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C-003

Testing the feasibility of a prototype welfare assessment protocol in intensive dairy goat farms

Monica Battini¹, Sara Barbieri¹, Guido Bruni²,
Giorgio Zanatta,² Silvana Mattiello¹

¹Dipartimento di Scienze Veterinarie e Sanità Pubblica,
Università degli Studi di Milano, Italy

²Servizio di Assistenza Tecnica agli Allevamenti, Associazione
Regionale Allevatori Lombardia, Crema, Italy

Corresponding author: monica.battini@unimi.it

A prototype was tested during February-July 2014 in 30 Italian farms, previously classified according to their size (small:<50 goats; medium: 51-100; large:101-500). The assessment was conducted at group level from outside the pen (queuing at feeding and at drinking, improper disbudding, hair coat condition, kneeling, thermal stress, isolated animals, abnormal lying, Qualitative Behaviour Assessment), from inside the pen (severe lameness, kneeling, latency to first contact test, avoidance distance test), and at individual level (3-level BCS, faecal soiling, discharges, udder conformation, cleanliness, lesions, abscesses, claw overgrowth, knee calluses). Time needed to apply the prototype was recorded. ANOVA was used to compare the time required to apply the prototype in farms of different size. The average time required was 144.0±9.6 minutes (min:37, max:272): the group assessment took 81.0±9.6 minutes; the individual assessment took 63.0±5.8 minutes (min:10, max:146, depending on farm size: small *vs.* medium: P<0.05; small *vs.* large: P<0.01), ranging from 131.4±15.9 seconds/per goat if goats were manually restrained in the pen to 119.3±10.9 seconds if goats were locked at the feeding rack. The assessment at individual level showed many constraints, mainly due to the difficulties in restraining goats. Some indicators (*e.g.* abscesses, lesions) were separately recorded for different body regions, but this resulted too time-consuming and not particularly informative. Feasibility constraints were found at group level for avoidance distance test, mainly due to the difficulties in identifying individual animals. Qualitative Behaviour Assessment was welcomed by farmers, being a non-invasive method of observation. Hair coat condition was the most prevalent problem (24.1%±2.8), followed by improper disbudding (12.7%±3.0) and queuing at feeding (7.2%±0.7), whereas low prevalence was recorded for kneeling and abnormal lying (less than 0.5%). At individual level, the most frequent problems were claw overgrowth (47.2%±6.0), faecal soiling (16.7%±4.7), too thin (14.5%±2.5) and too fat goats (5.1%±1.3). The prototype seems suitable to be used in farms of different size. Farm routine was not altered and only slight disturbance was caused to the farmers. Some adjustments are required for improving the feasibility of the protocol, considering the constraints identified, the possibility of reducing disturbance to farmers and animals, and the low prevalence of some indicators.

C-004

The effect of the relaying mode on welfare of the pregnant sow

Katia Parati¹, Rossana Capoferri¹, Livia Moscati², Marco Sensi²,
Guerino Lombardi³, Francesca Battioni³, Gianpietro Sandri⁴,
Carlo Briani⁴, Andrea Galli^{1,5}

¹Istituto Sperimentale Italiano Lazzaro Spallanzani, Rivolta
d'Adda, CR, Italy

²Istituto Zooprofilattico Sperimentale Umbria e Marche, Perugia,
Italy

³Istituto Zooprofilattico Sperimentale della Lombardia e
dell'Emilia Romagna, Brescia, Italy

⁴La Pellegrina Spa, Isola della Scala, VR, Italy

⁵Centro di Ricerca per le Produzioni Foraggere e Lattiero-Casearie,
Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Lodi, Italy
Corresponding author: katia.parati@istitutospallanzani.it

Animal welfare, particularly in pig, is a constraint for animal breeding. In this regard the Italian D.Lgs 53/2004 established that from 2013 sows and gilts shall be kept in groups during the four weeks after the service to one week before the expected farrowing time. Although its relevance is conceptually and extensively recognised, animal welfare is not yet fully characterized at an objective level and a protocol based on parameters for objectively evaluating animal welfare is still not available. The aim of this study was to evaluate a series of approaches in order to define informative markers associated with animal welfare, which allow an objective assessment of this status in the farm. Eight hundred pregnant sows reared in single and group-housing systems in a local farm were compared at different levels of investigation before and after the changeover imposed by law. Ethological, clinical, reproductive, metabolic and immunological measures were detected for each of the eight weeks of gestation (4 and 8-14). At the same time transcriptomic analysis of blood cells was conducted by OpenArray System on 224 genes involved in immunological response. The informativeness of the variables was studied by factor analysis and the effect of the housing system and the gestational week were studied by GLM. The odds ratio was calculated with the random component. Results showed that the group-housing system, contrary to the single-housing one, presented no stereotypy but significant increase in the frequency of lameness (P<0.001) and a decrease in fertility parameters (non-return to estrus 56-day post AI: 83% *vs.* 92%; farrowing rate: 78% *vs.* 88%, respectively) (P<0.05). The group-housing system revealed differences in the hematological picture for some parameters indicator of the metabolic status (ameliorative values for albumin, OR=4.4 and ALP OR=1.5 and pejorative for the AST, OR=0.6 and bilirubin, OR=0.4) when compared to the single, while at immunological level showed ameliorative values for bactericidal (OR=3.2) and complement (OR=24.3) and pejorative for lysozyme (OR=0.3) and C-reactive protein (P<0.001). At the functional genomics level, out of the 224

genes analyzed, 88 were under-expressed (Log FoldChange \leq 1.5; $P < 0.05$) in group-housing with respect to the single-housing system, within all the weeks and for all the gestational groups. Overall, the results of this multidisciplinary study provide potential candidates markers of sows housing relating stress.

C-005

Relationship between pig welfare in the pre-slaughter phase and superficial bruises of their carcasses

Marta Brscic, Giulia Vida, Annalisa Scollo, Giulio Cozzi, Flaviana Gottardo

Dipartimento di Medicina Animale, Produzioni e Salute, Università degli Studi di Padova, Legnaro (PD), Italy
Corresponding author: marta.brscic@unipd.it

Pre-slaughter stress represents a problem for both, pig welfare and product quality particularly in the case of high quality ham production. The aim of this study was, therefore, to assess the level of welfare in the pre-slaughter phase of 1079 heavy pigs destined to the production of PDO San Daniele ham in a commercial slaughterhouse in Friuli Venezia Giulia, Northeastern Italy. Twelve batches of pigs coming from 5 farms and transported by 8 truck drivers were considered in this study. The journeys from farm to slaughter were always shorter than 100 km and lasted from 15 to 90 minutes. At the slaughter, a trained assessor recorded the number of pigs slipping, fell down, reluctant, backing, vocalizing, lame, sick, or shivering during the unloading. Truck drivers were interviewed to gather data regarding characteristics of each batch (number of pigs, average body weight, age, sex), qualitative descriptors of pigs behavior during uploading at the farm (speed, reluctance, aggressiveness), and information on the transport (animal density, use of devices for uploading, distance and duration of the journey). At the slaughterline, the assessor scored pig carcasses in 3 areas (front, thorax, and back) for superficial bruises using a five point-scale (0 = no lesion; 4 = at least 1 lesion >15 cm). A total carcass score was calculated by adding the scores of the 3 areas. Results showed positive correlations between similar behavior descriptors at uploading and at unloading ($r > 0.58$; $P < 0.05$). Direct observation during unloading revealed prevalence below 1% of problematic events (2 pigs panting and 1 lame) and no animal sick, shivering or dead at arrival. Only 16% of the carcasses were scored 0 (no lesion in any area) and 63% of them had a total score above 6 (indicating at least 1 large and/or several to medium bruises). Carcass lesions were more prevalent on the thorax and this was probably due to both, the fact that it is a part of the body more exposed to hits and to the feasibility of observation by the assessor since this portion is easier to see in the slaughterline compared to the extreme sides of the carcass. The risk of having bruised carcasses calculated according to the driver and to the farm effect showed which drivers and farms provided the best batches with the lowest lesion scores pointing out the importance of the welfare level achieved also during handling and loading at the farm.

C-006

Corral modification for humane livestock handling can improve cattle behavior and reduce serum cortisol

Maria Lúcia Pereira Lima¹, João Alberto Negrão²,
Claudia Cristina Paro de Paz^{1,3}

¹*Instituto de Zootecnia, Centro APTA Gado de Corte, Sertãozinho, SP, Brazil*

²*Faculdade de Zootecnia e Engenharia de Alimentos, Universidade de São Paulo, Pirassununga, SP, Brazil*

³*Department of Genetics, Universidade de São Paulo, Ribeirão Preto, SP, Brazil*

Corresponding author: lucia.plima@hotmail.com

The handling of cattle in corral facilities can be an important source of stress and can induce behavioral changes in the animals. This experiment was conducted to evaluate whether corral modifications designed to transform them from a traditional into a humane livestock handling system influence cattle behavior, cortisol levels, and working time. The corral modifications consisted of blocking vision when the worker stands inside the animal's flight zone, eliminating contrast of light and dark or shadows, and keeping the workers calm at work, not allowing them to scream or hit the animals during handling. Electric cattle prods were never used. A total of 141 Nelore cows from two different farms were studied. First, the behavior of the animals in a traditional corral was evaluated. After modification of the corral, the same animals returned (6 days later) for a second behavioral assessment. The cows were evaluated using visual scores. Entry behaviour (EB) into the restraint device was evaluated by observing whether the cows walked, trotted or ran into the chute. Chute temperament (CT) was assessed by considering whether the animal was calm, agitated or struggled to escape, and exit speed (ES) by observing whether the animal walked, trotted or ran. Blood samples were collected from the jugular vein for analysis of serum cortisol. The time spent (TS) on blood sample collection during restraint in the chute was also recorded. After corral modification, the cows exhibited lower EB ($P = 0.049$) and ES ($P < 0.0001$) and a higher proportion of animals was calm (CT- $P = 0.002$). The proportion of cows that walked, trotter or ran was, respectively, 65.9, 27.0 and 7.1% for EB and 44.0, 32.6 and 23.4% for ES before corral modification, and 73.0, 23.4 and 3.6% for EB and 68.1, 27.0 and 4.9% for ES after corral modification. For CT, the proportion of calm animals, agitated animals and animals struggling to escape was 51.8, 25.5 and 22.7% before corral modification, respectively, and 66.0, 24.1 and 9.9% after corral modification. Serum cortisol levels were significantly lower after corral modification ($P = 0.019$). Mean serum cortisol was 6.3 mg/dL before corral modification and 4.1 mg/dL after corral modification. There was no difference in the TS on blood collection before and after modification ($P = 0.576$). The mean TS collecting blood was 1:42 minutes before and 1:04 minutes after corral modification. Changes in corral facilities and good handling practices reduce stress in cattle