



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 10

August 2024



The PPILOW project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement N°816172.



Summary

Editorial - by Anne Collin (INRAE)	3
PPILOW Final Conference!- by Anne Collin (INRAE)	3
PPILOW National Practitioners Groups (NPGs) meetings 2024: innovation and knowledge exchange accomplished! – by Monica Coletta, Martina Re and Laetitia Fauconnier (AIAB)	4
Webseries videos!	5
PPILOW Danish Workshop on “Free-range keeping of sows”! – by Pia Vanggaard (Vanggaard)	5
The PPILOW project meets the Organic Farm Knowledge Platform – by Monica Coletta and Laetitia Fauconnier (AIAB)	6
Straw bedding in the covered veranda can contribute to successful housing of laying hens in mobile houses – by Saskia Kliphuis (UU)	7
PPILOW dissemination activities: news from Italy – by Monica Coletta and Laetitia Fauconnier (AIAB)	7
Presentation video of the Vanggaard farrowing hut for outdoor pig production– by Pia Vanggaard (Vanggaard)	8
PPILOW scientific publications	10
1: Sows and piglets adjust their use of an outdoor paddock with season and piglet age during the first weeks of life in an organic farm - by Céline Tallet (INRAE).....	10
2: Effects of lighted incubation and foraging enrichment during rearing on individual fear behavior, corticosterone, and neuroplasticity in laying hen pullets - by Saskia Kliphuis (UU)	10
3: Face au changement climatique, quelles stratégies d’atténuation et d’adaptation pour les productions avicoles - by Anne Collin (INRAE)	10
4: High-throughput phenotyping to characterise range use behaviour in broiler chickens - by Julie Collet (INRAE)	11
5: Effect of genotype and outdoor enrichment on productive performance and meat quality of slow growing chickens - by Cesare Castellini (UNIPG)	11
6: In vivo assessment of the antiparasitics effects of <i>Allium sativum</i> L. and <i>Artemisia absinthium</i> L. against gastrointestinal parasites in swine from low-input farms - by Mihai-Horia Băieș (USAMV)	13
PhD thesis in PPILOW project	13
Coming events	14

Editorial - by Anne Collin (INRAE)

Here it is! After five years of PPILOW project with the consortium facing dramatic sanitary and economic events, we enjoy the progress made together with all the practitioners involved. More than a hundred of farmers and members of the production chains, NGOs, scientists and policy makers accompanied us for deciphering how to improve the welfare of poultry and pigs in low-input outdoor farms. Achievements will soon be available as a mind map on the PPILOW website, concerning the use of medicinal plants for limiting parasitism in pigs, how to identify genotypes well adapted to the outdoor range, how to manage dual-purpose breeds, non-beak-trimmed hens and non-castrated male pigs in organic farms for ethical meat and egg productions, how to manage incubation and hatching for better chicken resilience, how to improve piglet survival by means of selection and housing, how to identify the embryo sex as early as possible to avoid the killing layer male chicks... with dedicated evaluations of animal welfare made possible by the development of welfare self-assessment applications, One Welfare sustainability grids and business models for ensuring the economic viability of the proposed strategies.

In this final PPILOW Newsletter are available the last-publicised papers and videos from the consortium, but also the list of the PhD defended in the framework of the project, a presentation of the recently integrated PPILOW partners and an update of the coming events where PPILOW partners will present their last results. Enjoy and welcome to future projects prolonging the work done thanks to the multiactors involved, may they be warmly thanked, as all the project collaborators and the European Commission divisions AGRI and SANTE for their continuous support!

PPILOW Final Conference!- by Anne Collin (INRAE)

The PPILOW (Poultry and Pig Low-input and Organic production System's Welfare) final conference, organized by EAAP, INRAE and INRAE Transfert, was organized in Tervuren on the 11th afternoon and 12th of June to present the main achievements of the project thanks to its multiactor approach over 5 years. The Conference gathered a total of 123 participants (61 online and 62 on site), 56 PPILOW partners and 67 external participants. The presentations focused on the PPILOW realisations in terms of welfare self-assessment tools for evaluating the welfare of pigs and poultry in low input outdoor and organic farms, the strategies to avoid feather pecking in non-beak-trimmed hens and the castration of male pigs, in ovo sexing and the use of dual-purpose breeds for avoiding the culling of layer male chicks on the first conference afternoon. On the 12th of June, participants could exchange on PPILOW results concerning strategies to improve robustness, health and resilience in both species, in broilers concerning strains well adapted to the free range and the identification of markers or range use and concerning early life management levers such as incubation temperatures and on-farm hatching to improve welfare and resilience of outdoor chickens. Much interest was raised on the use of medicinal plants for improving the health of laying hens and pigs, and on the strategies to improve piglet survival in organic systems through selection and the co-design with practitioners of 4 countries of innovative farrowing huts for sows and piglets on the free range. The business models associated to the use of the PPILOW practices were presented, as well as consumer and practitioner views on the strategies proposed. The participants had the chance to follow the presentation of linked EU-funded projects, the aWISH project and the newly-launched European Partnership on Animal Health and Welfare (EUPAHW). The connections of PPILOW with other initiatives of the EU-funded Research network were highlighted, before representatives of the PPILOW project, its European Multiactor Board, the European Commission DG AGRI and DG SANTE and of Organic production systems and Animal welfare associations debated on the main results and outputs of the project supporting animal health and welfare, especially in the currently difficult economic and sanitary context for organic and low-input outdoor farming systems. The PPILOW partners are grateful to external participants who accepted their invitation to exchange on the project outcomes and all the members of the project National Practitioner Groups who co-built with them the PPILOW innovations. The PPILOW final Conference videos and presentations are available [on the PPILOW website](#).

PPILOW National Practitioners Groups (NPGs) meetings 2024: innovation and knowledge exchange accomplished! – by *Monica Coletta, Martina Re and Laetitia Fauconnier (AIAB)*



In the final year of the project all National Practitioners Groups (NPGs) were actively involved in the presentation of the outcomes of the project and participated in the dissemination activities. Great attention was dedicated to the results of the on-farm experiments which, together with the self-assessment tools, represent the readiest innovation to foster change in management supporting high levels

of animal welfare in the pig and poultry organic and low-input production systems. In fact, innovation in agriculture relies not only on scientific results and technical expertise but also on the active involvement and feedback from a multiplicity of actors. In the PPILOW project, stakeholders' feedback played a key role in shaping the trajectory of innovations and management practices. These stakeholders, including farmers, technical experts, and researchers, provided valuable insights that not only validated the experimental outcomes but also offered practical perspectives on feasibility, scalability, and sustainability. Feedback served as a crucial bridge between experimental outcomes and real-world applicability. It enriched the understanding of challenges faced at farm level, identified implementation barriers, and highlighted opportunities for improvement. NPGs also allowed further understanding of the specificities of organic and low-input production systems to be addressed at National level.



© all Photos AIAB

AIAB coordinated the activity of National Practitioner Groups established in seven European countries. Each NPG focused either on poultry (layers and broilers) or pigs. Belgium, France and Italy hosted two NPGs: one for pigs and one for poultry. Nine NPGs (poultry and pigs) were established, spread over seven countries (France, Italy, Germany, Romania, Belgium, Netherlands, Denmark). The livelihood of the NPGs was possible thanks to facilitators who had the challenging role of guiding the co-creation process and keep a high level of engagement of the multi-actor groups ensuring that everybody had the possibility to participate and collecting the feedback for researchers and experts. Facilitation included the selection of on-farm trials that were implemented in all the seven countries and supported the refinement of the dissemination materials. Change in management of poultry and pig organic and low-input production systems is a complex matter and the interest expressed in the on-farm experiments bodes well for the future exploitation activities of the PPILOW project: thanks to the strong engagement of all the Consortium partners the participatory approach was made possible and stakeholders were active contributors to enhance animal welfare in organic and low-input production systems.

Webseries videos!

One of the PPILOW project activities has been to create a web series of 10 episodes. The last five videos have been published. The topics are: the use of phytotherapy against microorganisms and parasites in traditional pig breeds, on farm-hatching in broiler production, dual purpose chicken breeds, Vanggaard farrowing 's hut and piglet welfare and finally the multiactor approach (National Practitioner Groups) used in PPILOW project. Enjoy these nice videos [on the website!](#)

PPILOW Danish Workshop on “Free-range keeping of sows”! – by Pia Vanggaard (Vanggaard)



As part of the PPILOW project, a mix of farmers, NGO/policy makers, researchers and private companies participated in the PPILOW workshop held in Denmark April 2024 (15 participants). The purpose of the workshop was to present and share knowledge from free-range production of pigs with the main focus on the sows and suckler pigs. Furthermore, the Workshop also aimed to exchange knowledge between test farmers of Vanggaard's farrowing hut in different countries in order to inspire further improvement of hut design for farrowing sows and piglets. At the workshop, the design of farrowing huts for outdoor use to reduce piglet mortality, including the importance of differences

between the countries, among other things, in climate conditions, was also discussed. Another issue that was debated was the hut's mobility, which was seen as an advantage and therefore a continued important factor to try to improve, also in relation to the geographical conditions across regions/national borders. As can be seen from [the video](#), as part of the workshop, a field visit was arranged to the Danish test farmer who runs his organic, outdoor piglet production exclusively in Vanggaard's farrowing huts. The farm visit was highly praised by the workshop participants, among other things because it gave a broad practical insight into the Farmer's care management and the good working environment in the hut, just as it also became clear to the participants during the farm visit to observe the hut design's support for increased animal welfare. Based on the participants' written evaluation, collected at the end of the workshop, the workshop was described as a very

fruitful workshop with good interaction between different stakeholders. Very useful and good debate due to the small group size, where everyone got to know each other and was therefore open to sharing advantages and disadvantages and engaging in co-creation. By activating the [video link](#), you can see a summary of the workshop and get an insight into what subject experts, researchers and test farmers have gained from participating in the workshop, which was part of the PPILOW project - work package 6.4 - which, among other things, worked with development of farrowing huts for outdoor pig production with a strong focus on increased animal welfare, good working environment, and reduction of piglet mortality.



© all Photos Vanggaard

The PPILOW project meets the Organic Farm Knowledge Platform – by Monica Coletta and Laetitia Fauconnier (AIAB)

Organic and low-input outdoor production systems require specific expertise and animal welfare is no exception: this has been at the basis of PPILOW project and of the advanced experimental results and set of practices selected by the National Practitioners' Groups (NPGs). These were tested on-farm with a scientific approach and are now available as practice abstracts on the [online Organic Farm Knowledge \(OFK\) platform](#).

The platform promotes productivity, quality and sustainability in organic farming across Europe by providing access to a wide range of tools and knowledge exchange among farmers, farm advisers and scientists. FiBL, IFOAM Organics Europe and ICROFS manage the platform, supported by a robust editorial board, with partners representative of the different European production contexts. Through a multi-stakeholder approach, the PPILOW project with its 23 partners in 9 European countries has worked at co-designing innovations based on the One Welfare concept to support farmers and advisors in guaranteeing high levels of animal welfare in organic and low input outdoor production systems. Specific and advanced practices, addressing the main animal welfare issues tackled by the project, have been implemented on-farm and uploaded on the Organic Farm Knowledge (OFK) platform as practice abstracts. Practice abstracts provide concrete advice based on the results of co-designed and on-farm implementations developed within the PPILOW project.

These advanced practices include:

- [On-farm hatching in organic and low-input outdoor farms](#)
- [Dual-purpose poultry genotypes in organic and low-input out-door farms](#)
- [Mobile farrowing huts for sows and piglets](#)
- [Medicinal plants to limit parasitism and pathogenic bacteria in pigs](#)

In the abstracts, practical recommendations and references to authors are provided. Use of the self-assessment tools (EBENE² and PIGLOW) is recommended to assess the performances of animal husbandry in terms of animal welfare and monitor the evolution over time, particularly when new practices and changes in management are introduced. The two animal welfare self-assessment tools are available on the OFK platform: the PIGLOW app created for pigs (link [PIGLOW APP](#)), and EBENE² app developed in the PPILOW project for organic and low-input production systems (link [EBENE \(R\) APP](#)). Both applications are designed to improve animal welfare using a multi-device platform with practical indicators. Furthermore, for PIGLOW (link [PIGLOW MANUALS](#)) 6 manuals are available with detailed explanations of the questions asked in the app based on the rearing period (Grower pigs; Finisher pigs; Sows management; Pregnant sows; Farrowing sows; Loading). Aspects like timing and frequency of the assessments, recommendations to carry out group or individual observations are also addressed.

Straw bedding in the covered veranda can contribute to successful housing of laying hens in mobile houses – by Saskia Kliphuis (UU)

Koen Riep and Jeroen Imholz are two veterinary MSc students at Utrecht University, the Netherlands. Supervised by Saskia Kliphuis, they are investigating the effects of extra litter material in the covered veranda on plumage condition, foot pad lesions and fearfulness in laying hens housed in mobile houses. The research was established in collaboration with Herenboeren, a farmer's coop in the Netherlands. They collected data on four different Herenboeren locations, where they added straw to the outdoor range and investigated the effects on the hens on three different time points. The first results are in, and the straw bedding resulted in an improvement of plumage condition, especially at farm where the plumage score at baseline was relatively low. These pictures give an impression of their practical work!



© Photos UU

PPILOW dissemination activities: news from Italy – by Monica Coletta and Laetitia Fauconnier (AIAB)

In 2024, the dissemination activities of the main exploitable results of the PPILOW project have been led by AIAB with the active participation of all the Italian partners of the Consortium (Veterinarians without Borders, SlowFood, University of Perugia) and a large number of stakeholders. Two technical days were dedicated respectively to [animal welfare in pigs rearing systems on April 16th](#) and [poultry rearing systems on May 29th](#) with a visit to the innovative hosting organic farms. Much interest was collected on the PPILOW experiments and on the results of on-farm trials. One of the main issues reported by farmers was the regulatory framework which is tailored on conventional indoor systems and does not valorise and sometimes hampers the efforts of organic and low-input farmers. The presence of NGOs and other stakeholders made the need of collaboration

along the value chain evident. The national workshop led by AIAB in Rome was anticipated by an on-line webinar on May 27th to reflect on the present regulation framework and the issues and levers to improve organic pig and poultry production systems focusing on animal welfare. During the seminar, the main goals and outputs of the PPILOW project were presented by partners. The succeeding Workshop held in Rome on May 31st was abundant in exchanges with a large partnership including policy makers and certification bodies focusing on integrated strategies to achieve welfare in organic poultry farming avoiding of synthetic products. The discussion emphasized the need of a holistic approach and a regulation framework supporting the adoption of innovative practices tailored on organic and free-range production systems. The participants concluded that policy actions should be undertaken to raise the awareness of consumers on the benefits and positive effects on welfare of organic production systems.



© Photo AIAB

On June 21st in Talmassons (UD) in coincidence with an NPG meeting on poultry production systems, the PPILOW results were presented while the discussion focused on the needs to conciliate biosecurity measures and animal welfare practices in organic and low-input outdoor production systems. Farmers reported a limited availability of slow-growing breeds and dual-purpose genotypes, particularly for small organic flocks, outlining the need of collaboration with breeders. After the meeting, a visit to a local organic farm with slaughterhouse and direct sales was led by AIAB FVG allowing further discussion and insights.

Presentation video of the Vanggaard farrowing hut for outdoor pig production – by Pia Vanggaard (Vanggaard)

Vanggaard Staldmontage ApS is a small Danish company with more than 25 years of experience in setting up stable equipment, feed systems, water, silos etc. within the conventional pig sector. In summer/autumn 2016, Vanggaard was contacted by a young organic farmer who wanted to develop a farrowing wagon for outdoor pig production, where there was a high focus on animal welfare and a good working environment for the farmer - this as an alternative to the well-known, traditional, low A- huts on the market, where especially the working environment for the farmer was very bad/poor. The collaboration with the young organic farmer was the starting point for Vanggaard's first development project within the creation of innovative farrowing huts with a focus on high animal welfare and a good working environment for the farmer. The first test huts (path sites for 4 sows) were put into use in the summer of 2017 and the hut design was continuously adjusted in 2017 + 2018, when several Danish farmers with outdoor pig production tested the farrowing huts.



In the development project, Vanggaard Staldmontage worked together with Aarhus University and a few Danish professional organizations within ecology and outdoor pig production, which in 2019 led to Aarhus University and Vanggaard Staldmontage entering into a collaboration regarding participation in yet another development project – the PPILOW EU project under Horizon 2020, among other things with the aim of further developing Vanggaard's newly developed farrowing hut to a (common) EU hut design, with a view to the development of a design that could be used in EU countries with both cold/warm climates and at the same time working towards the reduction of the well-known challenge factor of high piglet mortality, which is unfortunately the reality in outdoor pig production. As part of the PPILOW project, a presentation video of Vanggaard's farrowing hut was produced. [Watch the video](#), where the previously mentioned Danish, young organic farmer talks about the thoughts behind the innovative hut design, shows the hut functions in practice, including the effortless/easy moving of the huts with the patented moving unit. In the video, Aarhus University also presents the planned PPILOW test trials, which was carried out by the Aarhus University with a view to collect test data that contributes to greater knowledge about the minimization of piglet mortality in outdoor farrowing huts. In the PPILOW project, the presentation video of Vanggaard's farrowing hut was used, among other things, in 3 NPG workshops, where farmers from several EU countries with an interest in outdoor pig production participated, which resulted in 2 farmers from France, 2 farmers from Italy and 1 farmer from Belgium (a total of 8 test huts) agreed to test Vanggaard's EU hut design for farrowing huts. By watching the video, you will get a good insight/knowledge into the design of Vanggaard's farrowing hut and the hut's functionality.



© all Photos Vanggaard

PPILOW scientific publications

1: Sows and piglets adjust their use of an outdoor paddock with season and piglet age during the first weeks of life in an organic farm - by Céline Tallet (INRAE)

A variety of systems allowing pigs to access outdoors does exist. Some farming systems allow animals to choose if they want to be in or outside, via access to a roofed outdoor run for example or a pasture, with advantages but also disadvantages for animal welfare. In order to understand piglet's use of the outdoor space, INRAE and Aarhus University's collaborators of the PPILOW project explored how piglets use the indoor space, and which factors drive them to stay indoors or go outside. In this project published in Applied Animal Behaviour Science, they offered sows and their progenies access to a grassed outdoor on a voluntary basis and a protection in the form of a hut with deep straw bedding. The aim was to determine the factors influencing the use of outdoors and indoors spaces by piglets and the sow, in particular the age of piglets and the season of the year.

Sows and piglets adjust their use of an outdoor paddock with season and piglet age during the first weeks of life in an organic farm. A. Jahoui, J. Malmkvist, L. Juul Pedersen, B. Lieubeau, J. Hervé, C. Tallet. Applied Animal Behaviour Science, Vol. 276, July 2024. <https://doi.org/10.1016/j.applanim.2024.106325>

2: Effects of lighted incubation and foraging enrichment during rearing on individual fear behavior, corticosterone, and neuroplasticity in laying hen pullets - by Saskia Kliphuis (UU)

Early life conditions can influence stress responsivity of laying hens throughout their lifespan. Therefore, there are opportunities to improve welfare through the incubation and rearing environment. In this study, a 12:12h green LED light-dark cycle during incubation and larvae provisioning as enrichment during rearing were tested as strategies to optimize early-life conditions and thereby decrease stress responsivity in ISA Brown laying hens. We measured neuronal, physiological, and behavioral indicators that may affect fear and stress. Light during incubation did not influence neuronal or physiological measurements in this study, but light-incubated chickens were less fearful towards humans in one of the behavioral tests. Access to larvae had no effect on chicken behavior. Our study showed minor effects of light during incubation and no effects of enrichment during rearing on stress responsivity of young laying hens. The small effects may be explained by the enriched conditions for all chickens in this experiment (small groups, natural daylight, and 24/7 classical music). Given the promising results of lighted incubation in other studies, which were mostly performed in broiler chickens, and evidence regarding the positive effects of enrichment during rearing, the potential of these strategies to improve laying hen welfare needs to be explored further.

Effects of lighted incubation and foraging enrichment during rearing on individual fear behavior, corticosterone, and neuroplasticity in laying hen pullets. S. Kliphuis, M. W.E. Manet, V. C. Goerlich, R. E. Nordquist, H. Vernooij, F. A.M. Tuytens, T. B. Rodenburg. Poultry Science, Vol. 103, Issue 6, June 2024. <https://doi.org/10.1016/j.psj.2024.103665>

3: Face au changement climatique, quelles stratégies d'atténuation et d'adaptation pour les productions avicoles - by Anne Collin (INRAE)

In this review article in French published in INRAE Productions Animales, PPILOW partners INRAE and ITAVI show why Climate change is a major issue for poultry production, and how it must evolve on the one hand, in reducing its environmental impact and, on the other hand, in adapting to new climatic conditions. This involves co-adapting the animals and the breeding environment, reorganizing the sectors geographically and between

production chains actors to face health threats while saving resources and limiting the production of greenhouse gases. Some animal-welfare friendly practices studied in PPILOW for low input outdoor and organic farms, such as alternative incubation strategies, the use of outdoor well-adapted breeds of broilers in interaction with the free range design, and of verandas for limiting the sanitary increasing threats on the layer flocks while preserving welfare during confinements, are part of the solutions proposed.

Face au changement climatique, quelles stratégies d'atténuation et d'adaptation pour les productions avicoles? A. Collin, V. Coustham, J. Kokou Tona, S. Tesseraud, S. Mignon-Grasteau, B. Méda, A. V. Carvalho, Y. Guyot, S. Lagarrigue, F. Pitel, T. Zerjal. INRAE Productions Animales, Vol. 37 n. 1, April 2024. <https://doi.org/10.20870/productions-animales.2024.37.1.8069>

4: High-throughput phenotyping to characterise range use behaviour in broiler chickens - by Julie Collet (INRAE)

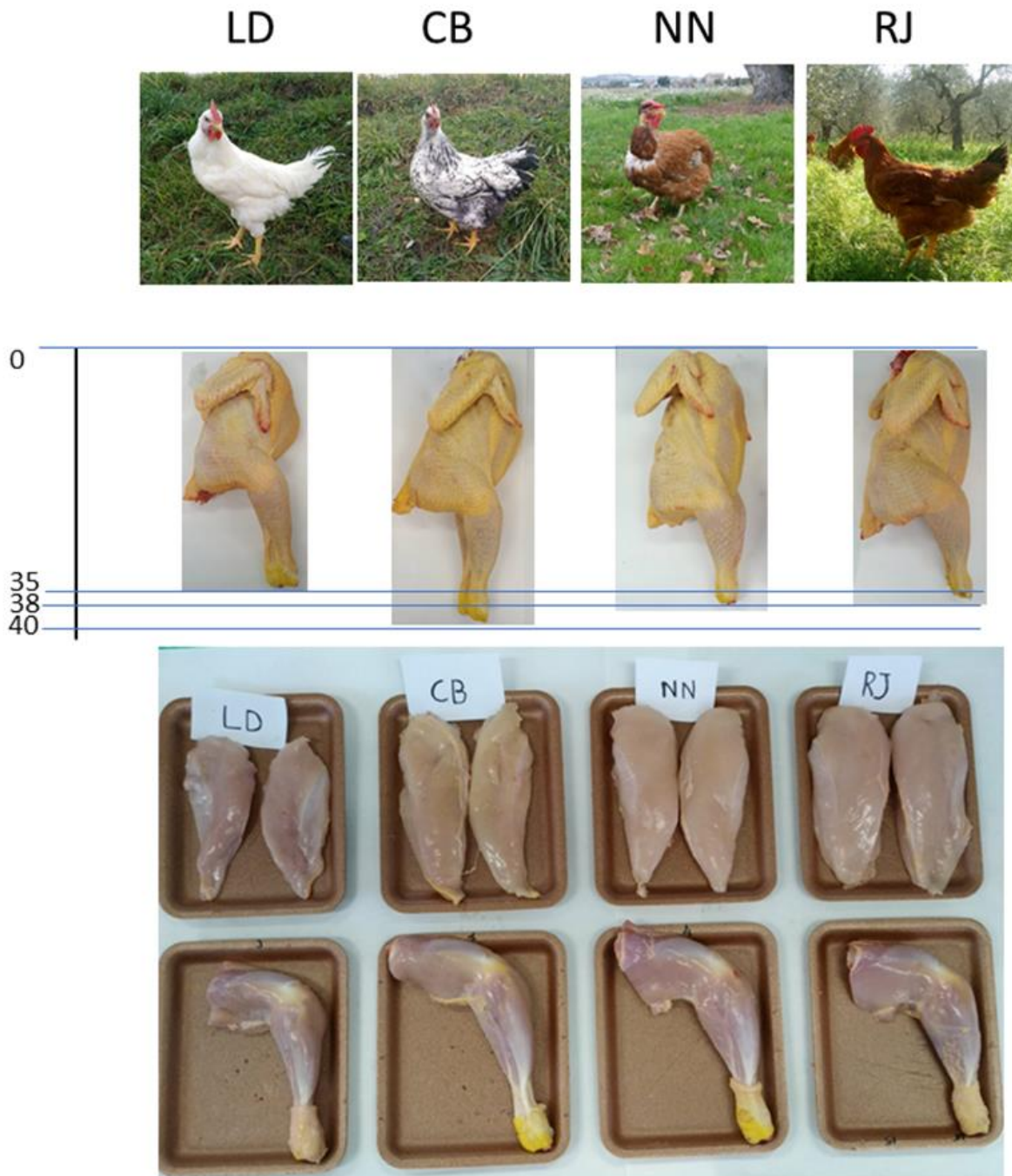
Characterising individual range use in free-range chickens is limited with traditional methods. In the paper published this year by INRAE and JUNIA collaborators, in *Animal - The international journal of animal biosciences* a new method based on active Radio Frequency Identification technology enabled evaluating range use in situ, minimising any disturbance to chickens' natural behaviour. They used Radio Frequency Identification technology in three broiler breeds used for outdoor production and provided two reliable and repeatable indicators to individually characterise range use.

High-throughput phenotyping to characterise range use behaviour in broiler chickens. J. M. Collet, C. Bonnefous, K. Germain, L. Ravon, L. Calandreau, V. Guesdon, A. Collin, E. Le Bihan-Duval, S. Mignon-Grasteau. *Animal*, Vol. 18, Issue 3, March 2024. <https://doi.org/10.1016/j.animal.2024.101099>

5: Effect of genotype and outdoor enrichment on productive performance and meat quality of slow growing chickens - by Cesare Castellini (UNIPG)

The optimization of animal welfare, meat quality, environmental impact, and economic sustainability in alternative poultry farming can be achieved by improving the synergy between the chicken genotype and the outdoor environment. The objective of the study is to characterize four slow-growing chicken strains reared free range. Eight hundred chickens of 4 slow-growing genotypes (25 chickens/replicates/genotype/enrichment) were reared and slaughtered at 81 d: Red JA57 (RJ), Naked Neck (NN), Lohmann Dual meat-type (LD), and an Italian crossbreed (Robusta Maculata x Sasso, CB). The grazing areas were alternatively provided with enrichment constituted by strips of sorghum plants (ENR) or only grass (NO ENR). Productive performances (daily weight gain - DWG, daily feed intake, feed conversion ratio - FCR, live weight) were recorded weekly. Behaviour observations (walking and grass pecking), carcass and meat quality (physico chemical evaluations, oxidative status, and fatty acid profile of breast and drumstick) were assessed. Results demonstrated that both LD and CB showed the highest walking activity, but the different strains differently finalise this activity in acquiring feed resources (pecking grass). The better productive performance was recorded in RJ followed by NN, CB and LD. In LD and CB, the different walking activities also affected the physico-chemical profiles (lower pHu, WHC, and lipids) of the breast and drumstick. The oxidative status was worse in CB than in the other groups (lower Tocols, higher Carbonyls). Fatty acid profile was also related to the genetic strain: a higher amount of n-3 polyunsaturated fatty acids was recorded both in the breast and drumstick of RJ and NN. The health quality index resulted excellent in all the chicken genotypes. In conclusion, the environment/animal interaction resulted as an important factor affecting the adaptability of genotypes to free range. All four genotypes, to different extents, showed good adaptation and production performance, with the exception of LD and CB, which were too light for the commercial supply chain.

Pictures, carcasses (with cm scale) and meat cuts (breast, thigh and drumstick) and of four chicken genotypes reared in an outdoor system with (ENR) or without (NO ENR) pasture availability



Effect of genotype and outdoor enrichment on productive performance and meat quality of slow growing chickens. S. Mattioli, E. Angelucci, C. Castellini, A. Cartoni Mancinelli, W. Chenggang, F. Di Federico, D. Chiattelli, A. Dal Bosco. – Poultry Science Vol. 103, Issue 10, July 2024. <https://doi.org/10.1016/j.psj.2024.104131>

6: *In vivo* assessment of the antiparasitic effects of *Allium sativum* L. and *Artemisia absinthium* L. against gastrointestinal parasites in swine from low-input farms - by Mihai-Horia Băieș (USAMV)

Ethno-veterinary practices could be used as a sustainable developmental tool by integrating traditional phytotherapy and husbandry. Phytotherapeutics are available and used worldwide. However, evidence of their antiparasitic efficacy is currently very limited. Parasitic diseases have a considerable effect on pig production, causing economic losses due to high morbidity and mortality. In this respect, especially smallholders and organic producers face severe challenges. Parasites, as disease causing agents, often outcompete other pathogens in such extensive production systems. A total of 720 faecal samples were collected in two farms from three age categories, i.e. weaners, fatteners, and sows. Flotation (Willis and McMaster method), modified Ziehl–Neelsen stained faecal smear, centrifugal sedimentation, modified Blagg technique, and faecal cultures were used to identify parasites and quantify the parasitic load. The examination confirmed the presence of infections with *Eimeria* spp., *Cryptosporidium* spp., *Balantioides coli* (syn. *Balantidium coli*), *Ascaris suum*, *Oesophagostomum* spp., *Strongyloides ransomi*, and *Trichuris suis*, distributed based on age category. A dose of 180 mg/kg bw/day of *Allium sativum* L. and 90 mg/kg bw/day of *Artemisia absinthium* L. powders, administered for 10 consecutive days, revealed a strong, taxonomy-based antiprotozoal and anthelmintic activity. The results highlighted the therapeutic potential of both *A. sativum* and *A. absinthium* against gastrointestinal parasites in pigs. Their therapeutic effectiveness may be attributed to the content in polyphenols, tocopherols, flavonoids, sterols, sesquiterpene lactones, and sulfoxide. Further research is required to establish the minimal effective dose of both plants against digestive parasites in pigs.

***In vivo* assessment of the antiparasitic effects of *Allium sativum* L. and *Artemisia absinthium* L. against gastrointestinal parasites in swine from low-input farms.** Băieș MH, Cotuțiu VD, Spînu M, Mathe A, Cozma-Petruț A, Bolboacă SD, Engberg RM, Collin A, Cozma V. (2024) BMC Vet Res., 20(1):126 (2024). <https://doi.org/10.1186/s12917-024-03983-3>.

PhD thesis in PPILOW project

One great success of the PPILOW project is the defence of several PhD theses, with students working on innovative practices for improving the welfare of poultry and pigs in low-input outdoor and organic farms. You will find below short summaries of the theses already achieved or planned in PPILOW.

1. Baies Horia Mihai (USAMV, Romania).

Title thesis: “Improving the welfare of pigs raised in low-input production systems, by controlling digestive parasites, with aromatic and medicinal plants”.

Discussion date: 10th May 2024

Summary: PhD thesis comprises 6 original studies focused on assessing, both in vitro and in vivo, the antiparasitic potential of the following medicinal plants *Allium sativum* (garlic), *Artemisia absinthium* (wormwood), *Cucurbita pepo* (pumpkin), *Coriandrum sativum* (coriander), *Calendula officinalis* (marigold), and *Satureja hortensis* (summer savory), on naturally occurring gastrointestinal parasites of swine. This research was conducted in two free-range (low-input) farms located in Transylvania, Romania and is integrated in WP6 of the PPILOW project.

2. Laura Rusu (USAMV, Romania).

Title thesis: “Alternative preventive phytotherapies in conditioning the portage microbiome and immune response in swine”.

Discussion date: September 2024

Summary: The thesis comprises 3 original studies focused on assessing, both in vitro and in vivo, the antibacterial effect on naturally occurring bacteria and the immune stimulating potential in pigs raised

on low input farms of Hippophae rhamnoides (sea buckthorn), Allium sativum (garlic), Artemisia absinthium (wormwood), Cucurbita pepo (pumpkin), Coriandrum sativum (coriander), Calendula officinalis (marigold), and Satureja hortensis (summer savory). The researches were conducted in vitro, in the USAMV laboratories and in two locations on low-input farms from Transylvania, Romania and was integrated in WP6 of the PPILOW project.

3. **Claire Bonnefous (INRAE, France).**

Title thesis: “Ranging behaviour of broilers: from behaviour, performance, physiological and metabolic indicators to the identification of potential early predictors”.

Discussion date: PhD thesis of the University of Tours (14/12/2023, confidential).

Summary: Organic broilers have access to an outdoor range from about five weeks of age. However, its use widely varies due to external factors and to animal’s own characteristics. Broilers social motivation, boldness, foraging and locomotor influence range use behaviour, with consequences on animal welfare, metabolism, performances and meat quality. In her PhD thesis, Claire Bonnefous provided new information on the understanding of range use behaviour, its explanatory factors and consequences to identify potential predictors to be included in genetic selection patterns. Her publicly available results can be found here: 1) [Animal](#); 2) [Research Square](#); 3) [Applied Animal Behaviour Science](#).

4. **Saskia Kliphuis (UU, The Netherlands).**

Title thesis: “Light and Larvae for Little Layers: Early-life strategies to improve welfare of laying hens on low-input and organic farms”.

Discussion date: planned for November/December 2024

Summary: The thesis describes how welfare of laying hens could be improved, especially through early-life conditions. By adapting the incubation and rearing environment to the biological needs of chickens, they may develop into more resilient birds that are less fearful, develop less problematic behavior like severe feather pecking, and more positive behaviors, like foraging.

5. **Evelien Graat (ILVO, Belgium).**

Title thesis: “Improving the welfare of organic and free-range pigs and broiler chickens”.

Discussion date: planned for January 2025

Summary: The thesis will cover the use of the PIGLOW app for welfare self-assessments by pig farmers, and the effect of thermal manipulation during incubation on the resilience of slow growing broiler chickens.

6. **Helen Pluschke (Thuenen, Germany).**





Title thesis: “Dual-purpose poultry in organic farming”.

Discussion date: planned in 2025

Summary: The objective of the thesis is to provide an overview of the current breeding progress of dual-purpose chicken by evaluating three different genotypes, with a particular focus on performance, welfare and behavioural traits, as well as product quality. On the base of an analysis, that considers both female and male as unit, optimization potentials will be highlighted in rearing organic dual-purpose chicken.

Coming events

List of the upcoming events with PPILOW project partners attendance.

Event 	Date 	Location 	Partners 
WAFL 2024	30 – 31 August 2024	Florence, Italy	ILVO, INRAE, JUNIA, SlowFood – VSF, Thuenen
75th EAAP Annual Meeting	1 – 5 September 2024	Florence, Italy	INRAE, UNIPG, ILVO

SPACE 2024	18 September 2024	Rennes 2024	INRAE, ITAB, IFIP
Sommet de l'élevage 2024	3 October 2024	Clermont Ferrand (France)	ITAB



© Photo ILVO

Keep safe, and for more information, visit our website:

www.ppilow.eu



[@PPILOWH2020](https://twitter.com/PPILOWH2020)



[@PPILOW](https://facebook.com/PPILOW)

- Project Coordinator: Anne Collin, INRAE (BOA Joint Research Unit) anne.collin@inrae.fr
- Project Manager: Anthony Vermue, INRAE Transfert anthony.vermue@inrae.fr

Disclaimer: the sole responsibility of this publication lies with the authors. The European Commission and the Research Executive Agency are not responsible for any use that may be made of the information contained therein. **Copyright 2020 PPILOW Project, All rights reserved.**

Images Cover ©: CRA-W, ILVO, INRAE-Armelle Prunier, ITAVI, Pascal Le Douarin Réussir Aviculture, VANGGAARD.