

The Impact of Winter Calf Feedlot Management on Spring Grazing Performance

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Cattle industry in Uruguay is mainly based on direct grazing. However, during the last years, feedlot has grown as a complementary feeding system to grazing for growing cattle to overcome low pasture offer during calves first winter, increasing mean liveweight gains (LWG) and reducing age at slaughter (Simeone *et al* 2008). However moving back calves from winter high grain diets to pasture after they leave the feedlot may reduce LWG during spring grazing (Parra *et al* 2006), affecting the whole efficiency of the winter-spring period. Grazing systems productivity in temperate areas is mostly determined by an efficient use of spring grass production, so understanding how feedlot management variable may relate to spring performance on pasture is relevant to the whole system efficiency.

Data corresponding to Hereford weaned calf performance was compiled during winter-spring 2006, 2007 and 2009 at the "M.A Cassinoni Experimental Station" in Paysandú, Uruguay (58°02'W, 32°22'S). Calves were all spring-born from the experimental cow-calf herd, castrated at birth and early weaned (70 kg liveweight) being manage on improved pastures plus supplementation during summer and autumn until they entered the feedlot. Animals were lot-fed during winter (14 June to 2 October, 86.0±8.0 days) in an open-air feedlot facility (2006: 4 pens, 10 calves/ pen; 2007: 3 pens, 8 calves/ pen; 2009: 7 pens, 6 calves/ pen) with a high grain ration based on ground sorghum grain (roughage: 18.3±10.4 % ration DM) gradually introduced (28.6±12.2 days). During spring (3 October to 13 December; 81.5±6.2 days), calves were moved to a mixed grass-legume pastures, grazing in one group at an average forage allowance of 6 kg DM/ 100 kg liveweight (LW). Database included individual animal records of LW taken as they enter (LWI, 142.9±16.2 kg), and left the feedlot (LWF, 226.1±34.2), at end of spring (LWS, 284.4±28.6), and every 14 days (feedlot) or every 28 days (spring). Mean pen LW was considered an observation for statistical analyses, and LWG was estimated by regression (feedlot-LWG, 0.952±0.183 kg/day; spring-LWG, 0.930±0.158 kg/day). Equations describing spring-LWG and LWS, were tested through stepwise regression analyses (SAS Inst. Inc., Cary, NC) including as independent input variables LWI, LWF, feedlot-LWG, day of feed introduction, days in feedlot, % roughage in feedlot DM ration (R), and roughage DM intake (RDMI, % LW). Linear and quadratic effects were tested and remained in the model if (P<0.05). Year effect and its interaction with feedlot-LWG were tested using the GLM procedure (SAS Inst. Inc., Cary, NC).

Mean spring-LWG varied between years (2006: 1.142 a, 2007: 1.073a, 2009: 0.784b, P=0.049) but no interaction was observed with feedlot-LWG (P=0.5340). Feedlot-LWG affected spring LWG during the first 28 days after leaving the feedlot (LWG-S1, P=0.0275), and calves LW by the end of spring [LWS (kg/day)= -588.7+1911.2(Feedlot-LWG)-1009.3(Feedlot-LWG)², R²=0.82, P<0.01]. An optimum feedlot-LWG of 0.947 kg/d was determined for maximising LWS (316 kg). RDMI was identified as the unique significant variable explaining LWG-S1 (R²p=0.50; b=0.0133 s.e. 0.0038 kg/d, P=0.0045). Model for predicting LWS was improved when including RDMI and spring-LWG [LWS (kg/d)=-197.4+809.9(Feedlot-LWG)-402.2(Feedlot-LWG)²+0.60(RDMI)+82.6(spring-LWG), R²=0.96; P<0.01].

These results suggest that when lot-feeding calves during their first winter of life the winter-spring period as a whole should be considered, planning feedlot diet to restrict LWG to approximately 1 kg/day in order to maximize LW by the end of spring. Winter high grain feedlot diet appears to affect animal transition to grazing (first 28 days). Based on observed positive association of feedlot RDMI with LWS, it is probable that gradually increasing RDMI as calves are to leave the feedlot may improve spring performance. Further analytical research may be necessary to quantify more precisely this relationship.

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