

Srinivasa



Hy-Line.

HY-LINE W-80 INDIA COMMERCIAL LAYERS



Management Guide



USE OF THE MANAGEMENT GUIDE

The genetic potential of Hy-Line W-80 India can only be realized if good poultry husbandry practices and management are used. This management guide outlines successful flock management programs for Hy-Line W-80 India based on field experience compiled by Hy-Line International and using an extensive commercial layer flock database of Hy-Line flocks from all parts of the world. Hy-Line International Management Guides are periodically updated as new performance data and/or nutrition information become available.

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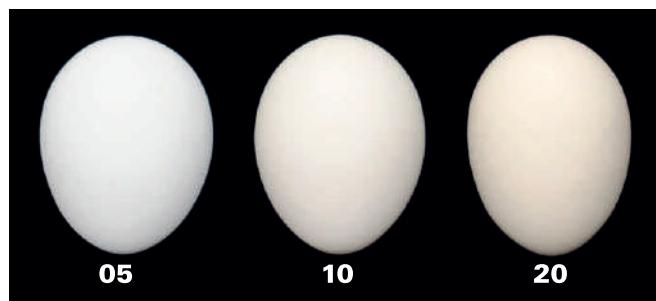
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Summary of Performance Standards

REARING PERIOD (TO 18 WEEKS):	
Livability	96.9%
Feed Consumed	5.64 kg
Body Weight at 18 Weeks	1.25 kg
LAYING PERIOD (TO 100 WEEKS):	
Percent Peak	95-96%
Hen-Housed Eggs to 60 Weeks	257.0
Hen-Housed Eggs to 90 Weeks	427.1
Hen-Housed Eggs to 100 Weeks	476.9
Livability to 60 Weeks	96.6%
Livability to 90 Weeks	94.1%
Livability to 100 Weeks	92.9%
Average Egg Weight at 26 Weeks	54.8 g / egg
Average Egg Weight at 32 Weeks	57.2 g / egg
Average Egg Weight at 70 Weeks	60.5 g / egg
Average Egg Weight at 100 Weeks	62.0 g / egg
Body Weight at 26 Weeks	1.52 kg
Body Weight at 32 Weeks	1.59 kg
Body Weight at 70 Weeks	1.62 kg
Body Weight at 100 Weeks	1.66 kg
Freedom From Egg Inclusions	Excellent
Shell Strength	Excellent
Average Daily Feed Consumption (19-100 weeks)	102 g / day per bird
Feed Consumption per Egg (19-100 weeks)	123.14 g
Condition of Droppings	Dry

Performance Summary data is based on results obtained from customers around the world. Please send your results to info@hyline.com. An easy to use record-keeping program, *Hy-Line International EggCel*, can be found at www.hylineeggcel.com.

SHELL COLOR SCORES



- The W-80 India normally lays uniformly white colored eggs (05-10).
- Eggs laid the first week are typically darker (10-20) than subsequent eggs.
- For more information on egg quality, see the "[The Science of Egg Quality](#)" technical update at www.hyline.com

Performance Tables

Rearing Period

AGE (weeks)	MORTALITY Cumulative (%)	BODY WEIGHT (kg)	FEED INTAKE (g/bird/day)	CUM.FEED INTAKE (g to date)	WATER CONSUMPTION (ml/bird/day)	UNIFORMITY (Cage)
1	1.0	0.07	12	80	18 - 28	>85%
2	1.3	0.12	15	190	23 - 38	
3	1.5	0.18	21	340	32 - 50	
4	1.6	0.25	27	530	41 - 62	
5	1.7	0.32	31	740	47 - 70	
6	1.8	0.41	35	990	53 - 78	
7	1.9	0.51	39	1260	59 - 86	
8	2.0	0.60	42	1550	63 - 92	
9	2.1	0.70	44	1860	66 - 100	
10	2.2	0.78	48	2190	71 - 105	
11	2.3	0.86	51	2550	76 - 111	
12	2.4	0.92	54	2920	80 - 117	
13	2.5	0.98	57	3320	85 - 123	
14	2.6	1.03	60	3730	89 - 129	
15	2.7	1.08	63	4170	94 - 135	
16	2.8	1.13	67	4640	100 - 143	
17	3.0	1.17	70	5120	104 - 149	
18	3.1	1.25	74	5640	111 - 162	>90%

Laying Period

AGE (weeks)	% HEN-DAY Current	HEN-DAY EGGS Cumulative	MORT. Cumulative (%)	HEN-HOUSED EGGS Cumulative	TOTAL FEED INTAKE (kg/bird)	FEED INTAKE (g/bird/day)	WATER INTAKE ¹ (ml/bird/day)	BODY WEIGHT (kg)	AVG. EGG WEIGHT ² (g/egg)	HEN-HOUSED EGG MASS Cumulative	FEED PER EGG Cumulative (g)
19	10.0	0.7	0.05	0.7	0.6	79	119 - 158	1.31	42.0	0.03	790.40
20	35.0	3.2	0.10	3.1	1.1	82	123 - 164	1.37	43.0	0.13	358.10
21	56.0	7.1	0.20	7.1	1.7	87	131 - 174	1.39	45.0	0.31	245.91
22	80.0	12.7	0.30	12.6	2.4	89	134 - 178	1.43	47.0	0.57	186.59
23	88.0	18.8	0.40	18.8	3.0	91	137 - 182	1.46	50.0	0.88	159.55
24	91.0	25.2	0.50	25.1	3.6	92	138 - 184	1.48	52.0	1.21	144.93
25	93.0	31.7	0.60	31.6	4.3	94	141 - 188	1.50	53.8	1.56	136.07
26	94.0	38.3	0.70	38.1	5.0	95	143 - 190	1.52	54.8	1.92	130.19
27	94.3	44.9	0.80	44.7	5.6	96	144 - 192	1.54	55.5	2.28	126.15
28	95.0	51.5	0.90	51.3	6.3	97	146 - 194	1.55	56.0	2.65	123.18
29	95.3	58.2	1.00	57.9	7.0	98	147 - 196	1.56	56.2	3.02	120.97
30	95.6	64.9	1.10	64.5	7.7	99	149 - 198	1.57	56.5	3.39	119.30
31	95.6	71.6	1.20	71.1	8.4	100	150 - 200	1.58	56.8	3.77	118.06
32	96.0	78.3	1.30	77.7	9.1	101	152 - 202	1.59	57.2	4.15	117.08
33	96.0	85.0	1.40	84.4	9.8	102	153 - 204	1.59	57.5	4.53	116.35
34	96.0	91.8	1.50	91.0	10.5	103	155 - 206	1.59	58.0	4.91	115.81
35	96.0	98.5	1.60	97.6	11.3	103	155 - 206	1.59	58.0	5.30	115.35
36	96.0	105.2	1.70	104.2	12.0	103	155 - 206	1.59	58.5	5.68	114.95
37	96.0	111.9	1.80	110.8	12.7	103	155 - 206	1.59	58.5	6.07	114.61
38	95.8	118.7	1.90	117.4	13.4	103	155 - 206	1.59	59.0	6.46	114.27
39	95.5	125.4	2.00	124.0	14.1	103	155 - 206	1.59	59.0	6.85	114.04
40	95.3	132.0	2.10	130.5	14.9	103	155 - 206	1.59	59.0	7.23	113.86
41	95.0	138.7	2.20	137.0	15.6	103	155 - 206	1.59	59.5	7.62	113.72
42	95.0	145.3	2.30	143.5	16.3	103	155 - 206	1.59	59.5	8.01	113.59
43	95.0	152.0	2.40	150.0	17.0	103	155 - 206	1.60	59.5	8.39	113.49
44	94.6	158.6	2.50	156.5	17.7	103	155 - 206	1.60	59.8	8.78	113.41
45	94.3	165.2	2.55	162.9	18.5	103	155 - 206	1.60	60.0	9.16	113.36
46	94.0	171.8	2.60	169.3	19.2	103	155 - 206	1.60	60.0	9.55	113.33

¹ The chart shows an expected range of feed and water consumption at normal environmental temperatures of 21°C. As the environmental temperature increases above this range, water consumption may increase up to double the amounts shown.

² Egg weights after 40 weeks of age assume phase feeding of protein to limit egg size.

Performance Tables *(continued)*

AGE (weeks)	% HEN-DAY EGGS Current	HEN-DAY EGGS Cumulative	MORT. Cumulative (%)	HEN-HOUSED EGGS Cumulative	TOTAL FEED INTAKE (kg/bird)	FEED INTAKE (g/bird/day)	WATER INTAKE ¹ (ml/bird/day)	BODY WEIGHT (kg)	AVG. EGG WEIGHT ² (g/egg)	HEN-HOUSED EGG MASS Cumulative	FEED PER EGG Cumulative (g)
47	94.0	178.4	2.65	175.7	19.9	103	155 - 206	1.60	60.0	9.93	113.30
48	93.8	184.9	2.70	182.1	20.6	103	155 - 206	1.60	60.0	10.32	113.28
49	93.6	191.5	2.80	188.5	21.4	103	155 - 206	1.60	60.0	10.70	113.28
50	93.2	198.0	2.90	194.8	22.1	103	155 - 206	1.60	60.0	11.08	113.30
51	93.0	204.5	2.95	201.1	22.8	104	156 - 208	1.60	60.0	11.46	113.36
52	93.0	211.0	3.00	207.4	23.5	104	156 - 208	1.60	60.0	11.84	113.42
53	92.8	217.5	3.05	213.7	24.3	104	156 - 208	1.61	60.0	12.22	113.48
54	92.6	224.0	3.10	220.0	25.0	104	156 - 208	1.61	60.0	12.59	113.55
55	92.0	230.5	3.15	226.3	25.7	104	156 - 208	1.61	60.0	12.97	113.64
56	91.6	236.9	3.20	232.5	26.4	104	156 - 208	1.61	60.0	13.34	113.74
57	91.3	243.3	3.25	238.6	27.2	104	156 - 208	1.61	60.0	13.71	113.84
58	91.0	249.6	3.30	244.8	27.9	104	156 - 208	1.61	60.0	14.08	113.95
59	90.4	256.0	3.35	250.9	28.6	104	156 - 208	1.61	60.0	14.45	114.07
60	90.0	262.3	3.40	257.0	29.4	104	156 - 208	1.61	60.0	14.81	114.20
61	89.8	268.5	3.50	263.1	30.1	104	156 - 208	1.61	60.5	15.18	114.34
62	89.6	274.8	3.60	269.1	30.8	104	156 - 208	1.61	60.5	15.54	114.47
63	89.3	281.1	3.70	275.1	31.5	104	156 - 208	1.62	60.5	15.91	114.62
64	89.0	287.3	3.80	281.1	32.3	104	156 - 208	1.62	60.5	16.27	114.76
65	89.0	293.5	3.90	287.1	33.0	105	158 - 210	1.62	60.5	16.63	114.93
66	88.6	299.7	4.00	293.1	33.7	105	158 - 210	1.62	60.5	16.99	115.10
67	88.3	305.9	4.10	299.0	34.5	105	158 - 210	1.62	60.5	17.35	115.28
68	88.0	312.1	4.20	304.9	35.2	105	158 - 210	1.62	60.5	17.71	115.46
69	87.5	318.2	4.30	310.8	35.9	105	158 - 210	1.62	60.5	18.06	115.64
70	87.3	324.3	4.40	316.6	36.7	105	158 - 210	1.62	60.5	18.42	115.83
71	87.1	330.4	4.50	322.4	37.4	105	158 - 210	1.62	61.0	18.77	116.02
72	87.0	336.5	4.65	328.2	38.1	105	158 - 210	1.62	61.0	19.13	116.21
73	86.5	342.6	4.75	334.0	38.9	105	158 - 210	1.63	61.0	19.48	116.40
74	86.3	348.6	4.80	339.8	39.6	105	158 - 210	1.63	61.0	19.83	116.59
75	86.1	354.6	4.90	345.5	40.3	105	158 - 210	1.63	61.0	20.18	116.79
76	86.0	360.6	5.00	351.2	41.1	105	158 - 210	1.63	61.0	20.53	116.98
77	85.5	366.6	5.10	356.9	41.8	105	158 - 210	1.63	61.0	20.87	117.18
78	85.2	372.6	5.20	362.5	42.6	105	158 - 210	1.63	61.0	21.22	117.38
79	85.0	378.5	5.30	368.2	43.3	105	158 - 210	1.63	61.0	21.56	117.58
80	84.0	384.4	5.40	373.7	44.0	105	158 - 210	1.63	61.2	21.90	117.79
81	83.6	390.3	5.45	379.3	44.8	105	158 - 210	1.63	61.2	22.24	118.01
82	83.0	396.1	5.50	384.8	45.5	105	158 - 210	1.63	61.2	22.58	118.24
83	82.0	401.8	5.55	390.2	46.2	105	158 - 210	1.64	61.2	22.91	118.48
84	81.5	407.5	5.60	395.6	47.0	105	158 - 210	1.64	61.5	23.24	118.72
85	81.0	413.2	5.65	400.9	47.7	105	158 - 210	1.64	61.5	23.57	118.97
86	80.3	418.8	5.70	406.2	48.4	105	158 - 210	1.64	61.5	23.90	119.23
87	80.0	424.4	5.75	411.5	49.2	105	158 - 210	1.64	61.5	24.22	119.49
88	79.3	430.0	5.80	416.7	49.9	105	158 - 210	1.64	61.8	24.54	119.75
89	79.0	435.5	5.85	421.9	50.6	105	158 - 210	1.64	61.8	24.87	120.02
90	78.5	441.0	5.90	427.1	51.4	105	158 - 210	1.64	61.8	25.18	120.28
91	78.1	446.5	6.00	432.2	52.1	105	158 - 210	1.65	61.8	25.50	120.55
92	78.0	451.9	6.10	437.4	52.8	105	158 - 210	1.65	61.8	25.82	120.82
93	77.3	457.3	6.20	442.4	53.6	105	158 - 210	1.65	61.8	26.13	121.10
94	77.0	462.7	6.30	447.5	54.3	105	158 - 210	1.65	62.0	26.45	121.37
95	76.4	468.1	6.50	452.5	55.0	105	158 - 210	1.65	62.0	26.76	121.66
96	76.1	473.4	6.70	457.5	55.8	105	158 - 210	1.66	62.0	27.06	121.94
97	76.0	478.7	6.80	462.4	56.5	105	158 - 210	1.66	62.0	27.37	122.22
98	75.0	484.0	6.90	467.3	57.3	105	158 - 210	1.66	62.0	27.67	122.52
99	74.0	489.1	7.00	472.1	58.0	105	158 - 210	1.66	62.0	27.97	122.82
100	73.2	494.3	7.10	476.9	58.7	105	158 - 210	1.66	62.0	28.27	123.14

Cage Brooding Recommendations

Transportation to the Farm

- Use a truck designed for transportation of chicks from hatchery to farm.
- Provide space between stacks of chick boxes for air flow.

Chick Placement

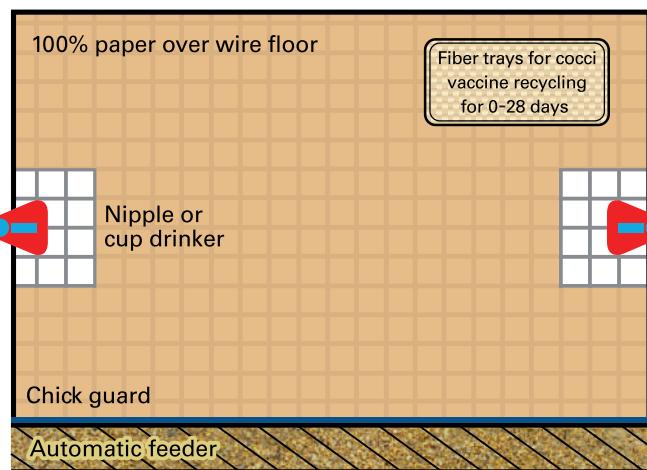
- Unload boxes quickly and gently place chicks in brooding area.
- Brood chicks in groups from similar aged breeder flocks.
- Start chicks in upper tiered cages which are usually warmer and brighter. Ensure there are no shadows on drinkers.
- Chicks from young breeder flocks should be placed in warmer and brighter areas of the house.

House Preparation before Arrival of Chicks

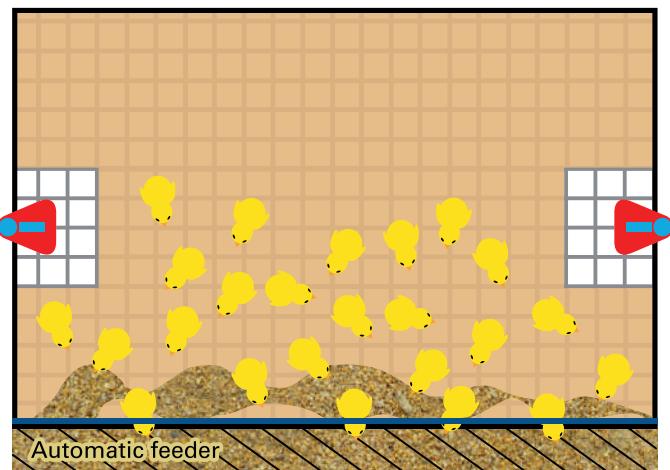
- Brooder house should be completely cleaned and disinfected well in advance of chick delivery. Confirm effectiveness of cleaning and disinfection with environmental swabs.
- Allow 2 weeks minimum downtime between flocks.
- For more information on house preparation and brooding management, see the Growing Management of Commercial Pullets technical update, available in [English](#), [Tamil](#), and [Telugu](#) at www.hyline.com.
- Establish proper house temperature of 33-36°C (air temperature measured at chick level) and 60% humidity 24 hours before chick placement.
- Pre-heat brooding houses prior to chick placement: 24 hours in normal climates, 48 hours in cool climates and 72 hours in cold climates.
- Fill automatic feed line to its highest level and adjust chick guards. Allow access to the automatic feeder from the first day.
- Bright light (30-50lux) during 0-7 days helps chicks quickly find feed and water and adapt to the new environment.

Brooding Management

- Place feed on cage paper 0-3 days to encourage consumption. For beak-treated chicks, feed on paper for 0-7 days.
- Place feed in front of permanent feeder to train chicks to move toward feeders.
- Remove paper at 7-14 days of age to avoid build-up of feces.
- Cage floors should not be slippery or sloped.
- Use vitamins and electrolytes in chicks' water (avoid sugar-based products to prevent growth of microorganisms).
- Chicks' body weight should double between arrival and 7 days of age.
- Brood chicks in groups from similar aged breeder flocks.
- Modify temperature as needed to meet chicks' comfort needs.
- Adjust brooding temperature according to relative humidity. Lower temperature should be used with higher relative humidity.
- Find optimum balance of temperature, humidity and ventilation rate for chick comfort.
- For every 5 percentage point increase above 60% relative humidity, reduce brooding temperatures by 1°C.
- After the first week, reduce temperature weekly 2-3°C until reaching 21°C.
- Do not give cold water to chicks. Be careful when flushing water lines for chicks. Allow water time to warm up in the house so chicks are comfortable drinking.

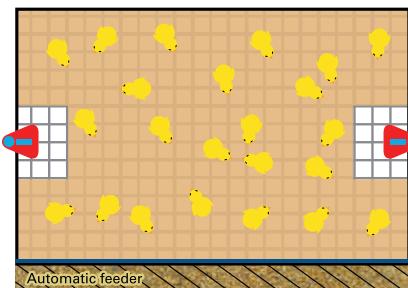


Chick guard adjusted to allow access to feeder from first day

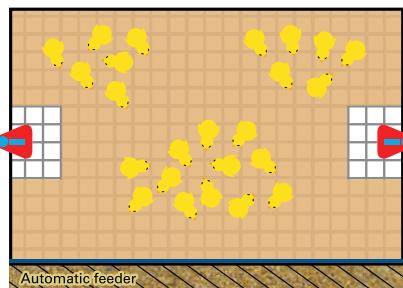


Place feed on paper near automatic feeder to train chicks

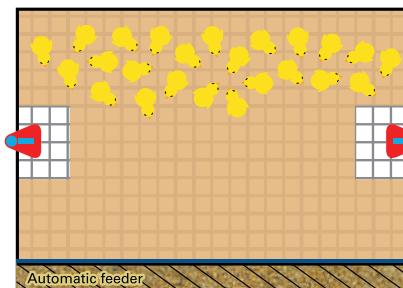
Cage Brooding Recommendations *(continued)*



CORRECT
Chicks evenly distributed in cage,
active and sounding content



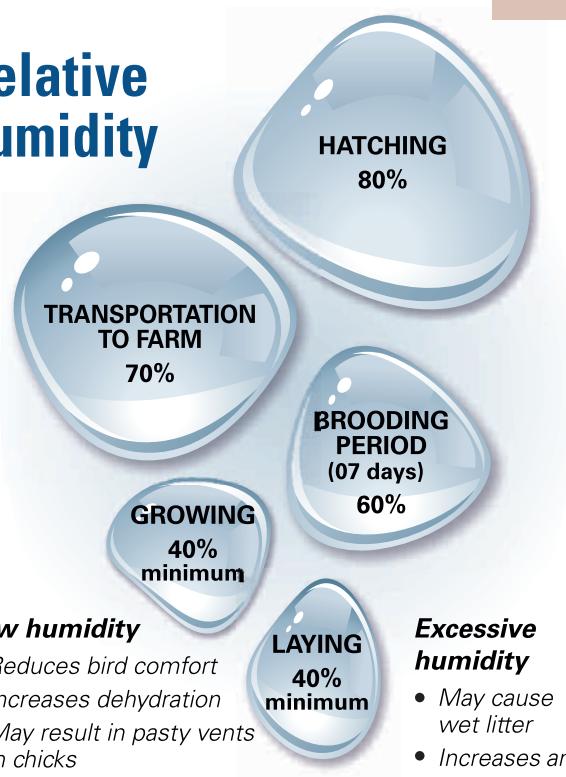
COLD
Chicks gathered into groups
sounding distressed



UNEVEN VENTILATION
Chicks congregated in one part
of cage, avoiding drafts, noise
or uneven light distribution

AGE	0-3 days	4-7 days	8-14 days	15-21 days	22-28 days	29-35 days	36-42 days
AIR TEMP. (CAGE)	33-36°C	30-32°C	28-30°C	26-28°C	23-26°C	21-23°C	21°C
AIR TEMP. (FLOOR)	35-36°C	30-32°C	28-30°C	26-28°C	23-26°C	21-23°C	21°C
LIGHT INTENSITY	30-50 lux	33-35°C	28-30°C	26-28°C	23-26°C	21-23°C	21°C
LIGHT HOURS	20 hours or Intermittent Program	30-50 lux	31-33°C	26-28°C	23-26°C	21-23°C	21°C
		20 hours or Intermittent Program	25 lux	29-31°C	23-26°C	21-23°C	21°C
			19 hours	25 lux	26-27°C	21-23°C	21°C
				17 hours	25 lux	23-25°C	21°C
					16 hours	5-15 lux	21°C
						15 hours	5-15 lux
							14 hours

Relative humidity



Low humidity

- Reduces bird comfort
- Increases dehydration
- May result in pasty vents in chicks
- May increase agitation and possibility of pecking
- Adversely affects feather cover
- Increases dust

Excessive humidity

- May cause wet litter
- Increases ammonia
- Causes poor air quality

CROP FILL - ARE THE CHICKS EATING?

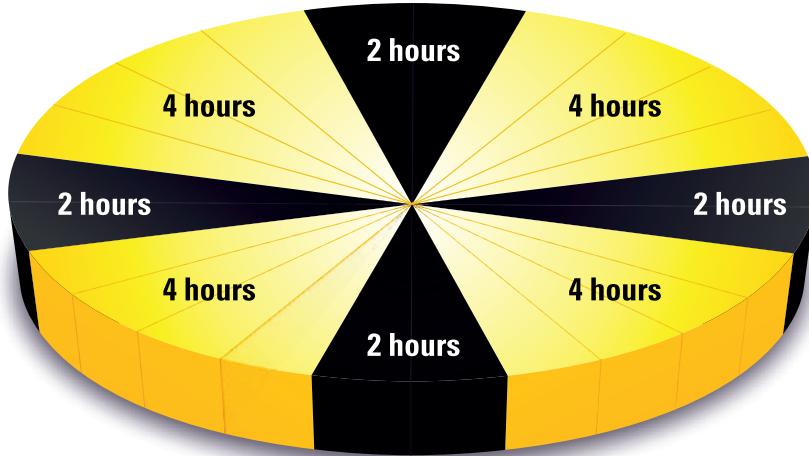
Hours after chick placement	Chicks with feed in crop		
6	75%		
12	85%	Chick with starter feed in crop	Chick without starter feed in crop
24	100%		

Brooding temperatures that are too low or too high will decrease the percentage of chicks with crop fill.

Lighting During Brooding Period

- An intermittent lighting program is preferred. If not using an intermittent lighting program from 0-7days, then use 22 hours of light from 0-3days and 21 hours of light from 4-7days.
- Do not use 24 hours of light.
- Bright light (30-50lux) during 0-7days helps chicks quickly find feed and water and adapt to the new environment.
- After the first week, reduce light intensity and begin slow step-down lighting program (see [Light Program for Light-Controlled Housing](#)).

INTERMITTENT LIGHTING PROGRAM FOR CHICKS

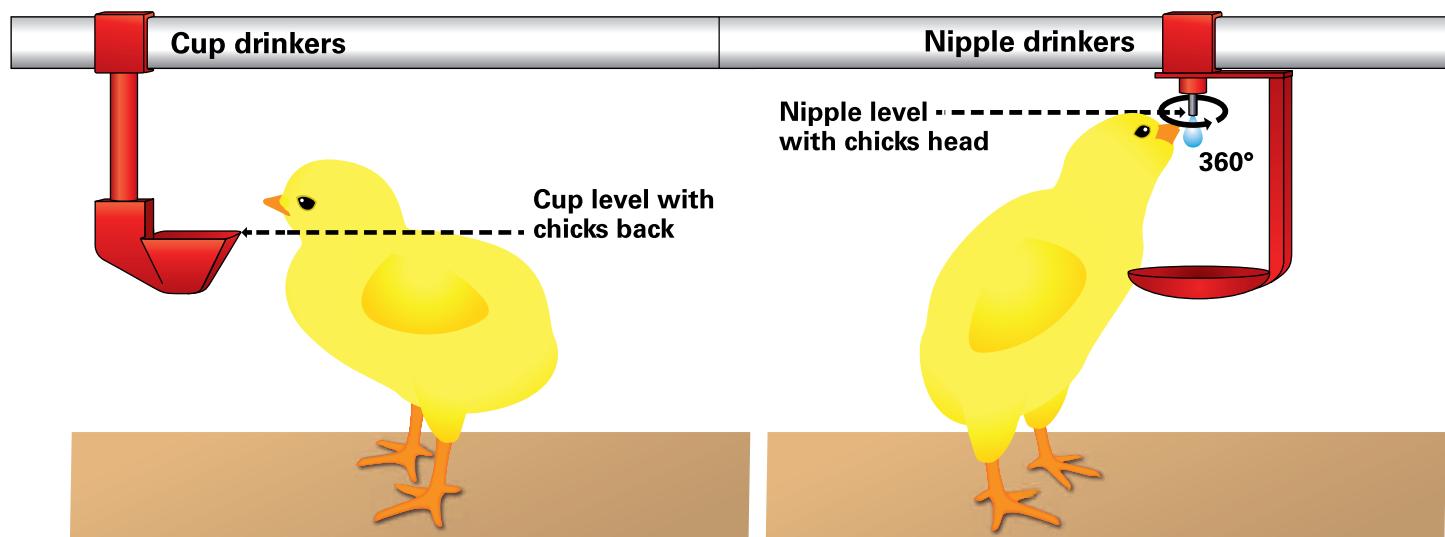


- Preferred lighting technique
Use from 0-7days (can be used up to 14 days of age)
- Intermittent dark periods provide rest periods for chicks'
- Synchronizes chicks activities and feedings
- Establishes more natural pattern of rest and activity
- May improve 7 day livability and pullet body weight
- May improve antibody response from vaccinations

Some dark periods may be shortened or removed to accommodate work schedules

Drinking Systems

- The type of drinkers used during rearing should be the same as in the layer house. Also use the same nipple type in rearing and laying house (vertical vs. 360° nipples).
- Drinking water should be tested periodically for quality and cleanliness from source and end of the water line.
- Flush water lines prior to chick arrival.
- Flush water lines weekly during rearing and production periods.
- Nipple drinkers should deliver minimum 60 ml per minute / nipple, with easy activation of the drinkers by chicks.
- Record daily flock water consumption. A drop in water consumption is often the first sign of a serious problem in the flock.



- Cup drinkers should be manually filled during 0-3 days to train chicks to drink.
- Open drinkers (bell, plasson, supplemental chick drinkers, trough) are easily contaminated and should be cleaned daily.

- Adjust nipple water system pressure to create hanging drop to help chicks find water for 0-3 days and in layer house at transfer.
- Splash cups are useful during brooding period and in hot climates.
- 360° activated nipples make drinking easy for chicks. Use only 360° activated nipples for hatchery beak-treated chicks.

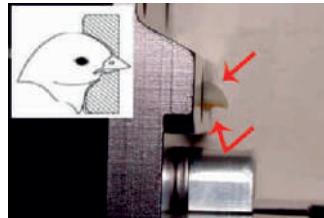
Beak Treatment / Trimming

(Check local regulations concerning use of beak trimming)

- Hy-Line W-80 India commercial layer should be beak treated at hatch by infrared beak treatment or between 7-10 days of age by precision beak trimming.
- If necessary, re-trim before 6 weeks or after 12 weeks of age.
- Hatchery beak treatment or 7-10 day beak trimming reduces feed wastage and leaves the beak less damaging to other birds.

HATCHERY INFRARED BEAK TREATMENT (IRBT)

- This provides efficient, uniform beak treatment.
- Beak remains intact until 21-28 days of age when treated portion separates.
- Use only 360° activated nipples for IRBT chicks, as well as supplemental chick drinkers.
- For IRBT chicks, feed on paper for 0-7 days.
- For more information, see the [Infrared Beak Treatment](#) technical update at www.hyline.com and the [Infrared Beak Treatment in Chicks \(IRBT\)](#) poster.



Infrared beak treatment can be modified according to local conditions.



Immediately following infrared beak treatment on day of hatch



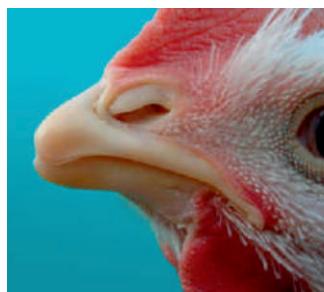
7 days after infrared beak treatment



Photo courtesy of Lyon Technologies, Inc.



Pyrometer indicating proper blade temperature of 650°C.



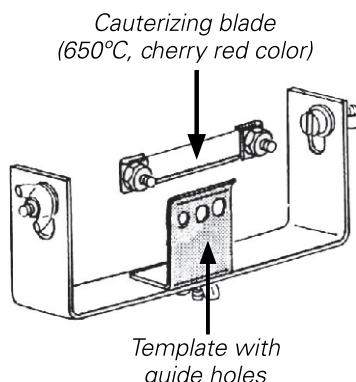
Properly trimmed beaks

- Cauterize beak for 2 seconds at 650°C.
 - When cauterizing blade is not hot enough or cauterization time is < 2 seconds, beak will continue to grow unevenly.
 - If cauterizing blade is too hot or cauterization time is > 2 seconds, sensitive neuromas may form.
- Use a pyrometer to accurately measure blade temperature, which should be approximately 650°C.
- Cauterizing blade color may be used as an approximate indicator of temperature.

< 650°C

650°C

> 650°C



Guide holes correspond to different size and age of chicks

- 3.56 mm
- 4.00 mm
- 4.37 mm

Precautions when using IRBT or beak trimming birds:

- Water intake is the most important factor in the success of IRBT/beak trimming. Chicks require immediate and easy access to water.
- Do not beak-trim sick or stressed birds.
- Do not hurry; handle chicks carefully.
- Provide vitamins and electrolytes containing vitamin K in drinking water 2 days before and 2 days after beak trimming.
- Watch chicks after beak trimming to assess stress. Raise ambient temperature until birds appear comfortable and active.
- Keep feed at the highest level for several days after beak trimming.
- Use only well-trained crews.
- Use 360° activated nipples, supplemental chick drinkers and splash cups to encourage drinking.

Infrared Beak Treatment (IRBT) Scoring

Holding the Bird for Scoring

- Hold the bird firmly without applying any pressure on the throat as this may draw the lower beak backwards giving the appearance the lower beak is shorter than it is. At least two people are required to do the scoring plus catchers.

How to Select Birds for Scoring of Treated Beaks

- Select 100 birds at random throughout the shed and assess beak quality to determine the effectiveness of tipping at the nominated times over the life of the flock.
- The birds to be scored must be representative of the flock. The process for selecting a random (or representative) sample of birds is as follows.
 - **From cages:**
 - Select cages throughout the house
 - Select cages from the top, middle and lower tiers
 - Ensure cages are selected from both ends of the house as well as the middle
 - Score all the birds in the same cages every time beaks are assessed.
 - **From a litter and/or slatted floor shed including aviary:**
 - If you have several sheds with birds the same age, randomly select one shed for sampling
 - Divide the shed into 10 sections and randomly select 10 birds from each section
 - Score birds from different locations such as littler area, slatted area, perches and various levels or tiers
 - An alternative for litter or slatted floored sheds is to set up catching pens at the front and back ends and in the middle and randomly select the appropriate number of birds to score
 - Scoring free range birds is easier before they are given access to the range
 - If birds are to be scored on the range, score half of the sample in the shed and half on the range
 - Sample the birds on the range from various locations
 - Visually assess the beaks of each bird
 - It is preferable to score hens in the afternoon after they have completed lay for the day.

When to Score Treated Beaks

- The treatment applied affects beak growth, shape and length as the bird ages.
 - At 28 days of age - Identifies gross treatment errors and unacceptable shapes such as beaks that are non-treated, have a severe hook or a large step (known as shovel beak).
 - Before or at transfer of the pullets to the layer facilities, particularly if started stock are purchased - the beak shape indicates if the prescribed treatment has been applied correctly.
 - When a bout of pecking occurs or a flock's flightiness increases - this indicates if the treatment applied is appropriate for the environment the flock lives in.
 - Towards the end of lay, if there are concerns about the beak shape, even if pecking is not a problem - indicates if the treatment applied is appropriate for the environment the flock lives in.
- Combine beak scoring with other activities, such as on-farm vaccination or body weight checks.

How to Score Beaks

1. Select 100 birds randomly from the flock.
2. Hold the bird firmly with the beak in a closed but natural position. Do not apply any pressure on the throat, as this may cause the lower beak to withdraw backwards and appear shorter.
3. Match the beak shape of each bird to the closest drawing and place a tally mark against each beak rating scale.
4. Add tally marks in each beak rating scale, divide by the total beaks rated, and work out a percentage score.

The distribution of beak shapes within these scores is influenced by the treatment prescription applied.

Scoring Sheets

See the following pages for beak treatment scoring sheets.

Comments on the quality of treatment (e.g. unusual beak shapes) should be included in the comments box at the bottom of the scoring sheet. Photos will help to describe unusual beak shapes.

Infrared Beak Treatment (IRBT) Scoring Sheets

For birds 28 days old

The sum of scores 3, 4, 5, or 6 should represent 97% of beaks.

BEAK TREATMENT (IRBT) SCORING SHEET for 28 day old chickens

Date	Hatchery	Age of flock
Farm	Hatch date	Mortality to 10 days %
Production system*	Donor flocks	Mortality to date %
Breed	Flock size at day old	Body weight
Shed/flock ID	Flock size at transfer	Uniformity %

* cage, aviary, barn, free range

1.												Total _____
2.												Score _____ as %
3.												Total _____
4.												Score _____ as %
5.												Total _____
6.												Score _____ as %
7.												Total _____
												Score _____ as %

TOTAL of all scores _____ **TOTAL of 3+4+5+6 scores as %** _____

IRBT Scoring Sheets *(continued)*

For birds 12-30 weeks old

The sum of scores 2, 3, or 4 should represent 97% of beaks. For score 2, the difference in length between the upper and lower beak tips (upper beak over step) must be less than 3 mm. For score 4, the difference in length between the upper and lower beak tips (upper beak under step) must be less than 5 mm. The residual beak length should be 10 mm or more for birds older than 16 weeks.

BEAK TREATMENT (IRBT) SCORING SHEET for 12–30 week old birds

Date	Hatchery	Age of flock
Farm	Hatch date	Mortality to date %
Production system*	Donor flocks	Body weight
Breed	Flock size at day old	Uniformity %
Shed/flock ID	Flock size at transfer	

* cage, aviary, barn, free range

TOTAL of all scores _____ **TOTAL of 2+3+4 scores as %** _____

IRBT Scoring Sheets *(continued)*

For birds older than 30 weeks

The sum of scores 3, 4, or 5 should represent 97% of beaks. For score 5, the difference in length between the upper and lower beak tips (the beak step) must be less than 5 mm.

BEAK TREATMENT (IRBT) SCORING SHEET for birds older than 30 weeks

Date	Hatchery	Age of flock
Farm	Hatch date	Mortality to date %
Production system*	Donor flocks	Body weight
Breed	Flock size at day old	Uniformity %
Shed/flock ID	Flock size at transfer	

* cage, aviary, barn, free range

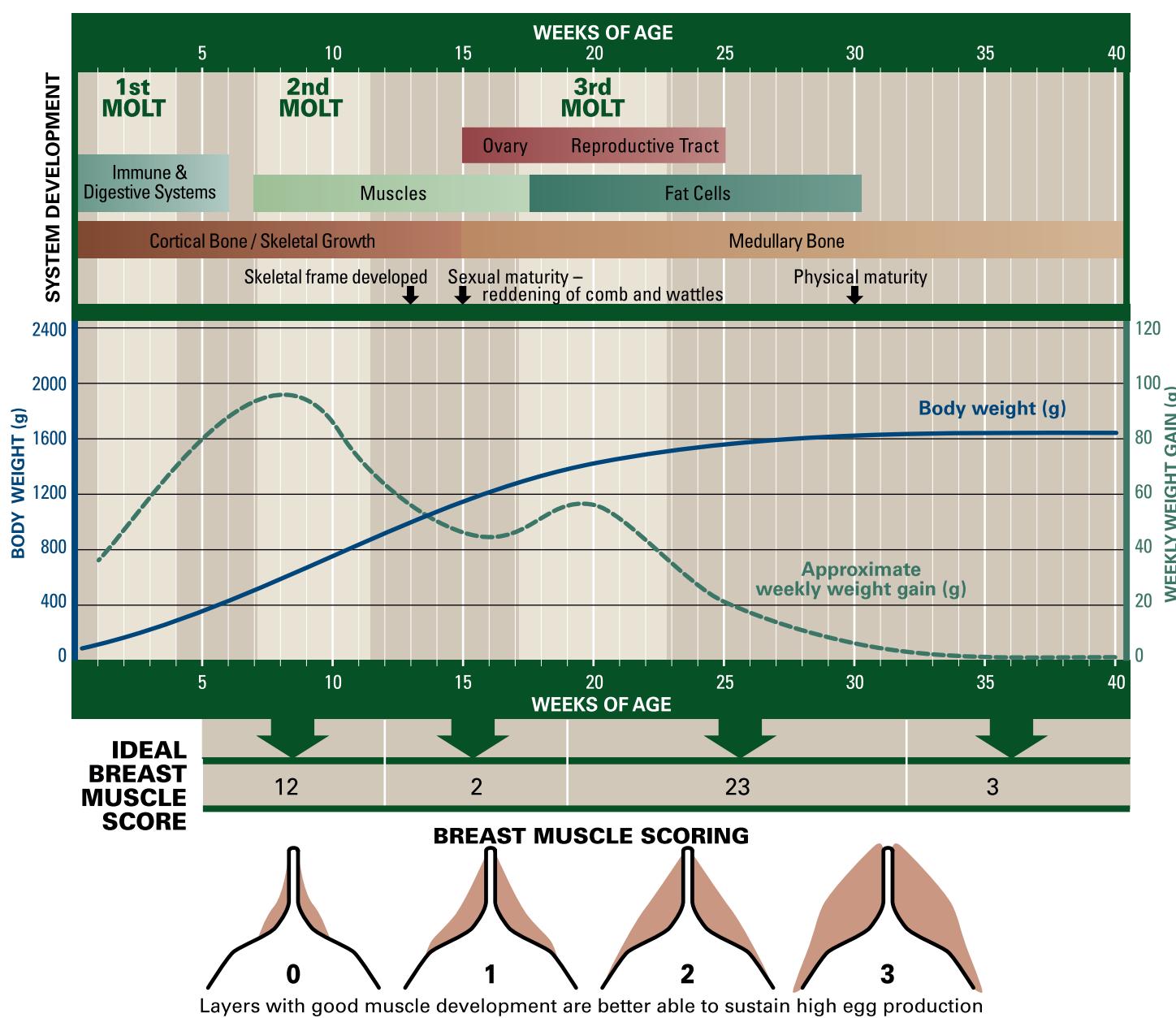
1.												Total _____
												Score _____ as %
2.												Total _____
												Score _____ as %
3.												Total _____
												Score _____ as %
4.												Total _____
												Score _____ as %
5. Step is less than 5 mm												Total _____
												Score _____ as %
6.												Total _____
												Score _____ as %

TOTAL of all scores _____ **TOTAL of 3+4+5 scores as %** _____

Growth and Development

- Focus on pullet rearing programs to optimize growth and development.
- The best predictor of future laying performance is the pullets body weight and body type at the point of lay.
- A pullet flock entering into egg production at the correct body weight (1.17-1.20 kg) with uniformity higher than 90% performs best in the production period.
- It is important to achieve 6, 12, 18, 24, and 30 week body weight targets to ensure optimum development of the birds body.
- Try to exceed body weight goals 0-12 weeks, but avoid excessive body weight gains after 12 weeks.

- Change rearing diets only when recommended body weight is attained. Suggested ages are a guide if target weights are achieved.
- Delay diet change if birds are underweight or have poor body weight uniformity.
- Anticipate rapid rise in ambient temperature and adjust bird's diet accordingly. Birds will eat less when exposed to a rapid temperature increase. (See the "Understanding Heat Stress in Layers" technical update in [English](#) and [Telugu](#) at www.hyline.com.)
- Stress periods require a change in diet formulation to ensure proper nutrient intake.
- Increasing dietary fiber to 5-6% beginning with developer diet can increase crop, gizzard and intestine development and capacity.



Rearing Body Weights, Feed Consumption and Uniformity

AGE (weeks)	BODY WT. (kg)	FEED INTAKE (g/bird/day)	WATER CONS. (ml/bird/day)	UNIFORMITY (Cage)
1	0.07	12	18 - 28	
2	0.12	15	23 - 38	
3	0.18	21	32 - 50	
4	0.25	27	41 - 62	
5	0.32	31	47 - 70	
6	0.41	35	53 - 78	
7	0.51	39	59 - 86	
8	0.60	42	63 - 92	
9	0.70	44	66 - 100	
10	0.78	48	71 - 105	
11	0.86	51	76 - 111	
12	0.92	54	80 - 117	
13	0.98	57	85 - 123	
14	1.03	60	89 - 129	
15	1.08	63	94 - 135	
16	1.13	67	100 - 143	
17	1.17	70	104 - 149	
18	1.25	74	111 - 162	

- Monitor body weights weekly from 0-30 weeks and before scheduled diet changes.
- Body weight gains and uniformity may be negatively affected by inappropriate diet changes, bird handling, vaccination and transfer.
- Using multiple hatch dates, causing a range of chick ages, will negatively affect uniformity.
- Flocks should be at 90% uniformity at the time of transfer to the laying facility.
- During the transfer of birds from rearing to laying facilities, there will be some loss of body weight.

Weigh 100 birds weekly to 30 weeks of age



Weigh birds separately after 3 weeks using a digital scale that calculates uniformity.

Space Guidelines *(check local regulations)*

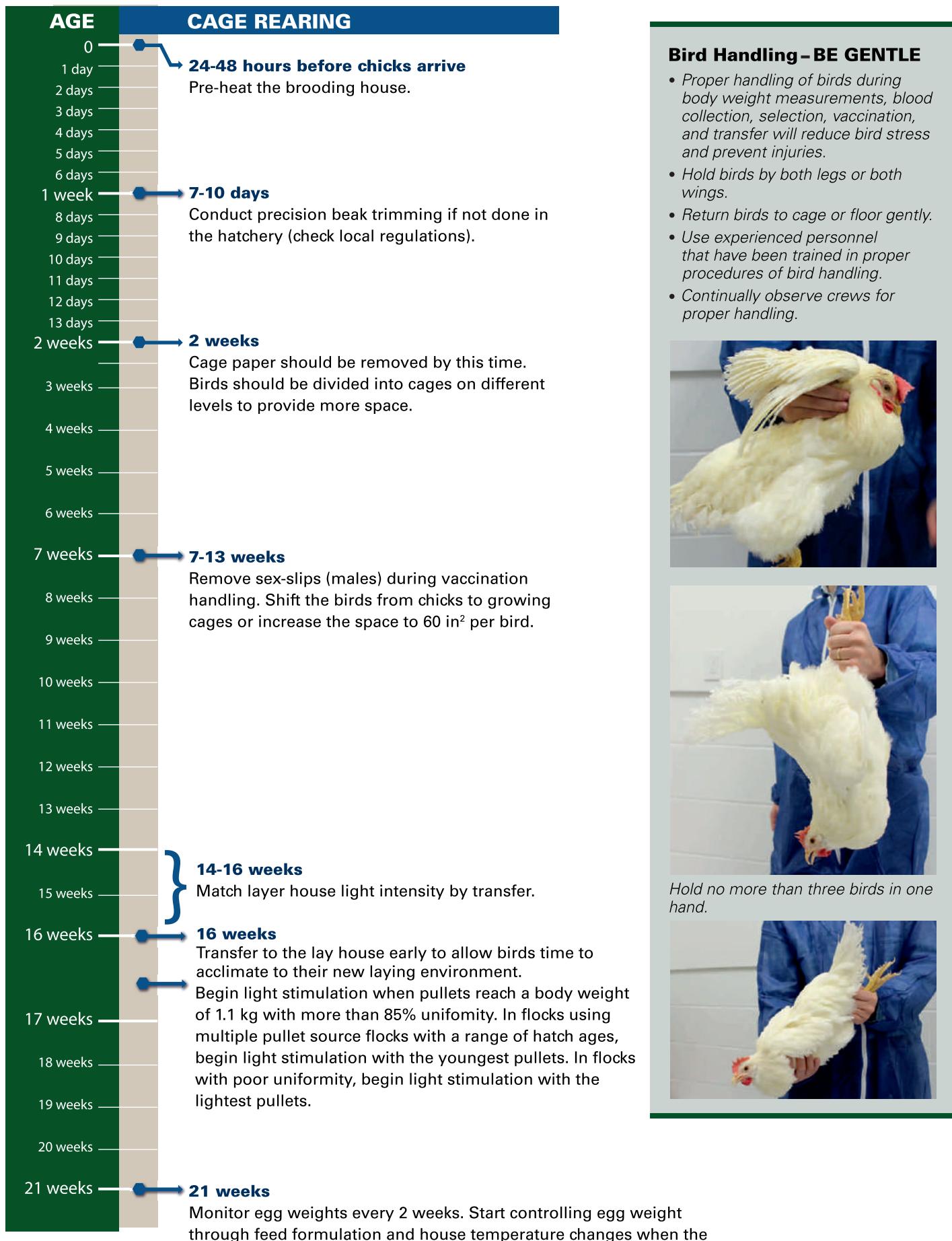
		WEEKS OF AGE	6	19	20	30	40	50	60	70	80	90	100
CONVENTIONAL AND COLONY CAGES													
Floor Space		40 in ²	60 in ²	65 in ²									
Nipple/Cup		8 birds / nipple	5 birds / nipple	4 birds / nipple, access to 2 drinkers									
Feeders		2.25 in / bird	4 in / bird	4 in / bird (environment-controlled) 5 in / bird (open-sided)									

Requirements vary with type of equipment used and environmental conditions.

Transfer to Laying House

- Transfer the flock to the production facility by 16 weeks of age or after administration of the last live vaccines.
- Delayed transfer results in overcrowding in rearing cages and loss of flock uniformity. This may result in some birds becoming fat.
- It is important that rearing and production cages use similar feed and water systems, to minimize stress.
- Any sex slips (males) should be removed around 7 weeks and at transfer.
- Supportive care to reduce stress, such as water-soluble vitamins, probiotics, vitamin C and increased dietary density, should be used 3 days before and 3 days after transfer.
- Weigh prior to transfer and monitor weight loss during transfer.
- Monitor flock water consumption frequently after transfer. Pre-transfer water consumption should be achieved within 6 hours after transfer to the laying house.
- Brighten the lights for three days after transfer until birds settle in their new environment.
- Inspect the flock and remove mortality daily.
- If mortality exceeds 0.1% per week, perform necropsies and other diagnostics to determine cause(s) of mortality.
- Transfer birds quickly to laying house. Transfer all birds the same day. Move early in the morning so birds can keep to a normal daily routine.

Management Events for Commercial Layers



Bird Handling – BE GENTLE

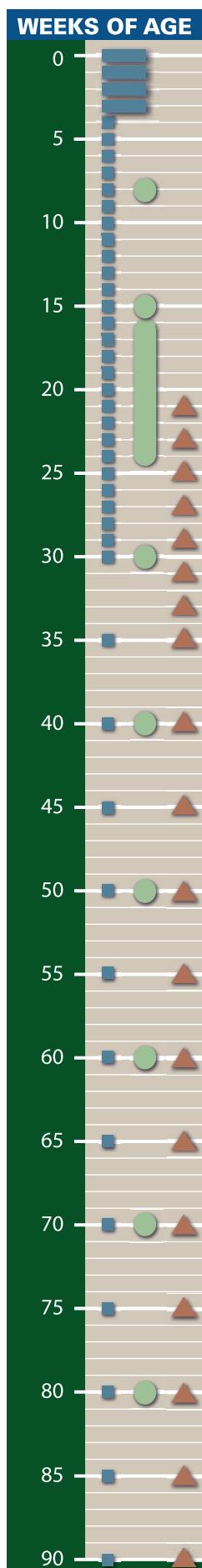
- Proper handling of birds during body weight measurements, blood collection, selection, vaccination, and transfer will reduce bird stress and prevent injuries.
- Hold birds by both legs or both wings.
- Return birds to cage or floor gently.
- Use experienced personnel that have been trained in proper procedures of bird handling.
- Continually observe crews for proper handling.



Hold no more than three birds in one hand.



Management Events for Commercial Layers



AGES OF BODY WEIGHT MEASUREMENTS

- Weigh separate groups of birds on each cage level due to temperature and environmental differences.
- Identify cages from the beginning and end of feed lines.
- Mark cages and use the same cage every time body weight is monitored.
- Weigh birds on the same day of the week and the same time of day.

0-3 weeks

- Bulk weigh 10 boxes of 10 chicks.

4-29 weeks

- Weigh 100 birds individually every week.
- Weigh birds in the same cages each time for best accuracy.
- Calculate uniformity.

30-90 weeks

- Weigh 100 birds individually every 5 weeks.
- Weigh birds in the same cages each time for best accuracy.
- Calculate uniformity.

When handling birds for body weights, assess:

- Keel bone-straightness and firmness
- Breast muscle score
- Body fat
- External parasites
- Clinical symptoms of disease

CALCULATING UNIFORMITY

- Use individual bird weights.
- Uniformity calculation tool is available at www.hyline.com.

AGES OF SERA COLLECTION

For more information, see the "[Proper Collection and Handling of Diagnostic Samples](#)" technical update at www.hyline.com

Collect 10-20 sera samples per flock for titer determination.

8 weeks

- Assess early vaccination technique and disease exposure.

15 weeks

- Collect sera before transfer to lay house to assess possible change in disease exposure.
- It is common to not send sera to the laboratory and freeze for future analysis in event of disease outbreak on lay farm.

16-24 weeks

- Collect sera at least 4 weeks after final inactivated vaccination to measure post-vaccination antibody response.
- It is useful to assess disease challenge after transfer to lay farm.

30-80 weeks

- Collect sera every 10 weeks.
- It is useful for assessing disease exposure during the laying period.

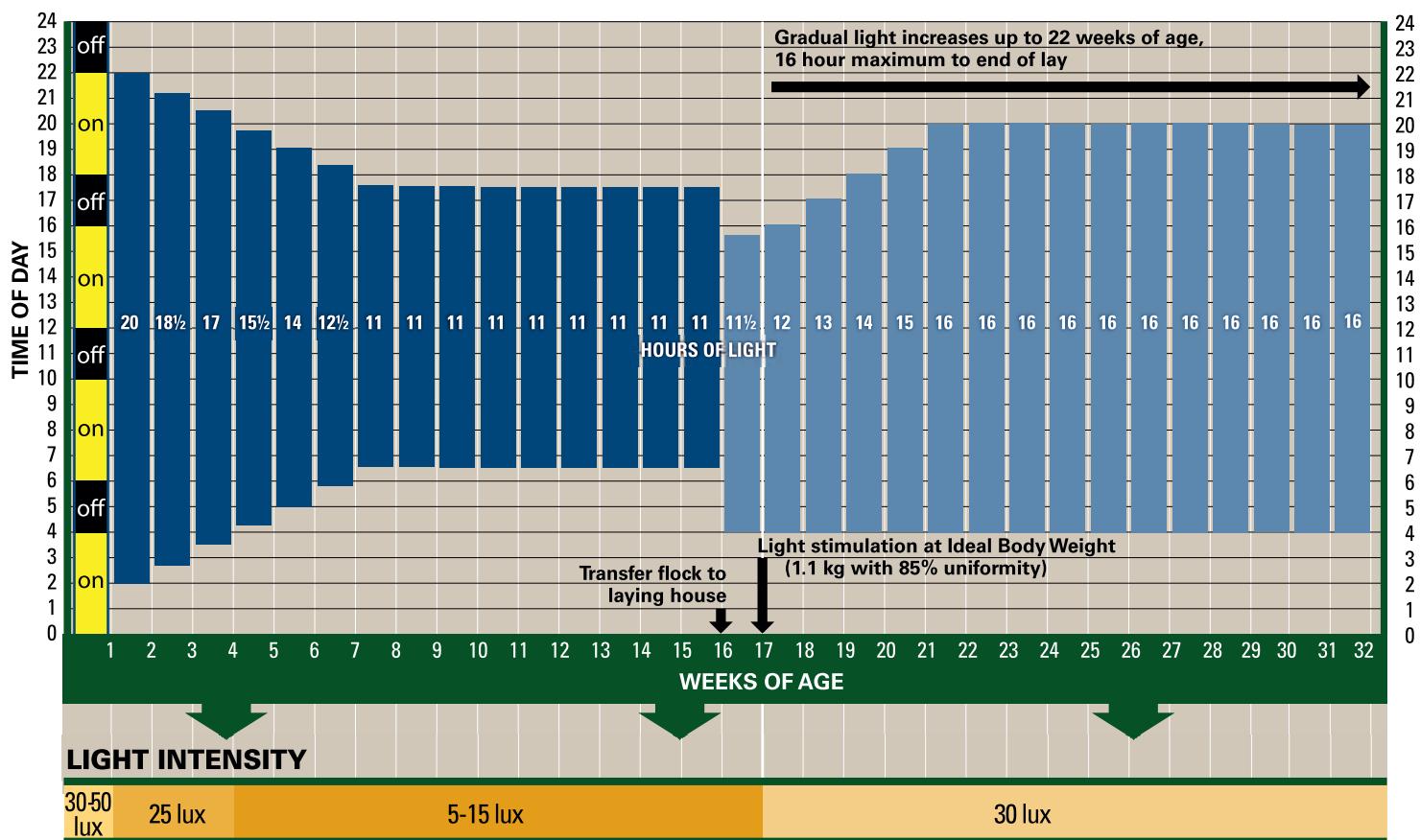
▲ AGES TO MONITOR EGG WEIGHTS

Weigh 100 eggs collected from egg belts in front of randomly selected cages (may be the same cages used for body weight monitoring) to ensure even distribution of egg samples. Monitor egg weights on a specific day of the week within the same 3-hour time frame.

Good Lighting Practices

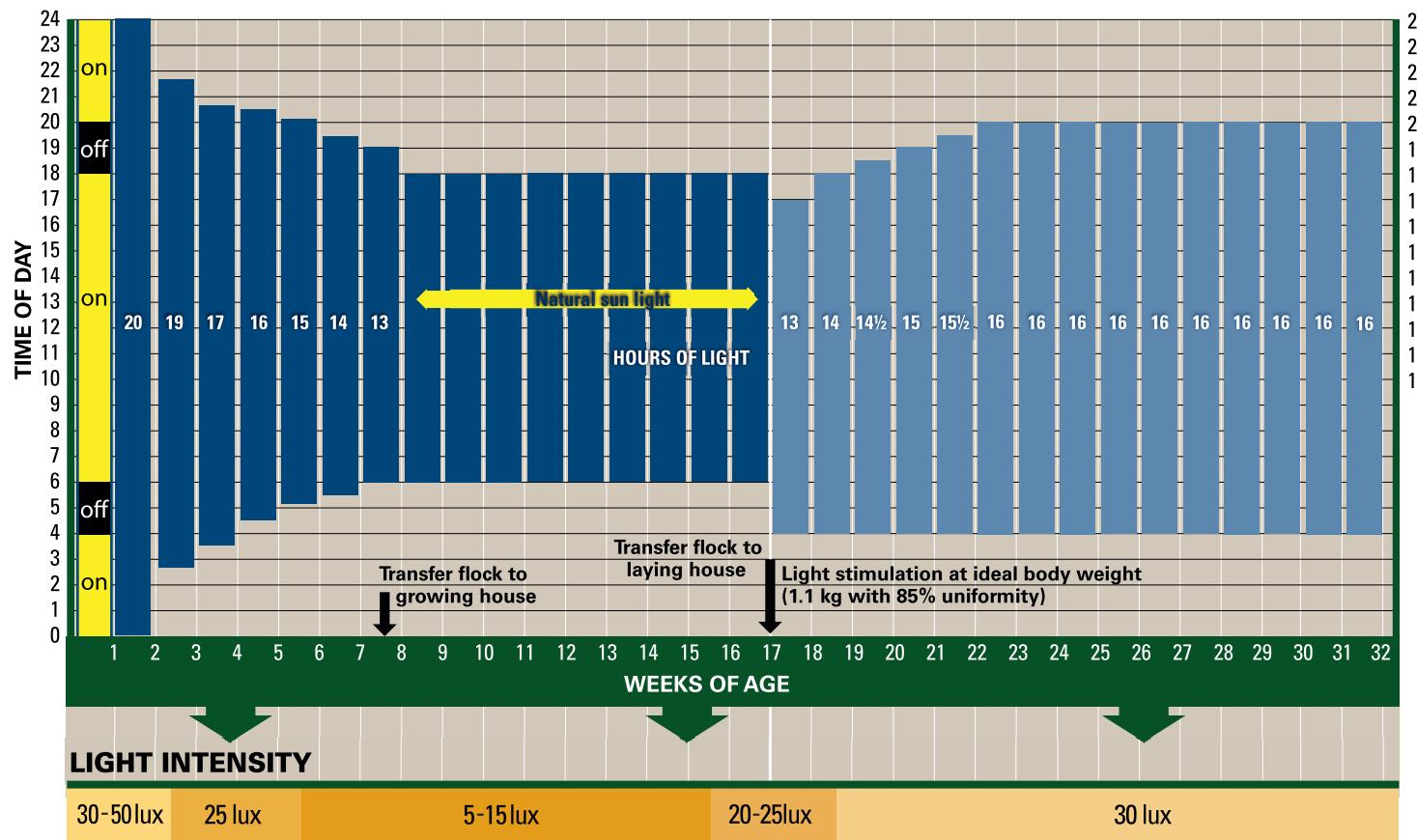
- Measure minimum light intensity at feeder on bottom tier cages, mid-way between lights.
- Keep light bulbs clean to prevent loss of light intensity.
- Prevent dark areas caused by too much distance between lights or burned-out light bulbs.
- Position lights to minimize bright and dark areas in the house.
- Shiny or white surfaces reflect light and increase light intensity.
- Take local conditions into account which may require adaptations of lighting programs.
- Light hours of rearing and production houses should be matched at transfer.
- Light intensity should gradually increase 2 weeks before flock is transferred to the laying house (but not prior to 14 weeks of age). Final rearing house light intensity should match the laying house intensity.
- Begin light stimulation when flock reaches a body weight of 1.1 kg with more than 85% uniformity. Delay light stimulation if the flock is underweight or has poor uniformity.
- Light stimulation period should extend into the peaking period.
- Alternating the height of lights improves light distribution to all cage levels.

Light Program for Light-Controlled Housing



- Light-controlled houses are those which use light traps around fans and air inlets and completely prevent the ingress of light from the outside. Houses that are not light controlled should use lighting programs for open-sided housing.
- An intermittent lighting program for chicks is preferred. If not using an intermittent lighting program from 0-7 days, then use 20 hours of light from 0-7 days.
- "Lights on" time can be varied between houses in laying flocks to facilitate egg collection on multiple flock complexes.
- If the laying flock has a large spread in hatch ages and/or poor uniformity, light stimulate the flock based on the youngest hatch date or lightest birds.
- Use warm lights (2700-3500 K) in laying flocks to ensure sufficient red spectrum light.
- For more information on poultry lighting, see the "[Understanding Poultry Lighting](#)" and "[Impact of Tarp Color on Poultry Lighting](#)" technical updates at www.hyline.com.

Light Program for Open-Sided Housing



Growing Period

Age (weeks)	Light Hours
1	20
2	19
3	17
4	16
5	15
6	14
7	13
8 to stimulation	natural daylight

Stimulation and Laying Period

Age (weeks)	Light Hours
16	BW=1100 g with 85% uniformity
17	+1 hr
18	+1 hr
19	+1/2 hr
20	+1/2 hr
21	+1/2 hr
22	15-16
23	15-16
24	15-16

Customized Lighting Programs for Open-Sided Housing (www.hyline.com)

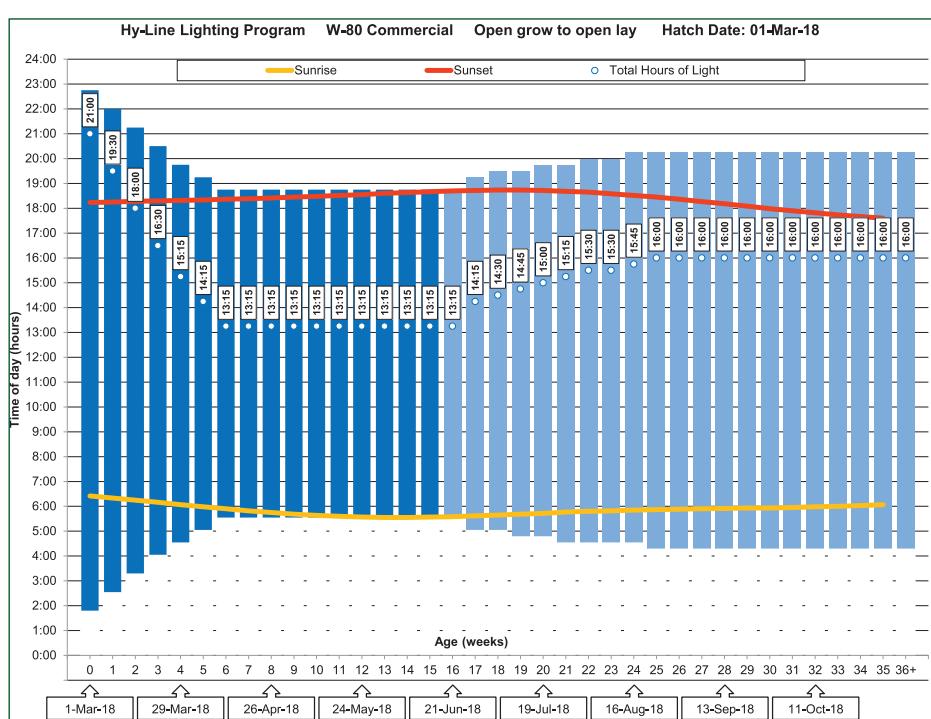
The Hy-Line International Lighting Program can create custom lighting programs for your location and flock hatch date. The program finds the longest natural day length between 12-17 weeks of age and constructs an artificial lighting program that holds day length constant with artificial lights from 12-17 weeks. This prevents the flock from being stimulated by natural light before achieving the proper body weights.

- On the first screen-enter e-mail address and select language.
- On the second screen, use dropdowns for "Select Location of Flock Hatch Date," "Variety Standards and Housing Style."
- Click on "Create Lighting Spreadsheet."
- Results will be e-mailed to you.

Lighting Program for : INDIA / VIJAYAWADA 80° 39' E 16° 30' N

Weeks of Age	Date	Sunrise	Lights on	Lights Off	Sunset	Total Hours of Light	Total Sunlight
0	1-Mar-18	6:25	1:45	22:45	18:14	21:00	11:49
1	8-Mar-18	6:20	2:30	22:00	18:15	19:30	11:55
2	15-Mar-18	6:15	3:15	21:15	18:17	18:00	12:02
3	22-Mar-18	6:10	4:00	20:30	18:18	16:30	12:08
4	29-Mar-18	6:04	4:30	19:45	18:19	15:15	12:15
5	5-Apr-18	5:59	5:00	19:15	18:20	14:15	12:21
6	12-Apr-18	5:54	5:30	18:45	18:22	13:15	12:28
7	19-Apr-18	5:49	5:30	18:45	18:23	13:15	12:34
8	26-Apr-18	5:45	5:30	18:45	18:25	13:15	12:40
9	3-May-18	5:41	5:30	18:45	18:27	13:15	12:46
10	10-May-18	5:38	5:30	18:45	18:29	13:15	12:51
11	17-May-18	5:35	5:30	18:45	18:31	13:15	12:55
12	24-May-18	5:34	5:30	18:45	18:33	13:15	12:59
13	31-May-18	5:33	5:30	18:45	18:36	13:15	13:03
14	7-Jun-18	5:33	5:30	18:45	18:38	13:15	13:05
15	14-Jun-18	5:34	5:30	18:45	18:40	13:15	13:06
16	21-Jun-18	5:35	5:30	18:45	18:42	13:15	13:07
17	28-Jun-18	5:37	5:00	19:15	18:43	14:15	13:06
18	5-Jul-18	5:39	5:00	19:30	18:44	14:30	13:05
19	12-Jul-18	5:41	4:45	19:30	18:44	14:45	13:03
20	19-Jul-18	5:43	4:45	19:45	18:43	15:00	13:00
21	26-Jul-18	5:46	4:30	19:45	18:41	15:15	12:55
22	2-Aug-18	5:48	4:30	20:00	18:39	15:30	12:51
23	9-Aug-18	5:49	4:30	20:00	18:35	15:30	12:46
24	16-Aug-18	5:51	4:30	20:15	18:31	15:45	12:40
25	23-Aug-18	5:52	4:15	20:15	18:27	16:00	12:35
26	30-Aug-18	5:53	4:15	20:15	18:22	16:00	12:29
27	6-Sep-18	5:54	4:15	20:15	18:16	16:00	12:22
28	13-Sep-18	5:55	4:15	20:15	18:11	16:00	12:16
29	20-Sep-18	5:56	4:15	20:15	18:05	16:00	12:09
30	27-Sep-18	5:56	4:15	20:15	17:59	16:00	12:03
31	4-Oct-18	5:57	4:15	20:15	17:54	16:00	11:57
32	11-Oct-18	5:59	4:15	20:15	17:49	16:00	11:50
33	18-Oct-18	6:00	4:15	20:15	17:44	16:00	11:44
34	25-Oct-18	6:02	4:15	20:15	17:40	16:00	11:38
35	1-Nov-18	6:04	4:15	20:15	17:36	16:00	11:32
36+			4:15	20:15		16:00	

Same lighting program with sunrise and sunset represented by yellow and red lines and suggested artificial day length indicated by blue bars



Use of Shades in Open-Sided Housing



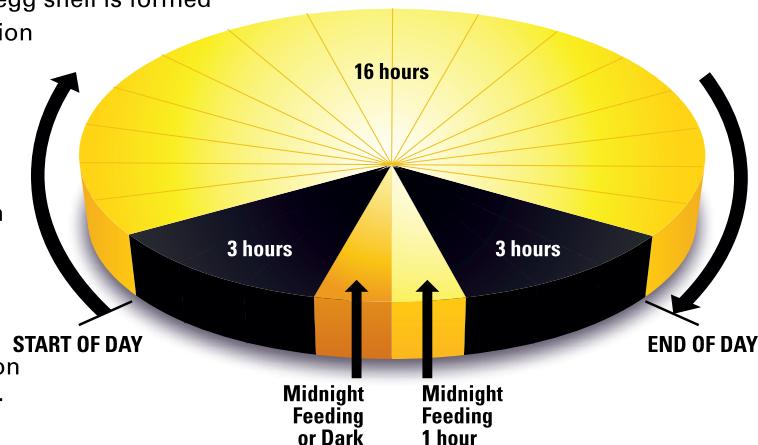
- Shades are an effective way to decrease light intensity in an open-sided house.
- Keep shades clean and free of dust to allow air flow.
- Use stir fans when using shades.
- Avoid direct sunlight on birds by using shades or roof overhangs.
- Black shades are preferred.

Midnight Feeding / Lighting Program

- Optional lighting technique that promotes greater feed consumption
- Used whenever more feed intake is desired in rearing or laying flocks
- Increases calcium absorption during night when most egg shell is formed
- Useful to increase feed intake during peak egg production
- Helps maintain feed consumption in hot climates
- Midnight feeding may increase feed intake
2-5g / day per bird

Good Practices

- Initiate the program by turning lights on for 1-2 hours in the middle of the dark period.
- Fill feeders before lights are turned on.
- There must be at least 3 hours of dark before and after the midnight feeding.
- Light provided during the midnight feeding is in addition to regular day length (i.e. 16 hours + midnight feeding).
- If midnight feeding is removed, reduce light gradually at a rate of 15 minutes per week.



Heat Stress

For information on management of layers in heat stress conditions, see the "Understanding Heat Stress in Layers" technical update, available in both [English](#) and [Telugu](#) at www.hyline.com.

Additionally, a [Best Management Practices During Summer](#) poster is available for download.

Water Quality

- Good quality water must be available to birds at all times.
- Water and feed consumption are directly related-when birds drink less, they consume less feed and production quickly declines.
- As a general rule, healthy birds will consume 1.5-2.0 times more water than feed. This ratio increases in high ambient temperatures.
- Test water quality at least 1 time per year. The water source will determine the regularity of water testing.
 - Surface water requires more frequent testing, as it is more affected by season and rainfall patterns.
 - Closed wells taking water from aquifers or deep artesian basins will be more consistent in water quality, but are generally higher in dissolved mineral content.
- The presence of coliform bacteria is an indicator that the water source has been contaminated with animal or human waste.

- When collecting a well water sample, let the water run for 2 minutes prior to collecting the sample. Water samples should be kept below 10°C and submitted to the lab in less than 24 hours.
- Some water sources contain high levels of dissolved minerals such as calcium, sodium and magnesium. When this occurs, amounts of these minerals in water have to be considered when formulating feed.
- Ideal water pH is 5-7 to promote good water sanitation, increase feed consumption and improve upper gastrointestinal health.
- Less than optimum water quality can have a significant impact on intestinal health, which will lead to under utilization of nutrients in feed.
- A decrease in flock water consumption is often the first sign of health problems and production drops.

ITEM	MAXIMUM CONCENTRATION (ppm or mg/L)*	
Nitrate NO ₃ ⁻ ¹	25	Older birds will tolerate higher levels up to 20 ppm. Stressed or diseased challenged birds may be more sensitive to effects of Nitrate.
Nitrate Nitrogen (NO ₃ -N) ¹	6	
Nitrite NO ₂ ⁻ ¹	4	Nitrite is considerably more toxic than Nitrate, especially for young birds where 1 ppm Nitrite may be considered toxic.
Nitrite Nitrogen (NO ₂ -N) ¹	1	
Total dissolved solids ²	1000	Levels up to 3000 ppm may not affect performance but could increase manure moisture.
Chloride (Cl ⁻) ¹	250	Levels as low as 14 mg may be problematic if sodium is higher than 50 ppm.
Sulfate (SO ₄ ²⁻) ¹	250	Higher levels may be laxative.
Iron (Fe) ¹	<0.3	Higher levels result in bad odor and taste.
Magnesium (Mg) ¹	125	Higher levels may be laxative. Levels above 50 ppm may be problematic if sulphate levels are high.
Potassium (K) ²	20	Higher levels may be acceptable depending on sodium level, alkalinity and pH.
Sodium (Na) ^{1,2}	50	Higher concentration is acceptable but concentrations above 50 ppm should be avoided if high levels of chloride, sulphate or potassium exist.
Manganese (Mn) ³	0.05	Higher levels may be laxative.
Arsenic (As) ²	0.5	
Fluoride (F ⁻) ²	2	
Aluminum (Al) ²	5	
Boron (B) ²	5	
Cadmium (Cd) ²	0.02	
Cobalt (Co) ²	1	
Copper (Cu) ¹	0.6	Higher levels result in bitter taste.
Lead (Pb) ¹	0.02	Higher levels are toxic.
Mercury (Hg) ²	0.003	Higher levels are toxic.
Zinc (Zn) ¹	1.5	Higher levels are toxic.
pH ¹	6.3-7.5	Birds may adapt to lower pH. Below pH 5 may reduce water intake and corrode metal fittings. Above pH 8 may reduce intake and reduce effectiveness of water sanitation.
Total bacteria counts ³	1000 CFU/ml	Likely to indicate dirty water.
Total Coliform bacteria ³	50 CFU/ml	
Fecal Coliform bacteria ³	0 CFU/ml	
Oxygen Reduction Potential (ORP) ³	650-750 mEq	The ORP range at which 2-4 ppm of free chlorine will effectively sanitize water at a favorable pH range of 5-7.

* Limits may be lower as interactions exist between magnesium and sulphate; and between sodium, potassium, chloride and sulphate.

¹ Carter & Snead, 1996. Drinking Water Quality for Poultry, Poultry Science and Technology Guide, North Carolina State University Poultry Extension Service. Guide no. 42

² Marx and Jaikaran, 2007. Water Analysis Interpretation. Agri-Facts, Alberta Ag-Info Centre. Refer to <http://www.agric.gov.ab.ca/app84/rwqit> for online Water Analysis Tool

³ Watkins, 2008. Water: Identifying and Correcting Challenges. Avian Advice 10(3): 10-15 University of Arkansas Cooperative Extension Service, Fayetteville

Air Quality

Air Movement (m³ / hour per 1000 birds)

AMBIENT TEMP. (°C)	WEEKS OF AGE					
	1	3	6	12	18	19+
32	340	510	1020	2550	5950	4650-9350
21	170	255	510	1275	2550	4250-5100
10	120	170	340	680	1870	2550-3400
0	70	130	230	465	1260	850-1300
-12	70	100	170	340	500	600-850
-23	70	100	170	340	500	600-680

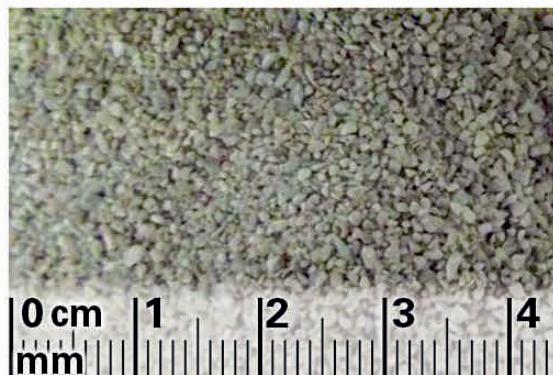
Acknowledgment: Dr. Hongwei Xin, Professor, Department of Agriculture and Biosystems Engineering and Department of Animal Science, Iowa State University, Ames, Iowa, USA

- Production house should be at 18-25°C and 40-60% humidity.
- The general rule for determining required fan capacity - 4 m³ of air movement / kilogram of body weight per hour.
- Ventilation is essential to:
 - Remove moisture from house
 - Remove excessive heat
 - Provide each bird with an adequate supply of oxygen
 - Remove carbon dioxide produced by birds
 - Remove dust particles
 - Dilute aerosolized pathogenic organisms
- Allowable levels of gases at floor level in the house are: ammonia (NH₃) < 25 ppm; carbon dioxide (CO₂) < 5000 ppm; carbon monoxide (CO) < 50 ppm.

Calcium Particle Size

PARTICLE SIZE	STARTER, GROWER, DEVELOPER	PRE-LAY	WEEKS 17+
Fine (0-2 mm)	100%	50%	30%
Coarse (2-4 mm)		50%	70%

- The appropriate particle size depends on the solubility of limestone.
- Dietary calcium levels may need to be adjusted based on limestone solubility.
- Limestone dark in color is geologically older, containing more impurities (typically magnesium) and is generally lower in solubility and calcium availability.
- Oyster shell and other marine shells are good sources of soluble calcium.



Fine calcium (0-2mm)



Coarse calcium (2-4mm)

Photos courtesy of Longcliff Quarries Ltd.

Feed Particle Size (Grist)

A sieve shaker separates a feed sample into categories based on particle size.

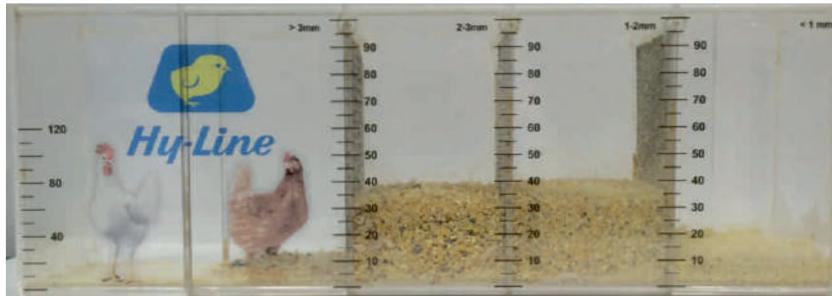
- Use on the farm to check feed particle size from the feed mill-sample taken on delivery or from feed bins.
- Use to assess the uniformity of feed particle size throughout the feeding system-samples are taken from various points.

Too many fine feed particles:

- Feed intake and nutrient absorption decreases
- Dust in house increases

Too many coarse feed particles:

- Birds selectively eat large particles
- Risk of feed separation increases



OPTIMAL FEED PARTICLE PROFILES

Hy-Line Sieve Shaker

PARTICLE SIZE	STARTER	GROWER	DEVELOPER	PRODUCTION
< 1 mm		< 15%	< 15%	< 15%
1-2 mm	1-3 mm diameter, crumble feed should contain < 10% fine feed particles	45-60%	25-35%	20-30%
2-3 mm		10-25%	25-40%	30-40%
> 3 mm			5-10%	10-15%

For more information, see the "[Feed Granulometry](#)" technical update at www.hyline.com

Best Practices

- A 3-4 hour gap between mid-day feedings allows birds to consume fine particles. Daily consumption of fine feed particles is important for a balanced nutrient intake.
- Add a minimum of 0.5% liquid oil / fat in mash diets to incorporate and retain small particles in feed. Use larger particle size mash or crumble to increase intakes in hot climates.

Vitamins and Trace Minerals

As the vitamin / trace mineral premix is often found in fine feed particles, a minimum level of 0.5% added liquid oil / fat in diets binds small particles in feed.

ITEM ^{1,2,3,4}	IN 1000 KG COMPLETE DIET	
	Rearing Period	Laying Period
Vitamin A, UI	1,00,00,000.00	80,00,000.00
Vitamin D ₃ ⁵ , UI	33,00,000.00	33,00,000.00
Vitamin E, g	30	25
Vitamin K (menadione), g	3.5	3
Thiamin (B ₁), g	2.2	2.5
Riboflavin (B ₂), g	6.6	5.5
Niacin (B ₃) ⁶ , g	40	30
Pantothenic acid (B ₅), g	10	10
Pyridoxine (B ₆), g	4.5	5
Biotin (B ₇), mg	100	75
Folic acid (B ₉), g	1	0.9
Cobalamine (B ₁₂), mg	23	23
Manganese ⁷	100	100
Zinc ⁷ , g	85	80
Iron ⁷ , g	30	40
Copper ⁷ , g	15	8
Magnesium ⁷ , g	600	500
Iodine ⁷ , g	1.5	1.2
Selenium ⁷ , g	0.25	0.25

¹ Minimum recommendations for rearing and laying periods. Local regulations may limit dietary content of individual vitamins or minerals.

² Store premixes according to supplier's recommendations and observe 'use by' dates to ensure vitamin activity is maintained. Inclusion of antioxidant may improve premix stability.

³ Vitamin and mineral recommendations vary according to activity.

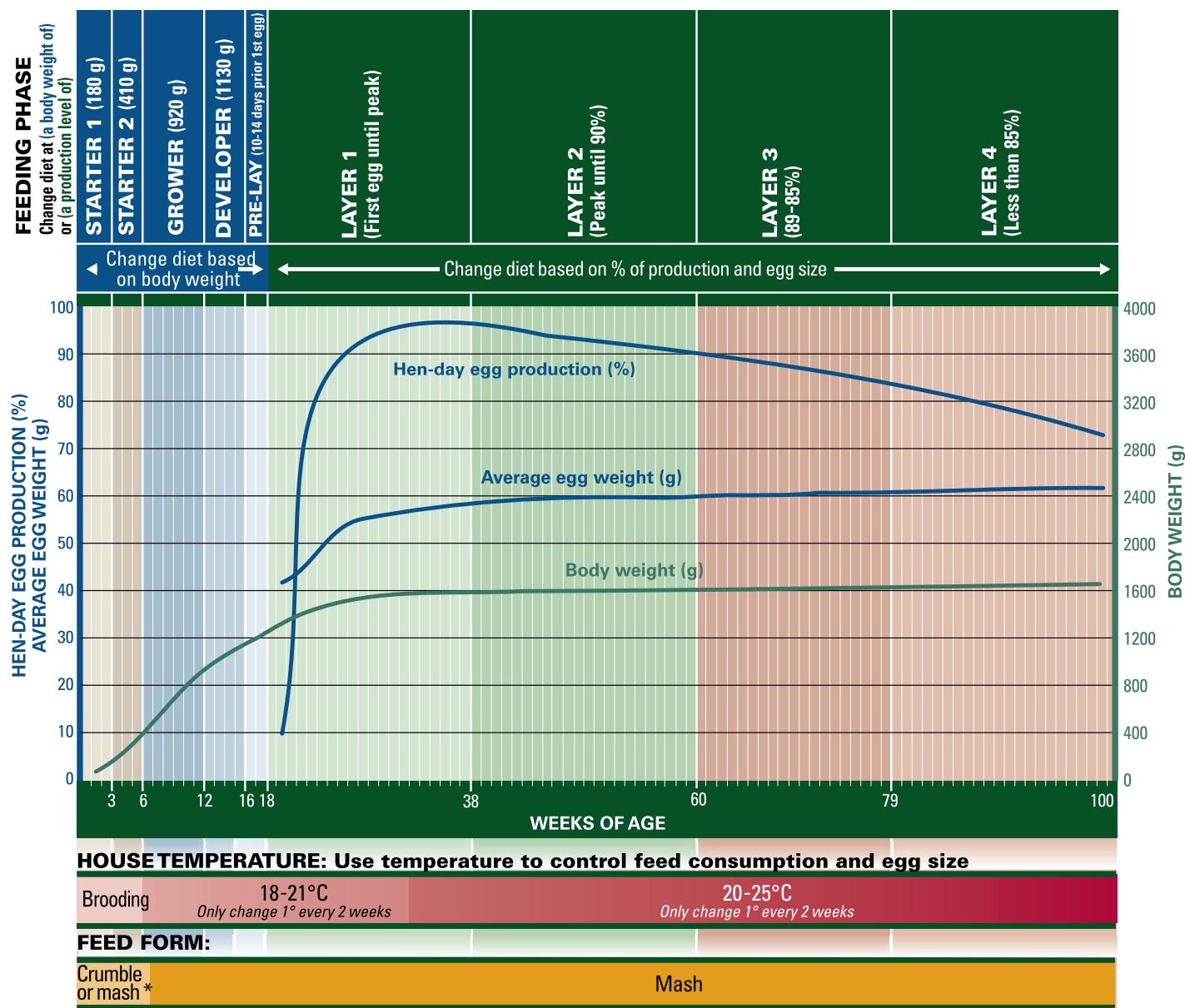
⁴ Where heat treatment is applied to diet, higher levels of vitamins may be required. Consult with vitamin supplier regarding stability through individual production processes.

⁵ A proportion of Vitamin D₃ can be supplemented as 25-hydroxy D₃ according to suppliers recommendations and applicable limits.

⁶ Higher levels of Niacin are recommended in non-cage systems.

⁷ Greater bioavailability and productivity may be possible with use of chelated mineral sources.

Phase Feeding to Meet the W-80s Nutritional Needs



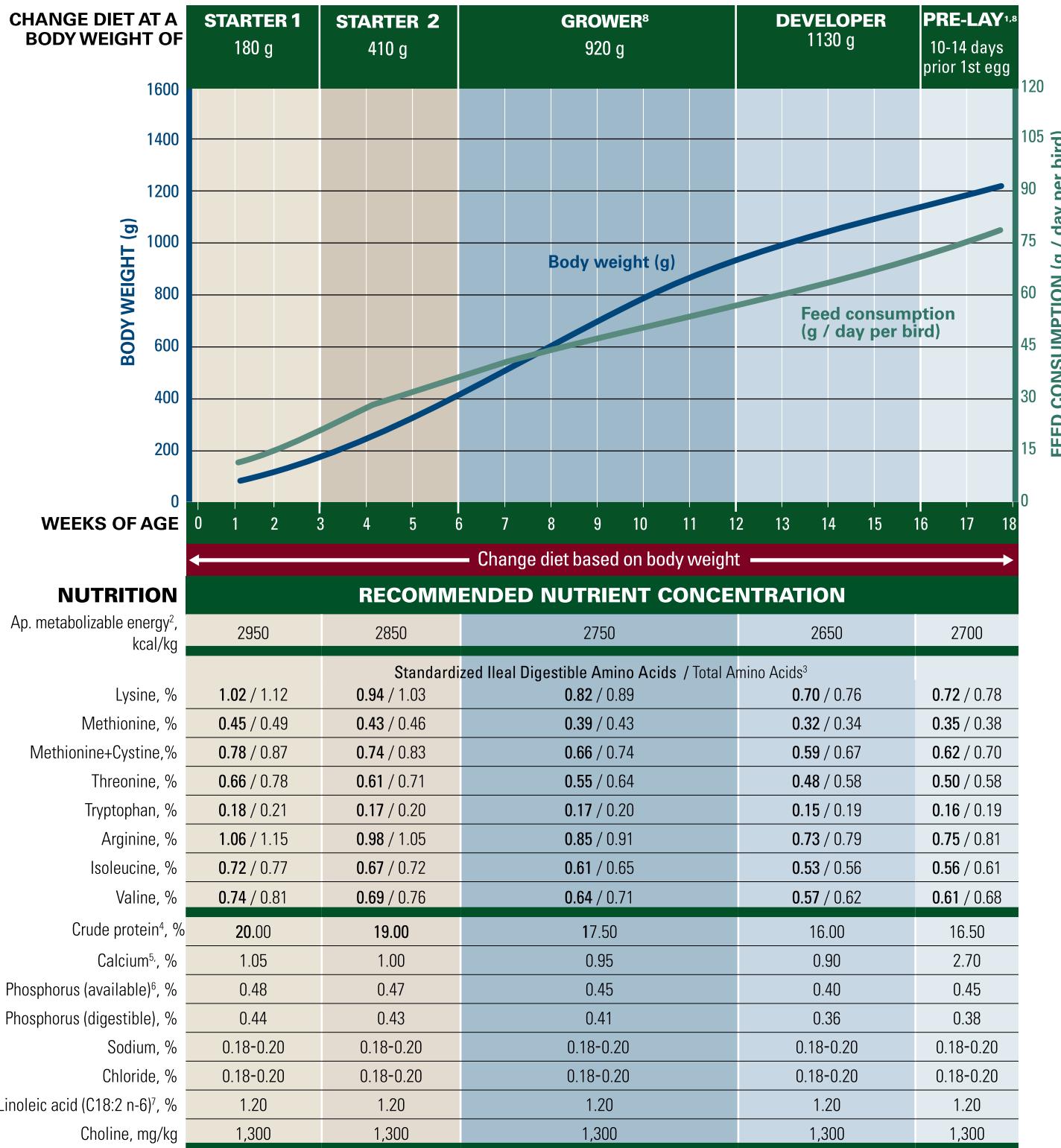
Control of Ambient House Temperature

- At housing, an ambient temperature of 18-20°C is desired. Increase house temperature about 1°C every 2 weeks until reaching 25°C, assuming ventilation systems are able to maintain adequate air quality at these temperatures.
- Lower (colder) house temperatures after peak will lead to greater feed intakes and may be counterproductive to egg-weight control, as well as optimal feed efficiency and adult hen body weights.
- Place temperature sensors to measure temperature inside of cage. The temperature in walkways is significantly colder than the temperature inside cages, especially in stack deck belted house systems.
- High environmental temperatures have a depressing effect on feed intake.

Controlling Egg Weight

- Closely monitor egg weight of each flock and make nutritional changes as needed to ensure optimal egg weight.
- If smaller eggs are desired, egg weight should be controlled at an early age.
- Egg-weight control is achieved by limiting amino acid consumption and ensuring that feed intake is not too high.
- Monitor egg weight every 2 weeks until 35 weeks of age, then every 5 weeks. Start controlling egg weight when average egg weight is within 2 g of target.

Rearing Period Nutritional Recommendations



¹ Do not feed Pre-Lay Diet earlier than 15 weeks of age. Do not feed Pre-Lay later than first egg as it contains insufficient calcium to support egg production. Use Pre-Lay Diet to introduce large particle calcium.

² Ap. metabolizable energy levels can be changed according to temperature, technical and economical performance.

³ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilize other ingredients, recommendations for Standardized Ileal Digestible Amino Acids must be followed.

⁴ Diets should always be formulated to provide required intake of amino acid. Concentration of crude protein in diet will vary with raw materials used. Crude protein value provided is an estimated typical value only.

⁵ Calcium should be supplied as fine calcium carbonate (mean particle size less than 2 mm). Coarse limestone (2-4 mm) can be introduced in Pre-Lay Diet at up to 50% of total limestone.

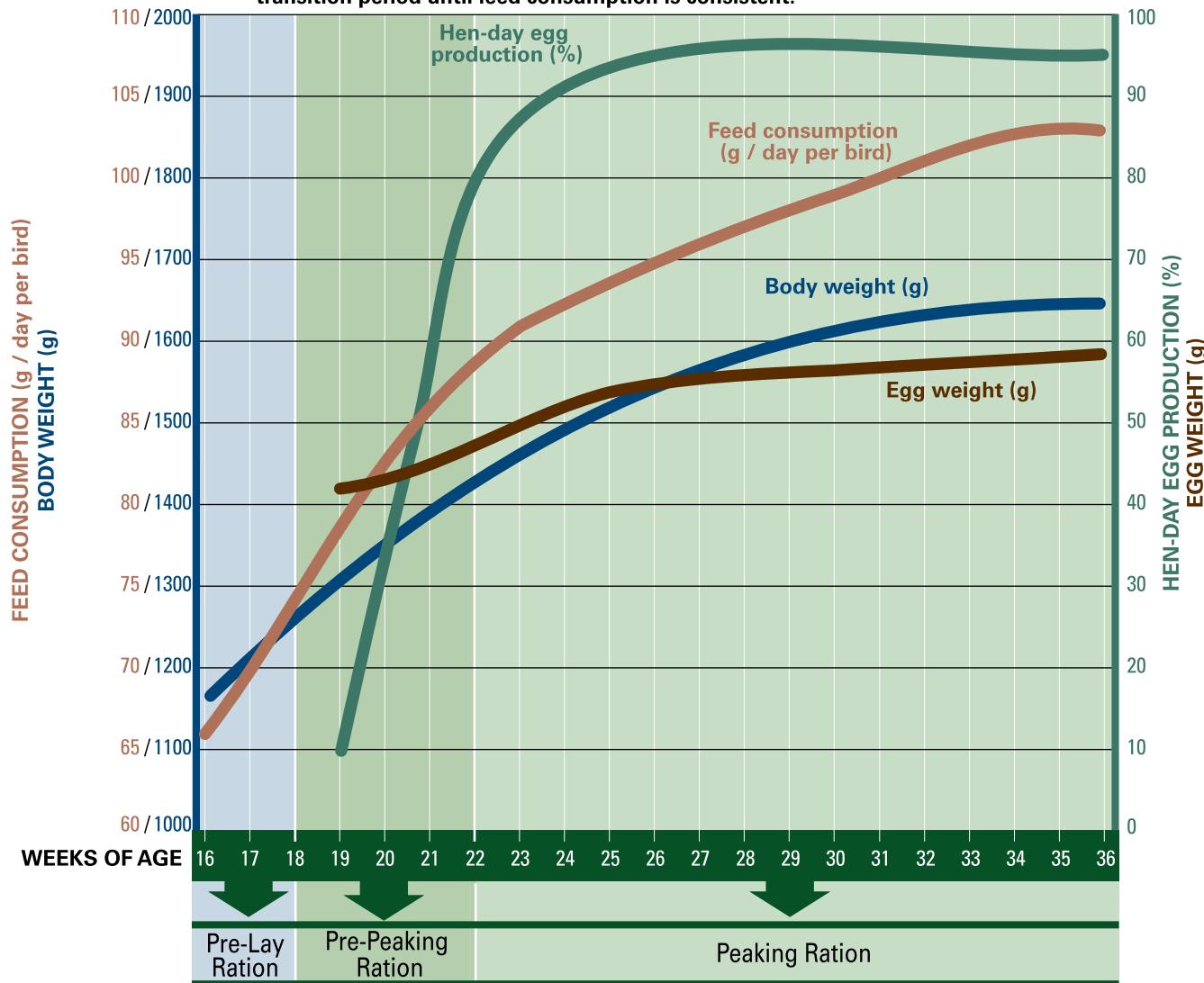
⁶ Where other phosphorus systems are used, diets should contain recommended minimum level of available phosphorus.

⁷ Oil levels can be increased to 2.0% in starter diets when given as a mash to control dust and increase feed palatability.

Avoid excessive body weight gain after 12 weeks.

Transition Period from Rear to Peak Egg Production

Frequently formulate to changing feed consumption during transition period until feed consumption is consistent.



Pre-Lay Ration

- Plan to feed for a maximum of 10-14 days before point of lay.
- Feed when most pullets show reddening of combs.
- It is important to increase medullary bone reserves.
- Begin introducing large particle calcium in Pre-Lay Diet.
- Discontinue pre-lay feeding with the commencement of egg production.

Transition Period

- Avoid excessive weight gain during the transition period.
- Body weight gain from 18-25 weeks should not exceed 20%.
- Occurring during the transition period:
 - Rapidly increasing egg production
 - Increasing egg size
 - Increasing body weight
- Feed consumption may increase slowly during transition:
 - In underweight birds
 - In flocks lacking uniformity
 - During high environmental temperatures
- Poor uniformity prolongs the transition period and may result in low peak and poor persistency of egg production.
- Monitor feed intake carefully during transition and adjust dietary nutrient concentration according to actual feed intakes.

Pre-Peaking Ration

- Formulations for low feed intakes (80-85 g/day/bird) should be given as the flock enters egg production to better meet nutrient requirements.
- Begin Pre-Peaking Diet with onset of lay (1% egg production).
- Pre-Peaking Diet is given until average feed consumption reaches 95 g/day/bird.

Peaking Ration

- Birds should continue to grow during peaking period. Poor nutrition during this period can lead to loss of body weight and soft bones.
- Feed intake may be reduced if birds are not accustomed to extra large particle calcium (i.e. not using a Pre-Lay Diet).
- Monitor keel bone development during the peaking period. For more information on keel bone scoring, see the "[Understanding the Role of the Skeleton in Egg Production](#)" technical update at www.hyline.com

Production Period Nutritional Recommendations^{1,2}

FEEDING PHASE PRODUCTION	LAYER 1 ³ First egg until peak	LAYER 2 Peak to 90%	LAYER 3 89-85%	LAYER 4 Less than 85%
HEN-DAY EGG PRODUCTION (%) EGG WEIGHT (g)	100 90 80 70 60 50 40 30 20 10 0	100 90 80 70 60 50 40 30 20 10 0	100 90 80 70 60 50 40 30 20 10 0	100 90 80 70 60 50 40 30 20 10 0
WEEKS OF AGE	18 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	18 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	18 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	18 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
	← Change diet based on % of production and egg size →			
NUTRITION	RECOMMENDED DAILY NUTRIENT INTAKE			
Ap. metabolizable energy ⁴ , kcal/day	260-270	270-280	270-280	270-280
Ap. metabolizable energy ⁴ , kcal/kg	2550-2600	2550-2650	2550-2650	2550-2650
Lysine, mg/day	750 / 821	720 / 788	680 / 745	650 / 712
Methionine, mg/day	371 / 399	353 / 379	325 / 350	286 / 308
Methionine+Cystine, mg/day	675 / 761	641 / 723	592 / 667	546 / 616
Threonine, mg/day	525 / 618	504 / 593	469 / 552	449 / 528
Tryptophan, mg/day	165 / 197	158 / 189	150 / 179	143 / 171
Arginine, mg/day	780 / 839	749 / 805	694 / 746	663 / 713
Isoleucine, mg/day	615 / 661	583 / 627	537 / 578	514 / 552
Valine, mg/day	675 / 744	641 / 707	592 / 653	566 / 624
Crude protein ⁶ , g/day	16.70	16.00	15.30	14.70
Sodium, mg/day	200	200	200	200
Chloride, mg/day	200	200	200	200
Linoleic acid (C18:2 n-6), g/day	1.60	1.40	1.20	1.00
Choline, mg/day	180	180	180	180
CALCIUM AND PHOSPHORUS				
Calcium ^{7,8} g/day	Phosphorus (available) ^{7,9} mg/day	Phosphorus (digestible) mg/day	Calcium Particle Size (fine : coarse)	IDEAL PROTEIN REFERENCE
First Egg-32 Weeks	4.10	432	388	PEAKING
Weeks 33-55	4.30	379	342	PHASE 2
Weeks 56-85	4.45	352	318	PHASE 3
Weeks 86+	4.70	329	295	PHASE 4
	40% : 60%	35% : 65%	30% : 70%	
Lysine	100%	100%	100%	100%
Methionine	50%	49%	48%	44%
M+C	90%	89%	87%	84%
Threonine	70%	70%	69%	69%
Tryptophan	22%	22%	22%	22%
Arginine	104%	104%	102%	102%
Isoleucine	82%	81%	79%	79%
Valine	90%	89%	87%	87%

Dietary Nutrient Concentrations for Production Period^{1,2} (According to Phase and Feed Intake)

FEEDING PHASE PRODUCTION	LAYER 1 ³ First egg until peak					LAYER 2 Peak to 90%					LAYER 3 89-85%					LAYER 4 Less than 85%					
	RECOMMENDED CONCENTRATION ¹																				
Ap. metabolizable energy ⁴ , kcal/day	260-270					270-280					270-280					270-280					
FEED CONSUMPTION (*Typical Feed Consumption)																					
g/day per bird	85	90	95*	100	105	90	95	100*	105	110	95	100	105*	110	115	100	105	110*	115	120	
Standardized Ileal Digestible Amino Acids																					
Lysine, %	0.88	0.83	0.79	0.75	0.71	0.80	0.76	0.72	0.69	0.65	0.72	0.68	0.65	0.62	0.59	0.65	0.62	0.59	0.57	0.54	
Methionine, %	0.44	0.41	0.39	0.37	0.35	0.39	0.37	0.35	0.34	0.32	0.34	0.33	0.31	0.30	0.28	0.29	0.27	0.26	0.25	0.24	
Methionine+Cystine, %	0.79	0.75	0.71	0.68	0.64	0.71	0.67	0.64	0.61	0.58	0.62	0.59	0.56	0.54	0.51	0.55	0.52	0.50	0.47	0.46	
Threonine, %	0.62	0.58	0.55	0.53	0.50	0.56	0.53	0.50	0.48	0.46	0.49	0.47	0.45	0.43	0.41	0.45	0.43	0.41	0.39	0.37	
Tryptophan, %	0.19	0.18	0.17	0.17	0.16	0.18	0.17	0.16	0.15	0.14	0.16	0.15	0.14	0.14	0.13	0.14	0.14	0.13	0.12	0.12	
Arginine, %	0.92	0.87	0.82	0.78	0.74	0.83	0.79	0.75	0.71	0.68	0.73	0.69	0.66	0.63	0.60	0.66	0.63	0.60	0.58	0.55	
Isoleucine, %	0.72	0.68	0.65	0.62	0.59	0.65	0.61	0.58	0.56	0.53	0.57	0.54	0.51	0.49	0.47	0.51	0.49	0.47	0.45	0.43	
Valine, %	0.79	0.75	0.71	0.68	0.64	0.71	0.67	0.64	0.61	0.58	0.62	0.59	0.56	0.54	0.51	0.57	0.54	0.51	0.49	0.47	
Total Amino Acids ⁵																					
Lysine, %	0.97	0.91	0.86	0.82	0.78	0.88	0.83	0.79	0.75	0.72	0.78	0.75	0.71	0.68	0.65	0.71	0.68	0.65	0.62	0.59	
Methionine, %	0.47	0.44	0.42	0.40	0.38	0.42	0.40	0.38	0.36	0.34	0.37	0.35	0.33	0.32	0.30	0.31	0.29	0.28	0.27	0.26	
Methionine+Cystine, %	0.90	0.85	0.80	0.76	0.72	0.80	0.76	0.72	0.69	0.66	0.70	0.67	0.64	0.61	0.58	0.62	0.59	0.56	0.54	0.51	
Threonine, %	0.73	0.69	0.65	0.62	0.59	0.66	0.62	0.59	0.56	0.54	0.58	0.55	0.53	0.50	0.48	0.53	0.50	0.48	0.46	0.44	
Tryptophan, %	0.23	0.22	0.21	0.20	0.19	0.21	0.20	0.19	0.18	0.17	0.19	0.18	0.17	0.16	0.16	0.17	0.16	0.16	0.15	0.14	
Arginine, %	0.99	0.93	0.88	0.84	0.80	0.89	0.85	0.81	0.77	0.73	0.79	0.75	0.71	0.68	0.65	0.71	0.68	0.65	0.62	0.59	
Isoleucine, %	0.78	0.73	0.70	0.66	0.63	0.70	0.66	0.63	0.60	0.57	0.61	0.58	0.55	0.53	0.50	0.55	0.53	0.50	0.48	0.46	
Valine, %	0.88	0.83	0.78	0.74	0.71	0.79	0.74	0.71	0.67	0.64	0.69	0.65	0.62	0.59	0.57	0.62	0.59	0.57	0.54	0.52	
Crude protein ⁶ , %	19.65	18.56	17.58	16.70	15.90	17.78	16.84	16.00	15.24	14.55	16.11	15.30	14.57	13.91	13.30	14.70	14.00	13.36	12.78	12.25	
Sodium, %	0.24	0.22	0.21	0.20	0.19	0.22	0.21	0.20	0.19	0.18	0.21	0.20	0.19	0.18	0.17	0.20	0.19	0.18	0.17	0.17	
Chloride, %	0.24	0.22	0.21	0.20	0.19	0.22	0.21	0.20	0.19	0.18	0.21	0.20	0.19	0.18	0.17	0.20	0.19	0.18	0.17	0.17	
Linoleic acid (C18:2 n-6), %	1.88	1.78	1.68	1.60	1.52	1.56	1.47	1.40	1.33	1.27	1.26	1.20	1.14	1.09	1.04	1.00	0.95	0.91	0.87	0.83	
Choline, mg/kg	2118	2000	1895	1800	1714	2000	1895	1800	1714	1636	1895	1800	1714	1636	1565	1800	1714	1636	1565	1500	

CALCIUM AND PHOSPHORUS CHANGES BASED ON FEED INTAKE

	First Egg–32 Weeks					Weeks 33–55					Weeks 56–85					Weeks 86+				
Feed Consumption, g/day per bird	85	90	95	100	105	90	95	100	105	110	95	100	105	110	115	100	105	110	115	120
Calcium ^{7,8} , %	4.82	4.56	4.32	4.10	3.90	4.78	4.53	4.30	4.10	3.91	4.68	4.45	4.24	4.05	3.87	4.65	4.43	4.23	4.04	3.88
Phosphorus (available) ^{7,9} , %	0.51	0.48	0.45	0.43	0.41	0.42	0.40	0.38	0.36	0.34	0.37	0.35	0.34	0.32	0.31	0.33	0.31	0.30	0.29	0.27
Phosphorus (digestible), %	0.46	0.43	0.41	0.39	0.37	0.38	0.36	0.34	0.33	0.31	0.34	0.32	0.30	0.29	0.28	0.30	0.28	0.27	0.26	0.25

¹ All nutrient requirements are based on the feed ingredient table at the back of this guide.

² Crude protein, methionine+cystine, fat, linoleic acid, and / or energy may be changed to optimize egg size.

³ Peaking nutrient levels are calculated for birds at peak egg production. Prior to achieving peak egg production, the nutrient requirements will be lower.

⁴ Ap. Metabolizable energy levels can be changed according to temperature, technical and economical performance. A good approximation of the influence of temperature on energy needs is that for each 0.5°C change higher or lower than 22°C, subtract or add about 1.8 kcal /bird /day, respectively.

⁵ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilize other ingredients, recommendations for Standardized Ileal Digestible Amino Acids must be followed.

⁶ Diets should always be formulated to provide required intake of amino acid. Concentration of crude protein in diet will vary with raw material used. Crude protein value provided is an estimated typical value only.

⁷ Calcium and available phosphorus requirements are determined by flock age. When production remains higher and diets are fed for longer than ages shown, it is recommended to increase to calcium and phosphorus concentrations of next feeding phase.

⁸ Calcium carbonate particle size recommendation varies throughout lay. Refer to Calcium Particle Size Table. Dietary calcium levels may need to be adjusted based on limestone solubility.

⁹ Where other phosphorus systems are used, diets should contain recommended minimum level of available phosphorus.

Disease Control

A flock of pullets or layers can only perform up to its genetic potential when disease influence is minimized. The diseases of economic importance vary widely between locations, but in every case the challenge is to identify and control those diseases.

Biosecurity

Biosecurity is the best method of avoiding diseases. A good biosecurity program identifies and controls the most likely ways a disease could enter the farm.

- Human and equipment movement onto the farm should be strictly controlled.
- Visitors to the farm should be limited to those essential for its operation.
- Visits should be documented in a logbook.
- All visitors and workers should shower at a central location before entering.
- Clean boots, clothing and head cover should be provided for workers and visitors.
- Clean footbaths containing disinfectant should be placed outside entries to all poultry houses.
- If possible, avoid using outside crews or equipment for vaccination, moving, and beak trimming.
- Ideally, workers should be limited to a single house.
- For those visiting a number of flocks, flocks visited on one day should be limited. Always progress from younger to older and from healthy to sick flocks. After visiting a sick flock, no other houses should be entered.
- Removal of flocks from the farm is an opportunity for disease to be introduced, as trucks and crews have often been on other farms.
- A single-aged rearing farm using an all-in, all-out principle is best to prevent transmission of disease from older flocks to younger, susceptible flocks.
- Houses should be designed to prevent exposure to wild birds, insects and rodents.
- Quickly and properly dispose of dead chickens.

Rodents

Rodents are known carriers of many poultry diseases and the most common reason for re-contamination of a cleaned and disinfected poultry facility. They are also responsible for house-to-house spread of disease on a farm.

- The farm should be free of debris and tall grass that provide a hiding area for rodents.
- The perimeter of each house should have a 1 m wide area of crushed rock or concrete to prevent rodents from burrowing into the house.
- Feed and eggs should be stored in rodent-proof areas.
- Bait stations should be placed throughout the house and maintained with fresh rodenticide.

Cleaning and Disinfection

Cleaning and disinfection of the house between flocks reduces infection pressure for the next flock.

- Allow a minimum of 2 weeks downtime between flocks.
- All feed and manure should be removed from the house before cleaning.
- Thoroughly clean air inlets, fan housing, fan blades and fan louvers.
- Heating the house during washing improves the removal of organic matter.

- The house should be cleaned of organic matter with a high-pressure spray of warm water.
- Use foam / gel detergent to soak into organic matter and equipment.
- Wash the upper portion of the house before the pit.
- Use high pressure warm water to rinse.
- Allow the house to dry.
- After it is fully dry, apply foam / spray disinfectant followed by fumigation.
- Flush and sanitize water lines.
- The monitoring of poultry houses for the presence of *Salmonella*, particularly *Salmonella enteritidis*, by routine environmental testing is recommended.
- Allow the house to dry before repopulating.

Vertically Transmitted Diseases

- Some diseases are known to be transmitted from infected breeders to progeny.
- Disease-free breeders are the first step in control of these diseases for commercial layers.
- All breeders directly under Hy-Line Internationals control are free of lymphoid leukosis, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, *Salmonella pullorum*, *Salmonella gallinarum*, *Salmonella enteritidis*, *Salmonella typhimurium* and other *Salmonella* species.
- Due to the possibility of horizontal transmission of these diseases, later generations may not remain free.
- It is the responsibility of breeding and commercial flock owners to prevent horizontal transmission of these diseases and to continue testing to be assured of a negative status.

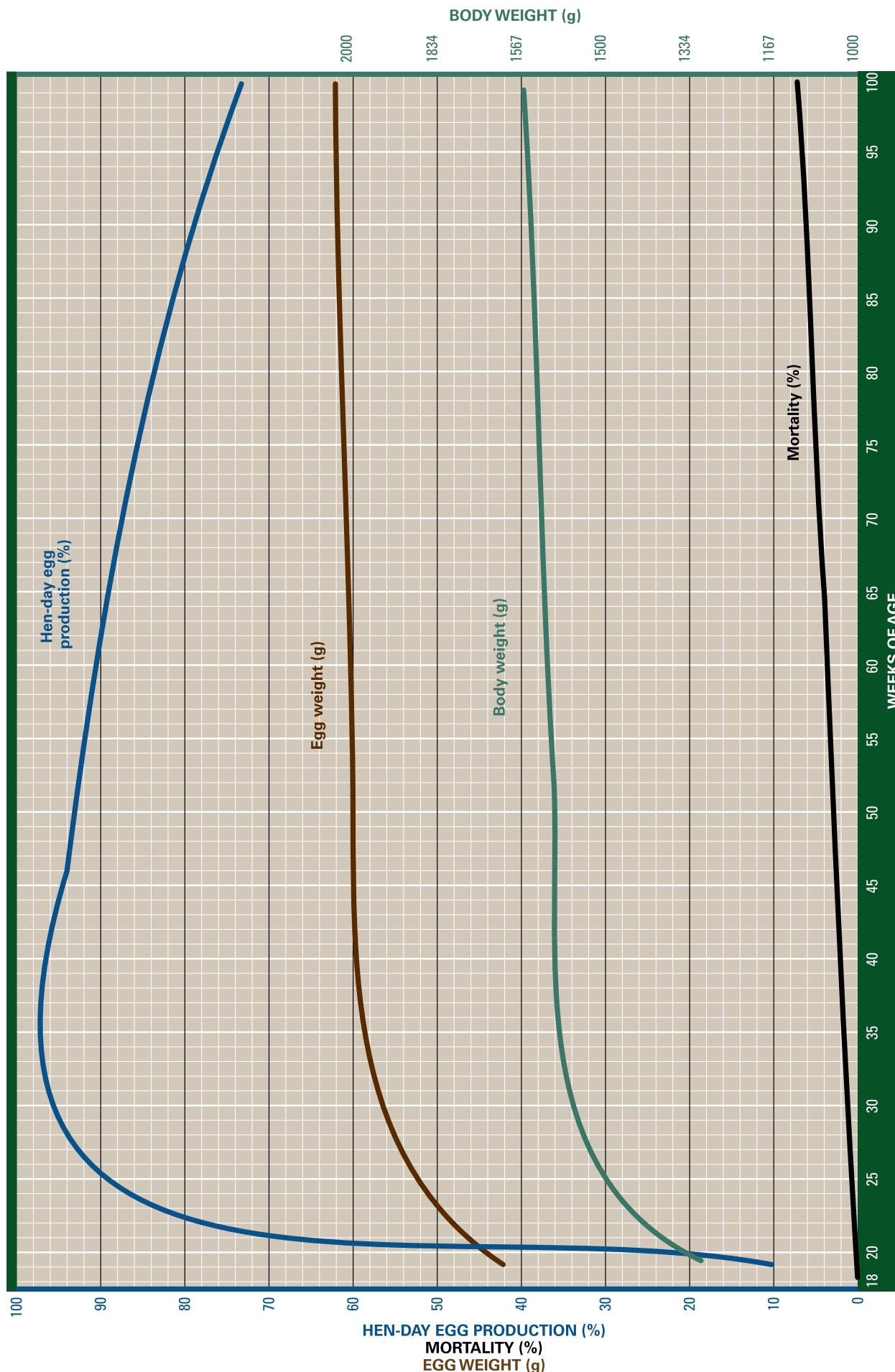


COCCIDIA

This parasitic infection of the intestines may lead to gut damage and, in severe infestations, death. More commonly, poor control of sub-clinical infection reduces feed conversion or leaves pullets with chronic, irreversible gut damage. Pullet flocks may be uneven or underweight at housing and not perform to their full potential in lay. Control of coccidia includes the following measures (check local regulations):

- Use ionophores or chemicals on a step-down program to ensure immunity in pullets.
- Live vaccine use is an alternative to anti-coccidial drug treatments.
- Live vaccines are available that can be administered by spray in the hatchery or by feed or water application during the first few days in the brooder house.
- Control of flies and beetles, which are vectors of coccidia spread.
- Thorough cleaning and disinfection of houses reduces challenge pressure.
- Limit bird access to manure belts.
- Cocc vaccines require cycling; discuss this with the vaccine manufacturer.

Performance Graph



Feed Ingredient Table

INGREDIENT	CP (%)	CF (%)	FAT (%)	ME (kcal)	CA (%)	PHOSPHORUS total (%)	PHOSPHORUS available (%)	DIGESTIBLE AMINO ACIDS						LINOLEIC ACID		
	lysine (%)	methionine (%)	cystine (%)	arginine (%)	isoleucine (%)			threonine (%)	tryptophan (%)	valine (%)						
Maize	8	2	3	3300	0.02	0.28	0.08	0.20	0.15	0.16	0.35	0.26	0.25	0.05	0.34	2.17
Jowar	9	3	2	3200	0.04	0.3	0.1	0.19	0.16	0.13	0.30	0.31	0.26	0.09	0.39	1.1
Broken Rice	9	3	1	3000	0.08	0.15	0.085	0.28	0.20	0.18	0.62	0.31	0.25	0.10	0.44	0.1
Wheat	12	3	3	3000	0.05	0.37	0.1	0.29	0.17	0.24	0.49	0.32	0.30	0.13	0.45	0.3
Bajra	9	2	4	3100	0.04	0.26	0.085	0.23	0.20	0.14	0.40	0.35	0.29	0.13	0.44	1.2
Rice Polish	13	8	16	3000	0.1	1.29	0.21	0.44	0.19	0.18	0.86	0.34	0.33	0.13	0.52	4.16
Oil	—	—	98	9450	—	—	—	—	—	—	—	—	—	—	—	25.5
Deoiled rice bran	15	14	1	2000	0.07	1.2	0.21	0.50	0.23	0.20	0.99	0.40	0.40	0.15	0.61	0.26
Sunflower DOC	35	14	1	2200	0.3	0.62	0.28	1.11	0.73	0.47	2.63	1.27	1.08	0.40	1.51	0.58
Groundnut DOC	40	7	1	2300	0.32	0.63	0.15	1.07	0.34	0.44	3.91	1.18	0.90	0.32	1.47	0.331
Hypro Soya	50	4	1.5	2550	0.3	0.62	0.28	2.75	0.61	0.59	3.39	2.02	1.66	0.60	2.08	0.5
SOYA	45	5.3	1	2400	0.3	0.62	0.28	2.59	0.57	0.55	3.19	1.90	1.56	0.56	1.96	0.52
Ful Fat Soya	37.5	6	17	3600	0.3	0.62	0.28	2.01	0.45	0.44	2.51	1.56	1.28	0.42	1.60	8.23
Rape seed meal	35	9	1	2000	0.6	0.6	0.3	1.31	0.54	0.69	1.92	1.05	1.01	0.38	1.33	0.16
Maize gluten meal	63	0.5	3	3720	0.02	0.5	0.14	0.79	1.32	0.84	1.70	2.16	1.66	0.23	2.44	0.9
Rice Gluten	45	5	5	1800	0.3	0.6	0.2	0.86	0.58	0.48	4.05	1.46	1.18	0.29	1.76	2.9
Til cake	30	6	8	2500	0.21	1.4	0.5	0.64	0.66	0.53	2.74	0.86	0.77	0.32	1.09	—
Cottonseed meal	40	12	1	2074	0.2	0.6	0.3	1.03	0.44	0.50	3.69	0.91	0.94	0.40	1.34	—
Guar Korma	50	6	6	2400	0.41	0.63	0.15	1.63	0.48	0.44	5.65	1.21	1.15	0.58	1.42	1.98
Distillers dried grain with solubles	44	12	2	2400	0.2	0.3	0.1	0.62	0.68	0.61	1.36	1.39	1.10	0.25	1.61	1.0
Copra meal	23	20	1	1800	0.3	0.6	0.2	0.31	0.25	0.18	2.04	0.56	0.40	0.09	0.89	0.58
Fish meal powder	43	—	6	2500	6	2	1.9	2.26	0.86	0.24	1.95	1.33	1.26	0.27	1.57	0.09
Dried Fish	45	—	6	2500	6	2	1.9	2.10	0.80	0.22	1.82	1.24	1.17	0.25	1.46	0.092
Meat and bone meal	44.5	0.5	6	2500	13	5.1	4.1	1.55	0.37	0.18	2.54	0.80	0.87	0.12	1.35	0.4
Ghee Residue	20	—	40	3794	1.2	0.6	0.57	1.34	0.48	0.11	0.62	0.95	0.85	0.15	1.20	—
Poochi	35	8	4	2430	8	1.5	1.43	0.97	0.46	0.31	1.85	1.24	1.24	0.30	1.52	0.06
LSP	—	—	—	—	37	—	—	—	—	—	—	—	—	—	—	—
Shell / Stone grit	—	—	—	—	38	—	—	—	—	—	—	—	—	—	—	—
DCP	—	—	—	—	22	16	15.2	—	—	—	—	—	—	—	—	—
MCP	—	—	—	—	15	—	21	—	—	—	—	—	—	—	—	—

Feed Cost Per Egg

1. Choose your current feed price.
2. Choose your current feed intake.
3. Choose your current production level within the feed intake range.
4. Read your flock's feed cost per egg from chart.

A [Feed Cost Per Egg poster](#) is also available for download.

Feed Cost per Kg. (₹)	24	24.5	25	25.5	26	26.5	27	27.5	28	28.5	29	29.5	30
Daily Feed Consumption (g)	Feed Cost per Egg (Rupee)												
Production %	75	2.56	2.61	2.67	2.72	2.77	2.83	2.88	2.93	2.99	3.04	3.09	3.15
80	77	2.49	2.55	2.60	2.65	2.70	2.75	2.81	2.86	2.91	2.96	3.01	3.06
	80	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
	82	2.34	2.39	2.44	2.49	2.54	2.59	2.63	2.68	2.73	2.78	2.83	2.88
	85	2.26	2.31	2.35	2.40	2.45	2.49	2.54	2.59	2.64	2.68	2.73	2.78
	87	2.21	2.25	2.30	2.34	2.39	2.44	2.48	2.53	2.57	2.62	2.67	2.71
	90	2.13	2.18	2.22	2.27	2.31	2.36	2.40	2.44	2.49	2.53	2.58	2.62
	92	2.09	2.13	2.17	2.22	2.26	2.30	2.35	2.39	2.43	2.48	2.52	2.57
	95	2.02	2.06	2.11	2.15	2.19	2.23	2.27	2.32	2.36	2.40	2.44	2.48
	75	2.72	2.78	2.83	2.89	2.95	3.00	3.06	3.12	3.17	3.23	3.29	3.34
	77	2.65	2.70	2.76	2.81	2.87	2.93	2.98	3.04	3.09	3.15	3.20	3.26
85	80	2.55	2.60	2.66	2.71	2.76	2.82	2.87	2.92	2.98	3.03	3.08	3.13
	82	2.49	2.54	2.59	2.64	2.70	2.75	2.80	2.85	2.90	2.95	3.01	3.06
	85	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
	87	2.34	2.39	2.44	2.49	2.54	2.59	2.64	2.69	2.74	2.78	2.83	2.88
	90	2.27	2.31	2.36	2.41	2.46	2.50	2.55	2.60	2.64	2.69	2.74	2.79
	92	2.22	2.26	2.31	2.36	2.40	2.45	2.49	2.54	2.59	2.63	2.68	2.73
	95	2.15	2.19	2.24	2.28	2.33	2.37	2.42	2.46	2.51	2.55	2.59	2.64
	75	2.88	2.94	3.00	3.06	3.12	3.18	3.24	3.30	3.36	3.42	3.48	3.54
	77	2.81	2.86	2.92	2.98	3.04	3.10	3.16	3.21	3.27	3.33	3.39	3.45
	80	2.70	2.76	2.81	2.87	2.93	2.98	3.04	3.09	3.15	3.21	3.26	3.32
90	82	2.63	2.69	2.74	2.80	2.85	2.91	2.96	3.02	3.07	3.13	3.18	3.24
	85	2.54	2.59	2.65	2.70	2.75	2.81	2.86	2.91	2.96	3.02	3.07	3.12
	87	2.48	2.53	2.59	2.64	2.69	2.74	2.79	2.84	2.90	2.95	3.00	3.05
	90	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
	92	2.35	2.40	2.45	2.49	2.54	2.59	2.64	2.69	2.74	2.79	2.84	2.89
	95	2.27	2.32	2.37	2.42	2.46	2.51	2.56	2.61	2.65	2.70	2.75	2.79
	75	3.04	3.10	3.17	3.23	3.29	3.36	3.42	3.48	3.55	3.61	3.67	3.74
	77	2.96	3.02	3.08	3.15	3.21	3.27	3.33	3.39	3.45	3.52	3.58	3.64
	80	2.85	2.91	2.97	3.03	3.09	3.15	3.21	3.27	3.33	3.38	3.44	3.50
	82	2.78	2.84	2.90	2.95	3.01	3.07	3.13	3.19	3.24	3.30	3.36	3.42
95	85	2.68	2.74	2.79	2.85	2.91	2.96	3.02	3.07	3.13	3.19	3.24	3.30
	87	2.62	2.68	2.73	2.78	2.84	2.89	2.95	3.00	3.06	3.11	3.17	3.22
	90	2.53	2.59	2.64	2.69	2.74	2.80	2.85	2.90	2.96	3.01	3.06	3.11
	92	2.48	2.53	2.58	2.63	2.68	2.74	2.79	2.84	2.89	2.94	2.99	3.05
	95	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95

Feed Cost Per Egg *(continued)*

Feed Cost per Kg. (₹)	24	24.5	25	25.5	26	26.5	27	27.5	28	28.5	29	29.5	30	
Daily Feed Consumption (g)	Feed Cost per Egg (Rupee)													
Production %	75	3.20	3.27	3.33	3.40	3.47	3.53	3.60	3.67	3.73	3.80	3.87	3.93	4.00
100	77	3.12	3.18	3.25	3.31	3.38	3.44	3.51	3.57	3.64	3.70	3.77	3.83	3.90
100	80	3.00	3.06	3.13	3.19	3.25	3.31	3.38	3.44	3.50	3.56	3.63	3.69	3.75
100	82	2.93	2.99	3.05	3.11	3.17	3.23	3.29	3.35	3.41	3.48	3.54	3.60	3.66
100	85	2.82	2.88	2.94	3.00	3.06	3.12	3.18	3.24	3.29	3.35	3.41	3.47	3.53
100	87	2.76	2.82	2.87	2.93	2.99	3.05	3.10	3.16	3.22	3.28	3.33	3.39	3.45
100	90	2.67	2.72	2.78	2.83	2.89	2.94	3.00	3.06	3.11	3.17	3.22	3.28	3.33
100	92	2.61	2.66	2.72	2.77	2.83	2.88	2.93	2.99	3.04	3.10	3.15	3.21	3.26
100	95	2.53	2.58	2.63	2.68	2.74	2.79	2.84	2.89	2.95	3.00	3.05	3.11	3.16
105	75	3.36	3.43	3.50	3.57	3.64	3.71	3.78	3.85	3.92	3.99	4.06	4.13	4.20
105	77	3.27	3.34	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02	4.09
105	80	3.15	3.22	3.28	3.35	3.41	3.48	3.54	3.61	3.68	3.74	3.81	3.87	3.94
105	82	3.07	3.14	3.20	3.27	3.33	3.39	3.46	3.52	3.59	3.65	3.71	3.78	3.84
105	85	2.96	3.03	3.09	3.15	3.21	3.27	3.34	3.40	3.46	3.52	3.58	3.64	3.71
105	87	2.90	2.96	3.02	3.08	3.14	3.20	3.26	3.32	3.38	3.44	3.50	3.56	3.62
105	90	2.80	2.86	2.92	2.98	3.03	3.09	3.15	3.21	3.27	3.33	3.38	3.44	3.50
105	92	2.74	2.80	2.85	2.91	2.97	3.02	3.08	3.14	3.20	3.25	3.31	3.37	3.42
105	95	2.65	2.71	2.76	2.82	2.87	2.93	2.98	3.04	3.09	3.15	3.21	3.26	3.32
110	75	3.52	3.59	3.67	3.74	3.81	3.89	3.96	4.03	4.11	4.18	4.25	4.33	4.40
110	77	3.43	3.50	3.57	3.64	3.71	3.79	3.86	3.93	4.00	4.07	4.14	4.21	4.29
110	80	3.30	3.37	3.44	3.51	3.58	3.64	3.71	3.78	3.85	3.92	3.99	4.06	4.13
110	82	3.22	3.29	3.35	3.42	3.49	3.55	3.62	3.69	3.76	3.82	3.89	3.96	4.02
110	85	3.11	3.17	3.24	3.30	3.36	3.43	3.49	3.56	3.62	3.69	3.75	3.82	3.88
110	87	3.03	3.10	3.16	3.22	3.29	3.35	3.41	3.48	3.54	3.60	3.67	3.73	3.79
110	90	2.93	2.99	3.06	3.12	3.18	3.24	3.30	3.36	3.42	3.48	3.54	3.61	3.67
110	92	2.87	2.93	2.99	3.05	3.11	3.17	3.23	3.29	3.35	3.41	3.47	3.53	3.59
110	95	2.78	2.84	2.89	2.95	3.01	3.07	3.13	3.18	3.24	3.30	3.36	3.42	3.47
115	75	3.68	3.76	3.83	3.91	3.99	4.06	4.14	4.22	4.29	4.37	4.45	4.52	4.60
115	77	3.58	3.66	3.73	3.81	3.88	3.96	4.03	4.11	4.18	4.26	4.33	4.41	4.48
115	80	3.45	3.52	3.59	3.67	3.74	3.81	3.88	3.95	4.03	4.10	4.17	4.24	4.31
115	82	3.37	3.44	3.51	3.58	3.65	3.72	3.79	3.86	3.93	4.00	4.07	4.14	4.21
115	85	3.25	3.31	3.38	3.45	3.52	3.59	3.65	3.72	3.79	3.86	3.92	3.99	4.06
115	87	3.17	3.24	3.30	3.37	3.44	3.50	3.57	3.64	3.70	3.77	3.83	3.90	3.97
115	90	3.07	3.13	3.19	3.26	3.32	3.39	3.45	3.51	3.58	3.64	3.71	3.77	3.83
115	92	3.00	3.06	3.13	3.19	3.25	3.31	3.38	3.44	3.50	3.56	3.63	3.69	3.75
115	95	2.91	2.97	3.03	3.09	3.15	3.21	3.27	3.33	3.39	3.45	3.51	3.57	3.63
120	75	3.84	3.92	4.00	4.08	4.16	4.24	4.32	4.40	4.48	4.56	4.64	4.72	4.80
120	77	3.74	3.82	3.90	3.97	4.05	4.13	4.21	4.29	4.36	4.44	4.52	4.60	4.68
120	80	3.60	3.68	3.75	3.83	3.90	3.98	4.05	4.13	4.20	4.28	4.35	4.43	4.50
120	82	3.51	3.59	3.66	3.73	3.80	3.88	3.95	4.02	4.10	4.17	4.24	4.32	4.39
120	85	3.39	3.46	3.53	3.60	3.67	3.74	3.81	3.88	3.95	4.02	4.09	4.16	4.24
120	87	3.31	3.38	3.45	3.52	3.59	3.66	3.72	3.79	3.86	3.93	4.00	4.07	4.14
120	90	3.20	3.27	3.33	3.40	3.47	3.53	3.60	3.67	3.73	3.80	3.87	3.93	4.00
120	92	3.13	3.20	3.26	3.33	3.39	3.46	3.52	3.59	3.65	3.72	3.78	3.85	3.91
120	95	3.03	3.09	3.16	3.22	3.28	3.35	3.41	3.47	3.54	3.60	3.66	3.73	3.79

Feed Cost Per Egg *(continued)*

Feed Cost per Kg. (₹)	24	24.5	25	25.5	26	26.5	27	27.5	28	28.5	29	29.5	30	
Daily Feed Consumption (g)	Feed Cost per Egg (Rupee)													
Production %	75	4.00	4.08	4.17	4.25	4.33	4.42	4.50	4.58	4.67	4.75	4.83	4.92	5.00
125	77	3.90	3.98	4.06	4.14	4.22	4.30	4.38	4.46	4.55	4.63	4.71	4.79	4.87
	80	3.75	3.83	3.91	3.98	4.06	4.14	4.22	4.30	4.38	4.45	4.53	4.61	4.69
	82	3.66	3.73	3.81	3.89	3.96	4.04	4.12	4.19	4.27	4.34	4.42	4.50	4.57
	85	3.53	3.60	3.68	3.75	3.82	3.90	3.97	4.04	4.12	4.19	4.26	4.34	4.41
	87	3.45	3.52	3.59	3.66	3.74	3.81	3.88	3.95	4.02	4.09	4.17	4.24	4.31
	90	3.33	3.40	3.47	3.54	3.61	3.68	3.75	3.82	3.89	3.96	4.03	4.10	4.17
	92	3.26	3.33	3.40	3.46	3.53	3.60	3.67	3.74	3.80	3.87	3.94	4.01	4.08
	95	3.16	3.22	3.29	3.36	3.42	3.49	3.55	3.62	3.68	3.75	3.82	3.88	3.95
130	75	4.16	4.25	4.33	4.42	4.51	4.59	4.68	4.77	4.85	4.94	5.03	5.11	5.20
	77	4.05	4.14	4.22	4.31	4.39	4.47	4.56	4.64	4.73	4.81	4.90	4.98	5.06
	80	3.90	3.98	4.06	4.14	4.23	4.31	4.39	4.47	4.55	4.63	4.71	4.79	4.88
	82	3.80	3.88	3.96	4.04	4.12	4.20	4.28	4.36	4.44	4.52	4.60	4.68	4.76
	85	3.67	3.75	3.82	3.90	3.98	4.05	4.13	4.21	4.28	4.36	4.44	4.51	4.59
	87	3.59	3.66	3.74	3.81	3.89	3.96	4.03	4.11	4.18	4.26	4.33	4.41	4.48
	90	3.47	3.54	3.61	3.68	3.76	3.83	3.90	3.97	4.04	4.12	4.19	4.26	4.33
	92	3.39	3.46	3.53	3.60	3.67	3.74	3.82	3.89	3.96	4.03	4.10	4.17	4.24
	95	3.28	3.35	3.42	3.49	3.56	3.63	3.69	3.76	3.83	3.90	3.97	4.04	4.11

Hy-Line International Welfare Goals and Principles

To promote animal well-being and produce birds of the highest quality, we adhere to the following welfare goals and principles. These goals and principles are the essential building blocks for the humane and professional care of our birds:

• Feed and Water

Provide access to good quality water and nutritionally balanced diets at all times

• Health and Veterinary Care

Provide science-based health programs and prompt veterinary care

• Environment

Provide shelter that is designed, maintained and operated to meet the birds needs and to facilitate daily inspection

• Husbandry and Handling Practices

Provide comprehensive care and handling procedures that ensure the birds well-being throughout its life

• Transportation

Provide transportation that minimizes travel time and stress

RESOURCES AVAILABLE AT WWW.HYLINE.COM

[Corporate Information](#) | [Technical Updates](#) | [Interactive Management Guides](#)

[Hy-Line International Lighting Program](#) | [Hy-Line EggCel](#) | [Body Weight Uniformity Calculator](#)

TECHNICAL UPDATES

Diseases

An Overview of Focal Duodenal Necrosis (FDN)
MG Control in Commercial Layers
Colibacillosis in Layers: An Overview
Fowl Pox in Layers
Avian Urolithiasis (Visceral Gout)
Infectious Bursal Disease (IBD, Gumboro)
Fatty Liver Hemorrhagic Syndrome
Infectious Laryngotracheitis (ILT)
Egg Drop Syndrome (EDS)
Intestinal Dilation Syndrome (IDS)
Newcastle Disease
Mycoplasma Synoviae (MS)
Low Pathogenic Avian Influenza (LPAI)

Diagnostic Samples and Breeder Flock Monitoring

Salmonella, *Mycoplasma*, and Avian Influenza Monitoring in Parent Breeder Flocks

Proper Collection and Handling of Diagnostic Samples

Management

Growing Management of Commercial Pullets (also Tamil and Telugu)
Understanding the Role of the Skeleton in Egg Production
The Science of Egg Quality
Understanding Poultry Lighting
Understanding Heat Stress in Layers (also Telugu)
Infrared Beak Treatment
Feed Granulometry and the Importance of Feed Particle Size in Layers
Impact of Tarp Color on Poultry Lighting
SPIDES (Short Period Incubation During Egg Storage)
Fly Management: Surveillance and Control
Optimizing Egg Size in Commercial Layers
Vaccination Recommendations
Non-Fasting Molt Recommendations
Managing Fully Beaked Flocks
Thiamin Deficiency in Pullets

POSTERS

Feed Cost Per Egg

Best Management Practices During Summer
Biosecurity on Commercial Layer Farms
Infrared Beak Treatment in Chicks (IRBT)



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