

COBB 500

BREEDER MANAGEMENT GUIDE



Revised
2003

INTRODUCTION

The Cobb commitment to genetic improvement of the Cobb 500 continues to increase the performance potential in all areas of broiler and broiler breeder production. However, to attain both genetic potential and consistent flock production, it is important that the flock manager has a good management program in place. The success of the Cobb 500 broiler breeder worldwide has provided considerable experience of the breed in a wide range of situations: hot and cold climates, controlled environment and open housing. This Cobb 500 Breeder Management Guide is designed to assist you in building your management program.

Management must not only meet the basic needs of the stock but must also be finely tuned to benefit fully from the breed's potential. Some of the guidelines may need to be adapted locally according to your own experience, and our technical teams will assist with this.

The Cobb Breeder Management guide highlights critical factors that are most likely to influence flock performance and is part of our technical information service, which includes the Cobb Hatchery and Broiler Management Guides, Technical Bulletins and a full range of performance charts. Our recommendations are based on current scientific knowledge and practical experience around the world. You should be aware of local legislation, which may influence the management practice that you choose to adopt.

The Cobb 500 Breeder Management Guide is intended as a reference and supplement to your own flock management skills so that you can apply your knowledge and judgement to obtain consistently good results with the Cobb 500.

Revised 2003

BREEDER PERFORMANCE

Age at depletion	(weeks) (days)	60 420	65 455
Age at 5% production	(weeks) (days)	24 168	24 168
Total eggs/hen housed		159	175
Hatching eggs/hen housed	(50g minimum)	153	169
Peak hatchability	(%)	91	91
Average hatchability	(%)	85.8	85.1
Broiler chicks/hen housed		131.3	143.8
Feed from day-old to depletion (100 chicks hatched)	(kg) (lb)	38.4 84.7	38.9 85.7
Livability from day-old to depletion	(%)	88-90	88-90

		In Season	Out of Season
Female bodyweight (24 weeks)	(kg) (lb)	2.93 6.45	3.03 6.70
Female bodyweight (65 weeks)	(kg) (lb)	3.95 8.71	4.05 8.91

The data in this guide give an indication of what can be achieved. While performance can be substantially affected by flock management, diseases and other factors, the figures and graphs are based on many actual flock results obtained under good environmental and management conditions.

Variations above and below these levels may and probably will occur for more than one reason. For example, feed consumption can be significantly affected by the type of feed, energy level and house temperature. These data should not, therefore, be regarded as specifications or standards but as performance guidelines.

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1. REARING MANAGEMENT

Dark out rearing houses with effective light traps are essential to ensure predictable, repeatable, satisfactory lay performance.

1.1 FARM ISOLATION AND PREPARATION

The brooding farm should be as far as possible from older birds. Brood chicks on an all-in, all-out program. Avoid multi-age flocks. Ensure a good brooder house security program. The same person should not look after young chicks and older birds. Keep all visitors out.

The elimination or reduction of disease exposure begins with careful farm preparation. A complete farm clean-up program is essential, including thorough inspection of all equipment to make sure it is completely sanitized and operating correctly.

1. The house and equipment should be thoroughly cleaned and disinfected (refer to health and hygiene section).
2. Before the chicks arrive, pre-heat the house for at least 12 hours. Partial house brooding may be considered to conserve energy in some growing areas. Place no more than 500 chicks per individual hover brooder.
3. Cockerels should be brooded and fed separately from the pullets, stocking males at 4.2 birds/m² (2.50 ft²/bird) and females at 7 birds/m² (1.54 ft²/bird). This will help to maintain good litter conditions and allow the cockerels to express fully their potential frame size.
4. Start chicks at a temperature of 32 °C (90 °F) at chick level at the hover edge, with a house temperature of 27 °C (81 °F). With whole house brooding, do not exceed 31 °C (88 °F). Reduce temperature gradually to 21 °C (70 °F) by 28 days.
5. The house ventilation system must be capable of providing sufficient fresh air to maintain the birds in good health and remove excess ammonia, carbon dioxide, moisture, dust and heat. The system must be sufficiently flexible to cope with the changing needs of the birds. In cold weather it must deliver air to the birds without allowing them to become chilled. In hot weather the system must have sufficient capacity to prevent the temperature inside the house rising to excessive levels.

The minimum ventilation rate should be 0.5 m³/s (1,070 CFM) for 10,000 day-old chicks. In hot weather, a fast airspeed at bird level will help to control heat stress by reducing the effective air temperature (wind chill).

Tunnel ventilation houses should be designed to provide airspeed of at least 1.5 m/s (300 FPM) at bird level for breeders during rearing.

6. Give extra feeding and drinking space for the first few days of life, and use tepid water in chick founts or disposable plastic trays to encourage drinking. Avoid using cold water straight from the tap. Mechanical feed troughs should be in place and full.
7. Where possible rear flocks from different sources separately.
8. Start chicks on an ample depth of litter 10-15 cm (4-6 in) and do all possible to keep it friable.
9. Consult your veterinary adviser regarding vaccinations and health procedures. Ensure that all staff involved in vaccination are fully aware of the correct procedure.
10. Keep accurate records of feed consumption, mortality and all other relevant factors such as diseases, vaccinations and unusual circumstances.

11. Carry out a weekly, random 5% check weighing of the flock starting at 7 days of age to determine feed amounts. (Additional weighing can be carried out at 10, 17 and 24 days to assess bird weight gain.) Initially bulk weigh a sample of chicks, then from 28 days of age carry out individual bird weighing. A minimum of 80-100 birds should be weighed for each group which are fed together.
12. Isolate small-framed birds into separate pens to reduce competition for feed and so encourage growth. These smaller framed birds should be retained in their own pen or house until transfer (refer to the section on Transfer) and may need to be given the light stimulus when they are older than their sisters. Selection of small-framed birds may begin when chicks are 14 days of age to be completed by 28 days of age.
13. Systems used for feed and bird weighing must be regularly checked for accuracy and the ability to deliver the required feed amounts.
14. For the first 48 hours continuous lighting should be provided in all types of houses to help the chicks return to feed, water and heat. Follow the lighting recommendations set out in this guide.
15. At 56 days of age - and not before - the males can be selected to reduce their numbers to 11% of the total number of females prior to mating. A second selection of males should be completed, prior to mating, removing any retarded males. Males should be housed with the females by 140 days of age at a mating ratio of 10 males per 100 females. By 154 days the ratio should be 9.5 males/100 females.

Use of more males than these recommended numbers can lead to over-mating of females and fighting between males. Sexual maturity between males and females must always be in balance.

Inactive males should be removed throughout the life of the flock. As part of the daily management routine males which are overweight or with any indication of leg problems should be removed.

As a guide, 6.5 to 7 males per 100 females are adequate from 50 to 60 weeks.

16. **To improve uniformity and reduce stress within a flock, it is important that feed is distributed throughout the house within a maximum time of three minutes. Distribution times of 1-3 minutes are now achievable and preferred. Where hand feeding is adopted each pen must be fed within this time.**
17. Clearly identifiable sexing errors should be removed as they appear during the later part of the rearing period.
18. It is recommended that birds are wormed at 119 and 140 days with a proprietary wormer according to your veterinary adviser's instruction.
19. Keep visitors to an absolute minimum and note all visits in the record book.

2. LAYING PERIOD MANAGEMENT

1. Allow adequate drinker space, at least one circular drinker (400 mm) per 100 birds or 1 nipple per 8 birds. There should be a minimum of two drinkers for any one pen. Maintain water supply at all times at any cost. Lack of water even for short periods, will reduce egg size and irrevocably depress egg production.
2. At point of transfer to laying farm have a good depth of litter, at least 20-23 cm (8-9 in). Where rollaway nest systems are installed less litter may be required. Remove wet or caked litter rather than stirring and releasing ammonia fumes. Good litter management is vital, and will certainly assist fertility and provide better quality eggs for the hatchery.
3. The minimum ventilation rate for breeders during production should be 0.5 m³/s (1,070 CFM) per 1,000 birds. Tunnel ventilation systems should be capable of providing airspeed at bird level of at least 1.75 m/s (350 FPM).
4. Follow the lighting recommendations set out in this guide. Make absolutely certain that the light increases are carried out on time; if not, the onset of production may be delayed. Ensure adequate light intensity to avoid floor egg laying.
5. Light proof production houses, although not essential, will minimize the effects of natural changes in day length.

6. Manual nest boxes -

Allow an adequate number of nest boxes. One individual nest 30.5 x 30.5 x 30.5 cm (12 x 12 x 12 in) with a 12.5 cm (5 in) front litter board per four hens is recommended. The nest should be no more than 38-45 cm (15-18 in) from the litter. Avoid placing nest boxes on an outer wall. Nests should be littered and opened at the start of egg production and manual nest boxes lowered to discourage floor eggs. Measures can be taken, for instance using wire netting, to prevent the laying of eggs under the nest boxes. Time spent training the pullets is well worthwhile.

Mechanical nest boxes -

These can be of Communal and Individual types and information will be provided by the supplier on current best practices with their nests. Your Cobb technical service representative will discuss individual house layout problems and opportunities.

7. Within the house layout, a sequence of feed-water-nests is important to follow the natural progression of bird activity and encourage nest usage.
8. Egg production should commence 14 days after the first light increase.
9. Make absolutely sure that all sexing errors are removed. Failure to do this will result in a loss of performance and some colored broiler chicks. It may also cause mating damage to the females.
10. **Cull poor quality males and non-laying females throughout the laying period.**
11. Record and plot daily/weekly production, bodyweight and egg weight in order to monitor performance trends. Respond quickly to variations in feed quality or bird health.

2.1 FEEDING RECOMMENDATIONS

Detailed recommendations for feed types and their nutrient specifications, in rear and lay, are provided in the Cobb Breeder Nutrition Technical Profile.

Rearing: Feeding

Remember that your pullets' future performance is primarily determined during the rearing period. Implementation of the controlled growing program is the most critical factor in the life of your stock. Incorrect feed amounts, by mistake or by failure to weigh accurately can lead to overweight or underweight problems which may never be remedied.

1. Feeds should be given as follows:
 - Starter : Day old - 42 days (approx. 1,580 kg (3,483 lb) per 1,000 females, 2020 kg (4,453 lb) per 1000 males).
 - Grower : 43 days - 126 days.
 - Pre-Breeder : 127 days - 154 days.
 - Breeder : 155+ days.
2. During rearing aim to achieve the bodyweight highlighted in the tables on pages 11, 12 and 13. The feeding programs also shown on these pages will help you to achieve the bodyweight target.

The actual feed amounts must be determined according to the feed specifications and environment.
3. Allow adequate trough space at all times especially when the birds' feed allowance is controlled. As a guide, 15 cm (6 in) is the optimum for growing birds, but different systems have different requirements.
4. Feed the birds every day at the same time under supervision. Remember feed distribution should be completed in 1-3 minutes.
5. A scratch feed of pellets may be fed at the rate of 0.45-0.9 kg (1-2 lb) per 100 birds starting at 28 days of age. Take account of this in calculating the feed amounts.

(Note: For salmonella control no untreated feed should be given at any stage.)
6. Throughout the growing period feed clean insoluble grit once every two weeks. Introduce small amounts of chick size grit from day old, and then feed at the following rate:
 - 4-10 weeks : 0.45 kg (1 lb) per 100 birds - grower size grit
 - 10-20 weeks : 0.45 kg (1 lb) per 100 birds - hen-size grit.

2.2 TRANSFERRING STOCK FROM REARING TO PRODUCTION FARMS

The following points must be considered when planning the transfer procedure:

1. The laying house must be ready to receive the flock, with the feeders, drinkers and nest boxes fully operational, one week before the planned transfer date.
2. The production farm manager must have full details of essential rearing records before transfer to plan the unloading of stock.
3. Ensure that there are enough clean crates to move the whole flock at the start of each day.
4. The final selection and transfer of the males should be carried out 2 to 3 days before the transfer of the females.
5. It is important to place the smaller framed females into a separate house or pen on transfer to the laying farm. These birds may not be ready to accept the light stimulation at the same time as their sisters. In closed housing consider delaying lighting for such flocks.
6. The females must be carefully culled before they are moved to the laying house.
7. Move the birds at night or in the early morning to reduce stress.
8. The transfer can be a very stressful time for the birds and every effort should be taken to ensure that it is carried out smoothly. Plan the work in detail and handle the birds carefully.
9. A copy of the rearing records must be transferred with the stock on arrival at the farm.
10. The records should include details of transfer bird numbers, bodyweights and uniformity, feed amounts, light program, vaccinations and medications and any other relevant information to assist the production farm manager during the settling in period.
11. It is good practice to give additional feed before and after the birds have been moved. The amount of extra feed and the time when it is given will depend on the season and the distance travelled. It is important to ensure that the birds do not lose weight, condition or uniformity as a result of transfer. They must find feed and water quickly when they reach the laying house.
12. The feeders and drinkers in the laying house should be the same as those in the rearing house.
Do not, for example, rear birds on bell drinkers then transfer them to a laying house equipped with nipple drinkers.
13. Observe the birds closely, handling their crops, to make sure that they are all able to find feed and water.
14. In slatted houses the birds may be encouraged to use the slatted area by walking through the house frequently. Slats must not be higher than 45 cm (approximately 18 in).

2.3 PRODUCTION: FEEDING

1. From transfer increase female feed amounts weekly to achieve target bodyweights until 5% hen day production. Once 5% hen day egg production is achieved, increase feed according to hen day egg production. The actual feed levels given will be determined according to the nutrient levels in the ration and environmental conditions. Refer to page 15 section 4.4 for feeding recommendations.

- 2. Allow adequate feeder space, the optimum being 15 cm (6 in) per bird. Feed only when staff are present and in one continuous period. Feed distribution should be completed in 1-3 minutes. Poor feed distribution will have an adverse effect on in-lay performance.**

- 3. Maximum feed intake should be reached between 60% and 70% (hen day) egg production. The birds should be capable of sustaining peak production on 25-27 grams protein/bird/day and 465 Kcal ME/bird/day.**

The peak feed level will normally be between 16.0 kg (35.2 lb) to 16.8 kg (37.0 lb) per 100 pullets/day depending on the energy value of the ration. Discuss the energy intake with your technical services representative.

- 4. Post peak feeding / Feed reduction**

Peak production is determined when daily egg production has not increased for 5 consecutive days.

Under normal circumstances feed can be reduced by a minimum of 1 g/week after peak production to depletion.

This reduction should be made each week until the peak production feed amount has been reduced by 14%.

The feed reduction rate may be made faster or slower based on daily records of bodyweight trends, egg weight, rate of lay, temperature and daily feed clean up time.

- 5. Feed quality for breeding stock should be consistent. Frequent changes in formulation should be avoided.**
- 6. As in the rearing stage, an accurate method of feed weighing is essential. Feed measurement by volume is not satisfactory, and with the high cost of poultry feed wastage cannot be tolerated. Some form of weighing must be installed in the feeding system and regularly checked. Samples of feed (1-2 kg) as fed should be retained on the farm for at least 14 days to allow testing in the event of production problems.**
- 7. Most rations contain sufficient calcium to sustain peak production. It should not therefore be necessary to feed soluble grit if your ration contains the correct level of calcium.**
- 8. Throughout the production period feed insoluble grit once every two weeks at the following rate: 0.45 kg (lb) per 100 birds - turkey or hen - size insoluble grit.**
- 9. A scratch feed in the form of pellets can be beneficial to encourage mixing of the sexes. It should be fed late in the afternoon at the rate of 0.45-0.90 kg (1-2 lb) per 100 birds. Take account of this in calculating the feed amounts.**
- 10. Prevent feed wastage and contamination by vermin. Rats and mice represent a considerable disease risk as well as causing damage.**
- 11. Separate sex feeding is recommended for all flocks of Cobb 500 breeders. This technique keeps the male in a fit and active condition for longer, with the advantages of improved fertility, hatchability and lower feed consumption. Details of the recommended feed allowances for both females and males are given on pages 11, 12, 13 and 15. For situations in which it is not possible to adopt separate sex feeding the flock should be fed according to the female feed guide.**

3. LIGHTING PROGRAM MANAGEMENT

The response of chickens to light is a complex subject. The following paragraphs provide basic advice on lighting programs that are proven for Cobb 500 parents. Local conditions and housing types may necessitate the use of modified lighting programs, which should be discussed with your Cobb Technical Service representative.

The response of the hens to light stimulation is based on their condition, bodyweight and age. In light controlled housing, delay light stimulation if the flock still contains underweight birds. As a guide, 95% of the birds in the flock should have reached a weight of 1850 g (4.07 lb) before light increases are made. When transferring birds from dark-out rearing to open sided laying house the weight and body condition must be correct at time of transfer

Broiler breeder hens come into lay in response to increases in the daylength - when these are made at the appropriate time. Increase the daylength by adding hours to the early morning; for example, if the daylength is 8 hours and the lights come on at 08:00, after a daylength increase of 4 hours is given the lights should come on at 04:00.

The following recommendations for lighting programs are given for 3 situations;

- Dark-out rearing to dark-out production.
- Dark-out rearing to natural daylight production.
- Natural daylight rearing to natural daylight production.

3.1 DARK-OUT REARING HOUSES

Cobb 500 parents must be reared in lightproof housing. The light intensity in such houses must be less than 0.5 lux (0.05 ft candle) when the lights are switched off.

Open houses can be converted to dark out rearing by eliminating all areas that allow for light leakage using effective blackout curtains. Provision must then be made for sufficient fan capacity to allow for correct ventilation. Fans and air inlets must also be covered with adequate light traps.

3.2 DARK-OUT REARING TO DARK-OUT PRODUCTION

Dark-out houses should provide total light control and hence one rearing program can be used for all flock placements.

1. The chicks start on 24 hours of light reducing to eight hours by two to three weeks of age. The age at which 8 hours daylength is reached will depend on the growth rate.
2. The daylength remains at 8 hours to 20 weeks (140 days) of age when the step-up programs should be followed.
3. It is important to have the ability to control light intensity during both rearing and production. This can be achieved by changing the wattage of the light bulbs or using a dimmer system.
4. Birds grown in dark-out conditions are typically raised on a dark-out body weight guide. Birds raised in dark-out conditions but raised on non dark-out body weight targets may begin increases in light period one week earlier.

Modifications can be discussed with your Cobb technical services representative. It is important not to stimulate the flock if it still contains underweight birds.

Recommended lighting program for flocks reared in dark-out housing.

Age (weeks)	Age (days)	Light (hours)	Light intensity (lux)
1 to 3	Day-old to 21	Decreasing from 24 hours at day 1 to 8 hours by 14 to 21 days	Days 0-2 maximum light (>60 lux) reducing to 20 lux by day 7
3 - 20	21 -140	-	5 - 10
20	141	+4	40 - 60
21	148	+1	40 - 60
22	155	+1	40 - 60
23	162	+1	40 - 60
24	169	+1	40 - 60
25	176	-	40 - 60
26	183	-	40 - 60
27	190	-	40 - 60
27+	190+	-	40 - 60

3.3 DARK-OUT REARING TO NATURAL DAYLIGHT PRODUCTION

Restricted light or 'dark-out' growing can be accomplished in modified open houses by eliminating all areas that allow for light leakage using black-out curtains and controlled light intensity. Provision must then be made for sufficient fan capacity to allow for correct ventilation. Fans and air inlets must also be covered with light traps.

For a dark-out program to be effective the rearing house must be 100% light proof. Lights, fans and automatic curtain controls are required; alarms and automatic curtain releases should be included in case of power failure.

The chicks start on 24 hours light from day old reducing to 8-10 hours by 2-3 weeks of age. the daylength remains at 8-10 hours up to 21 weeks (147 days).

At transfer to open sided housing at 21 weeks (148 days) light should increase at least 4 hours depending on natural daylength at transfer to a maximum of 16 hours per week. Light intensity during the production period must be 80-100 lux (8-10 ft candle).

It is important to ensure that light intensity is uniform throughout the house, avoiding bright and dim spots.

3.4 NATURAL DAYLIGHT REARING TO NATURAL DAYLIGHT PRODUCTION

It is not recommended that Cobb 500 parents be reared in natural daylight houses. However, it is recognized that this production system is used in certain parts of the world and works well if the variation in natural daylength is small.

In open-sided and windowed houses, local day length conditions require that a specific program be adopted for each flock as agreed with the Technical Services representative. The following guidelines apply to all such programs:

1. The lighting program in the production period will be determined by the natural daylength at 140 days.
2. When increasing the daylength from 141 days, provide extra light at both the beginning and end of the natural day light period, to be certain that the intended daylength is achieved.
3. Light intensity in the production period must be 80-100 lux (8-10 ft candles) to ensure that the birds are positively stimulated by the additional light. Failure to provide adequate intensity for artificial light additions is the main reason why 'autumn' flocks are delayed when the natural daylength reductions override the inadequate stimulus from artificial lights.

Recommended program for open-sided housing according to natural daylength at 20 weeks (140 days)

Daylength (hours) at 140 days	Lighting program at age						
	126 days	133 days	141 days	148 days	155 days	162 days	169 days
16	Natural		17	17	17	17	17
15	Natural		17	17	17	17	17
14	Natural		16	17	17	17	17
13	Natural		15	16	17	17	17
12	Natural		15	16	16	16	16
11	Natural		13	14	15	16	16
10	Natural		13	14	15	16	16
9	Natural		12	13	14	15	16

4. BODYWEIGHT TARGETS AND FEED GUIDE

4.1 FEMALE IN SEASON (AND/OR DARK-OUT)

Age		Body Weight*		Feed/Day*		Key Points
days	weeks	g	lb	g/bird	lb/100/day	
	0-1			20	4.40	Chick Starter 19% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
7	1-2	150	0.35	35	7.75	
14	2-3	290	0.65	39	8.60	
21	3-4	400	0.85	42	9.25	
28	4-5	520	1.15	45	9.90	
35	5-6	620	1.35	48	10.60	
42	6-7	720	1.60	51	11.23	Developer 15% Protein 1260 Kcal/lb (2770 Kcal/kg) (11.60 MJ/kg)
49	7-8	820	1.80	52	11.45	
56	8-9	920	2.00	54	11.89	
63	9-10	1020	2.25	56	12.33	
70	10-11	1120	2.45	57	12.56	
77	11-12	1220	2.70	58	12.78	
84	12-13	1300	2.85	59	13.00	
91	13-14	1380	3.05	61	13.44	
98	14-15	1460	3.20	65	14.32	
105	15-16	1540	3.40	71	15.64	
112	16-17	1620	3.55	78	17.18	
119	17-18	1720	3.80	86	18.94	
126	18-19	1820	4.00	94	20.70	Pre-Breeder 16% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
133	19-20	1960	4.35	102	22.47	
140	20-21	2160	4.75	107	23.57	
147**	21-22	2420	5.35	112	24.67	
154	22-23	2585	5.70	117	25.77	
161	23-24	2750	6.05	122	26.87	Breeder 16% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
168	24-25	2930	6.45	127	27.97	
175	25-26	3080	6.80	Feeding for Production Refer to page 15		
182	26-27	3190	7.05			
189	27-28	3280	7.25			
196	28-29	3350	7.40			
203	29-30	3395	7.50			

Please refer to pages 16 to 19 for further feeding recommendations.

Recommendations concerning post peak feeding are made on page 15.

*Weights correspond to the weekly anniversary date in column 1 (days)

Feed amounts correspond to the age range in column 2 (weeks)

Weights for weeks 4 through 20 are off-feed weights

**From week 21 onwards (or when you change to everyday feeding), birds are weighed in the afternoon on a feed day. Weights reflect an on-feed weight

Feed amounts based on crumbled feed.

If mash feed is used, feed amounts may be higher during certain parts of rearing.

COBB 500 BREEDER MANAGEMENT GUIDE

4.2 FEMALE OUT OF SEASON (OR NO DARK-OUT)

Age		Body Weight*		Feed/Day*		Key Points
days	weeks	g	lb	g/bird	lb/100/day	
	0-1			20	4.41	Chick Starter 19% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
7	1-2	150	0.35	38	8.37	
14	2-3	290	0.65	44	9.69	
21	3-4	420	0.95	47	10.35	
28	4-5	540	1.20	49	10.79	
35	5-6	650	1.45	51	11.23	
42	6-7	750	1.65	53	11.67	Developer 15% Protein 1260 Kcal/lb (2770 Kcal/kg) (11.60 MJ/kg)
49	7-8	850	1.85	55	12.11	
56	8-9	950	2.10	56	12.33	
63	9-10	1050	2.30	58	12.78	
70	10-11	1150	2.55	59	13.00	
77	11-12	1230	2.70	60	13.22	
84	12-13	1310	2.90	61	13.44	
91	13-14	1390	3.05	64	14.10	
98	14-15	1475	3.25	68	14.98	
105	15-16	1560	3.45	74	16.30	
112	16-17	1660	3.65	81	17.84	
119	17-18	1770	3.90	89	19.60	
126	18-19	1900	4.20	97	21.37	Pre-Breeder 16% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
133	19-20	2060	4.55	105	23.13	
140	20-21	2260	5.00	111	24.45	
147**	21-22	2520	5.55	116	25.55	
154	22-23	2685	5.90	121	26.65	
161	23-24	2850	6.25	126	27.75	Breeder 16% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
168	24-25	3030	6.70	131	28.85	
175	25-26	3200	7.05	Feeding for Production Refer to page 15		
182	26-27	3300	7.30			
189	27-28	3400	7.50			
196	28-29	3475	7.65			
203	29-30	3525	7.75			

Please refer to pages 16 to 19 for further feeding recommendations.

Recommendations concerning post peak feeding are made on page 15.

*Weights correspond to the weekly anniversary date in column 1 (days)

Feed amounts correspond to the age range in column 2 (weeks)

Weights for weeks 4 through 20 are off-feed weights

**From week 21 onwards (or when you change to everyday feeding), birds are weighed in the afternoon on a feed day. Weights reflect an on-feed weight

Feed amounts based on crumbled feed.

If mash feed is used, feed amounts may be higher during certain parts of rearing.

COBB 500 BREEDER MANAGEMENT GUIDE

4.3 MALE

Age		Body Weight*		Feed/Day*		Key Points
days	weeks	g	lb	g/bird	lb/100/day	
	0-1			FULL		Chick Starter 19% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
7	1-2	150	0.35	FULL		
14	2-3	350	0.75	FULL		
21	3-4	500	1.10	60	13.22	
28	4-5	640	1.40	62	13.66	
35	5-6	800	1.75	65	14.32	
42	6-7	960	2.10	68	14.98	Developer 15% Protein 1260 Kcal/lb (2770 Kcal/kg) (11.60 MJ/kg)
49	7-8	1115	2.45	70	15.42	
56	8-9	1270	2.80	72	15.86	
63	9-10	1420	3.15	74	16.30	
70	10-11	1550	3.40	76	16.74	
77	11-12	1660	3.65	78	17.18	
84	12-13	1770	3.90	80	17.62	
91	13-14	1880	4.15	82	18.06	
98	14-15	1990	4.40	85	18.72	
105	15-16	2100	4.65	87	19.16	
112	16-17	2210	4.85	89	19.60	
119	17-18	2330	5.15	91	20.04	
126	18-19	2470	5.45	93	20.48	16% Protein 1300 Kcal/lb (2860 Kcal/kg) (11.97 MJ/kg)
133	19-20	2620	5.75	99	21.81	
140	20-21	2800	6.15	106	23.35	
147**	21-22	3060	6.75	113	24.89	
154	22-23	3210	7.10	120	26.43	
161	23-24	3360	7.40	125	27.53	
168	24-25	3495	7.70	129	28.41	
175	25-26	3630	8.00			
182	26-27	3760	8.30			
189	27-28	3880	8.55			
196	28-29	3950	8.70			
203	29-30	3995	8.80			

Please refer to pages 16 to 19 for further feeding recommendations.

Recommendations concerning post peak feeding are made on page 15.

*Weights correspond to the weekly anniversary date in column 1 (days)

Feed amounts correspond to the age range in column 2 (weeks)

Weights for weeks 4 through 20 are off-feed weights

**From week 21 onwards (or when you change to everyday feeding), birds are weighed in the afternoon on a feed day. Weights reflect an on-feed weight

Feed amounts based on crumbled feed.

If mash feed is used, feed amounts may be higher during certain parts of rearing.

COBB 500 BREEDER MANAGEMENT GUIDE

Adult

Age	In Season Female Body Weight		Out of Season Female Body Weight		Male Body Weight	
	g	lb	g	lb	g	lb
30	3440	7.56	3575	7.87	4041	8.90
31	3460	7.63	3595	7.93	4066	8.96
32	3480	7.67	3615	7.97	4092	9.01
33	3500	7.72	3635	8.01	4118	9.07
34	3520	7.76	3655	8.06	4144	9.13
35	3540	7.80	3675	8.10	4169	9.18
36	3560	7.85	3695	8.15	4195	9.24
37	3580	7.89	3715	8.19	4221	9.30
38	3600	7.94	3735	8.23	4247	9.35
39	3620	7.98	3755	8.28	4273	9.41
40	3640	8.02	3770	8.31	4298	9.47
41	3660	8.07	3785	8.34	4324	9.52
42	3675	8.10	3800	8.38	4350	9.58
43	3690	8.13	3815	8.41	4376	9.64
44	3705	8.17	3830	8.44	4401	9.69
45	3720	8.20	3845	8.48	4427	9.75
46	3735	8.23	3860	8.51	4453	9.81
47	3750	8.27	3875	8.54	4479	9.86
48	3765	8.30	3890	8.58	4504	9.92
49	3780	8.33	3905	8.61	4530	9.98
50	3795	8.37	3915	8.63	4556	10.04
51	3810	8.40	3925	8.65	4582	10.09
52	3820	8.42	3935	8.68	4607	10.15
53	3830	8.44	3945	8.70	4633	10.21
54	3840	8.47	3955	8.72	4659	10.26
55	3850	8.49	3965	8.74	4685	10.32
56	3860	8.51	3975	8.76	4711	10.38
57	3870	8.53	3985	8.79	4736	10.43
58	3880	8.55	3995	8.81	4762	10.49
59	3890	8.58	4005	8.83	4788	10.55
60	3900	8.60	4015	8.85	4814	10.60
61	3910	8.62	4020	8.86	4839	10.66
62	3920	8.64	4025	8.87	4865	10.72
63	3930	8.66	4030	8.88	4891	10.77
64	3940	8.69	4035	8.90	4917	10.83
65	3950	8.71	4040	8.91	4943	10.89

COBB 500 BREEDER MANAGEMENT GUIDE

4.4 FEEDING FOR PRODUCTION

When the flock reaches 5% daily production, a “program” to lead production with feed should be developed

The flock should be on peak feed by 60 - 70% daily production.

The program can be built by deducting actual feed at 5% from peak feed. Calculate an amount to increase for each 10% increase in egg production.

Feeding Program:

Till 5% HD production, feed according to bodyweight.

Calculating Production Feeding		
	g/bird	lb/100
Feed at 5% Daily Production:	130	28.6
Peak Food Amount:	166	36.6
Amount to Increase:	36	8.0
Number of Increases:	6	6
Amount of Feed to Increase per 10%	6	1.3

Egg Prod. HD	Standard		Alternative*	
	g/bird	lb/100	g/bird	lb/100
5%	130	28.6	130	28.6
15%	136	30.0	133	29.3
25%	142	31.3	136	30.0
35%	148	32.6	142	31.3
45%	154	33.9	150	33.0
55%	160	35.2	160	35.2
65%	166	36.6	166	36.6

* The Alternative is a “Progressive” Program

4.5 POST PEAK FEEDING / FEED REDUCTION

Peak production has been reached when daily egg production has not increased for 5 consecutive days.

Under normal circumstances feed can be reduced by a minimum of 1 g/bird/week (0.22 lb/100 birds/week) from peak production to depletion. These changes in feed allowance amount to a total reduction of approximately 14% between peak production and 60 weeks of age.

The rate of feed reduction must be based on daily records of bodyweight trends, egg weight, rate of lay, temperature and daily feed clean up time.

5. FEEDING METHODS

Feed distribution is key to achieving production targets. The appropriate feeding method will depend on the design of the feeding system and the quality of the feed. The best results are achieved where feed is distributed in less than 3 minutes with feeding space of 15 cm (6 in) per bird.

5.1 FLOOR PELLET FEEDING

This system of feeding offers a very useful alternative to mechanical feeding systems where trough space and distribution is limited.

The following points should first be considered:

1. *Day-old to 2 weeks* - provide crumbs in chick feeders
2 weeks - start to feed 2.5 mm x 7.0 mm pellets in pans or troughs
3 weeks - begin floor feeding distributing in lines around feeders
4 weeks - broadcast the pellets evenly over the entire floor area
6 weeks - introduce larger 3.2 mm x 9.0 mm pellets.
2. If 2.5 mm pellets cannot be obtained then they must be short cut < 5 mm.
3. The pellets must be fed daily.
4. The pellets must be hard and relatively dust-free, therefore limiting wastage.
5. Friable litter conditions are essential.
6. It has been observed that pellet-fed flocks can exceed the weight guide, and therefore the regular weighing and handling of stock is vital to the programming of the required feed amounts.
7. Pellets can be used up to 20 weeks of age having changed on to a Pre-Breeder Pellet at 18 weeks (127 days) of age.

5.2 ALTERNATIVE FEEDING PROGRAMS

1. Skip-a-day feeding

Skip-a-day feeding may be advantageous when feeding space is limited, since it provides feed over a longer period of time and allows timid birds at the lower end of the peck order to feed properly. When skip-a-day feeding is practiced beak trimming may be necessary to prevent picking and injury.

This program uses the same feed amounts as the feeding program, but from the start of week 4-5 through to the end of week 19-20 feed two days' mash as one feed on one day with scratch feed on the next day, and so on.

Example: days 43-49 (female program)

Day	
43	106 g/bird mash (23.3 lb/100 birds)
44	Scratch feed
45	106 g/bird mash (23.3 lb/100 birds)
46	Scratch feed
47	106 g/bird mash (23.3 lb/100 birds)
48	Scratch feed
49	106 g/bird mash (23.3 lb/100 birds)
50	Scratch feed

2. 'Five-two' program

There are a number of different feeding programs that may be used as alternatives to 'one-day-on, one-day-off'. These include 'four-three', 'five-two' and 'six-one' patterns. The following example is of a 'five-two' program.

Example: days 43-49 (female program)

Female daily feed allowance - 53 g (11.7 lb/100 birds)

Female weekly feed allowance - 53 g/bird/day (11.7 lb/100/day) x 7 days = 371 g (81.7 lb)

Divided by 5 feeds = 74 g/bird (16.3 lb/100 birds)

Begin the program for the start of week 4-5 to the end of week 19-20.

Day	
43	74 g/bird mash (16.3 lb/100 birds)
44	74 g/bird mash (16.3 lb/100 birds)
45	Scratch feed
46	74 g/bird mash (16.3 lb/100 birds)
47	74 g/bird mash (16.3 lb/100 birds)
48	Scratch feed
49	74 g/bird mash (16.3 lb/100 birds)

For all feeding methods an anti-coccidial agent should be present at the normal level until its removal at week 14-15 unless a coccidiosis vaccine is administered.

5.3 WATER

At temperatures up to 25 °C (77 °F) normal water consumption is 1.6 to 1.8 times the food intake; thus birds eating 100 g/day (22 lb/100/day) would require 160-180 litres/1000 birds (35-40 gallons/1000 birds). This factor should be used only as a guide (it is not a fixed allowance), so that deviations in consumption due to feed quality, temperature or bird health can be noted and appropriate management action taken.

When feed intake is controlled and especially when 'skip-a-day' feeding is practiced, over consumption of water can result in wet droppings and poor litter condition. To overcome this problem in moderate and cold weather it may be necessary to control access to water.

Water must be available at all times when the temperature is higher than 30 °C (85 °F), when there is disease, or a stress condition.

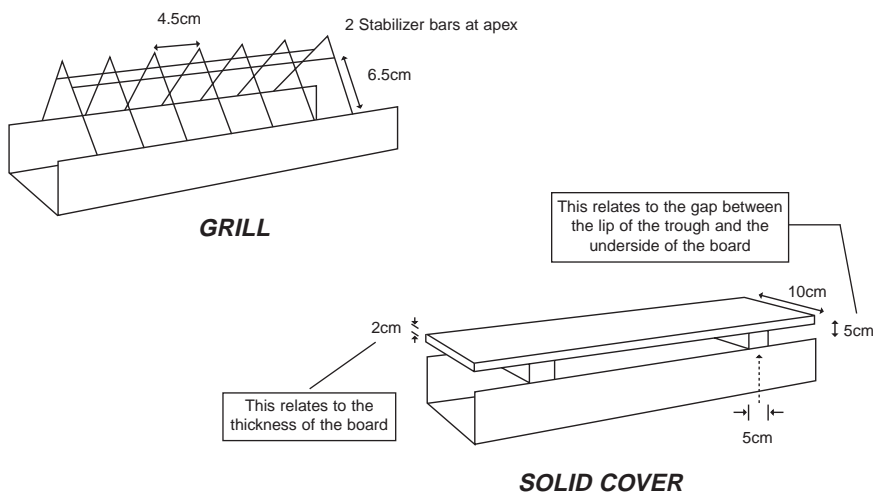
Never restrict intake of water during egg production.

5.4 SEPARATE SEX FEEDING METHODS

The basic principle of separate sex feeding is to exclude the males from the female feeder. A separate feeding system to control the amount of feed given to the males.

The normal method of exclusion is a grill placed on top of the track which controls access by the horizontal distance between the bars. Alternative methods use a solid cover/plastic half pipe for the track which restricts access vertically.

Pan or tube feeders are the most common male feeding systems. It is important to ensure equal amounts of feed are distributed to each pan and that the pans are suspended at the correct height. Male feeder pans must be high enough to make them inaccessible to the females without restricting access to the males. Tube feeders must be ballasted to stop them swinging.



The benefits of this technique are

- Better uniformity of males and females
- Improved control of the bodyweight of males and females
- Bodyweight is easier to control if males are not dubbed
- Opportunity to feed different rations to each sex
- Better control of feed amounts for both males and females
- Increased overall fertility and hatchability
- Maturity of males can be regulated
- Less need for "spiking" programs

6. ANALYSIS OF BIRD WEIGHTS

Assessing and maintaining evenness in flocks is critical and systems for monitoring the weight spread of a flock have been widely adopted. They are suitable for any age.

Test weight record (All birds penned in must be weighed)

Plotting the weight spread gives a measure of variation from the average weight. Assuming 100 birds are weighed and recorded, the spread in percentage terms from the average weight can be very easily seen. If 80% of the birds do not fall within $\pm 10\%$ of this weight, remedial action should be taken.

In the example scales with 20 g divisions are used and bird weights plotted on the chart. Average weight is 515 g. The range for $\pm 10\%$ is 464 to 567 i.e. 480 to 560 on the chart. Fifteen birds lie outside this range therefore 85% of the birds are within $\pm 10\%$.

Number of birds	g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	380																										
	400	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	420	X	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	440	X	X	X	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	460	X	X	X	X	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
-10% →	480	X	X	X	X	X	X	X	X	X	X	X	X	X	X	16	17	18	19	20	21	22	23	24	25		
Average →	500	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Target →	520	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	540	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
+10% →	560	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	580	X	X	X	X	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	600	X	X	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	620	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	640	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	

Select → '00 closest to expected average weight and mark the card accordingly

Date	--/--/--
Age	28d
House/Pen reference	--
Number of birds/pen	--
Number sampled	100
Target weight (g)	520
Average weight (g)	515
Coefficient of variation (%)	6.95
Percentage within $\pm 10\%$ of average weight	85

For a detailed analysis of weight spread the following calculations can be made.

Average weight of birds sampled

The more birds sampled, the more confident one can be that the sample indicates the true average weight of the whole group of birds. Using the example above:

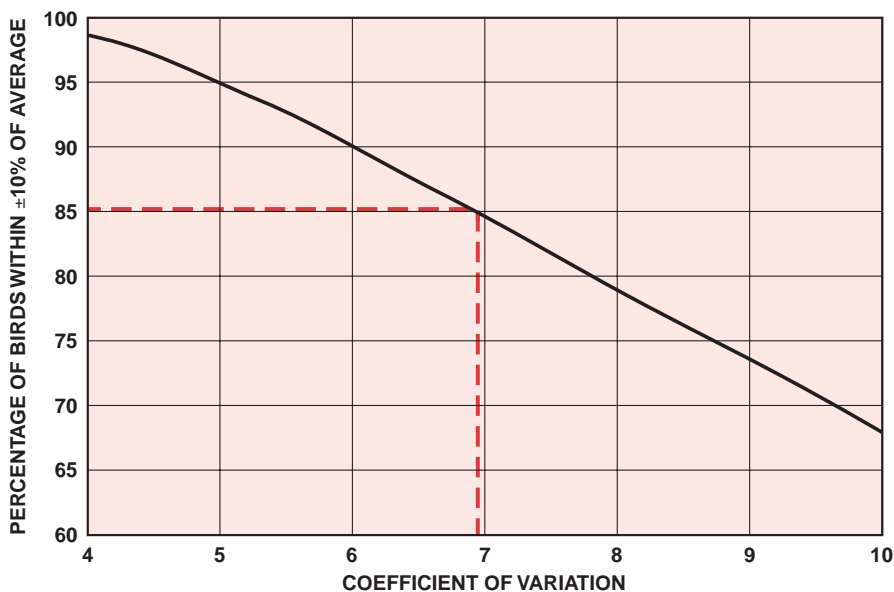
Total weight = 51500 g Average weight = 515 g

6.1 COEFFICIENT OF VARIATION

Variation within the group can be measured as standard deviation. Approximately 95% of all birds' bodyweight will lie within ± 2 standard deviations of the average weight. As this is a complicated statistical measurement the simpler term coefficient of variation (CV) can be applied in which the standard deviation is expressed as a percentage of the mean. The CV provides a quick and comparable measure of variation that can be used to assess the weekly change in uniformity.

The graph shows the relationship between the CV and the percentage of birds within 10% of the average weight. Well reared flocks will have a CV of less than 8%.

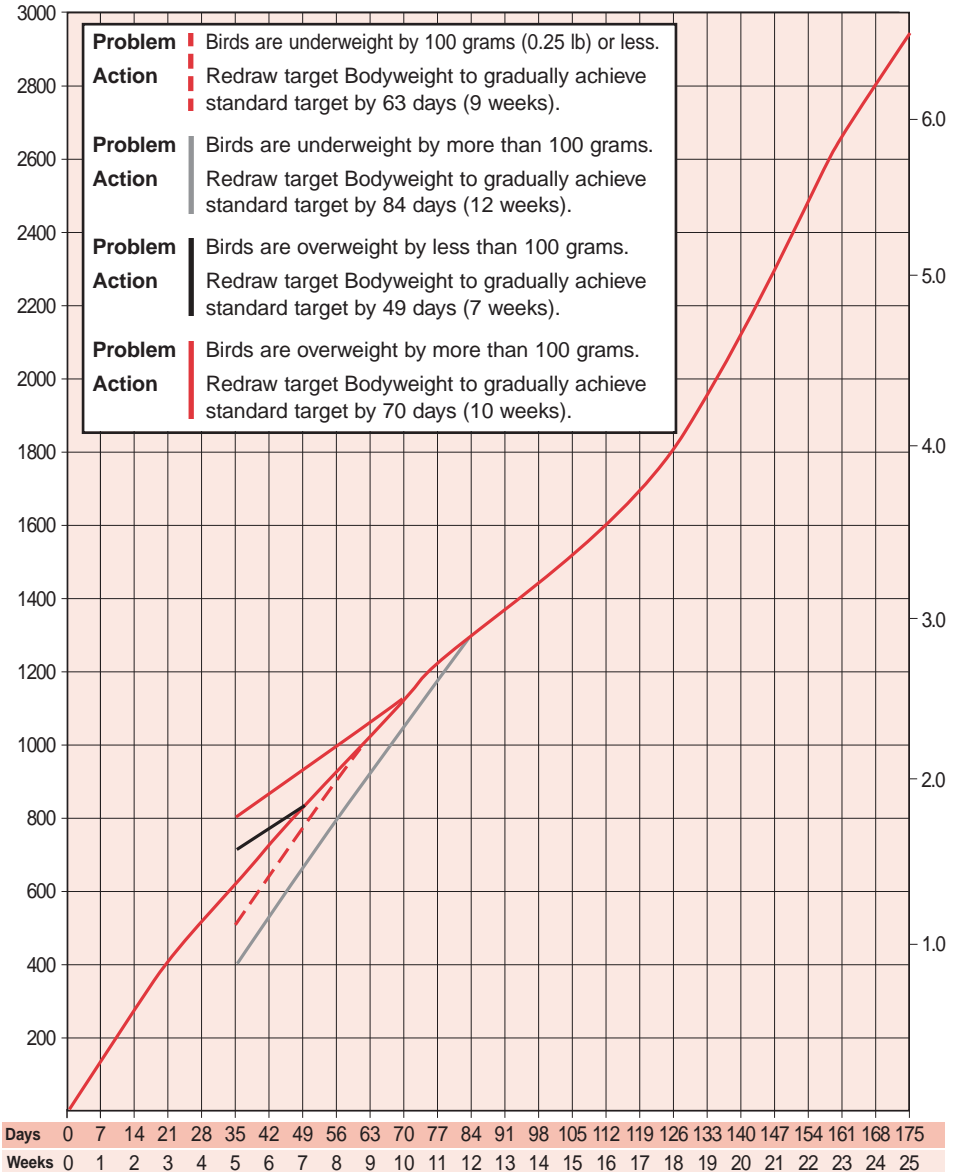
Using the example opposite, flocks in which 85% of birds are within 10% of the average have a CV of 6.95.



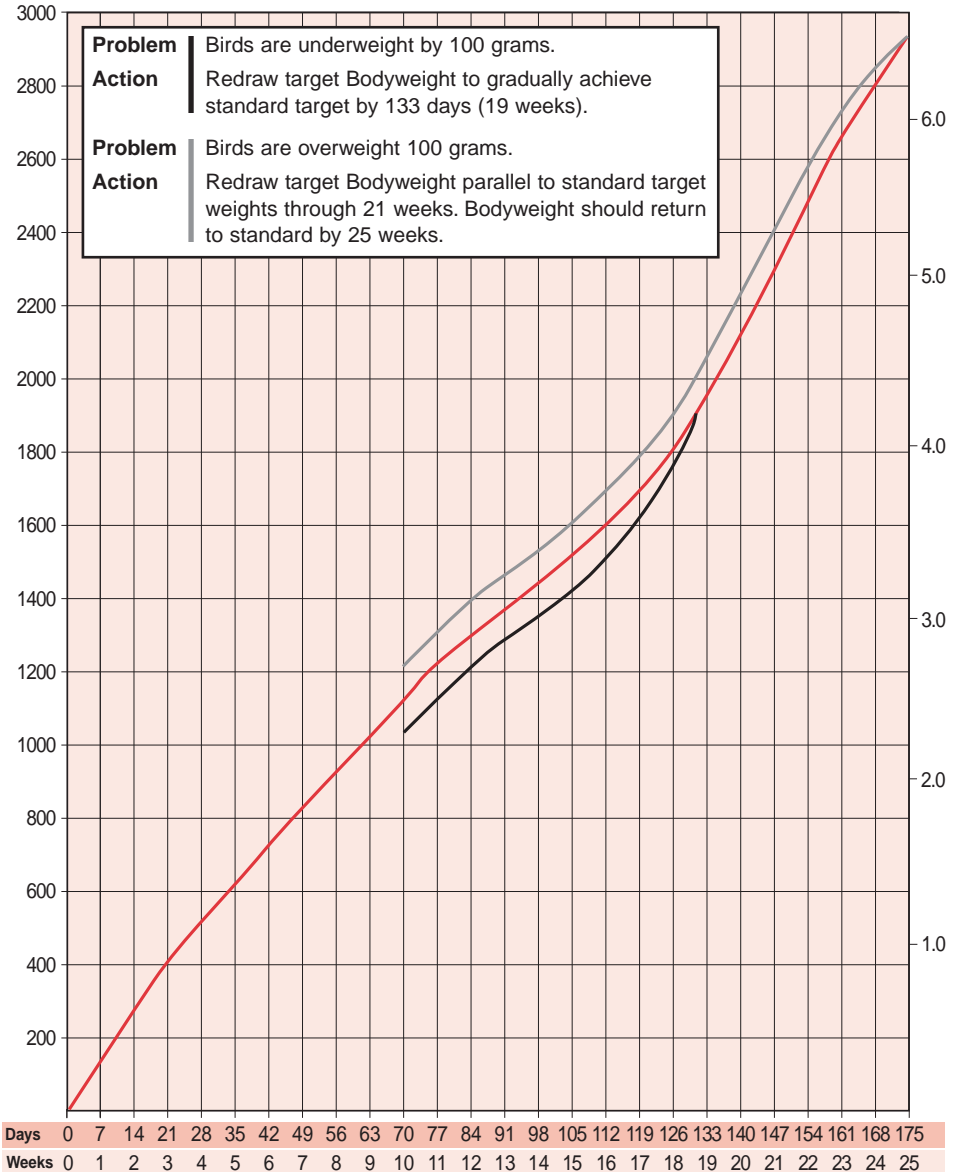
6.2 TROUBLESHOOTING BODYWEIGHT CONTROL

There may be occasions when flocks are not on the body weight target. Corrective action for such flocks should have a long-term rather than a short-term goal. Adjustments to the weight profile should ensure that pullets still achieve the proper development and condition for egg production. Examples of different approaches to resolving body weight issues are given on the following graphs.

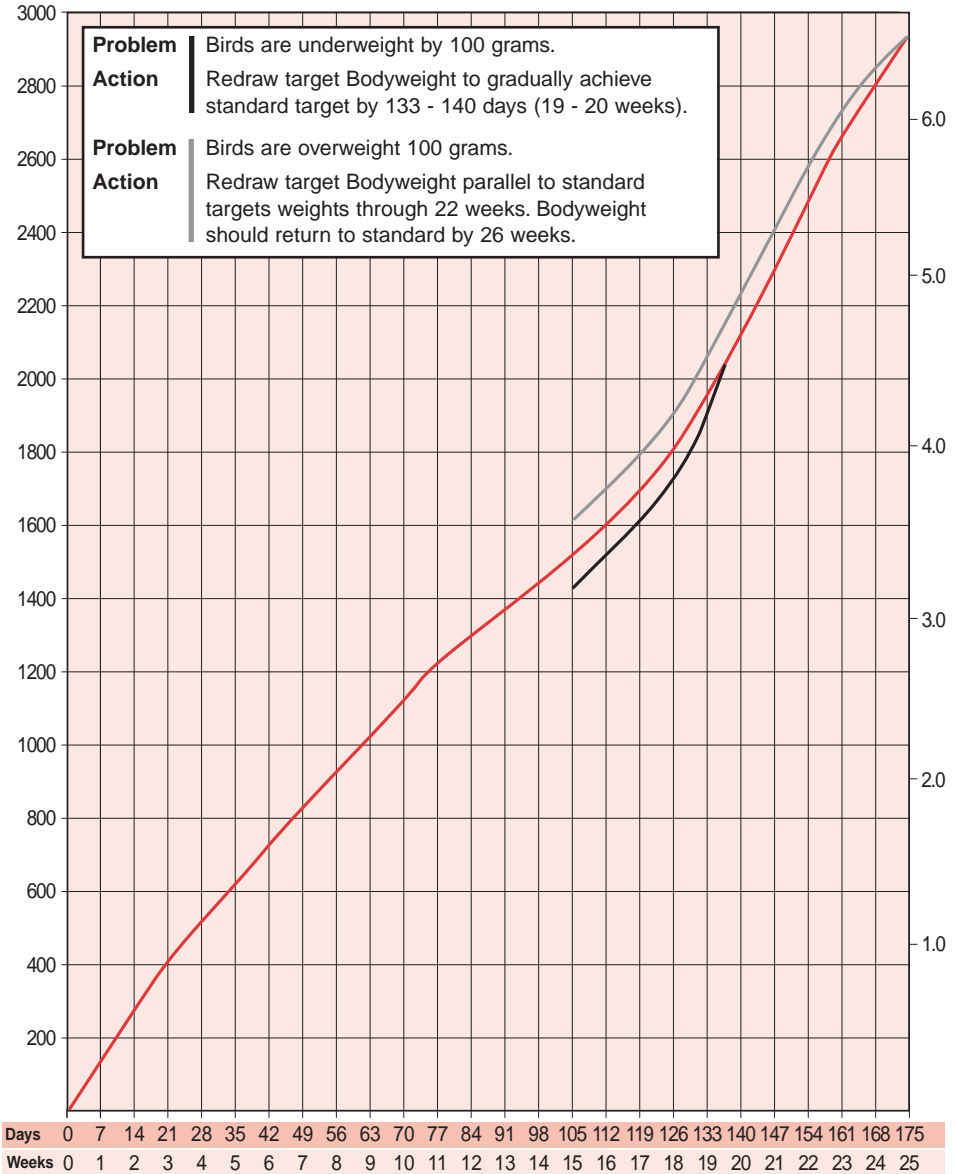
Flock weight off target at 5 weeks



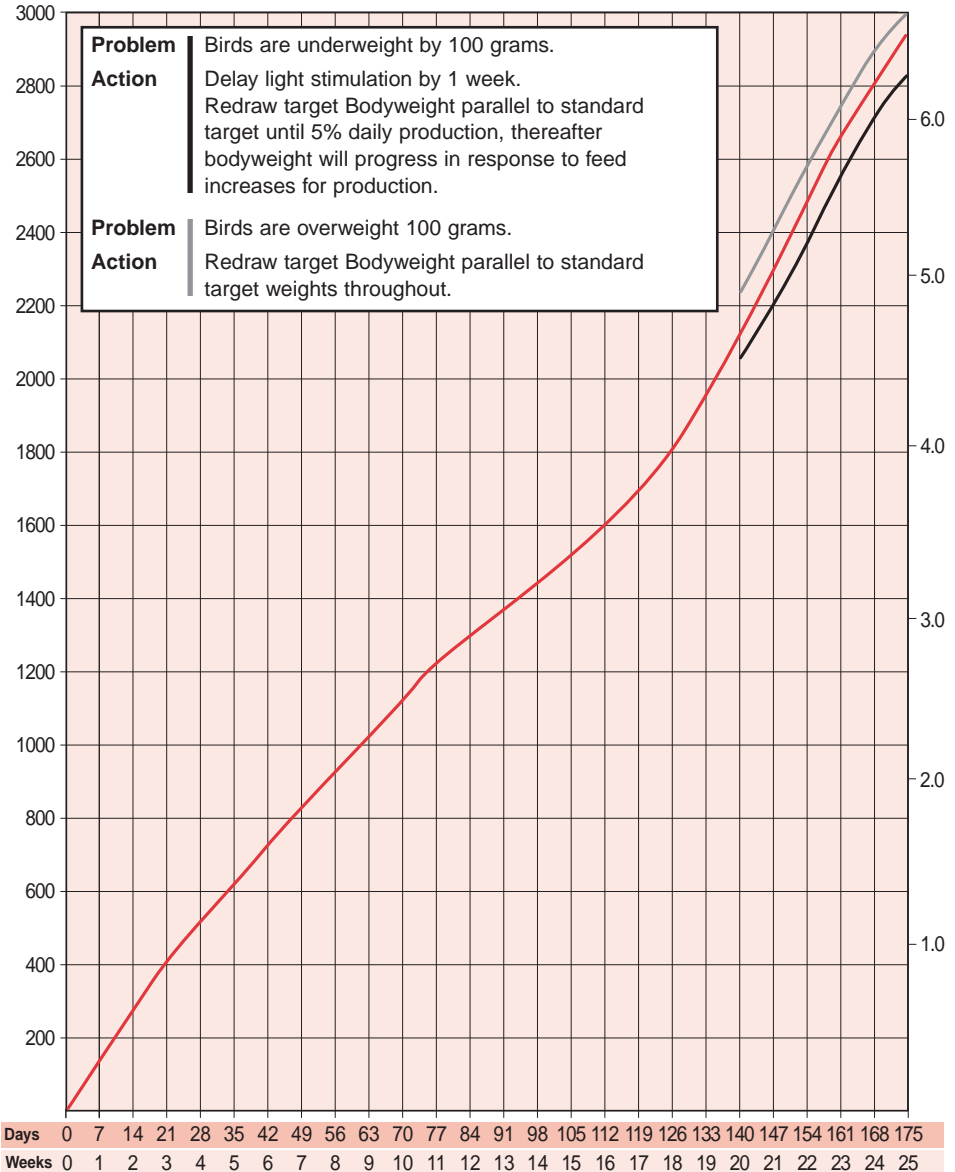
Flock weight off target at 10 weeks



Flock weight off target at 15 weeks



Flock weight off target at 20 weeks



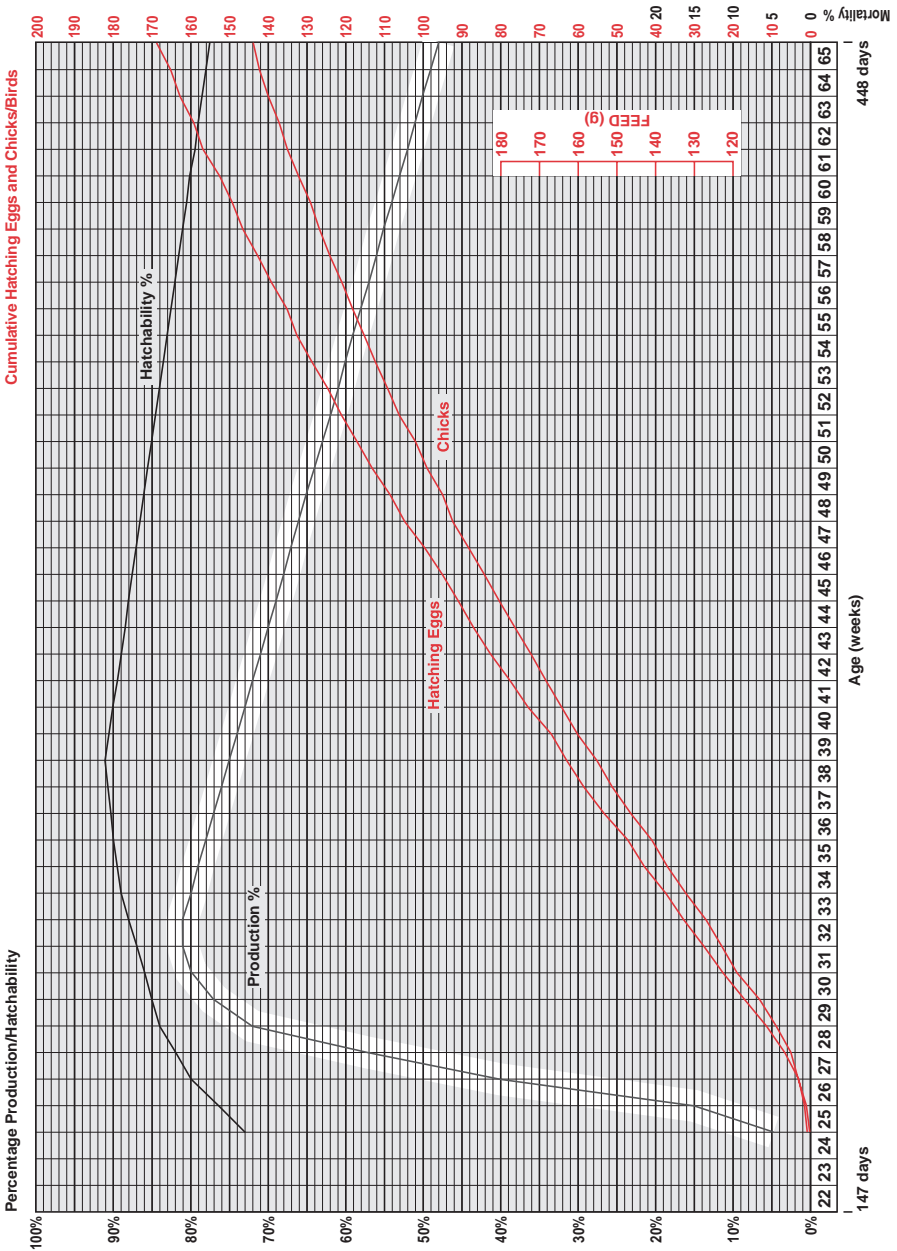
COBB 500 BREEDER MANAGEMENT GUIDE

7. BREEDER PERFORMANCE

Age	Females Housed	HD Prod. Percent	Total Eggs Per Week	Total Eggs (Cum)	Percent Hatch Eggs	Hatch Eggs Per Week	Hatch Eggs (Cum)	Hatch Percent	Chicks/Week	Total Chicks (Cum)
24	1000	5	0.35	0.35	40	0.14	0.14	73.0		
25	996	15	1.05	1.40	80	0.84	0.98	76.5	0.6	1
26	992	40	2.78	4.17	85	2.36	3.34	80.0	1.8	2
27	988	57	3.94	8.12	88	3.47	6.81	82.0	2.8	5
28	985	72	4.96	13.08	94	4.37	11.18	84.0	3.6	9
29	982	77	5.29	18.37	96	4.98	16.15	85.0	4.2	13
30	979	80	5.48	23.86	97	5.26	21.41	86.0	4.5	17
31	976	81	5.53	29.39	98	5.37	26.78	87.0	4.6	22
32	974	81	5.52	34.91	98	5.41	32.19	88.0	4.8	27
33	972	80	5.44	40.36	98	5.33	37.53	89.0	4.7	32
34	970	79	5.36	45.72	98	5.26	42.79	89.5	4.7	36
35	968	78	5.29	51.00	98	5.18	47.96	90.0	4.7	41
36	967	77	5.21	56.22	98	5.11	53.07	90.0	4.6	46
37	965	76	5.13	61.35	98	5.03	58.10	90.5	4.6	50
38	963	75	5.06	66.41	98	4.95	63.06	91.0	4.5	55
39	961	74	4.98	71.38	98	4.88	67.94	90.5	4.4	59
40	959	73	4.90	76.28	98	4.80	72.74	90.0	4.3	63
41	957	72	4.82	81.11	98	4.73	77.47	89.5	4.2	68
42	955	71	4.75	85.85	98	4.65	82.12	89.0	4.1	72
43	953	70	4.67	90.52	98	4.58	86.69	88.5	4.1	76
44	951	69	4.59	95.12	98	4.50	91.20	88.0	4.0	80
45	949	68	4.52	99.63	98	4.43	95.62	87.5	3.9	84
46	947	67	4.44	104.08	98	4.35	99.97	87.0	3.8	87
47	945	66	4.37	108.44	98	4.28	104.25	86.5	3.7	91
48	944	65	4.30	112.74	98	4.21	108.46	86.0	3.6	95
49	942	64	4.22	116.96	98	4.14	112.60	85.5	3.5	98
50	940	63	4.15	121.10	98	4.06	116.66	85.0	3.5	102
51	938	62	4.07	125.17	97	3.95	120.61	84.5	3.3	105
52	936	61	4.00	129.17	97	3.88	124.49	84.0	3.3	108
53	934	60	3.92	133.09	97	3.81	128.29	83.5	3.2	111
54	932	59	3.85	136.94	97	3.73	132.03	83.0	3.1	115
55	930	58	3.78	140.72	97	3.66	135.69	82.5	3.0	118
56	929	57	3.71	144.42	97	3.60	139.28	82.0	2.9	121
57	927	56	3.63	148.06	97	3.52	142.81	81.5	2.9	123
58	925	55	3.56	151.62	97	3.45	146.26	81.0	2.8	126
59	923	54	3.49	155.11	97	3.38	149.65	80.5	2.7	129
60	921	53	3.42	158.53	97	3.31	152.96	80.0	2.7	132
61	919	52	3.35	161.87	97	3.24	156.21	79.5	2.6	134
62	917	51	3.27	165.14	97	3.18	159.38	79.0	2.5	137
63	916	50	3.21	168.35	97	3.11	162.49	78.5	2.4	139
64	914	49	3.14	171.49	97	3.04	165.53	78.0	2.4	141
65	912	48	3.06	174.55	97	2.97	168.50	77.5	2.3	144

These performance guidelines are based on many actual flock results obtained under good environmental and management conditions.

COBB 500 BREEDER MANAGEMENT GUIDE



8. EGG WEIGHING

There are considerable advantages in weighing a sample of eggs each day. The result of this will give early indications of stress brought on by disease, nutritional deficiencies, water shortage, temperature extremes etc.

The weights shown on the opposite page should be expected from a normal Cobb 500 flock where our recommendations of bodyweights, feed levels and ration specifications have been followed.

Weigh at least 90 eggs daily, immediately following the mid-morning collection, excluding only double-yolked and cracked eggs. Rather than sampling once a week, weighing daily will give a much more accurate indication of potential problems which must be investigated immediately.

Common causes of incorrect egg weight

Overweight

- Overfeeding
- Above normal levels of energy or protein

Underweight

- Underfeeding
- Below normal levels of energy or protein
- Shortage of water
- Disease
- Presence of parasites
- Extreme house temperatures

Total weight - all eggs laid (Excluding only double-yolked eggs)

Age (weeks)	Weight (g)	Age (weeks)	Weight (g)
24 (168 days)	48.2	43	65.4
25	50.0	44	65.8
26	52.8	45	66.1
27	55.0	46	66.3
28	56.2	47	66.5
29	57.1	48	66.7
30	57.9	49	66.9
31	58.7	50	67.1
32	59.5	51	67.3
33	60.3	52	67.5
34	61.0	53	67.7
35	61.7	54	67.8
36	62.4	55	67.9
37	63.0	56	68.0
38	63.4	57	68.1
39	63.8	58	68.2
40	64.2	59	68.3
41	64.6	60	68.4
42	65.0		

9. HATCHING EGG MANAGEMENT

9.1 KEY POINTS FOR THE FARM

Optimum hatchability and chick quality can only be achieved when the egg is held under optimum conditions between laying and setting in the incubator. Remember that a fertile egg contains many living cells. Once laid, its potential to hatch can at best be maintained, not improved. If mishandled, hatchability will quickly deteriorate.

1. Nests should be kept well filled with clean shavings. In the early stages the pullets will tend to scratch them out; persevere, they will soon lose the habit.
2. Collect eggs at least four times daily. An additional collection during peak production periods would be beneficial. Egg temperatures within the nest, particularly during the summer months, may be similar to those in an incubator. If eggs are not regularly collected and cooled down to storage temperature, preincubation and embryo development will begin. This can increase the number of early dead germs and reduce hatchability. Egg collection from mechanical nests should be timed to avoid the risk of preincubation.
3. Use of floor eggs depresses hatchability. Under no circumstances should these eggs be transferred to the nest boxes. They should be collected and packed separately from nest eggs, and clearly identified. If they are to be incubated, they should be treated separately.
4. Wash hands before and after each egg collection, and before and after handling floor eggs.
5. Prevent hair cracks by handling eggs carefully at all times; if wire baskets are used do not fill them more than two-thirds full.
6. Take care with egg grading. During the early production period, check weight to select hatching eggs.
7. Remove and discard eggs unsuitable for hatching. These are:
 - Dirties
 - Cracks
 - Small - less than 50 g or hatchery policy
 - Very large or double yolked
 - Poor shells - but any shell color should be acceptable for hatching
 - Grossly mis-shapen
8. Place hatching eggs carefully into the setter tray or transport tray, small (pointed) end downwards.

- 9.** Sanitize all hatching eggs, either by fumigation with formaldehyde; or by dipping or spraying with a solution of sodium hypochlorite. Dipping eggs in a solution of hypochlorite at a concentration of 500 ppm (parts per million) available chlorine at a temperature of 43.3 °C (110 °F) for a period of two minutes has been found extremely effective in reducing the number of organisms on egg shells to an acceptable level. Alternatively, quaternary ammonium type products can be used with hypochlorite solutions in proprietary equipment. Either of these procedures is effective only if the correct chemical concentration and temperature are maintained. Simple test kits are available to check chemical concentration. These procedures are suitable for clean eggs only. Floor eggs or dirty eggs should not be treated in this manner.
- 10.** Store the eggs in a separate room (see table on page 39) in which the temperature and humidity are controlled.
- 11.** Keep the egg handling room clean and tidy. Maintain good vermin control in your egg store. Refuse to accept dirty egg containers and trolleys from the hatchery and take care of them while on your premises.

COBB 500 BREEDER MANAGEMENT GUIDE

9.2 BREEDER FLOCK FERTILITY AND HATCHABILITY

Age in Weeks	Hatchability (%)		Fertility (%)		Hatch of fertiles (%)		Chick No./hen housed	
	Weekly	Cumulative	Weekly	Cumulative	Weekly	Cumulative	Weekly	Cumulative
24	73.0	73.0	86.0	86.0	84.9	84.9	0.10	0
25	76.5	75.8	88.6	88.1	86.3	86.0	0.64	1
26	80.0	78.8	91.0	90.0	87.9	87.5	1.89	3
27	82.0	80.4	91.7	90.9	89.4	88.5	2.84	5
28	84.0	81.8	92.4	91.5	90.9	89.4	3.67	9
29	85.0	82.8	93.0	92.0	91.4	90.0	4.23	13
30	86.0	83.6	93.7	92.4	91.8	90.5	4.53	18
31	87.0	84.3	93.9	92.7	92.7	90.9	4.67	23
32	88.0	84.9	94.1	93.0	93.5	91.3	4.76	27
33	89.0	85.5	94.3	93.2	94.4	91.7	4.75	32
34	89.5	86.0	94.5	93.3	94.7	92.1	4.70	37
35	90.0	86.4	94.7	93.5	95.0	92.4	4.66	41
36	90.0	86.8	94.9	93.6	94.8	92.7	4.60	46
37	90.5	87.0	94.8	93.7	95.5	92.9	4.55	51
38	91.0	87.2	94.7	93.8	96.1	93.0	4.51	55
39	90.5	87.4	94.7	93.9	95.6	93.1	4.41	60
40	90.0	87.5	94.6	93.9	95.1	93.2	4.32	64
41	89.5	87.6	94.5	93.9	94.7	93.3	4.23	68
42	89.0	87.6	94.4	94.0	94.3	93.2	4.14	72
43	88.5	87.6	94.3	94.0	93.8	93.2	4.05	76
44	88.0	87.6	94.2	94.0	93.4	93.2	3.96	80
45	87.5	87.5	94.2	94.0	92.9	93.1	3.87	84
46	87.0	87.5	94.1	94.0	92.5	93.1	3.79	88
47	86.5	87.4	94.0	94.0	92.0	93.0	3.70	92
48	86.0	87.3	93.9	94.0	91.6	92.9	3.62	95
49	85.5	87.2	93.8	94.0	91.2	92.8	3.54	99
50	85.0	87.1	93.7	94.0	90.7	92.7	3.45	102
51	84.5	87.0	93.6	94.0	90.3	92.6	3.34	106
52	84.0	86.9	93.4	94.0	89.9	92.4	3.26	109
53	83.5	86.8	93.2	93.9	89.6	92.4	3.18	112
54	83.0	86.6	93.0	93.9	89.2	92.2	3.10	115
55	82.5	86.5	92.9	93.9	88.8	92.1	3.02	118
56	82.0	86.4	92.7	93.9	88.5	92.0	2.95	121
57	81.5	86.2	92.5	93.8	88.1	91.9	2.87	124
58	81.0	86.1	92.3	93.8	87.8	91.8	2.80	127
59	80.5	85.9	92.2	93.7	87.3	91.7	2.72	129
60	80.0	85.8	92.0	93.7	87.0	91.5	2.65	132
61	79.5	85.6	91.4	93.7	87.0	91.4	2.58	135
62	79.0	85.5	90.8	93.6	87.0	91.4	2.51	137
63	78.5	85.4	90.2	93.5	87.0	91.3	2.44	140
64	78.0	85.2	89.6	93.5	87.1	91.2	2.37	142
65	77.5	85.1	89.0	93.4	87.1	91.1	2.30	144

10. HEALTH AND HYGIENE

10.1 BIOSECURITY ON THE FARM

Good biosecurity must encompass all the operations carried out by a producer of breeding stock. Procedures to prevent the introduction and spread of disease or contamination must be put in place for feed production, farm operations, hatchery, general maintenance and personnel. A breakdown in any single area will endanger the whole biosecurity program.

The following paragraphs outline the biosecurity measures that must be implemented at farm level.

- Choose an isolated site when developing new breeder farm facilities.
- Farms should contain flocks of a single age. As a general rule the distance between flocks of different ages should be no less than 300 meters (1000 ft).
- Each farm must have a perimeter fence to prevent unauthorized entry of people, vehicles and animals.
- Any vehicle, including feed delivery and egg collection vehicles, that enter the farm must be washed and disinfected at the gate.
- All farm workers and any other personnel who need to enter the farm should shower and change into a clean uniform. Shower facilities can be a biosecurity risk - they must be kept clean!
- Uniforms and work clothing should be color coded to help control personnel movement between different farms or age groups.
- All personnel should be regularly screened for salmonella infection.
- All personnel should show their biosecurity clearance on entering the farm.
- No other poultry, livestock or domestic pets of any kind may be allowed on breeder farms.
- All buildings must be vermin proof.
- A vermin control program should be practiced at all times. It is important to maintain a clean, rubbish free environment. Rotate brands of bait frequently to prevent vermin developing resistance. Any spilled feed should be cleaned up immediately.
- Concrete floors are recommended for all houses.

Breeder farm disinfection schedule

1. All removable equipment and fittings should be taken out of the building and soaked in clean water in a tank or pit. After a thorough soaking they should be cleaned with a pressure washer. Once all dirt has been removed, they should be soaked in a disinfectant solution at the correct dilution as recommended by the manufacturer. Use an officially approved disinfectant.
2. Having stripped the house, brush the dust down so that it is removed with the litter, ideally using an industrial vacuum cleaner.
3. Remove the litter from the house on covered transport and away from the site.
4. Pressure wash suitable surfaces of the house with clean water, paying particular attention to air inlets, fan shafts and concrete floors.

5. Use the pressure washer on the outside of the fan shafts and air inlets. It is advisable to wash off the dust that accumulates on the roof and in the gutters. If left, this is not only a source of contamination but will cause the roof to deteriorate.
6. At the end of each flock, bag off any surplus feed in the bulk bins and remove from the site. The bins should then be thoroughly cleaned out and fumigated by the most appropriate method, according to the age and design of the bins.
7. When the interior is clean, add disinfectant to the water and pressure wash the entire house. Again, it is advisable to disinfect the areas of the roof surrounding the fan shafts and the gutters.
8. Drain the entire water system of the house and flush pipes out several times to remove any debris that might block valves. Finally, flush the whole system out with a sanitizing solution, preferably quaternary ammonia (quaternary sterilizer). Make sure that all trace of disinfectant is removed as it can impair the future use of live vaccines.
9. When the floor is dry, spray the floor and the sidewalls with a disinfectant of the cresylic acid type diluted in diesel oil or paraffin. It is advisable to spray an area of 6 m around the house with the disinfectant solution.
10. When the house interior is dry, put in the litter and set up the equipment. Then close and warm the house to 21 °C (70 °F) and fumigate/fog with formaldehyde gas (see details on fumigation shown on pages 34-35). This procedure should be carried out at least 48 hours before restocking.
11. After 24 hours, neutralize the gas and then open up the house and fully ventilate.
12. Include the egg room, feed store and changing room in the cleaning and disinfecting procedures.
13. In some cases it may be necessary to disinfect the house using an insecticide. Follow the manufacturer's instructions and introduce the application into the disinfection schedule as recommended.
14. It is recommended that dead birds be disposed of by incinerating the carcasses on farm.
15. Keep a record of all visitors.

Disinfection: Step by step

- Empty house, and preferably site, of all poultry.
- Clean out all organic matter and remove far off site.
- Remove all portable equipment for cleaning and disinfecting outside building.
- Wash down all the inside surfaces with heavy-duty detergent sterilizer, under pressure if possible.
- Apply disinfectant with guaranteed activity against all viruses, bacteria and parasites that can infect poultry.
- Use an insecticide and rodenticide where these vectors of disease are present.
- Fumigate with formaldehyde - active material.
- Replace equipment, put down litter and preferably fumigate again before house is re-stocked.

Remember:

- Hygiene is your insurance policy.
- No disinfectant is sufficient in itself. All waste matter must be removed before applying the disinfectant.
- It is impossible to sterilize a house but it is possible to reduce the number of pathogens to an insignificant level.
- Maintain a rigorous vermin control policy.
- Keep the doors shut at all times to prevent re-introduction of vermin and other contaminants.

10.2 FUMIGATION

Formaldehyde has been used for many years as a comprehensive fumigant. The environment during fumigation is critical to its efficiency, and these are the points to follow:

1. Increase relative humidity to 70-80%.
2. Heat house to 21 °C (70 °F) as formaldehyde gas has a high temperature coefficient.
3. Wash down all surfaces or place pans of water in the house, so increasing the relative humidity and gaining maximum benefit from both the gaseous actions of formaldehyde and its condensation into a polymerized form.
4. The house should be sealed and left to cool for 24 hours after fumigation, thus promoting uniform condensation.

10.3 FUMIGATION METHODS

Formalin and potassium permanganate

This method produces a violent chemical reaction that generates considerable heat and releases formaldehyde gas. Use 1 litre per 25 m³ (40 fl oz / 1000 ft³) formalin in the ratio of three parts formalin to two parts of potassium permanganate. Because of the violent chemical reaction, never use more than 1.2 litres (2 pints) of formalin in any one container. The container should have deep sides (at least 3 times the depth of the chemicals, with a diameter equal to the height) to prevent the mixture bubbling over. The formalin must be placed on concrete or metal, and not on shavings or any other inflammable material.

In practice, first calculate the cubic capacity of the house, e.g. 55 m x 10 m x 3.1 m = 1705 m³ (60,210 ft³)

This would require

- 68.2 litres (2400 fl oz or 120 pints) of formalin
- 60 containers
- 45.36 kg (100 lb) of potassium permanganate

Place 760 g (27 oz) of potassium permanganate into each container, preferably with two operators for safety. Start at the far end of the house placing as quickly as possible 1.2 litres (2 pints) of formalin into each container. Operators should wear a respirator throughout the entire procedure.

Heating Solid Paraformaldehyde

This is probably the most convenient method of producing formaldehyde gas. Paraformaldehyde prills are heated to a temperature of 218 °C (425 °F); generally 1 kg of prills will be sufficient for 300 m³ (1 lb of prills for 5000 ft³). If the heating device is fitted with a time switch, this system can be fully automatic. Always follow the manufacturer's instructions.

Formalin Vapor

A mixture of equal parts of water and formalin dispersed as an aerosol is a very efficient method. Use 28 ml of formalin per 25 m³ mixed with 28 ml of water, or 5 fl oz of formalin per 1000 ft³ mixed with 5 fl oz of water. This should be generated as an aerosol using the necessary equipment. In each house it may be necessary to use more than one generator or employ some system of removing the generator and refilling. There are several companies providing such a service to the poultry industry.

Precautions - Formalin solution and formaldehyde gas both represent a hazard to human and animal life. Operators must be provided with and wear suitable protective clothing, respirators, eye shields and gloves and should be aware of current legislation affecting these products.

10.4 SALMONELLA AND MYCOPLASMA CONTROLS

It has been clearly demonstrated that under normal circumstances the Mycoplasma group of organisms can remain latent in the chicken without causing clinical disease. Should the chicken be placed under stress, for instance through disease, the organisms can become active. By eradicating these latent organisms from the breeder, the resultant progeny are more able to achieve optimum performance. All Cobb breeding stock is derived from flocks that have been consistently tested negative for antibodies to *M gallisepticum* and *M synoviae*. To maintain freedom the following rules are important:

1. All houses must have concrete floors to ensure effective cleaning and disinfection.
2. Only farm personnel should have regular access to the pens. Farm personnel should only visit stock for which they are responsible and not visit other farms.
3. All personnel should shower and change clothes between visits to different houses. A different set of footwear must be worn in each house.
4. A complete set of clean protective clothing and boots must be provided for flock supervisors and visitors.
5. A disinfectant foot dip and brush for cleaning footwear, wash hand basin, soap or sanitizer and paper towel must be provided at the entrance to each house.
6. Keep all houses locked to prevent unauthorized entry.

10.5 VACCINATION

The main purpose of a vaccination program is to prevent losses from a specific disease. The usual method is to provide immunity by exposure with a disease agent of less pathogenicity than the field strains of the disease and provide immunity. The scheduling of a vaccination program should be such that it allows the infection to occur at an age in the flock's life that will cause the least economic loss. Vaccination is a necessary stress placed on the birds, therefore pay particular attention to these flocks to help reduce this stress.

It is not possible to recommend a specific vaccination program for poultry in all areas of the world. Consult your local poultry veterinarian for a program that meets the disease challenge in your geographical area.

1. Only vaccinate healthy birds.
2. Minimize stress following vaccination by careful flock management.
3. Read the label and follow the manufacturers' instructions for vaccine reconstitution, dilution and administration.
4. The vaccine refrigerator should be located in a clean and secure area. Keep vaccines at the manufacturers recommended temperature, avoiding heat and exposure to direct sunlight.
5. Do not use out-dated vaccines.
6. Use the full dosage; do not dilute the vaccines.
7. Do not save opened bottles for use at a later date.
8. All used and open vaccine containers should be disposed of in a correct manner following each vaccination to prevent accidental spread of the virus.
9. Shake the vaccine well prior to administration and regularly during the operation.
10. Change needles every 500 doses to ensure that needles are kept sharp.
11. One member of the vaccinating team should be responsible for supervising the procedure to check that the vaccine is administered correctly. Any birds that do not receive the full dose should be revaccinated.
12. The number of doses administered at the end of the day should be checked against the number of doses taken to the farm.
13. One qualified person should be responsible for cleaning and sterilizing the equipment at the end of each job.
14. To determine the quality of the vaccine administration, the flock should be monitored at 10 to 14 days for neck sores, twisted heads and mortality.
15. Monitor the health and antibody status of the flock on a routine basis.

10.6 MEDICATION

Prevention is by far the most economical and best method of disease control. Prevention is best achieved by the implementation of an effective biosecurity program, including appropriate vaccination. Diseases do, however, overcome these precautions and when they do, it is important to obtain qualified advice as quickly as possible.

Drugs and antibiotics are not only expensive, but they can confuse the characteristics of a disease, preventing the correct diagnosis. The use of the correct medication and the timing of treatment can be crucial in combating a disease problem.

The preferred choice of a drug or antibiotic for some diseases may be harmful if used for the treatment of others. For certain diseases there may not be an effective treatment or it may not be economically feasible to treat. Therefore, always submit 6 to 8 birds showing typical symptoms to a laboratory, so that sensitivity tests can be conducted to identify medication that will be effective against the disease agent involved.

10.7 WATER

Water should be kept clean, cool and free from pathogens. The total dissolved solids in the water should not exceed 3,000 ppm. It is recommended that that calcium and magnesium salts (hardness) should be less than 20 ppm and salinity less than 1,000 ppm.

Chlorination may be used to sanitize a water supply. It controls water-borne diseases such as colibaccilliosis, salmonellosis and coccidiosis, and also helps to prevent slime and algae build-up in water lines. A chlorine level of 5-10 ppm is recommended. Water analysis, at three monthly intervals, is good practice to determine the need for treatment.

10.8 RODENT AND VECTOR CONTROL

An effective rodent control program involves several measures that restrict shelter, food and water. Actions that need to be taken are as follows:

1. Eliminate hiding places, by removing all the rubbish from around the buildings.
2. All vegetation needs to be kept trimmed.
3. Make the entrance to the buildings as rat proof as possible.
4. Dispose of dead birds properly and promptly.
5. Keep feed spillage to a minimum. Clean up feed spills immediately.
6. Keep feed storage areas clean and store feed properly. Keep feed bags on pallets off the floor.
7. Maintain permanent bait stations with a fresh supply of rodenticides on a year round basis.
8. Rotate the use of different anticoagulant baits on a regular program.
9. Use traps where it is practical.

11. METRIC CONVERSIONS

1 mm	= 0.0394 in	
1 cm	= 10 mm = 0.3937 in	
1 m	= 100 cm = 1.0936 yd = 3.2808 ft	
1 km	= 1000 m = 0.6215 miles	
1 in	= 2.54 cm	
1 ft	= 30.48 cm	
1 yd	= 0.9144 m	
1 mile	= 1.609 km	
1 g	= 0.002205 lb = 0.0353oz	
1 kg	= 2.2046 lb	
1 tonne	= 1000 kg = 0.9842 long tons (British) = 1.1023 short tons (USA)	
1 oz	= 28.35 g	
1 lb	= 0.4536 kg = 453.6 g	
1 long ton	= 1.016 tonnes = 1.016 kg	
1 short ton	= 0.9072 tonnes = 907.2 kg	
1 cm ²	= 0.155 in ²	
1 m ²	= 1.196 yd ² = 10.7639 ft ²	
1 in ²	= 6.4516 cm ²	
1 ft ²	= 0.0929 m ²	
1 yd ²	= 0.8363 m ²	
1 litre	= 0.22 Imp gal = 0.2624 US gal	
1 pt (Imp)	= 0.5682 litre	
1 pt (USA)	= 0.4732 litre	
1 qt (Imp)	= 1.1365 litre	
1 qt (USA)	= 0.9463 litre	
1 gal (Imp)	= 4.54596 litre	
1 gal (USA)	= 3.7853 litre	
1 m ³ /kg/h	= 16.016 ft ³ /lb/h	
1 ft ³ /lb/h	= 0.0624 m ³ /kg/h	
1 m ³ /h	= 0.5886 cfm	
1 m/sec	= 196.85 ft/min	
1 Kcal	= 3.97 BTU	
1000 Kcal	= 4.184 MJ	
1 Kcal/m ³	= 0.1123 BTU/ft ³	
1 Kcal/kg	= 1.8 BTU/lb	
1 ft candle	= 10 lux	
3.5 birds/m ²	= 3.08 ft ² /bird	5.5 birds/m ² = 1.96 ft ² /bird
4 birds/m ²	= 2.69 ft ² /bird	6 birds/m ² = 1.82 ft ² /bird
4.5 birds/m ²	= 2.41 ft ² /bird	6.5 birds/m ² = 1.67 ft ² /bird
5 birds/m ²	= 2.1 ft ² /bird	6 birds/m ² = 1.54 ft ² /bird

Temperature	
°C	°F
35	95.00
34	93.20
33	91.40
32	89.60
31	87.80
30	86.00
29	84.20
28	82.40
27	80.60
26	78.80
25	77.00
24	75.20
23	73.40
22	71.60
21	69.80
20	68.00
19	66.20
18	64.40
17	62.60
16	60.80
15	59.00
14	57.20
13	55.40
12	53.60
11	51.80
10	50.00
9	48.20
8	46.40
7	44.60
6	42.80
5	41.00
4	39.20
3	37.40
2	35.60
1	33.80
0	32.00
-1	30.20
-2	28.40
-3	26.60
-4	24.80
-5	23.00

12. BREEDER FARM CHECK LIST

	Guidelines	Actual	Page
Stocking density:			
Rearing - females	7.0 birds/m ² (1.55 ft ² /bird)		1
- males	4.2 birds/m ² (2.50 ft ² /bird)		
Laying -	4.5 - 6.0 females/m ² (2.41 - 1.81 ft ² /bird) (including males)		
Litter depth: Day old	10-15 cm (4-6 in)		1
Point of Lay	20-23 cm (8-9 in)		3
Ventilation rate			
Rearing period	Min. day-old 0.5 m ³ /s of air per 10,000 140 days 2.5 m ³ /s of air per 10,000 Max. at least 25 m ³ /s of air per 10,000		1
Laying period	Min. 0.5m ³ /s of air per 1,000 Max. at least 5.0 m ³ /s of air per 1,000		3
Lighting at bird level			
Rearing period	Day-old >60 lux; 7 to 21 days, 20 lux; 21 to 140 days, 5-10 lux		8
Laying period	40-60 lux (4-6 ft candles) in controlled housing 80-100 lux (8-10 ft candles) artificial light in open houses		8
Trough space: rearing and laying	15 cm/bird (6 in/bird)		4
Feed distribution time	Within 3 minutes		2 & 4
Drinker space	One circular drinker/100 birds One nipple/ 8 birds		3
Water availability	Free access		3 & 17
Water consumption in lay	1.8 x feed intake		17
Nests	4 birds/nest in single nest systems 110 birds/per unit (back to back) in communal nest systems		3
Temperature recording (Max/Min thermometers)	Under brooders in house, egg store		2 & 29
Egg storage	Separate room Temperature 16-18 °C (60.8 - 64.4 °F) Relative humidity 75%		29
Monitor : Feed	Weighter – to 1 g/bird/day		19
: Bodyweight	Scales/20 g increments		
: Eggs	Grader and check scales		
Bird disposal	Incinerator		33

13. BREEDING FARM CONTACTS LIST

	Name	Telephone Number
Breeder flock manager		
Feed mill		
Hatchery manager		
Veterinary service		
Equipment supplier		
Electricity services		
Gas services		
Water services		
Cobb representative		

NOTES

TECHNICAL SUPPLEMENTS



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