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273 Dynamics of Bone Mineralization in Primiparous Sows as a Function of Dietary Phosphorus and Calcium During Lactation. Julien Heurtault[1], Marie-Pierre Létourneau-Montminy[2], Patrick Schlegel[3], [1]*Agroscope, Switzerland, Laval University, Canada,* [2]*Université Laval,* [3]*Agroscope*

Abstract: In a context of maximizing the use of dietary phosphorus (P) in swine production, research should focus on understanding the mechanisms of bone P and calcium (Ca) utilization in sows. A better knowledge of P and Ca quantities that can be mobilized from bones during lactation, which would then be restored during gestation, would allow the development of new feeding strategies including this dynamic process. In turn, it can lead to a substantial decrease in dietary P supply. The role of dietary phytase supplementation also needs to be quantified in such potential strategies. In addition to the bone mineral status of sows, the consequences of these strategies on litter performance need to be documented. The objectives of the experiment were to measure the capacity of the sow to mobilize bone minerals reserves during lactation according to dietary digestible P (P dig) content and phytase addition, to restore them, during the following gestation, and to measure the effects on the growth performance of the offspring. Whole body bone mineral content (BMC) of primiparous Swiss Large White sows (n = 24) from the Agroscope sow herd was measured by dual-energy X-ray absorptiometry (DXA) on days 2, 14, 26, 66, and 106 after parturition. Four lactation diets were formulated to cover all nutritional requirements except for Ca and P dig: control without phytase (100%; 3.0 g P dig, 9.9 g Ca/kg), 75% of P dig without phytase (75%; 2.3 g P dig, 8.3 g Ca/kg), 50% of P dig without phytase (50; 1.5 g P dig, 6.0 g Ca/kg), and 50% of P dig with phytase (50+Phyt; 3.0 g P dig, 7.6 g Ca/kg). The gestation diet was formulated to cover nutritional requirements of Ca and P dig (2.6 g P dig, 8.2 g Ca/kg). Piglets were weighed at 1 and 14 days after parturition and at weaning (day 26), and the average daily gain (ADG) per piglet was calculated. During lactation, BMC of the sow (in g/kg of body weight, BW) tended to be less in treatment 50% than in treatment 100% (-12.8%, linear effect x time quadratic, $P = 0.05$). During gestation, BMC was similar between treatments. Therefore, sows in treatment 50% were able to recover their bone-mineralization deficit during the next gestation. The BMC (in g and in g/kg BW) was similar between treatments 100% and treatment 50+Phyt throughout the experimental period. Piglet weight at days 1, 14, and 26 and ADG (days 1 to 14, 14 to 26 and 1 to 26) were

similar between dietary treatments. These results show the possibility of drastically reducing dietary P during lactation without decreasing litter performance and highlight the ability of primiparous sows to mobilize bone mineral during lactation and restore it during gestation.

Keywords: dual-energy X-ray absorptiometry, phosphorus, sow