TECH CARE

Integrating innovative **TECH**nologies along the value Chain to improve small ruminant welf**ARE** management

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The **TechCare** project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement N°862050.

SUMMARY

TechCare at the EAAP conference in Lyon – joint effort with ClearFarm - *by C. Morgan-Davies (SRUC)* 2

An Italian pilot farm with dairy sheep to test innovative technologies for welfare monitoring – *by M. Decandia, V. Giovanetti, M. Acciaro (AGRIS)* 3

Preparatory activities for LS studies in Greece at dairy sheep & goat farm of Iraklis Zisiopoulos (Pieria, Greece) – *by S. Patsios, E. Sossidou (ELGO-DIMITRA)* 6

Michelle Reeves award! – *by. M. Reeves (SRUC)* 8

Technology demonstrations and presentation of TechCare during the national sheep breeding exhibition "Tech-Ovin" – *by G. Tesnière (IDELE)* 8

TechCare UHF reading platform presented by Page Up at the agricultural fair "Sommet de l'Elevage" – *by F. Gimbert (Page Up)* 9

TechCare Partner Team: BUAS 9

TechCare in the news 11

TechCare at the EAAP conference in Lyon – joint effort with ClearFarm - *by C. Morgan-Davies (SRUC)*

TechCare and ClearFarm held a joint session at the 74th EAAP annual conference in Lyon (France) in August 2023. The conference was very successful, with over 2200 participants attending the week-long event. Clearfarm and TechCare are both projects funded by H2020 under the same call. Whilst TechCare focus is on small ruminants, ClearFarm is centred around pigs and dairy cows. This joint session was an excellent occasion to showcase both projects, see their advance and discuss similarities and synergies. Our session 39, entitled "TechCare and ClearFarm: pilots on PLF tools for monitoring animal welfare", was held on the second day of the conference. It was chaired by Claire Morgan-Davies (TechCare coordinator) and Pol Llonch (ClearFarm coordinator). The session was well attended, with more than 80 people joining in. There were 12 presentations, with 5 presentations from TechCare and 6 from ClearFarm, and a joint presentation from both coordinators. All presentations centred around how both projects are integrating welfare indicators with sensors technologies, to improve welfare monitoring. The session stimulated many questions and discussion points from the international audience. There were also a number of posters proposed by both projects, which were well visited. This conference was an excellent opportunity for some of the TechCare members to meet again in person. It also allowed members from both projects to meet and

discuss synergies and experiences. All TechCare presentations and posters are available on our website here.

The TechCare members who participated to the conference: L to R: Marco Acciaro (AGRIS), Eliel Gonzalez-Garcia (INRAE), Ali El Hadi (UAB), Irene Llach-Martinez (INRAE), Gerardo Caja (UAB), Valeria Giovanetti (AGRIS), Riccardo Carelli (EAAP), Claire Morgan-Davies (SRUC), Jean-Marc Gautier (IDELE), Jade Duncan (MRI), Fiona Kenyon (MRI), Ilan Halachmi (ARO), Ann McLaren (SRUC), Germain Tesniere (IDELE), Nicola Lambe (SRUC).

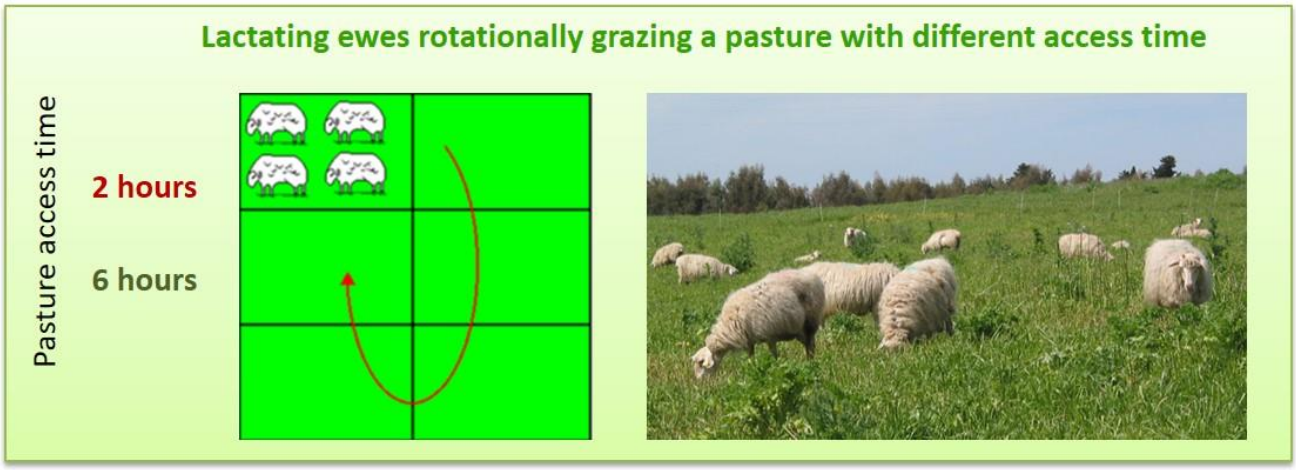
An Italian pilot farm with dairy sheep to test innovative technologies for welfare monitoring – *by M. Decandia, V. Giovanetti, M. Acciaro (AGRIS)*

Bonassai, an experimental farm of the regional research agency of Sardinia AGRIS (Italy), is located on the North –West of Sardinia. The farm has an area of 330 ha (181 crops + 200 pastoral) with alluvial soil. In the farm, 1100 dairy sheep belonging to Sarda breed are raised with a semi-intensive system. The sheep are fed at pasture, supplemented with chopped hay and concentrate, they are housed only overnight. The mating period is May – June for adult ewes and August - September for ewe-lambs, with one lambing per year. The milk produced is sold to a cooperative and the lactating lambs are sold to a private slaughterhouse at 30 days of age.

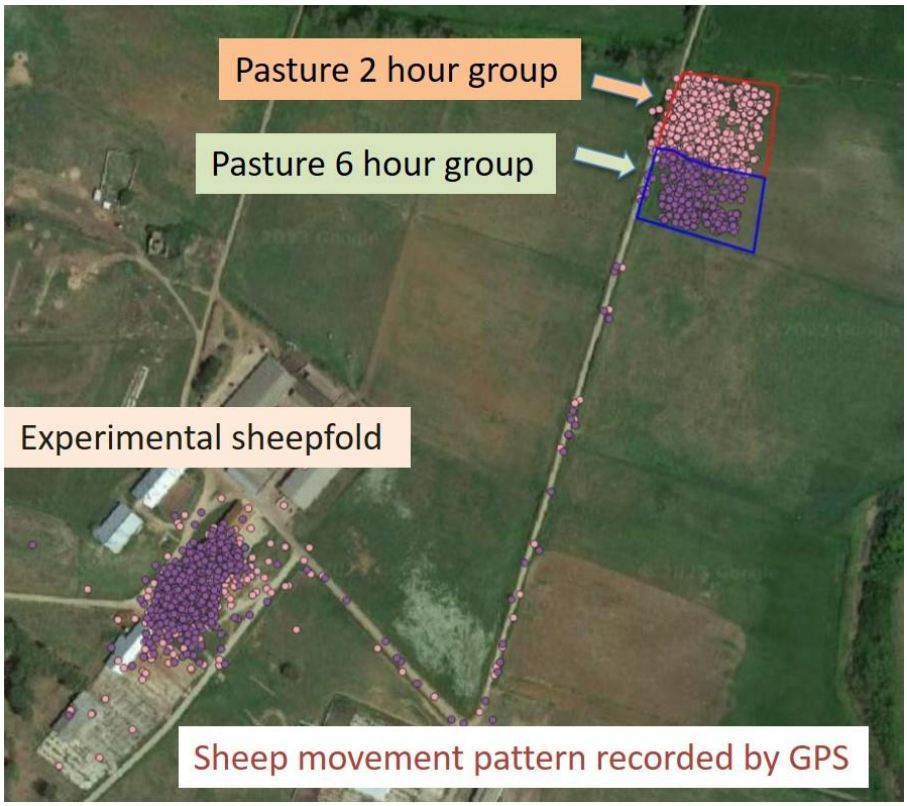
This farm is involved as pilot farm in TECHCARE project to test innovative technologies for welfare monitoring.

Among the innovative technologies evaluated in AGRIS pilot farm there is the Walk over weighing (WoW). It is a weight scale able to measure the weight of unconstrained sheep while walking on the weight platform. We adopted the prototype developed by INRAE (Gonzalez-Garcia et al., 2018, Gonzalez- Garcia et al., 2021). This digital tool has proven to accurately measure the weight of sheep (after data filtering) and has also shown good performance to measure short-term forage intake in sheep fed low amount of hay (Gonzalez-Garcia et al., 2017). The WoW represents a valid alternative to the static scales, conventionally used on meat sheep farms and could contribute to the close monitoring of individual live weight (LW) without operator intervention (i.e., voluntary weighing), taking animal welfare into account (i.e., no stress related to the weighing session on static scales), even in dairy sheep farms to potentially detect nutrition issues highlighted by LW changes.

This technology has been used together with others (e.g. flowmeters, milk tank weigh, static weigh, indoor and outdoor weather stations, GPS, Delaval Cell Counter etc.) in an experiment with dairy sheep fed at pasture. During the experiment different welfare animal indicators have been also recorded e.g. BCS, dag score, gait score, fleece cleanliness, mastitis and udder lesion, leg injuries. In the experiment, the sheep rotationally grazed an Italian ryegrass pasture with different access time.



The behaviour of sheep at pasture has also been monitored with GPS to check the movement, the hourly distance and the average daily speed of the animals. All data measured by the sensors has been also recorded in a platform built by Abinsula (one of the main Italian players in Embedded, IoT, Web and Mobile solutions).



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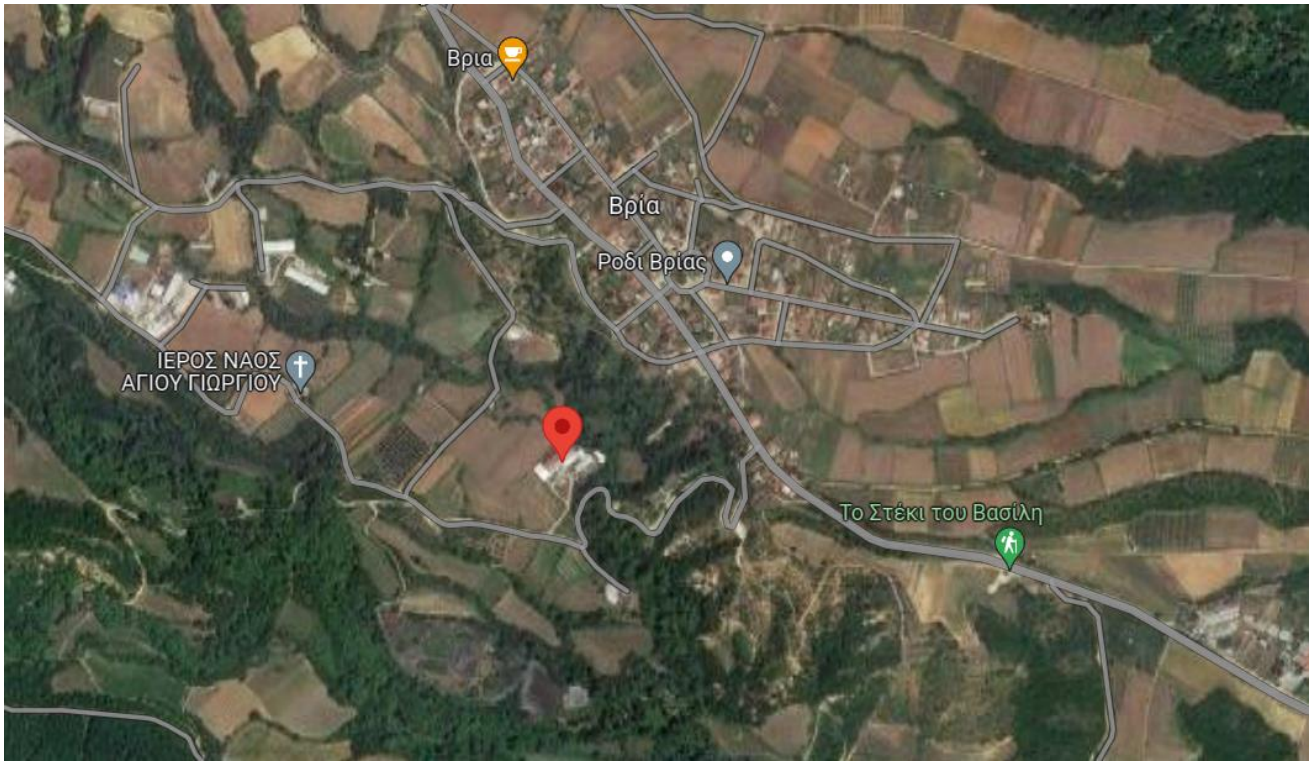
Preparatory activities for LS studies in Greece at dairy sheep & goat farm of Iraklis Zisiopoulos (Pieria, Greece) *– by S. Patsios, E. Sossidou (ELGO-DIMITRA)*

Mr. Iraklis Zisiopoulos is a goat farmer located in the small village of Vria in Pieria, Greece.



Location of Iraklis' sheep & goat farm

He owns a flock of 550 dairy sheep and a separate flock of 120 dairy goats. He manages his farm using a semi-intensive farming system. Additionally, he is a member of the Dairy Sheep Breeders Association, also known as Genelass. Iraklis employs innovative management techniques on his farm. These practices include regular volumetric milk measurements to record milk yield. He also uses specialized software called Sheeping.co to record important data such as lambing/kidding dates, mating groups, ultrasound pregnancy diagnosis results, and more. Furthermore, he adopts the method of artificial rearing for lambs and kids as rearing method on his farm. His farm's breeding schedule include three lambing periods throughout the year, which occur in September, November, and February. Additionally, he has one kidding period for his goats, which takes place in January and February annually.

Iraklis actively participates in the activities within the TechCare project and is firmly committed to be one of the Greek goat farmers to participate in the large-scale (LS) studies. Since July 2023, the first PLF equipment has been placed on his farm. This equipment comprises:

- GPS collars with activity and temperature monitoring capabilities, as well as entrance and exit alerts.
- A meteorological station which includes the Solar radiations shield RS3B as a solar radiation sensor, the Temp/RH sensor S-THCM002 HOBO for censoring relative

humidity and temperature, the DAVIS S-WCF anemometer to measure the speed and direction of the wind, the RAIN Gauge S-RGF-M002 as a gauge for the amount of rainfall and the HOBO Micro Station H21-USB for the monitoring of microclimates which is used as a data logger.

- Ear tags with an identification/recording system when the animal passes a certain location. Signal receivers have been installed at two specific locations: At the water trough that records each time an animal visits the trough to drink water and at the exit point of the farm's grazing area that records the entry and exit of animals from the grazing area.

Moreover, he has been trained to assess the health status, behaviour, and welfare of the animals and fulfil the relevant recording sheets on a daily basis. A comprehensive analysis of all the data gathered by the equipment will be conducted by the end of the year. The purpose of this analysis is to test the operation of the PLF tools in real operating environment and to identify potential technical issues and problems to be solved. Moreover, the data management procedure will be tested to gain useful experience for the data management of the large-scale studies in 10 Greek dairy goat farms.

Individual analog volumetric milk meters installed at Iraklis' sheep & goat farm (© ELGO – DIMITRA)

Michelle Reeves award! – *by. M. Reeves (SRUC)*

On October 19th, at Carpenter's Hall in London, UK, Michelle Reeves was awarded one of 8 Innovation Awards from the Worshipful Company of Woolmen. Every year, the Company recognizes researchers, young people and workers contributing to the sheep and wool industry. Michelle is a PhD student at SRUC and the University of Edinburgh funded by TechCare to work on the development and validation of animal welfare indicators for a PLF approach to sheep welfare management.

Technology demonstrations and presentation of TechCare during the national sheep breeding exhibition "Tech-Ovin" – *by G. Tesnière (IDELE)*

The 2023 edition of the Tech-Ovin national show was held under very high temperatures on September 6 and 7 in Bellac (France): the notion of summer heat stress took on its full meaning. For the 2 days of this national sheep breeding exhibition, IDELE set up a "connected village" stand composed of a technical documentation space on a wide diversity of technologies, and a demonstration space to exchange with stakeholders from meat and dairy sheep sectors. On this occasion Germain Tesnière, Estelle Nicolas, Jean-Marc Gautier (IDELE) and Claire Douine (CIIRPO – Le Mourier Pilot Farm) presented the TechCare project and made demonstrations of different technologies useful for sheep farmers, including those tested within TechCare (UHF tags, readers, and platform; connected water meters; cameras; GPS collars; weather station and indoor sensors etc.). This edition brought together more than 15,000 visitors from France and some neighbouring countries.

Photo credit: Germain Tesnière, IDELE

TechCare UHF reading platform presented by Page Up at the agricultural fair "Sommet de l'Elevage" – *by F. Gimbert (Page Up)*

Photo credit: Florian Gimbert - Page up

As a member of the TechCare consortium, Page Up company and its General Manager Jean-Claude Rousseaux, presented at the agricultural fair "Le Sommet de l'Elevage" in Clermont-Ferrand (France, 3-6 October 2023) the innovative UHF reading platform. This platform uses UHF tags to identify animals using the same schema than for official tags and taking advantage of this new technology with group readings and far higher reading distances. Proposing an easy hardware setup along with modern software tools, this platform allows to have a clear view of animals' movements. Automatic algorithms exploit the gathered data to provide high value interpretations: heartbeat, visits of animals, inventories... A mobile app allows to manually work with the reader and Cloud based database and website enables a clear monitoring of readers and an automatic data collection. The platform has been designed to work both on standard power system or on solar panels. With a 4G module, this tool can then be deployed in fields.

TechCare Partner Team: BUAS

Universitatea de Științele Vieții "Regele Mihai I" din Timișoara (University of Life Sciences "King Mihai I" from Timișoara) is a state institution for higher education located in SW Romania, in Banat Region. It has six faculties that offer 29 bachelor study programmes in Romanian and 4 bachelor study programmes in other languages (English and French), as well as 32 master study programmes (28 in Romanian and 4 in English) and 2 doctoral schools in Engineering and Veterinary Medicine. Scientific research plays a major challenge within the global university strategy. Currently, there are about 6000 students enrolled in undergraduate studies (BSc and MSc) and 210 students in PhD and postdoc. Teaching and research staff of our university is made up of 298 full-time employees. Research is carried out within the special structures such as departments, research and excellence centres, research institutes doctoral school and student research groups. University has authorized and certified laboratories, according to SR EN ISO CEI 17025, is partner of the European Food Safety Authority (art. 36 of CE Regulation 178/2002) and member of international networks EU Openscreen and METROFOOD. Research and education campus located in Northern Timișoara is comprising a total of 18216 sqm of built area. The university has experimental farms for domestic animals and crops in 5 locations. To find out more about our university visit the website.

Short profile of the team involved in the TechCare project:

Ludovic Toma Cziszter is Associated Professor, currently teaching Cattle and Horse Production at the Faculty of Bioengineering of the Animal Resources. He has experience in EU projects, being responsible for Romania in 5 EU projects on animal welfare. Research areas: cattle, sheep and goats, animal welfare, PLF, genetics. He also has expertise in building and modernizing cattle farms, participating as consultant for 36 projects. He was external expert for EFSA group studying the welfare of dairy cows in small farms in Europe. Published over 300 scientific papers, 8 books, 8 textbooks. Within the TechCare project, Ludovic is responsible for implementation of the project in Romania, participating in WP1, WP2, WP5, WP6, WP7, and WP8. He is particularly involved in WP1 connection with stakeholders and multi-actor approach and WP5 large-scale testing of PLF with dairy sheep.

Octavian Sorin Voia is Associated Professor, currently teaching Sheep and Goat Production at the Faculty of Bioengineering of the Animal Resources. He was involved in over 10 research contracts, mainly in the field of sheep and goats. He is strongly and actively involved in knowledge transfer to sheep and goat breeders, being technical consultant for several Romanian associations. Published over 170 original scientific papers and 8 books. Currently, he is involved in research projects regarding the production of organic sheep milk and selection of Romanian native sheep and goat breeds. Within TechCare he is involved in WP1 keeping the connection with stakeholders, WP2 prioritisation of welfare issues, WP5 large-scale testing of PLF and WP7 dissemination of knowledge.

Cristian Florin Lăzărescu is Lecturer, currently teaching Animal Welfare and Protection, Animal Ethology and Veterinary Hygiene at the Faculty of Veterinary Medicine, both in Romanian and English. He has a great experience in animal welfare and ethology. Has been involved in EUWelNet project. Published over 50 scientific research papers and 3 textbooks. Within TechCare project, Cristian is involved in WP2, but mainly in WP5 large-scale study.

Silvia Elena Erina is Lecturer, currently teaching Cattle Production and Animal Ethology at the Faculty of Bioengineering of the Animal Resources. She published over 100 scientific papers and 2 textbooks, being part in 5 research contracts, mainly on cattle. She is member of counselling commission of students and their insertion on the labour market. She has strong connection with farmers. Within TechCare project, Silvia is mainly involved in WP1 connection with stakeholders and WP5 large-scale studies.


Turcana sheep breed © Revista FERMA

TechCare in the news

List of past and upcoming events with TechCare partners attendance.

Event	Date	Location	Partner
←			
Webinar n°15 of the agricultural education network in France (rubrique webinaires DEA – DAT) : « L'évaluation des nouvelles solutions numériques - Un nouveau champs d'expérimentation »	9 June 2023	Online	IDELE and La Cazotte
74th EAAP Annual Meeting Session n. 39: "TechCare and ClearFarm: pilots on PLF tools for monitoring animal welfare	26 August – 1 September 2023	Lyon, France	IDELE, INRAe, SRUC, MRI, NIBIO, UAB, PageUp, ARO, AGRIS, Teagasc, ELGO, BUAS
Tech-Ovin national sheep show	6 - 7 September 2023	Bellac, France	IDELE and CIIRPO
→			
Opening of the new facilities for automated individual registration of roughage intake for sheep + seminar on Precision Livestock Farming	18 January 2024	Digifarm, NIBIO Station Tjøtta (meat sheep)	NIBIO

The French dairy sheep show	24 – 25 April 2024	Réquista, France	CNBL, IDELE

Ojinegra sheep breed © OVIARAGON

For more information visit our website:

www.techcare-project.eu

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