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Converting to organic dairy farming: Consequences for production, somatic cell scores and calving interval of first parity Holstein cows

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Abstract

This paper aims to describe the changes prompted by conversion to organic farming for milk production and fertility of first parity Holstein cows.

Data was collected for Dutch organic farms, with a distinction made between long-standing-organic farms, converted organic farms and a reference group of conventional farms. The percentage Holstein blood in the herds, milk production (kg milk, % milk fat, % milk protein), somatic cell scores (SCS), calving interval (CI) and age at first calving (AFC) were described over time. An animal model was used to estimate the effects of conversion on different traits based on data from converted organic farms.

Milk production was lower and somatic cell counts were higher on long-standing-organic farms than on conventional and converted organic farms. Interestingly, at pre-organic farms, i.e. before their conversion, the milk production level was already lower than at conventional farms.

The estimates from our statistical analysis showed a highly significant decrease in milk yield and protein percentage due to conversion. Also fat content decreased, SCS increased and AFC increased significantly.

It can be concluded that the conversion to organic farming is a gradual process over years. Dutch farmers who decided during the late 1990s to convert to organic farming, represented a specific group of farmers distinct from conventional farmers, which was reflected by lower milk yields, milk fat percentage and protein percentage before conversion as compared to conventional farms. During conversion, significant changes in milk production, protein and fat contents and somatic cell scores took place. Age of first calving is an important difference between organic and conventional farming.

Keywords: Conversion; Organic farming; Milk production; Calving interval; Somatic cell score; Age at first calving

1. Introduction

Converting to organic production necessitates changes in farm management which in turn can be

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expected to have consequences for a farm's characteristics and output. By the end of the 20th century, about 3% of European farmers had converted to organic farming (SÖL, 2003) in response to a growing market for organic products. In order to plan a conversion to organic production, basic information about expected changes is required. Little information is available about milk production, fertility and health of animals that experience a farm's conversion to organic. Information that we do have is based on questionnaires (Nauta et al., 2001; De Jong and Van Soest, 2001) and studies of relatively small groups of organic herds with or without statistical analyses to account for differences in breeds and relationships between animals (Kristensen and Kristensen, 1998; Toledo et al., 2002; Kristensen and Mogensen, 2000; Bennedsgaard et al., 2003; Vaarst et al., 2003; Hovi et al., 2003). For our research we were able to use all the available production and fertility records from calvings from 1990 to 2003 at almost all organic dairy farms in the Netherlands, precluding the risk of selecting a specific group of organic farms and giving us insight into the development of production and fertility over more than a decade.

Differences between organic and conventional dairy farming can be expected due to restrictions on the use of chemical fertilizer and concentrates (EU, 1999). Organic roughage is produced without chemical fertilizer and consequently has lower energy and protein compounds (Padel, 2000). Organic farming regulations also restrict the use of concentrates and set a limit on the content of conventional ingredients in the concentrates (EU, 1999). In practice, the latter restriction will act as a financial restraint on the use of concentrates as well. On top of this, many organic farmers simply opt for a low input of concentrates from an organic point of view. With more organic roughage in the diet and a lower intake of energy and protein from concentrates, milk production is expected to decrease. It is also expected that cattle with high genetic potential for production will have particular difficulty coping with organic environments (Hardarson, 2001; Kristensen and Struck Pedersen, 2001; Nauta et al., 2001). Our interest, therefore, is directed especially at Holstein cattle.

The aim of this paper was to describe the changes prompted by conversion to organic farming, focusing on milk production traits, somatic cell score and calving interval of first parity Holstein cows in those herds.

2. Material and methods

2.1. Data and edits

The data used were 305-day milk production records and accompanying fertility records, somatic cell count records of first lactations. Data were obtained from the Dutch Herd Book and milk recording organization (NRS). The data on organic farms were identified by using the addresses of all Dutch organic dairy farms in 2002. For the organic farms also their date of conversion was known. This information was obtained from Skal, the Dutch organic certification organization for organic farming. In 2002, 472 organic dairy farms were registered with Skal. The NRS database contained production records of 404 of these farms. Data from conventional farming was collected by a random selection of 966 conventional farms. These farms were situated in the same areas as the organic farms.

The data was edited in such a way that it only contained records that would meet the criteria as described by the NRS (NRS, 2002), e.g. only records of cows with a calving between 17 and 36 months of age and days open between 30 and 250 days. Additionally, in this study we excluded data from animals which moved between farms during their lactation. We could select 46,282 first lactation records from 367 organic farms and 184,993 first lactation records from 966 conventional farms. All cows calved between January 1990 and April 2003.

Three different data sets can be distinguished:

Conventional = data from the 966 conventional farms.

Converted-to-organic = data from 325 farms that converted to organic production somewhere between 1990 and 2003, records were available from the period before and after conversion.

Long-standing-organic = data from 42 organic farms that were already organic before 1990, only records produced under organic conditions were available.