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Use of hoof digital images in estimation of genetic parameters connected with health

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The objective of this study was to estimate the genetic parameters of individual hoof lesions and claw morphometric parameters in Holstein cows. According to this, the heritability and genetic correlations for milk fat to protein ratio were estimated as one of the indicator of the risk of metabolic disorders in dairy cattle. A total of 382 hoof-trimming records from 299 cows, kept in two farms in west part of Slovakia from TOP10, were used in the study. The hoof health data and morphometric parameters were collected immediately after regular functional trimming between 2015 and 2017. Eight claw morphometric parameters (angle, length, heel depth, height, diagonal, width, total and functional areas) were obtained by using digital image analysis. Images were analysed by using NIS Elements 3.0 software. Three types of hoof lesions were included in the analysis; interdigital dermatitis and heel erosion (IDHE), digital dermatitis (DD) and sole ulcer (SU). All of hoof lesions included in the analysis were analysed as binary traits. The frequency of hoof disorders in analysed herds ranged from 83% (IDHE) to 17% (DD). It can be concluded that more than half of analysed cows had at least one type of hoof lesion. To estimate the genetic parameters, the multi-trait animal models and Bayesian approach was used. The estimates of direct heritabilities for claw morphometric parameters ranged from 0.41 (heel height) to 0.62 (claw length). Heritability of total claw area and functional claw area were moderate (0.62). Average estimates of direct heritabilities for IDHE, DD and SU were relatively low 0.01, 0.03 and 0.04, respectively. For the F/P ratio moderate level of direct heritability was found (0.52). The genetic correlations between morphometric parameters were generally moderate to high. Genetic correlation between F/P ratio and claw disorders was very low. Estimated genetic parameters of morphometric traits provide base for the future selection and automation of claw data evaluation by use of machine learning. Observed parameters on F/P ratio could be successfully used in selection for high producing metabolically resistant and healthy cattle.

Diagnosis of ovarian activity: a powerful tool to manage beef cows under extensive grazing condition

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In South America most of the beef production systems are developed under extensive grazing conditions on native pastures. For this reason, feed intake pattern is irregular and commonly insufficient, and farmers must cope with this variability to maintain moderate to high levels of productivity. During the service period, body condition score (BCS) of suckler cows may not be the best indicator of ovarian cyclicity. In this context, the ovarian activity diagnosis (OAD) was developed to classify each beef cow by ovarian status, to predict the probability of getting pregnant but more importantly, to advice farmers about management decisions to improve reproductive performance. OAD is obtained by ultrasonography performed between the onset and the middle of the service period. Both ovaries are examined and cows are classified in: Pregnant (if the embryo is observed); Cycling (if a corpus luteum (CL) is observed); Superficial Anoestrous (SA, if the maximum follicle diameter is ≥ 8 mm); Deep Anoestrous (DA, if the maximum follicle diameter is < 7 mm). Results of research on commercial farms ($> 5,000$ cows) indicate that early weaning is recommended in DA cows whereas temporary calf removal is in SA cows. For example, recently an experiment was done at INIA using 64 primiparous beef cows that were classified by OAD at the beginning of the service period (68 ± 16 days pp). Cows had (average \pm SD) 380 ± 29 kg and 4.3 ± 0.33 u (scale 1-8) of LW and BCS; 41% of the cows were in DA and 59% in SA. Within DA, cows were assigned to two treatments: control (CON, without any management) and early weaning (EW, calves were removed definitively from cows). Within SA, cows were assigned to two treatments: control (CON, without any management) and temporary weaning (TW, calves were fitted with nose plates for 14 days). One month later, OAD revealed that within DA, 0% CON cows presented a CL while 64% EW did. Within SA, 8% CON cows presented a CL while 61.5% TW did. The OAD is a powerful tool in the management of a beef cow-calf system and farmers are now increasing the usage of this technology with high confidence and success.