



**ANIMAL WELFARE ASSESSMENT CONTEST 2023**



# Cage-Free Laying Hen Scenario

2023 Animal Welfare Assessment Contest



# NOTES

1. THESE ARE FICTITIOUS ANIMALS AND SITUATIONS. They have been created using pictures and information collected from multiple sources to generate realistic, yet fabricated scenarios. Scenarios may be set in places other than North America. Neither situation exists as presented here.
2. Please use the images provided throughout the presentation as well as text when making your assessment.

# Farm Overview

## Peko Farm

- Family poultry farm started in 1925
- Current generation of owners shifted to cage-free in 1998
  - Facilities and buildings substantially updated in 2016
- Sells directly to customers and local grocery stores
  - Branded as local, welfare-friendly, family farm
- Located in humid continental climatic zone. External climate is:
  - Winter low avg. 4F (-15C), 0% humidity
  - Summer high avg. 76F (25C), 21% humidity

## Mykal Farm

- Mixed purpose farm founded in 1882, has had multiple owners
- Current corporate owner transitioned to cage-free in 2012
  - Buildings and equipment renovated as needed
- Part of a large, vertically-integrated egg company
  - Branded as cage-free, happy chickens
- Located in humid subtropical climatic zone. External climate is:
  - Winter low avg. 40F (4C), 1% humidity
  - Summer high avg. 96F (35C), 94% humidity

# Personnel

## Peko Farm

- Current owner (48y) has an MBA and has lived and worked on farm since a child
- Animal operations manager (32y) has a BS in biology with a concentration in animal behavior
- 2 part-time employees assist with farm chores
- Regional poultry veterinary service used since 2000 sets up flock health plan and performs monthly checks of birds
- Consultant at local feed mill works with owner to formulate rations
- Equipment maintenance provided as part of contract with manufacturer
  - Rapid response

## Mykal Farm

- Farm manager (52y) has MS in precision agriculture and has worked at this site for 5 years
  - Pilot tests technologies on site in collaboration with local university
- Animal operations manager (25y) has a BS in animal science
- Company nutritionists provide ration formulations
- Company veterinarians provide flock health and biosecurity recommendations
  - On call as needed
- Company technicians provide equipment maintenance between flocks
  - On call virtual help, scheduled onsite visits

# Biosecurity

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## Peko Farm

- Gravel perimeter (3ft | 1m) and rodent traps around each barn
- Garden perimeter fencing is chain link sunk into concrete curb
  - Overlaid with wire mesh (1in | 2.5cm)
  - Mesh extends over garden and connects with veranda roof
- Visitors must be away from birds >72h
  - Park at farm entrance (50yd | 46m)
  - Put on farm boots and clothes in changing room before entering barn

## Mykal Farm

- Little vegetation around barns
- Veranda walls and ceiling covered by transparent plastic sheeting
- Outside visitors not admitted to farm
  - Driveway is gated, company employees have passes
- Employees coming from other company farms must wait 24h
  - Change into farm coveralls and boots at service center
  - Step in disinfectant inside barn door



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# Bird Background

## Peko Farm

- Brown commercial laying hen strain
  - Chosen for hardiness
- Chicks hatched off site and mailed 300mi (483km) to farm 24h after hatch
- Reared on site in cage-free pullet aviaries of similar style to adult system
- Pullets moved to layer housing at 15wk
- Production cycle ends at 82wk
  - Slaughtered on site (<5min transport), 3<sup>rd</sup> party audited for welfare to allow sale for use in welfare-friendly products

## Mykal Farm

- Brown commercial laying hen strain
  - Chosen for high productivity
- Hatched and reared off-site in company facilities
  - Beak tips infra-red trimmed <24 h
- Reared in floor pens equipped with platforms with Perches added at 6wk
- Pullets shipped 22mi (35km) via commercial poultry hauler to farm at 17wk for placement in layer housing
- Production cycle ends at 70wk
  - Shipped to company slaughter plant 200mi (321km) away, government inspected

# Vaccinations & Testing

## Peko Farm\*

- At hatch, given subcutaneous and spray vaccinations for Marek's disease, Coccidiosis, and Infectious Bronchitis (IB)
- Tested (drag swabs) then vaccinated (spray) for Salmonella in chick boxes prior to mailing (1d)
- Coccidiosis vaccine sprayed on feed at 7, 14, and 21d
- IB and Newcastle vaccines via water and sprayed on feed at 18, 32, and 56d
- E. coli vaccines via spray at 25, 56, and 98d
- Salmonella spray vaccine at 25d
- Vaccination via breast for Salmonella, IB, and ND, and via wing web for Fowl Cholera, Fowl Pox, and Encephalomyelitis at 12wk (84d)
- Tested for Salmonella (drag swabs) and Avian Influenza (blood) at 14 wk, before moving from pullet housing

## Mykal Farm\*

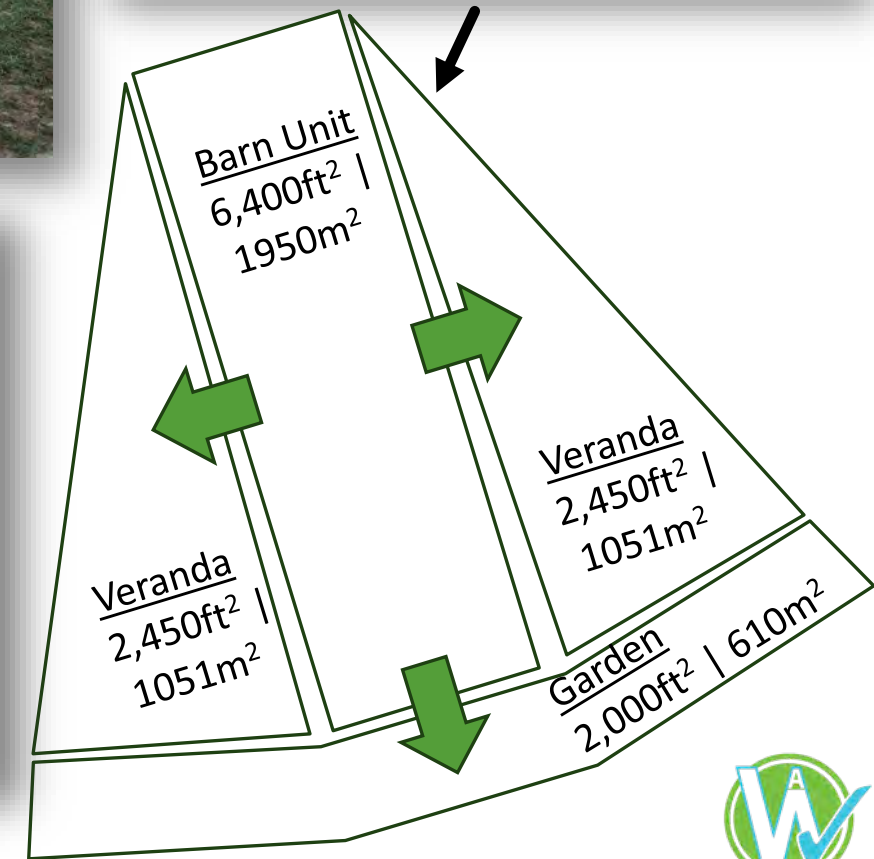
- *In ovo* vaccination for Marek's Disease
- Spray vaccination for Infectious Bronchitis (IB) at 21d, 10wk, and 16wk
- Chicks vaccinated via water for Newcastle Disease and IB at 21d, 10wk, and 16wk
- Aerosolized 4-way Coccidiosis vaccination sprayed on feed at 21d
- Wing web vaccination for fowl pox at 10wk
- Aerosolized vaccine for *Mycoplasma gallisepticum* sprayed on feed at 10wk
- Pullorum testing done at 16wk, prior to shipping pullets
- Vaccination for IB via breast muscle at 20wk after entering laying facility

\*Live vaccines given subcutaneously or via spray, water, or wing web

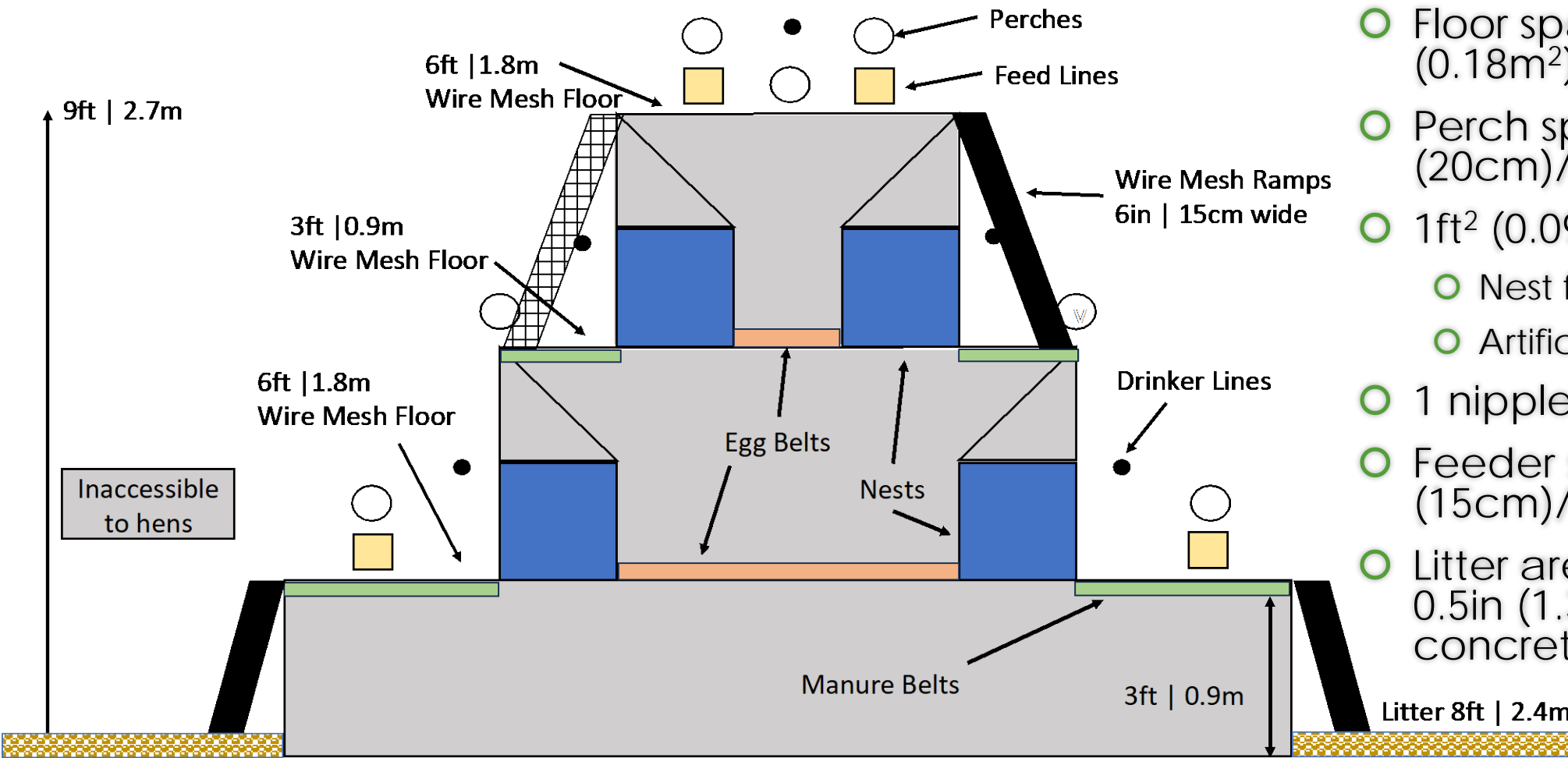


# Hen Housing 1: Peko Farm

- 4 cage-free laying hen barns
  - Divided into 5 units, each has 7,000 hens
- Each unit contains an indoor tiered aviary, covered veranda and enclosed garden
  - Veranda roof and interior walls are transparent polycarbonate panels, artificial turf floor
  - Garden roof and sides are metal mesh, packed dirt and wood chip floor
  - Solid roll up-doors give hens access between areas
    - Entire wall opens/closes, amount opening adjusted to control climate
    - Doors open 15 min after lights on
    - Doors between veranda and aviary lowered 1 h before lights off. Hens still on veranda are moved inside
    - Garden doors closed when  $<32\text{F}$  ( $0\text{C}$ )



# Hen Housing 2: Peko Farm Tiered Unit



- Floor space: 2ft<sup>2</sup> (0.18m<sup>2</sup>)/hen
- Perch space: 8in (20cm)/hen
- 1ft<sup>2</sup> (0.09m<sup>2</sup>) nest/5 hens
  - Nest flaps cover entirely
  - Artificial turf floor
- 1 nipple drinker/12 hens
- Feeder space: 6in (15cm)/hen
- Litter area on aviary floor is 0.5in (1.3 cm) sawdust over concrete

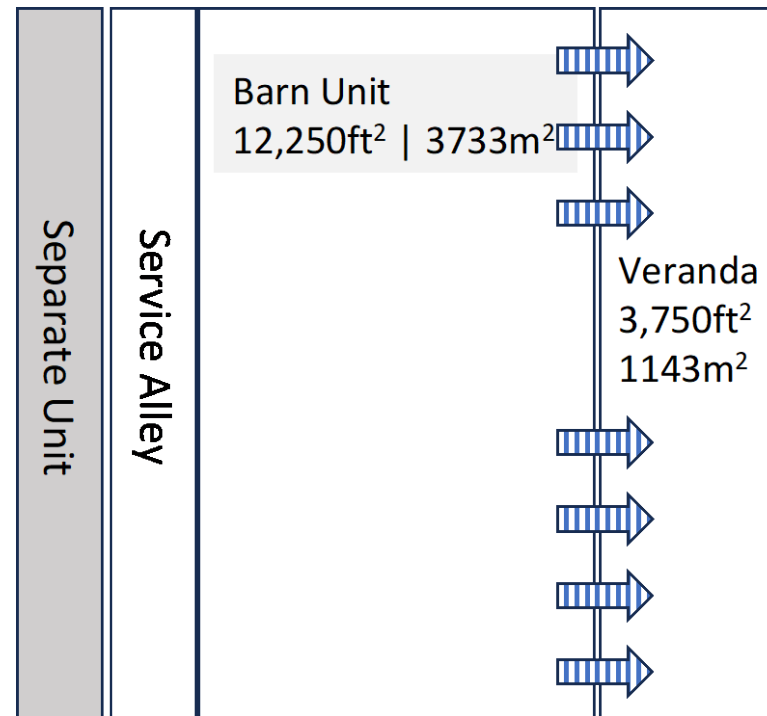
\*Dimensions of litter area and floor tiers are same on both sides.

# Hen Housing 1: Mykal Farm

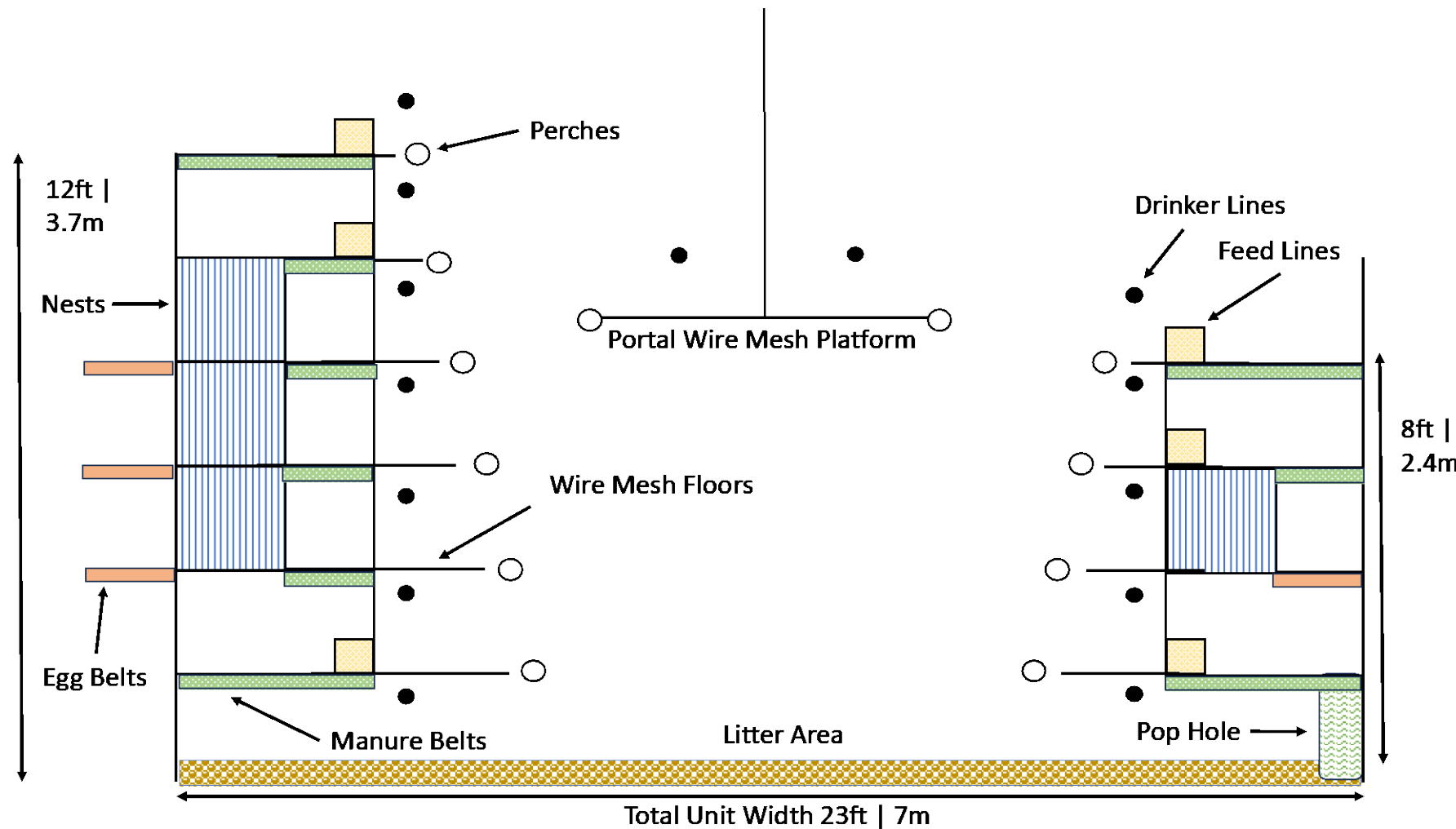
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- 6 long barns, divided in half lengthwise into 2 rooms
  - Indoor room contains tiered aviary
- Covered veranda has transparent walls and multiple skylights, and a dirt floor scattered with shavings
- 10,000 birds per unit
- Access to veranda through 15 - 3.5ft<sup>2</sup> | 1.1m<sup>2</sup> pop-holes (1/667 hens)
  - Pop-holes automatically close 15 min before sunset
  - Sensors prevent closing if hen is in door



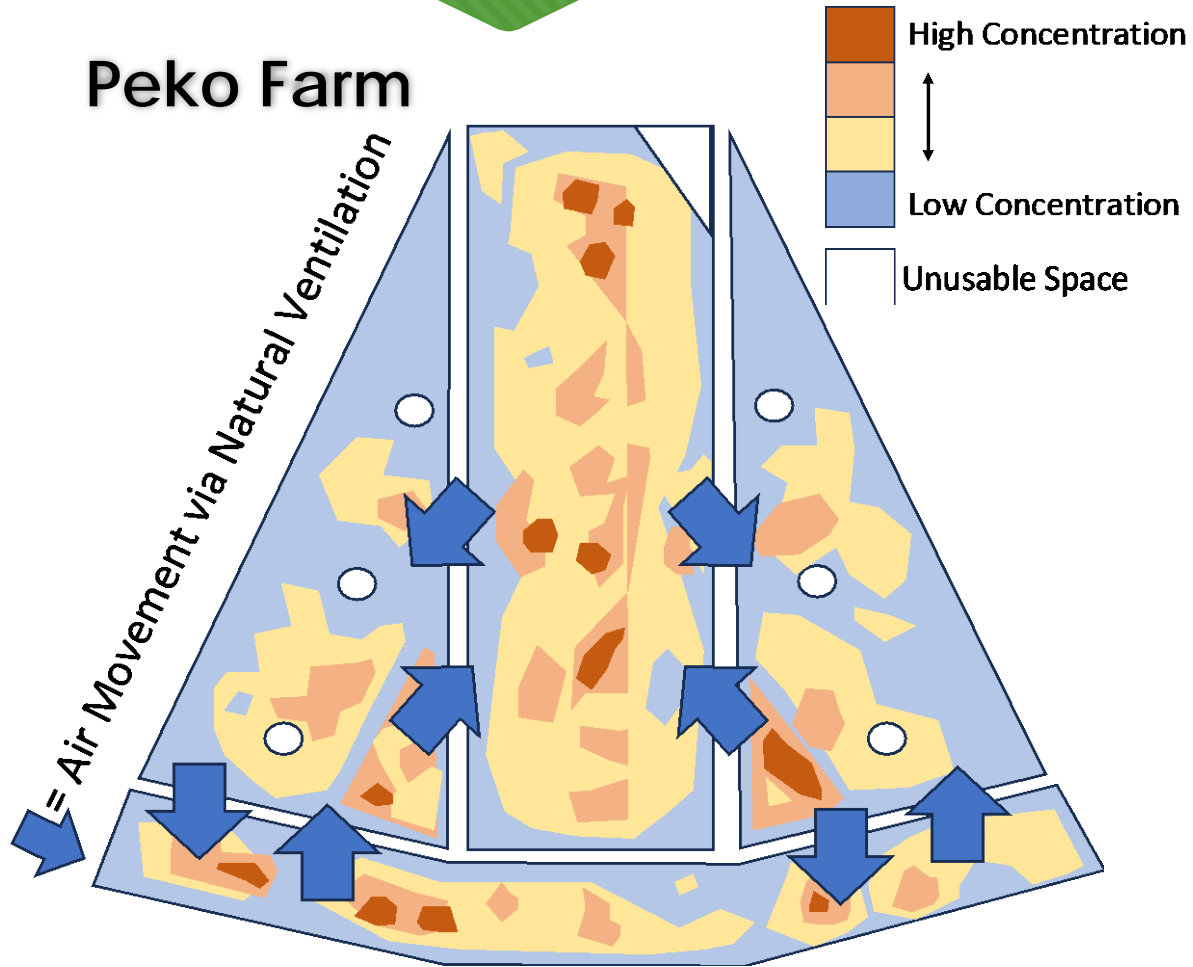
# Hen Housing 2: Mykal Farm Tiered Unit



- Floor space: 1.6ft<sup>2</sup> (0.15m<sup>2</sup>)/hen
- Perch space: 13in (33cm)/hen
- 1ft<sup>2</sup> (0.09m<sup>2</sup>) nest/9 hens
  - Nest flaps cover 75%
  - Plastic mesh floor
- 1 nipple drinker/10 hens
- Feeder space: 4in (10cm)/hen
- Litter area on aviary floor is 4in (10cm) wood shavings over concrete

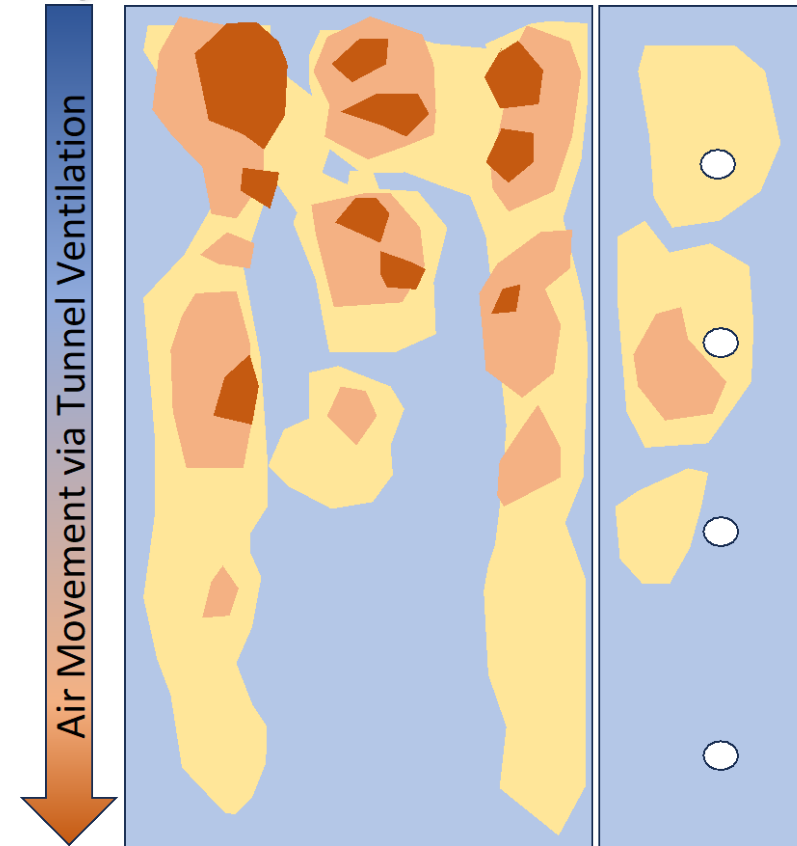
# Hen Distribution in Summer

## Peko Farm



- Hens move freely between the 3 areas
- Clustering observed near pecking blocks, logs, straw dispensers, and some nests

## Mykal Farm



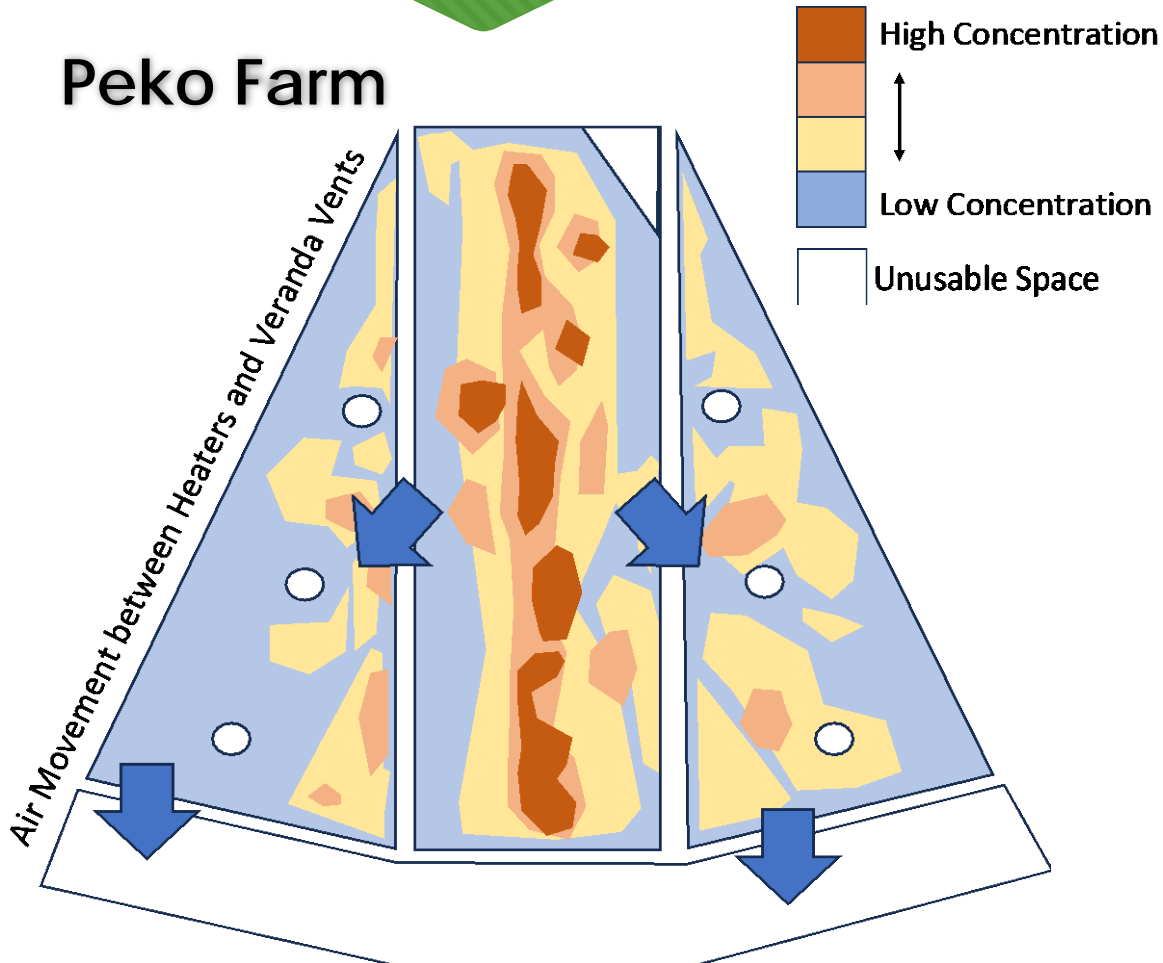
- Most hens remain indoors
- Crowding observed near north ends of room and veranda

Panting	Peko	Mykal
Aviary	Light Blue	Light Blue
Veranda	Light Blue	Dark Blue
Garden	Light Blue	N/A

<20% of flock ■  
 20-50% of flock ■  
 >50% of flock ■

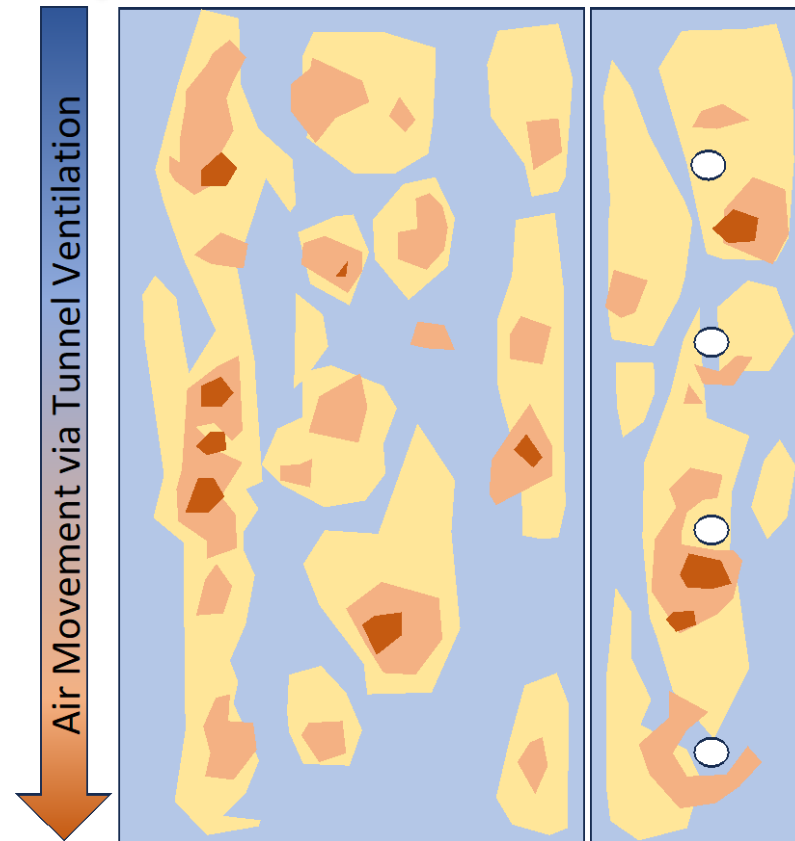
# Hen Distribution in Winter (<32F | 0C)

## Peko Farm



- Forced air heaters located in aviary area
- Upper tier of aviary is the most crowded area at night

## Mykal Farm



- Heaters located indoors and in veranda
- Hens distribute evenly among vertical tiers of aviary, some crowding near veranda feeders

Huddling	Peko	Mykal
Aviary	Light Blue	Light Blue
Veranda	Dark Blue	Light Blue

<20% of flock ■  
 20-50% of flock ■  
 >50% of flock ■

# Environmental Management & Conditions

## Peko Farm

- Environmental control system maintains temperature in barn between 60-82F (15-28C) via:
  - Natural ventilation for cooling
  - Heaters in barn
  - Adjusting how far doors are rolled up
- When garden doors are entirely closed, higher levels of particulate matter observed in barn unit
  - Typically remain within acceptable levels
  - Veranda is hard to seal entirely
- Record of parameters made on clipboard during 2x/day walk throughs

## Mykal Farm

- Environmental control system maintains temperature between 66-77F (19-25C) via:
  - Tunnel ventilation in barn for cooling
  - Heaters in barn and veranda
- Higher levels of ammonia, CO<sub>2</sub> and CH<sub>4</sub> and particulate matter in barn in winter when ventilation rate slows
  - Near upper end of acceptable limit
  - Wet patches observed in litter along interior walls
- Alerts sent to phones of farm and operations managers if parameters reach predetermined problematic thresholds

# Diet & Feeding: Peko Farm

- Feed prepared at local mill
  - Stored in bins near each barn
  - Pre-lay diet fed until laying at 1%
  - Layer diet fed for remainder of cycle
- Calcium is mix of limestone and oyster shells
  - Ratio of coarse to fine calcium in feed changes from 40:60 in pre-lay diet to 60:40 in layer
  - Peck stones in veranda contain 21% calcium
- 4 chain feeders in each aviary unit
  - Deliver fresh feed at 6am, 12pm, and 6pm
  - Run for 30sec at 9am and 9pm to stimulate feeding





# Diet & Feeding: Mykal Farm

- Feed prepared at company-owned mill
  - Delivered to large central bins on site, then piped to smaller bins near each barn
  - Pre-lay diet fed until first egg seen
  - Peak lay diet fed until laying drops 2% below peak
  - Diet changes occur with every 5% drop in production until down to 80% production
- Calcium in diet is predominately from oyster shells
  - Ratio of coarse to fine calcium particles in feed increases over time (e.g., 50:50 in pre-lay, 75:25 at end of lay)
- Auger feeders used in aviary units
  - Delivers fresh feed at 7am, 7pm, and 1am
  - Feeder runs for 10 sec at 10am and 5pm



# Water



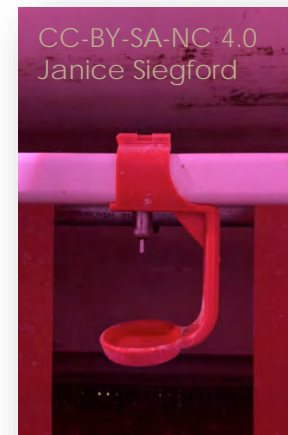
## Peko Farm

- Water from well, tested 2x/year
  - Nipple drinker lines on all aviary tiers
  - 2 bell drinkers per veranda
  - 5,000gal (18,927L) plastic tank provides back up water source



## Mykal Farm

- Water from well, tested 1x/year
  - Nipple drinker lines on all aviary tiers and on portal perch array
  - 10,000gal (37,854L) raised tank provides back up water source



# Lighting: Peko Farm

- Natural light in garden and veranda, reaches aviary units
  - Levels in garden = outdoor light
  - ~3000lux (279fc) in veranda
  - ~190lux (18fc) in aviary unit
- Full-spectrum LED ceiling lights in aviary units
  - 16h light, 32lux (3fc) at floor level
  - 5min sunrise begins at 5:55am
  - 15min sunset begins at 9:45pm



# Lighting: Mykal Farm

- Natural light in veranda, some enters via pop holes
  - ~2000lux (186fc) in veranda
  - ~80lux (7fc) on floor under outer aviary tier
- Poultry-specific LED ceiling lights
  - Warm light spectrum (3000K)
  - 11lux (1fc) in inner lower tier, 22lux (2fc) on portal
  - 16h light during day + 2h light in middle of night
- Rope lights hang under top, middle, and bottom tiers
- Lights go down over 10min (9:50pm, 1:50am)
  - Ceiling lights dim and go off first
  - Rope lights go off starting with lights near floor and work upward
- Lights come on over 5min (5:55am, 12:55am)
  - Rope lights come on first, then ceiling lights



# Husbandry and Hen-Human Interactions



## Peko Farm

- Owner, animal operations manager, or an employee walks slowly through each barn 2x/day
  - Carry checklists, record immediate and potential concerns
  - Initial when done and leave on clipboards outside unit
- Hens move toward entry doors when person approaches then follow them
- Peck at shoes and pants, allow person to scratch chest

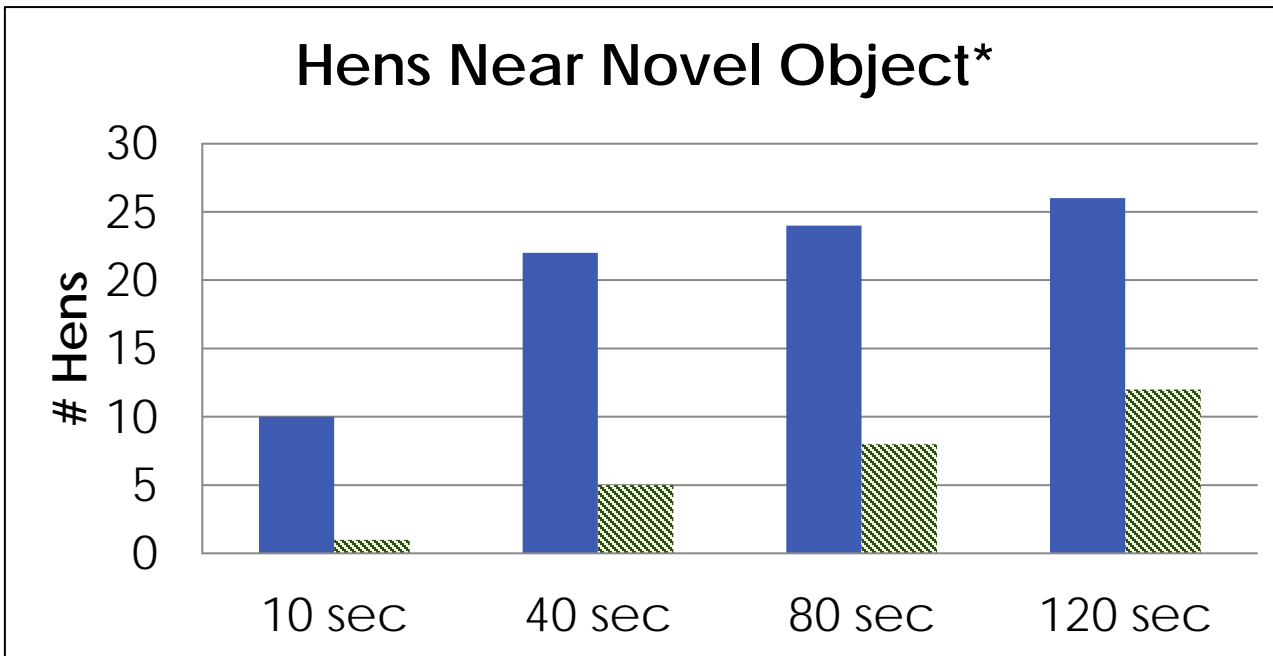
## Mykal Farm

- Animal operations manager or an employee walks quickly through each barn 1x/day
  - Look for problems with birds, water, feed, lighting and ventilation
  - Check poultry house system on phones to verify equipment performance
- Hens crouch or retreat when person moves toward them
- Maintain a 2ft (0.6m) distance between themselves and person

# Welfare Assessment at 45wk

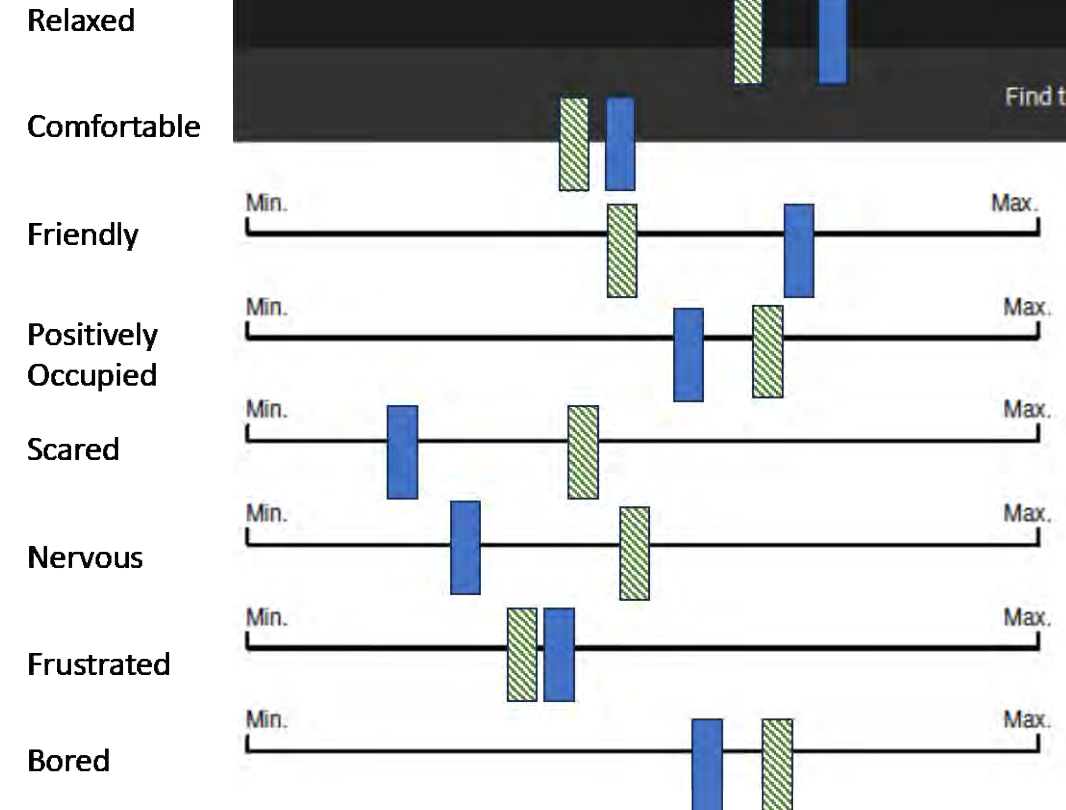
- At 45 weeks of age, welfare assessment was carried out on both flocks by 3<sup>rd</sup> party inspectors for same certification program

**Peko**   
**Mykal** 



\*Hens within 1 body length of novel object at each time point.  
 Test ends at 120 seconds

## Qualitative Behavior Assessment\*\*



\*\*Hens observed in all areas of each unit.

# Health Outcomes at 45wk Assessment

Mortality	Peko	Mykal
<b>Total Flock Mortality</b>	<b>2.1%</b>	<b>4.7%</b>
Main causes* (as % of total)		
Hypocalcemia	16%	12%
Egg yolk peritonitis	12%	23%
Pick out (vent)	1%	6%
Emaciated	5%	7%
Dehydrated	5%	8%
Necrotic enteritis	2%	8%
Culled <sup>‡</sup>	2%	1%
Caught in system	1%	4%
Predation	.01%	0%
Piling	0%	1%

\*Does not add to 100% because deaths of unknown cause are not included

Physical Scores**	Peko	Mykal
<b>Body Weight</b>	<b>4.22 lb (1.91kg)</b>	<b>4.35lb (1.98 kg)</b>
Keel damage	1.23	1.61
Comb wounds	1.14	1.11
Foot condition	0.79	1.22
Beak trim/abnormality	0.52	1.62
Feather damage	1.78	1.43
Feather cleanliness	0.62	1.31
Skin injuries	0.74	0.80
Evidence of mites	1.05	0
Toe damage	0	0.72

\*\*100 hens/flock scored. 0-2 scale: 0 = no problems, 2 = severe problems

<sup>‡</sup>Peko culls birds using manual cervical dislocation. Mykal uses a non-penetrating captive bolt device. Both confirm insensibility by no corneal reflex, cessation of breathing, and loss of muscle tension.



# Behavior Outcomes at 45wk Assessment

Frequency* (during light)	Peko	Mykal
Agonistic behavior	1.0	1.7
Severe feather pecking	1.3	5.1
Gentle feather pecking	2.7	3.2
Toe pecking	<0.1	2.4
Vent pecking	0.2	0.8
Falling from structure	0.3	0.4
Failed flight/landing	0.2	0.5
Piling	<0.1	1.3
Playing	0.5	0.1

\*Average frequency of occurrence per hour on a per 100 hen basis during a 16h day

Time Budget* (during light)	Peko	Mykal
Feed	17%	14%
Drink	4%	3%
Nest	9%	6%
Dust Bathe	2%	1%
Forage/object peck	13%	7%
Preen/stretch	9%	8%
Stand/sit	15%	28%
Move (walk/run/jump/fly)	13%	11%
Rest (eyes closed)	18%	22%

\*% of time behavioral states occurred over 16h day

Egg Laying Location	Peko	Mykal
Nests	97%	94%
Other Aviary Areas	1%	5%
Floor Areas	2%	1%

Roosting (night)	Peko	Mykal
Perches	84%	92%
Wire Floors	14%	4%
Litter	2%	4%



# Notes: Peko Farm

- Feather damage due to pecking was noticed starting at 30wk, mitigated problem via enrichment
  - Straw dispensers and platforms added and peck stones refreshed on veranda
  - Logs and branches added to garden
- Hen movement caused litter from aviary and wood chips from garden to end up on artificial turf on veranda
- Hens dust bathe in litter indoors and in garden as well as on veranda
  - Litter has remained dry throughout flock
- Birds regularly use ramps to transition between levels of aviary



# Notes: Mykal Farm

- Few hens out on veranda and little space used in summer, limited success in drawing more birds out via
  - Adding grain dispensers combined with peckstones to each veranda, visible from pop holes
  - Additional wood shavings
- 17% of flights to/from portal platform are unsuccessful
  - Birds slip on floor, crash into tier, or do not make it up to portal
- Toe pecking noticed in this flock starting at 26wk
- Installed new backup generator after severe storms earlier in the year knocked out power
- Avian influenza outbreak on another Mykal farm earlier in year
  - Planning to strengthen biosecurity protocols by reducing travel of personnel between farms
  - Managers updating protocols for rapid depopulation on farm to find alternatives to current CO<sub>2</sub> carts



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