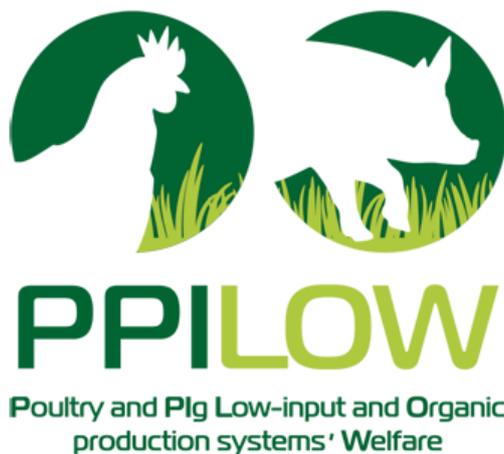


Horizon 2020 programme

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First wave of EIP Practice abstracts

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Author(s)	Léa Tourneur and authors from practice abstracts
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1. Summary

Objective and methodology:

This deliverable is the compilation of best practice abstracts that highlight farm and research led innovations which demonstrate ways to improve the welfare of poultry and pigs reared in organic and low-input outdoor farming systems.

The practices covered in these abstracts have been identified via the Executive Committee, through state-of-the-art reviews and first results analysis. The abstracts cover areas of interest for end-users, describing main information/recommendations/practices that can be used in their daily practice.

This mid-term achievement delivers 12 best practice abstracts and are written using the standard EIP Agri format. They will be hosted both on the PPILOW project website and the EIP Agri website.

Teams involved:

1	INRAE - Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (including Institut Agro as linked third party)	France
2	UU – Universiteit Utrecht	The Netherlands
3	AU - Aarhus Universitet	Denmark
4	ACTA - Association de Coordination Technique Agricole (including ITAVI, IFIP, IDELE and ITAB as linked third parties)	France
5	EV ILVO – Eigen Vermogen van het Instituut voor Landbouw en Visserijonderzoek	Belgium
6	AIAB - Associazione Italiana Agricoltura Biologica	Italy
7	LUKE – Luonnonvarakeskus (Natural Resources Institute Finland)	Finland
8	Thuenen-Institute – Johann Heinrich von Thuenen Institut	Germany
11	UNIPG - Universita degli studi di Perugia	Italy
12	SYSAAF - Syndicat des Sélectionneurs Avicoles et Aquacoles Français	France
13	CRAW – Centre Wallon de recherches agronomiques	Belgium
15	BioForum – BioForum Vlaanderen	Belgium
16	HAU - Harper Adams University	UK
17	SlowFood – Fondazione Slow Food per la Biodiversita onlus	Italy
18	JUNIA – JUNIA HEI-ISEN-ISA Grande école d'ingénieur	France
20	USAMV – Universitatea de Stiinte Agricole si Medicina Veterinara Cluj Napoca	Romania
23	IT - INRAE Transfert	France



2. Practice abstracts

PA1 - PIGLOW - a welfare self-assessment & benchmarking tool for outdoor and organic pig farms

TITLE	PIGLOW - a welfare self-assessment & benchmarking tool for outdoor and organic pig farms
N° in EIP file	PA1
Contact person	Evelien Graat (EV ILVO)
Abstract in English	<p>With PIGLOW, a new mobile application was developed by which outdoor and organic pig farmers can assess the welfare of their own animals. The app focuses on animal-based indicators, covering all four Welfare Quality principles of Good Feeding, Good Health, Good Housing and Appropriate Behaviour. During the step-by-step assessment (that takes approximately one hour and requires no internet connection), the app provides useful information and pictures that guide the farmer through the process. After completing the welfare assessment with the app and uploading the answers, farmers can immediately view their results on the PIGLOW website. These results include a (completely anonymous) comparison of his/her own scores for each welfare indicator with the scores of other farmers using the app. When using the app multiple times over a prolonged period, it also shows the change of scores within the farm over time, making it easy to see if a certain score has improved since the previous assessment. For each welfare indicator, the results contain automated feedback, explaining its meaning and importance as well as risk factors that could explain a possible low score. If relevant, this information can be discussed with a veterinarian or other advisors in order to investigate the feasibility of actions to continuously improve animal welfare status. Besides the direct advantages of using the app, pig production systems could also use it as a marketing tool to let the consumer know that they value animal welfare highly. The PIGLOW app is now freely available in three languages (English, French, Dutch) in the Google Play Store and the Apple Store. More European languages will be added in 2021.</p>

PA2 - EBENE® - a welfare self-assessment tool for poultry farms

TITLE	EBENE® - a welfare self-assessment tool for poultry farms
N° in EIP file	PA2
Contact person	Laura Warin (ITAVI)
Abstract in English	<p>The mobile application EBENE® was refined and now enables outdoor and organic poultry farmers to assess the welfare of their own animals (broilers, hens). The app focuses on animal-based indicators, covering all four Welfare Quality principles of Good Feeding, Good Health, Good Housing and Appropriate Behaviour. During the step-by-step assessment (that takes approximately one hour and requires no internet connection), the app provides useful information and pictures that guide the farmer through the process. After completing the welfare assessment with the app and</p>



	<p>uploading the answers, farmers can immediately view their results on the app through a radar chart. When using the app multiple times, all the results are visible in the app and allow the farmers to see if a certain score has improved since the previous assessment. For each welfare indicator, the results contain automated feedback, explaining risk factors that could explain a possible low score. If relevant, this information can be discussed with a veterinarian or other advisors in order to investigate the feasibility of actions to continuously improve animal welfare status. Besides the direct advantages of using the app, the poultry sector could also use it as a marketing tool to let the consumer know that they value animal welfare highly. The EBENE® app is freely available in three languages (English, French, Dutch) in the Google Play Store and the Apple Store. More European languages will be added in 2021.</p>
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PA3 - Economic aspects of range and outdoor run management in outdoor and organic broiler and pig production systems

TITLE	Economic aspects of range and outdoor run management in outdoor and organic broiler and pig production systems
N° in EIP file	PA3
Contact person	Jarkko Niemi (LUKE)
Abstract in English	<p>Based on feedback obtained from national practitioners, the PPILOW project has identified a set of welfare-improving practices in low-input outdoor and organic broiler and pig production systems. An in-depth qualitative and quantitative analysis was carried out to shortlist economically viable ways to improve animal welfare, health and performance in these systems.</p> <p>Improvements in the quality and usage of outdoor run enable the expression of natural behaviors and improvements in several welfare and performance indicators. Measures of improving outdoor run quality, such as enriching range with vegetation and grazing management and crop rotation, mobile houses and measures reducing the risk of parasitism and diseases, are recommended for both broilers and pigs.</p> <p>Providing proper fences and guard animals help to limit contacts with predators and other wildlife that may transmit pathogens. The costs of labor, land and materials needed to enhance the outdoor run quality, include the costs of trees, plants, fences, shelters, shall be kept under control as they can increase the costs of production substantially.</p> <p>Despite being labour-intensive, the relatively high labour costs of mobile housing systems might be compensated by lower veterinary costs and higher revenues per kilogram of poultry meat.</p> <p>In outdoor paddocks and straw yards, pigs have less adventitious bursitis, injuries, stomach ulceration, mortality and morbidity and lung damage compared to slatted pens. Costs incurred with the implementation of such practices can be compensated</p>



	by lower mortality and infections, or by market revenues and product branding in some cases.
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PA4 - Ensuring balanced diet is one of key factors to successful organic and low-input poultry

TITLE	Ensuring balanced diet is one of key factors to successful organic and low-input poultry
N° in EIP file	PA4
Contact person	Jarkko Niemi (LUKE)
Abstract in English	<p>PPILOW focus group discussions organized with supply side specialists in Finland, France, Italy, Romania and United Kingdom indicated several challenges which require specific attention in organic and low-input poultry farming.</p> <p>One of the main challenges is to provide the birds with a balanced diet. The relative feed intake in organic production systems is often high in comparison to other systems. Feeding has a substantial impact on the cost of production of organic poultry as organic feed is more expensive than conventional feed. Ensuring that essential amino acids and minerals are available in the diet is challenging in fully organic feed. New regulations which require feed to be 100% organic would prove to be problematical for producers to provide a balanced, high quality organic diet, and thus require careful planning of the diet and sourcing of appropriate feed materials.</p> <p>Cannibalism and feather-pecking usually occur as a result of birds experiencing stress. A balanced diet is one of the main factors, although not the only factor, that helps to alleviate feather pecking. The addition of amino acids could improve the balance of feed ration, but it is not allowed in organic production. Sodium chloride added to the drinking water can also have a calming effect on the birds. It is also essential to ensure that there are enough feed and water access points for birds. Controlling these factors helps to prevent feather pecking.</p>

PA5 - Stakeholders' views regarding the key challenges in organic and low-input pig farming

TITLE	Stakeholders' views regarding the key challenges in organic and low-input pig farming
N° in EIP file	PA5
Contact person	Jarkko Niemi (LUKE)
Abstract in English	<p>PPILOW focus group discussions indicated several challenges which require specific attention in organic and low-input pig production.</p> <p>In pig meat production, the choice of design and location of site was identified as instrumental to the success of the organic or low-input production. Appropriate levels of access to water and feed stations must be provided, along with sufficient space to enable the animals to exhibit natural behaviors. Sufficient space needs to be given</p>



	<p>upon farrowing to protect the piglets and prevent crushing in both indoor and outdoor production systems.</p> <p>In outdoor production, other factors such as soil type, drainage, accessibility, shelter design and pasture management were regarded as important factors. Range areas need to be constantly monitored and re-assessed. Strict pasture management is required to maintain the ground conditions and accessibility.</p> <p>Accessibility of the outdoor areas can be a particular problem, especially during winter months. It was perceived that access problems are alleviated if an outdoor area yard is provided rather than pasture, however, this would not enable the pigs' natural instinct to root.</p> <p>Castration of male pigs was regarded as an important factor irrespective of production system and further research is required to provide a reliable alternative to surgical castration. Some of the identified benefits achieved by castrating males are; less aggressiveness, fighting and mounting of other pigs and it reducing the incidence of boar taint to the meat which can seriously affect the marketability. Surgical castration without an anaesthetic is not allowed in all countries, which leads to contrasting perceptions.</p>
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PA6 - Perceived usefulness and feasibility of measures to enhance animal welfare in organic and outdoor-reared pigs and poultry

TITLE	Perceived usefulness and feasibility of measures to enhance animal welfare in organic and outdoor-reared pigs and poultry
N° in EIP file	PA6
Contact person	Jarkko Niemi (LUKE)
Abstract in English	<p>Farmers and other supply chain experts may perceive measures to enhance animal welfare in low-input outdoor and organic pig and poultry production beneficial but unapplicable. PPILOW survey aimed at identifying such measures to see, how the adoption of beneficial measures could be promoted.</p> <p>In pigs, the use of mobile shelters to enhance pasture use and health and well-being of outdoor-bred pigs and the use of using special pens to maximize piglet viability and health with loose-housed sows were considered substantially more frequently as beneficial than applicable.</p> <p>In poultry, several measures were considered substantially more often as beneficial than applicable. In laying hens these measures included feeding that supports natural behaviours (e.g. grains, insects or vegetables for pecking), restricting maximum number of birds per flock to enhance bird welfare and reduce disease risk, provision of dustbathing areas and efficient control of temperature, humidity and air quality in the house. In broilers, these measures included the use of mobile housing, provision</p>



	<p>of trees, bushes and other natural elements and hides on a pasture, and adjusting nutrition to ensure animal health and growth.</p> <p>As these measures were considered beneficial by the great majority of practitioners, the most common reasons for inapplicability were related to the costs of their adoption and to practical challenges of adoption. Practitioners are recommended to consider alternative ways of implementing beneficial measures if they are considered inapplicable in their standard form.</p>
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PA7 - Tools for data collection and criteria for multicriteria assessment according to the OneWelfare concept

TITLE	Tools for data collection and criteria for multicriteria assessment according to the OneWelfare concept
N° in EIP file	PA7
Contact person	Lucia Rocchi (UNIPG)
Abstract in English	<p>The PPILOW project adopts the One Welfare concept in order to assess different rearing strategies tested both in experimental facilities and commercial farms. The 'One Welfare' concept recognizes the interconnections between animal welfare, human wellbeing and environment (including biodiversity). Although multiple welfare assessment methods exist, a 'One Welfare' assessment tool - for evaluating the progress gained for animals and humans but also for broadening the impact-assessment on all three pillars of sustainability (environmental, social and economic) - has not yet been developed. PPILOW aims to fill this gap by developing specific tools for data collection and by identifying useful criteria to make the concept of One Welfare measurable and more concrete. The tools consist of four widespread sheets, one for each production type considered in the PPILOW project (broilers; laying hens; pigs and sows), which include economic, social, environmental and animal welfare variables. The data collection will enable the computation of the different criteria of the One Welfare Assessment Framework as identified with the National Practitioner Group using a participatory approach.</p>

PA8 - Methodology and process facilitating the National Practitioner Groups during Covid-19

TITLE	Methodology and process facilitating the National Practitioner Groups during Covid-19
N° in EIP file	PA8
Contact person	Martina Re (AIAB)
Abstract in English	<p>In PPILOW project participatory approach is crucial to ensure that project outcomes are broadly supported and respond to the needs of society. 'National Practitioner Groups' (NPGs) are organized, consisting of broad range of actors, representing the</p>



	<p>whole value chain, from farmers to retailers. In the original project frequent live meetings were planned. However, they were limited by Covid-19 breakout. NPG facilitators had to be creative and flexible in order to perpetuate the functionality of the NPG.</p> <p>Involving actors and engage them online was particularly challenging. In particular, it was difficult to create online a collaborative group, without leaving any space for informal interaction, crucial when forming new groups. Especially farmers from marginal areas had a lower interest to participate. Additionally, during these online meetings more intervention from the facilitators was needed to ensure that all actors participate in the debate.</p> <p>Choosing an easy platform is important for guaranteeing meeting quality and participation.</p> <p>Otherwise, online meetings were often more accessible, as participation did not require transport. Methods for making online meetings more interactive are: 1 the use of polls or other voting systems, as this requires everybody to participate; 2. the chat function helps to involve actors who are not comfortable to take the word in the discussion; 3. the use of breakout rooms can help interaction in smaller groups.</p> <p>We found that following these tips, while encouraging phone calls with actors, has led to good results.</p> <p>In conclusion, it is important for next years and future projects to rethink participatory methodologies as a whole, by evaluating a combination of ONLINE and IN PERSON meeting.</p>
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PA9 - Dual-purpose genotypes in organic egg production and effect on egg quality

TITLE	Dual-purpose genotypes in organic egg production and effect on egg quality
N° in EIP file	PA9
Contact person	Sanna Steinfeldt (AU)
Abstract in English	<p>Laying hens of different genotypes have been selected for generations for high yield and egg quality. This has resulted in efficient feed conversion and low body weight; whereby they are not suitable for meat production. Male chickens of egg-laying genotypes are therefore killed as day old. Due to the ethical dilemma and for better resource utilization, there is now more focus on other genotypes, the dual-purpose breeds, in order to be able to use the male chickens for meat production. The purpose of the study was to evaluate potential dual-purpose genotypes for the quality of their eggs compared to an efficient layer genotype. Two dual-purpose genotypes with divergent characteristics were evaluated: genotype A represented an experimental crossbreed based on a broiler type male and an egg layer female, and genotype C was a crossbreed of a layer type. These were compared to a rustic genotype B and a control genotype D, which was an egg layer. Eggs were collected from 21-54 weeks of age and a total of 990 eggs were analyzed. Parameters for egg weight, proportions of</p>



	<p>shell, yolk and albumen, along with quality parameters were measured. The layer genotype D produced the smallest eggs with the lowest frequency of blood and meat stains, compared to eggs from the two dual-purpose genotypes. The shell quality was best for layer genotype D. However, genotype A laid eggs of comparable shell quality, dry matter content in the albumen and yolk weight, and with the darkest and most reddish-yellow yolk. Genotype C, the second dual-purpose genotype, as well as the rustic genotype B, produced eggs of low-medium quality. In conclusion, genotype A can serve as a dual-purpose genotype from an egg quality perspective and male chickens can be used for sustainable meat production.</p>
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PA10 - Personality traits and exploratory behavior in slow-growing broilers

TITLE	Personality traits and exploratory behavior in slow-growing broilers
N° in EIP file	PA10
Contact person	Elisabeth Duval (INRAE)
Abstract in English	<p>Free-range system provides an outdoor range for broilers in order to allow them to express their natural behaviour. Nevertheless, we observe high variability of outdoor range usage by broilers due to large number of factors. Broiler's range usage can be individually quantified thanks to a distance index and qualified as his exploratory behaviour. It has been highlighted that range use is stable over time (early and late access), defining exploratory behaviour as a personality trait. On top, foraging behaviour, locomotion and social motivation were linked to the exploratory behaviour. However, this work was only performed on one strain, thus the genetic factor could not be excluded. To precisely define broilers' exploratory behaviour and its components, we investigated among four different slow growing breeds. We noticed a strong correlation between the exploratory behaviour at 37 to 46 days old and at 56 to 67 days old in all 4 strains. Thus, we confirmed that exploratory behaviour is a personality trait. Regarding, foraging and locomotion, we found no steady links with range use. However, we only observed foraging and locomotion before range access when broilers were 14 to 19 days old and animals' growth could influence their personality. Indeed, social motivation was noticed at not stable in time since no correlation was detected between the first social motivation test performed at 22 to 25 days old and the second round of test performed at 50 to 53 days old. Our results suggest that in very young animals, when personality traits are probably not yet established, early behavioural patterns may be poor indicators of later range use.</p>

PA11 - Artificial digestion to detect *T. spiralis* larvae in pork

TITLE	Artificial digestion to detect <i>T. spiralis</i> larvae in pork
N° in EIP file	PA11



Contact person	Vasile Cozma (USAMV CLUJ)
Abstract in English	<p>Trichinella spiralis widespread in wild animals and often can be found in domestic pigs. This parasite species is also the most important etiological agent in human trichinosis.</p> <p>This study aimed to compare the detection capability (for <i>Trichinella spiralis</i> larvae) of artificial digestion to an experimental microfluidic device.</p> <p>A total of 10 positive domestic pigs for <i>T. spiralis</i> were tested (5g/animal) in both methods. Artificial digestion is the gold standard method for the direct detection of <i>Trichinella</i> larvae in meat samples. The microfluidic method is a new approach regarding the detection of <i>Trichinella</i> spp. This method was done by an experimental device from Hungary (Bionics Biomicrofluidics lab, Budapesta).</p> <p>Out of the 10 positive samples, only two animals were negative in the microfluidic method, but they were positive (2, 21 larvae) in artificial digestion. Samples with high (500, 100, 75, 68) and medium (58, 20) number of larvae in artificial digestion, had a medium (200, 19, 40, 51) and small (4, 1) larvae count in the microfluidic method. In two cases, the number of larvae found in the microfluidic method was higher (35, 18) than in artificial digestion (32, 12).</p>

PA12 - Anti-Ascaris suum effect of *Artemisia absinthium* and *Allium sativum*

TITLE	Anti-Ascaris suum effect of <i>Artemisia absinthium</i> and <i>Allium sativum</i>
N° in EIP file	PA12
Contact person	Marina Spinu (USAMV CLUJ)
Abstract in English	<p><i>Ascaris suum</i> is present in traditionally managed indoor herds and on industrialized farms, especially in old fatteners and sows. Increasing resistance against antihelmintics redirected the research towards alternative, traditional therapies, medicinal plants included.</p> <p>This study comparatively evaluated the in vitro effects of <i>Allium sativum</i> and <i>Artemisia absinthium</i> L., on inhibition of <i>A. suum</i> egg hatching and larval development.</p> <p><i>A. suum</i> eggs were collected from randomly sampled of traditionally maintained swine faeces. The egg suspension was divided in two control and two experimental groups. In the experimental groups the egg suspensions were treated with alcoholic plant extract of various concentrations. <i>A. suum</i> eggs were examined at L1, L2 and L3 stages.</p> <p>Anti-embryogenic effects on the <i>A. suum</i> eggs were expressed by both plants at all tested concentrations. <i>A. sativum</i> and <i>A. absinthium</i> extracts showed a strong antihelmintic activity; still, in-depth phytochemical studies are required to identify the compounds responsible for the antihelmintic properties of these species.</p>



3. Conclusion

The 12 practice abstracts contained in this deliverable reflect a range of combination of practical solutions for welfare improvement that can be applied on a pan-European basis. Some practices can offer cross-sectorial, or cross-country learning opportunities.