

Happy Dutch organic calves: Suckling systems in organic dairying in the Netherlands

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Summary

Organic dairy farmers in the Netherlands, supported by the Louis Bolk Institute, developed a calf rearing system in which newborn heifer calves suckle their mother or a nurse cow up to three months of age. Consumers played an important role. Their critical questions made farmers take the initiative to investigate and develop an alternative way (more animal friendly) to raise organic dairy calves. Increased animal welfare and health were the focus of system development, but the practical and economic feasibility of the rearing system also received attention. Farmers implementing a suckling system aim to raise well-developed dairy cows that fit easily into the dairy herd and are adapted to the existing farming conditions. Natural bonding between calves and cows is allowed: calves suckle their mother or nurse mother. The development and implementation of the calf rearing system was followed in three consecutive phases, and aspects of calf health, housing, and milk production were assessed. Suckling of the mother or a nurse cow had a positive effect on the live weight development of the calf. During the process some practical problems had to be solved. However, suckling systems seem a worthwhile contribution to enhance animal welfare in organic dairying.

Introduction

Modern dairy farming is characterised by increasing farm size, high levels of mechanisation, labour efficiency, and strict hygienic rules. Although animal welfare is important, it is sometimes considered to be identical to a combination of good animal health and a good level of production. Specific components of animal welfare, such as the possibility to practice maternal behaviour, social learning, and contact between cow and calf are limited or absent, mainly because they are considered hazardous for animal health or production.

The organic way of producing stands for a more animal friendly and natural approach. However, in organic dairy farming the majority of newborn calves are removed from their mothers within 24 hours after birth. Consumers who are in contact with dairy farms are becoming increasingly critical about this early separation of mother and calf. Some organic farmers also are not satisfied with this situation. They are looking for ways to increase animal welfare in their milking herds and to show consumers the viability of practices that increase animal welfare. To do so, some organic dairy farmers have introduced suckling systems. Besides increased welfare, farmers also anticipate improved technical performance such as faster growth and a higher weaning weight resulting in lower age or higher weight at first calving. Finally, farmers aim for improved animal health. By allowing controlled contact between young stock and older animals, farmers hope that heifers will get increased immunity because the older animals have developed resistance towards a wider range of farm-specific germs, which may be transferred to the young animals.

This article reports on the experiences and findings during the different stages of the development and implementation process of suckling systems on organic farms in The Netherlands.

Materials and methods

The results presented in this paper are based on research and development activities on suckling systems in organic dairy farming in the Netherlands carried out in the period 2002-2008. The research and development activities can be divided into three distinct parts or phases:

1. *On-farm system development*

For the first phase, two organic farmers who were willing to change their existing calf rearing system into a suckling system were selected. Herd size at both farms was around 70 dairy cows. One farm had a traditional cubicle stable, the other had a deep litter stable. The shaping of the

suckling system, farmers' experiences, data on live weight gain of calves, and mother and calf behaviour were systematically collected and analysed in two consecutive Master of Science (MSc) projects. The focus was on incorporating a suckling system into the existing farm situation and reducing the stress for calf and cow at weaning.

The development of suckling systems and data on live weight gain of calves were also followed on another group of five farms working with suckling systems, although less intensively.

2. *On-farm experimental comparison of calf rearing methods*

Results of the first phase indicated that suckling systems work, but that experimental evidence was required to convince farmers and policy makers. Therefore an on-farm experiment was designed. Because farms were supposed to have at least one year's experience with suckling systems, only eight out of a total of 350 organic dairy farms qualified to be selected as experimental farms. Three rearing methods were compared: bucket feeding of artificial milk; bucket feeding of fresh bulk (tank) milk; and a suckling system. On two farms all three rearing methods were compared; on a third farm only bucket feeding of artificial milk and suckling were compared. Not all farmers were prepared to use single suckling of the mother. Therefore two suckling systems were allowed (see figure 1). Each rearing method on each farm involved six to seven calves. Farmers were trained to conduct part of the observations and measurements. Variables assessed included live weight development, disease incidence, treatments and accidents, and milk production and milk quality of mothers as well as of calves raised in the different rearing systems. The calves' milk consumption was estimated. Preliminary results have been published in Wagenaar and Langhout (2007); final results will be published early in 2009.

3. *Evaluation of technical performance of dairy farms using suckling systems in calf rearing*

In 2007 the Animal Sciences Group of Wageningen University and Research and the Louis Bolk Institute started research on general animal health and disease resistance of organic dairy cows. One hundred thirty organic farms (35% of the total in the Netherlands) enrolled in this research. The farm data and in-depth farm information made available in this research created the opportunity to have a closer look at the performance of farms working with a suckling system. Thirty-two farmers indicated they allowed calves to suckle their mothers or a nurse cow after birth. Out of these 32 farms, 11 were selected for evaluation. They applied a suckling system that allowed calves to suckle for 75 to 105 days after birth. They started using a suckling system before 2005 and provided the researchers access to digital milk records over the period 2004-2006. Different aspects of the technical performance of these 11 farms were evaluated.

A more extensive description of the material and methods of parts (1) and (2) can be found in Wagenaar and Langhout (2007) and of part (3) in Wagenaar and Smolders (2008).

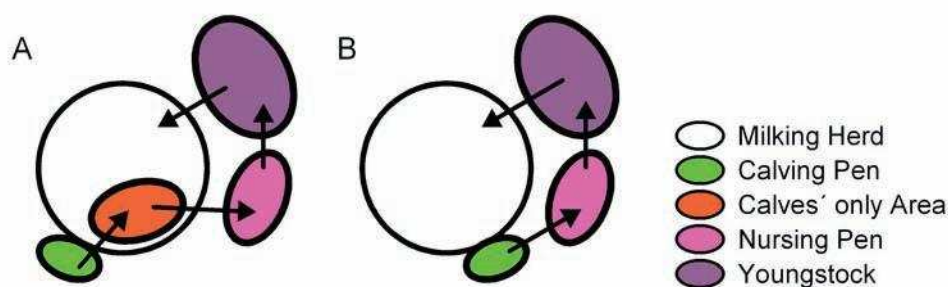


Figure 1. Different suckling systems used in the on-farm experiment; A Single Suckling of mother, B Multiple Suckling of mother, followed by suckling of nurse cow. (Figure made by Jasper van Ruth, JvR architects.)

Results

On-farm system development

In the development of a suckling system, two main aspects were considered. The first was the incorporation of the rearing method within the existing housing facilities and the procedures for milking used at the farm. The second was the development of the calf itself.

Incorporation of a suckling system into existing housing facilities and milking procedures

Both farmers initially started with a system of single suckling of the mother with additional machine milking. However, they experienced that calves moving around freely in the dairy herd led to practical problems. The most important problems were increased activity (unrest) in the herd due to the presence of calves and the separation of cow and calf during machine milking, which prevented cows from letting down their milk. Poor milk letdown was associated with a loss of marketable milk and an increased risk of problems with udder health. The farmers also were critical of the ad libitum milk consumption of calves and calves suckling other cows (aunties), both resulting in less marketable milk. While some of these problems could be partly solved, the farmers could not find complete solutions. After consultation with involved researchers, the farmers moved towards multiple suckling of nurse cows without machine milking. Multiple suckling requires housing space outside the herd, where one to three cows can nurse three to eight calves. Putting more cows and calves together in one group resulted in poor oversight and poor hygienic conditions. Because housing space was limited and expensive, the farmers started to aim for a calving peak in spring - early summer. In this way they could keep nurse cows and calves in an outside paddock, thereby reducing space requirements and also improving hygienic conditions.



Photo 1. Single suckling was successfully implemented in existing housing facilities.
Photo: Jos Langhout (LBI)

Development of suckling system in relation to weaning and calf development

The first results of the single suckling system with respect to the development of the calf were encouraging. The farmers did not experience many problems and the calves showed good live weight gain. Age, live weight, housing availability and the possibility of forming groups with other calves of the same age determined the age at which individual calves were weaned. Despite efforts to establish an appropriate weaning practice, many calves showed a low growth rate from weaning to one month after weaning. Separation at weaning resulted in vocalisations by cow and calf. These could last up to three days with varying intensity. Farmers tried to divert stress after weaning. They placed the calf pen close to the milking herd in such a way that the mother and calf could still see each other and/or have limited

physical contact through a fence. In some cases, space availability inside the milk barn limited optimal calf pen arrangement.

In 20% of the cases involving separating mother and calf, stress was successfully reduced. However, in most cases the calf, mother or both did not respond to the measures taken to avoid stress after weaning. As a result the calves and some mothers were disturbed and restless up to 72 hours after separation. Calves expressed their unhappiness by frequent and loud vocalisations. The farmers, but also neighbours, experienced the frequent and loud vocalisations after weaning as disturbing. This made them change from a single suckling system to a multiple suckling system. Multiple suckling implied a more gradual weaning (more calves per cow - less milk per calf) and offered farmers better oversight and control.

On-farm experimental comparison of calf rearing methods

Three calf rearing methods were tested on three different farms. Calves reared in a single suckling system gained weight very fast. More than 1 kg of weight gain per calf per day was possible. Figure 2 shows the average live weight development of calves raised with different rearing methods. Average weight at weaning (90 days) was 136 kg, 101 kg and 95 kg for the groups getting suckling, bucket-fed tank milk, and bucket-fed artificial milk, respectively. The average pre-weaning growth rate of suckled calves was 1.080 kg/day vs. 0.658 kg/day when bucket-fed on tank milk and 0.630 kg per day when fed on milk replacer. Rearing method ($P < 0.001$) and farm ($P < 0.01$) had a statistically significant effect on pre-weaning growth and live weight at 90 days of age, but not on weight gain between 90 and 365 days. The live weights at 365 days were 343, 316 and 288 kg for suckling, bucket-fed tank milk and bucket-fed milk replacer groups, respectively, which differed significantly ($P < 0.01$). This shows that the higher average live weight of the suckling group at weaning was sustained at least until the age of one year. Calves on the experimental farms did not suffer from any major health problems and the farmers did not encounter major practical constraints.

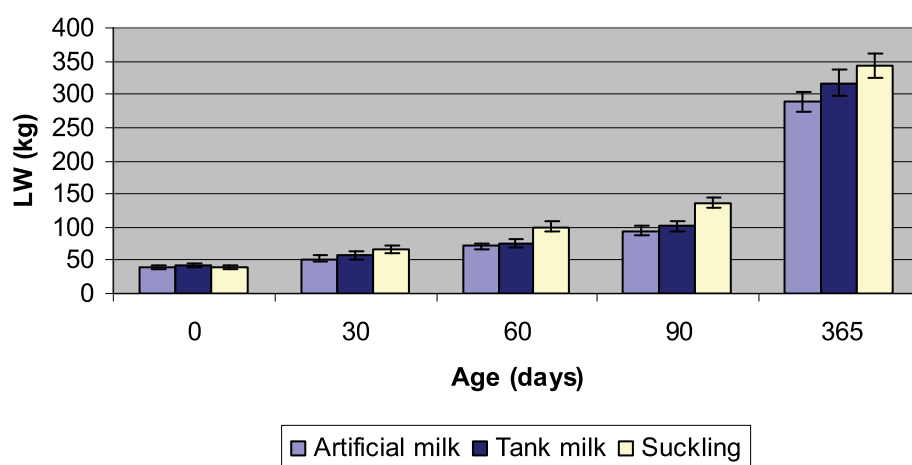


Figure 2. Live weight development of different rearing groups (adapted from Wagenaar and Langhout, 2007); average live weight (kg) plus/minus standard deviation (kg)

Evaluation of implementation of suckling systems on operational dairy farms

In 2007 a start was made to evaluate farms working with a suckling system in calf rearing. This work is ongoing and a more complete analysis will become available in 2009. Preliminary results indicate that there are no big differences between organic dairy farms that apply suckling systems in calf rearing and those that do not. Farm size was comparable; in both groups the main breed was Holstein Frisian (75%). This was followed by Blaarkop (7%) in the 'suckling' group and by Meuse-Rhine-Yssel cattle (MRY; 7%) in the 'other' group. In table 1 the average annual milk production in the period 2004-2006 is presented. A difference was found between the milk yield of 'suckling' farms (n=11) and 'other' farms (n=88). Because most suckling farms use nurse cows in suckling, the difference could not be explained by milk consumption of the calves. It was found that cows on farms that implemented suckling systems had a lower production

level. The major reason seemed to be that farmers working with a suckling system had an alternative management approach, e.g. they reduced their use of antibiotics, excluded maize silage from the ration, and had low concentrate purchases compared with the other group of farmers.

Table 1. Average annual production in different types of herds 2004-2006: milk yield, fat and protein content (adapted from Wagenaar and Smolders 2008)

Farm type	No. of cows	Days of lactation	kg milk	kg FPCM ¹	% fat	% protein
Suckling	1301	399	6534	6481	4.44	3.53
Other	10989	351	7479	7146	4.36	3.43

¹Fat and Protein Corrected Milk production

Discussion and conclusion

Farmers successfully develop and establish suckling systems. Even in a modern production system with an automated milking system (robotic milking), farmers are convinced that suckling in calf rearing adds something extra to the development of calves. Initial live weight gains of suckling calves are high. The downsides are the loss of marketable milk because of milk consumption by the calf, and stress around weaning. Although milk consumption by the calf is often considered a negative aspect, it can also be regarded as an investment in growth and development of a future dairy cow.

There is no golden formula for how to apply a suckling system; every farm has developed its own system. Single suckling of the mother is rarely practiced; most farmers go for a system with nurse cows. Weaning remains a point of concern; it causes distress for the calf, cow, and farmer. Even two-step weaning (single suckling mother for one or two months in combination with multiple suckling of nurse cow for two or one month) does not completely solve stress around weaning. To some extent 'unrest' around weaning is unavoidable, because suckling creates a bond between the (nurse) mother and calf. During five years of research, no serious health problems that could possibly be related to suckling were encountered on farms where suckling was practiced.

Suckling systems are an option to increase animal welfare and thus to further distinguish organic from conventional dairy farming. However, the decision to adopt a suckling system cannot be forced, but should be made by the farmers themselves. In order to evaluate the benefits of suckling systems in terms of animal welfare there is a need for observable and objective variables for calves and the dairy herd in general.

Introducing suckling systems in calf rearing has many implications for a dairy farm operation. Therefore the majority of organic farmers, although they are sympathetic towards welfare benefits of suckling systems, are hesitant to adopt suckling systems. Only 'organic-by-heart' farmers who have been prepared to radically change their approach to calf rearing, delegate part of their caretaking responsibilities to (nurse) cows, and persevere in fine-tuning the new rearing approach towards their farm-specific needs in a number of consecutive steps have been able to successfully implement a suckling system on their farms. Farmers who do not consider suckling in calf rearing are advised to look at other ways to improve calf and herd welfare, e.g., making sure that housing and climate are optimal and functional, that their animals are fed according to their requirements, and that they are given opportunities for social learning (for example, introducing heifers into the milking herd two months before calving).

On-farm research and development of suckling systems requires intensive follow-up, perseverance, and flexibility. In the development phase farmers start off with their ideal suckling system; however, based on how their animals react and practicality in general, the ideal system is continuously adjusted. It is important to keep track of even minor adjustments and reasons that they should be made, or whether the farmer should be patient to see the full effect of the chosen approach. Farmers also can abruptly change their approach, for example due to increasing somatic cell counts in the marketable milk. Although single suckling of the mother is preferred in terms of animal welfare, stress after weaning made farmers move

away from this practice very quickly. In the experimental phase, farmers cooperated in an excellent way by measuring the live weight of individual calves at specific dates and recording health events and behavioural aspects and taking milk samples. However, farmers cannot be expected to follow strict experimental protocols, embedded in an ongoing farming operation, for a longer period of time, even if they are given a financial reward. To measure the effect of suckling in calf rearing on future dairy cows, the animals have to be followed at least through their first lactation and preferably longer. Researchers and farmers have to settle on a feasible research set-up and data collection frequency. The final outcome can be rewarding: on-farm research and development of suckling systems generated many ideas, experiences, and valuable quantitative results.

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Photo 2. Suckling system during pasturing: added value!
Photo: Jos Langhout (LBI)

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