

UMR Herbivores

Behaviour, health, and welfare Team (Caraïbe)

New recommendations for cubicle housing and self-locking barrier to improve animal welfare.

Maladjusted cubicles (individual sleeping areas) and self-locking barriers (individual spaces to access the trough) cause increased skin alteration, lameness, and dirtiness. The International Commission of Agricultural and Biosystems Engineering (CIGR) produced recommendations for their design. Based on data collected on 3,841 cows on 131 farms, we found that the recommendations were met to various extent (e.g. in 76% for the cubicle resting length, 22% for the neck rail height) and that not all recommendations seemed appropriate. We modelled the association between equipment dimensions (e.g. cubicle width) relative to cow dimensions, other equipment properties (e.g. floor type) and the risk of dirtiness, injuries and lameness. This allowed us to refine the existing recommendations and propose additional ones to ensure cow welfare.

Cow cleanliness, freedom from injury and lameness are three important components of animal welfare that depend on housing conditions. Recommendations have been proposed by the International Commission of Agricultural and Biosystems Engineering (CIGR). These recommendations are based on expert advice and the data to support them are patchy. Even on farms where CIGR recommendations are followed, cows can be dirty, injured or lame. We modelled the association between cubicle and self-locking design and the risk for cows, with the aim of refining existing recommendations and proposing new ones. These refined recommendations have been proposed to the scientific community and we plan to propose them to actors of the breeding industry (breeders, technicians, veterinarians, ...).

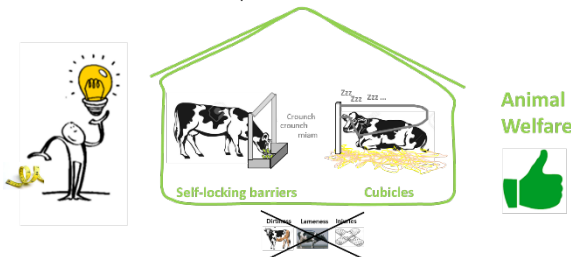
We surveyed 131 French farms, measuring cubicles, self-locking barrier and cows and recording the cleanliness, injuries and lameness of 3,841 cows using the Welfare Quality (2009) method. The prevalences of dirty cows (i.e. at least one thick patch of dirt the size of your hand), injured cows (from hair loss greater than 2 cm) and lame cows were 83.1%, 69.2% and 17.9%. Compliance with design recommendations for cubicles and self-locking barrier was quite variable (e.g. 76% for cubicle resting length, 39% for overall cubicle length, 22% for neck rail height). Some of the CIGR recommendations (e.g. cubicle width or the neck rail distance) are indeed significantly associated to lower prevalences of dirtiness, injuries and lameness. However, other recommendations (e.g. the top rail height of the self-locking barrier) increase the risks.

For cubicles, we confirmed the CIGR recommendations on cubicle floor inclination. We recommend improvements to the recommendations for the partition zone for pelvis freedom (i.e., the unobstructed area on the side of the cubicle to avoid injuries to the hips and ribs), cubicle width, and the height of the cubicle step.

We propose new recommendations on the height between cubicle floor and alley floor, the absence of sharp edges on the curb, the presence of a round brisket board, and if there must be an obstacle in front of the cow, the positioning of the obstacle. We also suggest cubicle to be positioned in such a way to leave more than 1 m unobstructed in front of the cow, to prefer straw litter as bedding (rather than sawdust or no bedding), to keep the litter dry, to add a mattress thicker than 1 cm with a micro-relief and a soft part at the fixing area (last 4 cm) and finally to prefer a stone-free subsoil, rather than a concrete floor.

For self-locking barrier, we confirmed the existing CIGR recommendations on the top rail height (i.e. "higher than 1.05 times the height of the cow"), and on the inclination of the self-locking barrier. We proposed improvements to the recommendations for the position of the bottom rail, the separation wall (i.e. "thinner than 15 cm"), the height difference between the feeding floor and the walking alley, and the length of the feeding step. We make new recommendations on the self-locking barrier articulation system. Finally, we recommend using a feeding table (i.e. flat) instead of feeding manger or cribs (i.e. hollow).

New recommendations for the design of resting areas (cubicles) and feeding areas (self-locking barriers) to improve animal welfare



Prospects :

Research prospects : This study allows to highlight risk factors. To ascertain these as causal factors, we need to test these new recommendations in experiments, while all other factors are controlled.

Application prospects :

- Interact with CIGR so that the results are used in a new version of the recommendations.
- disseminate the results to livestock professionals through technical articles in veterinary and livestock journals and participation into technical congresses (e.g. JN-GTV 2020).

Publications

De Boyer des Roches, Alice, Romain Lardy, Jacques Capdeville, Luc Mounier, et Isabelle Veissier. « Do International Commission of Agricultural and Biosystems Engineering (CIGR) Dimension Recommendations for Loose Housing of Cows Improve Animal Welfare? » Journal of Dairy Science 102, no 11 (22 août 2019). <https://doi.org/10.3168/jds.2018-16154>

Lardy, R., de Boyer des Roches, A., Capdeville, J., Mounier, L., Veissier, I. (2019). Space design : Comment l'ergonomie des équipements peut améliorer le bien-être des bovins en élevage. Presented at Colloque de la Société Française pour l'Étude du Comportement Animal (SEFCA), LILLE, FRA (2019-06-11 - 2019-06-14). <https://prodinra.inra.fr/record/474752>

De Boyer des Roches, A., Lardy, R., Capdeville, J., Mounier, L., Veissier, I. (2019). Les recommandations CIGR pour les dimensions de logement des vaches laitières permettent elles d'améliorer leur bien être?. Presented at Colloque du RMT bien-être animal : "bien-être animal, des valeurs à partager", Strasbourg, FRA (2019-07-01 - 2019-07-02). <https://prodinra.inra.fr/record/478416>

Lardy, R., de Boyer des Roches, A., Capdeville, J., Bastien R., Mounier, L., Veissier, I. New Recommendations for self-locking barriers to reduce skin injuries in dairy cows. Animal, in presss. <https://doi.org/10.1017/S175173112000052X>

Lardy, R., de Boyer des Roches, A., Capdeville, J., Bastien R., Mounier, L., Veissier, I. New Recommendations for cubicles to reduce skin lesions, dirtiness and lameness in dairy cows. Journal of Dairy Science, *under revision*.

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