PPILOW, a European project dedicated to welfare in Poultry and PIg Low-input outdoor and Organic production systems - Newsletter - Issue 7

Anne Collin, Raffaella Ponzio, Martina Re, Saskia Kliphuis, Cesare Castellini, Vasile Cozma, Daniela Werner, Craig Chibanda, Emy Ridderbos, Zsolt Boros, et al.

PPILOW

Poultry and Pig Low-input and Organic production systems' Welfare

PPILOW, a European project dedicated to Welfare in Poultry and Pig Low-input outdoor and Organic production systems (2019-2024)

Newsletter - Issue 7

July 2023

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Summary

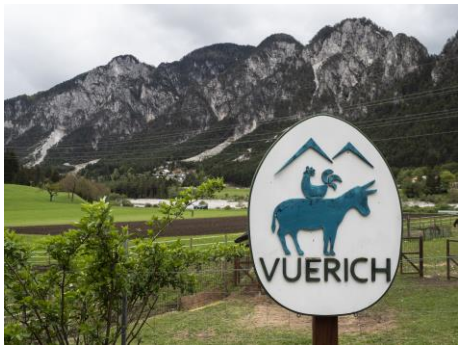
Editorial - *by Anne Collin (INRAE)*

Welcome back into the PPILOW community! In this 7th Newsletter, you will find information about our latest advances in the project, among which the launch of a platform for interacting with experts and stakeholders on Pig and Poultry Welfare, news from the multiactor approach of the project, recent meetings organized by PPILOW with practitioners in Italy on poultry welfare and human well-being, on dual purpose poultry breeds in The Netherlands, three recent PPILOW publications, and the extension of our PPILOW community welcoming four new collaborators. PPILOW partners will be happy to meet you at the coming national and international scientific, public or technical event!

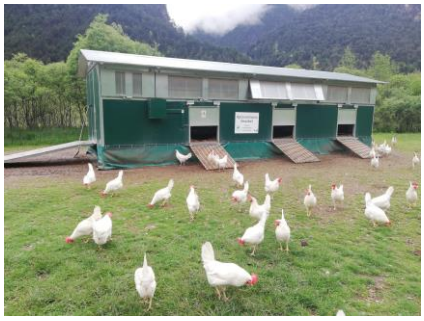
Web platform for interacting with PPILOW European Multiactor Board - *by Anne Collin (INRAE)*

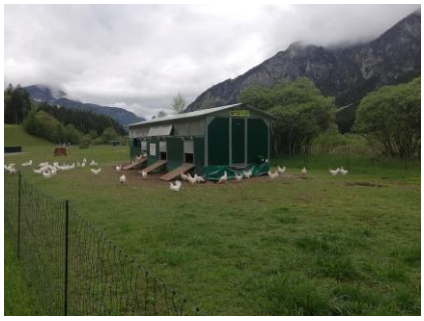
About 15 members of the PPILOW consortium including work package leaders, task leaders and members of the PPILOW partnership attended a videoconference meeting on the 5th of June where the PPILOW consortium presented its latest progress to its European Multiactor Board (EMB) gathering stakeholders and members of the pig and poultry value chains. This instance following the advance of the project was represented by Monique Bestman from the Louis Bolk Institute in The Netherlands, and by Alain Boissy and Agnès Tiret (INRAE, France) from the French National Reference Centre for Animal Welfare (FRCAW). After a reminder of the project objectives and structure, and the presentation of recent PPILOW results, a very rich discussion was engaged. Questions were raised, among others, about the project multiactor approach and the potential interest of a reflexive methodology to evaluate it, and about the assessment of the farmer well-being according to the One Welfare Concept (Garcia Pinillos et al., 2016). The potential interest and need for further research on the dual-purpose breeds aiming at avoiding the elimination of layer male chicks was also debated, with a particular interest for the valorisation of the male and females reared. The usefulness for practitioners, policy makers and labelling entities of welfare assessment tools was discussed, replacing the PIGLOW© and EBENE© apps, respectively built-up and extended within the framework of PPILOW, as tools helping farmers in their dynamics towards welfare improvement on farm through welfare self-assessment and benchmarking. The second part of the meeting was dedicated to the launch of a PPILOW platform, designed in the short term to stimulate discussions between PPILOW partners and the EMB members, and in a longer term to be opened upon registration to other experts and public for a larger discussion. The potential usefulness of such platform after the end of the PPILOW project for a large scientific community was also evoked.

Italian PPILOW partners: meeting on animal welfare! – *by Raffaella Ponzio (Slow Food)*



A farm where the welfare of the animals and the humans rearing them is guaranteed, where the environment is healthy and the ecosystem is in balance is possible. Veterinarians, zootechnicians and breeders of laying hens in extensive farming spoke about this last month at a meeting organised by Veterinarians Without Borders VSF - Italy, Slow Food Foundation for Biodiversity and the University of Perugia. Thus was born in Malborghetto the network of Slow Food poultry farmers, committed to raising their animals with respect and in a One Welfare perspective. In the coming months they will work on a manifesto. We will meet them again at Cheese 2023, from 15 to 18 September in Bra. [You can read more here]!





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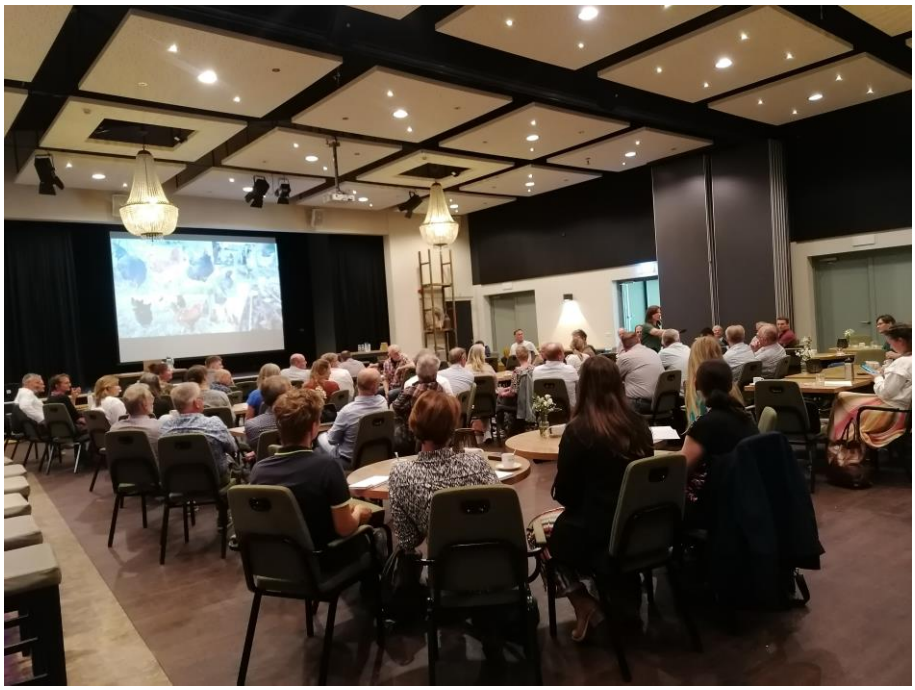
Progress and updates of the PPILOW National Practitioners Groups (NPG) – *by Martina Re (AIAB)*

During this period of the PPILOW project, the work package facilitating the project multiactor approach has strengthen the relationship with the NPG facilitators through individual meetings. The meetings had the purpose to understand the state of the art of each NPG, including improvements, experiments implementation and obstacles met during the last months. The NPG facilitators are currently working on change management and on-farm set-up of PPILOW innovations with a specific attention to the development of the on-farm experiments previously tested by PPILOW partners. On farm trials tested so far consist of innovative farrowing huts for sows, dual purpose chicken breeds and the use of plant extracts for supporting the animals immune systems against pathogens and parasites.

Multi-actor symposium on dual-purpose chickens – *by Saskia Kliphuis (UU)*



Symposium on the future of dual-purpose chickens © UU

On June 1st 2023, UU-members of the PPILOW consortium co-organized a symposium on the future prospects of dual-purpose chickens in the Netherlands, together with Bionext and Fair Poultry. Among the 60 attendees were poultry farmers, policy makers, veterinarians, feed suppliers, and researchers. Bas Rodenburg presented results from the PPILOW project, regarding the egg characteristics of dual-purpose genotypes (WP 5) and the perception of European consumers on the low-input and organic poultry production (WP 1). In addition, Fair Poultry presented the results of the dual-purpose study group, which is part of the Dutch NPG, revealing production and health parameters of several small-scale dual-purpose flocks kept in mobile houses throughout the Netherlands. Lastly, Bionext reflected on the past and current situation on the Dutch poultry market, and opportunities for the dual-purpose chicken in the future. From the many interactive discussions with the audience, the majority of attendees was positive about the dual-purpose chicken as part of the poultry sector, mostly because of its robustness. Furthermore, the dual-purpose concept was expected to increase dramatically in viability when waste streams from human food production can be utilized to produce feed for the birds, both from an environmental and economic perspective.

PPILOW scientific publications

1: Intake of nutrients (polyunsaturated fatty acid, tocols, and carotenes) and storage efficiency in different slow-growing chicken genotypes reared in extensive systems - *by Cesare Castellini (UNIPG)*

Extensive rearing system (ERS) of poultry requires an outdoor run, which involves the foraging activity of chickens. Indeed, pasture is an essential aspect of ERS although it is clear that grass intake does not ensure sufficient energy and protein for bird growth. Many factors modulate the foraging activity of chickens: Slow-growing (SG) strains have a higher scavenger activity than fast-growing (FG) and generally they have higher level of bioactive compounds in the meat. The aim of the paper was to assess the storage efficiency of n-3 and n-6 polyunsaturated fatty acids (PUFA), tocols (all the vitamin E isoforms) and carotenes in the meat of seven commercial SG genotypes having different daily weight gains and walking activity. Chickens were reared in pens with indoor and outdoor areas and feed and grass intake was estimated. At 81 days of age, the breast, thigh and drumstick meat from 30 carcasses/genotype were analyzed. Nutrients (e.g., n-3, n-6, carotenes and tocols) of feed, grass and meat were analyzed and the storage efficiency was estimated as the ratio between the amount present in the muscles and the dietary intake (feed and grass). The genotype affected foraging behavior of chicken and the intake of nutrients. The intake of n-3 in genotypes with higher walking activity came mainly from grass (more than 50%), whereas in the other genotypes, less than 20%. Accordingly, chickens that foraged more showed better nutritional profiles of meat (less fat, more n-3 and antioxidants), which could be ascribed to grass ingestion. However, the storage efficiency of nutrients into meat was inversely correlated with the grass intake: strains with higher grass intake had lower storage rate. The result suggest that foraging is relevant for nutrient intake because it provides a high share of nutrients, i.e., carotenes, tocols and n-3 PUFA, which are often scarce in standard poultry feed. Accordingly, the more foraging chicken genotypes had better meat nutritional profiles (less fat, more n-3 PUFA and LC-PUFA content) than not-foraging ones, due to the intake of grass which is a free source of nutrients in ERS. However, the foraging behavior was negatively associated with the ability to store nutrients in body meat. Genetic selection should be used to favor chickens with a good balance between foraging and recovery rates of nutrients, given that more active animals have lower storage efficiencies.

Intake of nutrients (polyunsaturated fatty acids, tocols, and carotenes) and storage efficiency in different slow-growing chickens genotypes reared in extensive systems. Mattioli, S., Mancinelli, A. C., Dal Bosco, A., Ciarelli, C., Amato, M. G., Angelucci, E., Chiattelli, D., Castellini, C. (2022). *Plos one*, *17*(11), 2022. https://doi.org/10.1371/journal.pone.0275527

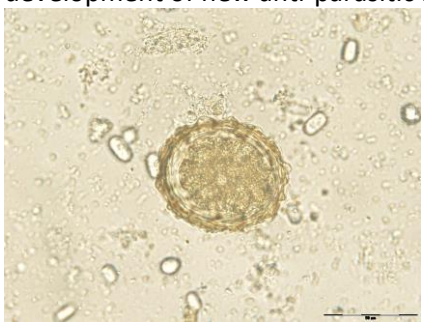
2: Early-life interventions to prevent feather pecking and reduce fearfulness in laying hens - *by Saskia Kliphuis (UU)*

Severe feather pecking is a major welfare issue in laying hens. Possible underlying causes are fearfulness and lack of foraging opportunities. Because early life is a crucial stage in behavioral development, adapting the incubation and rearing environment to the birds' needs may reduce fearfulness and prevent the development of feather pecking. In a 2*2 factorial design study, we investigated whether a green light-dark cycle throughout incubation, which resembles natural incubation circumstances more than the standard dark incubation, and foraging enrichment with live larvae during rearing reduce fearfulness and feather pecking and increase foraging behavior of laying hen pullets from an early age onwards. A slight increase in the number of foraging bouts was only seen with larvae provisioning. Neither lighted incubation nor larvae provisioning affected fearfulness, feather pecking, plumage condition or recovery time after vaccination. In conclusion, the present study showed no effects of light during incubation and minor effects of foraging enrichment during rearing on the behavior of laying hen pullets.

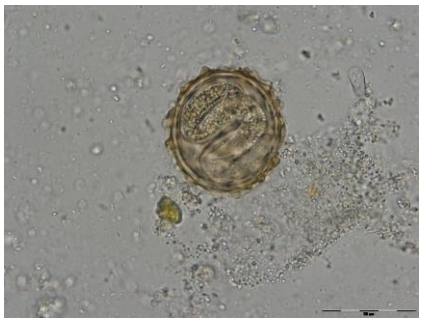
Early-life interventions to prevent feather pecking and reduce fearfulness in laying hens. Kliphuis, S., Manet, M. W., Goerlich, V. C., Nordquist, R. E., Vernooij, H., van den Brand, H., Tuyttens, F. A. M. & Rodenburg, T. B. (2023). *Poultry Science*. https://doi.org/10.1016/j.psj.2023.102801

3: The Effects of Allium sativum L., Artemisia absinthium L., Cucurbita pepo L., Coriandrum sativum L., Satureja hortensis L. and Calendula officinalis L. . on the Embryogenesis of Ascaris suum Eggs during an In Vitro Experimental Study - *by Vasile Cozma (USAMV)*

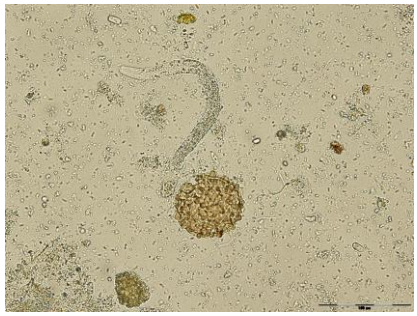
Ascaris suum L. is present in traditionally managed indoor pig herds and on industrialized farms, especially in older fatteners and sows. Increasing resistance against common anti-helminthic drugs redirected research towards alternative and traditional therapies that also include medicinal plants. This study comparatively evaluated the *in vitro* antiparasitic effects of *Allium sativum* L., *Artemisia absinthium* L*., Cucurbita pepo* L*., Coriandrum sativum* L*., Satureja hortensis* L. and *Calendula officinalis* L. against *A. suum* egg hatching and larval development*. A. suum* eggs were sampled from randomized faecal specimens collected from traditionally raised swine, in Romania. The egg suspension (ES, $8x10^3$/ml) was divided into two control (C) (1C - 1ml ES + 1 ml distilled water, 2C- five plates of 1ml ES + 1ml ethanol of 70%, 35%, 17.5%, 8.75%, and 4.375%, respectively) and six experimental groups, and placed in 3 ml cell plates. The experimental (EG, 1-6) groups included ES + each alcoholic plant extract (10%, 5%, 2.5%, 1.25%, 0.625%). Both C and EG were performed in quintuplicate. All variants were incubated at 27℃ for a total of 21 days. *A. suum* eggs were examined after 2, 14 (L1), and 21 (L2/L3) days of incubation. The efficacy of all tested plants when compared to the control groups increased with concentration. Anti-embryogenic effects on *A. suum* eggs were expressed by all plants. A superior influence was observed in *A. sativum, A*. *absinthium*, *C. pepo* and *S. hortensis* extracts at all concentrations tested. *A. sativum* and *A. absinthium* extracts showed the strongest anti-helminthic activity, while *C. sativum* and *C. officinalis* were the weakest ascaricids. The chemical composition of the six Romanian medicinal plants used in the present study is similar to that reported in the specialized literature. The differences between the main biological compounds are given by their concentration. The findings of the present study will hopefully contribute to the field of plant anti-helminthic preparations to develop sustainable, effective and safe alternatives to conventional anti-helminthic drugs. The anti-helminthic activity exhibited by some alcoholic plant extracts against *A. suum* eggs in this study bears prominent importance considering the worldwide emergence of anthelmintic resistance. To our knowledge, this is the first ethno-pharmacological report based on the anthelmintic activity of medicinal plants traditionally used to treat *A. suum* infection in Romania. In the current study, all plants extracts showed various degrees of inhibitory effects on egg development. *A. sativum, A. absinthium, C. pepo* and *S. hortensis* extracts have shown the strongest anthelmintic activity. Based on the results of this study we suggested that some of these plant materials could be prospective sources for development of new anti-parasitic herbal remedies.



Ascaris suum unembryonated egg (400x)



A. suum egg with L 2/3 (larva, 400x)



Hatched L 2/3 (larva, 400x)

All pictures © USAMV

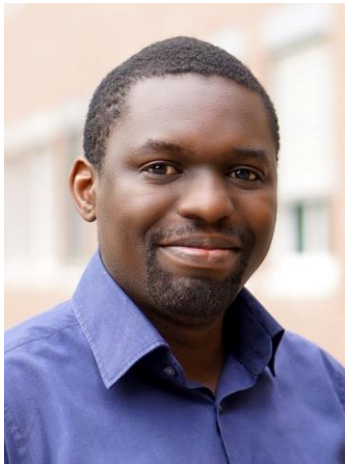
The effects of *Allium sativum* L., *Artemisia absinthium* L., *Cucurbita pepo* L., *Coriandrum sativum* L., *Satureja hortensis* L. *and Calendula officinalis* L. on the embryogenesis of *Ascaris suum* eggs during an *in vitro* experimental study. Mihai-Horia Băieş, Călin Gherman , Zsolt Boros, Diana Olah, Ana-Maria Vlase, Anamaria Cozma-Petruţ, Adriana Györke, Doina Miere, Laurian Vlase, Gianina Crişan, Marina Spînu,Vasile Cozma, *Pathogens* 2022, *11*(9),1065. http://dx.doi.org/10.3390/pathogens11091065

New people in the PPILOW project: Daniela Werner, Craig Chibanda, Emy Ridderbos, Zsolt Boros

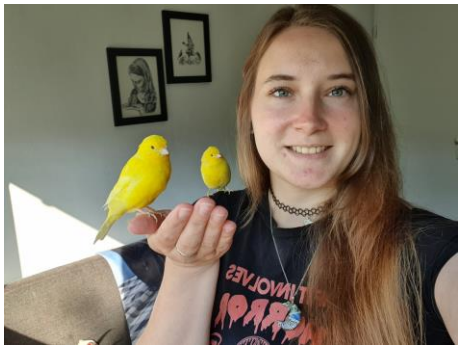
Daniela Werner (Thuenen, Agricultural Researcher)

Daniela studied agricultural science at the University of Gießen. After working in the animal feed sector for 10 years, she joined the Thuenen Institute of Organic Farming in 2018. She is part of the work group pig & poultry and has mainly worked with pigs so far but is eager to dive into the world of organic poultry. In PPILOW she will take over the lead of Task 5.2 dealing with field studies with dual-purpose breeds from Lisa Baldinger and will be involved in the facilitation of the German national practitioner group on poultry.

Craig Chibanda (Thuenen, Agricultural economist)



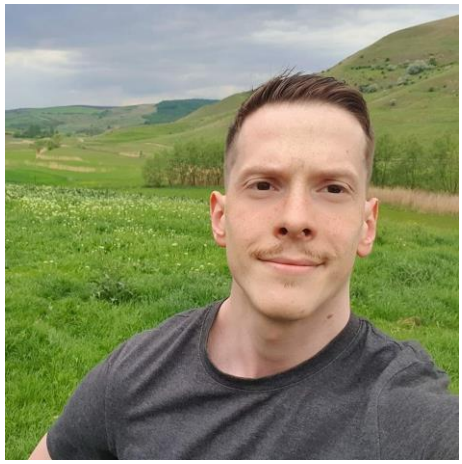
Craig Chibanda is an agricultural economist who has worked at the Thuenen Institute on poultry issues since 2019. He recently joined the PPILOW project in February 2023 and is conducting poultry farm economic analysis of slow-growing dual-purpose breeds under WP7. Prior to joining PPILOW, he worked on broiler farm economics in Ghana, Senegal and Germany. Craig is also in the final phase of his PhD at Hohenheim University. His doctoral research is entitled: "Broiler production in Ghana and Senegal: Economics, International Competitiveness and Policy Considerations". Craig holds a MSc. in Agricultural Economics (University of London), a Master in Business Administration (MBA ESG) and an Engineer degree in Agriculture (Blida University).



Emy Ridderbos (UU, Student)

This spring, Emy Ridderbos joined the UU team. She is an Applied Biology student at the HAS Green Academy. Her internship is established in collaboration with Herenboeren. In this on-farm study, Emy is comparing the behaviour of laying hen hybrids and dual-purpose hens in mobile houses, with the aim to design the most optimal conditions in these systems to prevent feather pecking and cannibalism, especially when the birds need to stay indoors to prevent the spread of Avian Influenza.

Zsolt Boros (USAMV, PhD student)



Boros Zsolt graduated in 2017 the Faculty of Veterinary Medicine at the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. He finished his PhD in 2022 at the Department of Parasitology and Parasitic Disease, under the coordination of Prof. Dr. Vasile Cozma. The topic of his doctoral thesis was “Epidemiological and experimental studies regarding *Trichinella spp.* infestations in sylvatic fauna (wild boars, mustelids) from Romania”. Innovative contributions of the thesis were: "Seroprevalance of Trichinella spp. in wild boars (*Sus scrofa*) from Bihor county, Western Romania" is the first study that highlights the presence of anti-Trichinella antibodies in wild boars from Bihor County, Romania. All the animals tested negative in the golden standard method but came out positive in ELISA and Western blot. The current study also highlights the fact that local consumers might be at risk to consume a small quantity of larvae as animals could be misdiagnosed using the artificial digestion method. "The effects of *Artemisia absinthium* (wormwood), *Allium sativum* (garlic), *Cucurbita pepo* (pumpkin), and *Coriandrum sativum* (coriander) on *Trichinella spiralis* and *Trichinella britovi* larvae, in vitro study" presented that *C. pepo* and *C. sativum* at 2.5% concentration had a strong effect against both species of Trichinella, but *A. sativum* and *A. absinthium* (2.5%) were less efficient against *T. britovi*. Thus indicating that *T. britovi* could be more resistant against some plant extracts than *T. spiralis* and higher concentrations are necessary to obtain the same effect. The current study is amongst the first which included T. britovi and not only T. spiralis in the experimental protocol. "Antiparasitic action of *Lactobacillus casei* ATCC 393 and *Lactobacillus paracasei* CNCM strain in CD-1 mice experimentally infected with *Trichinella b*ritovi" is amongst the first studies that tested the effects of probiotics on *T. britovi*. The study showed that *L. casei* ATCC 393 was more efficient in reducing the number of adult parasites in female mice at the intestinal level than *L. paracasei* CNCM. His activity in the PPILOW project, will be focused on tasks in the activities of the project for improving robustness, positive behaviour and survival in pigs.

PPILOW results will be presented at the coming EAAP meeting in Lyon, France (August 26-September 1, 2023)! - *by Anne Collin*

EAAP + WAAP + Interbull **Congress 2023**
Lyon, France - August 26th / September 1st, 2023

A session (#62) dedicated to Poultry and PIg Low input and Organic production systems’ Welfare will be held under both the EAAP ‘Animal Health and Welfare’ and « Pig (with the contribution of the Poultry working group) Commissions on the 30th of August, 2023. Several communications on PPILOW results will be presented:

- **Keynote Lecture**: Welfare barriers and levers for improvement in organic and low-input outdoor pig and poultry farms – Leterrier et al.
- Range use relationship with welfare and performance indicators in four organic broilers strains – Bonnefous et al.
- Case study of a newly-developed genotype for dual-purpose rearing of male chicks – Pluschke, Lombard et al.
- Poultry production: Using dual-purpose genotypes to reduce the culling of day-old male chicks? – Niemi et al.

- Animal welfare and pork quality of intact male pigs in organic farming according to genotype – Lebret et al.
- Large White genetics in organic system: breeding for piglet survival – Canario et al.
- Comparing animal welfare assessments by researchers and free-range pig farmers with the PIGLOW app – Graat et al.

Members of the PPILOW consortium are looking forward to share and discuss their scientific results during this meeting!

Coming and past events

List of the upcoming and past events with PPILOW project partners attendance.

Event	Date	Location	Partners
ASPA 2023 Congress	13 – 16 June 2023	Bari, Italy	UNIPG
EAAP 2023 meeting	26 August to 1 September 2023	Lyon, France	INRAE, USAMV Cluj Napoca, ACTA (IFIP, ITAB), WUR, SYSAAF, Thuenen Institute, LUKE, JUNIA, IFIP
SPACE (farming event in France)	14 September 2023	Rennes, France	INRAE, ITAB
Workshop PPILOW-NPG	15 September 2023	Cluj Napoca, Romania	USAMV
Cheese 2023	15-18 September	Bra, Italy	SlowFood
Tech and Bio (organic event in France)	20 – 21 September 2023	Valence, France	ITAB
Journée technique porcs Bio (technical day on organic pig production)	21 November 2023	Rennes, France	INRAE, IFIP, ITAB
Webinar (web-conference)	30 November 2023	Online	ITAVI

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