

EXCHANGE OF DATA TO IMPROVE DAIRY CATTLE HEALTH: FARMERS' AND VETERINARIANS' NEEDS

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ABSTRACT

Within the Comet K-Project ADDA - Advancement of Dairying in Austria - the basis for an integrated data management tool shall be established. A first step is the assessment of stakeholder needs. For this purpose, internet surveys were developed to gather feedback from farmers and veterinarians about the use of currently available herd management tools as well as the present status of documentation and recording of relevant data. Two questionnaires, pure online surveys for farmers and veterinarians, were designed end of 2014. The questionnaires, comprising of 23 (farmers) and 22 (veterinarians) questions were distributed end of February 2015 and could be completed until April 10, 2015. In total, 9,961 dairy farmers with performance recording and 1,022 contracted veterinarians of Austrian Animal Health Service member farms were contacted. The response rate was 19.1 % in farmers and 20.8 % in veterinarians. Currently, a large proportion of external information to be used for herd management is received on paper or in pdf-format and is thus not further processible. Hence, both farmers and veterinarians desire the integration of different data in platforms for data exchange or internet platforms. The highest interest of both groups is shown in bacteriological milk analyses and other lab data. When asked for necessary developments, more than 66 % of veterinarians request developments enabling them to download raw data. Farmers have the highest interest (78.1 %) in better integration of data of already existing systems (e.g. milking, feeding, performance recording) in order to avoid multiple recording. The combination of data from different data sources could support both, veterinarians and farmers, in their day-to-day work. However, data security aspects need be payed particular attention.

Key words: cattle, dairy cows, health data, survey, stakeholder needs, integrated data management

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1 INTRODUCTION

The EU Animal Health policy “Prevention is better than cure” emphasizes the importance of registering health data and using it for early detection of animal health problems. However, even though functional traits have been increasingly considered in many cattle populations (e.g. Reents and Rensing, 2009), health issues are mostly addressed by indirect health traits (correlated traits; e.g., somatic cell counts for udder health) rather than direct health traits (veterinary diagnoses, lab findings, direct observations of impaired health). Directly observed indicators of health or disease should be included in breeding, herd management and preventive measures (Kelton *et al.*, 1998) to effectively improve the health status of dairy cattle.

In 2006, a nation-wide health monitoring system for cattle was established in Austria (Egger-Danner *et al.*, 2012). It has become part of the routine performance recording in the meantime and was followed by similar health monitoring systems in Baden-Wurttemberg and Bavaria (Fuerst and Egger-Danner, 2014). In 2010, a routine genetic evaluation for mastitis, early reproductive disorders, cystic ovaries and milk fever was implemented as part of the joint Austrian-German genetic evaluation for Fleckvieh cattle (dual purpose Simmental; Fuerst *et al.*, 2011). Three years later, a genetic evaluation for the same traits in Brown Swiss and the inclusion of direct health traits in the total merit index (TMI) followed. When defining a new TMI in 2016, health observations made by farmers around calving were also included (Fürst *et al.*, 2016). For management purposes, extended reports including health data have been available to farmers since 2008 (Egger-Danner *et al.*, 2010). In agreement with farmers veterinarians also receive health reports in order to support herd health monitoring and consultation. Health reports are provided in accordance to the performance recording in a 5-week interval (Obritzhauser *et al.*, 2008). Additionally, annual reports of health monitoring provide the basis for evaluating the general health situation of the herd by means of audits which need to be conducted by contracted veterinarians in member farms of the Austrian Animal Health Service (Obritzhauser, 2012).

A general problem for both dairy farmers and veterinarians is however that many relevant data, in particular health related data, are scattered across different databases or different systems on farm which are not linked to each other. On top of that, lack of both interconnectivity and harmonization forces different persons involved to record the same data several times. Apart from dissipation of resources, timely reaction is hindered. A prominent example is the examination of bacteriological

data from milk samples. These have not been standardized, neither in terms of diagnostic findings nor in wording or data format and may hence not be used for genetic analyses, for benchmarking or analyses for preventive purposes. Linking these data would not only be beneficial for farmer and veterinarian but also for responsible laboratory personnel by supporting diagnostics with more detailed animal information.

Within the Comet K-Project ADDA - Advancement of Dairying in Austria – the basis for an integrated data management tool shall be established. A first step is the assessment of stakeholder needs. For this purpose, internet surveys were developed to gather feedback from farmers and veterinarians about the use of currently available herd management tools as well as the present status of documentation and recording of relevant data. Based on the needs of the stakeholders an overall concept for an integrated data management tool is elaborated subsequently.

2 MATERIAL AND METHODS

2.1 DESIGN AND DISTRIBUTION OF THE QUESTIONNAIRE

To assess the needs and desires of Austrian cattle breeders and their veterinarians regarding herd management, recording and documentation, two questionnaires were designed end of 2014. After testing the questionnaires by means of selected farmers and veterinarians and subsequent adaptations, the questionnaires were distributed end of February 2015. The on-line survey was conducted using the service of SurveyMonkey (2015).

E-mails including general information and the link to the questionnaires were sent to both farmers and veterinarians. In total, 9,961 dairy farmers with performance recording were contacted by the respective performance recording organisation; the first farmer completed the survey on February 24, 2015. Similarly, 1,022 contracted veterinarians of Austrian Animal Health Service member farms were contacted by the respective federal Animal Health Service, the first completion of the survey was recorded on February 27, 2015. The anonymous survey could be answered until April 10, 2015.

The questionnaires for this survey covered several main topics with 23 and 22 questions for farmers and veterinarians, respectively.

The main topics were:

1. statistics of the respondent and the farm/veterinary practice
2. key figures of the farm/veterinary practice
3. equipping of the farm/veterinary practice

4. use of computer applications
5. recording and documentation of data
6. use of external information for herd management and veterinary practice
7. further development of interfaces
8. data supply and utilization of data

2.2 STATISTICAL ANALYSES

All descriptive analyses were provided by SurveyMonkey (2015), all further data handling and analyses were made by means of SAS version 9.2.

3 RESULTS AND DISCUSSION

The response rate was 19.1 % in farmers (Weissensteiner *et al.*, 2016) and 20.8 % in veterinarians (Perner *et al.*, 2016). About 33 % of responding farmers are part-time farmers; 47.6 % of farmers have less than 20 cows, 43.9 % between 20 and 49 cows. A trend towards increasing mechanization could be observed, e.g. planned

investments in automatic milking or feeding systems or activity sensors within the next 5–10 years were mentioned by up to 15 % of the farmers. Nearly all farmers regularly use computer applications; mostly for any kind of animal registration and reporting (96 %) but also for herd management (70 %; Weissensteiner *et al.*, 2016).

Most of the veterinarian respondents (57 %) work in a single practice; 77 % mainly treat livestock in their practice. The majority of veterinarians use electronic equipment (89 %); practice software is available in 72 % of the practices. Among diagnostic tools, ultrasonography and practice laboratory is present in 80 % and 71 % of the respondents' practices, respectively. Generally, group practices have a significantly higher proportion of technical and electrical equipment than single practices (Perner *et al.*, 2016).

Currently, a large proportion of external information to be used for herd management is received on paper or in pdf-format and is thus not further processible. Hence, both farmers and veterinarians desire the integration of different data in platforms for data exchange or internet platforms (Table 1). More than 70 % of the veterinarians would like to get access to basic animal in-

Table 1: Importance of integration of different data in platforms for data exchange or internet platforms for veterinarians (Vet) and Farmers (Far) in % (different superscripts within data source category indicate significant differences between Vet and Far based on a χ^2 -Test, $p < 0.05$)

Data source	Respondents	Importance (% of answers)		N
		Important/very important	Not important/no opinion	
Bact. milk analyses	Vet ^a	87.6	12.4	161
	Far ^b	80.6	19.4	1514
Other Lab data	Vet ^a	77.3	22.7	154
	Far ^b	62.9	37.1	1435
Disease status	Vet ^a	74.2	25.8	161
	Far ^a	72.3	27.7	1514
Veterinarian Diagnoses ¹	Vet ^a	72.9	27.1	155
	Far ^a	73.4	26.6	1462
Bulk milk samples	Vet ^a	70.1	29.9	154
	Far ^b	78.1	21.9	1510
Carcass disposal	Vet ^a	63.7	36.3	157
	Far ^b	38.2	61.8	1402
EUROP grading (carcass)	Vet ^a	54.5	45.5	154
	Far ^a	53.6	46.4	1402
Claw trimming	Vet ^a	48.7	51.3	152
	Far ^b	38.7	61.3	1378
Performance recording data ²	Vet	78.6	21.4	159
Basic animal information ²	Vet	71.1	29.9	156

¹ – including the word treatments in question for veterinarians; ² – already available for farmers

Table 2: Proportion of farmers and veterinarians (in %) and their time needed for documentation (in hours per day)

Respondents	Time needed for documentation (h/day)				N	P ¹
	< 0.5	0.5–1	> 1–2	> 2		
Farmers	40.3	45.6	12.0	2.1	1,738	
Veterinarians	15.6	35.3	37.6	11.6	173	< 0.001

¹ – based on a χ^2 -Test

formation and data of milk recording; both data sources are available for farmers. The highest interest of both groups is shown in bacteriological milk analyses and other lab data. Among veterinarians, 87.6 % and 77.3 % of respondents consider these data sources to be available as important to very important. Farmers are significantly less interested; however, still 80.6 and 62.9 % would like to have access to laboratory data via platforms for data exchange or internet platforms. Information on carcass disposal and claw trimming are of least importance for farmers, the latter also for veterinarians. Nevertheless, more than one third to nearly half of the respondents would appreciate data integration for those traits as well.

When asked for necessary developments, more than 66 % of veterinarians (N = 159) request developments enabling them to download raw data. Farmers have the highest interest (78.1 % important and very important) in better integration of data of already existing systems (e.g. milking, feeding, performance recording) in order to avoid multiple data capture. Multiple recording does not only affect the farmer but also other personnel, e.g. technicians of performance recording and breeding organisations or claw trimmers. About one third of farmers stated that two or more persons (including the farmer) record diagnoses and drug receipts, inseminations and laboratory results (Weissensteiner *et al.*, 2016) to name but a few. Veterinarians on the other hand partly record the same data by hand and by means of practice software. Slightly less than half of the veterinarians (49.1 %) spend more than one hour per day for fulfilling documentation requirements while the majority of farmers need up to one hour (85.8 %, $p < 0.001$).

The combination of data from different data sources could support both, veterinarians and farmers, in their day-to-day work. For veterinarians, increased knowledge regarding individual animals facilitates making diagnoses and subsequent treatments. For farmers, the abundance of different data offers the opportunity of appropriate benchmarking, which is limited in case of single parameters (e.g. Bradley *et al.*, 2013), more rapid feedback and as a positive side-effect the reduction of required multiple recording.

Finally, given that data security is granted, a significantly larger proportion of veterinarians than of farm-

ers (72.1 % vs. 44.9 %) would be willing to provide data for scientific analyses. On the other hand, a much larger proportion of farmers approves of using data for genetic evaluation and across farm analyses by performance recording organisations (72.6 and 65.2 % of farmers, Weissensteiner *et al.*, 2016, vs. 43.5 and 43.5 % of veterinarians, Perner *et al.* 2016). Nearly 61 % of farmers are also willing to provide data for use by their veterinarians.

4 CONCLUSIONS

Based on the needs of the stakeholders an overall concept for an integrated data management tool shall be elaborated. Both farmers and veterinarians demand further developments, in particular in connection with easier access to data from different sources. Interest in animal health data is rapidly increasing for different reasons including food safety and animal welfare. Apart from harmonization across systems and organisations (e.g. trait definitions) the provision of interfaces or other possibilities for easy-handling data exchange is essential. Different farmers and veterinarians have different needs – hence additionally to raw data, formatted reports or pre-completed forms (e.g. for submitting milk samples for bacteriological analyses) will have to be available to fulfill stakeholders' desires. Ideally, all relevant animal related data shall be accessible via a central database. However, in order to avoid loss of confidence, data security aspects need be payed particular attention.

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