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ASPA 23rd CONGRESS

Sorrento, June 11–14, 2019

Book of Abstracts

Guest Editors: Fulvia Bovera (Coordinator), Marzia Albenzio, Mariangela Caroprese, Rosaria Marino, Gianluca Neglia, Giovanni Piccolo, Angela Salzano.

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Italian Journal of Animal Science

The *Italian Journal of Animal Science* is an international peer-reviewed open access journal publishing original scientific papers, reviews and short communications.
The journal serves as essential reading for animal scientists, technicians and all those who research animal production.

The journal encourages submissions of international relevance on the following subjects:

- Animal derived food quality and safety
- Animal genetics and breeding
- Aquaculture, poultry, companion and wild game animals
- Livestock systems, management and environment
- Non-ruminant or ruminant nutrition and feeding
- Production physiology and functional biology of farmed, companions and wild game animals.
- Animal behavior
- Animal welfare
- In vitro studies that have an application to farmed livestock

Manuscripts must address topics based on research at molecular, cellular, organ, whole animal and production system levels. Manuscripts discussing milk or meat analysis and compositions must show a direct link to either livestock production system, product quality, animal feeding/nutrition, animal genetics or breeding. Manuscripts describing laboratory animal models will be considered where the study highlights a potential benefit to farmed livestock.

Submissions discussing epidemiology, parasitology, infective diseases, food-borne diseases do not fit with the aims and scope of the journal.

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Sorrento, June 11–14, 2019

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The aim of the present study is to investigate the demographic asset, the inbreeding levels and breeders' management in Italian Weimaraner (WMR) population in 46 years of data, entered in the ENCI-Italian Kennel Club Studbooks with the first records tracing back to 1970. Data were analysed using SAS ® (NC, USA) and CFC (Niigata, Japan) software. The WMR, according to Federation Cynologique Internationale (FCI) standard n° 99 (26 May 2015) is a medium to large sized hunting dog with a functional working type. The breed is part of the 7th FCI group Pointing Dogs, Section 1.1 Continental pointing dogs, type 'Braque'. The most recognisable and distinguishing phenotypical trait is the unique 'silver, roe or mouse grey' coat colour. Two varieties are present: short-haired (SH) and long-haired (LH). In the observed period, a total of 9974 subjects were entered in Italian stud books (Registro Origini Italiano (ROI)+RSR (Registro supplementare riconosciuti), sex ratio 1:1, varieties are present with a dramatic difference: 99% SH–1% LH. A constant increase in puppies' entries has been recorded in the last ten years. It should be underlined that 23.7% of the population has foreigner origin, 76% is entered in ROI and only 0.3% of the population is constituted by RSR subjects (founders recognised as typical by official judges, 3 generation pedigree). A complete genealogy was recorded for 13,002 dogs, the reference population is sized on 11,579 dogs, 8364 subjects are inbred. A total of 1929 breeding males and 2385 breeding females have been calculated. The population average inbreeding coefficient (F) is 0.025, in inbred dogs mean F is 0.038, the maximum calculated F is 0.375. In the last 10 years, F levels have always been lower than 0.05. In the whole population, 27 full-sib, 121 half-sib and 75 parent-progeny combinations have been recorded. The top producing sire originated 216 puppies, the top producing dam originated 64 puppies. The maximum number of litters per sire recorded was 33. The maximum number of litters per bitch recorded was 9. The average dams age is 3.6 years, and the average sire age is 4 years. Some breeding activities (litter birth) under 1 year of age and over 7 years of age were recorded in dams and sires. Objective data have been supplied for WMR breed conservation and study and breeding strategies planning a constant attention towards breeder management and coefficient level could be suggested according to ENCI rules.

Acknowledgements
We would like to thank Ente Nazionale della Cinofilia Italiana ENCI for data supplying.

ANIMAL PHYSIOLOGY, HEALTH AND WELFARE

P051

Stage of gestation and dietary carbohydrates change ruminal microbiota structure in sheep

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Nutrition during pregnancy significantly affects the metabolic homeorhesis of the mother and the metabolism of the foetus with permanent effects on offspring performance. Human studies highlighted a central role of diets and physiological stages, mediated by the gastrointestinal microbiome, in the regulation of the host metabolism for food energy harvesting and, in particular, to influence the hormonal regulation of glucose metabolism. The aim of this study was to study the effects of different dietary carbohydrates on the microbiota structure of dairy sheep in their last month of pregnancy. Two groups of 6 Sarda sheep (BW: 47.4 ± 5.4 kg and BCS: 2.7 ± 0.2) were fed a glucogenic (starch) or a lipogenic (fibre) diet (37.0% vs. 46.5% of NDF and 26.1 vs. 10.0 of starch and sugars on DM basis, respectively) from –75 to the day of parturition (DoP). From each group, a ruminal fluid sampling was performed with oesophageal probe at –35 and –5 DoP. Samples were immediately frozen until DNA extraction and analysis by quantitative real-time PCR and DGGE analysis. Hierarchical cluster analysis and linear mixed models were applied for qualitative and quantitative statistics, respectively. At –35 to DoP the ruminal microbiome was strongly influenced by the diet while microbial groups clustered accordingly with the diet at this phase. On the other hand, at –5 DoP the dietary effect on microbial groups was not detectable and the ruminal microbial structure of the starch and fibre ewes showed a very high inter-animal similarity.
The number of bacteria, methanogens, *Butyrivibrio fibrisolvens* and *Prevotella ruminicola* were not influenced by diets at –35 to and –5 DoP. *Protozoa*, both at –35 and –5 DoP tended to be higher in fibre ewes ($p<.01$). The diet had a significant effect on the number of *Fibrobacter succinogenes*, with higher values in fibre than in starch ewes ($p<.05$). Gestation stage influenced the Fungi population, which declined significantly from –35 to –5 DoP ($p<.05$). Observed microbial changes and the depression effect of the fungal growth rate could be due to the increase in ruminal passage rate with the advance of gestation. In conclusion, pregnancy stage has led to a change in the structure of the microbiome, which needs to be further investigated to better understand possible links with animal performances.

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Evaluation of industrial by-products

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The use of industrial by-products increased constantly in the present years in order to reduce the economic and environmental impact of animal production system. Nevertheless, to use correctly residuals as feedstuffs, it is necessary to know their nutritional characteristics. The aim of the present study was to evaluate the chemical composition and *in vitro* fermentation characteristics of nine by-products obtained by different industrial processes: three by olive oil production (dry pomace DP1, DP2, DP3); four by fruit transformation (grapecake GC and orange fruits pulp OFP1, OFP2, OFP3) and two from sugar industry (glutamic beet pulp GBP and dried beet pulp BP). Each sample was analysed for chemical composition according to official methods. To consider the use of these by-products in swine nutrition, each sample was incubated at 39 °C for 96 h, into serum bottles under anaerobic condition with swine faecal inoculum. At the end of incubation, cumulative gas production (OMCV), organic matter digestibility (OMD), short chain fatty acids (SCFA) and NH_3 were determined. All data were statistically analysed. As expected, chemical composition of the tested by-products varied consistently in function of the productive process as well as the nature of raw material. Regarding protein, GPB showed the highest value (31.17% a.f.), while in the other by-products crude protein ranged from 5.57 to 13.14% a.f., in OFP1 and GC, respectively. Structural carbohydrates showed the highest levels in GC (NDF: 58.89; ADF: 55.97, ADL: 34.24% a.f.), while the lowest values were registered in OFP1, OFP2 and OFP3. The olive oil residuals showed lipid values exceeding 25.0% a.f. Both fermentation parameters and end-products were influenced by chemical composition. In particular, OMD was significantly ($p<.01$) correlated to dry matter and ether extract, while NDF, ADF and ADL content reduced significantly ($p<.05$) OM digestibility; OMCV was significantly ($p<.05$) related only to structural carbohydrates fraction. All chemical parameters influenced significantly ($p<.01$) SCFA production; on the contrary, no correlations were observed between NH_3 production and chemical parameters. The evaluation of chemical composition and *in vitro* fermentation parameters is an essential step in order to utilise by-products as feedstuffs in swine nutrition; the search for other compounds, as well as the direct *in vivo* confirmation, will represent a subsequent step.

P053

Responses to heat stress of three rabbit synthetic breeds: physical and sensory traits of the longissimus dorsi muscle

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Rabbits are very sensitive to high environmental temperature due to their limited number of sweat glands. This typically leads to decreased performance with possible effects on meat quality aspects. However, it has been shown that different rabbit genotypes might display different performances when farmed under heat stress. This research studied the effects of the rabbit breed and the farming temperature on physical and sensory quality of the longissimus dorsi (LD) muscle. A total of $n = 90$ LD muscles were obtained from three different synthetic rabbit breeds: Pannon Large (PL), Pannon White (PW) and Pannon Ka (PK). Each genotype was farmed at two different temperatures, 20 °C (normal) and 28 °C (heat-stress conditions). After slaughter, the LD samples were submitted to physical analysis (pH, $L^*a^*b^*$ colour, thawing and cooking losses, and Warner-Bratzler shear force – WBSF). A trained sensory panel ($n = 12$ members) received a list of descriptors (olfactory, gustative, textural) to score them on numerical and continuous scales from 0 to 10. For each sample, panellists were also asked to indicate if and which of a list of off-odours and off-flavours they could recognise. Data were analysed with a two-way ANOVA with breed and temperature as fixed effects. As for sensory data, a χ^2 test was performed on off-odours and off-flavours characterisation. The breed significantly affected water total losses as well as WBSF values of LD meat. The PW rabbits showed higher thawing loss compared to PL ones ($p<.05$). However, it was the PK breed that displayed the highest cooking loss ($p<.01$) total loss ($p<.05$), and meat WBSF values ($p<.01$). The farming temperature affected some physical meat traits: the LD pH increased when rabbits were outside their thermoneutral zone ($p<.01$) which determined lower thawing loss ($p<.05$), and b* value ($p<.05$). Overall, the breed did not affect the LD sensory traits, except for meat toughness, whose score was the highest ($p<.05$) in PK rabbits, thus supporting the results on the physical traits of the LD meat. The environmental temperature did not affect the LD sensory attributes, except the 'pungent' off-odour who increased in rabbit farmed under heat stress condition ($p<.05$). It was concluded that the PK breed was the less acclimated to heat which negatively reflected on physical and sensory meat quality traits, and that the heat stress did not impair the LD meat quality traits.

Acknowledgements

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Response of the bovine milk microbiome to different dry-cow treatment approaches

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