

Challenges of implementing new traits in dairy breeding: The role of communication from a breeder's point of view

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Supply and demand of traits in dairy breeding

The dairy sector has benefitted a lot from the recent technological developments in breeding through which routine genomic applications could be introduced for many traits and in multiple countries. Genomic selection has allowed increasing the genetic gain in production and functional traits that are considered in the breeding programs for dairy cattle worldwide. However, the opportunities for introducing new traits has only insufficiently used so far, although the demand for targeted approaches for improving, for example, efficiency and health of dairy cattle and the potential of genomics in this field have been widely recognized (Boichard & Brochard 2012, Egger-Danner et al. 2015). The major reason for this gap is the unequal development of genotyping logistics and genomic tools on the hand and phenotyping strategies on the other hand. Principally, advantages of genomic over conventional selection are largest for traits with low heritabilities that are difficult to access, and many of the requested new traits fall into this category (Stock & Reents 2013). However, improving the breeding programs by introducing new traits implies increased efforts of dairy breeding to obtain additional phenotype data of high quality and sufficient quantity, so ensuring high motivation for refined phenotyping in a large enough sample of the dairy population has become crucial for the success and long-term competitiveness of breeding organizations (Egger-Danner et al. 2015).

Meeting the challenges of phenotyping for new traits - exemplified for animal health traits

In times of increasing numbers of attractive solutions for automated herd management support and control systems for individual dairy farms, the still important role of the traditional data recording is often neglected. Even if collection of observational and

measurement data is considered infeasible on the large scale, so possibly problematic as sole basis of routine applications, identification of good indicators that are easier to record and validation of indicator-based predictions require such data (e.g. Schlageter-Tello et al. 2014). Nevertheless, economic constraints may hinder increasing manpower and time for data recording in the farms as long as there is no convincing proof of benefit. It is therefore crucial, that any initiative for refined phenotyping is accompanied by reporting services that are tailored to suit the needs of the practice. Using health data recording in the context of health monitoring and improvement programs as an example, periodic reports and daily figures of health events allow benchmarking, help optimizing herd management and can significantly facilitate the daily work of farmers, veterinarians and farm advisors (ICAR 2014). Ideally, regular use of the statistics produces own interest of users who are usually also responsible for the recording, in good data quality (Egger-Danner et al. 2012). Knowledge of how to read and use the health statistics provided is crucial in this respect as it makes people recognize the advantages of proper documentation which may go far beyond the legal minimum requirements, such that continuity of data flow and reliability of the health data reporting can be achieved and maintained. Good communication of results is precondition for visibility of the added value of health monitoring in the daily practice on the farms, so contributing to system performance, stability and long-term success of the health improvement program.

Interdisciplinary approaches promise optimum conditions for improved understanding of the complexity of the animal health and disease situation in the specific environment, with its importance for animal welfare as well as efficiency and profitability of milk production. Observations of farmers, diagnoses of veterinarians, and findings of claw trimmers can all provide valuable information on animal health. The clear benefit of efficient integrated data usage, systematic data analyses within and also across farms, and optimized information-based advisory services has been well documented (Østerås et al. 2007), but the coverage of such comprehensive services in the dairy sector is still limited. Major challenges arise from the often lacking transparency and minimum information exchange and collaboration between the professions that are directly or indirectly concerned with animal health issues (Pothmann et al. 2014). In the light of the intense societal and political discussion about modern livestock keeping and use, there is increased concern about data security and considerable reluctance to share data that

may be sensitive. Intensified and improved communication within the dairy sector is needed to create confidence and initiate concerted actions that have the potential to yield substantial synergistic effects: reduced efforts of individual contributors by integration of existing documentation systems and combined use of information from different sources; accessibility of veterinary and non-veterinary expertise with management, veterinary intervention and selection decisions based on the same comprehensive information basis; strengthened position in the public debate on animal health and welfare.

In running interdisciplinary programs, the very different backgrounds, expectations and needs of the professional group requires clear definition of responsibilities and elaborate information policy. Communication skills of contributors may be considerably challenged to specifically address key factors like: pros and cons of available recording systems; data quality issues, support requirements and advisory services; contents, interpretation and use of the output generated (health reports, check and alert lists, case histories and lifetime health information of cows, estimated breeding values of bulls). New tools and advanced didactic methods such as e-learning can help reaching the different target groups, thus supplementing the classical ways of communication and knowledge transfer, while freeing human resources for cases where specific support and individual consultation is needed.

New traits and the new role of communication

Modern agriculture, livestock husbandry and breeding are often critically discussed in terms of responsible use of animals and natural resources, reflecting the increased concern of consumers and politics about food safety, animal welfare and sustainability. However, the recent developments in this sector, as shown for dairy cattle, provide striking opportunities of increasing efficiency in improving traits which were previously hardly accessible. Although phenotyping for new traits is still and will remain to be a challenge to implement, successful programs illustrate how new communication and collaboration strategies within the sector can take effect. However, external communication, i.e. proactive transfer of information to the public, with regard to common practices, initiatives and their results remains to be strengthened in order to ensure wider acceptance and positive recognition of the developing livestock sector.

References

- Boichard D, Brochard M, 2012. New phenotypes for new breeding goals in dairy cattle. *Animal* 6, 544-550.
- Egger-Danner C, Cole J, Pryce JE, Gengler N, Heringstad B, Bradley A, Stock KF, 2015. Overview of new traits and phenotyping strategies in dairy cattle with a focus on functional traits. *Animal* 9, 191-207.
- Egger-Danner C, Fuerst-Waltl B, Obritzhauser W, Fuerst C, Schwarzenbacher H, Grassauer B, Mayerhofer M, Koeck A, 2012. Recording of direct health traits in Austria - experience report with emphasis on aspects of availability for breeding purposes. *J Dairy Sci* 95, 2765-2777.
- ICAR (International Committee for Animal Recording), 2014. International agreement of recording practices - ICAR recording guidelines. (available online at http://www.icar.org/Documents/Rules%20and%20regulations/Guidelines/Guidelines_2014.pdf, assessed on 30 June 2015), pp. 235-261.
- Østerås O, Solbu H, Refsdal AO, Roalkvam T, Filseth O, Minsaas A, 2007. Results and evaluation of thirty years of health recordings in the Norwegian dairy cattle population. *J Dairy Sci* 90, 4483-4497.
- Pothmann H, Nechanitzky K, Sturmlechner F, Drillich M, 2014. Consultancy to dairy farmers relating to animal health and herd health management on small- and medium-sized farms. *J Dairy Sci* 97, 851-860.
- Schlageter-Tello A, Bokkers EAM, Groot Koerkamp PWG, van Hertem T, Viazzi S, Romanini CEB, Halachmi I, Bahr C, Berckmans D, Lokhorst K, 2014. Manual and automatic locomotion scoring systems in dairy cows: a review. *Prev Vet Med* 116, 12-25.
- Stock KF, Reents R, 2013. Genomic Selection: Status in Different Species and Challenges for Breeding. *Reprod Dom Anim* 48 (suppl. 1), 2-10.