



PPILOW-talk: Light & larvae as early-life interventions to prevent feather pecking in laying hens

Saskia Kliphuis

PhD candidate Animal Welfare group

Animals in Science and Society

s.kliphuis@uu.nl



PPILOW consortium: 23 organizations in 9 countries

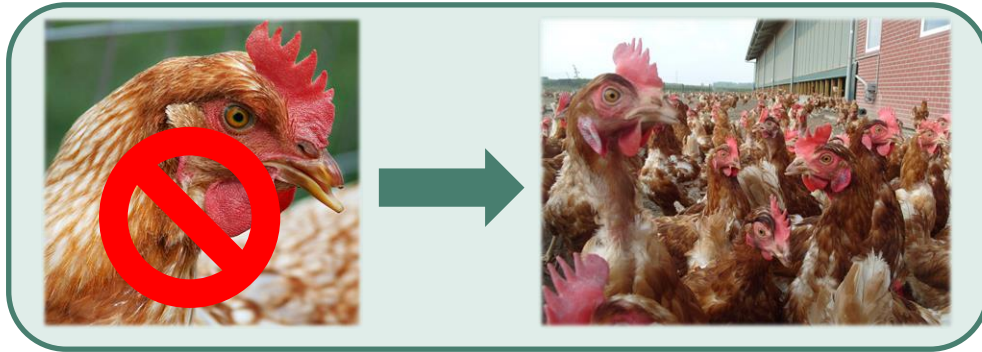
Experimental and on farm-facilities engaged in PPILOW

- 1 Organic/low input outdoor broiler experimental facilities
- 2 Organic/low input outdoor broiler farms
- 3 Organic/low input outdoor laying hen experimental facilities
- 4 Organic/low input outdoor laying hen farms
- 5 Organic/low input outdoor pig experimental facilities
- 6 Organic/low input outdoor pig farms

Locations and associated organizations:

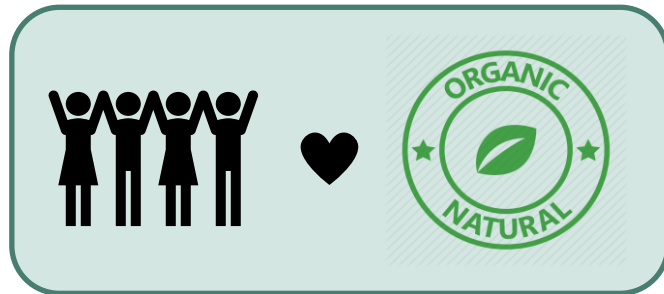
- HAU
- WU UU
- AU Vanggaard FEXP
- LUKE
- TI-BW
- USAMV
- INRA ACTA SYSAAF YNCREA-HDF CNRS IT
- EV-ILVO CRAW BioForum Circular Organics
- AIAB UNIPG SlowFood EAAP

Background



Ban on beak trimming,
increased risk of damage
feather pecking (FP)

Rodenburg et al., 2013



Adapt environment to
animal behavioural
needs



Prepare laying hens for
outdoor life

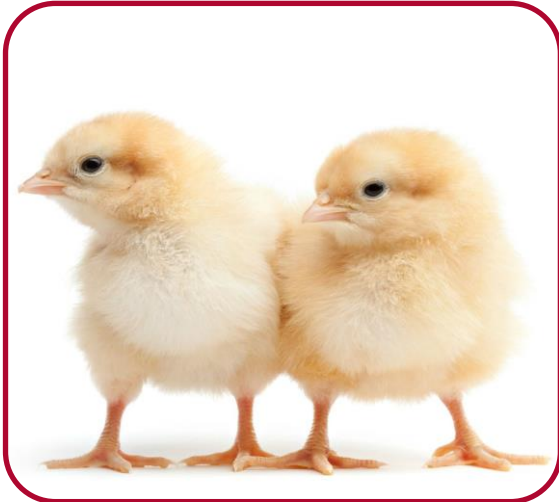
Campbell et al., 2019

Importance of early life experiences



- **Incubation environment influences stress sensitivity**

Archer and Mench, 2014; Özkan et al., 2022



- **Enriched rearing environment reduces fearfulness and increases cognitive abilities**

Brantsaeter et al., 2016; Gilani et al., 2013; de Haas et al., 2014

Objective & methods

Reduce stress sensitivity and the risk of FP, through:

Green light-dark cycle during incubation



Black soldier fly (BSF) larvae as enrichment during rearing



2x2 factorial design, 44 pens (400 birds) in total:

Light-Dark – No larvae	Light-Dark – Larvae	Dark - Larvae	Dark – No larvae
			

44 home pens



Behaviour tests – overview

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Round 1 Jan-Jun '20	NO-1		LT		<u>FP</u>	<i>COVID</i>				NOT-2 HA	TI			VR	<u>FS</u>			
Round 2 Apr-Sep '21	NO-1 <u>FBO</u>		LT <u>FBO</u>		<u>FP</u>	<u>VA</u>	<u>FBO</u>	OF		NOT-2 HA	TI		VR		MS <u>FS</u>			CFL

Individual tests:

LT = Lateralisation test

VA = Voluntary approach test

TI = Tonic immobility test

OF = Open field test

MS = Manual restraint test

FS = Feather scoring

CFL = Contrafreeloading test (pilot)

Pen level tests:

NO = Novel object test

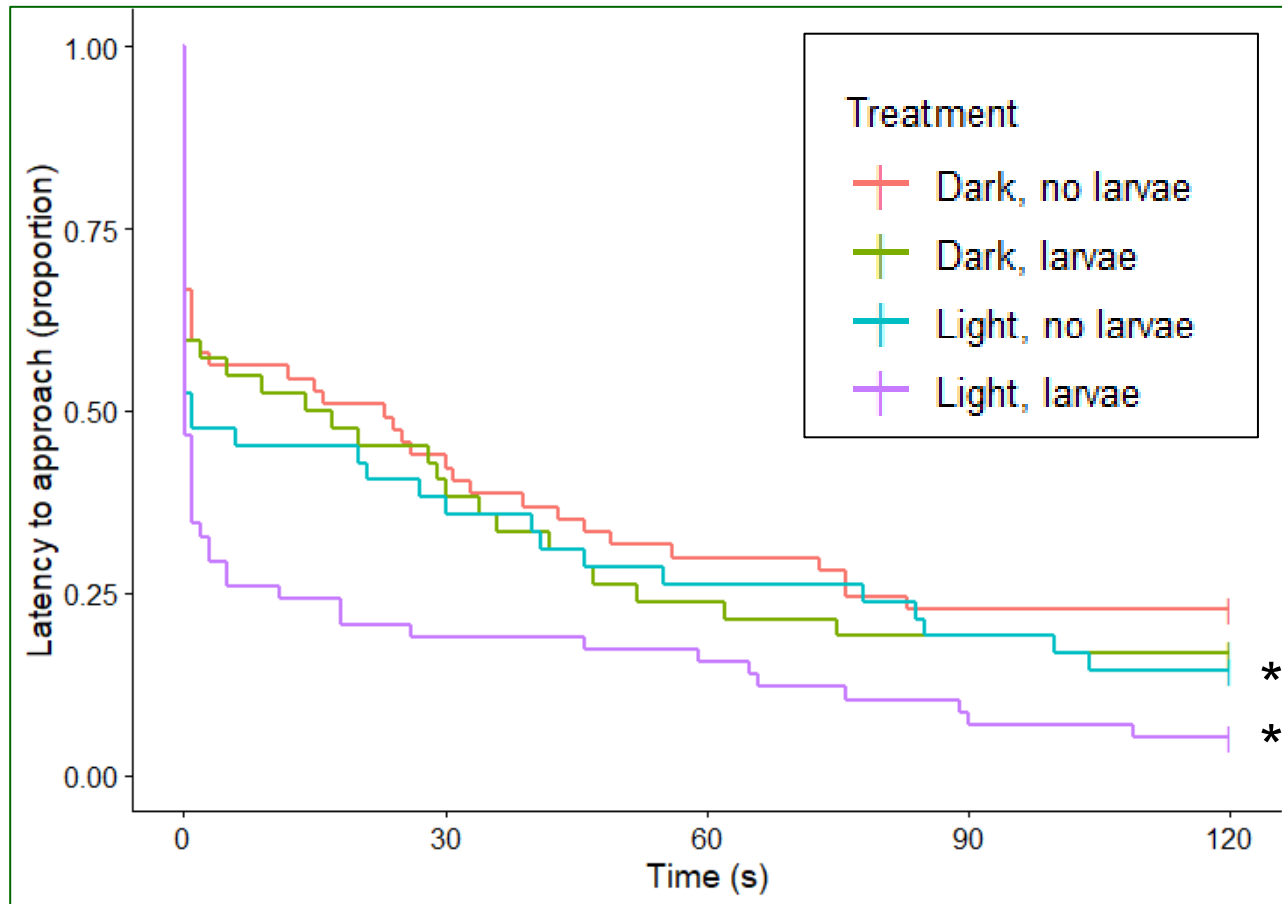
FBO = Foraging observations

FP = Feather pecking observations

HA = Human Approach test

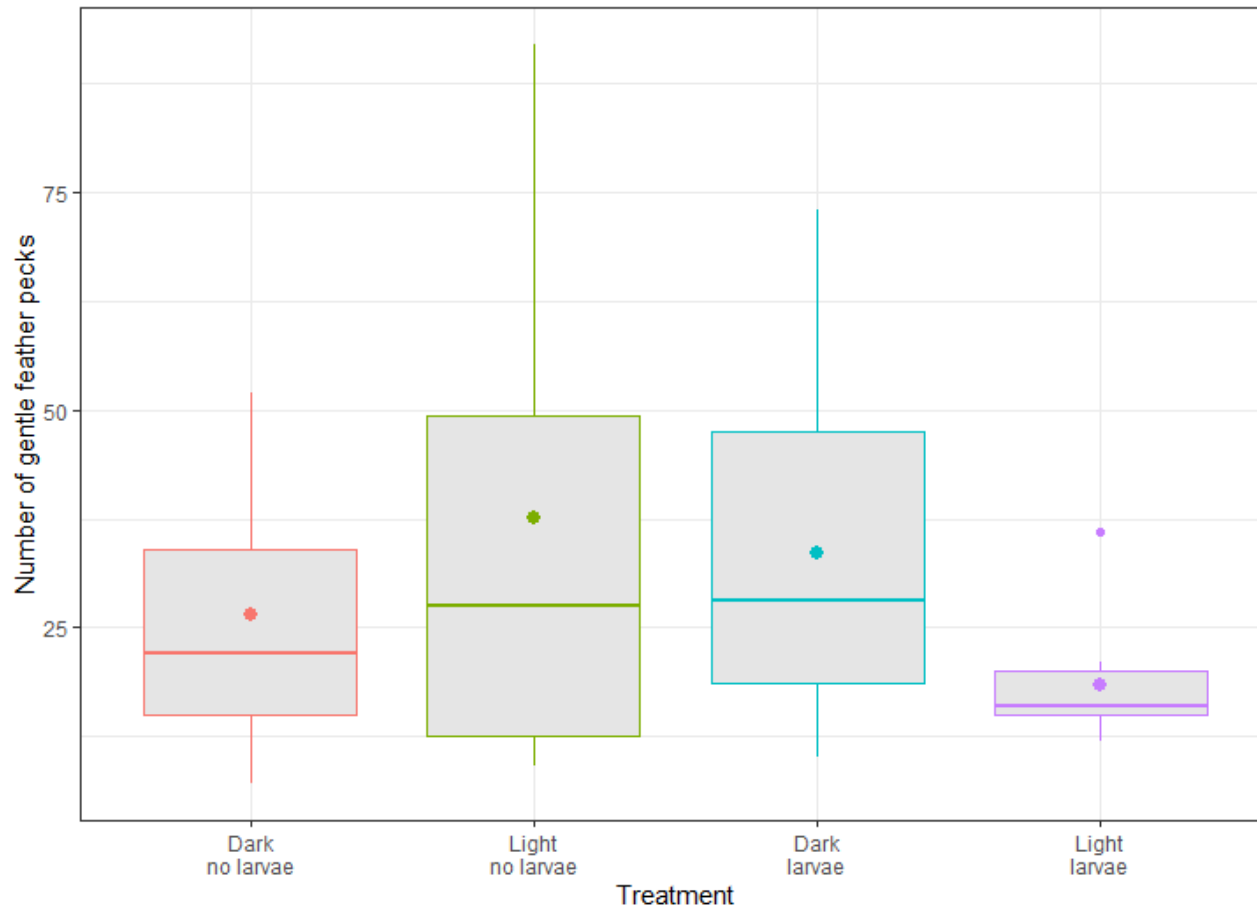
VR = Vaccination recovery test

Fear of humans (6 wks)



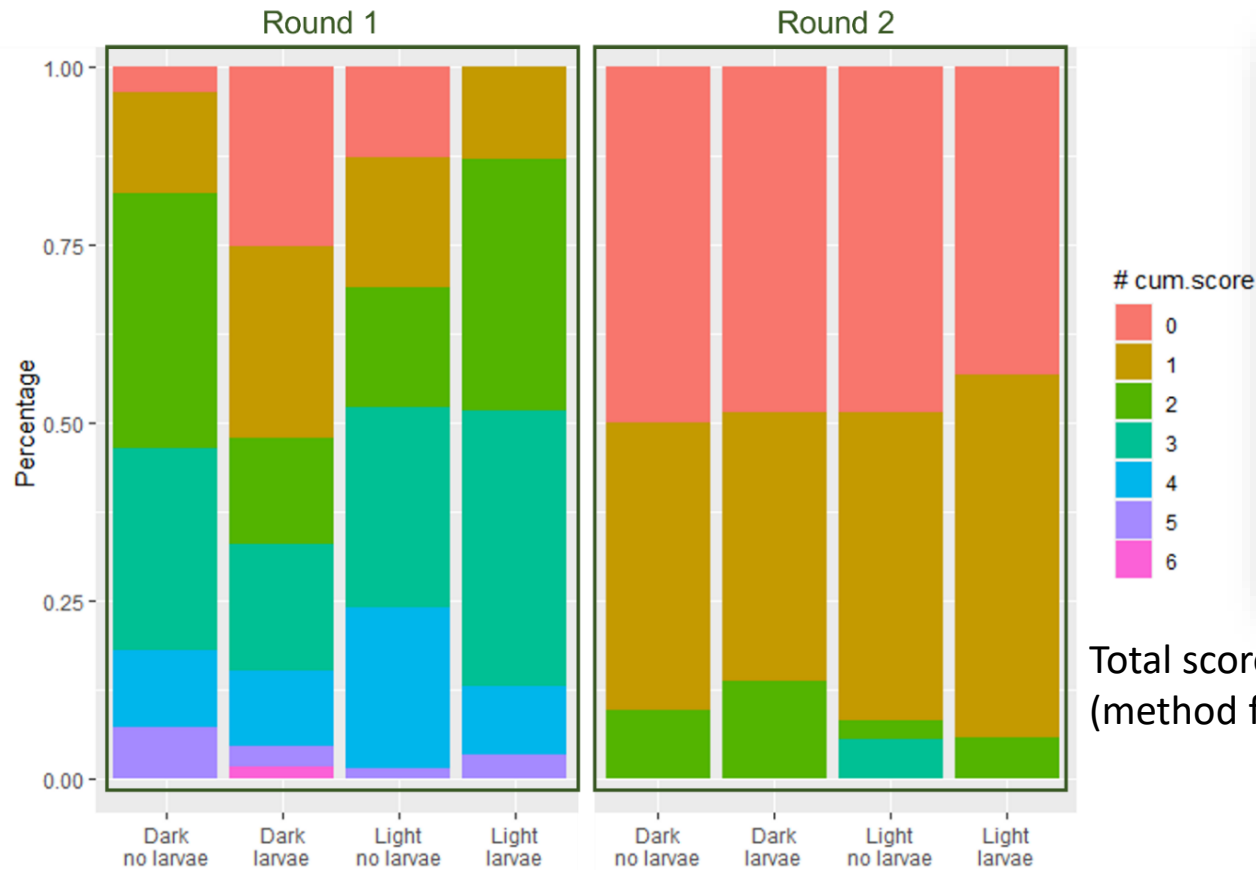
- Light-incubated birds approached 1.29 times faster than dark (95% CI 0.09-0.99, $p < 0.05$)
- However: No effects found in other fear tests performed (NOT, HAT, TI, OFT, MR)

Feather pecking (5 wks)



- No effect of light-incubation and larvae on number of gentle FP
- Hardly any severe FP observed
- Gentle FP 1.34 times more often in round 1 compared to round 2 (95% CI 0.27-0.44, $P < 0.0001$)

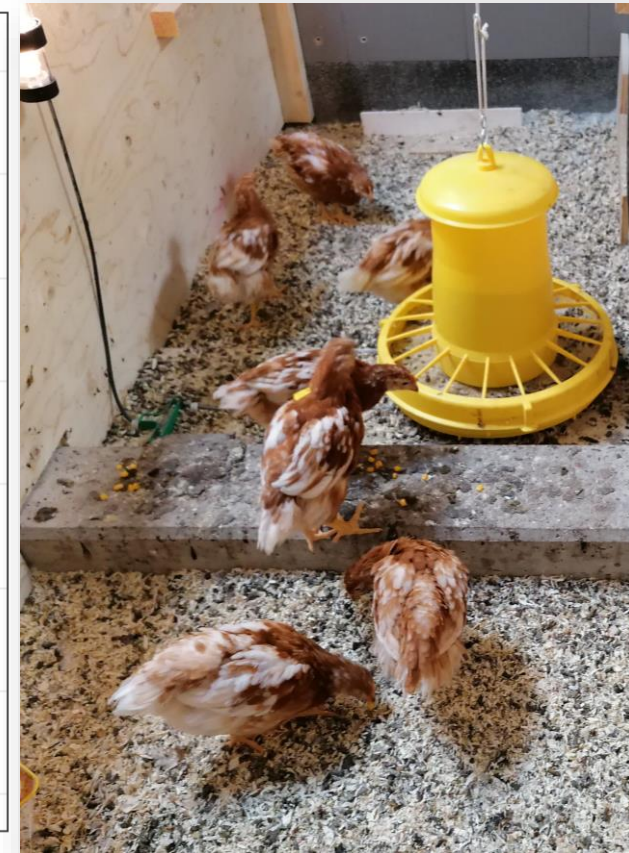
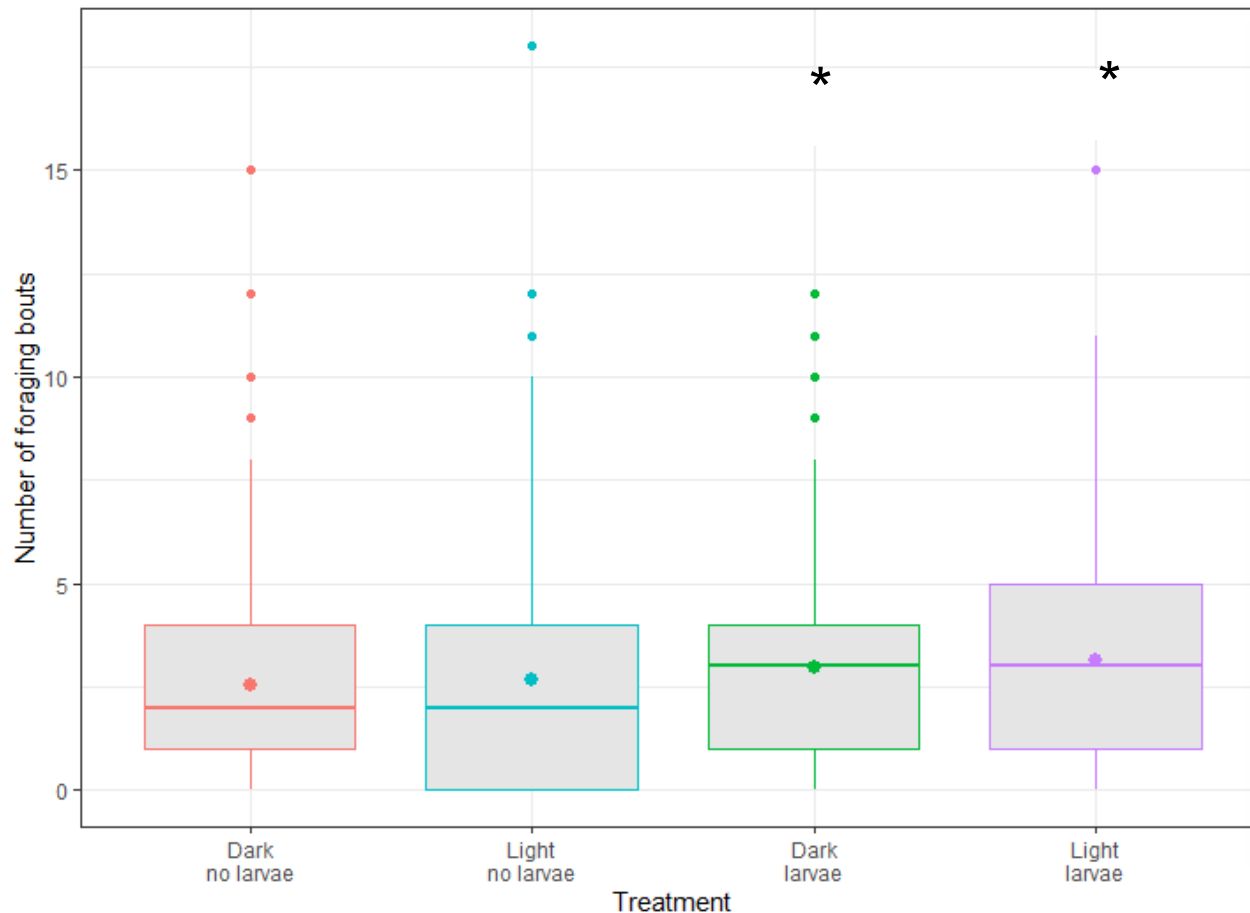
Feather scoring (15 wks)



Total score of 11 body regions, 0 = no damage (method from Bilcik & Keeling, 1999)

- Overall little feather damage (max score = 54, our birds had max 6)
- No effects of light or larvae on feather damage
- Slightly more feather damage in round 1

Foraging behaviour (1, 3 and 7 wks)



- Larvae-enriched birds foraged 1.19 times more often than birds that did not receive larvae (95% CI 1.02-1.29, $p=0.008$)
- However: no effect on total foraging time
- Pen level data only scored in round 2 → low sample size

Take home messages

Early-life effects

- In general, minor effects of treatments on behaviour
- Light during incubation...
 - reduced fear_of humans, but only in one test
 - did not affect feather pecking
- Larvae enrichment...
 - increased foraging bouts, but not duration (though low sample size)
 - did not affect fearfulness or feather pecking
- Round effects in some tests

Too enriched?
Longer photoperiod?
Scattering larvae?

Observer effect?
Parental stock age?
COVID lockdown?



© Michael Plante-Ajah

Long-term effects

Follow-up study in progress, results expected in 2023
(effect on fear, feather pecking and free-range use)

Acknowledgements



Wageningen team

- Henry van den Brand
- Marcel Heetkamp
- Ries Verkerk



Utrecht team

- Maëva Manet
- Bas Rodenburg
- Vivian Goerlich
- Rebecca Nordquist
- Arjen van Putten
- Jary Weerheijm
- Mona Giersberg
- Freek Weites
- Marc Kranenburg
- Thijs Manders
- Mieke Matthijs



ILVO team

- Frank Tuytens
- Charlotte van den Hole
- Michael Plante-Ajah

Students

- Kjelt Kruijthoff
- Margaux Laurent
- Antoine Prunier
- Elyse van Leeuwen
- Dylan Geerman
- Inge van der Burg
- Eric Scherpenisse
- Elise Reuvers
- Rosa Schimmel
- Lisa Veldkamp
- Jesse Tijssen



All animals



Thanks for your attention! Questions?

