Using GrazeGuide (virtual fencing) separation for grazing in production groups

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NGO’s: Cows shall be part of the Landscape!!

Stalmelk in Chocomel en Fristi

Pas op: kaas zonder weidemelk!

NGO informs consumers:
Products manufactured from NON grazing milk!!!
Motivation

- Efficient use of grassland $<=$ labour intensive
- Guiding cows with sensors:
  - Adaptive grazing area
  - Position information individual cows (GPS)
  - Lead cows with sound signals (warning)
  - Correct cows with electric signals
- First questions:
  - Can cows be guided with signals
  - Effect of signal guiding on behaviour
Farmer draws virtual fence with app on tablet or smartphone.

A GPS-collar gives cow signals and communicates data to the farmers-app.

At a distance of 1.5m of the virtual fence cows receive a sound signal.

When continuing walking in same direction the cow runs against virtual electric fence.
Other initiatives

Anderson, US 2007

CSIRO, Australia 2016

Umstätter et al, Scotland 2015

Nofence, Norway 2018

Piggott, New Zealand 2017
2015 (Carus) BoviGuard + GPS

- Approval animal welfare commission
- Inductive loop
- Strips (10x ~80mx10m)
- BoviGuard actuator
  - Warning (sound) / Correction (shock)
- Heifers (4x4)
Carus 2015

Conclusions:
• Cows learn quickly
• Herd behaviour beats virtual fence
• Some escapes recorded
  • Mostly the same cows
• Virtual fence can have impact behaviour
  • Especially with small strips (10 m)
Research spring 2016 on Dairy Campus

Questions

- Works Graze Guide also for dairy cows
- Is a short training period possible
- What happens if fence is moved during day
- What happens if cows are in heath
- Impact on behavior

- Cows (15) early lactation
- Strips 12x ~160mx15m
Conclusion research spring 2016

- Works the system for group dairy cows?
  - 15-20 per group?  
    No problem
  - Training of the cows?  
    Within 4 hours
  - Problems with cows in heath?  
    No problem
  - Adjustment of fence during day?  
    No problem
  - Effect on behaviour and production?  
    No issues??
Research October 2016 on Dairy Campus

Strips 2x 12x ~80mx15m

Question (with 2x2x8 cows, experimental & control group):

- Separating High Yielding (HY) and Low Yielding (LY)
  - LY: 2 strips where cows grazed previous days
  - HY: 2 strips where cows grazed previous days
    1 additional strip with fresh grass

- What is impact on production, behaviour

- Phases:
  - P1 (leaning)
  - P2 (basis)
  - P3 (cross-over, i.e. experimental & control group switched)
High and Low productive
Experimental & Control group switched
Distance walked / day

[Bar charts showing distance walked over days and periods with conditions labeled as 'Con' and 'Exp' for 'Control' and 'Experimental' respectively. The charts indicate varying levels of locomotion for different conditions and periods.]
Locomotion activity (LA)

- **P1**: HY-koeien (1585 m/day) LA higher than LY-koeien (1049 m/day; LMM $P<0.001$)
  - Control group (1719 m/day) LA higher than experimental group (1050 m/day; $P<0.001$)
  - Experimental LY lowest LA (771 m/day; int.act. $P=0.028$)

- **P2**: Control group (1850 m/day) LA higher than experimental group (1130 m/day; $P=0.002$)

- **P3**: Cross-over no significant difference in LA
Milk production

Milk yield:
- HY-cows (23.5 l/day) higher than LY-koeien (19 l/day) during P1, P2 & P3 (all P=0.000)
- No effect virtual fence on yield LY-cows
Conclusion October 2016

- GrazeGuide can be used for separating groups
- Impact on production and behaviour:
  - Remarkable: in cross-over separation remained 2 days
  - Behaviour: Impact on locomotion activity
  - Production: no effect recorded
General conclusions

- Sensor-controlled grazing of cows is possible
- Preconditions to dimensions of the grazing area
- System consistency is crucial
- GrazeGuide offers new grazing possibilities
- Areas of interest in development
  - Public opinion
  - Animal welfare
Next step!

- Commercial GPS based system
- Technical & economic feasibility
- Integration in farm management
  - Secure grazing (time a day & days a year)

Questions!