PIGWEB

Newsletter
ISSUE 3 MARCH 2024

EAAP Session

The PIGWEB project organised a round-table discussion at the EAAP Conference in Lyon, focusing on the future of animal experimentation. The discussion involved early career scientists who are working towards reducing welfare and health problems in animals.

European citizen's perspectives

The survey aimed to improve transparency in the pork industry, address concerns related to animal welfare in pig farming and give PIGWEB partners an insight into people's attitudes toward pork consumption and animal welfare.

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EDITORIAL

JAAP VAN MILGEN *INRAE - Coordinator of the PIGWEB project*

Dear stakeholder,

We are very pleased to bring you the third PIGWEB newsletter with updates on what the project has achieved in the last year. As you may know, research infrastructure projects such as PIGWEB are based on three pillars: Transnational Access (TNA), Networking Activities (NA), and Joint Research Activities (JRA).

Transnational Access provides access to the infrastructures of PIGWEB partners to external users. We are now in the process of finalising the third and last call for projects. The TNA showed that there is a need to share the infrastructures we have and it proved to be successful in establishing partnerships between users and providers of research infrastructures. The first results of TNA projects have been presented at conferences and more results will be presented at the annual meeting of the EAAP in Florence, Italy.

The Networking Activities of PIGWEB cover a wide range of activities. One of these is to develop a map of infrastructures for pig research, to help researchers identify infrastructures that fit their needs. The map is accessible through https://map.pigweb.eu/. If your organization has a research infrastructure that third parties can use, please contact *pigwebmap@irta.cat* so that it can appear on the map.

Sound research depends on sound methods and a set of SOPs (standard operating procedures) and templates have been developed in PIGWEB to improve our research methods. Written procedures are essential to ensure that operations (e.g., measuring the body weight of an animal) are carried out the same way by different people in a research facility.

We now live in an era where Big Data is getting increasingly important. This is especially important in animal science, because of the societal demand to reduce the use of animals in research. This means that we have to ensure that data can be re-used by others (including by future generations of researchers). FAIR (Findable, Findable, Accessible, Interoperable, Reusable) data is an essential aspect to ensure that the "data" that we generate now will have "value" in the future. PIGWEB partners developed a guidebook (see later in this newsletter) that can guide you in making your data FAIR.

The European Commission indicated that communities play an important role in reducing the use of animals in research. This has been the case for the "cosmetics community", and should also be the case for our "animal and veterinary science community". Many (if not all) of us have been trained that if we have a research question, the answer is to be found in an animal experiment. Our community now publishes well over 10,000 scientific articles each year. Would it be possible that part of the answer we look for can be found in some of these articles? Should an animal experiment be the first response or the last resort? This puts a responsibility on us, not only on what we do now and how it can be re-used in the future but also on how we train future generations of scientists.

PIGWEB

EARLY CAREER SCIENTIST DISCUSSION

The PIGWEB project organised a round-table discussion at the EAAP Conference in Lyon, focusing on the future of animal experimentation. The discussion involved early career scientists who are working towards reducing welfare and health problems in animals.

Key points from the discussion include:

1 Alternatives to Invasive Sampling: The panel discussed the need for alternatives to invasive sampling techniques. They expressed hope that sensor technologies could reduce the need for invasive sampling. Examples of current alternatives include exhalomics and bolus samples.

2 In Vitro Methods: The panel acknowledged the challenges of using in vitro methods to study animal gut health. While these methods can help screen potential feed ingredients and additives, they cannot fully replicate the complex processes of digestion and microbiota interactions in live animals.

3 Balance Between Precision and Scale: The panel discussed the trade-off between precision and scale in gut health research. Animal experiments are more precise but also more expensive and time-consuming than in vitro methods.

4 Digital Twins: The panel discussed the potential of digital twins to reduce the need for animal experimentation. They acknowledged the limitations of digital twins but still saw value in their use for understanding gut health and developing new treatments and interventions.

5 Data and Sampling Protocols: The panel agreed on the need to standardise sampling protocols and emphasised the importance of open data and open science. They also highlighted the need for good data management.

6 Collaboration and Training: The panel stressed the importance of collaboration between researchers from different fields and the need for more training in modelling for researchers working on alternatives to animal experimentation.

7 Future-Proof Animal Facility: The panel discussed the components of a future-proof animal facility, including the ability to measure as much as possible about the animals and the possibility of making the facility publicly accessible.

8 Public Communication: The panel discussed the challenges of communicating about animal production research with the general public. They suggested training researchers on how to communicate in an accessible and engaging way and noted the importance of transparency.

In conclusion, the panelists expressed optimism for the future of gut health research and emphasised the importance of open science, collaboration, and the exploration of new tools, methods, and alternatives to animal research.
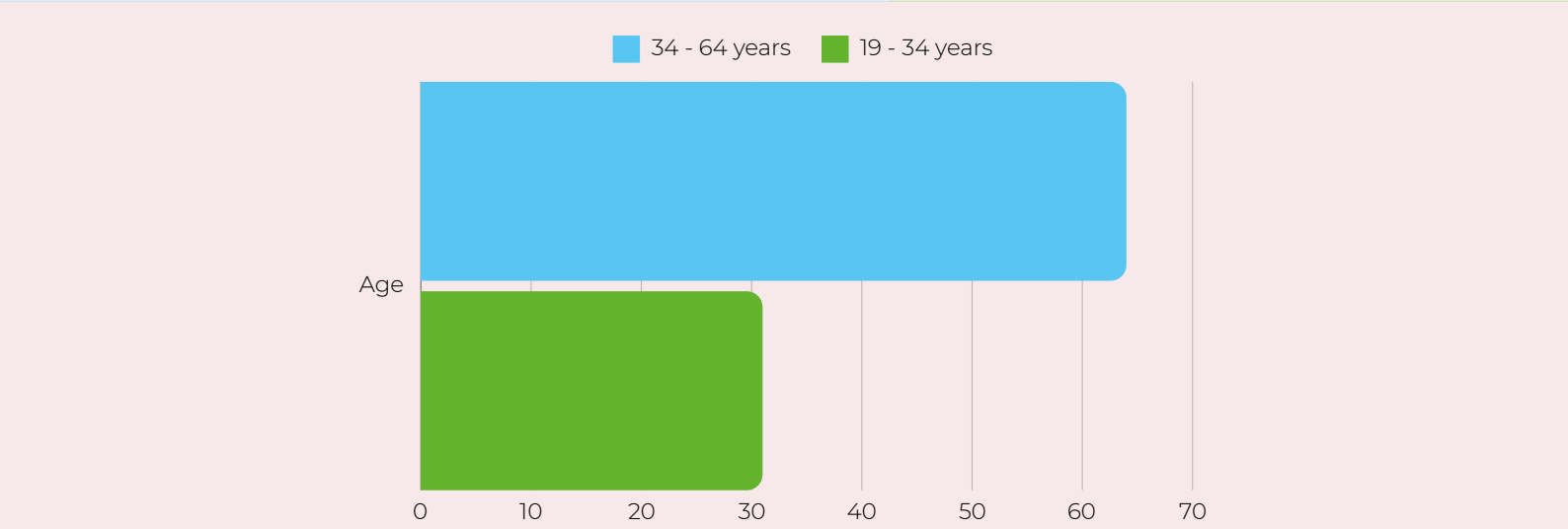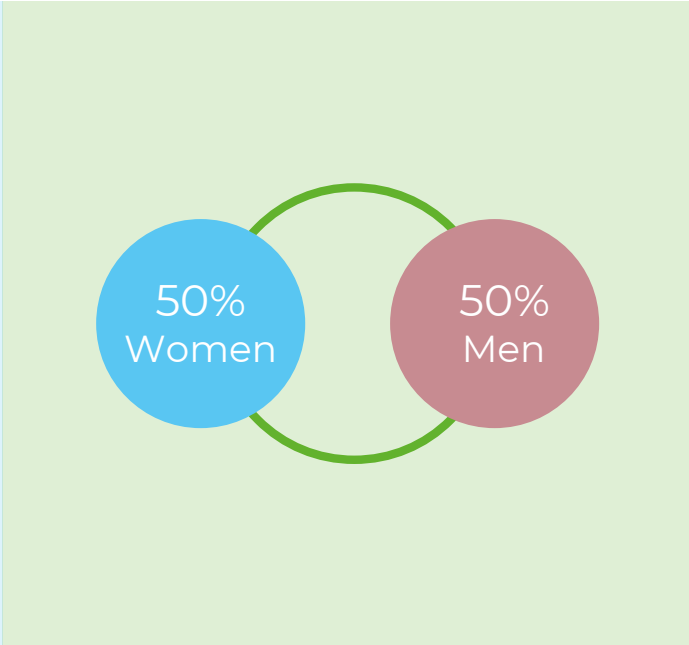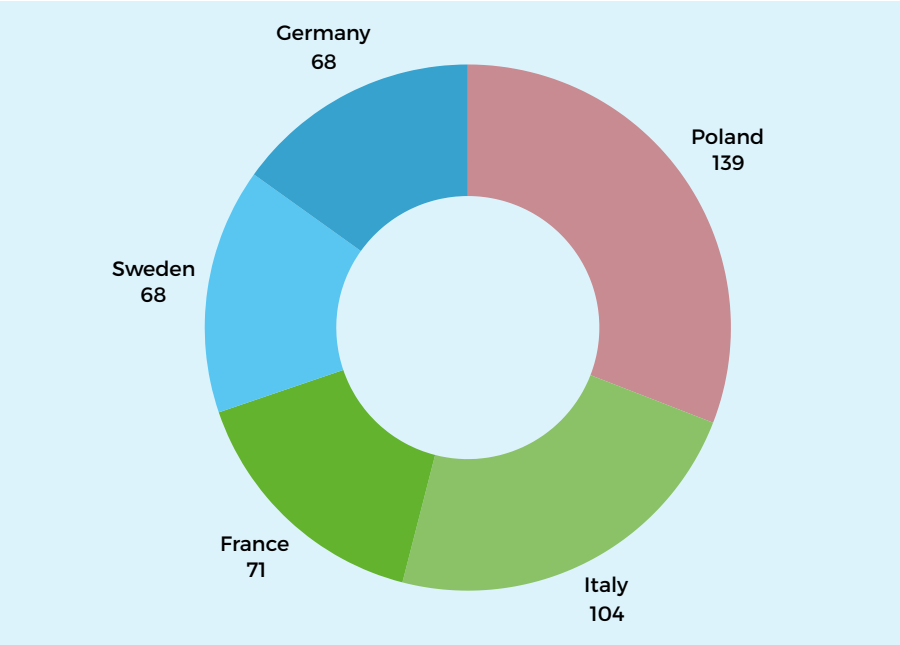
***Watch the testimony video
on our YouTube channel here.***

An online citizen survey with participation from different European countries was carried out by ESCI (D4.7) using external partners (SAGO). The survey was divided into three sections. Participants were asked about their attitudes towards meat consumption in the first part, their understanding of pig farming methods in the second and attitudes towards pig production research, animal welfare and slaughter methods in the third.

The survey aimed to improve transparency in the pork industry, address concerns related to animal welfare in pig farming, and give PIGWEB partners an insight into people's attitudes toward pork consumption and animal welfare.

The survey was translated with the support of EFFAB into five languages according to the respondents' countries and distributed by SAGO via the LimeSurvey platform on August 1st, 2023. The survey collected data from **450 EU citizens:**

Germany 68
Poland 139
Sweden 68
France 71
Italy 104

50% Women
50% Men

34 - 64 years
19 - 34 years

Age

MAIN RESULTS:

Most respondents consume meat. The data suggests variations in meat consumption patterns across these European countries.

MEAT CONSUMPTION

95%
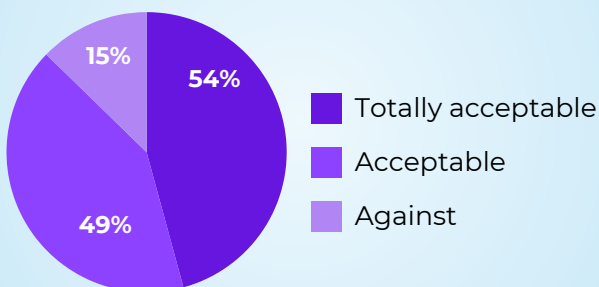of respondents eat meat

89% Women — **93% Men**
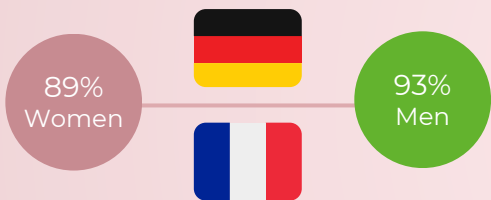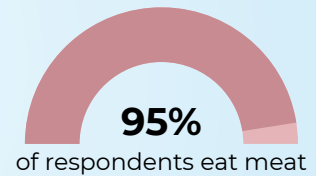
Germany and France have a bit lower percentages of meat consumption compared to the other countries (98%) and relatively low percentages for pork consumption.

On the other hand, Italy, Sweden, and Poland show comparable high rates of pork consumption. These differences may reflect cultural, dietary, regional preferences or a more critical society related to meat consumption in these countries and may require further investigation.

- Poland 91%
- Italy 91%
- France 75%
- Germany 75%
- Sweden 91%

(bar chart axis: 0, 20, 40, 60, 80, 100)
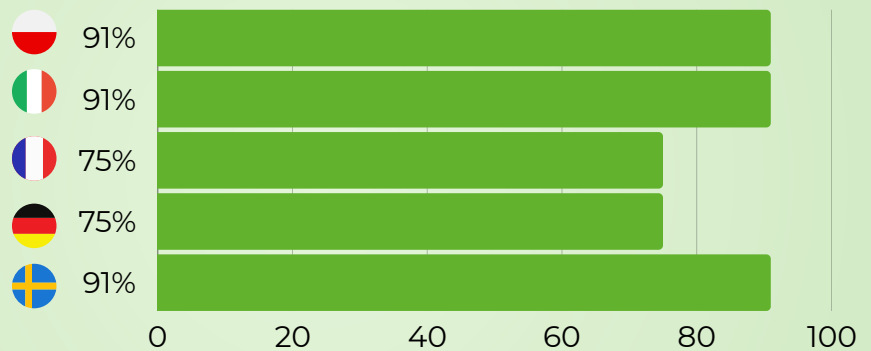
Especially interesting for the Pig research community are the results regarding the management practices and the acceptance of the different research purposes and methods. The practices for raising pigs deliver a clear picture what the majority of the customers accept and what is unacceptable for them:

DIVERSE AND ROBUST BREEDS:

- 54% Totally acceptable
- 49% Acceptable
- 15% Against

NOT ACCEPTED

Using concrete floors: **55%**

Castration: **32%**

Faster fattening breeds: **50%**
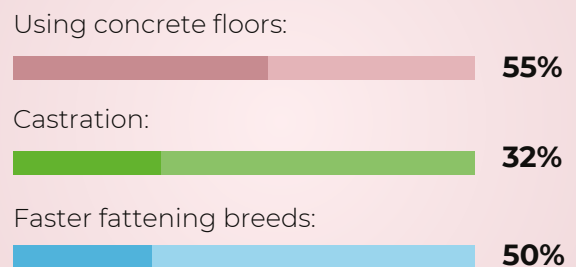
Using a variety and more robust breeds are accepted/ totally accepted by nearly half of the people (49% and 54%) even if it results in higher costs, only below 15% speak against.
Not accepted are livestock farming methods for more efficiency like using concrete floors with no chance to dig or root, castration and faster fattening breeds resulting in lower meat quality.

A similar picture delivers the questionnaire about research purposes and methods. *More accepted* are purposes that aim for higher **welfare (80%)** of the pigs and improve **health (82%)**, **environmental impact (63%),** and **quality (74%)** of the meat. *Less accepted* is research to **lower the costs (50%)** of the breeding.

These results mirror also the methods of research. *Moderately accepted* are **modeling (49%)** and **non-invasive methods (50%)**, *Hardly acceptable* for the customers are methods resulting in **discomfort (19%)** or even **pain (7%) for the pigs.**

HOW DO YOU RATE THE FOLLOWING PRACTICES?
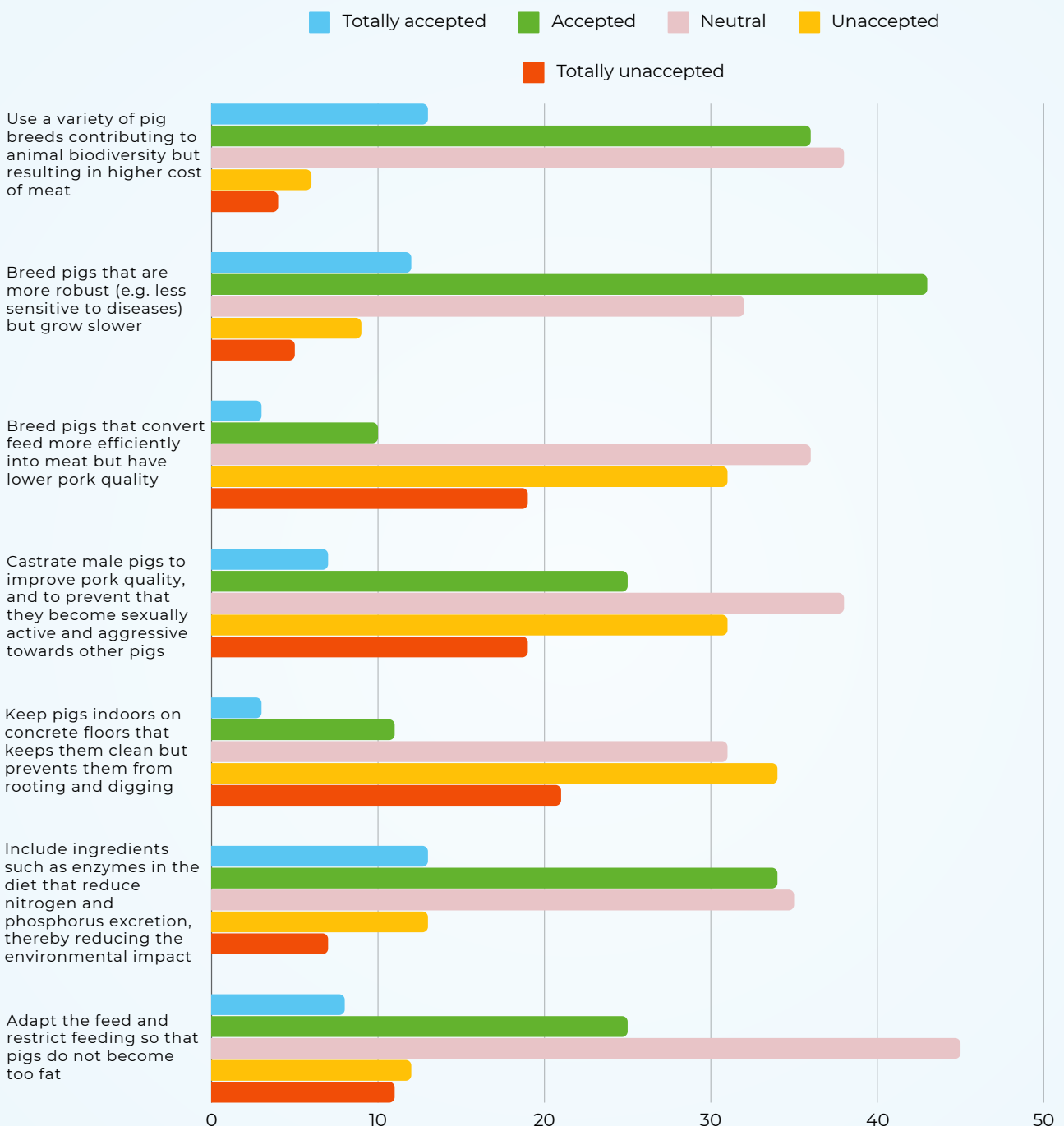
Overall, the data indicates a strong concern for the welfare and well-being of pigs, with experiments causing pain or distress being widely rejected. However, there is more acceptance for experiments that aim to improve pig welfare and health, as well as those that contribute to the safety and quality of pig meat. The data also reflects varying degrees of acceptance for experiments with non-invasive methods and those aimed at reducing pig production's environmental impact and costs. Public opinion on these matters is diverse, with a significant portion of respondents falling into the *Neutral* category for specific scenarios.

In summary, research practices in pig farming should prioritize ethics, transparency, environmental sustainability, and consumer education. Collaborative efforts and adaptability are crucial to addressing the diverse opinions and values associated with pig farming practices while ensuring pigs' well-being and the industry's sustainability.

WHAT (IF ANY) TYPES OF EXPERIMENTAL METHODS WOULD BE ACCEPTABLE TO YOU?

THE PIGWEB JUNIOR COMMUNITY
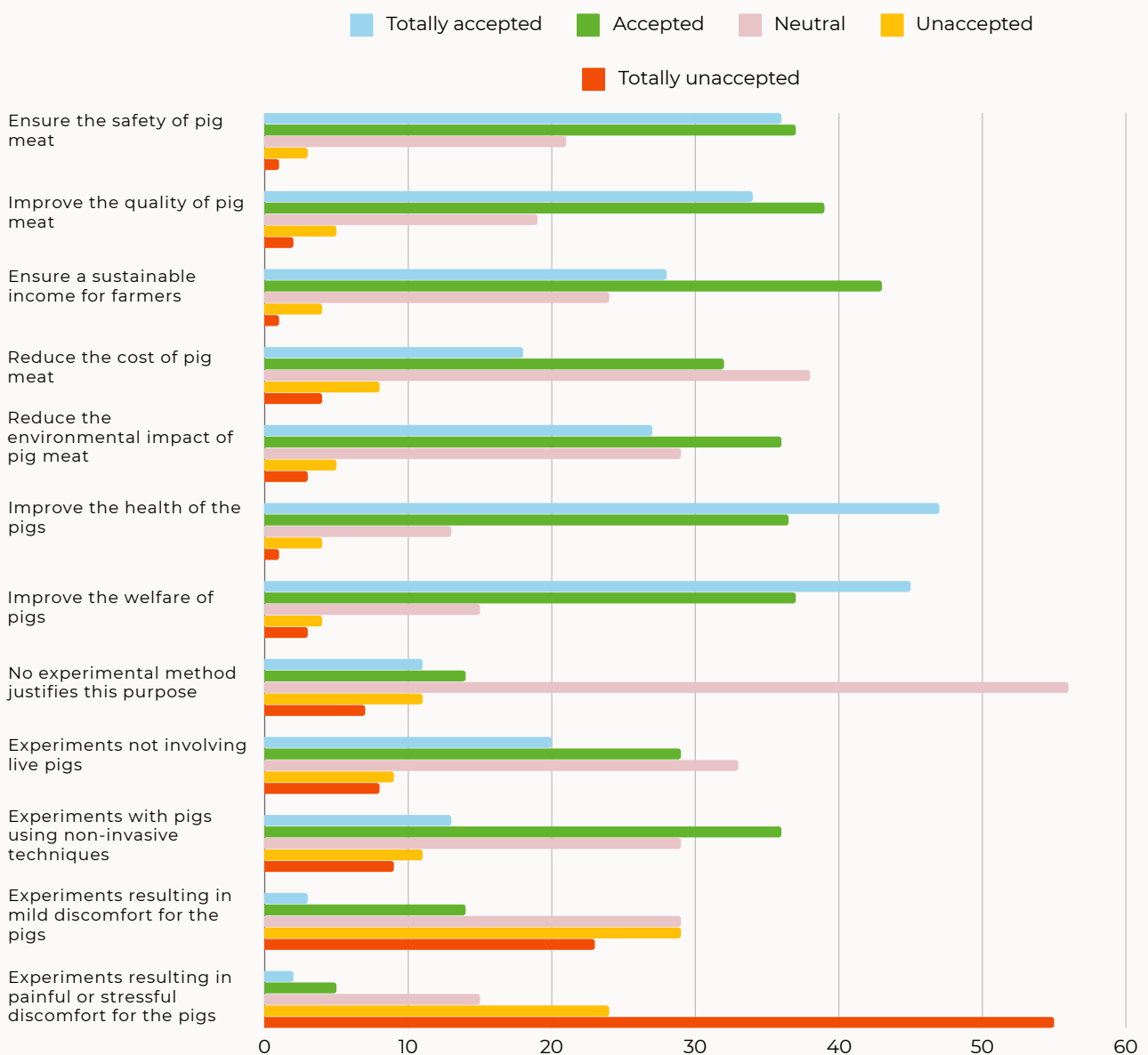
Hey there, young graduates!

Are you ready to embark on an exciting journey in the world of pig research? If so, we've got some thrilling news for you!

The PIGWEB Junior Community is not just a network; it's a family of post-docs, PhD students, and early career scientists working on various aspects of pig production. It's a platform that's run by the new generation of scientists for the new generation of scientists.

Why Should You Join?

- **Collaborate:** The PIGWEB Jr. Community is about strengthening the pig research network and fostering a culture of cooperation.
- **Learn:** The community is a treasure trove of knowledge. You'll have the opportunity to learn from experienced researchers and industry professionals.
- **Network:** The community is a great place to meet like-minded individuals. You might meet your future collaborator here!

MEET OUR BOARD!

Our community is home to some incredibly talented individuals:

CLÉMENCE ORSINI

A PhD Candidate at Wageningen University, The Netherlands, who is focusing on modeling social behaviours in pigs using automated data.

YARSMIN YUNUS ZEEBONE

A Research Associate at the Animal Science Department of the Kwame Nkrumah University of Science and Technology (KNUST) in Ghana.

INÉS GARCÍA VIÑADO

A PhD Candidate at Agroscope Posieux, Switzerland, who is currently in her 3rd year of PhD in Agroscope- Posieux (Switzerland).
She is ESR2 in the MonoGutHealth project.

FRANCIS AMANN EUGENIO

A researcher at Adisseo, France, who is currently working as an amino acid metabolism scientist. He was involved in the PIGWEB project as a postdoc of the PigVampire project.

Join Us!
So, are you ready to leap? Join the PIGWEB Junior Community today and start your journey towards becoming a part of the new generation of scientists! Remember, the future of pig research is in your hands. Let's shape it together!

Check for more information here.

PIGWEB & HoloRuminant
Skill Developtment
1st Webinar

We are happy to share the success of our recent collaboration with the Holoruminant project for a joint webinar initiative.

The webinar, which kicked off at the beginning of February, was a great opportunity for skill development within our junior community.

Featuring **Kevin Jerez-Bogota**, a PhD candidate at the Department of Food Science & the Department of Animal and Veterinary Sciences at Aarhus University, Denmark. The first version of the webinar delved into **"The Strategic Application of Data Science Principles in Animal Science Research."** Kevin, representing the HoloRuminant project, provided interesting insights into how data science principles are transforming animal science research.

From exploring real-world applications to discussing precision insights and ethical considerations, Kevin's presentation offered a deep dive into the principles driving advancements in animal science. The webinar had a fair number of participants, and we expect to have more attendees in future versions.

Building on that goal, we are excited to announce the upcoming second episode of our Skill Development Series. In this session, we aim to promote and encourage **"The practice of fair data principles within the young community"**. We are honored to have **Hendrick Boogaard** from Wageningen University join us as a guest speaker to share his expertise on this important topic. Stay tuned for more news about this webinar series and join us in our journey towards greater knowledge sharing and innovation!

You can watch the full webinar session on our YouTube channel here.

SCIENTIFIC UPDATES

WP1

EXPANDING THE PIGWEB MAP:
JOIN OUR GROWING EUROPEAN PIG RESEARCH COMMUNITY

In the previous edition of our newsletter, we highlighted the significant strides made by the WP1 team towards establishing a robust community of Research Infrastructures (RI) for the pig industry in Europe and developing the interactive map showcasing the location of European RIs participating in the initiative.

As we continue to evolve and expand, all PIGWEB partners are currently visible on the map. In the coming year, we aim to include all pig research infrastructures that wish to be part of this initiative. To facilitate this, we have created a simple questionnaire to gather the necessary information.

Currently, **we have 51 Research Infrastructures (RIs)** on the map. Participating in the PIGWEB Map will provide you with exposure to a broad audience of potential clients and strengthen connections within the pig research community. If your infrastructure is not there yet and you want to be part of it, write to us at *pigwebmap@irta.cat* and join us! We look forward to growing our community and supporting the pig sector in Europe.

Do you want to know which pig Research Infrastructures exist in Europe?
PIGWEB project aims to build a long-lasting European Pig Research Community, and following this point of view, a PIGWEB Map is created where you can find different research facilities around Europe.

WP2

SOPs: A Step Towards Harmonizing European Pig Research Infrastructures

We are delighted to share that we have reached a significant milestone in our commitment to fostering a harmonious and efficient environment across all European pig research infrastructures. Our Standard Operating Procedures (SOPs) and protocols for documentation of basic management and recordings of standard traits have been developed and translated into seven languages and are available ***here.***

Understanding the unique needs and circumstances of each facility, we have designed our SOPs not only as protocols but also as a flexible template. This approach empowers each facility to tailor the SOPs to their specific requirements, thereby promoting the development of personalised and efficient procedures.

We are proud to announce that these SOPs have already been transformed into a Practice Abstract, aimed at inspiring and guiding facility staff in crafting their own SOPs:

- Standard Operating Procedures (SOPs)
- SOP Template
- Practice Abstract

We eagerly anticipate seeing how these resources will be leveraged to enhance operations across all facilities.

WP3
FAIR data guidelines for pig research

Data Science is at the heart of a lot of pig research activities.

To overcome the reluctance for data sharing identified in the pig researchers community, we elaborated a FAIR (Findable, Accessible, Interoperable, Reusable) data-dedicated guidebook. The objective is to maximize the use of all data obtained from animal experiments and to consider the guiding principles of open science and open data. To accomplish this, we need to ensure that relevant data is accessible, shared, and easy to find as well (re)use.

These guidelines introduce FAIR principles, and important aspects of data management and curation that are relevant for efficient data sharing and reuse. The aim is to provide knowledge and introduce good practices and tools that can aid in the wider community's adoption of FAIR data practices. Moreover, it attempts to lower some of the current barriers to data sharing and reuse by discussing some currently observed misunderstandings and interpretations as well as clarifying some often fewer known opportunities and incentives.

The guidebook introduce the FAIR principles, explaining the motivation behind the current FAIR data movement, what FAIR means and how it relates to the broader process of working with data. The various steps of data curation, data handling from data collection to data publication and reuse are presented. Some key aspects in this process are discussed in more detail, specifically how data can be harmonized by using common standards, formats semantics etc., and how data can (should) be published so it can be easily reused. A separate section focuses on data management plans.

A data management plan, describing how you will handle data in your project, is becoming a mandatory deliverable of more and more research projects. Finally, the guidebook introduces several use cases from the pig research domain to illustrate how different FAIR data and data management aspects are practically applied in current research. An online version of the guidelines is available ***here***.

Greetings, PigWeb enthusiasts!

As we gear up for our Annual Meeting, let's take a moment to reflect on the exciting journey of Work Package 4 (WP4) over the past year and look forward to the thrilling ventures that lie ahead.

Holoruminant x PIGWEB Joint Community Skills Development Series Webinar:

In a significant collaboration, we joined forces with Holoruminant for a skill development webinar. The first session in February was a hit, and we're excited about the future sessions. Keep your eyes open for the next one!

Half-Day Event in Torre Marimón, Spain (March 23, 2023):

This event was a milestone, showcasing the first results of PIGWEB's JRA activities and fostering interaction with local stakeholders. It was a day of learning and collaboration.

Workshop at the Annual EAAP 2023 Meeting:

This workshop took place in Lyon, France and it was a platform for early-career scientists to discuss the future of animal experimentation. The round-table discussion was a melting pot of ideas and perspectives.

Participation in the International Symposium on Animal Sciences 2023:

PIGWEB extended its outreach to Eastern Europe through this event in Novi Sad Serbia, furthering our mission of global collaboration in animal research.

Outreach Communications Capacity Development:

Mark your calendars for Monday 15th of April (14:30h - 17:30h) for this in-person session at the start of the Annual Meeting in Dummerstorf, Rostock, Germany. This session is designed to boost the confidence and competence of the PigWeb team in advocating for our project and its objectives. It's an opportunity to refine your communication skills, share experiences, and support colleagues in their outreach efforts.

These events underscored the importance of open science and collaboration and served as platforms to explore new methods and technologies in animal research.
As we move forward, we invite you to join us in our quest for knowledge and innovation.

See you at the Annual Meeting!

WP6
DECODING NUTRIENT EFFICIENCY:
AN IN-DEPTH STUDY OF PIG BODY COMPOSITION

In Work Package 6, Task 6.4, a comprehensive pig fattening experiment was carried out at Agroscope in Posieux. This experiment was supported by IRTA, Medicopus, FBN, and INRAE. The primary objective was to calibrate and validate non-invasive techniques for determining body composition. These techniques included Computed Tomography (CT), Dual-Energy X-ray Absorptiometry (DXA), and Nuclear Magnetic Resonance Imaging (NMRI). These were compared with invasive reference methods such as dissection and chemical analyses.

To achieve variation in body composition and bone mineralization, the pigs underwent four different dietary treatments. These treatments varied in their nitrogen and phosphorus content. In accordance with the 3R principles*, the data was collected in a manner that facilitated scientific analysis of the relationship between diet, body composition, nutrient efficiency, and meat quality. Consequently, data on feed and nutrient intake (specifically nitrogen and phosphorus), nutrient balance data, and meat quality parameters were collected from the same 48 pigs. Blood and urine samples were also collected.

The body composition data from DXA, NMRI, and CT images have been completed, along with the chemical analysis of fat moisture, protein, and ash in the carcasses. NIR spectra and physiological parameters in blood have also been recorded. Additionally, CT data from previous experiments at IRTA and FBN, as well as DXA data from Agroscope, have been included in the database. Based on these data, equations to predict body composition will be derived. Furthermore, the full data set will be published along with a data paper in a scientific journal.

We're excited to share the latest insights from our project that leverages historical data from our partners to shed new light on pig growth and health. By reevaluating growth performance trial data, we've been able to gather a comprehensive collection of existing methods and proxies that offer a deeper understanding of pig growth performance, nutrient efficiency, and overall health.

Our goal was to put these proxies to the test, aiming to create new model algorithms that could provide clearer connections between these proxies and key aspects of pig growth and health. But we didn't stop there; we also explored how these growth performance traits might influence each other, and how we can better identify and understand the trade-offs involved.

Here's a quick look at the innovative approaches we've taken:

● **Piglet Survival Insights by FBN:** Focusing on the crucial early stages of life, FBN has developed a model that uses birth weight and its variability to predict piglet survival. This model offers valuable insights into how early factors can impact piglets' chances of thriving.

● **Feeding Behavior Analysis with MATE:** Working with data from Agroscope and IRTA, MATE has delved into how different feeding behaviors can act as proxies for performance traits. This research helps us understand the intricate relationship between how pigs eat and their overall growth performance.

● **Fattening Efficiency Predictions by IRTA:** Utilizing their own dataset, IRTA has created a model that could be used to predict the final fattening efficiency from early growth and feeding behavior. This innovative approach highlights the importance of early indicators in determining long-term growth efficiency.

Our collaboration and these approaches have opened up new possibilities for enhancing pig welfare and performance. We're excited about the potential these findings have to improve decision-making in pig growth management. Stay with us for more updates as we continue to explore and innovate for a better understanding of pig growth and health.

REBECKA WESTIN
WP2

Rebecka is a veterinarian, senior researcher and lecturer at the Swedish University of Agricultural Sciences at the Department of Applied Animal Science and Welfare. She is also working part-time as a herd health veterinarian on pig farms within the company Gård & Djurhälsan (Farm and Animal Health Service). Rebecka received her PhD in Veterinary Medicine in 2014. After her doctoral studies she was a post-doc at the University of British Columbia in Canada in 2015. In 2016 she became a Diplomate of the European College of Animal Welfare and Behavioural Medicine, Sub-Specialty Animal Welfare Science, Ethics and Law.

Her research is mainly focusing on animal housing and its effects on health, behavior and welfare, primarily in pigs. Currently, she is involved in a large study identifying individual differences in nest-building behavior among sows and its effect on piglet survival (SowNest), as well as in a study on improving the design of "pig sorting systems" for slaughter pigs in large groups (PigNovations). In PIGWEB, Rebecka leads Work Package 2 which deals with the development of standard operating procedures, guidelines and animal ethics in pig research.

GEENA CARTICK
WP4

Geena earned her Master of Science degree in European Master in Animal Breeding and Genetics from the University of Natural Resources and Life Sciences, Vienna (BOKU). She also holds a BSc(Hons) in Agricultural Science and Technology from the University of Mauritius.

Since June 2022, she has used her expertise at EFFAB as a Breeding and Genetics Advisor. In this role, her notable contributions include finalizing the 7th edition of the **Code of Good Practices (Code EFABAR)**, including one for Pig Breeding. Additionally, she assists the EU research projects team in ensuring effective knowledge exchange and transfer. She gained practical experience during her internship at GENOSTAR Rinderbesamung GmbH, where she conducted her master's thesis research on phenotypic and genomic sperm analysis in young Fleckvieh bulls used in Artificial Insemination Stations in Austria.

Further improving her skills, she worked as a bio-production assistant at LIVINfarm Vienna, focusing on insect breeding. Geena also spent eight years at Avipro Co Ltd (Eclosia Group Mauritius), undertaking roles such as Broiler Operations Officer and Breeding Operations Intern. Geena is committed to ethical and sustainable practices in animal breeding. Currently, Geena is leading Work Package 4 on dissemination, training and technology transfer in the PigWeb project.

CORNELIA C. METGES
WP6

Cornelia graduated as an animal scientist from the Technical University of Munich, Germany, in 1983 and obtained a doctorate in agriculture (Dr. agr.) from the University's Institute of General Chemistry and Biochemistry. She received her habilitation degree (Dr. habil.) in Nutritional Physiology from the University of Potsdam, Germany, and holds an adjunct professorship in ‚Biochemistry of Nutrition' at the University of Rostock, Germany, where she teaches. She was the head of a working group ‚Protein Metabolism' at the German Research Institute for Human Nutrition (DIfE) in Potsdam, Germany, and a visiting scientist at the Massachusetts Institute of Technology, Clinical Research Center and Laboratory of Human Nutrition, USA, 1995-1997 and 2013 at Department Animal & Avian Sciences, University of Maryland, USA. Cornelia works at the Research Institute for Farm Animal Biology (FBN) in Dummerstorf, Germany, since 2001, first as the head of the Institute for ‚Nutritional Physiology' and now as the leader of the focus topic ‚Managing critical phases in the life of livestock'. She took part in several EU projects and coordinated research at the national level. Her research interests are pig nutrition and metabolism during early life and less invasive research methods in pigs. In PIGWEB she leads the WP6 which deals with novel and refined methods to measure behaviour, health, and body composition.

PUBLICATIONS

"Testing minimally invasive blood collection techniques in pigs used for research"
Eugenio FA, Gondret F, Oster F, and Ollagnier C
Book of abstracts of the 74th Annual Meeting of the European Federation of Animal Science (EAAP).

"What are our future needs for research infrastructures to study energy, protein metabolism?"
van Milgen, J., Domingo, P., Reverté, C., Millet, S.
Animal - science proceedings.

"Review: Methods and biomarkers to investigate intestinal function and health in pigs"
Q.L. Sciascia, C.C. Metges
Animal - The international journal of animal biosciences.

"Parámetros productivos y calidad sensorial de cerdos inmunocastrados tempranos y tardíos"
Font-i-Furnols, M., Savić, R., Bozickovic, I., Brun, A., Gispert, M., Panella-Riera, N., Radojković, D., Lizardo, R., Soler, J.
XX Jornadas de Producción Animal AIDA-ITEA, Zaragoza, 13-14 junio 2023, pag. 62.

"Development of protocols for standard management and recording in pig research facilities"
Wallenbeck A., Girard M., Johansen M., Düpjan S., Aluwe M., De Cuyper C., Labussière E., Font-I-Furnols M., Heetkamp M., Westin R
Book of abstracts of the 74th Annual Meeting of the European Federation of Animal Science (EAAP).

"Changes in salivary oxytocin in response to biologically-relevant events in farm animals: Method optimization and usefulness as a biomarker"
Moscovice, L. R., Sobczak, B., Niittynen, T., Koski, S. & Gimsa, U
Frontiers in Physiology Special Issue: Methods and Applications in Integrative Physiology, 2023.

"La réponse à la supplémentation en L-leucine pendant la phase de post-sevrage diffère selon le poids de naissance des porcelets"
Millet, S., De Cuyper, C., Kowalski, E., Lambert, W., Simongiovanni, A. & Chalvon-Demersay, T.
56èmes Journées de la Recherche Porcine

UPCOMING EVENTS

**PIGWEBINAR: TIPS AND TRIX FOR SOP DEVELOPMENT
APRIL 3RD - ONLINE**

**ANNUAL GENERAL MEETING
15TH - 17TH APRIL 2024, DUMMERSTORF GERMANY**

**9TH INTERNATIONAL CONFERENCE OF THE WELFARE OF ANIMALS AT FARM LEVEL (WAFL)
AUGUST 30TH AND 31ST, 2024 - FLORENCE, ITALY**

EAAP 2024 - SEPTEMBER 15TH 2024, FLORENCE ITALY

ESOF 2024

BSAS 2024

for more information about the PIGWEB project, visit our website:

www.pigweb.eu

You can also follow us on our social media accounts:

and subscribe to our mailing list!

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