



## ASPA 25th Congress Book of Abstract

Pasquale De Palo

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# **ASPA 25<sup>th</sup> Congress**

## ***Monopoli (BARI - ITALY), June 13-16, 2023***

**#ASPA2023**

### **ASPA 25<sup>th</sup> Congress Book of Abstract**

**The 25th congress of the Animal Science and Production Association**

**“Animal Production Science: Innovations and sustainability for future generation” is under patronage of Loghi patrocini**

**Monopoli (BARI - ITALY),  
June 13-16, 2023**

#### **Venue**

**Torre Cintola Natural Sea Emotions**

**Località Capitolo - Monopoli (BARI - ITALY)**



## Thursday June 15<sup>th</sup> – Room Peucetia

### Session 29 – Sustainable feeding strategies in livestock system

Sponsored by Mignini & Petrini

Chairs:	Pinotti Luciano – Masucci Felicia	
14:30	<b>INVITED LECTURE</b>	
	<u>Pulina Giuseppe</u> , Correddu Fabio, Caratzu Maria Francesca, Lunesu Mondina Francesca	
	<i>Livestock sustainability, the four slices of the same pie</i>	
15:00	<u>Oteri Marianna</u> , Scordia Danilo, Armone Rosangela, Costale Annalisa, Meineri Giorgia, Gresta Fabio, Chiofalo Biagina	
	<i>A sustainable alternative grain legume for livestock: agronomic and nutritional traits of three lupin (<i>Lupinus spp.</i>) species .....</i>	<b>O030</b>
15:15	<u>Braidot Matteo</u> , Sarnataro Chiara, Fabro Carla, Spanghero Mauro	
	<i>In vitro evaluation of sodium nitrate as a rumen methane reducer .....</i>	<b>O358</b>
15:30	<u>Battelli Marco</u> , Colombini Stefania, Crovetto Gianni Matteo, Galassi Gianluca, Manfredi Maria Teresa, Rapetti Luca	
	<i>Quebracho condensed tannins fed to lactating goats: effect on methane production .....</i>	<b>O325</b>
15:45	Vastolo Alessandro, Formato Marialuisa, Piccolella Simona, Calabrò Serena, Pacifico Severina, <u>Cutrignelli Monica Isabella</u>	
	<i>Evaluation of the effect of leaf extracts from deciduous trees (<i>Castanea sativa</i>, <i>Fagus sylvatica</i> and <i>Quercus robur</i>) on ruminal fermentation .....</i>	<b>O178</b>
16:00	<u>Scicutella Federica</u> , Mannelli Federica, Daglio Matteo, Azim Khalid, Toni Elisabetta, Viti Carlo, Buccioni Arianna	
	<i>Mediterranean agro-industrial by-products as ingredients in a sustainable feeding strategy for dairy sheep: an in vitro trial to evaluate rumen ecosystem .....</i>	<b>O489</b>
16:15	Piccioli-Cappelli Fiorenzo, Moschini Maurizio, <u>Froldi Federico</u> , Bani Paolo, Müller Isabel, Tamassia Luis, Bulgarelli Paolo, Trevisi Erminio	
	<i>Effects of 3-nitrooxypropanol (3-NOP, Bovaer®10) on methane emission and productive performance of mid-lactating dairy cows fed a typical diet for Grana Padano cheese-making.....</i>	<b>O491</b>
16:30	<u>Massaro Selene</u> , Andersen Jonas Bylov Hedegaard, Franciosi Elena, Tagliapietra Franco	
	<i>Alpine herbs affect rumen in vitro degradability and methane emissions.....</i>	<b>O079</b>
16:45	<u>Caturano Costantino</u> , Tremonte Patrizio, Lombardi Silvia Jane, Fatica Antonella, Sorrentino Elena, Coppola Raffaele, Salimei Elisabetta	
	<i>Use of lactic acid bacteria in forage production of Alto Sannio area .....</i>	<b>O245</b>
17:00	Coffee break	

## Thursday June 15<sup>th</sup> – Room Messapia

### Session 30 – Precision livestock farming: production efficiency and environmental impacts

Chairs:	Mattiello Silvana - Neglia Gianluca	
14:30	<b>INVITED LECTURE</b>	
	<u>Rosa Guilherme</u> , Hernandez Laura, Dorea Joao R. R.	
	<i>Digital technologies and Machine learning: A new way to look at novel traits at spatial and temporal dimensions</i>	
15:00	<u>Casu Sara</u> , Usai M. Graziano, Salaris Sotero, Caredda Marco, Addis Margherita, Carta Antonello	
	<i>Phenotypic Analysis of Ovine Milk Infrared Spectra .....</i>	<b>O193</b>
15:15	<u>Cartoni Mancinelli Alice</u> , Chiattelli Diletta, Menchetti Laura, Bernacchia Gianmaria, Castellini Cesare	
	<i>Preliminary validation of Ultra-Wide Band device as an innovative tool to assess chicken behaviour.....</i>	<b>O499</b>
15:30	<u>Pietrucci Daniele</u> , Milanese Marco, Chandramouli Balasubramanian, Vignali Giovanni, Negrini Riccardo, Macini Marco, Santini Monia, Chillemi Giovanni	
	<i>Identification of the most impacting environmental variables on dairy cows milk yield using Machine Learning methods .....</i>	<b>O324</b>

ISPRA equations for the Net Energy for Lactation, the Net Energy for Maintenance, and for the Ratio of Net energy available in diet for maintenance to digestible energy was estimated using DHI/LEO data as an alternative to the adoption of the default Tier 2 values suggested by ISPRA. Enteric emissions were calculated per herd, categories, animals, and kg of milk. Then, 1549 dairy farms were sampled and divided into 3 classes of average size per cow/year (156 farms up to 100 lactating cows; 640 up to 200; 753 with >200). Preliminary results indicated that emissions per kg of milk from the largest size classes appear to be equal to or slightly lower than those in the class with the lower heads number. The different level of farm management in relation to farm size could influence the level of emissions. The results will contribute to a more precise quantification and monitoring of enteric emission at the farm level, to identify differences among herd size, regions, and seasons, and to deploy targeted large-scale mitigation actions.

#### Acknowledgement

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This research was financed by LEO project, PSRN 2014–2020 Sottomisura: 16.2, Project number PRJ-0185, CUP: J84I18000090007.

## O553

### Agroforestry to support carbon-neutral dairy productions in Tuscany

Alberto Mantino<sup>a</sup>, Alice Ripamonti<sup>a</sup>, Margherita Tranchina<sup>b</sup>, Ricardo Villani<sup>b</sup>, Matteo Finocchi<sup>a</sup> and Marcello Mele<sup>a</sup>

<sup>a</sup>Department of Agriculture, Food and Environment, University of Pisa, Pisa, Italy

<sup>b</sup>Sant'Anna School of Advanced Studies, Pisa, Italy, Pisa, Italy

Agroforestry is considered an appropriate strategy to cope with climate change through both adaptation and mitigation solutions. Agroforestry is defined as 'the practice of deliberately integrating woody vegetation (trees or shrubs) with crop and/or animal systems to benefit from the resulting ecological and economic interactions'. Agroforestry combines on the same land surface food, feed, and timber production, stocking carbon in the biomass of trees, reducing soil erosion and flooding risks, and improving nutrient cycling and animal welfare. Among agricultural sectors, livestock is the most impacting in terms of greenhouse gas (GHG) emissions. At the same time, livestock productions maintain socio-economic sustainability in both marginal and intensive agricultural areas. Carbon insetting refers to any activity undertakes to reduce GHG emission or to sink carbon from the

atmosphere within a production system. The development of integrated crop-livestock-tree systems can help the transition to a low-carbon agriculture through stocking carbon in tree biomass.

A preliminary scenario analysis was conducted to assess the carbon sequestration potential of a poplar-based agroforestry systems in eight dairy cattle farms (Mugello area, northern Tuscany) and in six dairy sheep farms (Manciano area, southern Tuscany). Firstly, a LCA analysis was conducted by collecting primary data in both cattle and sheep farms. The functional unit was 1 kg of fat (4%) and protein (3.3%) corrected cow milk or sheep milk (6.5%, 5.8%, for fat and protein, respectively). Secondly, the Eco Yield-Safe model (a dynamic model for predicting resource capture, growth, and production in agroforestry systems) was used to estimate carbon sequestration of a poplar agroforestry system in both study areas.

Global warming potential was 1.14 CO<sub>2</sub>-eq kg<sup>-1</sup> for dairy milk and 4.11 CO<sub>2</sub>-eq kg<sup>-1</sup> for sheep milk. Total emissions per ha of utilized agricultural area varied from 4.13 to 30.78 Mg CO<sub>2</sub> ha<sup>-1</sup> y<sup>-1</sup> in dairy cattle farms, and from 3.85 to 7.53 Mg CO<sub>2</sub> ha<sup>-1</sup> y<sup>-1</sup> in dairy sheep farms. The Eco Yield-Safe model predicted a total above-ground biomass after ten years of 21.59 Mg ha<sup>-1</sup> of timber in Mugello area and 12.02 Mg ha<sup>-1</sup> in Manciano area. The potential carbon compensation of the agroforestry systems was 3.69 and 2.03 Mg CO<sub>2</sub> ha<sup>-1</sup> y<sup>-1</sup>, respectively. The average potential carbon compensation ranges from 12 to 89% (average 33%) and from 26 to 52% (average 43%) in Mugello and Manciano farms respectively.

## O30

### A sustainable alternative grain legume for livestock: agronomic and nutritional traits of three lupin (*Lupinus* spp.) species

Marianna Oteri<sup>a</sup>, Danilo Scordia<sup>a</sup>, Rosangela Armone<sup>a</sup>, Annalisa Costale<sup>b</sup>, Giorgia Meineri<sup>c</sup>, Fabio Gresta<sup>a</sup> and Biagina Chiofalo<sup>a</sup>

<sup>a</sup>Department of Veterinary Sciences, University of Messina, Messina, Italy

<sup>b</sup>Department of Drug Science and Technology, University of Turin, Torino, Italy

<sup>c</sup>Department of Veterinary Sciences, University of Turin, Torino, Italy

With the aim of evaluating lupin grain as a sustainable source of nutrient and bioactive compounds for animal feeding, the main agronomic traits, nutrients and antioxidant phenols of *Lupinus albus* L. (Luxor), *Lupinus luteus* L. (Dukat) and *Lupinus angustifolius* L. (Wonga), grown side-by-side in the Mediterranean area, were studied.

Proximate composition was determined using the official methods of analyses, fatty acid profile by gas chromatography, total phenolic content (TPC) and the scavenging activity (DPPH• and ABTS•+) by spectrophotometric assays. A one-way ANOVA was used to assess the significance of accessions effect and means were separated by the Tukey HSD test ( $p \leq 0.05$ ).

Seed yield resulted significantly different among lupin species: *L. albus* proved to be the most productive species (2.27 Mg/ha) compared to *L. luteus* and *L. angustifolius* (1.49 and 1.77 Mg/ha, respectively) that were not significantly different.

Regarding nutritional traits, *L. luteus* showed the significantly highest crude protein content (396 g/kg, as fed) and *L. albus* the highest oil content (93 g/kg, as fed) and the lowest crude fiber content (120 g/kg, as fed).

The FAs resulted of nutritional interest for *L. albus* and *L. luteus*; the former showed the significantly highest content of the oleic acid (51%), the latter, the significantly highest content of linoleic acid (50%) and alfa-linolenic acid (8%). *Lupinus luteus* showed the significantly highest polyunsaturated FAs (58%), in particular for those of n6 (50%) and n3 series (8%), while, *L. albus* the highest monounsaturated FAs (58%) and the lowest saturated FAs (16%).

Antioxidant properties, namely total phenolic content and scavenging activity (DPPH• and ABTS•+), were the highest in *L. luteus* and *L. albus*, respectively. The highest content of Apigenin 1 derivatives was observed in *L. luteus*, while the highest level of Apigenin 2 ones was determined in *L. albus*.

Among studied species, *L. albus* resulted largely the most productive species showing an interesting protein, oil and unsaturated fatty acid contents, and antioxidant activity; *L. luteus* showed lower yields but emerged for polyunsaturated FAs content, and *L. angustifolius* did not show valuable traits compared to the other lupin species. The present data suggest that *L. albus* can be considered a valuable crop and feed resource for livestock.

## O62

### The value of sheep transhumance for rural landscape: a GPS tracking approach

Elena Benedetti Del Rio, Maurizio Ramanzin, Salvatore Raniolo and Enrico Sturaro

DAFNAE, University of Padova, Legnaro, Italy

In the Mediterranean and Alpine regions, transhumance is a form of pastoralism based on the seasonal driving of livestock along established drovers' roads. In 2019, it was inscribed on the Representative List of the Intangible Cultural Heritage of Humanity due to its contribution to conserving marginal areas' natural and cultural heritage. In particular, the grazing patterns of transhumant flocks can contribute to maintaining

High Nature Value Farmland (HNVF), defined as those areas in Europe where agriculture supports, or is associated with, either a high species and habitat diversity and/or the presence of species of European conservation concern. This research investigates the potential role of sheep transhumance in the conservation and sustainable use of marginal areas in the Eastern Alps. We monitored two flocks of sheep for 16 months (from November 2020 to March 2022) using GPS (Global Positioning Systems) GSM collars. Two sheep per flock were equipped with GPS collars collecting the animals' position every hour, except for one day/week, when positions were collected every 15 min. We obtained digital maps of protected areas (Natura 2000 network) from the European Environment Agency and land use from CORINE Land Cover 2018 with a resolution of 10 m. We defined as HNVF the pixels classified as '243-agricultural land with significant natural vegetation', '231-pastures', and '321-natural grasslands'. The two flocks moved for 1587 km and 1118 km, with a daily movement of  $3.23 \pm 2.92$  km and  $2.83 \pm 2.19$  km, respectively. The altitudinal gradient ranged from 0 to 2340 m a.s.l. The two flocks intersected protected areas (Natura 2000 network) for 18% and 8% of total GPS positions and HNVF areas for 35% and 28%, respectively. The results confirmed the potential role of transhumant sheep flocks in conserving rural landscapes and HNVF and suggest that further information should be acquired on the effects of grazing practices on these habitats. This knowledge could inform specific policies and the promotion of knowledge of the multifunctionality of transhumance to support this traditional livestock system.

#### Acknowledgements

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## O505

### An agronomic-food strategy to improve the environmental impact in terms of water saving and food efficiency

Sergio Vaiani

Agroteam S.p.A., Torrimpietra, Italy

Producing fodder, using less water. Often a forced choice. This requires new fodder routes.. We know that 1/3 of Europe's available water resources are used for agriculture. In Southern Europe it is as high as 80%. An agronomic revision is needed in the production of fodder with high quantity and quality, but less need for water. Excellent dairy farming must be considered, even without maize. The working strategy goes in a different direction: make the most of the autumn-winter rains for fodder production by using autumn