Workman, Jeffrey D.

Subject: Ohio Veterinary Newsletter Vol 42 No 13

OHIO STATE UNIVERSITY EXTENSION

OHIO VETERINARY NEWSLETTER

October 30, 2016 | Veterinary Extension | Vol 42, No 13

In This Issue

Research

Robbins, J. A., von Keyserlingk, M. A. G., Fraser, D., & Weary, D. M. (2016). **Farm size and animal welfare**. *Journal of Animal Science*. Advanced online publication. doi: 10.2527/jas.2016-0805

BACKGROUND: In the last century many countries have intensified their livestock production characterized by many changes including: increased automation and specialization, changes in the nature and quantity of inputs (e.g. non-renewable vs. renewable; off-farm vs. on-farm and high input vs. low-input), confinement of livestock in more controlled and restrictive environments, consolidation of ownership, substitution of capital for labor, vertical integration and supply contracts, increased reliance on non-family labor and – the focus of this paper – increased farm size. A representative sample of U.S. citizens found that most (57%) agreed or strongly agreed with the statement, ‘farm animals raised on small farms have a better life than those raised on large farms’.

PURPOSE: The aim is to review and critically assess the literature relevant to the relationship between farm size and the welfare of farm animals..

RESULTS: To critically examine evidence relevant to this claim, the authors reviewed more than 150 publications that examined the relationship between farm size and at least one animal welfare indicator. Given that the authors are most familiar with the work on dairy cattle they have focused on these animals, but where applicable they also cite literature on other farmed animals. They found little evidence of any simple relationship, negative or positive, between farm size and animal welfare. Instead the evidence suggests that larger farms provide some opportunities to improve animal welfare but may also create welfare risks.

CONCLUSIONS: The authors concluded that farm size and animal welfare exhibit no consistent relationship. Although larger farms are more likely to adopt some practices (such as worker training and standard operating procedures) that benefit animal welfare, they are less likely to use other practices (such as pasture access) that may also be beneficial. The over-simplified view that animal welfare is better on smaller farms may create complacency among small farmers (allowing welfare problems to persist), and fails to focus efforts on specific welfare challenges that need to be resolved on farms of all sizes.

Calendar

*Click **here** to view archives*

Location

Department of Veterinary Preventive Medicine

Chair:
Dr. Thomas E. Wittum
A100S Sisson Hall
1920 Coffey Road
Columbus, Ohio 43210
wittum.1@osu.edu
614-292-1206

Subscribe

Contact:
Jeffrey D. Workman, PhD
Extension Program Coord.
workman.45@osu.edu
614-292-9453

http://vet.osu.edu/extension

ACCESS THE ARTICLE…

Beaver, A., Ruegg, P. L., Gröhn, Y. T., & Schukken, Y. H. (2016). **Comparative risk assessment for new cow-level *Mycobacterium avium* ssp. *paratuberculosis* infections between 3 dairy production types: Organic, conventional, and conventional-grazing systems**. *Journal of Dairy Science*. Advance online publication. doi: 10.3168/jds.2016-11360

BACKGROUND: Few studies have sought to compare management practices of organic and conventional farm types in a risk-assessment type analysis. Conventional farms were more likely to report positive a Johne's diagnosis in their herds (48.5% compared with 25% of organic farms). However, the basis of these diagnoses is not described further, and the herd sizes of the conventional farms tended to be larger. Another study reviewed requirements for organic farming in Canada and developed a conceptual analysis regarding the effect of these practices on Johne's disease transmission. The authors acknowledged the necessity for empirical research, not only with regard to organic farms, but also for conventional farms implementing relevant organic practices.

PURPOSE: In the present large-scale study of 292 farms, the authors review the management practices from 3 types of US dairy production systems in light of the risk of new cow-level MAP infections. The production types considered are organic (ORG), conventional nongrazing (CON-NG), and conventional grazing (CON-GR).

RESULTS: Organic herds received higher overall risk scores compared with both conventional grazing and nongrazing subtypes. To identify which factors contributed to the overall increased risk for organic herds, the management practices were categorized and evaluated by logistic regression. They determined that the increased risk incurred by organic herds was predominantly due to decisions made in the calving area and preweaned calf group. However, although certain individual risk factors related to calf management are commonly involved in prevention strategies (e.g., cow/calf separation) and were thus included in the overall risk assessment, empirical evidence linking them to the spread of MAP is lacking. Instead, these factors are problematic when executed with other management decisions, leading to a hypothesized synergism of transmission risk. To this end, we developed a set of compound risk factors, which were also evaluated as outcomes in logistic regression models, with production type serving as the predictor of interest. Organic farms in our study were more susceptible to risks associated with the synergism of study variables. Notably, organic producers were most likely to allow calves to spend extended time with the dam, while also lacking a dedicated calving area. Additionally, calves in organic herds were more often permitted to nurse even with poor udder hygiene on farm. A heightened vigilance toward calving area hygiene is therefore indicated for these herds.

CONCLUSIONS: In an overall risk assessment, organic herds demonstrated significantly higher risk of MAP transmission than both conventional grazing and nongrazing herds. Decisions regarding postweaned heifer management and purchase of additional animals seem to be comparably executed across the 3 production types; thus, the heightened risk for organic herds appears to be primarily due to management in the calving area and subsequent housing of preweaned calves. However, certain management practices traditionally cited as risk factors (e.g., prolonged cow–calf contact and nursing) lack a supporting body of empirical evidence to associate them with increased MAP prevalence. Such practices may even be beneficial for animal welfare. Nonetheless, these practices have the potential to interact with other management decisions and act synergistically on the risk of MAP transmission. An increased awareness of hygiene in the calving area is therefore necessary for farms electing to permit cow–calf contact, nursing, and subsequent group housing of calves. The organic farms in this study did not appear to take these extra precautions with regard to hygiene; consequently, increased vigilance is recommended to mitigate an increased risk.

ACCESS THE ARTICLE…

Ammer, S., Lambertz, C., & Gauly, M. (2016). **Is reticular temperature a useful indicator of heat stress in dairy cattle?** *Journal of Dairy Science*. Advance online publication. doi: 10.3168/jds.2016-11282

BACKGROUND: Manual recordings of rectal or vaginal temperatures to determine body temperature (BT) are time and labor consuming and bear the risk of operator errors or injuries. Therefore, several studies investigated the use of the intraruminal sensor in which sensors are placed in the reticulum and enable an automatic, continuous, and labor-extensive monitoring of the reticular temperature (RT). Other effects that should be considered include: (1) RT is generally higher than BT due to heat from fermentation, (2) RT may be influenced by water intake, and (3) milk production is associated with a metabolic heat increment.

PURPOSE: The objectives were to (1) investigate whether RT can be used as an indicator of heat stress under moderate climatic conditions and (2) study the influences of water intake and milk yield on RT in high-yielding dairy cattle.

RESULTS: Averaged over all farms, daily temperature-humidity index (THI) ranged between 35.4 and 78.9 with a mean (±standard deviation) of 60.2 (±8.7). Dairy cows were on average (±standard deviation) 110.9 d in milk (±79.3) with a mean (±standard deviation) milk yield of 35.2 kg/d (±9.1). The daily mean RT was affected by THI, milk yield, days in milk, and WI. Up to a THI threshold of 65, RT remained constant at 39.2°C. Above this threshold, RT increased to 39.3°C and further to 39.4°C when THI ≥70. The correlation between THI ≥70 and RT was 0.22, whereas the coefficient ranged between r = −0.08 to +0.06 when THI <70. With increasing milk yield, RT decreased slightly from 39.3°C (<30 kg/d) to 39.2°C (≥40 kg/d). For daily milk yields of ≥40 kg, the median RT and daily milk yield were correlated at r = −0.18. The RT was greater when dairy cows yielded ≥30 kg/d and THI ≥70 (39.5°C) compared with milk yields <30 kg and THI <70 (39.3°C). The water intake, which averaged (±standard deviation) 11.5 l (±5.7) per drinking bout, caused a mean decrease in RT of 3.2°C and was affected by the amount of water intake (r = 0.60). After water intake, it took up to 2 h until RT reached the initial level before drinking.

CONCLUSIONS: The authors concluded that the results confirmed that even dairy cows under moderate climatic conditions are already exposed to heat stress during the summer months. Reticular temperature increased when the daily temperature-humidity index (THI) threshold of 65 was exceeded. A further increase was noted when THI ≥70. Concerning the effect of performance, particularly the interaction of high milk yields and ambient heat conditions resulted in increasing RT. Voluntary water intake influenced the course of RT sizably depending on the consumed amount of water. Thus, the effects of water intake and milk yield have to be considered carefully when RT is used to detect hyperthermia in dairy cattle.

ACCESS THE ARTICLE…

Nelson, C. D., Lippolis, J. D., Reinhardt, T. A., Sacco, R. E., Powell, J. L., Drewnoski, M. E., …Weiss, W. P. (2016). **Vitamin D status of dairy cattle: Outcomes of current practices in the dairy industry**. *Journal of Dairy Science*. Advance online publication. doi: 10.3168/jds.2016-11727

BACKGROUND: The NRC recommendation and current practices for cows and calves, however, are not based on dose titration studies or corresponding serum 25(OH)D concentrations. Whether or not the recommendations and practices for vitamin D supplementation of dairy cattle are adequate or excessive is largely unknown.

PURPOSE: The objective was to assess serum 25(OH) D concentrations of dairy cattle fed and managed according to typical industry practices with the goal of ascertaining the appropriateness of current practices in the dairy industry.

RESULTS: The serum 25(OH)D concentration of 702 samples collected from cows across various stages of lactation, housing systems, and locations in the US was 68 ± 22 ng/mL (mean ± stand dev), with the majority of samples between 40 and 100 ng/mL. Most of the 12 herds surveyed supplemented cows with 30,000 to 50,000 IU of vitamin D3/d, and average serum 25(OH)D of cows at 100 to 300 DIM in each of those herds was near or above 70 ng/mL regardless of season or housing. In contrast, average serum 25(OH)D of a herd supplementing with 20,000 IU/d was 42 ± 15 ng/mL, with 22% below 30 ng/mL. Cows in early lactation (0 to 30 d in milk) also had lower serum 25(OH)D than did mid- to late-lactation cows (57 ± 17 vs. 71 ± 20 ng/mL, respectively). Serum 25(OH)D of yearling heifers receiving 11,000 to 12,000 IU of vitamin D3/d was near that of cows at 76 ± 15 ng/mL. Serum 25(OH)D concentrations of calves, on the other hand, was 15 ± 11 ng/mL at birth and remained near or below 15 ng/mL through 1 mo of age if they were fed pasteurized waste milk with little to no summer sun exposure. In contrast, serum 25(OH)D of calves fed milk replacer containing 6,600 and 11,000 IU of vitamin D2/kg of dry matter were 59 ± 8 and 98 ± 33 ng/mL, respectively, at 1 mo of age. Experimental data from calves similarly indicated that serum 25(OH)D achieved at approximately 1 mo of age would increase 6 to 7 ng/mL for every 1,000 IU of vitamin D3/kg of dry matter of milk replacer.

CONCLUSIONS: The authors concluded that the current practices for dietary vitamin D3 supplementation in the dairy industry seem to be adequate for cows and heifers, with the 25(OH)D concentrations of most animals ranging between 50 to 80 ng/mL of serum. In fact, supplementing cows at rates well above the NRC recommendation of 21,000 IU of vitamin D3/d for mature cows, such as 40,000 to 50,000 IU/d, may be more than necessary. In contrast, supplementation with 21,000 IU/d may not be adequate based on limited observations reported here.

ACCESS THE ARTICLE…

Calendar

A full calendar of all upcoming events and continuing education opportunities offered by the College of Veterinary Medicine is available on the website at http://vet.osu.edu/

Access to full-text journal articles may require individual subscriptions.

COLLEGE OF VETERINARY MEDICINE

COLLEGE OF FOOD, AGRICULTURAL AND ENVIRONMENTAL SCIENCES