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Breeding decisions of organic dairy farmers

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Introduction

The research presented is part of a project exploring the demand for and possibilities of a more organic type of selective breeding in organic dairy production. This demand is differentiated by different options on what should be the basic principles of organic breeding, i.e. a more principle stand versus more a pragmatic one (Nauta et al., 2005). Also changes in production environment and genotype by environment interaction (GxE) play a role (Nauta et al., 2006a; Nauta et al., 2006b). Further differential farm development strategies, such as specialised dairy versus multifunctional farms strategy (Milone & Ventura, 2000) or a low input strategy or farming economically versus high input/high output or intensive farming, have influence on the demand for breeding (Van der Ploeg and Renting, 2000).
The last step in this research project, is to outline differential routes towards a more organic (selective) breeding. The basic question is, if organic farming needs specific type of animals and breeding that are adapted to the organic regime and principles. The latter is more likely while organic farming is very heterogeneous and is more dependent on the local agro-ecological system. It is also more multifunctional in nature, serving multiple goals and combining different activities at a farm. Research has revealed different strategies in organic farming (Padel, 2000; Verhoog et al., 2003). These different strategies also result in different circumstances and might need different functions with respect to theirs animals.
In the survey two opposing strategies were used; (multi)functionality of farming and low vs. high input farming. The demand for selective breeding was analysed for these strategies. hypothesising that the different strategies have a differed demand for breeding.

Materials and Methods

In a exploring survey Dutch organic dairy farmers were asked about their main farming strategy, farm characteristics, breeding goal, prevalence for different production, conformation and functionality traits of animals and the breed or crossbreed they wanted to go on with in the future. Based on this survey farms were divided into two pairs of opposing strategies: Specialised Dairy Farming vs. Multifunctional Farming, and Low Input Farming vs. High Input Farming (based on input of concentrates per milking cow. Differences in demand for breeding were analysed for these dimensions using SPSS.

Results

Clear differences were found between the characteristics of the farming strategies (see Table 1). Despite of these differences, the breeding goal and preferred characteristics of the animals were very similar for all farms.
Table 1: Characteristics of specialized milk and multifunctional farms

	Specialized Milk farming N=74	Multi-functional farming N=58	Low Input Farming N=48	High Input Farming N=63
	Mean (sd.)	Mean (sd.)	Mean (sd.)	Mean (sd.)
Total farm area (ha)	52 (22)	51 (29)	53 (30)	56 (25)
Quota (tons)	380 (154)	282 (164)	287 (161)	365 (138)
% nature grass*	0.14 (0.18)	0.19 (0.23)	16 (17)	18 (20)
No. Milking cows	58 (21)	48 (25)	48 (22)	55 (20)
Milk per ha (kg)	7656 (2540)	5737 (2147)	5511 (1864)	6990 (2164)
% Holstein cows in herd	75 (28)	37 (31)	44 (35)	68 (32)
Concentrates/cow /yr (kg)	1232 (376)	973 (395)	764 (427)	1381 (290)
Average prod./cow (kg)	6634 (1306)	5820 (959)	5811(1106)	6577 (1056)

* grass from nature land with low energy and protein due to low fertilizing and late harvesting.

Farmers wanted a weight of about 43 % for functional traits in the breeding goal, 32% for production traits and 25 for conformation traits. For production traits, the main focus was on a long productive life, a good milk yield per lactation and high milk compound (protein and fat). The most important functional traits were fertility and udder health. For conformation the conformation of the udder and quality of legs were most important.
Surprisingly, big differences were found between the choices for breeds and crossbreeds between the strategies (see Fig. 1). Specialized Dairy farming and High Input Farming had the highest choice for Holstein cows. Multifunctional Farming and Low Input Farming chose more for Dutch breeds like Maas-Rijn-IJssel, Groninger White face cattle and Dutch Friesians (FH).. In all groups we found many farmers that chose for crossbreeding, mostly from out Holstein cattle but also with MRIJ and other more robust breeds. Overall there were 18 different Holstein (two- and three-way) crossbreeds combinations chosen for the future by 42 farms. For crossbreeding MRIJ there were 6 different combinations chosen at 10 farms.

Table 2: Distribution of choices (in percentages) for breeds and crossbreeds of the different breeding strategies of organic farmers.

	Specialized Milk farming	Multi-functional farming	Low Input Farming	High Input Farming
Holstein Friesian (HF)	31	2	6	25
HF-crossbreed	37	28	28	30
Jersey	3	2	4	0
Dutch breeds	10	36	36	17
Foreign breeds	12	7	6	15
Other	7	26	19	12

Discussion

The results show that many organic dairy farmers are searching and experimenting with many different breeds and crossbreeds. Farmers did have problems with the durability of Holstein cows under organic conditions (Nauta et al., 2001). With using new breeds farmers probably try to get robust cows. However, for many farmers, the choices for breeding shows little relation to their farming strategy and it can be questioned what the basis is of the choices they make. The growing supply of foreign breeds might play a role in this. But there is no specific information available on the suitability of these breeds for organic farming. Such breeds have in general stronger claws, better fertility etc. However, research should been carried out on the overall suitability of these breeds for organic milk production. Especially of the crossbreeds combinations little is known, except that crossbreeding will result in phenotypic variation after the F1 cross, which might be a problem for farm management.
The growing choice for Dutch native breeds is remarkably. It might be an indication that breeding has become a new dimension: the preference and saving of native rare breeds. This might be more accepted in organic farming and native breeds might give a better recognition of organic production like brown eggs have for organic eggs.
Based on the choices for breeds and crossbreeds, specific groups with a coherent breeding demand are present. However, for a conventional approach for selective breeding (bull testing schemes, estimation of breeding values) these groups are very small. Farm based breeding using Kin-breeding and natural mating (Nauta and Cazemier, 2005) could be an option for small dual purpose breeds. Holstein breeding and crossbreeding might need an international approach and information exchange with conventional breeding schemes. With a common breeding goal and different breeds, a new organic breed could emerge.

Conclusion

Farmers are experimenting and searching for the type of cow that best fits their organic principles, production environment and farm strategy, resulting in a large diversity of breeds and crossbreeds. This questions the actual need and feasibility of an overall breeding goal. Farmers need information on the suitability of different breeds and crossbreeds for organic farming to help them to select the best animals. Other aspects of breeding becomes important in organic farming, like the breed it self. The colour of the cows might be used for the recognition of organic dairy production.

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