Current state of the feeding systems on dairy farms in the Principality of Asturias (Spain)

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Abstract

Nowadays, a wide range of dairy farms coexist: from family farms to large-scale dairy farms. In order to determine the feeding systems of the dairy farms in Asturias (Spain), a sample of close to 2% of the total number of dairy farms (2,446) was randomly selected and surveyed. Farms were stratified according to their milk quota into four groups: <175, 175-325, 325-500 and >500 Mg year^{-1}. Milk yields in each group were 6,120, 7,525, 7,997 and 9,537 kg cow^{-1} per lactation, respectively (P<0.05). The 54.5% of the cows in smaller farms use grazing, while this percentage decreases to 7.1% in the larger farms. The preserved forage used is different between groups. Maize silage is more frequently used on large farms (0, 41.2, 80 and 100%, respectively), while the use of grass silage is higher in smaller farms (100, 76.5, 70 and 64.3%, respectively). In conclusion, feeding systems are influenced by the size of the farms. The use of grazing is associated primarily with the smaller farms (less than 175 Mg milk year^{-1}), whereas maize silage has become the main part of the diet on larger farms (more than 325 Mg milk year^{-1}).

Keywords: dairy cow, feeding systems, silage, grazing

Introduction

In recent decades, the dairy sector has shown a global tendency toward an increase in the number of dairy cows per hectare. This has resulted in the current situation, in which there are a wide variety of dairy farms, ranging from family farms to large and technologically advanced farms, each with different levels of intensification. Milk production in the North of Spain is based on an increased use of concentrates in the diet and in the number of dairy cows per farm (Alvarez *et al.*, 2008). This tendency also causes the adoption of new technologies, such as silage (specifically maize silage), use of a mixer wagon to prepare diets, automatic milking, etc. In addition, pasture-based systems allow farmers to produce milk with lower average costs than high-input systems (Soder and Rotz, 2001). The aim of this study was to describe the feeding systems that coexist on dairy farms in the Principality of Asturias (Spain), classified according milk quota levels.

Materials and methods

According to official data, there are currently 2,446 dairy farms in the Principality of Asturias. For this study, farms were classified depending on their milk quota, and were distributed into four groups: (1) lesser than 175 Mg year^{-1}; (2) between 175 and 325 Mg; 3) from 325 to 500 Mg; and (4) more than 500 Mg year^{-1} (layers 1, 2, 3 and 4, respectively). A sample close to 2% of the total dairy farms was randomly established. Thus, there were 11 farms in layer 1, 17 farms in layer 2, 10 farms belonged to layer 3 and 14 farms in layer 4. A survey was compiled to obtain data about the characteristics of the selected farms. This survey was structured in the following blocks: (a) farm identification; (b) herd composition; (c) milk production; (d) usable agricultural area; (e) feeding management; (f) farmer labour and educational level; and (g) cows' reproductive status. This work is focused on the point 'e', which collects data about the feeding systems of dairy farms, such as grazing or no grazing, grazing season, time spent grazing per day, arable land surface and annual forage crops, type of preserved forages, kind of silages (ditch, trench, tower, round bale, etc.), amount of feed brought from outside the farm, and methods used to make the ration (with a mixer wagon or not). Surveys were conducted through personal interviews. Visits to farms

began on 3 December 2013 and 52 surveys were completed by 11 March 2014. Means were calculated for each of the four layers. Differences in milk production between groups were examined using the GLM proc (SAS, 1999).

Results and discussion

The average number of cows per herd in each layer was higher as the volume of quota increased. Farms in layer 1 had 18 cows, farms belonging to layer 2 had 34 cows, and layers 3 and 4 had 54 and 99 cows on average, respectively. Layer 1 presented the lowest level of milk yield per cow and per lactation, with 6,120 kg cow^{-1} (P<0.05). The following layers were progressively increasing their milk yield levels per lactation: layer 2 presented 7,525 kg cow^{-1}, layer 3 had 7,997 kg cow^{-1} and layer 4 reached the highest level of milk production, with 9,537 kg cow^{-1} (P<0.05). The cultivated area was 13.7 ha in farms of layer 1; 20.4 ha in layer 2; increasing to 27.8 ha in layer 3 and 52.8 ha in layer 4. However, the size of the farm was inversely related to grazing practice. Thus, the 54.5% of smaller farms (which belonged to layer 1) used grazing. By contrast, the proportion of farms that used grazing decreased as the farms became larger. In this way, the proportions of farms that grazed were 29.4% and 30% in layers 2 and 3, respectively. The lowest use of grazing was found in layer 4, where the percentage of farms that grazed was only 7.1%. Grazing takes place mainly in spring, summer and autumn, with an average of 9.9 hours per day spent grazing. In winter, cows were grazing for only 3.4 hours. When zero-grazing is considered, the percentage of farms that offer fresh grass in the stable reached 72.7% in layer 1, but it decreased to 58.8%, 30% and 14.3% in layers 2, 3 and 4 respectively.

The most common forage rotation (including two crops by year) was maize forage in summer and ryegrass (Italian or hybrid) in winter. Therefore, maize silage was the most frequently preserved forage used to feed dairy cows on the largest farms, with 100% of them using it. The proportion of farms that used maize silage in layer 3 was 80%, and in layer 2 it was 41.2%; finally, the smallest farms did not use maize silage for their milking cows. By contrast, smaller farms more frequently used grass silage to feed dairy cows. In this sense, all farms (100%) belonging to layer 1 used grass silage. This percentage decreased gradually in the following layers, from 76.5% for layer 2, 70% for layer 3, and to 64.3% for layer 4. The maize silage is mostly made on platform or trench silos, while the traditional form for grass silage is in round bales due to the ease of use and for transport between paddocks. The use of mixer-wagon for preparing the ration was more widespread on larger farms, of which 92.9% used it, whereas no small farm (layer 1) used a mixer wagon. The proportions of farms that used a mixer wagon in layers 2 and 3 were 35.3% and 60%, respectively.

Conclusions

The dairy farms in the Principality of Asturias (Spain) have different feeding systems according to their milk quota. Maize silage has become the mainstay of the diet on larger farms (those with more than 325 Mg milk year^{-1}), whereas grazing is associated primarily with smaller farms (less than 175 Mg milk year^{-1}).

Acknowledgements

Work supported by Spanish Project INIA (Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria) RTA2012-00065-C05-01 co-financed with the EU ERDF. J.D. Jiménez-Calderón is the recipient of an INIA Predoctoral Fellowship.

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