Livestock Science 168 (2014) 149–158

Contents lists available at ScienceDirect

Livestock Science

journal homepage: www.elsevier.com/locate/livsci

Economic comparison of a sixty day dry period with no dry period on Dutch dairy farms

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ARTICLE INFO

Article history:
Received 24 January 2014
Received in revised form
5 August 2014
Accepted 7 August 2014

Keywords:
Continuous milking
Economic comparison
Milk production
Dairy cow
Dry period
Whole farm model

ABSTRACT

In the Netherlands it is general practice that dairy cows have a dry period of six to eight weeks. Research, however, shows that omission of the dry period avoids the negative energy balance after calving with its potential negative effects on metabolic disorders, infectious diseases, and fertility. On the downside, no dry period (NDP) causes a loss of milk production per cow compared with a conventional dry period (CDP). The objective of this research was to make an economic comparison between CDP with a sixty day dry period and NDP. Data on milk production per cow and on replacement rate, being the possible result of improved health, were taken from five farms involved in a research project on the effects of NDP, both from the year before and the year after switching from CDP to NDP. These data show that the replacement rate was on average 37% in the CDP situation while it was 24% in the NDP situation. Milk production was on average 13% lower in the NDP situation while fat and protein content of the milk were 0.21% and 0.42% points higher. A whole farm dairy linear programming model maximizing labor income (returns to family labor and management) was used to determine the technical and economic results for the situation with CDP and NDP. Results were calculated for three scenarios (one with milk quota and two without milk quota), representing differences in possibilities for increasing the farm size. Results show that under each scenario NDP is more profitable than CDP. The increase in labor income varies from 20% to 42%. This means that the negative effect of a lower milk production per cow is outweighed by the positive effect of a lower replacement rate and higher milk components. Sensitivity analysis shows that under a milk quota scenario NDP always results in a higher labor income than CDP irrespective of the change in replacement rate and milk production loss. Under the scenarios without milk quota a replacement rate of 34–35% or a milk production loss of 19–21% with NDP would result in a comparable labor income. The conclusion of this research is that NDP gives better economic results than CDP in a dairy quota situation for a broad range of replacement rate reduction and milk production reduction. In a situation without dairy quota, the replacement rate should be at least 3% points lower and milk production should be not more than 19% lower in the NDP situation to end up with better economic results.

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1. Introduction

High-producing dairy cows typically experience a negative energy balance after calving. This negative energy balance results from a fast increase in energy requirements

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http://dx.doi.org/10.1016/j.livsci.2014.08.004
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for milk production, while feed intake capacity in early lactation is limited. A negative energy balance in early lactation is related to an increase in incidence of metabolic disorders (Grummer, 1993), infectious diseases (Collard et al., 2000) and reduced fertility (Butler, 2003). No dry period (**NDP**) has been proposed as a management strategy to improve energy balance in early lactation (Grummer and Rastani, 2004).

It is well known that complete omission of the dry period reduces milk production in the subsequent lactation. Milk production losses amount up to 24% when compared with cows with a dry period of eight weeks (e.g., Andersen et al., 2005; Mantovani et al., 2010). Recently, a Dutch study involving commercial herds concluded that applying NDP for all cows in the herd resulted in a reduction in 305-d milk production between 12% and 32% (Steeneveld et al., 2013). It is, however, also known that NDP results in an increase in milk fat and milk protein content (Andersen et al., 2005; de Feu et al., 2009), and that there is an additional milk yield before calving (Rastani et al., 2005; Mantovani et al., 2010; Schlamberger et al., 2010). It is also reported that NDP results in an earlier ovulation postpartum (Gumen et al., 2005; de Feu et al., 2009) and an improved metabolic status of the cow (Andersen et al., 2005; Rastani et al., 2005). No dry period, therefore, may lead to a longer cow longevity and thus a reduced replacement rate.

Switching to NDP for all cows in the herd will have economic consequences. For instance, the reduced milk production with higher fat and protein content will result in a change in milk revenues, but also in changed feed requirements which might influence costs. In addition, farmers might adjust their herd size to compensate for the lower milk production, or farmers might lease out milk quota. Studies investigating the economic impact of applying NDP for all cows in the herd are not available, but some studies investigated the economic impact of short dry period compared with a conventional dry period length. Sørensen et al. (1993) used a stochastic simulation model to estimate effects of various dry period lengths, and concluded that maximal net benefit would be obtained with a dry period of seven weeks. Santschi et al. (2011a) used data of 13 commercial Canadian herds and found that cows with a short dry period (35 days) had a higher milk production than cows with a conventional dry period length (60 days). Subsequently, a partial budgeting approach was used to evaluate the economic impact of the short dry period compared with the conventional dry period (Santschi et al., 2011b). Based on the scenario where available milk quota was kept constant and herd size was adjusted, it was concluded that switching to a short dry period increased the net annual income for the farm. Based on the scenario where the number of cows was kept constant and additional quota was bought, switching to a short dry period resulted in an even higher annual net farm income.

The objective of this study is to determine the economic impact at farm level of applying NDP for all cows in the herd compared with applying a sixty day dry period (**CDP**). Results for both situations are determined using a dairy farm model developed by Berentsen and Giesen (1995) to represent an average Dutch dairy farm in 2011. The average farm is based on data from the Agricultural Economics Research Institute in the Netherlands (LEI, 2012). Specific data on milk production and replacement rate is based on five Dutch commercial dairy herds who participated in a research project on dry period length effects (Steeneveld et al., 2013).

2. Materials and methods

2.1. Data

Five commercial Dutch dairy herds (herds A–E) started between October 2010 and April 2011 voluntarily with an omission of the dry period for all cows in their herd. Information about these five herds, from the final year applying a CDP and the succeeding year applying NDP, is given in Table 1. Size of the herds varied between 54 and 170 cows. The replacement rate averaged over the five farms in the year before applying NDP was 37%, and this percentage decreased to 24% in the year after the start of applying NDP. The average replacement rate in the Netherlands for the years 2007–2010 was 31.5% (Mohd Nor et al., 2014). Average milk production (per cow/year) before applying NDP was 8878 kg, and this decreased to 7714 kg

Table 1
Data from the five farms from the year before and from the year after switching from conventional dry period (CDP) to no dry period (NDP).

Farm	A		B		C		D		E		Average	
	CDP	NDP	CDP	NDP	CDP	NDP	CDP	NDP	CDP	NDP	CDP	NDP
Herd data												
Dairy cows (#)	147	170	125	131	84	85	92	89	55	54	101	106
Replaced dairy cows (#)	69	37	61	24	33	22	17	29	18	11	40	25
Replacement rate (%)	47	22	49	18	39	26	18	33	33	20	37	24
Production data												
Milk production (kg/cow/year)	9014	7292	8491	8231	8187	7338	9929	9005	8770	6704	8878	7714
Fat (%)	4.82	4.85	4.56	4.90	4.95	5.25	4.89	4.90	4.23	4.60	4.69	4.90
Protein (%)	3.58	3.91	3.65	4.13	3.62	4.25	3.55	3.97	3.30	3.54	3.54	3.96
FPCM (kg/cow/year)[a]	10,014	8271	9212	9492	9238	8813	11,093	10,298	8995	7260	9710	8827

[a] Fat and protein corrected milk.

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