



Greater intake before weaning improves first lactation performance

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The preweaning period is the most important phase in the productive lifetime of a dairy cow. Two meta-analyses published recently in the *Journal of Dairy Science* determined the relationships between early-life parameters and the performance of first-lactation (primiparous) cows. A meta-analysis is the statistical procedure for combining data from multiple studies.

The first meta-analysis included data from 2,880 Holstein calves from 37 calf research trials conducted at the University of Minnesota Southern Research and Outreach Center. The researchers (Chester-Jones et al., 2017) found that average daily gain (ADG) during the first 8 weeks of calf life significantly improved 305-days milk yield in the first lactation: for every kg of ADG at 8 weeks, milk yield improved by 579kg.

Similarly, in the second meta-analysis (including 21 treatment groups) carried out by Pennsylvania State University's researchers (Gelsinger et al., 2016) found: for each additional 100g of preweaning ADG; milk, fat, and protein production during first lactation increased by 130.4, 6.1, and 4.7kg, respectively. Moreover, this work showed that calf starter intake is as important as milk intake in calf feeding programs:

- For each additional 100g/d of milk or milk replacer intake before weaning, milk, fat, and protein increased by 138.5, 8.4, and 4.7kg, respectively.
- For each additional 100g/d of calf starter intake in the preweaning period, first-lactating cows produced 127.0kg more milk, 8.4kg more fat, and 4.0kg more protein.

A greater plane of nutrition during the preweaning period also improves mammary gland development. In a recent study conducted at Cornell Research Farm, Harford, NY, the researchers (Soberon and Van Amburgh, 2017) compared two groups of calves; a low-intake group in which the calves were fed 0.89 megacalories of metabolisable energy above maintenance and a high-intake group in which the calves received 3.75 Mcal of ME above maintenance) during the first 54 days of life.



As expected, calves in the high-intake group had higher ADG than calves in the low-intake group (0.82 vs. 0.39kg). The mammary glands of calves fed for higher nutrient intake weighed 3.4 times more than that of calves fed for lower intake (337.6 vs. 75.5g). Moreover, the parenchymal mass of the mammary glands of highly fed calves weighed 5.9 times more than the mammary parenchymal mass of low-intake calves (6.48 vs. 1.1g). These results may explain the greater performance of first lactating cows with better early-life growth.

The minimum body weight of primiparous cows necessary to optimise milk yield after calving is 85% of their mature body weight. Therefore, in order to take full advantage of the greater growth before weaning, an adequate feeding program should be implemented during the rest of the heifer period (from weaning until calving).