

12 ■ Work time and working environment in the fattening of young cattle in Sweden

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Background

In Sweden there are approximately 400.000 dairy cows and 200.000 beef cows. The beef production in Sweden is highly connected to the dairy production, and approximately 70% of the cattle slaughtered for red meat originate from dairy breeds (Strand & Salevid, 2007).

Red veal production

Swedish veal production is entirely of the red veal type, with an annual production of ~5000 tons (approx. 30.000 calves), constituting 0.6% of EU27 total production of ~800 000 tons in 2008 (carcass weight equivalents) (Eurostat, 2009). Red veal represents slightly less than 10% of Swedish beef cattle production (SJV, 2009). The production of red veal is characterized by a relatively intensive fattening of calves of dairy breed (*ad libitum* access to concentrates and hay or grass silage) to the age of 8 months and a carcass weight of 160 kg. The short rearing period and the young age of the calves require high demands on work organization and working routines with several systematic work tasks performed daily, weekly or monthly. At 1-10 weeks of age the calves are transported from the dairy farm to the specialist farm, often from several different herds. If more than 50 calves <4 months of age are bought from more than one farm, the calves must by law be kept separate from older calves for a minimum five-week quarantine period. In the quarantine building, calves are mainly grouped on straw litter, but single pens or outside group/single hutches are also used, depending on the age of the calf. The majority of quarantine houses are run according to an 'all in-all out' strategy for a maximum period of three weeks before the batch is closed off for a five additional weeks.

Young bull production

Production of young bulls make 45% of the total beef production with ~57.000 tons carcass weight (approx. 175.000 animals) (SJV, 2009). The production of young bulls is based on dairy and suckler calves reared to an average age of 15-17 months and carcass weight 310 and 350 kg, for dairy and beef breeds, respectively. The first months of rearing dairy calves for young bull production has management practices similar to red veal production. Rearing young bulls from beef breeds might be without the use of a quarantine area.

Introduction

Input costs in agriculture are increasing world-wide and labour costs are no exception. Additionally, the shortage of labour from outside the family is a large concern, intensifying the need of a work-efficient and attractive production. Despite of an increasing demand for feed, the self sufficiency of beef in Sweden is continuously decreasing. Agriculture is together with forestry the occupation with the highest risk of injuries and accidents, most commonly caused by handling of animals (70% of all accidents) or by machines and during construction work (Pinzke

& Lundqvist, 2007; SWEA, 2009). Work-related troubles other than injuries commonly seen in agriculture can even be respiratory diseases, disorders due to chemical handling, musculoskeletal disorders (MSD) due to awkward working postures, heavy loads and repeated strain during manual work (Walker-Bone & Palmer, 2002; Pinzke, 2003). The present study investigated the latter in relation to labour use in the fattening of young cattle. **Aim**

The aim of the present study was to investigate the current use of labour and the working environment in terms of hazard risks, the exposure of physical strain and prevalence of MSD in the production of red veal (RV) and young bulls (YB). Long term aims were to improve labour efficiency and working environment. A questionnaire was used to cover the production on a broad scale and field studies were used to investigate larger and more specialised farms.

Methods

Work time and work environmental factors during predefined work tasks were investigated through semi-structured questionnaires and field studies. Field studies were performed on 10 farms from each production line. Of red veal farms, 31 (67%) participated in the study and in the ongoing study of young bull farms producing ≥ 100 cattle per year, 96 farms (48%) have so far been involved. Predefined work tasks focus on the handling of animals, feed, litter and manure including cleaning procedures in quarantine (QS) - and fattening houses (FS), as well as labour use for administrative work. Farm facilities were recorded as well as strategies, performance frequency and techniques related to the different work tasks.

Work time

The labour use for every work task was given in time units per day and batch in quarantine and fattening houses, respectively, and total time for the whole rearing period until slaughter.

Labour efficiency was calculated as sec/calf/day or min/calf/batch. Calculation was based on the number of calves and total days in the quarantine area ($batch_{QS}$) or fattening unit ($batch_{FS}$), and the total number of days in the entire production period ($batch_{tot}$). Group size within the batch was not considered in the calculation of labour use.

Working environment

Perceived physical exertion in relation to each work tasks was assessed by the farmers using the Borg's CR-10 Scale (Borg, 1990) ranging from 0 (none at all) to 10 (extremely strong). From the general standardized Nordic questionnaire (Kourinka et al. 1987), perceived symptoms of musculoskeletal disorders (MSD) in different body parts were assessed. MSD was referred to as "pains, aches or discomfort" in the body parts.

The relationship between duration and repetitiveness of different work tasks influences the impact of physical exertion level (Borg's scale) and the risk of developing MSD. This impact can be determined by use of a Physical Work Strain index (PWS), according to the equation (Kolstrup et al. 2006):

$$PWS_i = t_{ix}p_i/t_i$$

Where t is the number of work hours per week working with a specific work task, i and p is the level of physical exertion (Borg's CR-10 scale) related to the work task.

Incidents of accidents was addressed through closed questions regarding where the accident took place, under which circumstances and how serious the accident was in terms of medical examinations and days absent from work.

The farmers' perceptions on a 1-4 scale (1=bad, 4=very good) of eight different physical and psychosocial work factors (Lundqvist, 1988) such as work climate, social network, teamwork and stress related to the production line was addressed through closed questions in the survey. A finalizing set of questions inquired whether the respondent was planning to make investments or improvements in his beef cattle enterprise to: a) reduce the work hours; b) improve the physical work environment; c) Improve the psychosocial working environment or; d) Reduce work-related hazard risks.

Results and discussion

Preliminary results show that the average labour use per calf and batch during the pre-defined work tasks was 6.4 hours on young bull farms (100-500 bulls/year) and 7.0 and 2.1 hours for medium (100-500 calves/year) and large sized (500-1150 calves/year) red veal farms, respectively. Overall, labour use was highly diverse between farms. Housing systems, level of mechanisation, ages and group sizes of calves during the production period differed not only between farms, but even within farms. Labour use per calf in the red veal production was not significantly more efficient when farm size increased from 500 to 1150 calves per year, indicating that the trend towards high mechanisation and effectiveness has not been as noticeable in beef cattle production as in the dairy, pig and poultry industry. This might illustrate the limit of the farming facilities used at present, with a minimum amount of time per calf that can be put into production. Utilization of former buildings was typically leaving manual feeding and strewing techniques as the only option.

Feeding comprised averagely 57% and 65% of the total work time in red veal and young bull fattening, respectively. Example of the distribution of work time on 11 large red veal farms rearing weaned calves is shown in.

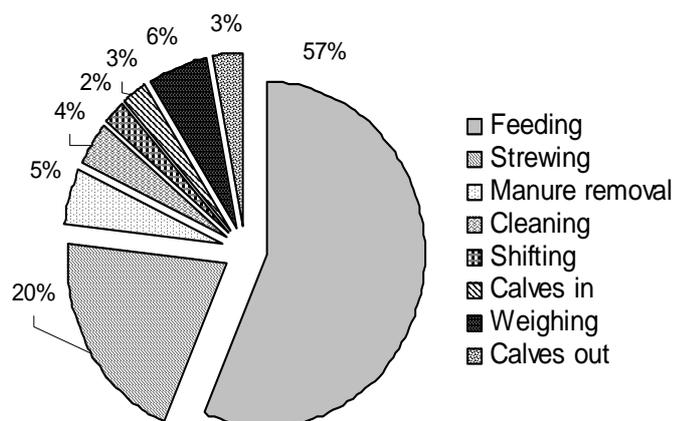


Figure 1: Distribution of average labour use for work tasks on 11 farms producing 500-1150 calves/year from 8 weeks of age (weaned calves). n=11.

Physical exertion and PWS

Cleaning was estimated as the most physically demanding work task, average scores ranging from 3.6 to 4.1 on Borg's scale (4 = strong strain). Overall, the perceived physical strain and PWS-index was negatively correlated with cattle operation size, however not significant. Further, work in quarantine houses was more strenuous than in the fattening houses, presumably due to a higher level of manual work in the quarantine building. Feeding tasks were the most frequent and time consuming (6.5 to 7.6 h/week) and were also the tasks with highest PWS (up to 1.3). The feeding frequency and time spent on this work task could be dramatically lowered by the use of automatic feeders, but up to 80% of the farmers in the study opted to have daily feeding routines, either once or twice daily.

Perceived musculoskeletal problems

Perceived MSD in any part of the body during the past 12 months period was reported by 52% and 65% of red veal and young bull producers, respectively. The prevalence of MSD was highest in the upper extremities, followed by the back, particularly the lower back. Effect of sex on the prevalence of MSD was not found, presumably due to the low representation of females in the study (12% and 7% of RV and YB respondents, respectively). The prevalence of pain, ache and discomfort in different body parts was by more than 50% of the respondents assumed to be related to the work in the beef cattle production.

Work related injuries

Work related injuries or accidents were reported by 28% of the respondents from RV farms, and 39% of the respondents on YB farms. Accidents were 89% of the cases of young bull farming related to the handling of animals, i.e. during strewing, weighing and shifting of animals between boxes or from box to transport vehicle. Although recommended, around 50% of the young cattle farmers in this study chose not to weigh the animals during the fattening period, which might reduce the possibility to optimize the production

Conclusion

Labour use and strategies for work on beef cattle farms is highly variable and is not simply dependent on farm size. The level of mechanisation, frequency and technique implemented for each work task play a major role for efficient labour use and a healthy working environment, particularly in quarantine houses where number of animals are low and batch period is short. Awareness of these factors is crucial during planning and designing for rebuilding or construction of new houses for young cattle production.

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