**Application:**

Estimation of standard reference weight of ewes from the Icelandic sheep breed to provide a better basis for determining nutrient requirements and improved sheep production system

**Introduction:**

Standard Reference Weight (SRW) is a concept that connects frame size, live weight and body condition; and for any particular breed and sex of cattle or sheep SRW is the approximate liveweight achieved by that animal when skeletal development is complete and the empty body contains 250 g fat/kg (CSIRO, 1990); corresponding to body condition score 3 for sheep on the scale described by Russel et al. (1969). The SRW is a useful concept for several purposes: 1) to relate live weight and body condition for mature animals; 2) to define the maturity of growing animals; 3) with the animals estimated degree of maturity, its energy and protein requirements for growth can be estimated with much higher accuracy due to more accurate estimate of the fat, protein and energy content of the gain. To estimate SRW for ewes of the Icelandic breed of sheep, we used data on ewe live-weight (LW) and body condition scores (BCS) from 22 production years, 2001–2022, from the Hestur sheep experimental farm in Borgarfjörður, Southwest- Iceland.

**Material and methods:**

 Live weight (LW) and body condition scores (BCS) were registered at six stages of the annual cycle, defined as following: Post-weaning (18 October); Pre-mating (1 December); Post-mating (4 January); 2-months pregnant (10 February); Mid-pregnancy (15 March); Late-pregnancy (20 April). Each of the set dates varied 1-2 days in either direction. The total dataset contained around 14.000 records of LW and BCS at each stage of the annual cycle. Based on literature studies and a preliminary analysis of the data, it was decided to use for further analysis only data for ewes that had complete records of LW and BCS up to 5 years of age. According to these criteria, data for 1266 ewes were available. Ewe LW at different stages of pregnancy was corrected by formulas describing the weights of the products of conception (Robinson et al., 1977), considering the number of foetuses carried by each ewe and the stage of pregnancy based on recordings of date of mating or lamb birth. The pregnancy-free live weights (PFLW) were then regressed on BCS for data from different ewe age and stages of the annual cycle as reported in Table 1.

**Results:**

Some more complex relationships were tested but none of them gave a better prediction than the simple linear relationship PFLW = a + b ꞏ BCS. The resulting regression coefficients a and b within each year and production stage as reported in Table 1 were compared statistically, according to 95% confidence limits. The constant a had generally lower value and the slope b higher value for ewes in year 2 than other age categories in different stages of the production cycle. By using the prediction equations derived by the regressions, LW at BCS 3.00 was calculated for different age categories and production stages, as reported in Table 1.

Table 1. Coefficients for the regressions a + b ꞏ BCS within each year and stage of the production cycle.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Production stage**  | **year no** | **age mo** | **a** | **b** | **R2** | **LW at BCS 3.00** |
|  | Post-weaning | 2 | 17 | 28.1a  | 8.93B | 0.41 | 54.91 |
|  | Pre-mating | 2 | 19 | 31.7ab | 8.33B | 0.35 | 56.65 |
|  | Post-mating | 2 | 20 | 30.4ab | 8.62B | 0.36 | 56.26 |
|  | 2-months pregnant | 2 | 21 | 32.9b | 8.27B | 0.35 | 57.72 |
|  | Mid-pregnancy | 2 | 22 | 29.6ab | 9.18B | 0.37 | 57.09 |
|  | Late-pregnancy | 2 | 23 | 34.3b | 8.47B | 0.30 | 59.68 |
|  | Post-weaning | 3 | 29 | 42.6c | 6.46A | 0.23 | 61.98 |
|  | Pre-mating | 3 | 31 | 42.9cd | 7.09AB | 0.22 | 64.21 |
|  | Post-mating | 3 | 32 | 43.2cd | 7.12AB | 0.21 | 64.59 |
|  | 2-months pregnant | 3 | 33 | 41.7c | 7.79AB | 0.25 | 65.08 |
|  | Mid-pregnancy | 3 | 34 | 37.0bc | 8.91B | 0.28 | 63.75 |
|  | Late-pregnancy | 3 | 35 | 37.3bc | 9.41B | 0.29 | 65.47 |
|  | Post-weaning | 4 | 41 | 45.7cd | 6.61AB | 0.22 | 65.48 |
|  | Pre-mating | 4 | 43 | 47.8d | 6.93AB | 0.19 | 68.63 |
|  | Post-mating | 4 | 44 | 47.9d | 6.95AB | 0.20 | 68.79 |
|  | 2-months pregnant | 4 | 45 | 46.6cd | 7.64AB | 0.24 | 69.51 |
|  | Mid-pregnancy | 4 | 46 | 41.1c | 8.97B | 0.27 | 68.05 |
|  | Late-pregnancy | 4 | 47 | 44.6cd | 8.43B | 0.24 | 69.91 |
|  | Post-weaning | 5 | 53 | 47.7d | 6.57A | 0.21 | 67.43 |
|  | Pre-mating | 5 | 55 | 48.5d | 7.31AB | 0.19 | 70.46 |
|  | Post-mating | 5 | 56 | 50.4d | 6.92AB | 0.18 | 71.12 |
|  | 2-months pregnant | 5 | 57 | 47.4d | 8.07B | 0.24 | 71.63 |
|  | Mid-pregnancy | 5 | 58 | 44.1cd | 8.88B | 0.27 | 70.70 |
|  | Late-pregnancy | 5 | 59 | 43.3cd | 9.42B | 0.29 | 71.54 |

a, b, c: Values with different superscript within a column are statistically different, p<0.05.

**Conclusions:**

 According to the data presented in Table 1 the SRW estimate for ewes of the Icelandic sheep breed, based on LW of fully developed indoor fed ewes at BCS 3.00 is 70-72 kg. The ewes are fully developed at 5 to 6 years of age.

**References:**

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