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Book of Abstracts

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Feeding behaviour of Massese lamb reared indoors

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Massese breed is commonly reared for milk production, but is also able to produce lambs with good growth performances and muscular development. These lambs are slaughtered at around one month of age, in order to let milk available for cheese production. Lambs reared up to two months of age and with higher weight (about 20 kg) represent an innovative product for this breed, and their rearing and feeding system should be properly characterized. The aim of this work was to study the feeding behaviour of Massese lambs reared up to 65-70 days of age. Behavioural observations were performed during autumn and winter on a group of 12 lambs reared indoors: animals were observed from birth to slaughter, every 7 days. Focal observations were performed by scan sampling at 5 minute intervals, from dawn to dusk. Lambs were kept in collective boxes with their dams, fed by suckling milk, hay and supplemented with pelleted concentrate. The daily observation time was grouped into four time slots (morning, midday, afternoon and evening) and the percent of time devoted to the recorded behaviours within each time slot was analyzed with GLM, using diurnal time slot as discrete variable and age as intraclass (time slot) covariate.

The amount of diurnal time devoted to total feeding activity progressively increased with age ($p<.001$), and amounted to 32% at 60 days of age. The growing time dedicated to food intake was mainly due to an increasing quadratic ($p<.001$) trend in hay consumption, which raised markedly until around the 40th day of age, particularly in the morning and in the evening. Also time devoted to concentrate consumption slightly increased with age, but without statistical significance. Milk suckling occurred equally in each part of the day and decreased with age according to a quadratic regression ($p<.001$), however the presence of the dam induced lambs to continue milk intake. Rumination activity started to occur regularly around the 2nd week of age and increased linearly with age. Lambs ruminated mainly in the middle of the day and in the afternoon, as a long interval among feeding activity.

The results indicate that milk consumption during the second month of life does not show a substantial reduction, therefore lambs could be separated from ewes at around 1 month of age because they are able to access spontaneously solid food and to devote time to rumination activity. Moreover, this would allow to obtain a higher yield of milk for cheese production.

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The effect of different time epoch settings on the classification of sheep behaviour using tri-axial accelerometry

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Automated monitoring of foraging behaviour in grazing sheep can help to improve efficiency of animal production. Data from tri-axial accelerometers have been used to classify feeding behaviours in ruminants. These devices sample at high frequencies, which generates vast amounts of data and carries a cost in terms of battery consumption. To overcome this, an epoch, or size of aggregation window, can be set and applied to the data stream. We evaluated the effect of different epoch settings (5, 10, 30, 60, 120, 180 and 300 s) on the precision of behaviour classification for sheep wearing the BEHARUM tri-axial accelerometer and force sensor. This device stores the data in a secure digital card, or transmits it to a remote computer. The study was conducted in spring 2016 with Sarda dairy sheep that rotationally grazed berseem clover and Italian ryegrass for 6 hours day. Sheep behaviour was recorded by a fixed video camera. On four occasions, eight sheep were equipped with the BEHARUM devices, configured to store three acceleration values per second for each axis and for the force sensor. Mean, variance and inverse coefficient of variation (ICV; mean/standard deviation) of the recorded data were calculated for each epoch. Video recordings were coded manually, with behaviour during each epoch classified as grazing, ruminating or resting. The merged sensor and behavioural data were analysed for each epoch, by multivariate statistical techniques: canonical discriminant analysis (CDA), and discriminant analysis (DA). The CDA significantly discriminated the three behaviours (Hotelling's test $p<.001$) by extracting two canonical functions. To validate the derived discriminant functions, the complete dataset was randomly divided into training and validation dataset in the proportion of 85 to 15%. This partition of the dataset was iterated 1000 times using a bootstrap procedure. At each run,