Improvement of animal health indicators in German organic dairy farms through 'Stable Schools'

SOLVEIG MARCH[1], JAN BRINKMANN[1], CHRISTOPH WINCKLER[2]

Key words: stable schools, dairy cattle, animal health, knowledge exchange

Abstract

In this study we initiated four regional stable schools focusing on animal health with in total 19 German organic dairy farms. A modified stable school approach was used, i.e. providing the farmers with detailed information on the health status of each farm. The participating farmers showed a positive attitude towards this concept. Accordingly, the compliance regarding implementation was high. More than two thirds of all 123 recommendations given by the stable school groups to host farmers were implemented. The degree of implementation was similar to the level achieved in other intervention studies using a face-to-face advice. Across all farms, cleanliness of the cows improved significantly over the two years monitoring period. In nine farms which had implemented measures regarding udder health, the somatic cell score improved significantly and milk yield increased as compared to the control peer farms. However, treatment incidence for mastitis and antibiotic drying-off remained unchanged.

Introduction

Production diseases such as mastitis, metabolic disorders and lameness, play a considerable role in organic dairy farming (e.g. Ivemeyer et al. 2012) and prevention is crucial to maintain herd health and welfare. In general, there is no lack of scientific knowledge about possible risk factors of production diseases, but rather on knowledge transfer and preventive concepts.
Motivation of farmers to implement corrective measures may be achieved through the stable school concept, which aims at common learning in farmer groups. It has previously been successfully implemented in Danish organic dairy farms to promote animal health and reduce the use of antibiotics (Vaarst et al. 2007). This concept has been adapted from farmer field schools and developed and used e.g. by FAO in Asia and Africa.

Material and methods

Total duration of the pilot study was 36 months. After an initial data collection during winter 2010/11 which aimed at objectively assessing the health state of the farms, 4 regional stable schools with in total 19 farms willing to actively participate were started (average herd size 57 cows, range 23-178). All farms had loose housing systems (11 cubicle-housed, 8 straw yard systems) and participated in a milk recording scheme.

Information on the current health status of the farms was provided to the farmers and served as basic information for regular meetings of the stable schools (modified from Vaarst et al. 2007). This information comprised analyses of milk recording data and treatment records as well as animal based parameters assessed in the herds (e.g. body condition, locomotion, cleanliness and leg injuries). The host farmer defined the agenda together with the facilitator, who guides the process but does not provide problem-related input, whereas the group members analyse and suggest changes regarding the farm-specific situation.
After a 1-year cycle when all members of a group had met once at each farm, a halftime evaluation was carried out. At these 2nd farm visits the implemented measures were evaluated and all indicators of herd health assessed again to evaluate changes and to update the farm-specific information fed back for the next stable school cycle. At the end of the winter housing period 2012/13 a final assessment of health state was carried out in order to evaluate the effectiveness of this tool in terms of improving herd health. Furthermore, we assessed the implemented measures due to the stable school process in the course of the whole project period.

Analyses were carried out at farm level and the analysed data comprised four 12-month-periods. Incidences of treatments were obtained as number of cases per cow and year. Data of monthly milk recordings were calculated as herd average in the respective period. The average of the first two 12-month-periods was used

[1] Thuenen-Institute of Organic Farming, Germany, www.ti.bund.de/ol,
eMail: solveig.march@ti.bund.de / jan.brinkmann@ti.bund.de

[2] University of Natural Resources and Life Sciences, Vienna; Department of Sustainable Agricultural Systems, Austria, www.boku.ac.at,
eMail: christoph.winckler@boku.ac.at

as a baseline before stable schools meetings started in April 2011 (start of intervention). Results from the first farm visit for additional health indicators directly assessed in the herds were also taken as baseline. The development of herd health was subsequently monitored for two years.
Across all 19 farms, mixed models for repeated measures were used to analyse the effect of time after starting stable schools meetings. Furthermore we used mixed models for repeated measures to analyse the effect of group (G: intervention vs. control group) and year (time after intervention/ start of stable school process), as well as their interaction (G*Y=group*year) on the parameters of dairy health, considering farms implementing measures recommended by their colleagues to improve udder health as intervention group (I) vs. the remaining farms as control group (C).

Results

Recommendations and subsequent implementation of measures
In the two cycles of stable school meetings with in total two meetings on each project farm, in total 123 measures which had been recommended by the peer farmers to improve herd health were regarded useful by the host farmers after the group discussions. The most common topics addressed were metabolic health and feeding strategies (in total 45 recommendations for 16 farms), in particular possibilities to avoid subclinical ketosis in the early lactation (14 recommendations for 4 farms), and udder health (30 recommendations for 8 farms). Other areas were calf and young stock health (13 recommendations for 6 farms), fertility, lameness and claw health, and aggressive behaviour, especially of horned cows. Out of all recommendations given by the group members, slightly more than two thirds were implemented within the project period (completely or at least partly). The degree of implementation was similar to other intervention studies, which partly required considerably more input of the advisors/ scientists (e.g. Green et al. 2007). Further 36 measures, mainly dealing with udder health and rearing of youngstock, were implemented by the project farmers without having been explicitly discussed during the group meetings.

Development of selected herd characteristics and health parameters
Across all farms, average herd size increased significantly (56.9->58.9->61.5 cows/ herd, $p<0.008$), while mean milk yield and herd age did not change over the two years period. We also found a significant reduction of the percentage of cows with dirty udders (65.9->44.6->39.9%; $p<0.001$) and bellies (38.8->27.6->31.4%; $p<0.001$).

In the intervention farms which had implemented measures to improve udder health recommended by their colleagues (I), milk somatic cell score (SCS) significantly improved (interactions group*year: p=*0.003*) whilst treatment incidence for mastitis and also the percentage of animals with antibiotic dry-off treatments stayed unchanged (Table 1). At the same time the percentage of cows with a fat-protein-ratio≥1.5 in the first 100 days in milk decreased and milk yield increased in I-farms.

Discussion

In this study, levels of SCS were comparable with results from other European studies (Gay et al. 2007, Ivemeyer et al. 2012). In comparison with control farms, udder health significantly improved on farms that had implemented measures: a reduction of SCS was found, whereas milk somatic cell count slightly deteriorated in the control group. Comparable effects have been found in a study to improve udder health in Switzerland (Ivemeyer et al. 2008). Contrary to findings of Ivemeyer et al. (2012), the treatment incidence of mastitis remained unchanged in both groups of farms, but on average it was markedly lower than reported in other studies on organic dairy farms (March et al. 2011, Bennedsgaard et al. 2010).

The present findings provide evidence for improvements of health in commercial dairy farms in response to the stable school approach. The self-determined and farmer-owned approach appears to be highly motivating thus leading to a high implementation rate of measures.

Table 1: Development of selected parameters during 2 years after initiation of the stable school process (I=9 intervention farms, which actually implemented recommended measures to improve udder health1; C=10 control farms); mean (sd) and level of significance for the effects group (G: I vs. C), year (Y: 2009/ 10, 2011, 2012), as well as their interaction (G*Y)

		2009/ 2010 Initial situation	*2011*	*2012*	*p*
SCS (Somatic Cell Score)[1]	I	3.36 (0.30)	3.24 (0.38)	3.10 (0.40)	*G: 0.507* *Y: 0.466* ***G*Y: 0.003***
	C	3.06 (0.54)	3.06 (0.42)	3.20 (0.52)	
Treatment incidence Mastitis (%)[2]	I	10.3 (8.4)	7.9 (7.7)	9.0 (11.7)	*n.s.*
	C	12.7 (11.6)	12.0 (12.4)	11.8 (12.7)	
Dry-off-treatments with antibiotics	I	29.5 (30.3)	22.8 (25.8)	26.5 (27.3)	*n.s.*
	C	20.8 (22.2)	19.9 (25.3)	21.2 (29.0)	
Percentage of cows with FPR[3] ≥ 1.5 in first 100 DIM[4]	I	16.3 (8.7)	14.0 (13.5)	10.6 (5.4)	*G: 0.167* *Y: 0.929* ***G*Y: 0.047***
	C	17.7 (9.2)	18.6 (9.1)	21.6 (10.4)	
Milk yield (kg/ laktation)	I	6,343 (1,626)	6,349 (1448)	6,637 (1,818)	*G: 0.458* *Y: 0.762* ***G*Y: 0.015***
	C	6,999 (1,319)	7,060 (1,379)	6,838 (1,478)	
Herd age (years)	I	5.6 (0.4)	5.6 (0.2)	5.6 (0.3)	***G: 0.004*** *Y: 0.065* *G*Y: 0.053*
	C	4.9 (0.4)	5.2 (0.4)	5.1 (0.5)	

[1] Only SCS used for analysis of variance in order to obtain normal distribution; denoted SCS is equivalent to a Somatic Cell Count (SCC) of 303,000, 279,000 and 267,000 cells/ ml milk (Intervention farms) and 225,000, 244,000, 257,000 cells/ ml milk (Control farms), respectively.
[2] Repeated application of drugs connected to the same diagnosis with a maximum lag of seven days between treatments was counted as one event.
[3] Milk fat-protein ratio; [4] Days in milk.

Suggestion to tackle with the future challenges of organic animal husbandry

Since less a lack of scientific evidence but a lack of implementation of improvement measures is likely to account for sustained health problems in organic animal husbandry, approaches that increase the motivation of farmers to implement measures should be emphasized. Stable Schools provide a promising approach. Farmers appreciate to work together and to learn from each other. Apart from tackling animal health issues, stable schools may also be used to focus on other challenges of organic farming such as the reduction of surgical interventions, e.g. disbudding.

References

Bennedsgaard TW, Klaas IC, Vaarst M, (2010): Reducing use of antimicrobials - Experiences from an intervention study in organic dairy herds in Denmark. Livestock Science 131, 183-192.

Gay E, Senoussi R, Barnouin J (2007): A spatial hazard model for cluster detection on continuous indicators of disease: application to somatic cell score. Veterinary Research 38:585-596.

Green MJ, Leach KA, Breen JE, Green LE, Bradley AJ (2007): National intervention study of mastitis control in dairy herds in England and Wales. Vet. Rec. 160, 287-293.

Ivemeyer S, Smolders G, Brinkmann J, Gratzer ET, Hansen B, Henriksen BIF, Huber J, Leeb C, March S, Mejdell C, Nicholas P, Roderick S, Stöger E, Vaarst M, Whistance LK, Winckler C, Walkenhorst M (2012): Impact of health and

welfare planning on medicine use, health and production in European organic dairy farms. Livestock Science, 145: 63-72.

Ivemeyer S, Maeschli A, Walkenhorst M, Klocke P, Heil F, Oser S, Notz C (2008): Auswirkungen einer zweijährigen Bestandesbetreuung von Milchviehbeständen hinsichtlich Eutergesundheit, Antibiotikaeinsatz und Nutzungsdauer. Schweizer Archiv f. Tierheilkunde 150, 499-505.

March S, Brinkmann J, Winckler C (2011): Improvement of udder health following implementation of herd health plans in organic dairy farms: results of a pilot study in Germany. In: Hogeveen H, Lam TJGM 2011 (Edt.): Udder health and communication. Proceedings of the international conference, 25.-27.10.2011, Utrecht/ The Netherlands, 91-99.

Vaarst M, Nissen TB, Ostergaard S, Klaas IC, Bennedsgaard TW, Christensen J (2007): Danish stable schools for experiential common learning in groups of organic dairy farmers. Journal of Dairy Science 90:2543-54.

The Federal Agency for Agriculture and Food (BLE), Bonn, is gratefully acknowledged for financial support in the context of the Federal Organic Farming Scheme (BÖLN), grant no. 10 OE 017.