THE EFFECTS OF RESTRICTED MATERNAL NUTRITION ON CONCEPTUS DEVELOPMENT OF FALLOW DEER (*DAMA DAMA*) IN EARLY PREGNANCY

J.S. FLESCH and R.C. MULLEY

School of Environment and Agriculture, University of Western Sydney, Richmond, NSW 2753

The production of offspring in fallow deer (*Dama dama*) is clearly expensive, the price of which is often manifest in the future fertility of the dam. Compounded by the physiological effects of gestation and lactation on doe body condition score (BCS), declining pasture quality and availability is a feature of the breeding season, affecting reproductive performance in farmed fallow deer in Australia. It has been demonstrated for a range of ruminants that restricted maternal nutrition and low BCS during the pre-mating period may reduce the chances of conception, retard conceptus development and reduce the metabolic capacity of the dam to absorb nutritional stress in later pregnancy (Robinson *et al*. 1999). The aim of this study was to determine if restricted feed intake in early gestation affected conceptus development.

Twenty-four mature European fallow does were naturally mated following oestrous synchronisation, and assigned a feeding treatment: *ad libitum* (AL) or reduced energy intake (RI). All animals were fed an oats/lucerne diet containing 10.5 MJ metabolisable energy/kg DM and 12% crude protein. Twelve of the does were individually housed in 12 m^2 pens with sawdust flooring, providing shelter and *ad libitum* fresh water. Six were fed AL and 6 RI. The daily feed intake of RI does was reduced to 70% of the average intake of the 6 AL does on a metabolic liveweight ($W^{0.75}$) energy intake basis calculated daily. The remaining 12 does were divided into 2 groups of 6, and group-fed the same diet in paddocks. The group-fed AL does had access to kikuyu and ryegrass pasture, while group-fed RI does were fed at 70% of the mean intake of penned RI does on a $W^{0.75}$ basis. The ME intake of group-fed AL does was not calculated. The RI does were also located on a ¼ ha paddock, devoid of pasture. Liveweight gain (LWG) and BCS were recorded weekly. At 87 days gestation, all animals were slaughtered. Carcass weight, placental mass, foetal mass and foetal crown-rump length (CRL) were measured.

Feeding treatments had a significant affect on patterns of LWG. The AL treatment groups had a higher LWG than RI treatments by week 12 of gestation (P=0.043), although there was no significant difference between individually fed and group-fed does within feeding treatments (P=0.636). Trends in BCS were concomitant with rates of LWG over the treatment period. The RI animals had significant reductions in BCS compared with their AL counterparts (P=0.001), while there were no significant differences in BCS between penned or group-fed does within feeding treatments (P=0.283). The BCS of RI does dropped between 0.5 and 1.0 score. Carcass weights reflected BCS and LWG differences. The AL and RI does had mean carcass weights of 26.5 kg (SEM ± 2.4) and 24.2 kg (SEM ± 2.6), respectively, with RI carcasses significantly lighter than their AL counterparts (P=0.039).

There were no significant differences in foetal weight between high and low energy intake treatments (P=0.733) or between group and pen-fed does on the same nutritional intake (P=0.931). Foetuses from penned and group-fed AL does had average weights of 135.2 g (SEM ± 5.2) and 135.7 g (SEM ± 5.6), respectively, with their penned RI and group-fed RI counterparts averaging 135.7 g (SEM ± 3.6) and 134.5 g (SEM ± 3.5), respectively. Crown-rump length ranged between 128 and 145 mm between feeding treatments, although differences were not significant (P=0.701). There were no significant differences between AL and RI treatments for placental mass (P=0.878) or placentome number (P=0.369).

Nutritional intake over late gestation is clearly important in determining conceptus development. While feeding restrictions over early gestation did not affect conceptus development in this study, the flow-on metabolic consequences of such restrictions over late gestation on foetal development and neonate survivability are yet to be demonstrated in this species.

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Email: j.flesch@uws.edu.au