



# Early-life strategies to limit feather pecking in laying hens

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PPILOW Final conference – Africa Museum, Tervuren (Brussels)

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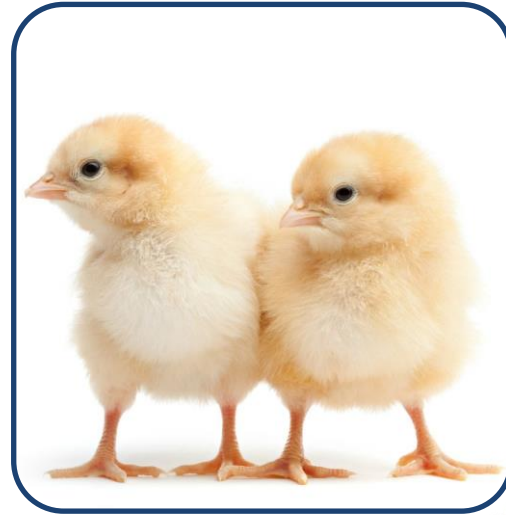
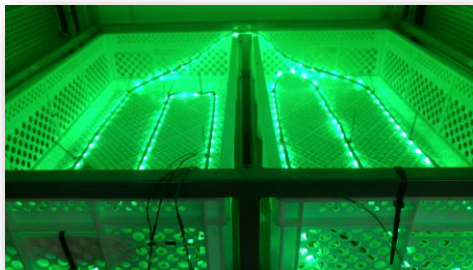
# PPILOW - Feather pecking, beak trimming & free-range use



Poultry World



## How to keep laying hens with intact beaks?

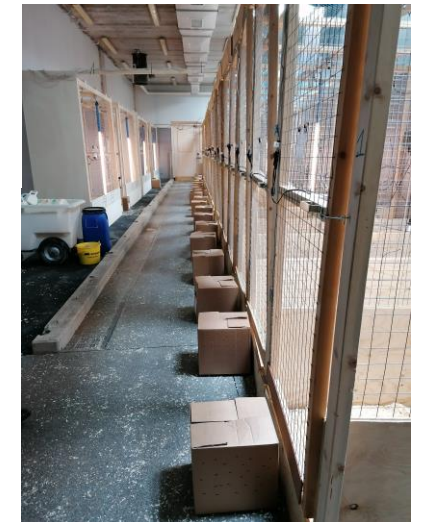


# PPILOW – Incubation and rearing



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

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



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

**Individual tests:**

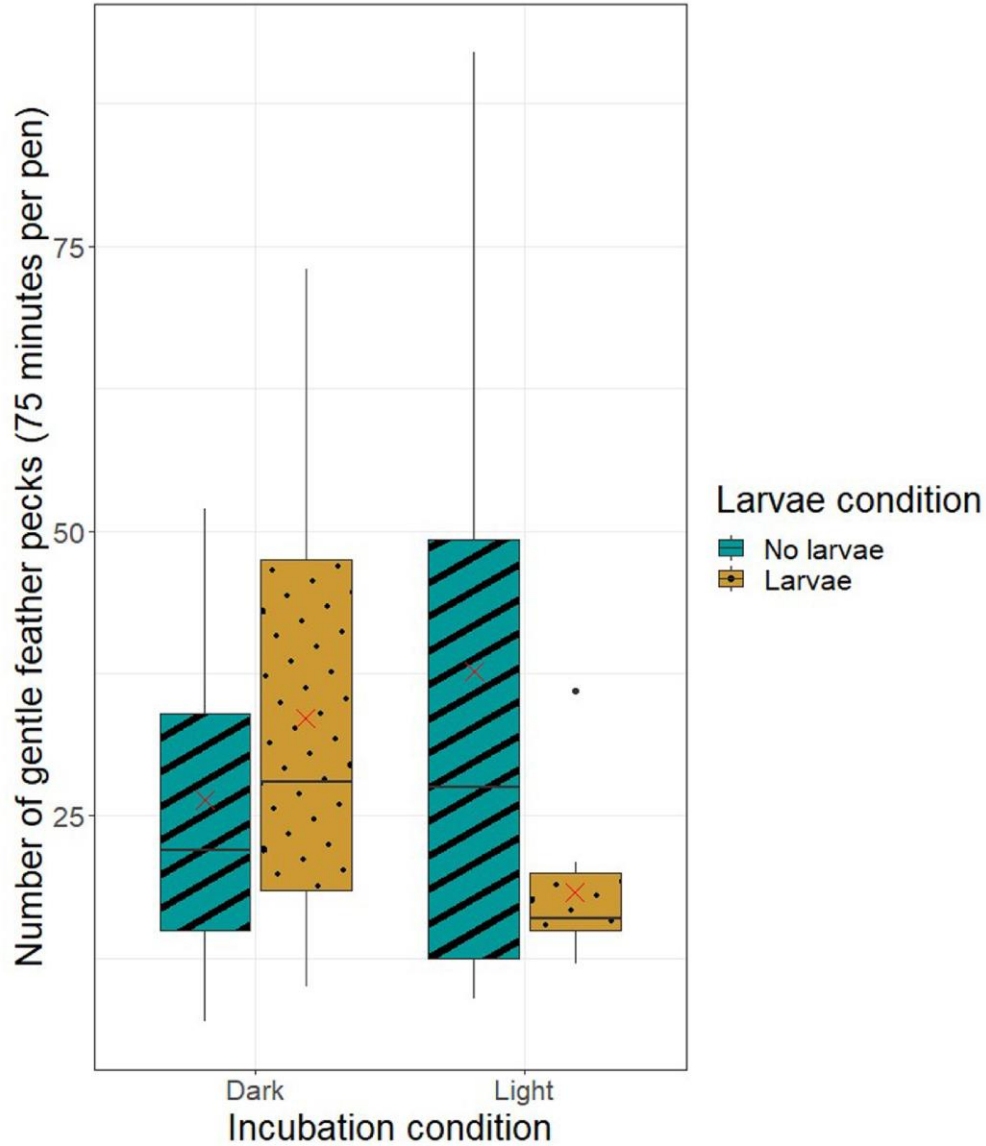
- LT = Lateralisation test
- VA = Voluntary approach test
- TI = Tonic immobility test
- OF = Open field test
- MS = Manual restraint test
- FS = Feather scoring
- CFL = Contrafreeloading test (pilot)

**Pen level tests:**

- NO = Novel object test
- FBO = Foraging behaviour observations
- FP = Feather pecking observations
- HA = Human Approach test
- VR = Vaccination recovery test



# PPILOW – Feather pecking (5 wks)

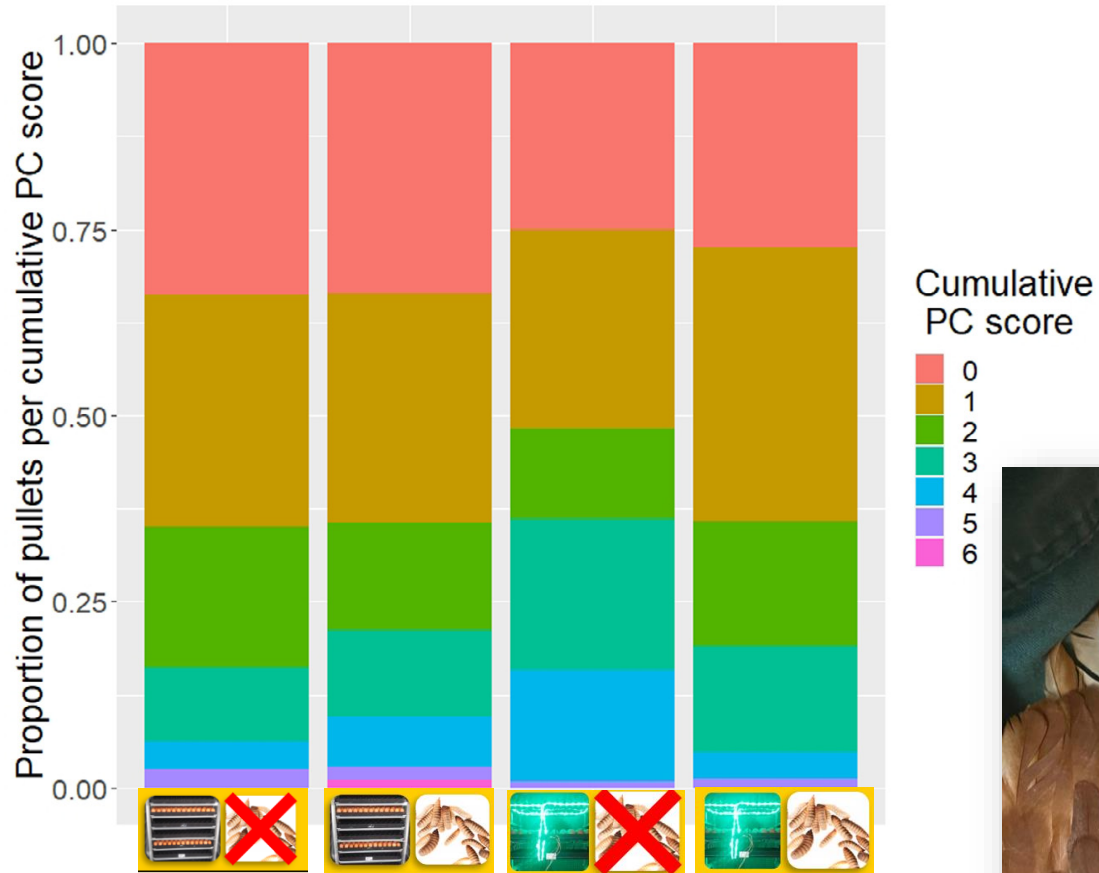


## Early-life interventions to prevent feather pecking and reduce fearfulness in laying hens

Saskia Kliphuis\* , Maëva W.E. Manet\*, Vivian C. Goerlich\*, Rebecca E. Nordquist\*, Hans Vernooij\*, Henry van den Brand†, Frank A.M. Tuytens‡§, T. Bas Rodenburg\*†

- **No effects** on gentle feather pecking
- Hardly any severe feather pecking observed

# PPILOW – Plumage condition score (15 wks)



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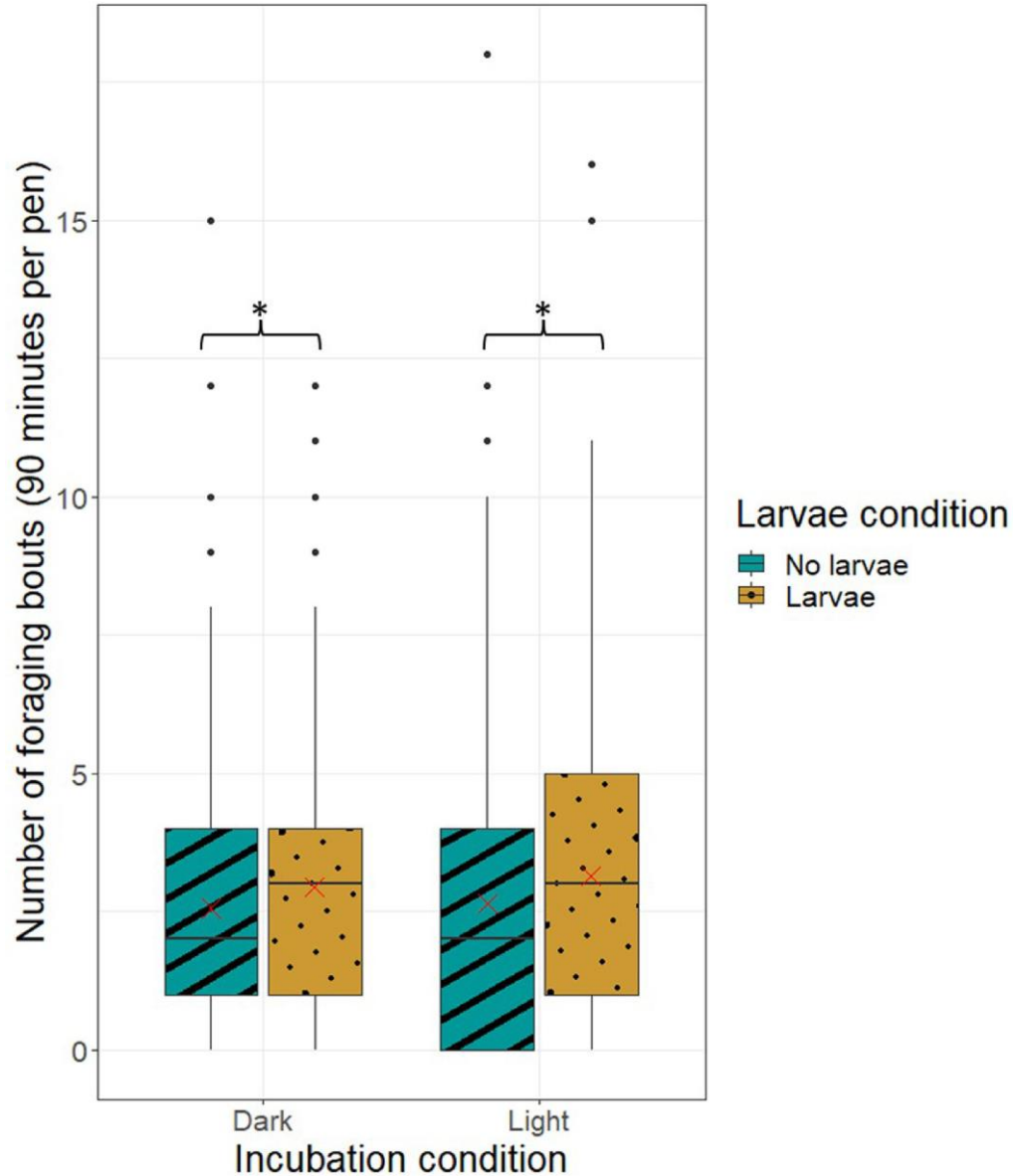
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- Total score of 11 body regions
- Overall little feather damage
- **No effects** on plumage condition (PC) score



# PPILOW – Foraging behaviour (1, 3 and 7 wks)



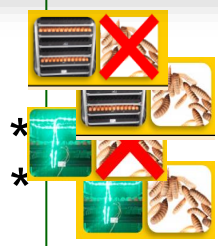
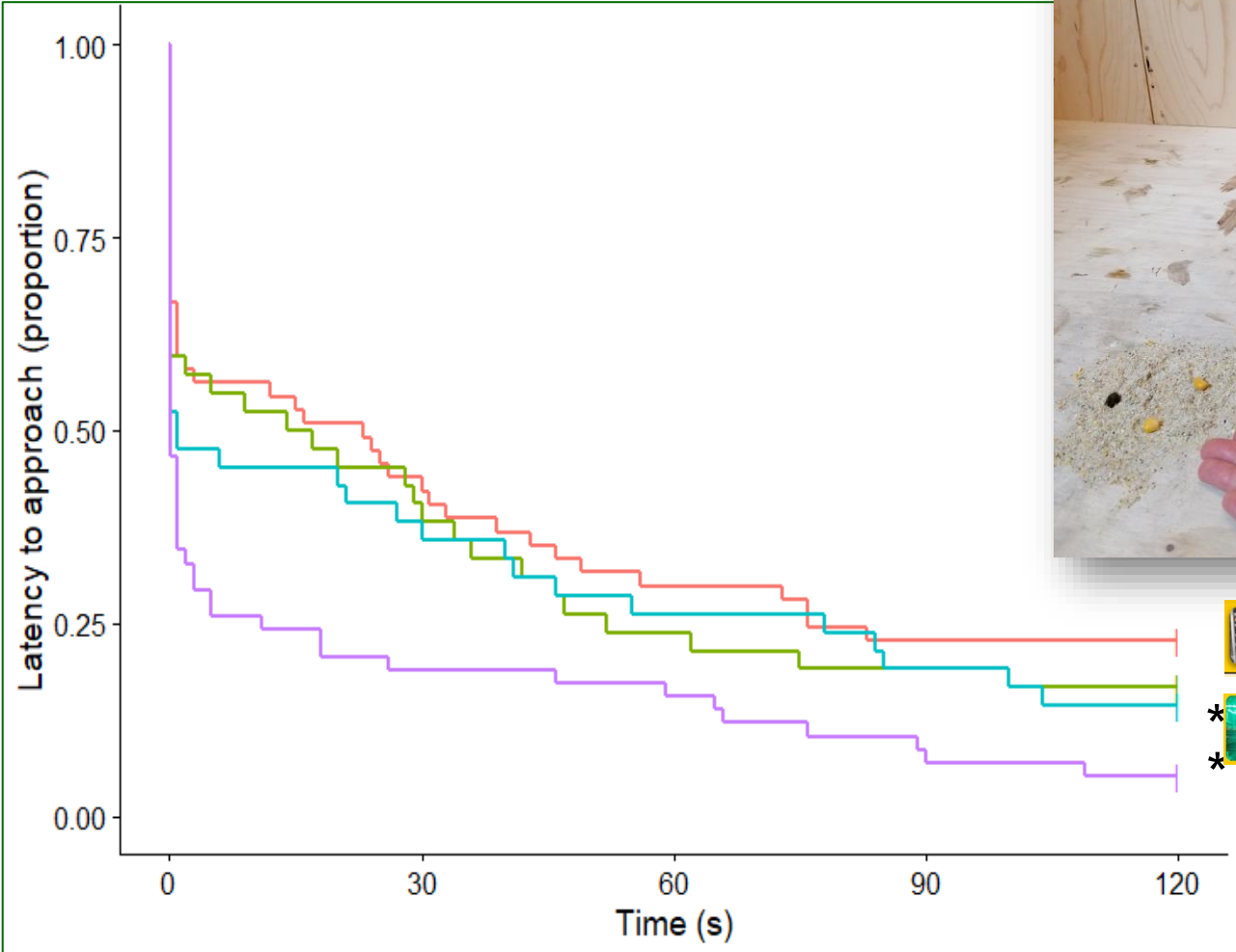
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- Larvae-enriched birds **foraged more often**
- BUT: no effect on total foraging time



# PPILOW – Fear of humans (6 wks)



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ELSEVIER

Animal Well-Being and Behavior

### Effects of lighted incubation and foraging enrichment during rearing on individual fear behavior, corticosterone, and neuroplasticity in laying hen pullets

Saskia Kliphuis\*, Maëva W.E. Manet\*, Vivian C. Goerlich\*, Rebecca E. Nordquist\*, Hans Vernooij\*, Frank A.M. Tuytens†‡, T. Bas Rodenburg\*§

- Light-incubated birds **showed less fear towards humans**
- BUT: No effects in other fear tests



Flanders Research Institute for Agriculture, Fisheries and Food

- At approximately 20 weeks
- Birds moved to ILVO to two mobile housing units withing an 88 x 88 m free range area
- Each house was subdivided in two, resulting in four groups
- Two reared with larvae, two without



Groups

- 1 Lv+ Inc- & Inc+
- 2 Lv- Inc- & Inc+
- 3 Lv+ Inc- & Inc+
- 4 Lv- Inc- & Inc+

Legend

- F Larvae Feeder
- S Mobile Stable
- WG Winter Garden
- W Willow Area
- H Hazel Area



Each of the four groups had:

- Access to a dense area with willows
- Access to a more open area with hazelnut trees
- Larvae feeder offered in the furthest corner of each field (12 wk periods)
- Round 2: covered veranda added (six month confinement due to AI)



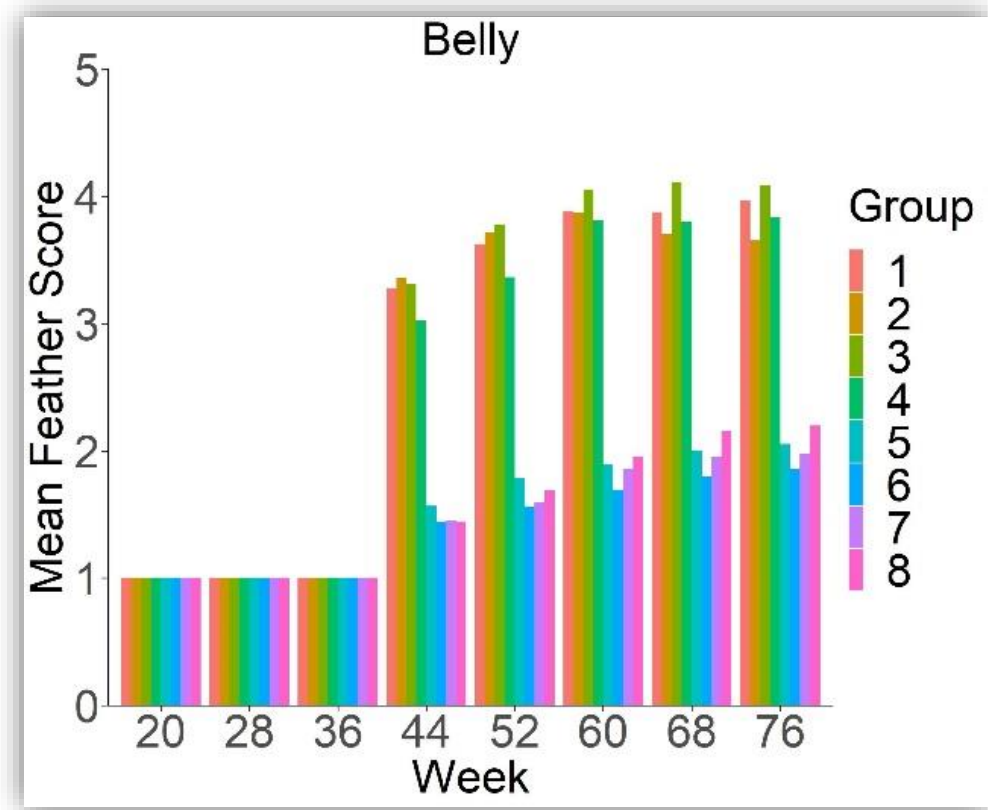
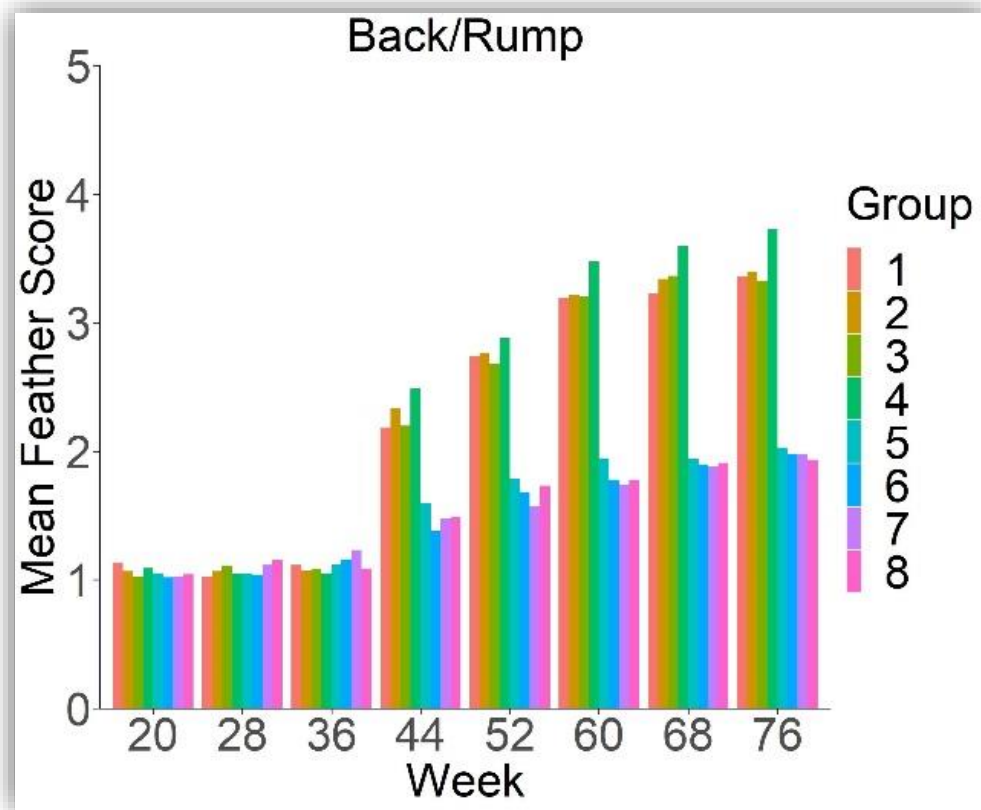
Groups

- 1 Lv+ Inc- & Inc+
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- 3 Lv+ Inc- & Inc+
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Legend

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## PPILOW – Laying phase: Feather damage and wounds



- Very few wounds, mortality 5%
- More feather damage in batch 1 (no veranda during AI outbreak)
- No effect of rearing treatments



- Feather damage and wounds: few wounds and low mortality
- Feather damage developed with age, especially in batch 1 (no access to covered veranda during AI outbreak):

**Clear positive effect of veranda with foraging opportunities**

- **No effect of rearing treatments or from larvae provisioning on feather damage:**  
restriction from free range access played major role

## PPILOW – Laying phase: Range use

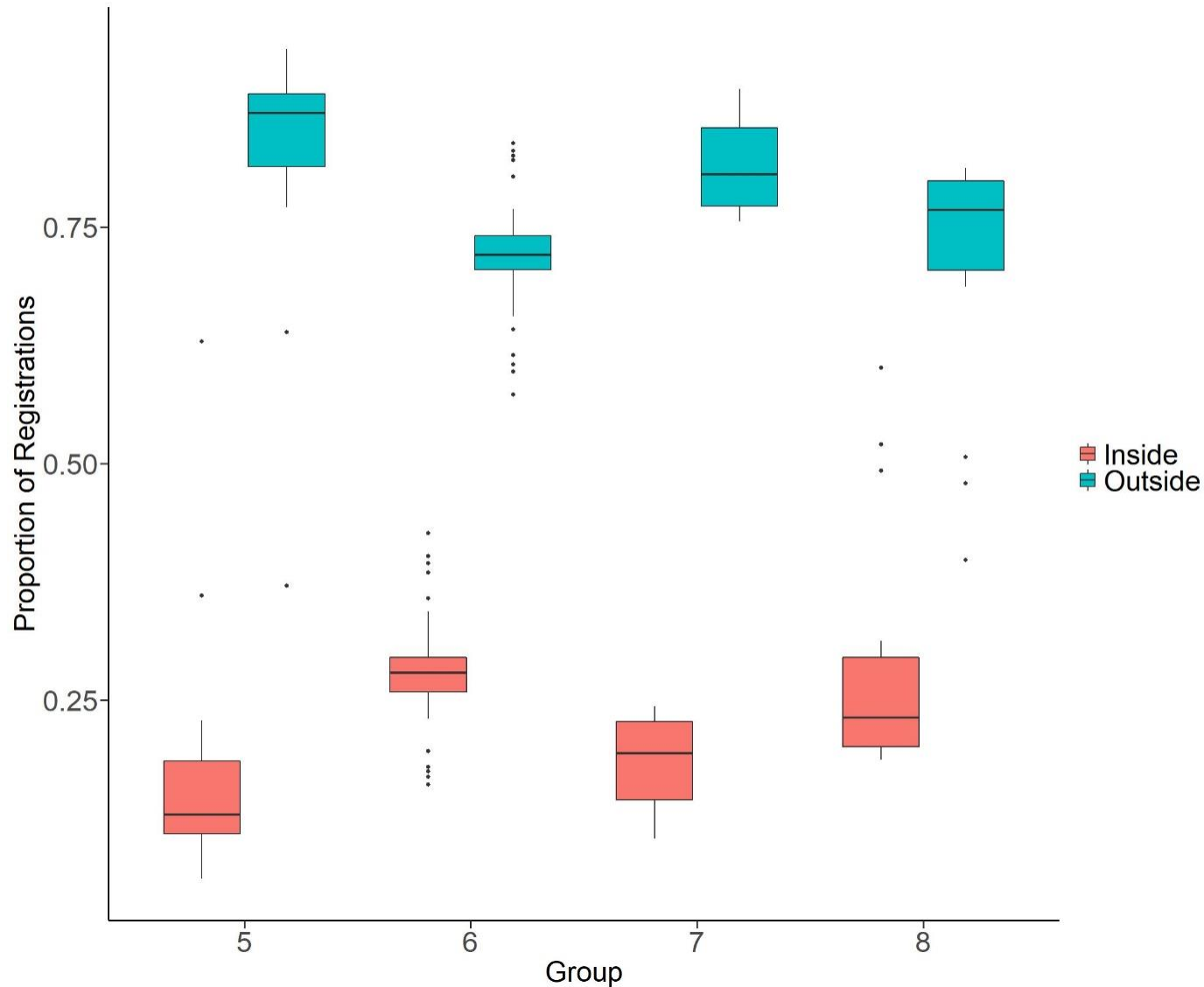
- Range use monitoring only in last part batch 2
- Data from approximately 100 hens fitted with UWB tag



23 days of tracking period August - October 2022 (81 wks)



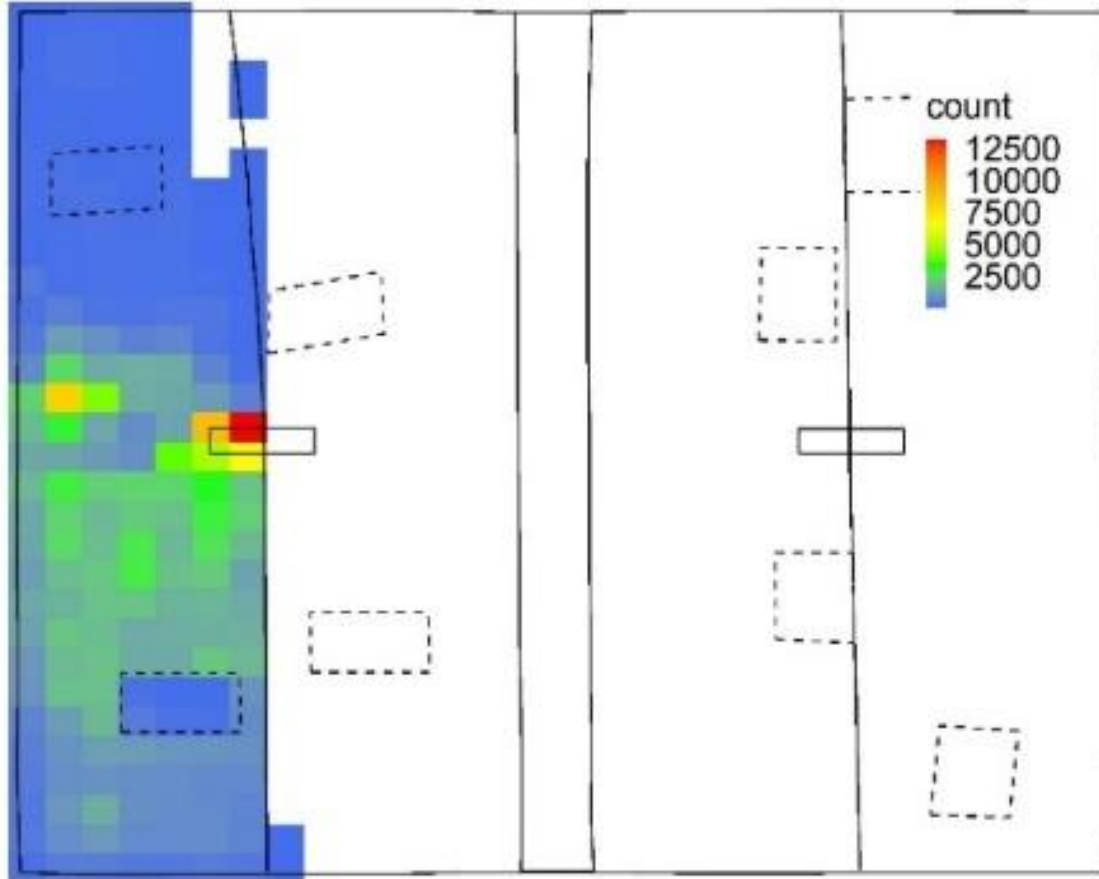
## PPILOW – Laying phase: Range use



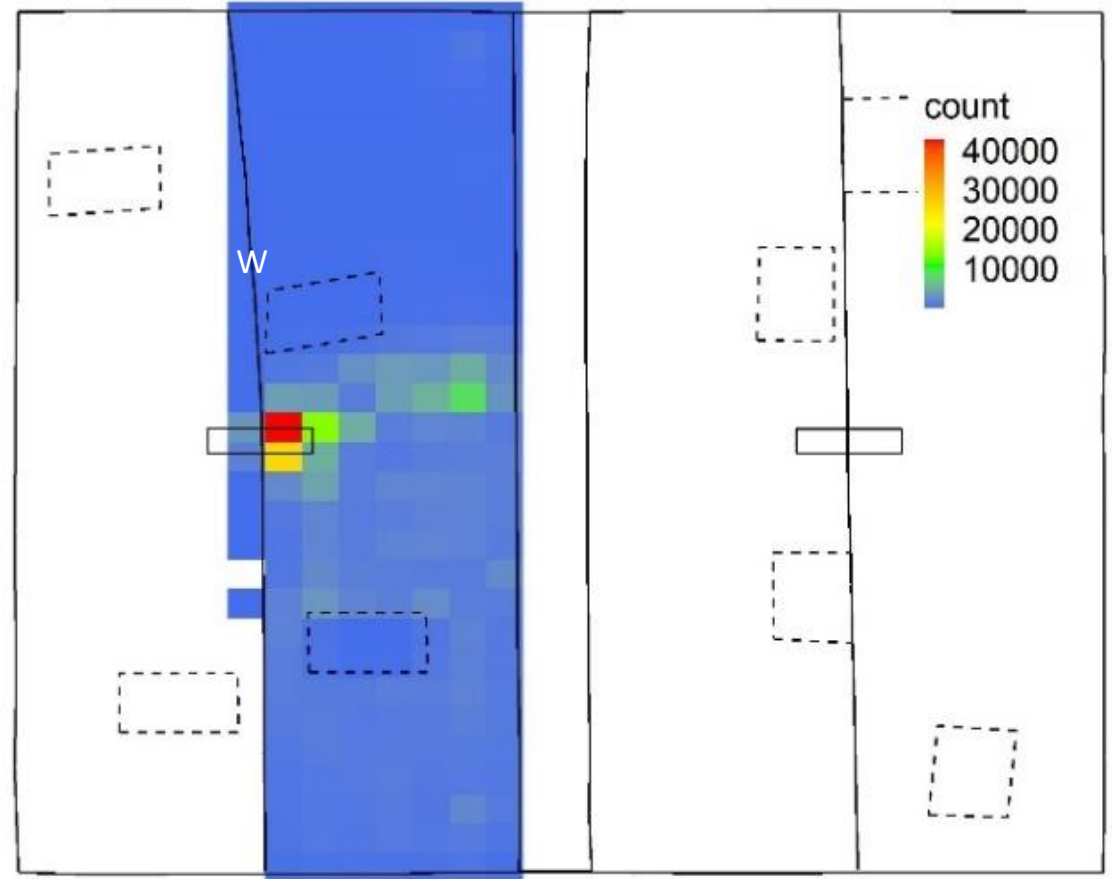
- 75% registrations outside
- Range use was high
- Advantage of small flocks in mobile houses: easy access
- No effect of treatments

# PPILOW - Heat maps of two groups

Group 1



Group 2





- High levels of free range use during the tracking period
- Preference for the middle area, close to the house, followed by grass and willows
- Grass: foraging opportunities, forest: dust bathing opportunities, shelter
- No effect of rearing treatments or from larvae provisioning on range use

Do early-life treatments increase cognitive performance?

- Round 2 (41-42 wks)
- Pebble floor test (Rogers, 1990)
- 400 fake, 200 real meal worms





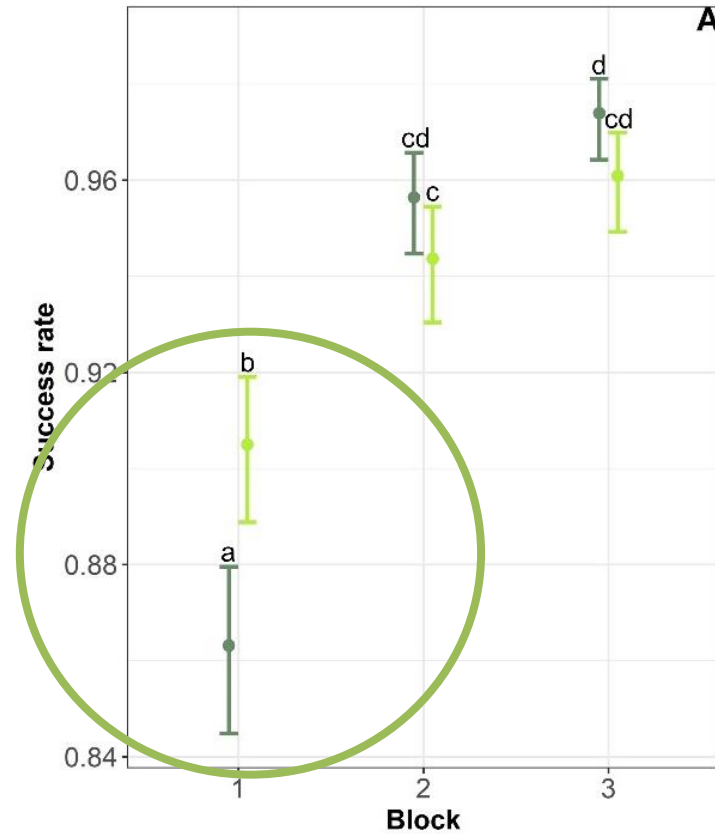
Do early-life treatments increase cognitive performance?

- Food deprived 3h before testing
- 60 pecks allowed at real or fake worms
- Only new choices were scored

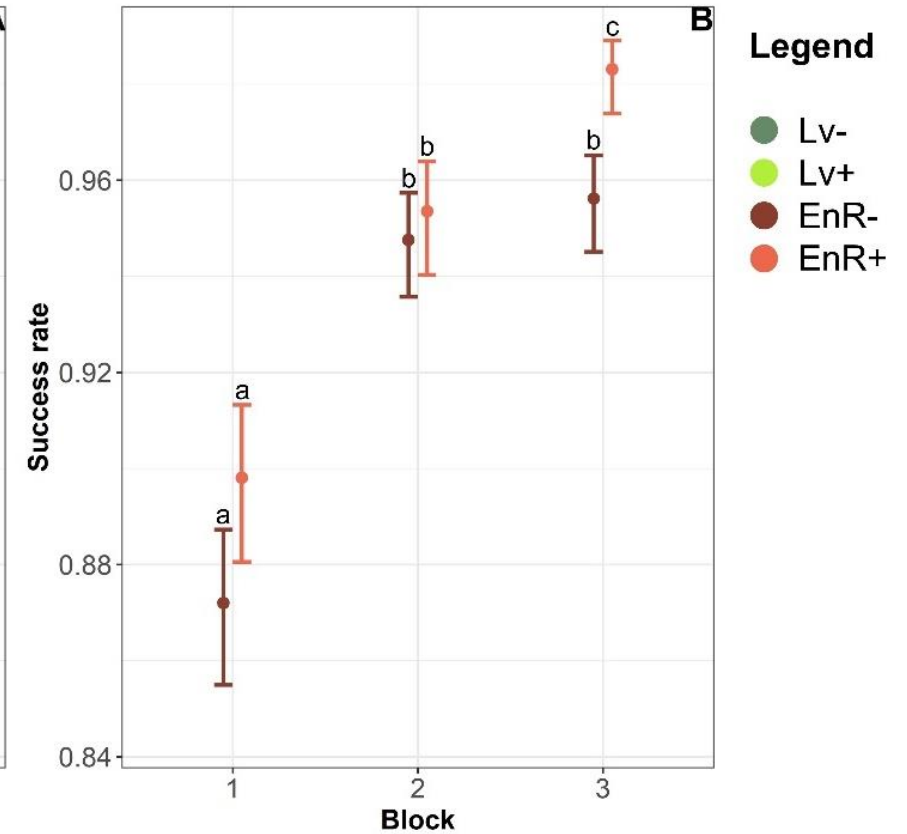


Do early-life treatments increase cognitive performance? **Yes (larvae treatment)**

- Rearing with larvae affected success rate in block 1
- More than 25 wk later!
- No effect of incubation light



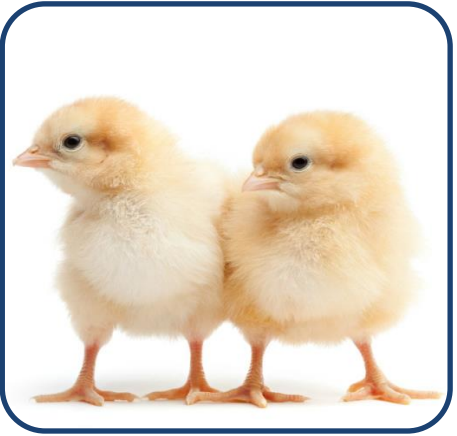
Lv = Enrichment during rearing phase



EnR = enrichment during laying phase



## In general, small effects of treatments



- 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.



- Rearing treatments and larvae provisioning in the free range had relatively few effects on adult performance.
- Feather pecking and feather damage 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.



## Challenges:

- Predation
- Avian Influenza
- Feather pecking



# Four Herenboeren farms in NL

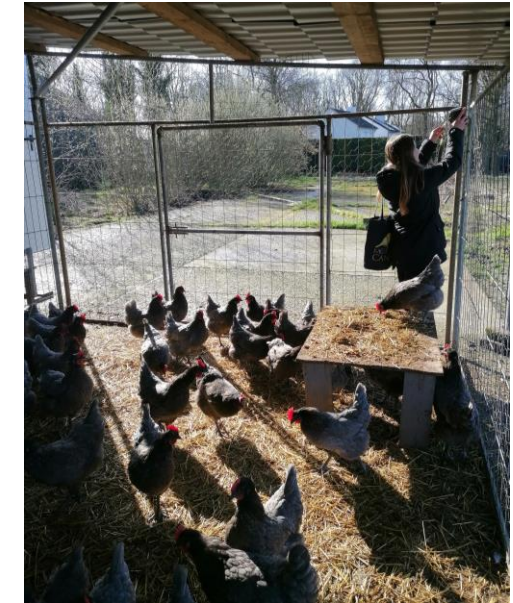


Layer hybrid (h)

VS



Dual purpose (dp)



VS



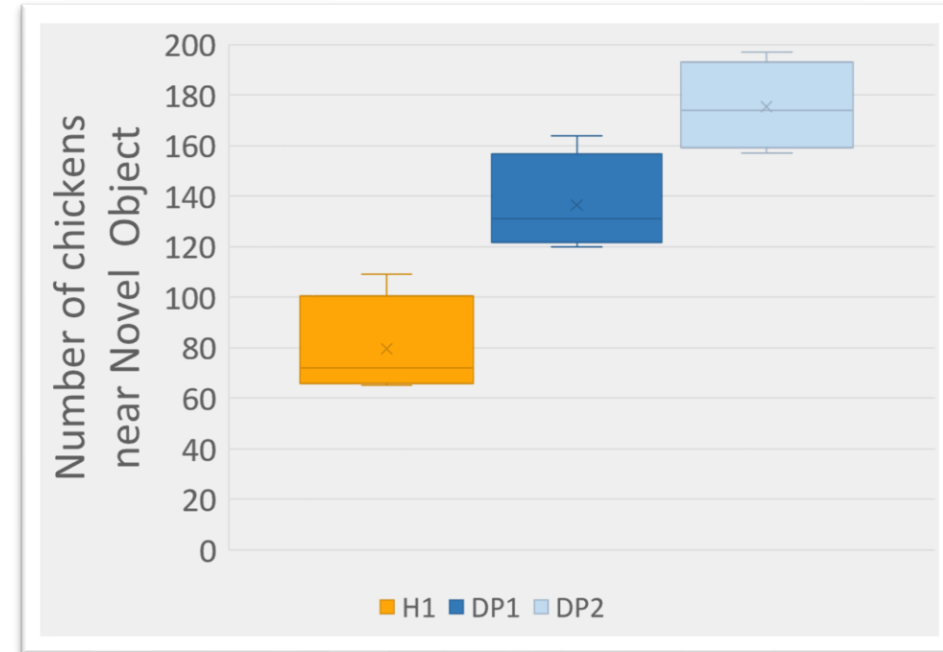
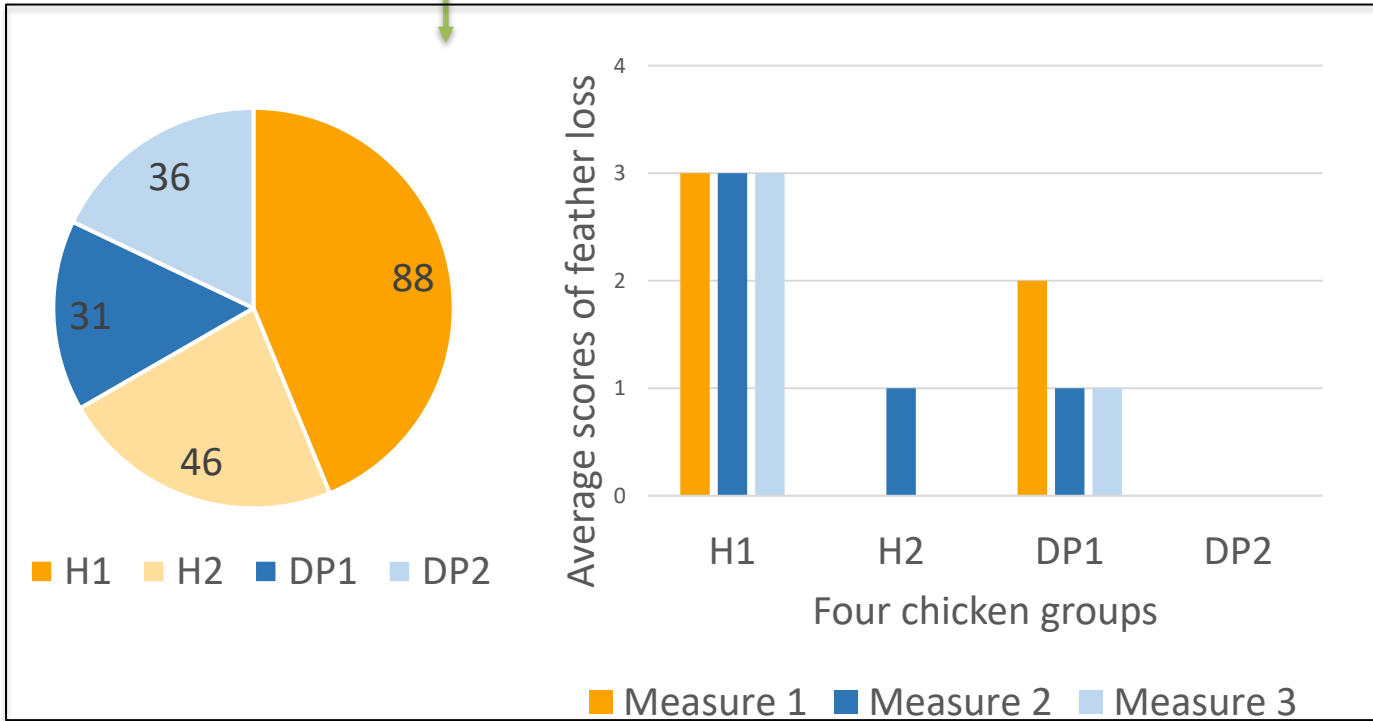
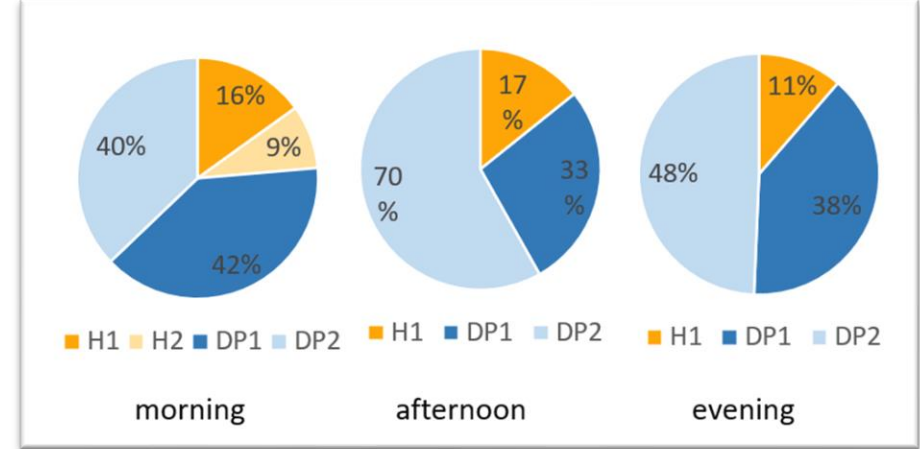
Student: Emy Ridderbos



# PPILOW – On-farm studies: results

Dual purpose chickens (blue in figures):

- showed more foraging behaviour
- were less fearful towards a novel object
- showed less feather pecking (in enriched environment)

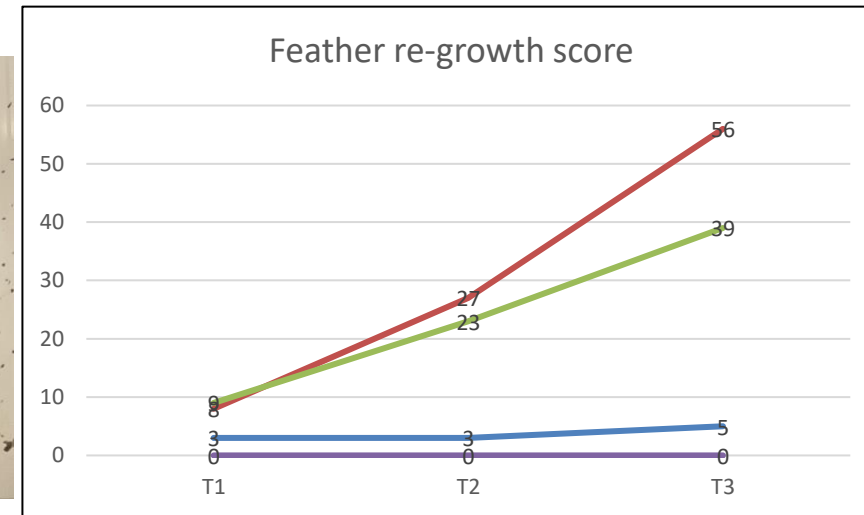
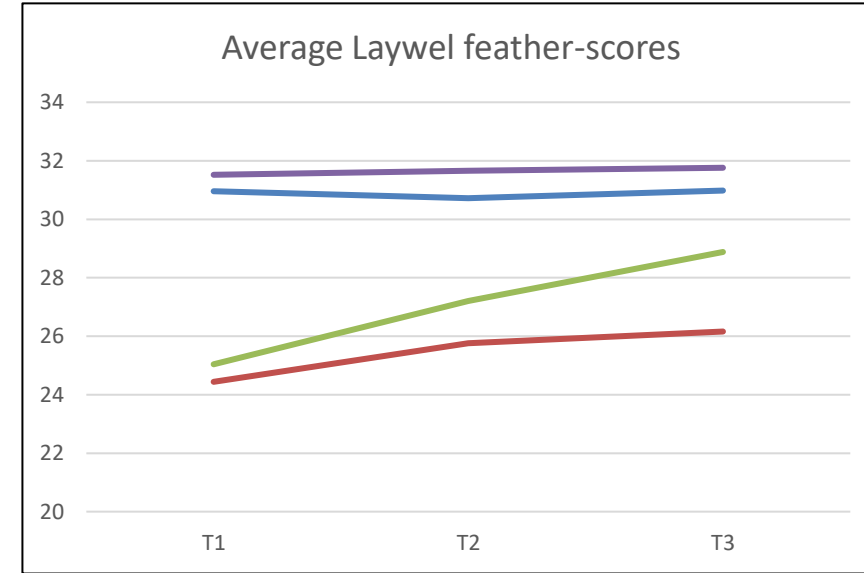


# PPILOW – Ongoing study: Effect of bedding in covered veranda on feather damage, fearfulness and footpad lesions



Preliminary results:  
2 farms with less baseline enrichment had most benefits of intervention (Laywel and re-growth score)

Shows importance of good enrichment in covered veranda



Students: Koen Riep and Jeroen Imholz

- During avian influenza outbreak, covered veranda is important for birds to express foraging (helps to prevent FP)
- Good quality environmental enrichment important: alfalfa bales, fresh greens, hay, straw, pecking blocks
- Dual-purpose birds seem less at risk to develop FP and show more normal foraging behaviour, less fearful – opportunity for small-scale producers?



# Acknowledgements



## Wageningen team

- Henry van den Brand
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- Elise Reuvers
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- Emy Ridderbos
- Koen Riep
- Jeroen Imholz



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



## On-farm work

- All farmers
- Vera Bavinck
- Marjon Wijdeven
- Monique Bestman
- Han Swinkels



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## ILVO team

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

## All animals



# PPILOW PARTNERS



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*Thank you for your attention*

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