

Facilitating grazing for organic dairy farms with expanding herd size.

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Introduction

Organic dairy farming is inseparably connected with grazing. One of the key objectives and core indicators for sustainability is to respect the animals' natural behaviour (SAFA 2013), and on this issue there is no doubt that the dairy cow is a grazing animal. Of course organic dairy farmers have to answer to the call for increasing production volume and continuity of delivery; therefore seasonal calving is mostly omitted, and barn feeding with supplements and concentrates is required. However, maximized grazing, in time and amount, together with loose housing using straw or biomass mattresses for the winter periods, must be the primary aim for organic animal management. farm -and herd sizes are expanding the last years due to increase of automation and mechanization and rising labour costs, . In Denmark the average herd size for organic herds has increased dramatically. (Fig. 1)

Fig. 1. Organic dairy farms statistics in Denmark

	2003	2009	2010	2011	2012	2013
Amount of dairy farms	636	399	422	417	409	392
Milk delivery (1000 t)	434	453	478	490	499	505
av. Delivery pr. farm (t)	682	1135	1133	1175	1220	1288
av. Herd size (milking cows)	85	126	126	131	136	143

Often the farm structure (fields surrounding the farm buildings and milking parlour), was destroyed by expanding farm size . Remote fields are not usable for grazing dairy cows, but used for cut and carry regimes or grazed by heifers and dry cows. The fields that are in reach of the milking herd are limited, and lack of land in the proximity is sometimes the main reason for the organic dairy farm to strive for further expansion. If all fields were ideally distributed in the near surroundings of the barns and 50% of the fields could be used for grazing (with 0.5 ha per cow), an average farm in 2013 would need about 150 ha adjacent to the farm. If herds should expand further, the distance from barn to fields would exceed one km. For normal batch milking in milking parlours or carousels this is not an insuperable problem, but for farms with automatic milking (AMS), this could be the case. The gregarious character of the cattle and the distance to the AMS hampers cows to visit the AMS voluntarily on individual basis (Ketelaar-De Lauwere, 2000). In addition, limited acreage makes the desire for the farm manager to control grass offer to and grass intake of the herd even more acute.

Therefore, during the last five years Danish researchers have investigated the possibilities to facilitate the farms with innovative technology and design, with the aim of improving grazing and grazing management (technology for grazing). In the following article we shall describe some of the results

Results

Logistics and walkway stabilizers

By actively involving farmers and their experiences, some interesting best practice suggestions came forward. One of the comments was that cows have the habit of remembering especially logistics and unpleasant experiences. Permanent and robust cow tracks, openings and gates to fields, water troughs and entrances to the barn greatly improve cow traffic. Cow tracks can be a source of nuisance if they become muddy, slippery or impassable; hoof sores and starting inflammatory and contagious diseases can occur.

Different kinds of coverage materials have been tried out in experiments, permanent concrete or asphalt, and removable plastic grids, or recycled rubber mining belts have been implemented. All materials greatly improved the walkability but needed a good foundation of sand and gravel, as well as drainage. Removable material was cheaper per square meter and can be used in other fields, when rotation is practiced. Rubber belts could be slippery in wet weather, and should be kept sand-covered (fig 1).

Intelligent gates

Gates to the fields and gates from barn to field can easily be made intelligent. One-way gates to secure traffic in the desired direction, timer connected one-way gates to open automatically (fig 2), and gates that can direct the herd two or three ways as preferred as (fig 3), have been tested. In combination with RFID tags the latter two or three way gate can direct the cows individually.



Fig 1. Rubber belt on the right



Fig 2. Timer connected gate



Fig 3. selection gate

RFID to register cows' behaviour

Cows in Denmark are equipped with RFID tags in the left ear. Antennas to register the RFID tags can be programmed to register time of contact, and store the information or send it real-time to the herd manager. The information can be used to register time spent outside when the antennas are



Fig 4. Gates with RFID scanner

installed close to the entrance (fig 4), and from this information maximum grazing time can be obtained Especially in situations where herd managers are doubtful if the herd or specific animals have been outside long enough, the information can be valuable.

Sensors for measuring cow behaviour

Different sensors can be used for measuring cow behaviour. Most of them are utilized with accelerometers. They register movement and can, by use of developed algorithms, translate these movements to key indicators (e.g. standing, walking, or grazing –see Fig 5). The algorithms have to be calibrated for different races and grass heights and can, although crudely, give information on grass intake. More efficient supplement feeding and concentrates supply can be the result.

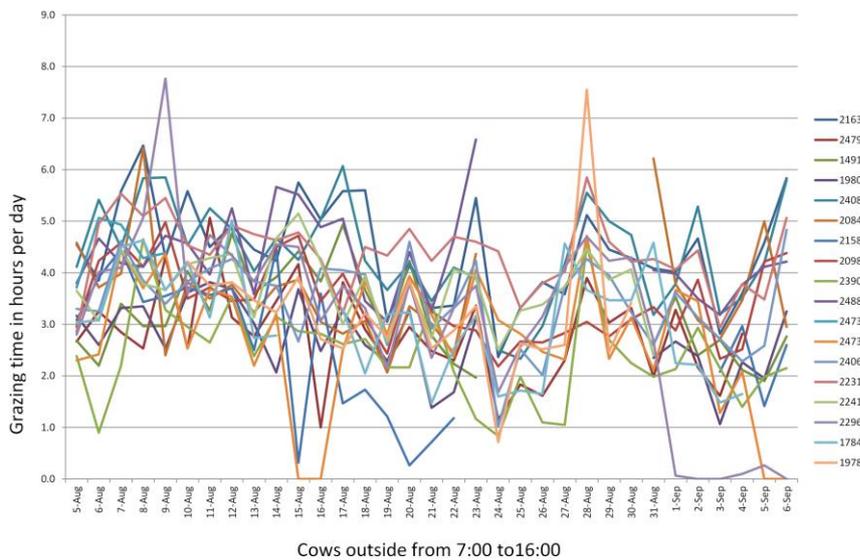


Fig 5 Information on individual grazing time can be seen

Conclusions

Organic dairy farming can use innovative technology and best practice management experiences for improving grazing results. Especially wireless contact to gates and sensors attached individually to cows' halters, can save labour and resources.

References

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