

Alternative Systems

Management Guide

Next Generation



Hy-Line[®]

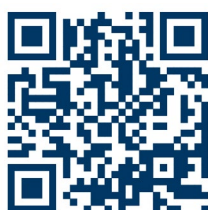
BROWN

Use of the Performance Guide

The genetic potential of Hy-Line Brown Commercial can only be realized if good poultry husbandry practices and management are used. This management guide outlines successful flock management programmes for Hy-Line Variety Brown Commercial 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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Online Management Guide**

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Summary of Performance Standards

REARING PERIOD (TO 17 WEEKS):	
Livability	97.73%
Feed Consumed	6.24 kg
Body Weight at 18 Weeks	1430–1600 g
LAYING PERIOD (TO 100 WEEKS):	
Percent Peak	94.8–96.6%
Hen-Day Eggs to 60 Weeks	257.4–269.0
Hen-Day Eggs to 100 Weeks	479.1–500.4
Hen-Housed Eggs to 60 Weeks	253.0–264.4
Hen-Housed Eggs to 100 Weeks	459.6–480.2
Livability to 60 Weeks	96.53%
Livability to 100 Weeks	88.77%
Days to 50% Production (from hatch)	142
Egg Weight at 26 Weeks	56.7–59.7 g
Egg Weight at 32 Weeks	59.1–62.2 g
Egg Weight at 70 Weeks	62.5–65.7 g
Egg Weight at 100 Weeks	63.8–67.1 g
Total Egg Mass per Hen-Housed (18–80 weeks)	23.0 kg
Total Egg Mass per Hen-Housed (18–100 weeks)	29.4 kg
Body Weight at 26 Weeks	1740–1880 g
Body Weight at 32 Weeks	1830–1970 g
Body Weight at 70 Weeks	1920–2070 g
Body Weight at 100 Weeks	1970–2130 g
Freedom From Egg Inclusions	Excellent
Shell Strength	Excellent
Shell Color Score at 38 Weeks	91
Shell Color Score at 56 Weeks	88
Shell Color Score at 72 Weeks	84
Shell Color Score at 90 Weeks	81
Haugh Units at 38 Weeks	90
Haugh Units at 56 Weeks	84
Haugh Units at 72 Weeks	81
Haugh Units at 90 Weeks	80
Average Daily Feed Consumption (19–100 weeks)	113.7–124.3 g/day per bird
Feed Conversion Rate, kg Feed/kg Eggs (20–60 weeks)	2.19–2.28
Feed Conversion Rate, kg Feed/kg Eggs (20–100 weeks)	2.30–2.39
Feed Utilization, kg Egg/kg Feed (20–60 weeks)	0.44–0.46
Feed Utilization, kg Egg/kg Feed (20–100 weeks)	0.42–0.44
Feed Consumption per 10 Eggs (20–60 weeks)	1.32–1.37 kg
Feed Consumption per 10 Eggs (20–100 weeks)	1.38–1.43 kg
Feed Consumption per Dozen Eggs (20–60 weeks)	1.58–1.64 kg
Feed Consumption per Dozen Eggs (20–100 weeks)	1.65–1.72 kg
Skin Color	Yellow
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 hyline.com.

Rearing Period Performance Table

AGE (weeks)	MORTALITY Cumulative (%)	BODY WEIGHT (g)			WATER INTAKE (ml/bird/day)			FEED INTAKE (g/bird/day)			CUMULATIVE FEED INTAKE (g/bird to date)			UNIFORMITY %
		Low	High	Target	Low	High	Target	Low	High	Target	Low	High	Target	
1	0.45	67	77	72	18	30	23.8	12	15	13.5	84	105	90	>85%
2	0.62	121	141	131	26	45	35.2	17	22	19.7	203	262	230	
3	0.74	180	217	198	30	53	41.7	20	27	23.3	343	449	400	
4	0.85	254	300	277	38	64	50.7	25	32	28.5	518	672	600	>80%
5	0.96	340	394	367	44	77	60.0	29	38	33.6	721	940	830	
6	1.08	433	496	465	53	93	72.9	35	47	40.8	966	1267	1120	
7	1.19	526	608	567	62	104	82.7	41	52	46.5	1253	1630	1440	>85%
8	1.30	624	719	672	71	118	94.5	47	59	53.1	1582	2045	1810	
9	1.42	720	833	777	78	129	103.4	52	64	58.2	1946	2496	2220	
10	1.53	819	939	879	84	135	109.5	56	67	61.7	2338	2968	2650	
11	1.64	911	1045	978	90	145	117.6	60	73	66.3	2758	3476	3120	
12	1.76	999	1141	1070	93	151	122.1	62	76	68.8	3192	4006	3600	
13	1.85	1083	1228	1156	96	155	125.6	64	78	70.8	3640	4549	4090	
14	1.93	1158	1312	1235	99	161	130.1	66	81	73.3	4102	5113	4610	
15	2.02	1232	1385	1309	102	165	133.6	68	83	75.3	4578	5691	5130	
16	2.10	1305	1455	1380	105	171	138.1	70	86	77.8	5068	6290	5680	
17	2.27	1375	1525	1450	108	177	142.6	72	89	80.3	5572	6910	6240	>90%

Rearing Period Space Recommendations

(check local regulations concerning space requirements)

- Useable space is calculated as litter floor and raised slat areas, not including perch space.
- Rearing density depends on age of transfer to the laying facility. Use the approximation at right.

Week of Transfer	Birds/m ² of Useable Space
15	15
16	14
17	13
18	12

	MULTI-TIER	FLOOR
Floor space	< 20 kg live weight per m ² of useable space at 16 weeks when transferred to the laying facility. Adjust stocking density if birds are transferred at other ages.	< 20 kg live weight per m ² floor space at end of rearing period
Feeder space	2.5 cm/bird with access on both sides; 5 cm/bird with side access; 2.0 cm/bird with circular feeders	2.5 cm/bird with access on both sides; 5 cm/bird with side access; 2.0 cm/bird with circular feeders
Drinking systems, cups or nipples	12.5 birds per nipple drinker; 20 birds per cup	12.5 birds per nipple drinker; 20 birds per cup; 125 birds per bell drinker
Perch space	10–15 cm/bird	10–15 cm/bird

Production Period Performance Table

AGE (weeks)	% HEN-DAY Current			HEN-DAY EGGS Cumulative			HEN-HOUSED EGGS Cumulative			MORT- ALITY Cumulative (%)	BODY WEIGHT (g)		
	Low	High	Target	Low	High	Target	Low	High	Target		Low	High	Target
18	1.1	7.7	4.4	0.1	0.5	0.31	0.1	0.5	0.3	0.14	1434	1601	1518
19	8.2	27.1	17.7	0.7	2.4	1.54	0.7	2.4	1.5	0.14	1500	1660	1580
20	30.8	57.3	44.1	2.8	6.4	4.63	2.8	6.4	4.6	0.14	1555	1714	1635
21	61.4	80.5	71.0	7.1	12.1	9.59	7.1	12.1	9.6	0.27	1611	1749	1680
22	82.4	90.6	86.5	12.9	18.4	15.65	12.8	18.4	15.6	0.40	1651	1785	1718
23	90.6	94.1	92.4	19.2	25.0	22.11	19.2	24.9	22.0	0.40	1684	1812	1748
24	93.2	95.5	94.4	25.7	31.7	28.72	25.6	31.6	28.6	0.53	1705	1840	1773
25	94.2	96.2	95.2	32.3	38.4	35.38	32.2	38.3	35.2	0.67	1725	1863	1794
26	94.6	96.4	95.5	39.0	45.2	42.07	38.8	45.0	41.9	0.67	1744	1882	1813
27	94.8	96.6	95.7	45.6	51.9	48.77	45.4	51.7	48.5	0.81	1762	1899	1830
28	94.8	96.6	95.7	52.2	58.7	55.46	51.9	58.4	55.2	0.81	1778	1916	1847
29	94.8	96.6	95.7	58.9	65.5	62.16	58.5	65.1	61.8	0.94	1788	1935	1862
30	94.8	96.5	95.7	65.5	72.2	68.86	65.1	71.8	68.4	0.94	1801	1949	1875
31	94.7	96.5	95.6	72.1	79.0	75.55	71.6	78.5	75.1	1.07	1819	1957	1888
32	94.7	96.5	95.6	78.8	85.7	82.24	78.2	85.1	81.7	1.07	1826	1974	1900
33	94.6	96.3	95.5	85.4	92.5	88.92	84.7	91.8	88.3	1.20	1836	1984	1910
34	94.4	96.1	95.3	92.0	99.2	95.59	91.3	98.5	94.9	1.20	1844	1992	1918
35	94.2	96.0	95.1	98.6	105.9	102.25	97.8	105.1	101.4	1.34	1855	1994	1925
36	94.0	95.8	94.9	105.2	112.6	108.89	104.3	111.7	108.0	1.34	1857	2006	1931
37	93.7	95.7	94.7	111.7	119.3	115.52	110.7	118.3	114.5	1.47	1865	2013	1939
38	93.5	95.5	94.5	118.3	126.0	122.14	117.2	124.9	121.0	1.47	1873	2022	1948
39	93.3	95.3	94.3	124.8	132.7	128.74	123.6	131.5	127.5	1.60	1874	2023	1949
40	93.1	95.0	94.1	131.3	139.3	135.32	130.0	138.0	134.0	1.60	1875	2024	1950
41	92.8	94.9	93.9	137.8	146.0	141.89	136.4	144.5	140.5	1.74	1876	2025	1951
42	92.5	94.6	93.6	144.3	152.6	148.44	142.8	151.0	146.9	1.87	1878	2027	1952
43	92.1	94.4	93.3	150.7	159.2	154.97	149.1	157.5	153.3	1.87	1880	2028	1954
44	91.8	94.1	93.0	157.2	165.8	161.47	155.4	164.0	159.7	2.01	1881	2030	1956
45	91.5	93.8	92.7	163.6	172.4	167.96	161.7	170.4	166.0	2.01	1883	2032	1957
46	91.2	93.5	92.4	169.9	178.9	174.42	167.9	176.8	172.3	2.14	1885	2034	1959
47	90.9	93.3	92.1	176.3	185.4	180.87	174.1	183.2	178.7	2.14	1886	2035	1961
48	90.7	93.1	91.9	182.7	191.9	187.30	180.3	189.6	184.9	2.27	1888	2037	1962
49	90.4	92.8	91.6	189.0	198.4	193.71	186.5	195.9	191.2	2.40	1890	2039	1964
50	90.0	92.7	91.4	195.3	204.9	200.11	192.7	202.2	197.4	2.40	1891	2040	1966
51	89.8	92.4	91.1	201.6	211.4	206.49	198.8	208.5	203.7	2.54	1893	2042	1968
52	89.6	92.2	90.9	207.8	217.9	212.85	204.9	214.8	209.9	2.68	1894	2044	1969
53	89.4	91.9	90.7	214.1	224.3	219.19	211.0	221.1	216.0	2.68	1896	2046	1971
54	89.3	91.7	90.5	220.4	230.7	225.53	217.1	227.3	222.2	2.81	1898	2047	1973
55	88.9	91.5	90.2	226.6	237.1	231.84	223.1	233.5	228.3	2.94	1899	2049	1974
56	88.7	91.4	90.1	232.8	243.5	238.15	229.1	239.7	234.4	2.94	1901	2051	1976
57	88.4	91.2	89.8	239.0	249.9	244.43	235.1	245.9	240.5	3.07	1903	2053	1978
58	88.2	91.0	89.6	245.1	256.3	250.71	241.1	252.1	246.6	3.21	1904	2054	1979
59	87.9	90.8	89.4	251.3	262.6	256.96	247.0	258.2	252.6	3.35	1906	2056	1981
60	87.6	90.5	89.1	257.4	269.0	263.19	253.0	264.4	258.7	3.47	1908	2058	1983

Production Period Performance Table (cont.)

AGE (weeks)	% HEN-DAY Current			HEN-DAY EGGS Cumulative			HEN-HOUSED EGGS Cumulative			MORT- ALITY Cumulative (%)	BODY WEIGHT (g)		
	Low	High	Target	Low	High	Target	Low	High	Target		Low	High	Target
61	87.3	90.2	88.8	263.5	275.3	269.41	258.8	270.4	264.6	3.61	1909	2059	1984
62	87.0	90.0	88.5	269.6	281.6	275.60	264.7	276.5	270.6	3.74	1911	2061	1986
63	86.7	89.8	88.3	275.7	287.9	281.78	270.5	282.5	276.5	3.88	1913	2063	1988
64	86.5	89.7	88.1	281.8	294.1	287.94	276.4	288.6	282.5	3.88	1914	2065	1989
65	86.3	89.5	87.9	287.8	300.4	294.10	282.2	294.6	288.4	4.02	1916	2066	1991
66	85.9	89.3	87.6	293.8	306.6	300.22	287.9	300.6	294.3	4.14	1917	2068	1993
67	85.4	89.0	87.2	299.8	312.9	306.33	293.7	306.6	300.1	4.14	1919	2070	1994
68	84.9	88.7	86.8	305.7	319.1	312.41	299.3	312.5	305.9	4.28	1921	2071	1996
69	84.3	88.5	86.4	311.6	325.3	318.46	305.0	318.4	311.7	4.41	1922	2073	1998
70	83.8	88.2	86.0	317.5	331.5	324.48	310.6	324.3	317.4	4.55	1924	2075	1999
71	83.4	87.7	85.5	323.3	337.6	330.46	316.1	330.2	323.1	4.81	1926	2077	2001
72	82.7	87.2	85.0	329.1	343.7	336.41	321.6	336.0	328.8	4.95	1927	2078	2003
73	82.2	86.7	84.4	334.9	349.8	342.32	327.1	341.7	334.4	5.22	1929	2080	2005
74	81.6	86.1	83.9	340.6	355.8	348.19	332.5	347.4	340.0	5.34	1931	2082	2006
75	81.1	85.6	83.3	346.3	361.8	354.02	337.9	353.1	345.5	5.61	1932	2084	2008
76	80.5	85.1	82.8	351.9	367.7	359.82	343.2	358.7	350.9	5.75	1934	2085	2010
77	80.0	84.6	82.3	357.5	373.7	365.58	348.4	364.3	356.3	6.01	1936	2087	2011
78	79.5	84.0	81.8	363.1	379.5	371.30	353.7	369.8	361.7	6.15	1937	2089	2013
79	78.9	83.5	81.2	368.6	385.4	376.99	358.8	375.2	367.0	6.42	1939	2090	2015
80	78.4	83.0	80.7	374.1	391.2	382.64	364.0	380.7	372.3	6.56	1941	2092	2016
81	78.0	82.5	80.2	379.5	397.0	388.25	369.0	386.0	377.5	6.82	1942	2094	2018
82	77.5	81.9	79.7	385.0	402.7	393.84	374.1	391.4	382.7	6.95	1944	2096	2020
83	77.1	81.4	79.3	390.4	408.4	399.38	379.1	396.7	387.9	7.21	1945	2097	2021
84	76.8	80.9	78.8	395.7	414.1	404.90	384.1	401.9	393.0	7.35	1947	2099	2023
85	76.4	80.3	78.4	401.1	419.7	410.39	389.0	407.1	398.1	7.62	1949	2101	2025
86	76.1	79.8	78.0	406.4	425.3	415.85	393.9	412.3	403.1	7.76	1950	2102	2026
87	75.8	79.3	77.5	411.7	430.8	421.27	398.8	417.4	408.1	8.02	1952	2104	2028
88	75.4	78.7	77.1	417.0	436.3	426.67	403.7	422.4	413.0	8.16	1954	2106	2030
89	75.2	78.3	76.7	422.3	441.8	432.04	408.5	427.4	418.0	8.43	1955	2108	2031
90	75.0	77.8	76.4	427.5	447.3	437.39	413.3	432.4	422.9	8.69	1957	2109	2033
91	74.7	77.4	76.1	432.7	452.7	442.71	418.0	437.4	427.7	8.96	1959	2111	2035
92	74.5	77.1	75.8	438.0	458.1	448.02	422.8	442.3	432.5	9.22	1960	2113	2037
93	74.3	76.7	75.5	443.2	463.4	453.30	427.5	447.1	437.3	9.49	1962	2115	2038
94	74.0	76.4	75.2	448.3	468.8	458.57	432.2	451.9	442.0	9.76	1964	2116	2040
95	73.8	76.1	74.9	453.5	474.1	463.81	436.8	456.7	446.8	10.03	1965	2118	2042
96	73.5	75.7	74.6	458.7	479.4	469.04	441.4	461.5	451.5	10.16	1967	2120	2043
97	73.3	75.4	74.3	463.8	484.7	474.24	446.0	466.2	456.1	10.42	1968	2121	2045
98	73.1	75.0	74.1	468.9	489.9	479.42	450.6	470.9	460.8	10.70	1970	2123	2047
99	72.8	74.7	73.8	474.0	495.2	484.59	455.1	475.6	465.4	10.96	1972	2125	2048
100	72.6	74.4	73.5	479.1	500.4	489.73	459.6	480.2	469.9	11.23	1973	2127	2050

Production Period Performance Table (cont.)

AGE (weeks)	WATER INTAKE (ml/bird/day)			FEED INTAKE (g/bird/day)			HH EGG MASS Cumulative (kg)			EGG WEIGHT (g/egg)		
	Low	High	Target	Low	High	Target	Low	High	Target	Low	High	Target
18	114	189	151.6	76	95	85.3	0.0	0.0	0.0	44.8	47.2	46.0
19	132	202	166.9	88	101	94.4	0.0	0.1	0.1	47.6	49.9	48.8
20	140	212	175.8	93	106	99.5	0.1	0.3	0.2	49.7	52.3	51.0
21	147	220	183.7	98	110	104.1	0.4	0.6	0.5	51.5	54.1	52.8
22	153	229	190.9	102	114	108.2	0.7	1.0	0.8	52.9	55.6	54.3
23	158	237	197.3	105	119	111.8	1.0	1.3	1.2	54.2	57.0	55.6
24	164	243	203.4	109	122	115.3	1.4	1.7	1.6	55.2	58.0	56.6
25	167	245	206.0	111	123	116.9	1.8	2.1	1.9	56.0	58.9	57.4
26	168	248	207.8	112	124	117.9	2.2	2.5	2.3	56.7	59.7	58.2
27	169	248	208.5	113	124	118.3	2.5	2.9	2.7	57.3	60.3	58.8
28	170	249	209.3	113	124	118.8	2.9	3.3	3.1	57.8	60.7	59.2
29	171	249	210.1	114	125	119.3	3.3	3.7	3.5	58.2	61.2	59.7
30	172	250	210.9	114	125	119.7	3.7	4.1	3.9	58.5	61.6	60.1
31	173	251	211.7	115	125	120.2	4.1	4.5	4.3	58.9	61.9	60.4
32	173	251	211.7	115	125	120.2	4.5	4.9	4.7	59.1	62.2	60.6
33	173	251	211.7	115	125	120.2	4.9	5.3	5.1	59.4	62.4	60.9
34	173	251	211.7	115	125	120.2	5.3	5.7	5.5	59.5	62.6	61.1
35	173	251	211.7	115	125	120.2	5.7	6.1	5.9	59.6	62.8	61.2
36	173	251	211.7	115	125	120.2	6.1	6.5	6.3	59.9	62.9	61.4
37	173	251	211.7	115	125	120.2	6.5	6.9	6.7	60.0	63.1	61.6
38	173	251	211.7	115	125	120.2	6.9	7.3	7.1	60.1	63.2	61.6
39	173	251	211.7	115	125	120.2	7.3	7.7	7.5	60.2	63.2	61.7
40	173	251	211.7	115	125	120.2	7.7	8.1	7.9	60.2	63.3	61.8
41	173	251	211.7	115	125	120.2	8.1	8.5	8.3	60.3	63.4	61.9
42	173	251	211.7	115	125	120.2	8.5	8.9	8.7	60.5	63.6	62.1
43	173	251	211.7	115	125	120.2	8.9	9.3	9.1	60.6	63.7	62.2
44	173	251	211.7	115	125	120.2	9.3	9.7	9.5	60.7	63.8	62.3
45	173	251	211.7	115	125	120.2	9.7	10.2	9.9	60.8	64.0	62.4
46	173	251	211.7	115	125	120.2	10.1	10.6	10.3	60.9	64.0	62.5
47	173	251	211.7	115	125	120.2	10.5	11.0	10.7	61.0	64.1	62.6
48	173	251	211.7	115	125	120.2	10.8	11.4	11.1	61.0	64.2	62.6
49	173	251	211.7	115	125	120.2	11.2	11.8	11.5	61.2	64.3	62.8
50	173	251	211.7	115	125	120.2	11.6	12.1	11.9	61.2	64.3	62.8
51	173	251	211.7	115	125	120.2	12.0	12.5	12.3	61.3	64.5	62.9
52	173	251	211.7	115	125	120.2	12.4	12.9	12.7	61.3	64.5	62.9
53	173	251	211.7	115	125	120.2	12.8	13.3	13.1	61.5	64.6	63.1
54	173	251	211.7	115	125	120.2	13.2	13.7	13.4	61.5	64.6	63.1
55	173	251	211.7	115	125	120.2	13.5	14.1	13.8	61.5	64.7	63.1
56	173	251	211.7	115	125	120.2	13.9	14.5	14.2	61.7	64.8	63.2
57	173	251	211.7	115	125	120.2	14.3	14.9	14.6	61.7	64.8	63.2
58	173	251	211.7	115	125	120.2	14.7	15.3	15.0	61.7	64.9	63.3
59	173	251	211.7	115	125	120.2	15.1	15.7	15.4	61.8	65.0	63.4
60	173	251	211.7	115	125	120.2	15.4	16.1	15.8	61.9	65.0	63.4

Production Period Performance Table (cont.)

AGE (weeks)	WATER INTAKE (ml/bird/day)			FEED INTAKE (g/bird/day)			HH EGG MASS Cumulative (kg)			EGG WEIGHT (g/egg)		
	Low	High	Target	Low	High	Target	Low	High	Target	Low	High	Target
61	173	251	211.7	115	125	120.2	15.8	16.5	16.1	62.0	65.2	63.6
62	173	251	211.7	115	125	120.2	16.2	16.9	16.5	62.0	65.2	63.6
63	173	251	211.7	115	125	120.2	16.6	17.2	16.9	62.1	65.2	63.6
64	173	251	211.7	115	125	120.2	16.9	17.6	17.3	62.1	65.3	63.7
65	173	251	211.7	115	125	120.2	17.3	18.0	17.7	62.2	65.4	63.8
66	173	251	211.7	115	125	120.2	17.7	18.4	18.0	62.2	65.4	63.8
67	173	251	211.7	115	125	120.2	18.0	18.8	18.4	62.3	65.5	63.9
68	173	251	211.7	115	125	120.2	18.4	19.1	18.8	62.3	65.5	63.9
69	173	251	211.7	115	125	120.2	18.8	19.5	19.1	62.4	65.6	64.0
70	173	251	211.7	115	125	120.2	19.1	19.9	19.5	62.5	65.7	64.1
71	173	251	211.7	115	125	120.2	19.5	20.3	19.9	62.5	65.7	64.1
72	173	251	211.7	115	125	120.2	19.8	20.7	20.2	62.6	65.8	64.2
73	173	251	211.7	115	125	120.2	20.2	21.0	20.6	62.6	65.8	64.2
74	173	251	211.7	115	125	120.2	20.5	21.4	21.0	62.7	65.9	64.3
75	173	251	211.7	115	125	120.2	20.9	21.8	21.3	62.7	65.9	64.3
76	173	251	211.7	115	125	120.2	21.2	22.1	21.7	62.7	65.9	64.3
77	173	251	211.7	115	125	120.2	21.5	22.5	22.0	62.8	66.1	64.4
78	173	251	211.7	115	125	120.2	21.9	22.8	22.4	62.9	66.1	64.5
79	173	251	211.7	115	125	120.2	22.2	23.2	22.7	62.9	66.1	64.5
80	173	251	211.7	115	125	120.2	22.6	23.5	23.0	62.9	66.2	64.5
81	173	251	211.7	115	125	120.2	22.9	23.9	23.4	63.0	66.2	64.6
82	173	251	211.7	115	125	120.2	23.2	24.2	23.7	63.1	66.3	64.7
83	173	251	211.7	115	125	120.2	23.5	24.6	24.1	63.1	66.3	64.7
84	173	251	211.7	115	125	120.2	23.9	24.9	24.4	63.1	66.3	64.7
85	173	251	211.7	115	125	120.2	24.2	25.2	24.7	63.1	66.3	64.7
86	173	251	211.7	115	125	120.2	24.5	25.6	25.0	63.2	66.4	64.8
87	173	251	211.7	115	125	120.2	24.8	25.9	25.4	63.2	66.4	64.8
88	173	251	211.7	115	125	120.2	25.1	26.2	25.7	63.2	66.5	64.9
89	173	251	211.7	115	125	120.2	25.4	26.6	26.0	63.3	66.5	64.9
90	173	251	211.7	115	125	120.2	25.8	26.9	26.3	63.4	66.6	65.0
91	173	251	211.7	115	125	120.2	26.1	27.2	26.6	63.4	66.7	65.1
92	173	251	211.7	115	125	120.2	26.4	27.5	27.0	63.4	66.7	65.1
93	173	251	211.7	115	125	120.2	26.7	27.8	27.3	63.4	66.7	65.1
94	173	251	211.7	115	125	120.2	27.0	28.2	27.6	63.5	66.7	65.1
95	173	251	211.7	115	125	120.2	27.3	28.5	27.9	63.6	66.9	65.3
96	173	251	211.7	115	125	120.2	27.6	28.8	28.2	63.6	66.9	65.3
97	173	251	211.7	115	125	120.2	27.9	29.1	28.5	63.6	66.9	65.3
98	173	251	211.7	115	125	120.2	28.2	29.4	28.8	63.7	66.9	65.3
99	173	251	211.7	115	125	120.2	28.5	29.7	29.1	63.7	67.0	65.4
100	173	251	211.7	115	125	120.2	28.8	30.0	29.4	63.8	67.1	65.5

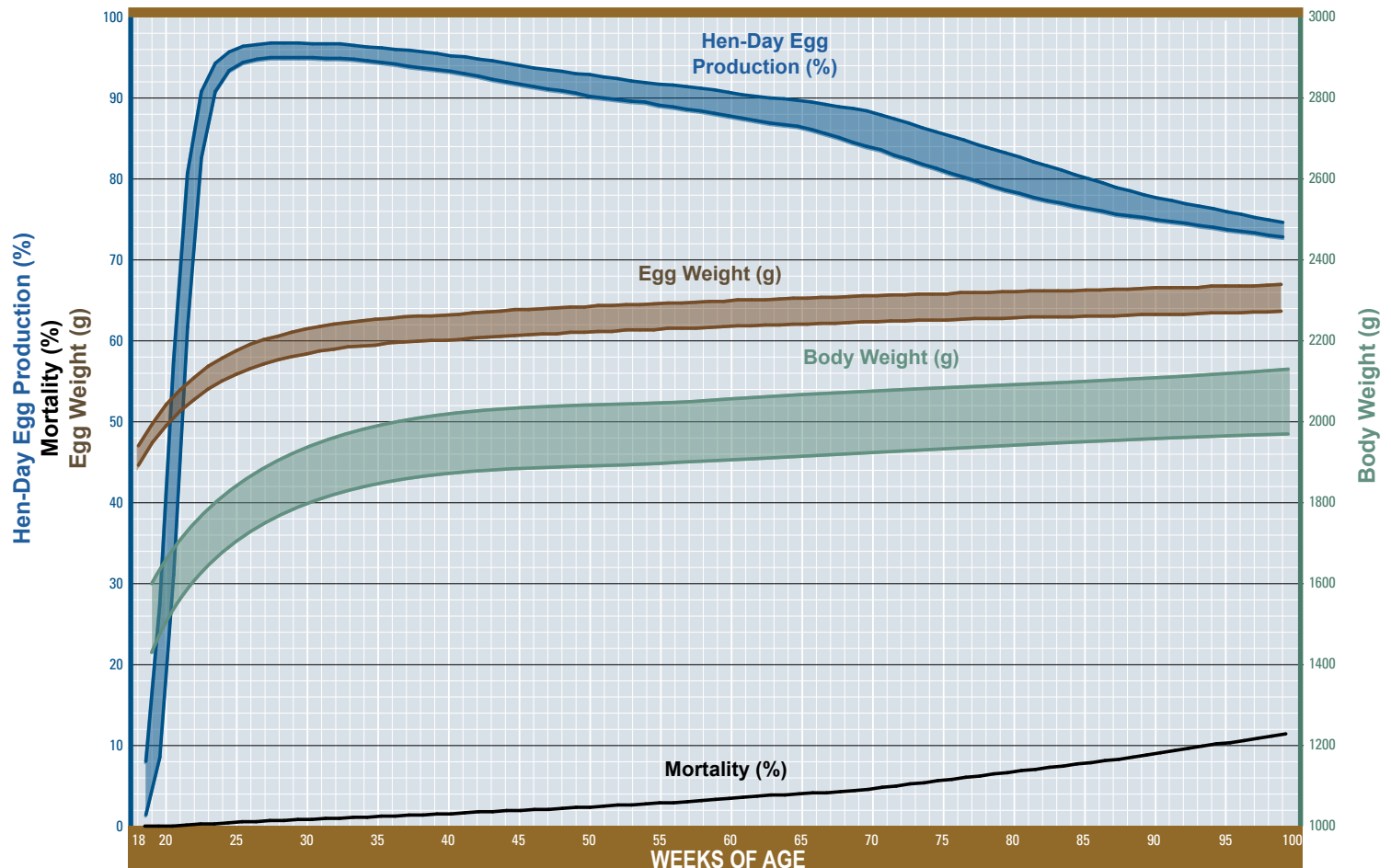
Production Period Space Recommendations

(check local regulations concerning space requirements)

- Useable space is calculated as litter floor and raised slat areas, not including perch space.
- Rearing density depends on age of transfer to the laying facility.

Floor	7–9 birds/m ² of useable space. Higher stocking densities can be used in aviary systems. Consult equipment manufacturers.
Feeders	5cm/bird (with access on both sides); 10 cm/bird (with access on one side); 4 cm/bird with circular feeders
Drinkers	Nipples/cups: 1 per 10 birds; circular drinkers: 1 cm/bird; linear drinker: 2.5 cm per bird
Perches	10–15 cm/bird
Nests	5 birds/nest or 120 birds per m ² in colony nests

Performance Graph



Egg Quality and Egg Size Distribution

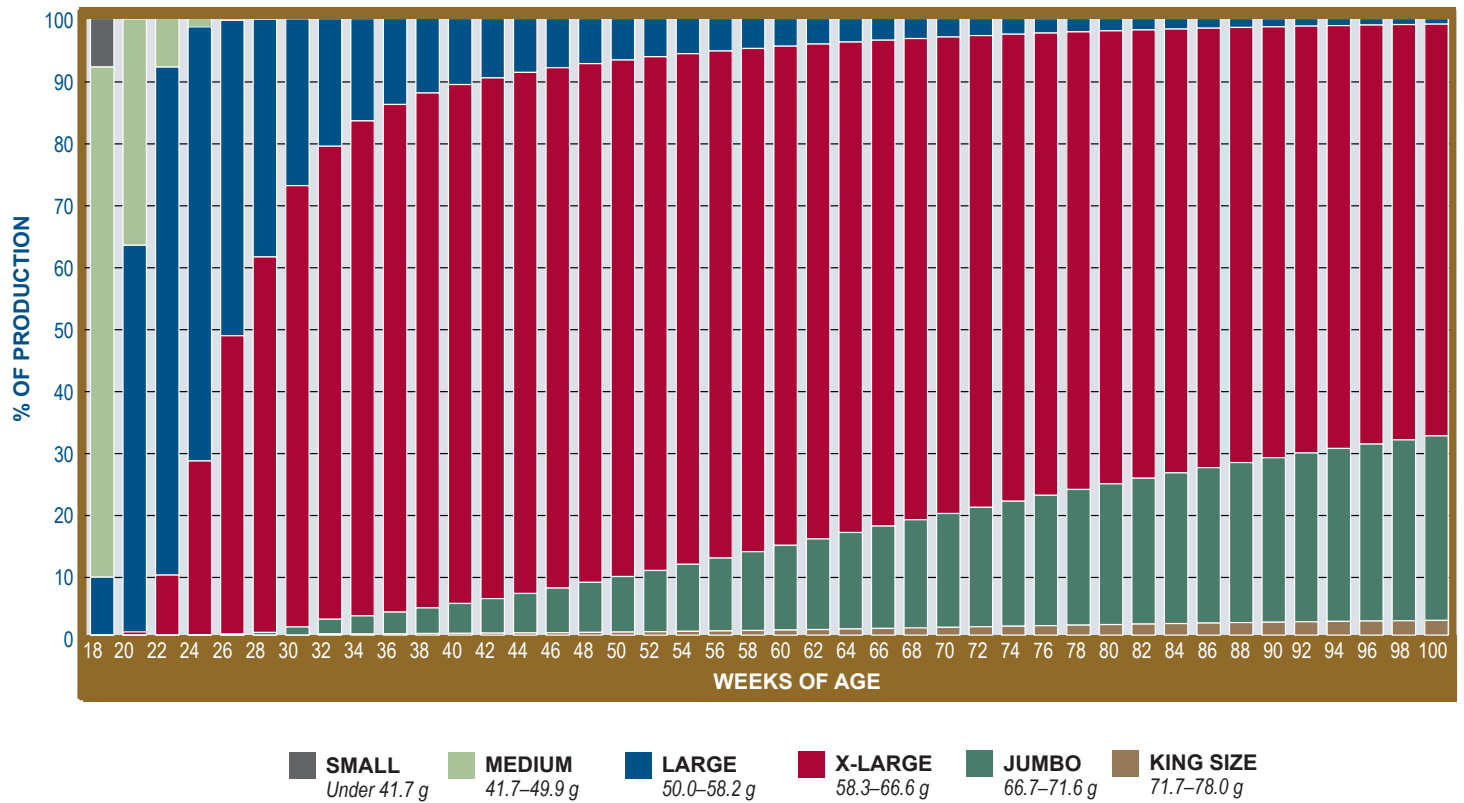
Australia Standards–Weekly*

AGE (weeks)	HAUGH UNITS	BREAKING STRENGTH	SHELL COLOR	AGE (weeks)	AVG. EGG WT. (g)	% KING SIZE 71.7–78.0 g	% JUMBO 66.7–71.6 g	% X- LARGE 58.3–66.6 g	% LARGE 50.0–58.2 g	% MEDIUM 41.7–49.9 g	% SMALL < 41.7 g
20	97.8	4605	93	18	46.0	0.00	0.00	0.00	9.39	82.74	7.87
22	97.0	4590	93	20	51.0	0.00	0.00	0.52	62.70	36.71	0.07
24	96.0	4580	93	22	54.3	0.00	0.00	9.73	82.39	7.88	0.00
26	95.1	4570	92	24	56.6	0.00	0.06	28.18	70.40	1.36	0.00
28	94.2	4560	92	26	58.2	0.00	0.20	48.35	51.15	0.30	0.00
30	93.3	4540	92	28	59.2	0.00	0.43	60.90	38.56	0.11	0.00
32	92.2	4515	92	30	60.1	0.00	1.32	71.57	27.06	0.05	0.00
34	91.5	4490	92	32	60.6	0.19	2.38	76.71	20.70	0.02	0.00
36	90.6	4450	91	34	61.1	0.21	2.91	80.27	16.60	0.01	0.00
38	90.0	4425	91	36	61.4	0.23	3.50	82.33	13.94	0.00	0.00
40	89.3	4405	91	38	61.6	0.26	4.15	83.51	12.09	0.00	0.00
42	88.5	4375	91	40	61.8	0.28	4.85	84.16	10.71	0.00	0.00
44	87.8	4355	91	42	62.1	0.32	5.60	84.45	9.63	0.00	0.00
46	87.1	4320	91	44	62.3	0.35	6.40	84.51	8.74	0.00	0.00
48	86.4	4305	91	46	62.5	0.39	7.24	84.39	7.98	0.00	0.00
50	85.6	4280	90	48	62.6	0.44	8.11	84.13	7.32	0.00	0.00
52	85.0	4250	89	50	62.8	0.49	9.01	83.77	6.73	0.00	0.00
54	84.6	4225	89	52	62.9	0.55	9.93	83.32	6.20	0.00	0.00
56	84.0	4190	88	54	63.1	0.61	10.87	82.81	5.72	0.00	0.00
58	83.1	4170	88	56	63.2	0.68	11.82	82.23	5.27	0.00	0.00
60	82.6	4150	88	58	63.3	0.75	12.78	81.61	4.87	0.00	0.00
62	82.2	4130	87	60	63.4	0.82	13.74	80.95	4.49	0.00	0.00
64	81.9	4110	86	62	63.6	0.90	14.70	80.26	4.14	0.00	0.00
66	81.6	4095	86	64	63.7	0.99	15.65	79.54	3.82	0.00	0.00
68	81.5	4085	85	66	63.8	1.08	16.60	78.80	3.53	0.00	0.00
70	81.1	4075	84	68	63.9	1.17	17.54	78.04	3.25	0.00	0.00
72	81.0	4065	84	70	64.1	1.26	18.46	77.28	3.00	0.00	0.00
74	80.8	4055	83	72	64.2	1.35	19.37	76.51	2.77	0.00	0.00
76	80.5	4040	83	74	64.3	1.44	20.27	75.74	2.55	0.00	0.00
78	80.2	4020	83	76	64.3	1.53	21.14	74.97	2.35	0.00	0.00
80	80.1	3995	83	78	64.5	1.62	22.00	74.21	2.17	0.00	0.00
82	80.0	3985	82	80	64.5	1.71	22.83	73.46	2.00	0.00	0.00
84	79.9	3975	81	82	64.7	1.79	23.65	72.71	1.85	0.00	0.00
86	79.8	3965	81	84	64.7	1.87	24.44	71.98	1.71	0.00	0.00
88	79.7	3960	81	86	64.8	1.95	25.21	71.27	1.57	0.00	0.00
90	79.7	3955	81	88	64.9	2.03	25.95	70.57	1.45	0.00	0.00
				90	65.0	2.09	26.68	69.88	1.34	0.00	0.00
				92	65.1	2.16	27.38	69.22	1.24	0.00	0.00
				94	65.1	2.22	28.05	68.58	1.15	0.00	0.00
				96	65.3	2.28	28.70	67.96	1.06	0.00	0.00
				98	65.3	2.33	29.33	67.36	0.98	0.00	0.00
				100	65.5	2.38	29.93	66.77	0.91	0.00	0.00

* Distribution of egg sizes based on weekly (not cumulative) average egg weights.

Egg Size Distribution (cont.)

Australia Standards–Weekly*

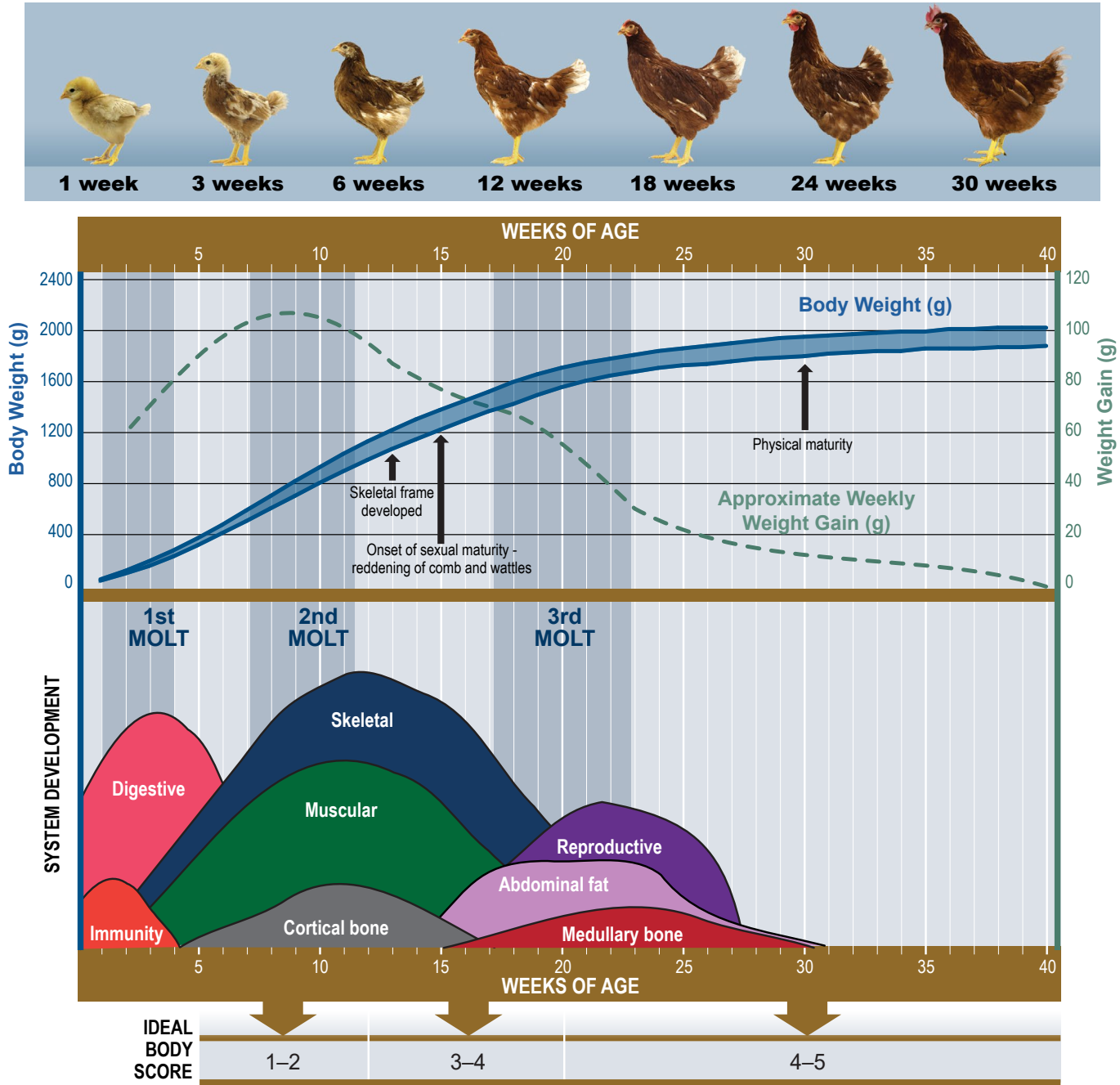


* Distribution of egg sizes based on weekly (not cumulative) average egg weights.

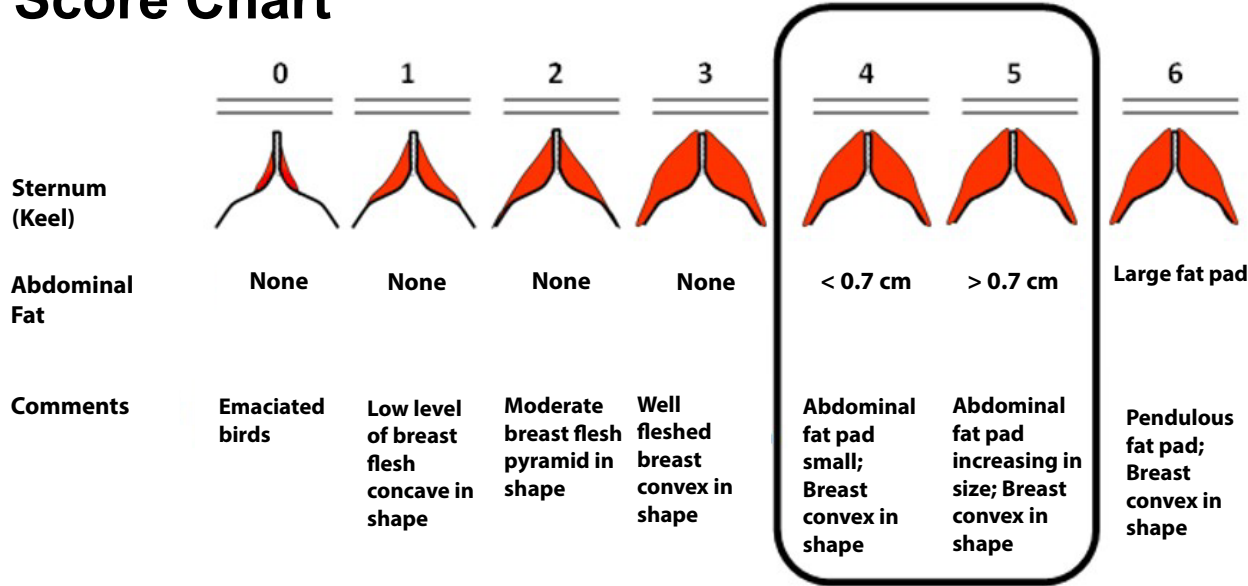
Brooding Temperature and Lighting Recommendations

							
AGE	0–3 days	4–7 days	8–14 days	15–21 days	22–28 days	29–35 days	36–42 days
AIR TEMP. (FLOOR)	35–36°C	33–35°C	31–33°C	29–31°C	26–27°C	23–25°C	21°C
LIGHT INTENSITY	30–50 lux	30–50 lux	25 lux	25 lux	25 lux	10–15 lux	10–15 lux
LIGHT HOURS	Intermittent Program or 20 hours	Intermittent Program or 20 hours	Intermittent Program or 20 hours	18 hours	18.5 hours	15 hours	13.5 hours

Development of the Organ Systems in Pullets

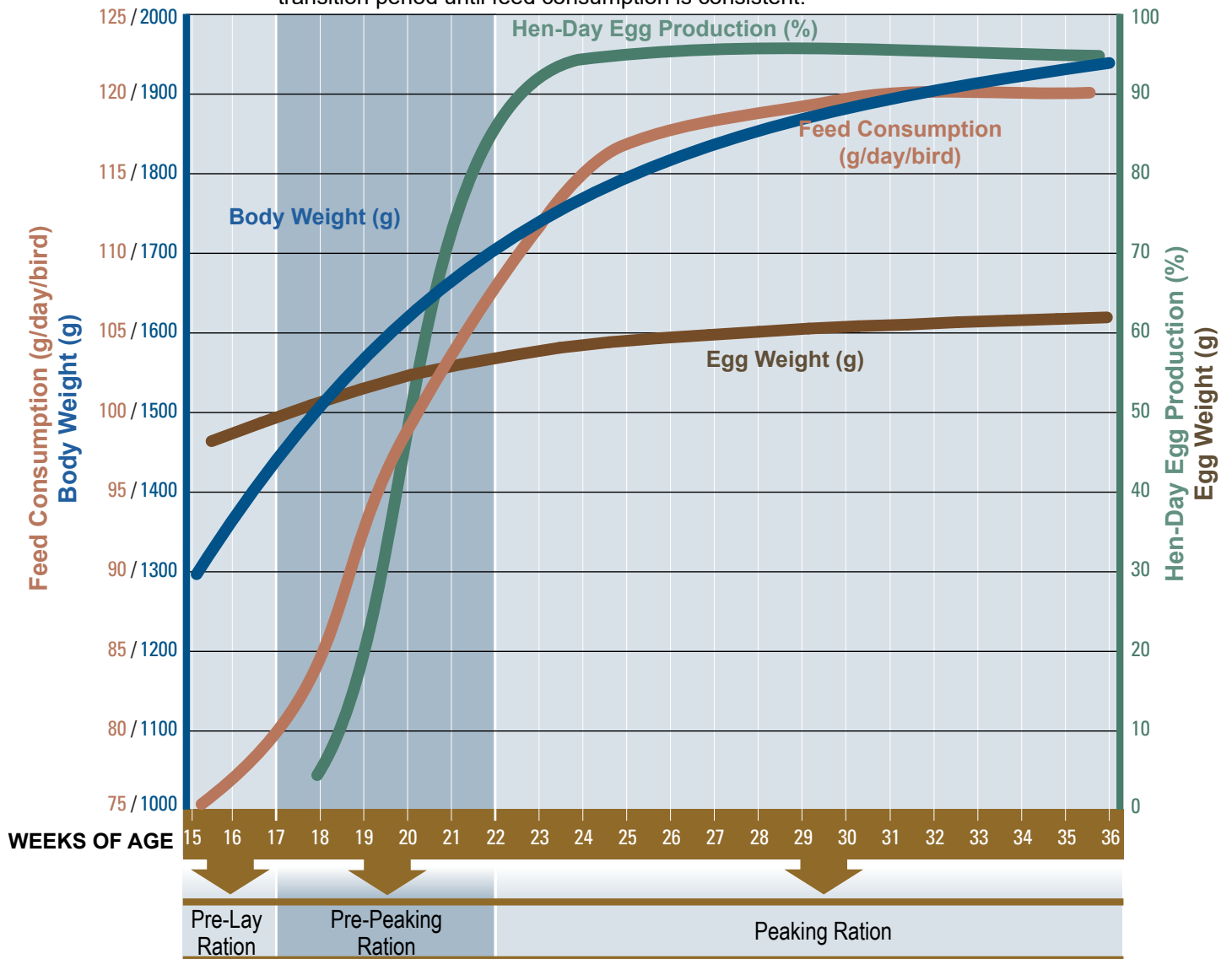


Body Score Chart



Transition Period from Rear to Peak Egg Production

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



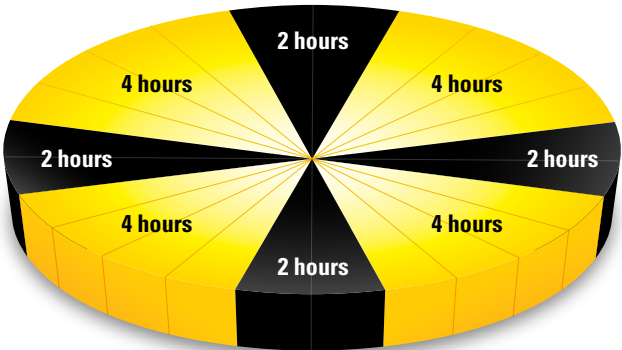
Pre-Peak

- Pre-Peak diets are intended for flocks with low feed intake and are fed for a limited period from first egg to the beginning of peak production. The nutrient specification of the Pre-Peak diet should be dense enough to allow for lower feed intake and also cater to the increased nutritional needs of the bird entering egg production. Continue to feed the Pre-Peak until feed intake has developed sufficiently to allow transition to the Peak diet.
- If utilised until no more than 50–70% HD, a Pre-Peak diet with reduced energy concentration can be beneficial to stimulate feed intake. Pre-Peaking diets are useful in situations where local conditions may result in reduced feed intake, such as hot climates where feed intake may be depressed.
- Increasing the vitamins and trace mineral inclusion to 30% can be useful to cope with the lower feed intake during the Pre-Peak phase.

Lighting Programs

Intermittent Lighting Program for Chicks

- Preferred lighting technique.
- Use from 0–7 days (can be used up to 14 days of age).
- Intermittent dark periods provide rest periods for chicks.
- Synchronises chicks’ activities and feedings.
- Establishes more natural behaviour of rest and activity.
- May improve 7-day livability and pullet body weight.
- Some dark periods may be shortened or removed to accommodate work schedules.



Basic Rules for Lighting Programs

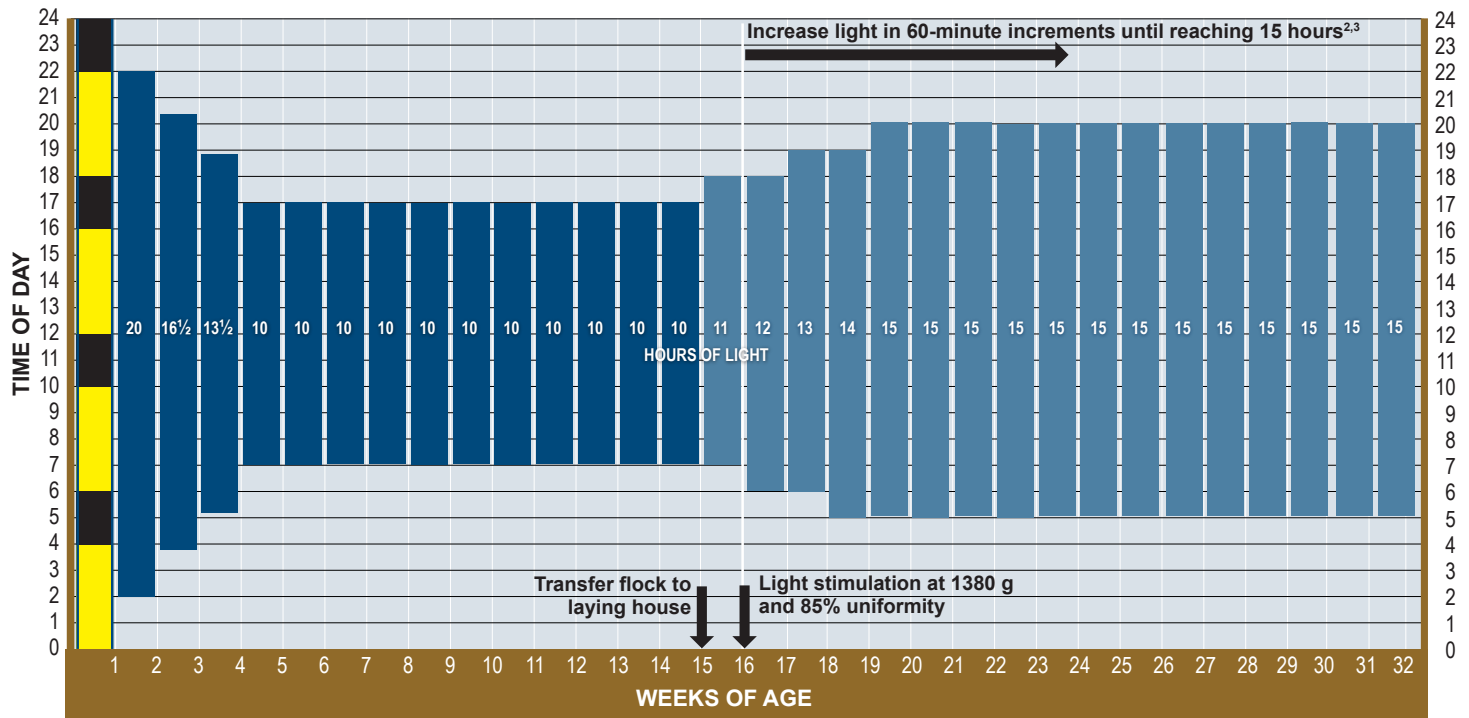
		Age at Stimulation (weeks)					
		15	16	17	18	19	20
Body Weight (g)	1360		Open-sided				
	1380		Controlled				
	1420			Controlled			
	1450			Open-sided			

Egg Numbers

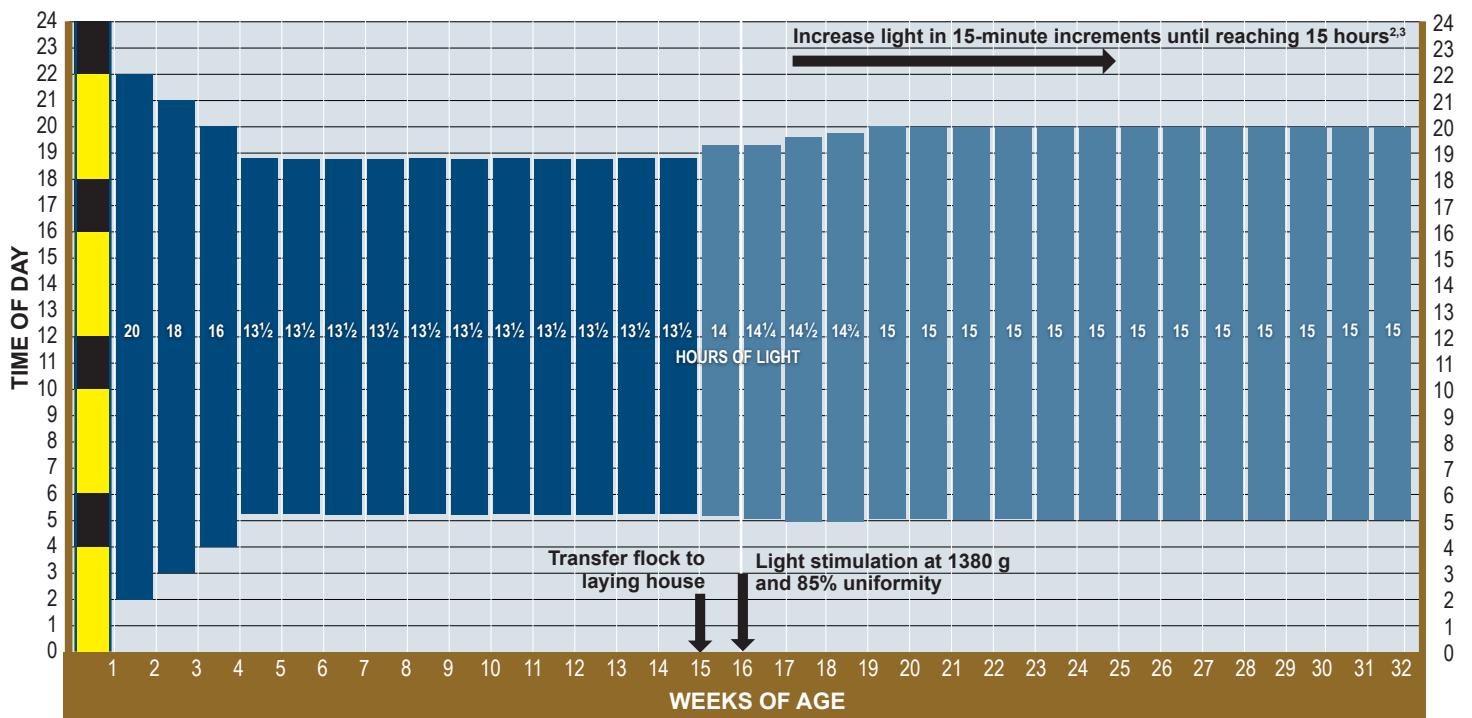
Egg Weight

Lighting Programs (*continued*)

CONTROLLED ENVIRONMENT - LIGHT STIMULATION FOR EGG NUMBERS¹



OPEN-SIDED - LIGHT STIMULATION FOR EGG NUMBERS¹



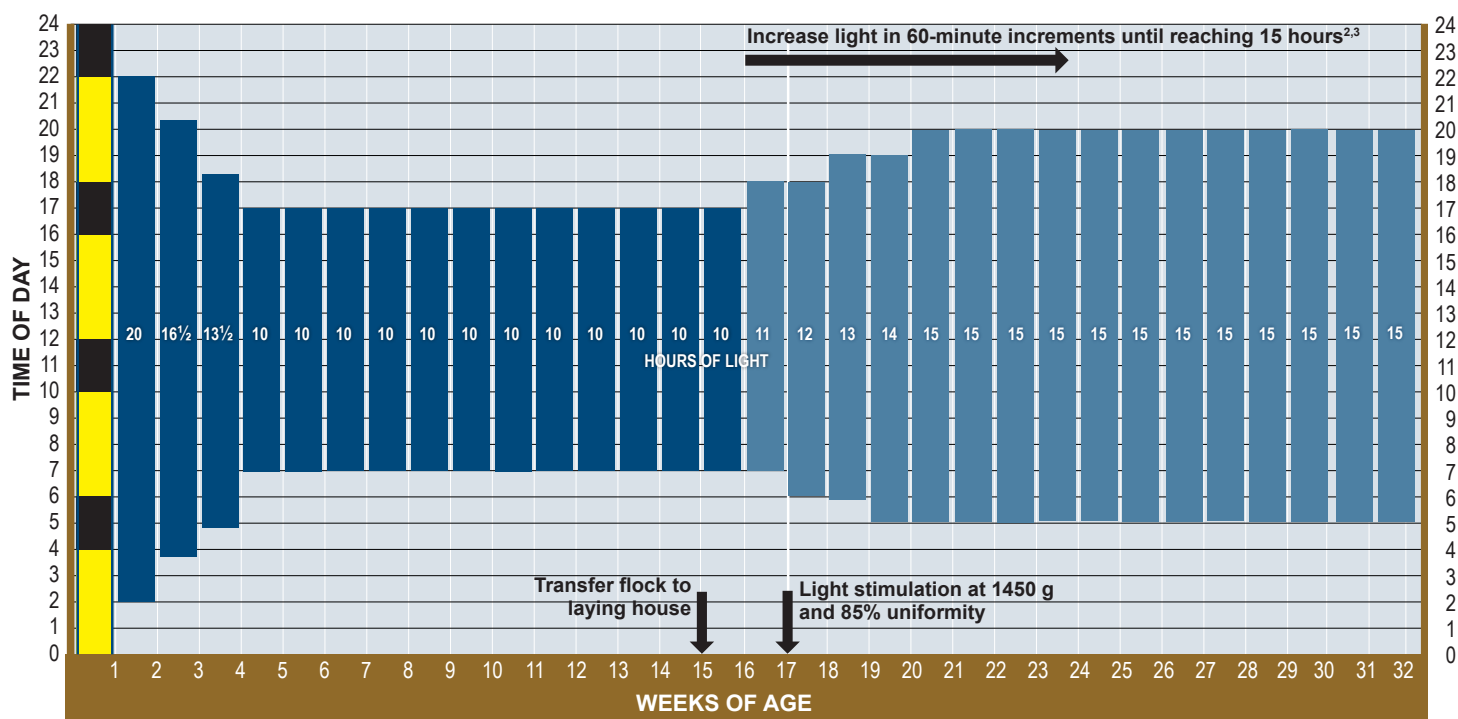
¹ Especially during the transition from rearing in a controlled environment to open-sided production, it is recommended to utilize the [Hy-Line lighting application](#) to establish a lighting program that ensures adequate stimulation for your flock.

² Day length of 14 hours can also work well.

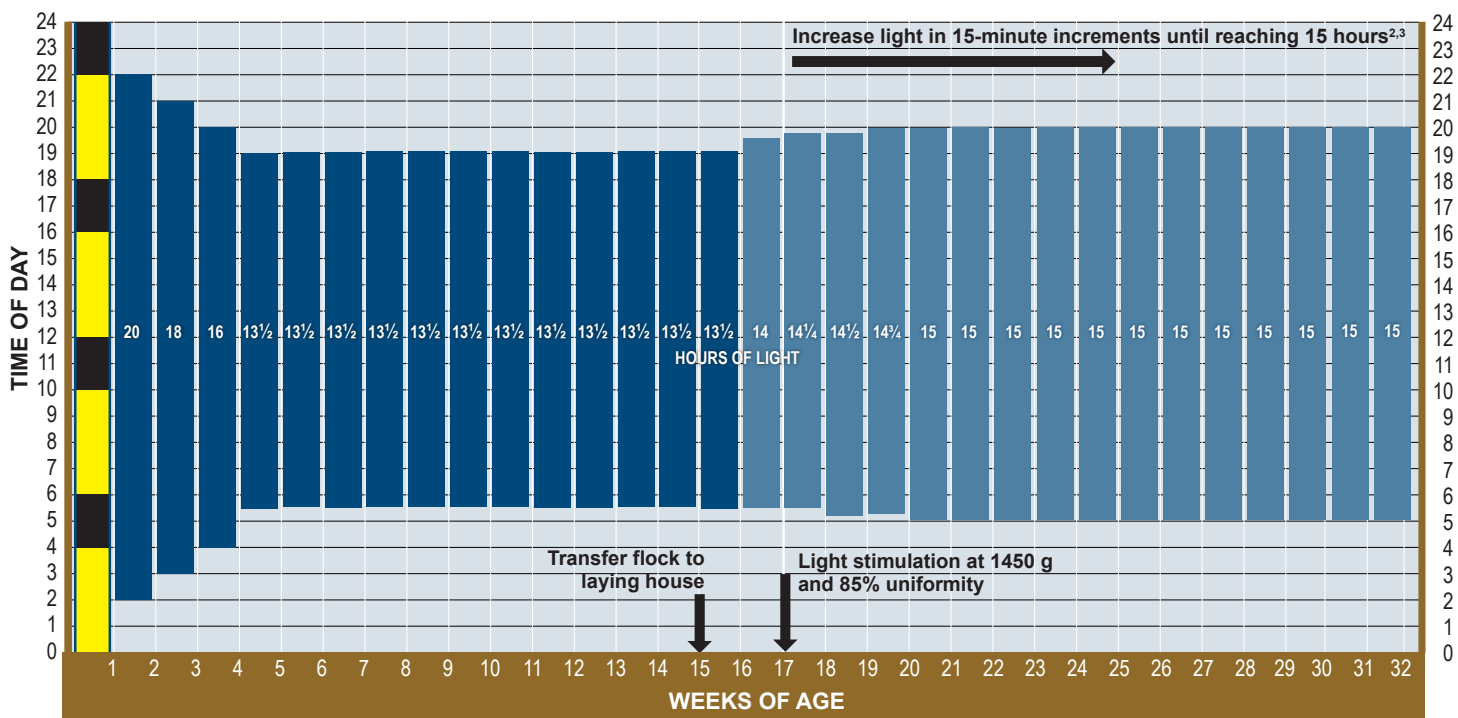
³ Day length should be aligned as closely as possible with labour availability. Minimum light hours should be adjusted in accordance with natural day length variations between summer and winter. For a tailored lighting schedule, please refer to the [Hy-Line lighting application](#).

Lighting Programs (continued)

CONTROLLED ENVIRONMENT - LIGHT STIMULATION FOR EGG WEIGHT¹



OPEN-SIDED - LIGHT STIMULATION FOR EGG WEIGHT¹

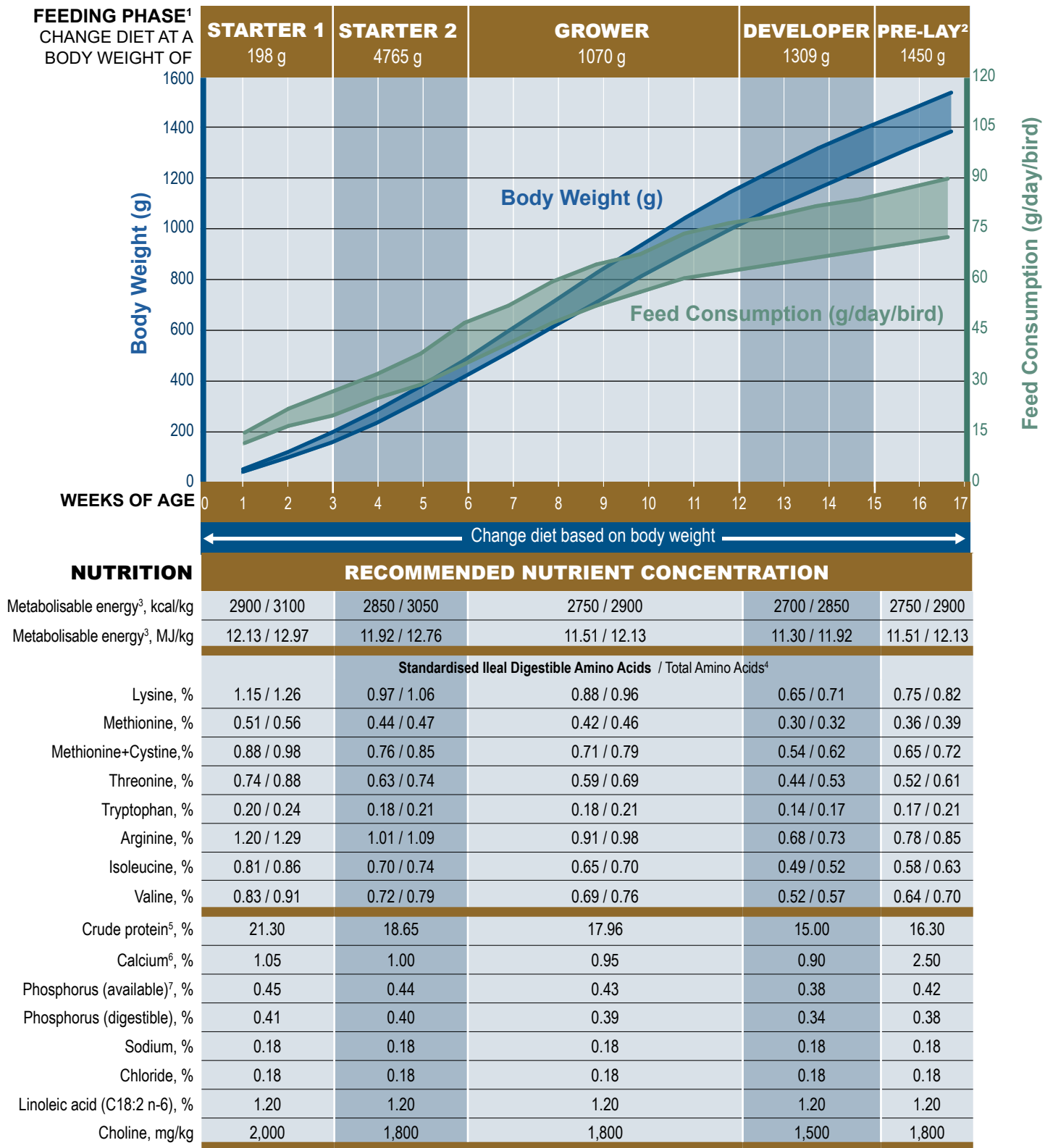


¹ Especially during the transition from rearing in a controlled environment to open-sided production, it is recommended to utilize the [Hy-Line lighting application](#) to establish a lighting program that ensures adequate stimulation for your flock.

² Day length of 14 hours can also work well.

³ Day length should be aligned as closely as possible with labour availability. Minimum light hours should be adjusted in accordance with natural day length variations between summer and winter. For a tailored lighting schedule, please refer to the [Hy-Line lighting application](#).

Rearing Period Nutritional Recommendations



¹ Body weights are approximate. Ages shown are a guide only. Please note that at time of transfer, there will be some loss in body weight (normally 10–12%) due to reduced water intake. Ration changes through rear must be based on body weight rather than age.

² 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. Implementing a pre-lay diet can be challenging in mixed-age flocks. If it's not possible to use the Pre-Lay diet, the calcium content of the last stage rearing diet (developer) must be increased to 1.4%.

³ Recommended energy range is based on raw material energy values shown in feed ingredient table at back of this guide. It is important that target concentrations of dietary energy are adjusted according to energy system applied to raw material matrix.

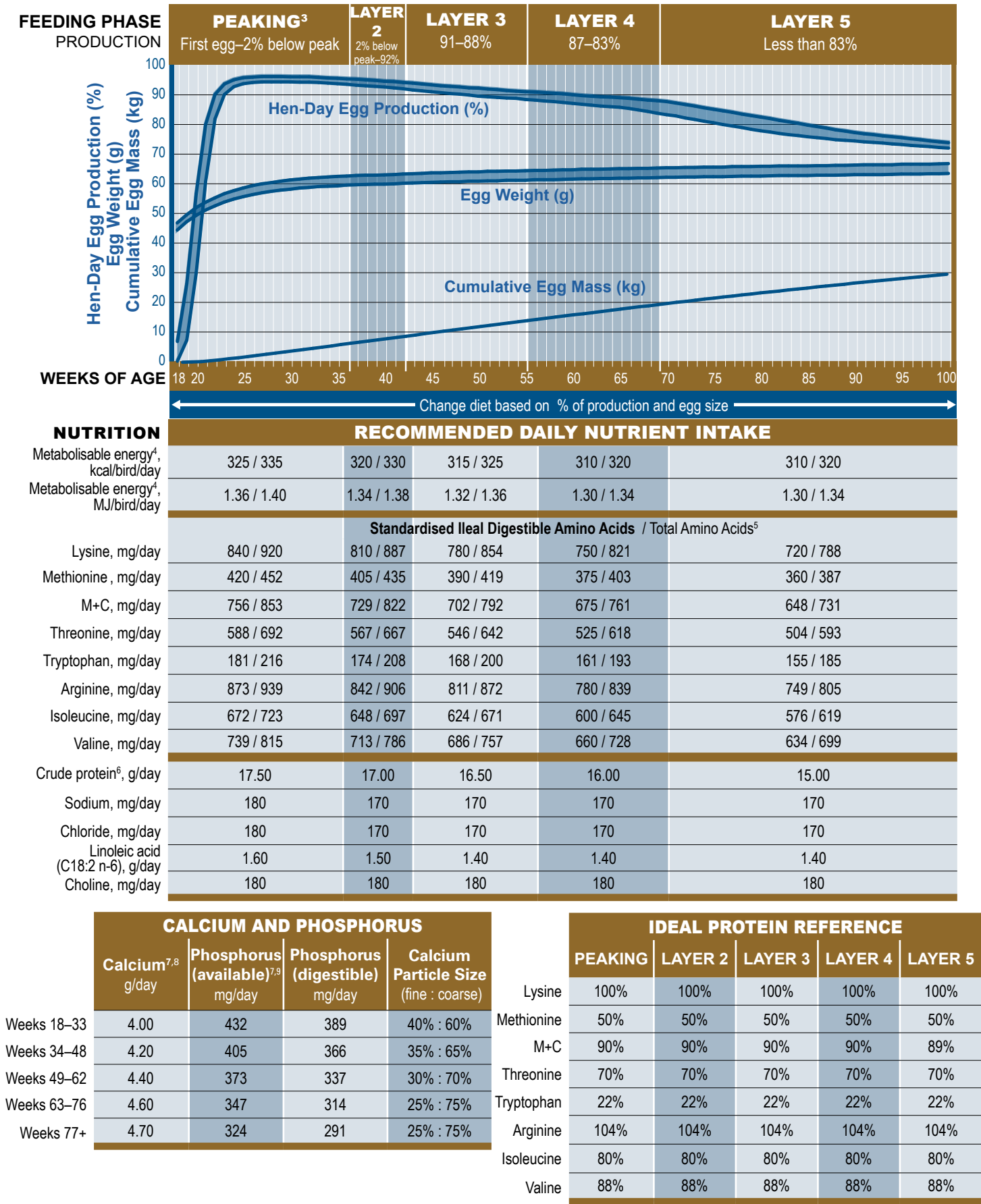
⁴ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilise other ingredients, recommendations for Standardised Ileal Digestible Amino Acids must be followed.

⁵ 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.

⁶ 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. Introduction of up to 50% coarse limestone of the pre-lay diet can help familiarize the bird to a coarser form of limestone and help support positive behaviour.

⁷ Where other phosphorus systems are used, diets should contain recommended minimum level of available phosphorus.

Production Period Nutritional Recommendations for Egg Numbers^{1,2}



Production Period Dietary Nutrient Concentrations for Egg Numbers^{1,2}

FEEDING PHASE PRODUCTION NUTRITION	PEAKING ³ First egg until production drops 2% below peak					LAYER 2 2% below peak to 92%					LAYER 3 91–88%					LAYER 4 87–82%					LAYER 5 Less than 83%									
	RECOMMENDED CONCENTRATION																													
	ME ⁴ , kcal/bird/day					325 / 335					320 / 330					315 / 325					310 / 320					310 / 320				
	ME ⁴ , MJ/bird/day					1.36 / 1.40					1.34 / 1.38					1.32 / 1.36					1.30 / 1.34					1.30 / 1.34				
FEED CONSUMPTION (*Typical Feed Consumption)																														
g/day/bird	90	95	100*	105	110	105	110	115*	120	125	105	111	117*	123	129	105	111	117*	123	129	105	111	117*	123	129					
Standardised Ileal Digestible Amino Acids																														
Lysine, %	0.93	0.88	0.84	0.80	0.76	0.77	0.74	0.70	0.68	0.65	0.74	0.70	0.67	0.63	0.60	0.71	0.68	0.64	0.61	0.58	0.69	0.65	0.62	0.59	0.56					
Methionine, %	0.47	0.44	0.42	0.40	0.38	0.39	0.37	0.35	0.34	0.32	0.37	0.35	0.33	0.32	0.30	0.36	0.34	0.32	0.30	0.29	0.34	0.32	0.31	0.29	0.28					
M+C, %	0.84	0.80	0.76	0.72	0.69	0.69	0.66	0.63	0.61	0.58	0.67	0.63	0.60	0.57	0.54	0.64	0.61	0.58	0.55	0.52	0.62	0.58	0.55	0.53	0.50					
Threonine, %	0.65	0.62	0.59	0.56	0.53	0.54	0.52	0.49	0.47	0.45	0.52	0.49	0.47	0.44	0.42	0.50	0.47	0.45	0.43	0.41	0.48	0.45	0.43	0.41	0.39					
Tryptophan, %	0.20	0.19	0.18	0.17	0.16	0.17	0.16	0.15	0.15	0.14	0.16	0.15	0.14	0.14	0.13	0.15	0.15	0.14	0.13	0.12	0.15	0.14	0.13	0.13	0.12					
Arginine, %	0.97	0.92	0.87	0.83	0.79	0.80	0.77	0.73	0.70	0.67	0.77	0.73	0.69	0.66	0.63	0.74	0.70	0.67	0.63	0.60	0.71	0.67	0.64	0.61	0.58					
Isoleucine, %	0.75	0.71	0.67	0.64	0.61	0.62	0.59	0.56	0.54	0.52	0.59	0.56	0.53	0.51	0.48	0.57	0.54	0.51	0.49	0.47	0.55	0.52	0.49	0.47	0.45					
Valine, %	0.82	0.78	0.74	0.70	0.67	0.68	0.65	0.62	0.59	0.57	0.65	0.62	0.59	0.56	0.53	0.63	0.59	0.56	0.54	0.51	0.60	0.57	0.54	0.52	0.49					
Total Amino Acids ⁵																														
Lysine, %	1.02	0.97	0.92	0.88	0.84	0.84	0.81	0.77	0.74	0.71	0.81	0.77	0.73	0.69	0.66	0.78	0.74	0.70	0.67	0.64	0.75	0.71	0.67	0.64	0.61					
Methionine, %	0.50	0.48	0.45	0.43	0.41	0.41	0.40	0.38	0.36	0.35	0.40	0.38	0.36	0.34	0.32	0.38	0.36	0.34	0.33	0.31	0.37	0.35	0.33	0.31	0.30					
M+C, %	0.95	0.90	0.85	0.81	0.78	0.78	0.75	0.71	0.69	0.66	0.75	0.71	0.68	0.64	0.61	0.72	0.69	0.65	0.62	0.59	0.70	0.66	0.62	0.59	0.57					
Threonine, %	0.77	0.73	0.69	0.66	0.63	0.64	0.61	0.58	0.56	0.53	0.61	0.58	0.55	0.52	0.50	0.59	0.56	0.53	0.50	0.48	0.56	0.53	0.51	0.48	0.46					
Tryptophan, %	0.24	0.23	0.22	0.21	0.20	0.20	0.19	0.18	0.17	0.17	0.19	0.18	0.17	0.16	0.16	0.18	0.17	0.16	0.16	0.15	0.18	0.17	0.16	0.15	0.14					
Arginine, %	1.04	0.99	0.94	0.89	0.85	0.86	0.82	0.79	0.76	0.72	0.83	0.79	0.75	0.71	0.68	0.80	0.76	0.72	0.68	0.65	0.77	0.73	0.69	0.65	0.62					
Isoleucine, %	0.80	0.76	0.72	0.69	0.66	0.66	0.63	0.61	0.58	0.56	0.64	0.60	0.57	0.55	0.52	0.61	0.58	0.55	0.52	0.50	0.59	0.56	0.53	0.50	0.48					
Valine, %	0.91	0.86	0.82	0.78	0.74	0.75	0.71	0.68	0.66	0.63	0.72	0.68	0.65	0.62	0.59	0.69	0.66	0.62	0.59	0.56	0.67	0.63	0.60	0.57	0.54					
Cr. protein ⁶ , %	19.44	18.42	17.50	16.67	15.91	16.19	15.45	14.78	14.17	13.60	15.71	14.86	14.10	13.41	12.79	15.24	14.41	13.68	13.01	12.40	14.29	13.51	12.82	12.20	11.63					
Sodium, %	0.20	0.19	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13					
Chloride, %	0.20	0.19	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13					
Linoleic acid (C18:2 n-6), %	1.78	1.68	1.60	1.52	1.45	1.43	1.36	1.30	1.25	1.20	1.33	1.26	1.20	1.14	1.09	1.33	1.26	1.20	1.14	1.09	1.33	1.26	1.20	1.14	1.09					
Choline, mg/kg	2000	1895	1800	1714	1636	1714	1636	1565	1500	1440	1714	1622	1538	1463	1395	1714	1622	1538	1463	1395	1714	1622	1538	1463	1395					
CALCIUM AND PHOSPHORUS CHANGES BASED ON FEED INTAKE																														
Feed Consumption, g/day per bird	Weeks 18–33					Weeks 34–48					Weeks 49–62					Weeks 63–76					Weeks 77+									
	90	95	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124			
Calcium ^{7,8} , %	4.44	4.21	4.00	3.81	3.64	3.48	3.33	4.20	4.00	3.82	3.65	3.50	4.40	4.19	4.00	3.83	3.67	4.60	4.38	4.18	4.00	3.83	4.70	4.48	4.27	4.09	3.92			
Phosphorus (available) ^{7,9} , %	0.48	0.46	0.43	0.41	0.39	0.38	0.36	0.41	0.39	0.37	0.35	0.34	0.37	0.36	0.34	0.32	0.31	0.35	0.33	0.32	0.30	0.29	0.32	0.31	0.29	0.28	0.27			
Phosphorus (digestible), %	0.43	0.41	0.39	0.37	0.35	0.34	0.32	0.37	0.35	0.33	0.32	0.31	0.34	0.32	0.31	0.29	0.28	0.31	0.30	0.29	0.27	0.26	0.29	0.28	0.26	0.25	0.24			

¹ All nutrient requirements are based on the [Feed Ingredient Tables](#).

² Crude protein, methionine+cystine, fat, linoleic acid, and / or energy may be changed to optimise 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 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 2 kcal /bird /day, respectively.

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

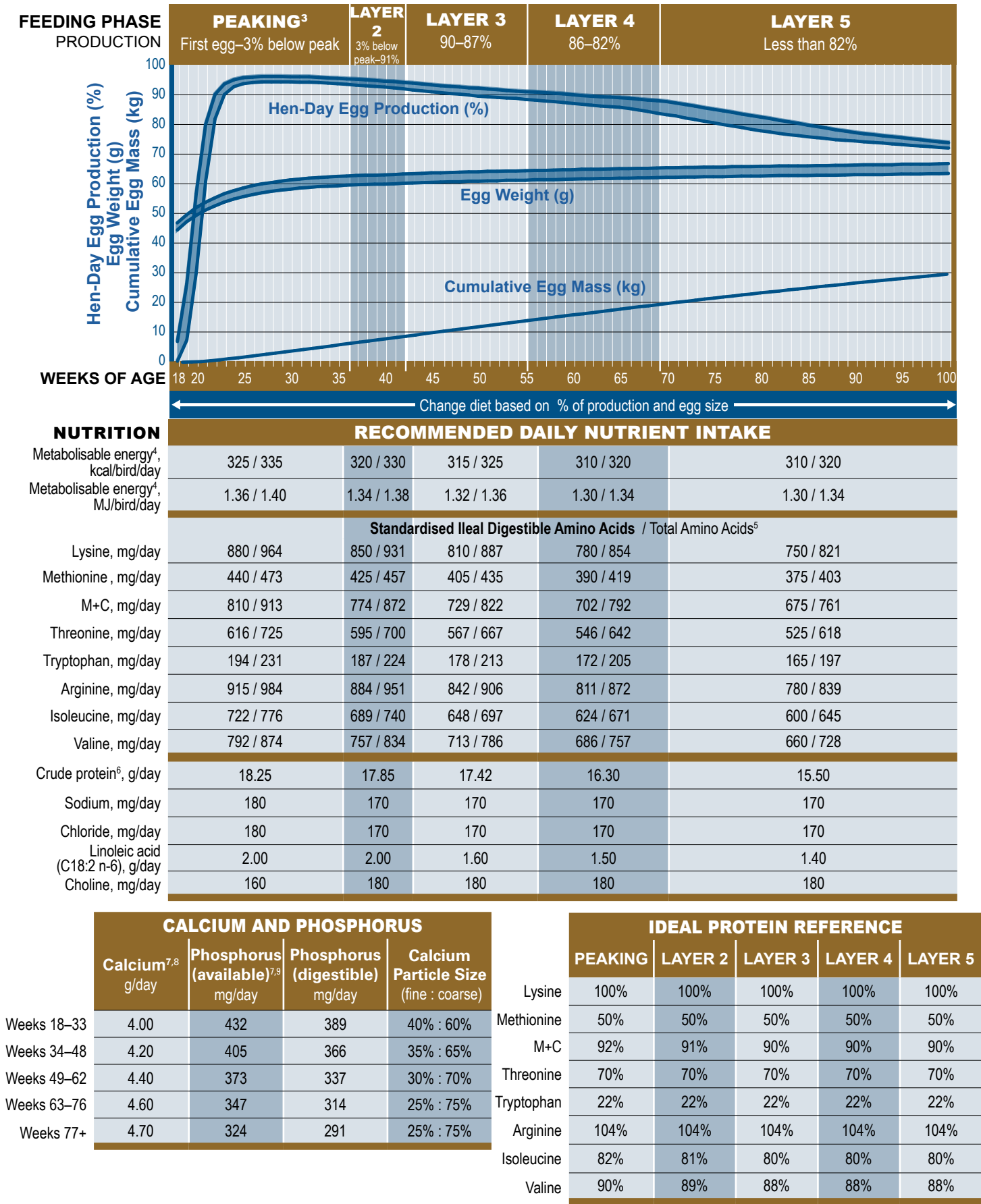
⁶ Diets should always be formulated to provide required intake of amino acid. Concentration of crude protein in diet will vary with raw material used. Crude protein value provided is an estimated typical value only.

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](#) at hyline.com. Dietary calcium levels and fine to coarse ratio 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.

Production Period Nutritional Recommendations for Egg Weight^{1,2}



Production Period Dietary Nutrient Concentrations for Egg Weight^{1,2}

FEEDING PHASE PRODUCTION NUTRITION	PEAKING ³ First egg until production drops 3% below peak					LAYER 2 3% below peak to 91%					LAYER 3 90–87%					LAYER 4 86–82%					LAYER 5 Less than 82%									
	RECOMMENDED CONCENTRATION																													
	ME ⁴ , kcal/bird/day					325 / 335					320 / 330					315 / 325					310 / 320					310 / 320				
	ME ⁴ , MJ/bird/day					1.36 / 1.40					1.34 / 1.38					1.32 / 1.36					1.30 / 1.34					1.30 / 1.34				
FEED CONSUMPTION (*Typical Feed Consumption)																														
g/day/bird	90	95	100*	105	110	105	110	115*	120	125	105	111	117*	123	129	105	111	117*	123	129	105	111	117*	123	129					
Standardised Ileal Digestible Amino Acids																														
Lysine, %	0.98	0.93	0.88	0.84	0.80	0.81	0.77	0.74	0.71	0.68	0.77	0.73	0.69	0.66	0.63	0.74	0.70	0.67	0.63	0.60	0.71	0.68	0.64	0.61	0.58					
Methionine, %	0.49	0.46	0.44	0.42	0.40	0.40	0.39	0.37	0.35	0.34	0.39	0.36	0.35	0.33	0.31	0.37	0.35	0.33	0.32	0.30	0.36	0.34	0.32	0.30	0.29					
M+C, %	0.90	0.85	0.81	0.77	0.74	0.74	0.70	0.67	0.65	0.62	0.69	0.66	0.62	0.59	0.57	0.67	0.63	0.60	0.57	0.54	0.64	0.61	0.58	0.55	0.52					
Threonine, %	0.68	0.65	0.62	0.59	0.56	0.57	0.54	0.52	0.50	0.48	0.54	0.51	0.48	0.46	0.44	0.52	0.49	0.47	0.44	0.42	0.50	0.47	0.45	0.43	0.41					
Tryptophan, %	0.22	0.20	0.19	0.18	0.18	0.18	0.17	0.16	0.16	0.15	0.17	0.16	0.15	0.14	0.14	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.14	0.13	0.13					
Arginine, %	1.02	0.96	0.92	0.87	0.83	0.84	0.80	0.77	0.74	0.71	0.80	0.76	0.72	0.68	0.65	0.77	0.73	0.69	0.66	0.63	0.74	0.70	0.67	0.63	0.60					
Isoleucine, %	0.80	0.76	0.72	0.69	0.66	0.66	0.63	0.60	0.57	0.55	0.62	0.58	0.55	0.53	0.50	0.59	0.56	0.53	0.51	0.48	0.57	0.54	0.51	0.49	0.47					
Valine, %	0.88	0.83	0.79	0.75	0.72	0.72	0.69	0.66	0.63	0.61	0.68	0.64	0.61	0.58	0.55	0.65	0.62	0.59	0.56	0.53	0.63	0.59	0.56	0.54	0.51					
Total Amino Acids ⁵																														
Lysine, %	1.07	1.01	0.96	0.92	0.88	0.89	0.85	0.81	0.78	0.74	0.84	0.80	0.76	0.72	0.69	0.81	0.77	0.73	0.69	0.66	0.78	0.74	0.70	0.67	0.64					
Methionine, %	0.53	0.50	0.47	0.45	0.43	0.44	0.42	0.40	0.38	0.37	0.41	0.39	0.37	0.35	0.34	0.40	0.38	0.36	0.34	0.32	0.38	0.36	0.34	0.33	0.31					
M+C, %	1.01	0.96	0.91	0.87	0.83	0.83	0.79	0.76	0.73	0.70	0.78	0.74	0.70	0.67	0.64	0.75	0.71	0.68	0.64	0.61	0.72	0.69	0.65	0.62	0.59					
Threonine, %	0.81	0.76	0.73	0.69	0.66	0.67	0.64	0.61	0.58	0.56	0.64	0.60	0.57	0.54	0.52	0.61	0.58	0.55	0.52	0.50	0.59	0.56	0.53	0.50	0.48					
Tryptophan, %	0.26	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.19	0.18	0.20	0.19	0.18	0.17	0.17	0.20	0.18	0.18	0.17	0.16	0.19	0.18	0.17	0.16	0.15					
Arginine, %	1.09	1.04	0.98	0.94	0.89	0.91	0.86	0.83	0.79	0.76	0.86	0.82	0.77	0.74	0.70	0.83	0.79	0.75	0.71	0.68	0.80	0.76	0.72	0.68	0.65					
Isoleucine, %	0.86	0.82	0.78	0.74	0.71	0.70	0.67	0.64	0.62	0.59	0.66	0.63	0.60	0.57	0.54	0.64	0.60	0.57	0.55	0.52	0.61	0.58	0.55	0.52	0.50					
Valine, %	0.97	0.92	0.87	0.83	0.79	0.79	0.76	0.73	0.70	0.67	0.75	0.71	0.67	0.64	0.61	0.72	0.68	0.65	0.62	0.59	0.69	0.66	0.62	0.59	0.56					
Cr. protein ⁶ , %	20.28	19.21	18.25	17.38	16.59	17.00	16.23	15.52	14.88	14.28	16.59	15.69	14.89	14.16	13.50	15.52	14.68	13.93	13.25	12.64	14.76	13.96	13.25	12.60	12.02					
Sodium, %	0.20	0.19	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13					
Chloride, %	0.20	0.19	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13	0.16	0.15	0.15	0.14	0.13					
Linoleic acid (C18:2 n-6), %	2.22	2.11	2.00	1.90	1.82	1.90	1.82	1.74	1.67	1.60	1.52	1.44	1.37	1.30	1.24	1.43	1.35	1.28	1.22	1.16	1.33	1.26	1.20	1.14	1.09					
Choline, mg/kg	1778	1684	1600	1524	1455	1714	1636	1565	1500	1440	1714	1622	1538	1463	1395	1714	1622	1538	1463	1395	1714	1622	1538	1463	1395					
CALCIUM AND PHOSPHORUS CHANGES BASED ON FEED INTAKE																														
Feed Consumption, g/day per bird	Weeks 18–33					Weeks 34–48					Weeks 49–62					Weeks 63–76					Weeks 77+									
	90	95	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124	100	106	112	118	124			
Calcium ^{7,8} , %	4.44	4.21	4.00	3.81	3.64	3.48	3.33	4.20	4.00	3.82	3.65	3.50	4.40	4.19	4.00	3.83	3.67	4.60	4.38	4.18	4.00	3.83	4.70	4.48	4.27	4.09	3.92			
Phosphorus (available) ^{7,9} , %	0.48	0.46	0.43	0.41	0.39	0.38	0.36	0.41	0.39	0.37	0.35	0.34	0.37	0.36	0.34	0.32	0.31	0.35	0.33	0.32	0.30	0.29	0.32	0.31	0.29	0.28	0.27			
Phosphorus (digestible), %	0.43	0.41	0.39	0.37	0.35	0.34	0.32	0.37	0.35	0.33	0.32	0.31	0.34	0.32	0.31	0.29	0.28	0.31	0.30	0.29	0.27	0.26	0.29	0.28	0.26	0.25	0.24			

¹ All nutrient requirements are based on the [Feed Ingredient Tables](#).

² Crude protein, methionine+cystine, fat, linoleic acid, and / or energy may be changed to optimise 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 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 2 kcal /bird /day, respectively.

⁵ Recommendation for Total Amino Acids is only appropriate to corn and soybean meal diet. Where diets utilise other ingredients, recommendations for Standardised 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](#) at hyline.com. Dietary calcium levels and fine to coarse ratio 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.

Vitamins and Trace Minerals

ITEM ^{1,2,3,4}	IN 1000 KG COMPLETE DIET	
	Rearing Period	Production Period
Vitamin A, IU	10,000,000	8,000,000
Vitamin D ₃ ⁵ , IU	3,300,000	3,300,000
Vitamin E, g	30.00	25.00
Vitamin K (menadione), g	3.50	3.00
Thiamin (B ₁), g	2.20	2.50
Riboflavin (B ₂), g	6.60	5.50
Niacin (B ₃) ⁶ , g	40.00	30.00
Pantothenic acid (B ₅), g	10.00	10.00
Pyridoxine (B ₆), g	4.50	5.00
Biotin (B ₇), mg	100.00	75.00
Folic acid (B ₉), g	1.00	0.90
Cobalamine (B ₁₂), mg	23.00	23.00
Manganese ⁷ , g	100.00	100.00
Zinc ⁷ , g	85.00	80.00
Iron ⁷ , g	30.00	40.00
Copper ⁷ , g	15.00	8.00
Magnesium ⁷ , g	600.00	500.00
Iodine, g	1.50	1.20
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. Levels of 150-200mg/kg of Vitamin C can be beneficial during periods of stress.

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 supplier's 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.

Drinking Water Quality for Poultry

ITEM	MAXIMUM CONCENTRATION (ppm or mg/L)*	
Nitrate NO_3^- ¹	25	Older birds will tolerate higher levels up to 20 ppm. Stressed or disease challenged birds may be more sensitive to effects of Nitrate.
Nitrate Nitrogen ($\text{NO}_3\text{-N}$) 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 ($\text{NO}_2\text{-N}$) 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.
Sulphate (SO_4^{2-}) ¹	250	Higher levels may be laxative.
Iron (Fe) ¹	<0.3	Higher levels result in bad odour 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	
Aluminium (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	5–7	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	This is likely to indicate dirty water.
Total Coliform bacteria ³	50 CFU/ml	
Faecal 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 sanitise water at a favourable 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 & Sneed, 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



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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)
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
Understanding the Role of the Skeleton in Egg Production
The Science of Egg Quality
Understanding Poultry Lighting
Understanding Heat Stress in Layers
Infrared Beak Treatment
Feed Granulometry and the Importance of
Feed Particle Size in Layers
Impact of Tarp Colour on Poultry Lighting
SPIDES (Short Period Incubation During Egg Storage)
Fly Management: Surveillance and Control
Optimising Egg Size in Commercial Layers
Vaccination Recommendations
Egg Drop Syndrome (EDS)
Managing Fully Beaked Flocks
Thiamin Deficiency in Pullets
Understanding Nesting Behaviour

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