P.13

Relationship between body condition of pregnant dairy cows and insulin-dependent glucose metabolism of their offspring

Danijela Kirovski, Snežana Stevanović Đorđević, Ljubomir Jovanović, Željko Sladojević
Faculty of Veterinary Medicine, University of Belgrade
dani@vet.bg.ac.rs

The metabolic state of pregnant cows influences the calf's risk of metabolic disease in postnatal life. We have hypothesized that obesity in pregnant dams may disturb insulin-dependent glucose metabolism in their offspring. Twenty late pregnant cows were selected and divided in two groups based on their body condition score. First group (n=10) included obese pregnant cows (BCS > 4.0) and second group (n=10) included cows with optimal body condition score (3.0 > BCS < 3.50). Calves born from these dams were weighed at birth, and subjected to intravenous glucose tolerance test (GTT) at day 7 of age. Calves from obese dam had significantly lower birth weight and modified insulin response to glucose infusion, compared to calves that originated from optimal body conditioned dams. At day 7 of neonatal life, calves from obese dams had significantly lower basal glucose concentrations, significantly higher glucose AUC, significantly higher basal insulin, insulin AUC and insulin peak concentrations compared to calves from optimal body conditioned dams. Glucose elimination rates were lower in calves from obese dams than in calves from optimal conditioned cows. The RQUICKI was significantly lower in calves from obese dams than in calves from optimal conditioned cows, indicating on insulin resistance of calves that originated from obese dams. In conclusion, differences in the metabolic state of pregnant cows during late gestation may be related to their offspring's birth weight and glucose metabolism.
Keywords: obese pregnant cows, neonatal calves, glucose metabolism
Acknowledgement: Results presented in this summary are part of research done within scientific Project entitled: „Effect of insulin receptor and glucose transporter protein expression in pregnant cows tissues on newborn calves` vitality" funded by Ministry of Science and Technology, Republic of Srpska Government.

P.14

Assessing resilience of dairy cattle by studying impact of heat stress on predicted feed intake

Marie-Laure Vanrobays [1], Hedi Hammami [1], Aurélie Lainé [1], Hélène Soyeurt [1], Jérémie Vandenplas [2], Eric Froidmont [3], Nicolas Gengler [1]
[1] *Department of Agricultural Science, Gembloux Agro-Bio Tech, University of Liege, Gembloux, Belgium.* [2] *Animal Breeding and Genomics Centre, Wageningen UR Livestock Research, Wageningen, the Netherlands.* [3] *Walloon Agricultural Research Centre, Gembloux, Belgium.*
mlvanrobays@ulg.ac.be

Milk production and feed intake of dairy cows are both affected by heat stress (HS) which is also a potentially important cause of discomfort for animals. Therefore, strategies allowing mitigation of HS effects are required. Genetic selection appears to be a good solution because this tool permits to improve cumulatively and continuously traits of interest. In this context, the goal of this study was to estimate genetic variation of milk yield and predicted feed intake over the whole trajectory of temperature humidity index (THI) using a reaction norm approach. A total of 30,161 fat and protein corrected milk (FPCM) yield records from 4,577 Holstein cows were used. These data were collected between June 2009 and December 2010 in 453 herds in the Walloon Region of Belgium. Daily dry matter intake (DMI; g/d) of dairy cows were estimated at the day of FPCM records from the prediction equation of NRC (2001), which is based on predicted body weight, FPCM, and week of lactation. Body weight of cows was estimated using a two-step approach allowing to predict body weight throughout the lactation from body weight calculated using linear conformation traits. Daily values of THI were computed from meteorological data using the mean of daily values of dry bulb temperature and relative humidity. Bivariate random regression test-day models with random linear regressions on THI values were developed for FPCM and DMI. Estimated average daily heritability for FCPM was 0.08 and decreased slightly at extreme THI values (from 0.10 (THI = 17) to 0.06 (THI =75)). Heritabilities of DMI also decreased with increasing THI values: from 0.11 (THI=17) to 0.05 (THI=75). Genetic correlations between FPCM and DMI were positive and ranged from 0.85 (THI=17) to 0.55 (THI=75). This decrease could be explained by the decrease of DMI under HS which could be balanced by the buffering effect of body tissue mobilization. Combining these novel results with known effects of HS on body fat mobilization might help to disentangle complex relationships between mobilization and intake under HS; this being also an important issue in assessing well-being of dairy cattle and their resilience potential to HS.