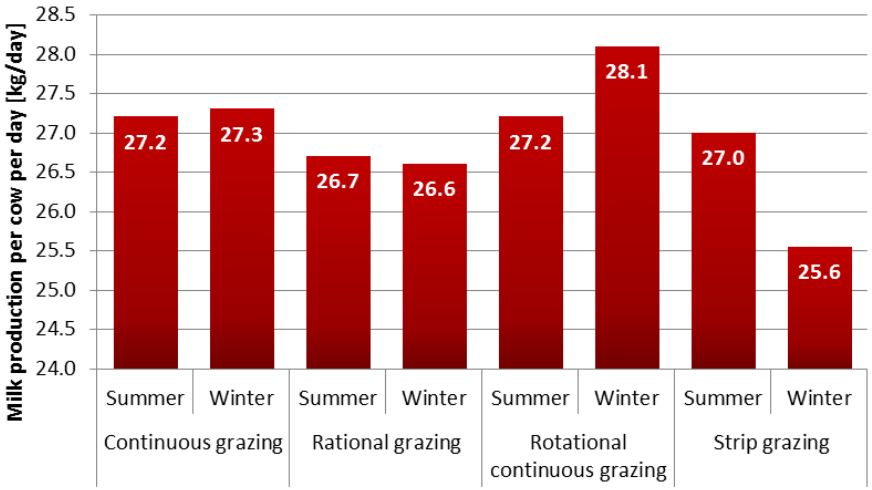
$$Milk\ Production = Grazing\ system * Season + FarmID(random)$$

	Value	p-value	
Intercept (Continuous grazing, Summer)	27.2	0.00	*
System: Rational grazing	-0.45	0.61	
System: Rotational continuous grazing	-0.04	0.97	
System: Strip grazing	-0.16	0.87	
Season:Winter	0.11	0.13	
Rational grazing - Winter	-0.20	0.12	
Rotational continuous grazing - Winter	0.81	0.00	*
Strip Grazing - Winter	-1.56	0.00	*



- With strip grazing higher milk production
- With rotational continuous grazing lower milk production

Results

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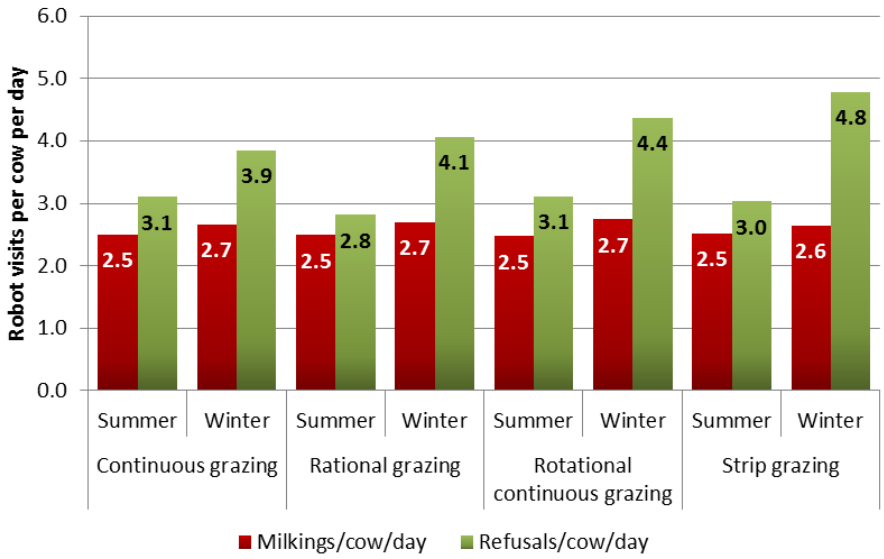
$$Milking\ per\ cow\ per\ day = Grazing\ system * Season + FarmID(random)$$

	Value	p-value
Intercept (Continuous grazing, Summer)	2.5	0.000 *
System: Rational grazing	-0.01	0.894
System: Rotational continuous grazing	-0.03	0.652
System: Strip grazing	0.01	0.939
Season: Winter	0.16	0.000 *
Rational grazing - Winter	0.05	0.000 *
Rotational continuous grazing - Winter	0.11	0.000 *
Strip Grazing - Winter	-0.03	0.047 *



- Drop in milkings/cow/day

Results

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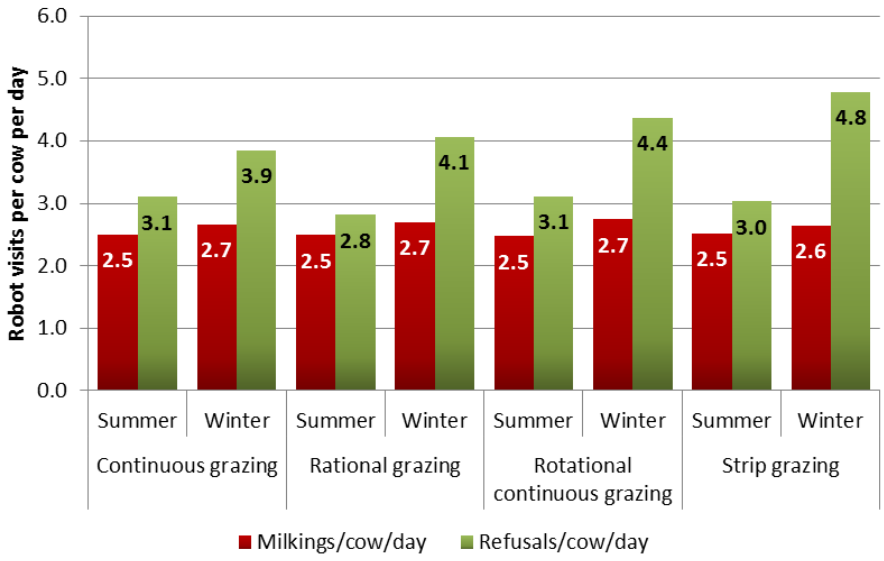
$$Refusals\ per\ cow\ per\ day = Grazing\ system * Season + FarmID(random)$$

- Drop in refusals

	Value	p-value	
Intercept (Continuous grazing, Summer)	3.1	0.000	*
System: Rational grazing	-0.29	0.455	
System: Rotational continuous grazing	0.01	0.978	
System: Strip grazing	-0.07	0.878	
Season: Winter	0.75	0.000	*
Rational grazing - Winter	0.50	0.000	*
Rotational continuous grazing - Winter	0.51	0.000	*
Strip Grazing - Winter	1.00	0.000	*



Cows per AMS

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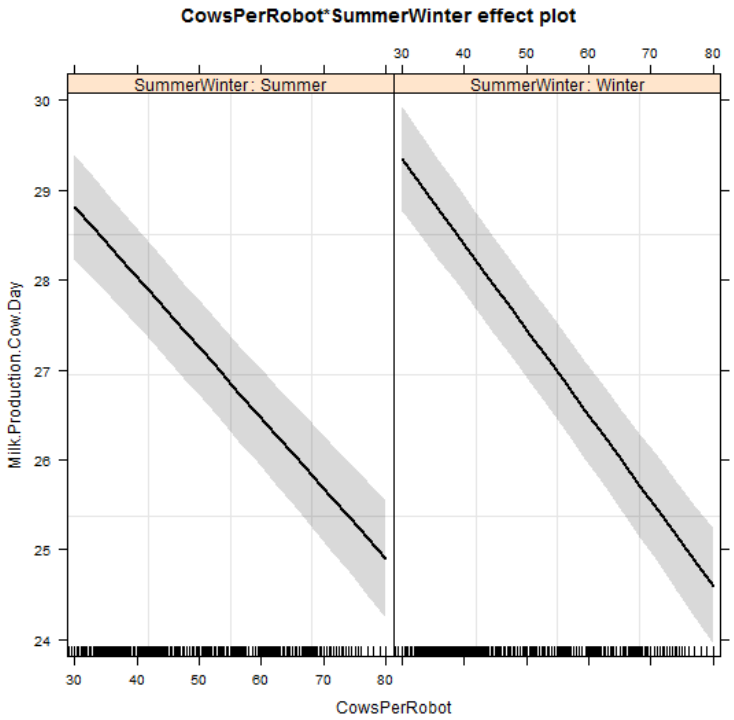
$$Milk\ production\ per\ cow\ per\ day = Cows\ per\ AMS * Season + FarmID(random)$$

	Value	p-value
Intercept (Summer)	31.2	0.000 *
Cows Per Robot	-0.08	0.000 *
Season: Winter	1.03	0.000 *
Interaction: Cows Per Robot*Season	-0.02	0.000 *

- From 52 cows per AMS grazing has positive effect on production



Grazing hours

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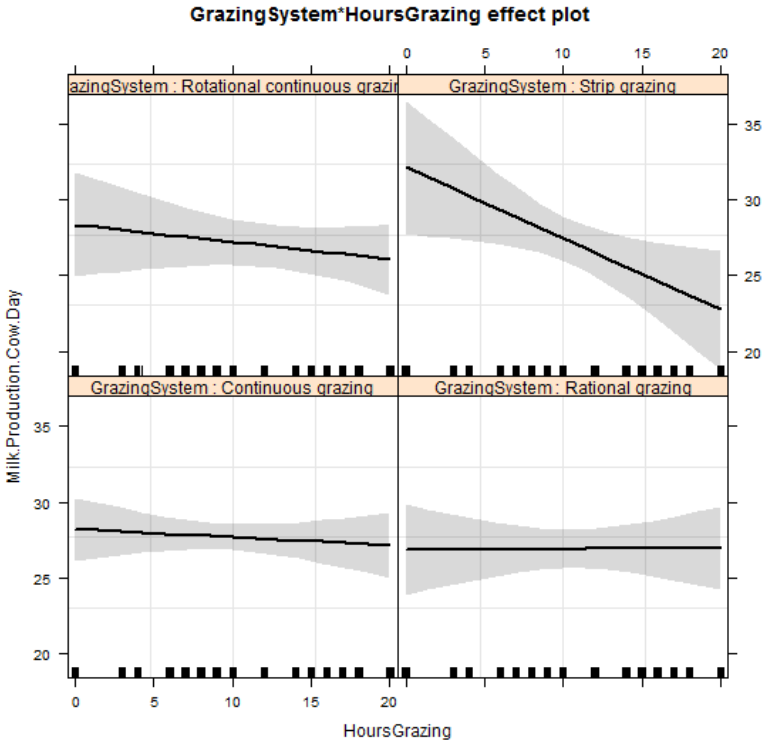
$$Milk\ production\ per\ cow\ per\ day = Grazing\ system\ * Grazing\ hours + Cows\ per\ Robot + FarmID(random)$$

	Value	p-value	
Intercept (Continuous grazing)	36.6	0.000	*
System: Rational grazing	-1.37	0.460	
System: Rotational continuous grazing	0.14	0.944	
System: Strip grazing	3.94	0.112	
Hours Grazing	-0.05	0.587	
Cows per Robot	-0.17	0.000	*
Rational grazing - Hours grazing	0.06	0.718	
Rotational continuous grazing - Hours grazing	-0.06	0.706	
Strip Grazing - Hours grazing	-0.42	0.061	.

- Trend between strip grazing and grazing hours



Discussion

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- Grazing system ~ Milk yield
  - Strip grazing > Higher yield
    - Low yielding farms in the winter
  - Rotational continuous grazing > Lower yield
    - High yielding farms in the winter
- Grazing system ~ Visit behavior
  - Drop in milk visits is around 0.2, milk yield per milking stays good
  - Refusals is still above 1, meaning that visit behaviour is good

Discussion

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- Number of cows per robot ~ Milk production
  - Slight drop in milkings per cow
  - More time for low ranked cow and heifers
- Grazing system ~ grazing hours
  - Extensive strip grazing tends to lower production
  - Amount of grazed grass in ration

Conclusion

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- Grazing has an impact on robot visit behaviour
  - Impact is manageable
- Reduced visit behaviour positively affects the milk production when milking over 52 cows per robot

Successful grazing with automatic milking is very well possible!

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