

**Influence of *in utero* undernutrition on beef heifer performance up to their first lactation***A. Noya, I. Casasús, J. Ferrer, L. López De Armentia and A. Sanz**CITA de Aragón (CITA-IA2), Avda Montañana 930, 50059 Zaragoza, Spain; asanz@aragon.es*

The productivity of suckler cows, considering their ability to conceive, calve and rear a calf, can be impaired under malnutrition. We studied the consequences of early maternal nutrition on the performance of female offspring along with their first breeding, gestation and lactation. Sixteen-month-old heifers (n=36) born from CONTROL (100% energy requirements during the first third of gestation) and SUBNUT (65%) cows were artificially inseminated (AI). After calving, heifers reared their calves until weaning on day 105. Heifer diet was calculated to supply 100% of energy requirements during the experiment. Heifers and calves were weighed fortnightly, and heifer BCS was assessed at calving. Calving ease was classified as unassisted or assisted. Data were analysed with a generalized or mixed linear model with heifer maternal nutrition and sex, in the case of calves, as fixed effects. Fertility rate, calving ease and male/female ratio were assessed using the F-test. Heifer daily gains during rearing (0.77 kg/d), fertility rate to a single AI (80%) and BCS at calving (3.0) were similar in all heifers. No difference in calving assistance was found between CONTROL and SUBNUT heifers (26.7 vs 16.7%,  $P>0.05$ ). The male/female calf ratio was higher in CONTROL heifers, but not significantly (8/7 vs 3/9,  $P>0.05$ ). During lactation, all heifers lost weight (-0.52 vs -0.35 kg/d, for CONTROL and SUBNUT heifers,  $P>0.05$ ), probably due to their high metabolic rates. Heifer prenatal nutrition had no effect on their calf weight at birth (35 vs 34 kg,  $P>0.05$ , for CONTROL and SUBNUT calves) nor on calf ADG during lactation (0.72 vs 0.68 kg/d,  $P>0.05$ ), neither of which were affected by calf sex. Calf ADG during lactation was correlated with their dams' weight at calving ( $r=0.65$ ,  $P<0.001$ ). Calf weaning weight was correlated with their dams' weight when they were weaned ( $r=0.61$ ,  $P=0.001$ ). In conclusion, undernutrition during early gestation had no long-term effects on heifer postnatal performance during their first breeding, gestation and lactation. However, as heifers grow until their fifth year, further research is needed to study the impact of prenatal nutrition on maturity and performance during their productive lifespan.

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**Session 50****Theatre 1****Back to the future: re-introduction of cow-calf contact into dairy farming requires new knowledge***K. Barth**J. H. v. Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, Institute of Organic Farming, Trenthorst 32, 23847 Westerau, Germany; kerstin.barth@thuenen.de*

For more than one hundred years, dairy production has separated calves from dams. More milk and reducing the risk of infectious diseases for calves and cows were sensible goals. This practice is being questioned not only by a critical public but also by farmers who now are again allowing calves to have contact with their dams and to suckle. In addition to aspects concerning the management of these cow-calf contact (CCC) systems, however, questions are increasingly arising concerning fundamental relationships between dairy cows' physiology, genetics and behaviour, which, due to the exclusion of contact with their own offspring, were not any longer in focus of research. Especially milk secretion and machine milking were investigated without any interference of the calf's role in these processes. Answers to the questions that arise in the context of CCC could also help to address existing challenges of intensive dairy farming where calves are raised separately, e.g. the causes of milk ejection problems in heifers. We still do not know what processes underlie the – compared to machine milking – higher oxytocin secretion in cows that have established a bond with their calf when suckled by it; we do not know if and how the more and repeatedly oxytocin releases due to multiple suckling, that result from unlimited cow-calf contact, affect the cows' well-being including their performance, and we do not know the cause of the differences in the nursing cows' response to machine milking, which range from complete blockage to (presumably) complete milk let-down as can be deduced from the large variation in yield and milk composition. It is well known that intensive suckling by more than one calf in addition to machine milking increases the frequency of udder emptying and thus induces an increase in productivity that is maintained even after returning to a lower milking frequency. However, this does not seem to apply to all CCC systems. In conclusion, cow-calf management on dairy farms was not in the centre of research for many years. This topic is now back on the scientific agenda because of the obviously successful re-introduction of suckling into European dairy farms.