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Animal-human-technology interactions: novel means of phenotyping cattle health and welfare

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With increasing availability and affordability of technology for use at the animal level, possibilities for automated recording of data related to animal production, health and behaviour have skyrocketed. In particular with dairy cattle, sensor-based technology at the individual animal level is well established and provides an abundance of data mainly intended for use in production, reproduction and health management. For example, automated detection or measurement of body temperature, heat, mastitis, metabolic disorders, and birth prediction is already commonplace in modern dairy cattle farming. Applications of automated monitoring of e.g. rumination, lameness, heat stress or methane emission detection are under development. Besides its use in management decisions, these data provide with its longitudinal structure on an individual animal level, invaluable information also for breeding purposes. However, in particular with sensors recording behaviour-based measurements, such as locomotion sensors for heat detection, interpretation of data remains challenging, and results from automated processing may require verification by human personnel. With regard to welfare-related traits, it is important to note that so far, only indicator traits are available that can provide at best a rough estimate on an animal's internal state. Development of automated behaviour tests that can provide a closer insight into the animals' needs and desires would be desirable to obtain more detailed information on how animals cope with given husbandry and management conditions. In other areas such as early detection of lameness, mastitis or upcoming parturition, technology already proves to be clearly superior to trained personnel. These facts raise the question, if future dairy farmers will increasingly be technology rather than animal experts, and if so, what this means to animal welfare. The present paper reviews prospects and limitations of existing and evolving technology for simultaneous use in dairy cattle breeding and selection as well as husbandry and management.

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Characteristics of organic dairy farm types in seven European countries

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Development of suitable management and breeding strategies for organic animal production depends on the characteristics of the production systems, which vary between countries, regions and over time. The importance of this variation is frequently discussed among researchers, but often based on inadequate information. An important step in the Core Organic project ORGANICDAIRYHEALTH is to develop a data base on characteristics of major organic dairy farm types in Europe. The process of creating this database include three steps: (1) identify major organic dairy farm types in the partner countries (AT, CH, DE, DK, LT, PL, SE); (2) describe characteristics of the production system in each farm type; (3) Establish and deliver a database with key information on these farm types. Major organic dairy farm types in each country were identified according to a standardised protocol including four criteria; Herd size, Production level, Geographical location and Housing type. The farm type identification protocol was completed using data from national milk recording and organic certification bodies. The number of major farm types identified per country was: AT-5, CH-4, DE-4, DK-1, LT-4, PL-5, SE-4. The production system in each farm type was investigated by a profound farmer questionnaire including detailed questions on: Farm location, structure and size, Housing and milking system, Production level, Animal health and management, Feeding strategy, Breeding and reproduction. We aimed for complete protocol information from at least 10 farms per farm type and ended up with in total 419 completed questionnaires (AT-50, CH-20, DE-41, DK-10, LT-40, PL-198, SE-60). The data base will be used in other steps of the current project and as a basic resource for future research and decision making.