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Influence of stage of maturity of the sward on the bite mass of lactating ewes

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On continuously stocked ryegrass pastures maintained at a vegetative stage, bite mass of ewes linearly increases with sward surface height (Penning *et al*, 1991, Grass and Forage Science, 46, 15-28). This relationship probably differs with the grazing management and the stage of maturity of the sward. In tropical complex swards, bite mass of cattle has been actually shown to be more related to leaf density and leaf : stem ratio than to sward surface height (Chacon and Stobbs, 1976, Aust J Agric Res, 27, 709).

Three cocksfoot sward structures were compared under rotational grazing : S1 = vegetative, S2 = reproductive (beginning of stem elongation), S3 = reproductive (appearance of first flowerheads). Grazing periods lasted from 21 to 30 June (S1), 10 to 19 May (S2) and 27 May to 10 June (S3). Eight Ile de France ewes, which had lambed on 23 March and suckled twin lambs, were used. Mean live weight and body condition score 5 weeks after lambing were 70 kg (se 2.3) and 2.5 (se 0.7) ; mean lamb growth rate during the first 22 days of life was 271 g/d (se 9).

Sward surface height was measured daily using a stick. It decreased curvilinearly with time from 205 to 47 mm, 296 to 69 mm and 385 to 145 mm in S1, S2 and S3 respectively. Ten randomly chosen quadrats (100 cm2) were cut to ground level three times weekly. On each of them, green lamina were separated and dried. Green leaf mass per ha (GLM) decreased curvilinearly from 2.76 to 0.23, 4.50 to 0.68 and 3.24 to 0.68 t DM/ha respectively for S1, S2 and S3. Bite mass was measured after a fast of 3 hours on three randomly chosen ewes, twice weekly, using the method of short-term weight changes (Penning and Hooper, 1985, Grass and Forage Science, 40, 79-84). The animals were fitted with human adult shaped nappies to prevent faeces or urine losses and suckling. Number of prehension bites was visually recorded.

Bite mass (BM) ranged from 18 to 275 mg DM. It was linearly related to sward surface height (H, mm), but regressions differed significantly for S1 and S2 swards on one hand, and S3 sward on the other hand, equations being :

S1 + S2 : BM = -2 (± 15.4) + 0.81 (± 0.100) H ; r^2 = 0.80, rsd= 29, n = 18

S3 : BM = -100 (± 28.2) + 0.92 (± 0.114) H ; r^2 = 0.88, rsd= 24, n = 12

Bite mass was linearly related to green leaf mass (GLM, t DM/ha), regressions being no more affected by stage of maturity of the sward, as follows :

BM = 18 (± 10.0) + 56.67 (± 5.175) GLM ; r^2 = 0.82, rsd= 27, n = 29

Regression of bite mass on green leaf mass had a common intercept but different slopes ($P<0.001$) between animals (A1, A2, A3), as follows :

A1 : BM = 19 (± 7.0) + 70.03 (± 4.473) GLM
A2 : BM = 19 (± 7.0) + 55.28 (± 4.473) GLM
A3 : BM = 19 (± 7.0) + 45.25 (± 4.455) GLM ; r^2 = 0.92, rsd = 19, n = 29

The slope might be related to ewe milk production, growth rate during the first three weeks of lactation being higher for A1 litter (603 g/d), lower for A3 litter (486 g/d), and intermediate for A2 litter (520 g/d).

Results demonstrate that sward surface height can not be used to characterize bite mass in different situations of maturity of the sward. In contrast, relationship between bite mass and green leaf mass is independent of the stage of maturity of the sward, at least until appearance of first flowerheads.