Italian Journal of Animal Science

ISSN: 1828-051X (Online) Journal homepage: www.tandfonline.com/journals/tjas20

ASPA 25th Congress Book of Abstract

Manuela Renna (Dr.)

To cite this article: Manuela Renna (Dr.) (2025) ASPA 25th Congress Book of Abstract, Italian Journal of Animal Science, 24:sup1, 1-463, DOI: 10.1080/1828051X.2025.2520034

To link to this article: https://doi.org/10.1080/1828051X.2025.2520034

26th Congress

ASPA25

17 / 20 June 2025 | Turin, Italy

Association for Science and Animal Production

INNOVATIONS IN ANIMAL SCIENCES: SHAPING THE WAY FOR A SUSTAINABLE FUTURE

Campus SAMEV
(Scuola di Agraria e Medicina Veterinaria)
Largo Braccini 2, Grugliasco (TO) – ITALY

aspa2025.it

PROGRAM

Thursday,
19th June 2025

Room Valentino | Session 39

Monogastric Nutrition:
SWINE I

Sponsored by Silvateam
Chairs: Cappai Maria Grazia – Braidot Matteo

10:45 Manoni Michele, Altomare Alessandra, Nonnis Simona, Mazzoleni Sharon, Tretola Marco, Bee Giuseppe, Silacci Paolo, Tedeschi Gabriella, Aldini Giancarlo, Pinotti Luciano 027
Evaluation of the impact of the dietary inclusion of salty and sugary former food products on the liver and the plasma profile of pigs through OMICS approaches

11:00 Luise Diana, Correa Federico, Rocchetti Gabriele, Errico Michela, Polimeni Barbara, Serra Andrea, Mele Marcello, Gallo Antonio, Lucini Luigi, Trevisi Paolo 462
Multi-omics characterisation of pig colostrum and association of its bioactive compounds and gut microbiota with the survival of piglets

11:15 Trevisi Paolo, Luise Diana, Palladino Giorgia, Palumbo Francesco, Scicchitano Daniel, Babbi Giulia, Castagnetti Andrea, Rampelli Simone, Candela Marco, Martelli Pier Luigi, Correa Federico 558
EU Circles Project: Multi-omics analysis reveals distinct microbial networks linked to a blend of chestnut and quebracho extract supplementation in weaned pigs under different farming conditions

11:30 Toscano Alessandro, Don Gregorio, Ramayo-Caldas Yuliaxis, Sanchez Juan Pablo, Pegolo Sara, Schiavon Stefano, Gallo Luigi, Giannuzzi Diana 246
Metataxonomic characterization of fecal microbiota of heavy pigs fed with different levels of Arthrospira platensis

11:45 Correa Federico, Luise Diana, Palumbo Francesco, Zurru Antonio, Biagi Giacomo, Trevisi Paolo 519
Effect of dietary microbial muramidase supplementation on weaned pigs' performance, health status and intestinal microbiota

12:00 Zurru Antonio, Trevisi Paolo, Laghi Luca, Palumbo Francesco, Correa Federico, Luise Diana 381
Effect of complete maize replacement by sorghum on health, welfare, performance and faecal microbiota of post-weaning piglets

12:15 Polimeni Barbara, Correa Federico, Luise Diana, Zurru Antonio, Palumbo Francesco, Trevisi Paolo 483
Postbiotic supplementation in gestating and lactating sows and its effects on piglets health and performances

12:30 Lunch

PROGRAM

Friday,
20th June 2025

Room Valentino | Session 51

Monogastric Nutrition: SWINE II

Chairs: Pinotti Luciano – Correa Federico

9:00 Graziosi Maria Vittoria, Luise Diana, Correa Federico, Zurru Antonio, Trevisi Paolo, Biagi Giacomo — 526
Reduction of amylose-amylopectin ratio in low-protein diets for fattening pigs: performance, health, behavioral, and environmental implications

9:15 Lin Peng, Tretola Marco, Pinotti Luciano, Bee Giuseppe, Schlegel Patrick — 360
Growth performance and nutrient balance of pigs fed low protein diets without mineral phosphate supplementation

9:30 Antonacci Alessandro, Bee Giuseppe — 187
Feeding low-protein or standard diets to growing-finishing pigs reared under environmental stressors: effects on growth and carcass composition

9:45 Tono Veronica, Toscano Alessandro, Don Gregorio, Giannuzzi Diana, Gallo Luigi, Cecchinato Alessio, Schiavon Stefano — 264
Growth performance and carcass quality of heavy pigs fed ad libitum diets with decreasing SID lysine contents

10:00 Don Gregorio, Giannuzzi Diana, Toscano Alessandro, Tono Veronica, Schiavon Stefano, Gallo Luigi — 101
Effects of a partial to total replacement of soybean meal with spirulina powder in the diets for growing pigs on fatty acid profile of loin, lard, ham trimming and liver fat

10:15 Luise Diana, Zurru Antonio, Laghi Luca, Palumbo Francesco, Correa Federico, Trevisi Paolo — 110
Increasing the energy and lysine content of sow transition diets can improve litter performance and modulate colostrum composition

10:30 Marchetti Luca, Rebucci Raffaella, Piantoni Caterina, Bontempo Valentino — 214
Effects of a combination of the active form of Vitamin D and natural triterpenes on sows health and productivity

10:45 Coffee Break and Poster session

(Illumina, San Diego, USA). Bioinformatics analyses showed differences in the relative abundances of phyla and genera both for sampling time and diet effect. In particular, at phylum level Bacillota was the most present (80% at T1 and 85.4% at T2), followed by Bacteroidota (11.4% at T1 and 10.6% at T2) and Spirochaetota (5.3% at T1 and 2.1% at T2). For dietary treatments, Bacillota phylum exhibited a decline from 84.8% in the CTR group to 81.1% in the SP100 group, while Bacteroidota increased from 9% in the CTR group to 12.4% in SP100, and Spirochaetota rose from 3.3% in the CTR group to 4% in SP100. The α-diversity analysis showed no differences among diets within sampling times, while the results of the perMANOVA on β-diversity showed differences between sampling time and diet effect on the structure and composition of the microbiota. In particular, the CTR group differed from the SP66 and SP100 groups at both sampling times. In conclusion, soybean substitutions with *A. platensis* led to differences in the pigs' fecal microbiota.

Further studies will assess whether the different dietary treatments may be associated with favorable or unfavorable changes in the microbial ecosystem and the host physiology.

Research supported by the Agritech National Research Center and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA – PNRR – MISSIONE 4 COMPONENTE 2, CUP C93C22002790001) and from University of Padova (2024DAFNAE1SIDPROGETTI-00004).

O519

Effect of dietary microbial muramidase supplementation on weaned pigs' performance, health status and intestinal microbiota

Federico Correa[a], Diana Luise[a], Francesco Palumbo[a], Antonio Zurru[a], Giacomo Biagi[b] and Paolo Trevisi[a]

[a]*Department of Agricultural and Food Sciences, University of Bologna, Viale G Fanin 44, Bologna 40127, Italy*
[b]*Department of Veterinary Sciences, University of Bologna, Via Tolara di Sopra 50, 40064 Ozzano dell'Emilia, Bologna, Italy*
Contact federico.correa2@unibo.it

Microbial muramidase (MM) has recently been introduced as a feed additive for swine. However, limited research has investigated its effects, particularly on intestinal microbiota. This study evaluated the effects of dietary MM on growth performance, health status, and fecal microbiota profiles of weaned pigs. A total of 96 weaned pigs (28 ± 0.2 days old) were assigned to two groups based on body weight (BW): (1) Control (CTR), fed a standard diet; and (2) Treated (TRT), fed a standard diet supplemented with MM at 65,000 LSU(F) (muramidase activity units)/kg feed. Diets were provided from day (d) 0 (weaning) to d44. Body weight, and feed intake (FI) were measured weakly, while antibiotic use and diarrhea occurrence were measured thought the trial. Fecal samples were collected on d9 and d28 for microbial profile, NH_3 and calprotectin quantification. Supplementing MM increased FI ($p = 0.05$) and ADG ($p = 0.02$), leading to a BW gain of up to 2.1 kg ($p = 0.05$) by d44 in the TRT group. From d7 to d14, MM reduced the feed conversion ratio ($p = 0.05$), while antibiotic treatments decreased ($p < 0.01$) until d28 in the TRT group. MM supplementation had no significant effect on fecal scores, calprotectin levels (an inflammatory marker), or mortality. Microbiota analysis revealed that at d9, alpha diversity (Chao1 index) was lower in the TRT group compared to CTR ($p = 0.02$), but no differences were observed at d28 or for other alpha indices. Beta diversity differed significantly at both d9 ($R^2 = 0.05$, $p = 0.002$) and d28 ($R^2 = 0.05$, $p = 0.05$), indicating distinct microbial community structures between groups. LEfSe analysis identified reductions in specific bacterial taxa, including *Turicibacter* and *Colidextribacter*, in the TRT group. Despite these changes, MM did not alter fecal concentrations of volatile fatty acids or NH_3, indicating that microbial fermentative activity remained intact. This study demonstrates the effectiveness of microbial muramidase at the recommended dosage in improving growth performance and reducing the need for antibiotic treatments in weaned pigs. The reduction in APP treatments suggests that MM was able to improve piglets health, those improving nutrient utilisation. Moreover, MM influenced fecal microbial composition by reducing rare species and altering beta diversity, while preserving fermentative activity.

The present research was funded by Piano di Innovazione 'MELioR DIET', Call: DGR n. 227 del 27/02/2017 REG. (UE) N. 1305/2013 – PSR 2014/2020 – PROGETTI DI FILIERA – OPERAZIONE 4.1.01, 4.2.01, 16.2.01 ID:5404635, Capofila Gesco Società Cooperativa Agricola.

O381

Effect of complete maize replacement by sorghum on health, welfare, performance and faecal microbiota of post-weaning piglets

Antonio Zurru, Paolo Trevisi, Luca Laghi, Francesco Palumbo, Federico Correa and Diana Luise

Department of Agricultural and Food Sciences, University of Bologna, Bologna, Italy
Contact diana.luise2@unibo.it

Sorghum, due to its nutritional value and lower environmental impact, especially in terms of water use, could be a viable substitute for maize in pig diets. This study evaluated the effects of replacing maize with sorghum or extruded sorghum on the performance, intestinal health, and behavior of post-weaning piglets. From weaning (d0) to 4 weeks, 522 pigs were assigned to one of 3 diets: Control (CTR), sorghum

(SO), and extruded sorghum (EX_SO). Pigs were fed 2-phase diets: phase I (d0-d6) and phase II (d7-d28). CTR included 7% and 10% maize in phases I and II and it was fully replaced with sorghum and extruded sorghum in SO and EX_SO groups. Diets were isoenergetic and isoaminoacidic. At d0, d7, and d28, pigs were weighed, and ear and tail lesions were scored. Feed intake (FI) and behavior measurements (BMs) were recorded on d7, d14, and d28. Faecal samples collected on d7 and d28 were analyzed for microbiota (16S rRNA gene V3-V4), metabolomics (NMR), NH_3, and dry matter content. Data on body weight, average daily gain, NH_3 and dry matter faecal content were analysed using a 'linear mixed effects' model including the diet, litter and sex as factors; pigs were considered as the experimental unit. FI, feed conversion ratio, lesions index and BMs were analysed using a linear model including the diet as factor; pen was used as experimental unit. Metabolomics and microbiota data were analyzed using a multivariant approach. Results showed no significant differences in growth performance, FI or BMs among groups. At d7, NH_3 and faecal dry matter were not affected by the diet. At d7, *Oscillospira* ($p < 0.01$), was more abundant in the CTR than EX_SO, 2-Oxogutarate, Acetoin, 2-Methyl 3-Ketovalerate, 3-Methyl 2-Oxovalerate was more abundant in the EX_SO than CTR. At d28, faecal dry matter content tended to be higher in the SO compared to the CTR group ($p = 0.08$) and the diet affected the beta-diversity ($p = 0.05$); *Olsenella* was more abundant in the CTR than in the SO ($p < 0.01$). Additionally, *Olsenella* ($p = 0.01$) and *Ligilactobacillus* ($p = 0.01$) were more abundant, while *Anaerovoracaceae_Family XIII UCG-001* ($p = 0.01$) was less abundant in the CTR group than in the EX_SO; *Shuttleworthia* ($p = 0.02$) and *Syntrophococcus* ($p < 0.01$) were more abundant in the SO than in the EX_SO, Butyrate, Propionate and Valerate were more abundant in the EX_SO than CTR. In conclusion, sorghum can replace maize in weaned pig diets, maintaining growth performance, behavioral welfare, and intestinal health.

Research supported by SustainableHeavySuis Project (J33C23002980002) – L.R. n. 17/2022-DGR 165 del 06/02/2023, Emilia Romagna Region, Italy. The authors thank Martini Srl for the support in managing the in vivo trial.

O483

Postbiotic supplementation in gestating and lactating sows and its effects on piglets health and performances

Barbara Polimeni, Federico Correa, Diana Luise, Antonio Zurru, Francesco Palumbo and Paolo Trevisi

Department of Agricultural and Food Sciences, University of Bologna, Viale G. Fanin 46, Bologna, 40127, Italy
Contact paolo.trevisi@unibo.it

Hyper-prolific sows, genetically selected to increase piglets per farrowing, face physiological and management issues that affect both their welfare and piglet growth. Postbiotics, consisting of inanimate microbial cells and/or their components, are a promising solution to improve the piglet's gut health and overall performance. This study investigates the impact of a postbiotic (heat-inactivated *Lactobacillus fermentum* and *Lactobacillus delbrueckii*) (GutServTM Biotix, dsm-firmenich, Switzerland) administered to sows in late gestation and lactation at different doses, on the growth and health of their piglets. The last three weeks of gestation, 200 sows were divided into two groups: (i) a control group (G0; 40 sows) fed a standard gestation diet, (ii) a postbiotic group (G20; 160 sows) fed the same gestation diet with the on top addition of 20 g/t of postbiotic. After farrowing, the G20 group was further divided into 4 subgroups receiving different doses of postbiotic during lactation: 0 (G20-L0), 10 (G20-L10), 20 (G20-L20), or 100 (G20-L100) g/t. Productive performances of the sows, as well as piglets body weight (BW) and mortality, were recorded at days 0, 6, 14, and 28. Colostrum samples were collected to analyse the immunological profile. Data were analysed using a linear model, including diet, batch, and parity as factors, and litter size and initial BW as covariates for piglet growth performance. Results showed that piglets born from G20 sows had a higher BW at birth than those from G0 ($p < 0.05$). Piglet BW and ADG from day 0 to day 6 were significantly greater for piglets born to sows supplemented with postbiotics during gestation ($p < 0.001$). Mortality rates during the suckling period were lower in groups receiving the postbiotic, particularly in G20-L0 and G20-L100, compared to G0-L0 ($p < 0.01$). Sow's feed intake and weight loss was not influenced by the lactation diet. Colostrum immunological profile was not affected by the experimental diets. In conclusion, supplementing the gestation diet with postbiotics proved to be an effective strategy for enhancing piglet survival and growth performance during the suckling period. However, it did not appear to influence the immunological profile of colostrum. The observed benefits are likely attributable to other, as yet unidentified, mechanisms that warrant further investigation to better understand their effects and optimise the application of postbiotics in the management of hyper-prolific sows.

O102

Modeling dairy production under microclimatic variability in Automatic milking systems using TSMixer

Marco Zanchi[a], Caterina Anna Maria La Porta[b], Claudio Forte[a], Stefano Zapperi[c] and Laura Ozella[a]

[a]*Department of Veterinary Sciences, University of Turin, Largo Braccini 2, Grugliasco (TO) 10095, Italy*
[b]*Departement of Environmental Sciences and Policies, University of Milan, Via Celoria 10, Milan 20133, Italy*
[c]*Department of Physics, University of Milan, Via Celoria 16, Milan 20133, Italy*
Contact marco.zanchi@unito.it

This study investigated the effects of replacing soybean meal (SBM) with *Arthrospira platensis* (AP) in the diets for growing pigs on fatty acid (FA) profile of lard, ham trimming, liver and loin fat. The study involved 88 gilts and barrows (52.4 ± 4.2 kg initial body weight – BW) randomly allocated to one of the following four dietary treatments (2 groups/treatment): a control diet, based on cereals and SBM, and 3 experimental diets formulated by replacing 33%, 66% or 100% SBM with a nucleus based on AP (640 g/kg), sugar beet pulp (308 g/kg) and soft wheat (40 g/kg). After 138 days on feed pigs were slaughtered at 174.9 ± 6.4 kg BW, and samples of lard, trimming fat from hams, liver and loin were individually collected to be analysed for FA profile. Data were analyzed with a mixed model including the effects of tissue, sex and diet and the random effect of animal. Ten saturated FA (SFA), 8 monounsaturated FA (MUFA), and 13 polyunsaturated FA (PUFA) were identified, of which 3 were exclusive to the liver (C22:1n-9, DPA C22:5n-6, DHA C22:6n-3), 2 were present only in the liver and loin (C8:0 and C20:5n-3 EPA), and 1 was absent in the liver (CLA c9,t11). Tissue significantly influenced FA composition ($p < 0.05$). SFA were highest in the liver (43.02%) compared to other tissues, which ranged between 36.98% of loins to 32.13% of ham's fat. MUFA were predominant in loin and ham fat, whereas PUFA were most abundant in the liver (32.17%) and lowest in loin (10.16%). Sex influenced only few FA, the most notable was C18:2n-6, more abundant in females. Diet affected mainly PUFA and SFA content, but no consistent pattern in FA profile variation emerged with increasing levels of AP supplementation, and differences compared to control were limited to specific experimental groups. Concerning interaction effects, only the tissue × diet interaction exhibited notable significance for most FA, mainly due to the different behavior of liver fat compared to other tissues. Indeed, the increase of AP in the diets tended to linearly increase the SFA and decrease the PUFA content in the liver. Conversely, no systematic variation in the FA profile appeared to be associated with the progressive increase of AP in the diets in the other tissues. This study adds new knowledge about the feasibility of using AP as main protein source in the diets of growing pigs, evidencing neutral effects of the replacement of SBM with AP on the quality of fat composition of the carcass tissues obtained.

The study was conducted within the Agritech National Research Center and received funding from the European Union NextGenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA – PNRR – MISSIONE 4 COMPONENTE 2, CUP C93C22002790001).

O110

Increasing the energy and lysine content of sow transition diets can improve litter performance and modulate colostrum composition

Diana Luise, Antonio Zurru, Luca Laghi, Federico Correa and Paolo Trevisi

Department of Agricultural and Food Sciences, University of Bologna, Bologna, Italy
Contact diana.luise2@unibo.it

The transition period from 7 days pre-parturition to 4 days post-parturition is a critical phase for the sow due to physiological changes and nutritional requirements. A balanced diet for energy and amino acid (AAs) requirements could improve reproductive performance, colostrum quality and piglet growth. The aim of this study was to verify the efficacy of a diet designed to improve the coverage of the energy and AAs requirements of the sow during the transition period, compared to a standard diet, on the composition and qualitative characteristics of colostrum and of sows and piglet's performance. Two diets were compared: a standard farm diet (CO) with 2950 kcal of metabolised energy (ME) and 0.70% of SID lysine (Lys) and a treated diet (TRT), characterised by 3100 kcal of ME and 0.85% SID Lys. The ration between the AAs and SID Lys was maintained in both diets. A total of 100 sows, balanced for to body condition score (BCS) and muscle and backfat depth and parity, were divided into the CO and TRT groups, on upon entry into the farrowing room. The diet was administered from day 6 pre-parturition to day 4 post-parturition. Duration of farrowing, timing intervals between born piglets and their vitality were recorded on 12 sows/group. Data on performance and colostrum (20 sows/group) were collected at farrowing (d0), day 6 (d6) and weaning (d24). Colostrum was analysed for its proximal, immunoglobulin (Ig) and metabolomic composition (NMR analysis). The diet did not affect the feed intake, BCS, backfat and muscle loss of the sows. The farrowing duration and piglets-born intervals were not affected by the diet. The TRT group tended to have a higher number of live births ($p = 0.066$), a lower number of stillbirths ($p = 0.002$) and an increase in piglets' weight at weaning ($p = 0.032$) and average daily gain d0-d24 ($p = 0.080$)

compared to the CO group. Colostrum from the TRT group had a higher percentage of fat ($p = 0.036$) and a different metabolomic profile, mainly characterised by a higher concentration of UDP-gluconate and carnitine and a lower concentration of citrate ($p < 0.05$). In conclusion, the results suggest that a transition diet consisting of 3,101.08 Kcal EM and 0.85% SID Lys is capable of improving sow parturition performance (fewer stillbirths) and lactation performance by modifying sow energy metabolism and colostrum quality.

Research supported by SustainableHeavySuis Project (J33C23002980002) – L.R. n. 17/2022-DGR 165 del 06/02/2023, Emilia Romagna Region, Italy. The authors thank Gruppo Veronesi Srl for the support in managing the *in vivo* trial.

O214

Effects of a combination of the active form of Vitamin D and natural triterpenes on sows health and productivity

Luca Marchetti, Raffaella Rebucci, Caterina Piantoni and Valentino Bontempo

Department of Veterinary and Animal Sciences, University of Milan, Lodi, Italy
Contact luca.marchetti1@unimi.it

Productive sows are susceptible to vitamin D deficiency, resulting in reduced calcium bioavailability, decreased offsprings growth and altered immune functions. We hypothesised that a supplementation of a premix containing glycosylated calcitriol (Active D) combined with triterpenes, able to bypass liver and kidney hydroxylation processes, may enhance sows' productivity and health. The present trial was performed in a conventional commercial farm in which 24 multiparous sows (320.08 ± 26.21 kg) were divided into 3 homogenous groups from one-week prior to farrowing to the end of lactation: Control (CTR) fed a standard basal diet (1800 IU of cholecalciferol), Treatment 1 (T1) and Treatment 2 (T2) fed the basal diet +400 mg/kg and 600 mg/kg of premix corresponding to 0.64 µ/kg and 0.96 µ/kg of calcitriol respectively. Sows body weights (BW), back fat thickness (BF) and body condition score (BCS) were registered during the trial. Farrowing time (FT) was monitored through dedicated cameras. Litters growth performances were evaluated. Blood samples were collected from each sow at the start, farrowing and end of lactation to determine plasma pro-inflammatory cytokines (TNF-α, IL1-β and IL1-α), parathormone (PTH) and calcitriol levels through ELISA tests. Data were analyzed through a general linearised model (GLM) followed by Tukey's test. T1 and T2 sows displayed reduced FT in comparison to CTR (176.25 ± 32.92 min. and 181.25 ± 24.16 min vs 236.25 ± 28.88 min.; $p < 0.05$). T1 litters revealed a higher livability in comparison to CTR at the end of the trial (0.13 ± 0.35 vs 1.25 ± 1.16 lost piglets; $p < 0.05$). Both T1 and T2 piglets revealed better BW at weaning when compared to CTR (10.63 ± 1.06 kg and 10.50 ± 1.07 kg vs 9.38 ± 1.30 kg; $p < 0.05$). No differences in terms of sows BW and BCS were detected ($p > 0.05$). At the end of the lactation, T2 sows revealed lower BF in comparison to CTR ($p < 0.05$). Calcitriol levels were stably higher in T1 and T2 after farrowing (15.83 ± 4.63 pg/ml and 17.49 ± 4.48 pg/ml vs 7.12 ± 3.45 pg/ml; $p < 0.01$) and at the end of lactation (16.79 ± 5.00 pg/ml and 18.61 ± 4.39 pg/ml vs 10.58 ± 3.01 pg/ml; $p < 0.05$). PTH revealed the opposite trend ($p < 0.05$). TNF-α, IL1-β and IL1- α were markedly lower at the end of the trial in T1 and T2 sows ($p < 0.05$).

In conclusion, the tested solution based on glycosylated calcitriol improved sows productivity and health in a critical phase of the production cycle due to its enhanced bioavailability.

O209

Leveraging 3D accelerometer data to predict heat stress in dairy cows

Alessio Cecchinato[a], Diana Giannuzzi[a], Carlo Rovetta[a], Vittoria Bisutti[a], Sara Pegolo[a], Alon Arazi[b], Gil Katz[b], Erminio Trevisi[c], Marcello Mele[d], Luigi Gallo[a], Franco Tagliapietra[a], Stefano Schiavon[a] and Lucio Flavio Machedo Mota[a]

[a]*Department of Agronomy, Food, Natural Resources, Animals and Environment DAFNAE, University of Padova, Legnaro, Padova 35020, Italy*
[b]*Afimilk LTD, Afikim 15148, Israel*
[c]*Department of Animal, Nutrition and Food Sciences DIANA, Università Cattolica del Sacro Cuore, Piacenza 29122, Italy*
[d]*Dipartimento di Scienze Agrarie, Alimentari e Agro-ambientali, Università di Pisa, Via del Borghetto, 80, Pisa 56124, Italy*
Contact alessio.cecchinato@unipd.it

Collar-based activity sensors are increasingly recognised as effective tools for monitoring cow behavior and identifying potential indicators of heat stress. This study evaluated the use of a 3D accelerometer-based neck-mounted collar (AfiCollar, Kibbutz Afikim, Afimilk, Israel) to investigate the associations between feeding, rumination, and panting behaviors under varying stress conditions, as defined by the daily average temperature-humidity index (THI). The study was conducted on 1,295 Holstein cows housed in four commercial farms across Lombardy, Emilia-Romagna, and Tuscany (Italy) from September 2023 to October 2024. Behavioral data, captured at 0.01-second intervals by the accelerometer, included feeding, rumination, and panting activities, resulting in a raw dataset of 273,851,259 records. Average (± SD) daily values for feeding, rumination, and panting were 7.82 ± 0.99 hours, 8.23 ± 0.82 hours, and 2.49 ± 0.81 hours, respectively. Climatic data were sourced from NASA POWER and validated against continuous measurements