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Recording of direct health traits in Austria—Experience report with emphasis on aspects of availability for breeding purposes

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ABSTRACT

A project to establish an Austria-wide health-monitoring system for cattle was launched in 2006. Veterinary diagnostic data subject to documentation by law [Law on the Control of Veterinary Medicinal Products (Tierarzneimittelkontrollgesetz)] are standardized, validated, and recorded in a central database. This Austria-wide project is a collaboration among agricultural and veterinary organizations as well as universities, and is also supported by the Austrian government. In addition to providing information for herd management and preventive measures, further objectives of the project include estimating breeding values for health traits and monitoring the overall health status of Austria's cattle. To ensure a high level of participation from farmers and veterinarians, data security issues are extremely important. Valid data are the prerequisite for the efficient use of health records. The challenge hereby is to distinguish between farms with low frequencies of diseases and incomplete documentation and recording. Measures were undertaken to establish a routine monitoring system for direct health traits. A routine genetic evaluation for direct health traits as part of the joint breeding value estimation program between Germany and Austria was introduced for Fleckvieh in December 2010, based on diagnostic data from 5,428 farms with 147,764 Fleckvieh cows. In 2010 to 2011, the reporting of direct health traits as a compulsory part of performance recording and the breeding program was introduced as well. The overall challenge is the availability of sufficient valid direct health data for reliable breeding values. Practical experience gained in Austria in setting up a health registration system, focusing mainly on the availability of direct health data for breeding purposes with its successes and difficulties, is described.

Key words: registration, health disorders, genetic selection

INTRODUCTION

Improved animal health is becoming increasingly important worldwide, because of its effect on farm economy and animal welfare, but also because food safety is of increasing interest to the consumer. The European Union Animal Health policy "Prevention is better than cure" (European Commission, 2007) emphasizes the importance of registering health data and using it for early detection of animal health problems.

Health issues may be addressed either directly or indirectly. Indirect parameters of health or disease have been included in routine recording systems by many countries. The importance of functional traits within total merit indices (**TMI**) is increasing worldwide. However, to increase the efficiency of genetic health improvement measures, directly observed indicators of health or disease need to be included in recording, evaluation, and selection systems.

Heringstad et al. (2003a) evaluated 2 Norwegian dairy cattle selection experiments. A high protein yield group and one low clinical mastitis group were introduced in 1989. Previously, from 1978 to 1989, groups were selected for high milk production and low milk production. Results showed that it is possible to obtain considerable selection response for clinical mastitis and that selection for increased milk production results in an unfavorable correlated increase in mastitis incidence, if mastitis is ignored in the breeding program. The results from the second selection experiment clearly demonstrate the positive effects of direct selection (Heringstad et al., 2007).

Philipsson and Lindhé (2003) reported a positive response to selection for mastitis resistance in all Nor-

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dic countries. The opportunities for genetic analysis, evaluation, and selection for reproduction and health traits depend on the development of integrated cattle databases.

For long-term enhancement of animal health, the genetic improvement of relevant traits is beneficial. A combination of direct and indirect health data are ideal. The lack of availability of reliable phenotypes for direct health traits very often restricts breeding for disease resistance with both traditional and advanced genomic methods. As the heritability for these traits is usually low, comprehensive and high-quality health data records are needed.

In the Scandinavian countries, direct health data has been routinely collected and used for years, with recording based on veterinary medical diagnoses (Nielsen et al., 2000; Forshell and Østerås, 2001; Heringstad et al., 2003b; Philipsson and Lindhé, 2003; Østerås and Sølverød, 2005; Aamand, 2006; Heringstad et al., 2007; Østerås et al., 2007; Johansson et al., 2008; Negussie et al., 2010). In many other countries, experience with direct health data is still limited, but interest in using recorded diagnoses or observations of disease has increased considerably in Austria (Egger-Danner et al., 2010a,b), Canada (Neuenschwander, 2010; Koeck et al., 2012), and the United States (Zwald et al., 2004a,b; Cole et al., 2006; Appuhamy et al., 2009).

The basic concept of the Austrian project "Health monitoring in cattle" follows the Scandinavian approach, where reporting of health data are carried out in close cooperation with veterinarians. In Austria, recording of diagnostic data and treatments has been required by law since 2002. Before the project started in Austria in 2006, the data was neither standardized, nor routinely collected and stored in a common database, and could not, therefore, be used for breeding and management purposes. In Austrian cattle breeds, functional traits have a relative economic weight of almost 50% within the TMI. However, so far no direct health data has been included in breeding value estimation for functional traits. For mastitis and fertility, the auxiliary traits SCC and traits based on insemination and calving have been considered, respectively.

The project objectives are to develop and implement a system to collect diagnostic data, providing reports for herd management and preventive measures, and estimating breeding values for direct health traits and key parameters for the monitoring of health status. The cooperation between agricultural and veterinary organizations has also been strengthened by working together on this project.

This paper describes the concept, parameters, and practical experience gained in 4 yr of implementation of the project. Special attention is paid to the aspects of using the recorded data for breeding purposes.

MATERIALS AND METHODS

Project Organization and Time Frame

Under the leadership of the Federation of Austrian Cattle Breeders (ZAR, Vienna, Austria), a health-monitoring system was developed and implemented in close cooperation with several organizations involved in animal health issues: the Ministry for Agriculture, Forestry, Environment and Water Management (Vienna, Austria); the Ministry for Health (Vienna, Austria); the University of Veterinary Medicine Vienna; the University of Natural Resources and Life Sciences Vienna; local animal health organizations; the Chamber of Agriculture (Vienna, Austria); and the Chamber of Veterinarians (Vienna, Austria). The Federation of Austrian Cattle Breeders, also representing performance recording and breeding organizations, is the organization in charge of executing the project.

The project was managed by a steering committee. Temporary working groups were set up to develop different project aspects (e.g., health reports, breeding values, and training modules).

The project officially started in 2006. The design of the project and preparation was carried out in 2005 and early 2006. The different measures carried out within the project are listed in Table 1. In 2010, the main emphasis was on implementation of the measures into practitioners' routines.

Health Data Recording

Motivation and Information. To encourage farmers and veterinarians to adopt any new technology, they must be informed and made aware of possible benefits. The employees of performance-recording organizations (**EPO**) were given the task of convincing farmers to join the project. Veterinarians were informed by their Chamber and local animal health organizations. Before starting the information campaign, employees of the EPO and representatives from the other partner organizations were trained to effectively present the necessary information.

Legal Framework. Based on the Law on the Control of Veterinary Medicinal Products (Tierarzneimittelkontrollgesetz), diagnoses have had to be documented upon receipt of medications since 2002. Due to a bylaw on veterinary drug residue testing, all treatments and prescriptions have to be recorded in a log at the farm.