



IT-Solutions for Animal Production

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Applications for comprehensive support of improving health and welfare in dairy cattle

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Applications for comprehensive support of improving health and welfare in dairy cattle

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Background

- importance of appropriate consideration of health and welfare of dairy cows when making management and breeding decisions
- limited access to information on direct health traits (health data recording including veterinary diagnoses, records from herd breeding etc.), but huge amount of information on potential indicator traits (long-established data collection in all cows under milk recording)
- need for applications providing comprehensive, consistent and practical support of farmers to allow satisfactory management and breeding with regard to farm efficiency as well as health and welfare of dairy cows

Conclusions

- different quality of available health-related information (direct, indirect), but reasonable combination of distribution indicators
- optimal integration use through clear distinction between sources of information in both management and breeding-related applications
- separate statistics in health reports, multiple test approach in genetic and genomic evaluation (indicators of reduced morbidity)
- new applications for direct health traits in German Holstein dairy cattle breeding, evaluation and quantitative requirements and ongoing great opportunities for improving animal health and by that overall efficiency and sustainability of milk production

Aims

- illustrating the rationale behind the integrated data usage and the purposes of applications relating to direct health traits in German Holstein dairy cattle
- quantifying the potential gain in farm efficiency through targeted improvement of dairy health

Methods

- statistical analyses of health events (direct health records and health-related diagnoses of dairy cows, using data from routine genetic evaluation in April 2019)
- study sample defined by region and time period: 1950 dairy farms, from 16 German federal states, data from 2010-2018 (n = 1.1 Mio; incidence of 688 000 cases, 1.5 Mio recorded health events, 170 000 health-related diagnoses, 200 000 disease events)
- focus on: ethiopathologic distribution patterns of health-related phenotypes and their own (management, breeding) indicators of health-related statistics including improvement potential

Parameter	Group	Incidence	Prevalence	Prevalence	Prevalence
Disease reason (overall)	00	22.5	18.7	13.9	20.3
	01	28.9	27.2	14.1	21.1
Year of diagnosis (Yd)	01	10.0	10.0	10.0	10.0
	02	26.0	26.0	26.0	26.0
Lactation Day (Ld)	01	20.0	20.0	20.0	20.0
	02	22.0	22.0	22.0	22.0
Daily milk yield (kg)	01	12.0	12.0	12.0	12.0
	02	12.0	12.0	12.0	12.0

Fig. 1: Distribution of health-related events (prevalence and incidence) by disease reason, year of diagnosis, lactation day and daily milk yield.

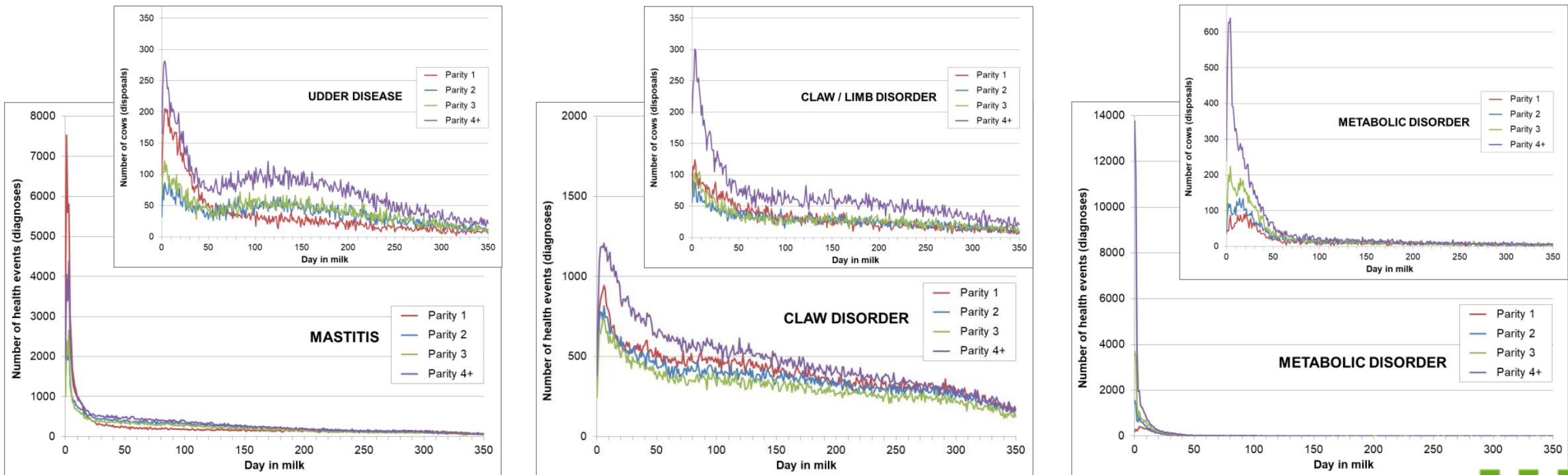
Background & study approach

- limited access to information on direct health traits vs. huge amount of information on potential indicator traits
- **integrated data usage**
- required comprehensive, consistent and practice-oriented support of farmers to allow optimizing management and breeding
 - health and welfare of dairy cows
 - farm efficiency
- **quantifying the potential gain in farm efficiency through targeted improvement of dairy health**



Results & conclusions I

- recorded health events and health-related disposals
 - different quality (indirect, direct)
 - characteristic and reasonably similar distribution patterns



Results & conclusions II

- recorded health events and health-related disposals
 - different quality (indirect, direct)
 - characteristic and reasonably similar distribution patterns
- optimal integrated use
 - clear distinction between sources of information
 - complementary statistics in health reports, multiple trait setting in genetic and genomic evaluation (GE)

Health complex (GE)	Health-related disposal reason	Genetic correlation	Reliability increase (gBV)
Udder health	udder disease	0.85	13 %
Claw health	claw / limb disorder	0.60	5 %
Metabolic stability	metabolic disorder	0.80	12 %
Reproduction	infertility	0.55	4 %





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recorded health events and health-related disposals

➤ optimal integrated use

- balancing qualitative and quantitative requirements
- great opportunities for improving animal health and by that overall efficiency and sustainability of milk production

THANK YOU!

Applications for comprehensive support of improving health and welfare in dairy cattle

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Background

- Importance of appropriate consideration of health and welfare of dairy cows when making management and breeding decisions
- limited access to information on direct health traits (health data recording including veterinary diagnoses, records from hoof trimming etc.), but huge amount of information on potential indicator traits (long-established data collection in all cows under milk recording)
- need for applications providing comprehensive, consistent and practice-oriented support of farmers to allow optimizing management and breeding with regard to farm efficiency as well as health and welfare of dairy cows

Conclusions

- different quality of available health-related information (indirect, direct), but reasonable similarities of distribution patterns
- optimal integrated use through clear distinction between sources of information in both management- and breeding-oriented applications; separate statistics in health reports, multiple trait approach in genetic and genomic evaluation (indices of increased reliability)
- new applications for direct health traits in German Holstein dairy cattle: balancing qualitative and quantitative requirements and exploiting great opportunities for improving animal health and by that overall efficiency and sustainability of milk production

Aims

- illustrating the rationale behind the integrated data usage and the portfolio of applications relating to direct health traits in German Holstein dairy cattle
- quantifying the potential gain in farm efficiency through targeted improvement of dairy health

Methods

- statistical analyses of health events (direct health records) and health-related disposals of dairy cows, using data from routine genetic evaluation in April 2019
- study sample: defined by region and time period: 550 dairy farms from 5 German federal states, data from 2010-2018 (1.1 Mio. lactations of 498.000 cows, 1.5 Mio. recorded health events, 170.000 health-related disposals, 260.000 lifetime yields)
- focus on: characteristic distribution patterns of health-related phenotypes and their use (management, breeding); implications of health-related statistics indicating improvement potential

Parameter	Group	Udder health	Cow health	Metabolic stability	Reproductive
Disposal reason (specific)	00	22.3	18.7	12.8	20.3
	01	29.6	22.2	14.7	20.8
Time of disposal (dM)	00	168.2	167.8	167.2	165.1
	01	165.5	163.9	165.7	162.8
Life yield (kg milk)	00	26,421.4	26,268.1	25,793.4	26,329.7
	01	26,962.4	26,968.9	27,839.1	26,822.4
Daily life yield (kg milk / day)	00	12.57	12.61	12.38	12.53
	01	12.67	12.42	13.04	12.82

Fig. 1: Results of analyses of variance with least square means (LSM) estimates of observed and efficiency-related parameters for German high-producing Holstein Friesian dairy cattle within year and region (2% and 10% farms with lower degrees of freedom 200)

Fig. 1 is a: Distribution of udder health events (disposals) and health-related disposals related to udder health compliance

Genetic evaluation
for dairy cattle

