PERFORMANCE IMPROVEMENT OF BALI CATTLE THROUGH THE USE OF QUALITY FEEDS AND SUPPLEMENTATION ZINC ACETATE

Sentana Putra

Under the supervision of Toha Sutardi as Chairman of Dissertation Committee, Djokowoerjo Sastradipradja, Tuty L. Yusuf, Jajat Jachja, and Ketut Lana as member of committee.

ABSTRACT

Bali cattle (*Bibos banteng*) is indegenous animal that well recognized for superior reproduktive performance, high dressing out percentage, and high meat/bone ration. The animals however, is getting smaller and smaller in size due to continuous offtake of quality bulls and poor nutrition. The experiment tried to improve performance of the cattle through the use of leguminous tree foliage, concentrate feeds, and supplementation of zinc acetate. Experimental results were analyzed for the efficacy of the improvement followed by regression studies to elucidate metabolizable energy (ME) and crude protein (CP) requirements of animals. The experiment was a randomized complete block feeding trial in pregnant cows, 261 ± 16.5 kg liveweight, where the treatments were A = 70% elephant grass (EG) + 30% *Gliricidia sepium* (GS), B = 30% EG + 58% GS + 12% *Hibiscus tilliacius* (HT), containing devaunating agent, C = 74% B + 25% concentrate feeds, and D = C + 50 mg Zn-acetate/kg of dietary dry matter. The feeding regime was more or less maintained sinc2 6.2 ± 1.4 months of pregnancy throughout 25 weeks of lactation.

The use of HT (treatment B) slightly decreased the total viable rumen protozoa from 8.14×10^4 to 5.51×10^4 cells/ml, that was accompanied by a small increase in the total cultivable rumen bacteria from 3.56×10^8 to 3.96×10^8 colonies/ml. The changes reduced rumen NH_3 from 6.34 to 5.41 mM ($P<0.01$), but increased digestibility ($P<0.01$) of fat (11.4 vs 23.4%), crude protein (62.4 vs 67.1%), and N retention (22.6 vs 37.0 g/d). Inclusion of concentrate feeds (treatment C) stimulated the growth of protozoa to 2.44×10^5 cells/ml, while the total counts of bacteria remained unchanged (4.95×10^8 colonies/ml). The treatment improved fermentability of the whole diet that was apparent from the increase in the total volatile fatty acids (VFA) from 81.0 to 95.7 mM and the increase in the rate of tungstic acid precipitible N (TAPN) formation from 14.6 to 20.8 mg/l in a hour. The changes lead to improvement in energy utilization that was noted from the drop of the acetate/propionate ratio of the VFA from 3.07 to 2.01 and the increase in the efficiency of convertion of hexose energy into VFA from 74.6 to 77.8 % ($P<0.01$). Addition of Zn-acetate (treatment D) promoted growth of rumen bacteria to 1.28×10^9 colonies/ml and decrease the rumen protozoa to 1.53×10^5 cells/ml, so that fermentation, degestibility, and N utilization parameters were improved accordingly. Animals on treatment C and D gained faster during the last 6 weeks of

pregnancy (0.465 vs 0.355kg/d) and gave birth to heavier calves (18.7 vs 15.4 kg). Animals on treatment D yielded more milk than rest (2.73 vs 1.62 4%FCM/d).

Regression analysis revealed that the pregnant cows required 0.466 MJ ME and 9.91 g CP for maintenance, 7.96 MJ ME and 44 g CP for one kg liveweight gain, and 1.93 MJ ME and 15.1 g CP for one month advancement of pregnancy stage. The lactating cows required 0.728 MJ ME and 1.9 g CP for maintenance, 4.393 MJ ME and 1.03 kg CP for one kg liveweight gain, and 3.272 MJ ME and 271 g CP for production of one kg 4%FCM. Within ihe first 25 weeks of age, the requirements of the calves could be represented by following equations: ME (MJ/d) = -0.639 + 0.073W + 13.574G + 8.056D with R^2 = 0.84 and S_b = 0.56, and CP (g/d) = -5.20 + 0.661W + 3.68G + 198.05G + 145.5D with R^2 = 0.92 and S_b = 26.6. In the equations, W stands for liveweight (kg), G for liveweight gain (kg/d) and D for dry matter consumption of diet.

The experiment clearly shows that Bali cattle responded well to feed improvement. The animal requirements could be used as an initial guide in feeding improvement. The superiority of Zn-acetate supplemented diet in almost all nutrition parameters strongly suggests that Zn is limiting factor for performance of Bali cattle in the area.