

Risk factor analysis for dairy cow production diseases by a system analysis - First results from the EIP-project “Die Entwicklung des KUH-mehr-WERT Navigators”

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Introduction The EIP-project “Die Entwicklung des KUH-mehr-WERT Navigators“ („The development of the COW-more-VALUE“) is a multicentric cooperative five-years project in which different partners from the dairy industry in Brandenburg (Germany) are working together to develop an economical risk analysis tool for dairy cow production systems. To properly assess risk factors and their consequences for animal health and production a sound and encompassing data collection regarding the housing, management, feeding, animal constitution and economical factors needs to be established and changes in the production system and their consequences monitored and documented. Therefore, a so called “system analysis” was elaborated.

Materials and Methods Twelve dairy farms were analysed throughout the year 2018. The farms are characterized by: an average size of 553 cows (235 - 1383), an average milk production of 10'561 kg per cow and lactation, 29.6 % culling rate, German Holstein breed, total mixed ration (TMR)-based total confinement system, using the herdmanagement software HerdeW or HERDEplus (dsp-Agrosoft GmbH, Ketzin, Germany). The analysis included aspects from housing and management (e.g. group size, stocking density, feed bunk space, water accessibility, freestall dimension and bedding, cleanliness of the environment, evaluation of the milking process in various aspects, synchronization of working processes and time budgeting), different animal scores adjusted to the production and age group (e.g. body condition score (BCS), lameness, hygiene, decubital lesions for cows and bovine respiratory disease (BRD) score and nesting score for calves), assessment of critical control points in the feeding routine, as well as the analysis of various key figures in animal production, health, feeding and economical aspects. The on-farm data collection lasted three days and was followed by an intense analysis within approximately one week, finalized by the composition of a presentation and a team meeting to consolidate on a list of recommendations. The results were then presented to the farm the following week. The participants in this one-day meeting included the farms management, commercial administration, the herdmanager, optionally additional employees, the farms external consultants (claw trimmer, veterinary and nutritionist) and the project team including an agricultural economist, veterinaries, a nutritionist and agricultural engineers. In the final part of the day collectively a plan of action for the following year was developed. To motivate and support the farms in implementing their personal action plan, as well as to monitor the changes on the farm closely, the team re-visits the farms on a six-weekly basis. Further, several workshops were and are organized to train the herdmanagers, accountants and different other personnel in data documentation as well as various practical aspects, and to increase the motivation for change by creating benchmarks for different analyses.

Results The system analysis revealed, even though the farms exhibit similar production levels (9'977 - 11'234 kg per cow and year) and housing systems, a wide range in key production figures: culling rate of 15.9 - 38.2 %, of which euthanized or died: 6.4 - 37.6 % (av. 18.9 %), life span production of 26'510 - 47'580 kg (av. 33'712 kg) and average lactation in herd until culling of 2.8 - 4.3 (av. 3.4), age at first calving of 23.9 - 29.2 months (av. 25.4 months) and stillbirth rates in cows and heifers of 2.5 - 11.1 % (av. 7.9 %) and 4.5 - 16.3 % (av. 9.7 %), respectively. The proportion of marketable milk of total milk production per cow and year ranged between 90.3 and 95.3 % (av. 93.2 %). The results of the scores also revealed large differences in animal constitution: proportion of animals with a BCS ≤ 2 (according to Edmonson et al. (1989)) of 6 - 29 % (av. 13 %), with a lameness score of ≥ 3 (mild to severe lameness; score adapted according to Offinger et al. (2013)) of 15 - 35 % (av. 22 %), decubital lesions at the hock with a score 3 (abrasion of hair with mild swelling to severe enlargement of the joint and lameness; according to Lombard et al. (2010)) of 4 - 97 % (av. 42 %) and a hygiene score of ≥ 4 (= dirty to severe dirtiness; score according to Reneau et al. (2005)) of 3 - 74 % (av. 34 %). Most frequent issues named on the plan of actions for the twelve farms were for the area of herdmanagement and housing: digital structuring of herd (7), stocking density (7), cleanliness of flooring and bedding (9), climate/ventilation (6), light intensity (8), harmonization/optimization of work processes (6) and biosecurity (12), for production and animal health: animal control protocols (e.g. fresh cow control, calf control (7)), BCS controlling (7), still birth rates (9), dry cow management (6), lameness (11) and udder health (6), for calf and youngstock: housing (7), daily gain in various growth stages (9) and pneumonia (8), for feeding: water availability (10), feeding routine precision (6), efficiency (6) and documentation (7); numbers indicate numbers of farms affected, only issues are named with six or more farms affected. The evaluations and presentations of the system analysis have been received positively and constructive by the farm members on all twelve farms. The continuous mentoring and control in implementing the plan of action has begun in all farms. Already now large differences in adaptation and motivation are observed.

Conclusion/Outlook The system analyses have confirmed the complex interrelations between management, housing, feeding, economical and animal health and production, and that only by a encompassing and profound analysis durable recommendations can be made. In the second year of the project new aspects will be included in the system analysis, such as the analysis of the efficiency of work processes. Next analysis steps are to find interrelations between different variables and their consequences for animal health, production and economical aspects. *This project was funded by the European Innovation Partnership (EIP)-AGRI.*

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