Actividades divulgación Proyecto AGROALNEXT_2022_037

Evento	The 76th EAAP Annual Meeting
Localidad	Innsbruck
Pais	Austria
Fecha	August 25th -29th, 2025
Proyecto:	Adaptación al cambio climático y mejora de la sostenibilidad mediante selección genética por resiliencia y la alimentación en cunicultura
Código proyecto	AGROALNEXT_2022/037
Grupo de investigación	CITEPA Grupo de Investigación en Ciencia y Tecnología de la Producción Animal; ICTA INSTITUTO DE CIENCIA Y TECNOLOGIA ANIMAL; UNIVERSITÀ DEGLI STUDI FIRENZE DAGRI DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRARIE, ALIMENTARI, AMBIENTALI E FORESTALI

INFORME DE LA ACTIVIDAD:

La 76ª reunión anual de la Asociación Europea para la Producción Animal (EAAP) se ha celebrado en Innsbruck del 25 al 29 de agosto de 2025. Al congreso asistió M. Luz García y la participación en este congreso fue de 1 comunicación y de 2 pósteres.

1. **Session 64. Genetics of novel health and welfare traits in species other than dairy cattle.**

Inflammatory response in males from two rabbit lines divergently selected for resilience. *M. L. García, D. Serrano-Jara, I. Agea, M. J. Argente*

2. **Session 33. Integrating animal microbiomes and host genetics - Holobiont; Where the host meets the guest: the holobiont concept in 1) Ruminants & 2) Monogastrics (joint with Genetics).**

Distinct gut microbiota response to heat stress in two rabbit maternal lines. *I. Biada, F. Tiezzi, N. Ibáñez-Escriche, M. L. García, M. J. Argente, M. A. Santacreu*

3. **Session 23: Selection for Efficiency, Resilience, and Climate Adaptation.**

Effect of selection for resilience on sperm head morphometry in rabbits. *M. L. García, D. Serrano-Jara, I. Agea, M. J. Argente*

Destacar que la comunicación titulada “Distinct gut microbiota response to heat stress in two rabbit maternal lines” es una colaboración con el Dipartimento di Scienze e Tecnologie Agrarie, Alimentari, Ambientali e Forestali, Università degli Studi di Firenze, Firenze, Italia.

Session 23 Poster 16

Effect of selection for resilience on sperm head morphometry in rabbits

M. L. García[1], D. Serrano-Jara[1], I. Agea[1], M. J. Argente[1]

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An experiment of divergent selection for residual variance of litter size was carried out on rabbits. The Ve was estimated as the phenotypic variance of litter size within female after correcting litter size for year-season and lactation status. The HO line is selected for decreasing Ve and HE line is selected for increasing Ve. We know that males of the HE lines showed higher temperature than HO line after a stressful stimulus, such as semen extraction, indicating higher stress level and less resilience. Chronic stress has been shown to negatively impact spermatogenesis by affecting hormone levels, particularly testosterone and cortisol, which play crucial roles in sperm development. The aim of this study was to examine the correlated response on sperm head morphometry. A total of 30 semen samples (15 samples by line) were diluted 1:15 and SpermBlue® staining was performance. Automatic analysis of the sperm morphometry with the Sperm Class Analyzer CASA System was used. Each sperm head was measured for four primary parameters (area, perimeter, length, width), and four derived parameters of head shape [Ellipticity (L / W), rugosity (4πA / P2), elongation ((L − W) / (L + W)), regularity (πLW / 4A)]. Data were analyzed using Bayesian methods. After 17 generations of selection, the HO males showed a lower area of the sperm head than HE males (29.48 µm2 and 33.54 µm2, respectively), being the difference between lines D = -0.46 µm2, with a probability of being negative P = 91%. Also, width (4.00 µm and 4.46 µm, P = 91%), length (7.45 µm and 8.33 µm, P = 91%) and perimeter (17.10 µm and 18.96 µm, P = 90%) was lower in HO males. Both lines showed similar results for ellipticity, elongation, regularity and rugosity. In conclusion, selection for increased resilience in rabbits is associated with smaller sperm head dimensions but does not affect overall sperm shape. These differences may be linked to its lower stress levels. We thank the institutions (European Union and Generalitat Valenciana) involved in AGROALNEXT/2022/037 that have provided the necessary funds (PRTR-C17.I1) for the execution of the project.

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Session 33 — Theatre 9

Distinct gut microbiota response to heat stress in two rabbit maternal lines

I. Biada[1], F. Tiezzi[2], N. Ibáñez-Escriche[1], M. L. García[3], M. J. Argente[3], M. A. Santacreu[1]
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This study uses different modelling approaches to explore the impact of heat stress on gut microbiome in two maternal rabbit lines (LP and A) with distinct longevity. It hypothesizes that heat stress differentially affects the gut microbiota of these genetic lines, reflecting differences in physiological responses and providing potential biomarkers for heat stress adaptation. Faeces samples were collected from high-longevity line LP (n=101) and standard-longevity line A (n=98) under heat stress (Temperature-Humidity Index, THI: 25.7±1.2) and thermal comfort (THI: 17.5±1.7). The analysis included microbiota diversity and genetic line classification (A and LP) under both thermal conditions, using Random Forest (RF), Partial Least Squares Discriminant Analysis (PLS-DA), and Bayesian Regression (BayesC). Heat stress increased Shannon index ($p = 0.01$) and altered beta diversity (Aitchison $p < 0.001$). This is likely due to intestinal barrier disruption, which facilitates pathogen proliferation. Prediction accuracy and key selected taxa distinguishing lines A and LP varied across thermal conditions, showing distinct microbiome responses to heat stress. Area Under the Curve (AUC) exceeded 0.92 under heat stress and 0.87 in thermal comfort. Stress-associated taxa, such as Erysipelatoclostridium and Monoglobus, were more abundant in the low longevity line A. Concerning comparisons between models, PLS-DA provided higher predictive accuracy and captured a broader range of features, while RF selected fewer but more biologically and taxonomically relevant taxa. These results highlight line LP's longevity and expected resilience, as reflected in a higher abundance of potential heat stress-associated taxa in line A. Additionally, this study showed the value of combining modeling approaches, offering both high accuracy and insight into key taxa driving heat stress responses.

Session 64 — Poster 15

Inflammatory response in males from two rabbit lines divergently selected for resilience

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Adaptation to the environment is a key factor in animal welfare. Rabbits are highly sensitive to heat stress, which can increase susceptibility to disease. Inflammation is a physiological response to infection or tissue damage, with tumor necrosis factor-alpha (TNF-α) and C-reactive protein (CRP) serving as key biomarkers. Their levels indicate the severity of inflammation and disease. This study aimed to evaluate TNF-α and CRP levels in male rabbits from two divergently selected lines during winter and summer. A total of 40 (TNF-α) and 18 (CRP) males (50% per line) from generation 17 of a divergent selection experiment for litter size variability (HO and HE lines) were used. Rabbits were 4.5–10 months old, averaging 3.53 kg. Blood samples were collected twice: in September (heat stress) and February (thermal comfort). Samples (3 ml) were drawn from the auricular and central artery in the morning, centrifuged at 4000 rpm for 20 min, and serum was stored at -80°C until analysis. TNF-α and CRP levels were measured using ELISA kits. Statistical analysis included the effect of line-stress interaction (HO-stress, HO-comfort, HE-stress, HE-comfort), weight as a covariate, and animal as a random effect, using Bayesian methodology. The HO line exhibited lower TNF-α levels than the HE line under heat stress (56.8 vs. 69.1 pg/ml; P = 98%) and a similar trend in thermal comfort (58.2 vs. 66.3 pg/ml; P = 88%). Neither line was significantly affected by thermal conditions. Regarding CRP, the HO line had lower levels under heat stress (39.9 vs. 52.5 mg/ml; P = 86%), but not in thermal comfort (43.0 vs. 41.3 mg/ml; P = 57%). Both lines showed a trend towards CRP modification under heat stress (P > 80%). The HO line exhibited a lower inflammatory response than the HE line, particularly under heat stress. CRP results complement TNF-α findings, but further samples are needed to confirm these results. We thank the institutions (European Union and Generalitat Valenciana) involved in AGROALNEXT/2022/037 that have provided the necessary funds (PRTR-C17.I1) for the execution of the project.

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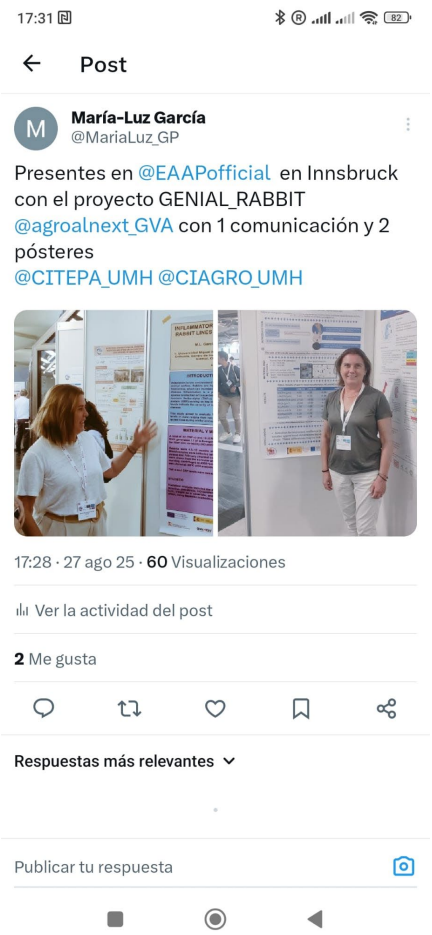

Y para que conste a los efectos oportunos

María de la Luz García Pardo

IP1 del proyecto AGROALNEXT_2022/037

MARIA DE LA LUZ|GARCIA|PARDO

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