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Incubation and early-life strategies to minimize feather pecking and cannibalism in laying hens

One of PPILOW's experiments aims to develop innovations to reduce feather pecking in laying hens. This will help farmers in keeping laying hens with intact beaks. This experiment is split up in short term effects of the strategies on animal welfare (incubation and rearing) and long-term effects (laying phase).

Incubation and rearing: short-term effects

We know that incubation and early life are important for the healthy development and functioning of animals. We also know that feather pecking has multiple underlying causes, among which are fearfulness and lack of foraging opportunities. By adapting the incubation and rearing environment the birds may become less fearful, more robust, and less prone to develop feather pecking. We studied the effect of a light-dark cycle with green light during the entire incubation, as this has been shown to reduce fearfulness in broilers. In addition, in early life, we investigated if foraging enrichment with insect larvae had a positive effect on fearfulness and feather pecking. We studied fearfulness and feather pecking using multiple behaviour tests. The experiments were finished in September 2021. Light during incubation and larvae enrichment during rearing had small short-term effects:

- Light during incubation reduced fear of humans, but only in one test. It did not affect feather pecking.
- Larvae enrichment increased foraging bouts, but not duration. It did not affect fearfulness or feather pecking.

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

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Incubation and hatching in a green light/dark cycle

Insect larvae provided in perforated cylinders

Laying phase: Long-term effects

The effects of the incubation and rearing treatments were followed into adulthood at ILVO's experimental free-range facility, where the hens would spend approximately one year in mobile poultry houses with access to a large, tree-covered outdoor range. While ranging, the groups of hens also had access to live insect larvae in operant feeders placed on the range in alternating 12-week periods. The hens' body condition was scored approximately every 8 weeks to monitor feather condition and other health measures, and they were subjected to behavioural tests early and late in the laying period to obtain measures on fearfulness and stress responsivity.

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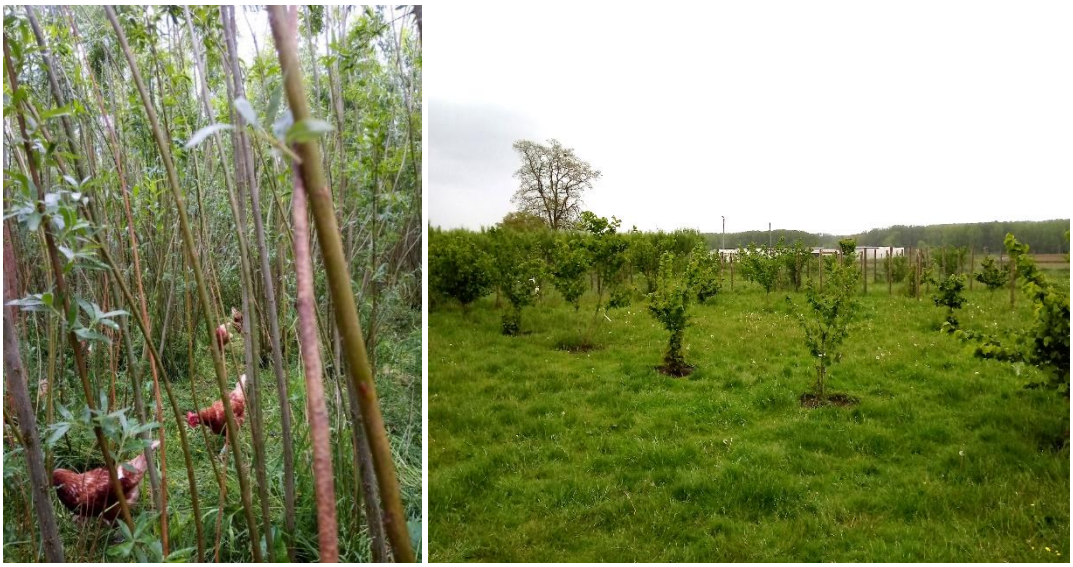

The two types of tree-covered areas of the outdoor range: short rotation coppice of willow (left), and hazel trees (right).

After an extended period of indoor confinement due to avian influenza there was an outbreak of feather-pecking in all groups during the first experimental round, with no difference between treatments for feather condition. Only a single instance of a substantial wound (i.e. excluding scratches) from cannibalism was recorded. In the second experimental round overall feather condition was good in all groups (no difference between treatments), though unlike round 1, the hens in round 2 have had access to a covered outdoor veranda throughout the influenza confinement. The second round of experiments was completed in August 2022.

- Rearing treatments and larvae provisioning in the free range had relatively few effects on adult performance.
- Feather pecking and feather damage were mainly affected by veranda access.
- Free-range use fitted with previous studies, with hens staying close to the house and preferring more open areas over the forest.
- Larvae enrichment during early-life increased foraging skills in adult hens.

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Video:
PPILOW web series: prevent feather pecking in laying hens

Further reading:

- Kliphuis, S., Manet, M. W. E., Goerlich, V. C., Nordquist, R. E., Vernooij, H., Brand, H. V. D., Tuyttens, F. A. M., & Rodenburg, T. B. (2023). Early-life interventions to prevent feather pecking and reduce fearfulness in laying hens. *Poultry Science*, *102*(8), Article 102801. https://doi.org/10.1016/j.psj.2023.102801
- Kliphuis, S., Manet, M., Goerlich, V., Nordquist, R., Vernooij, H., Tuyttens, F. A. M., & Rodenburg, B. (2024). Effects of lighted incubation and foraging enrichment during rearing on individual fear behavior, corticosterone, and neuroplasticity in laying hen pullets. *Poultry Science*, *103*(6), Article 103665. https://doi.org/10.1016/j.psj.2024.103665
- Vanden Hole, C., Plante-Ajah, M., Kliphuis, S., Manet, M., Rodenburg, T.B., Tuyttens, F. In press. The impact of early-life conditions on visual discrimination abilities in free-ranging laying hens. Accepted for publication by Poultry Science on 13 August 2024.

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