



Management Supplement

CX1054 Male

Management Supplement



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Introduction

Cobb's commitment to genetic improvement of our family of products 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 to have a good management program in place. Cobb broiler breeder success worldwide provides considerable experience with the breed in a wide range of situations including hot and cold climates, controlled environment and open housing. This Male Management Supplement should help you build a breeder management program that maximizes performance in your region.

Successful management must not only meet the basic needs of the stock but also be finely tuned to fully benefit from the breed's potential. Some of the guidelines may need to be adapted locally according to your own experience or infrastructure. Cobb's regional technical service and world tech teams can help with adapting recommendations for your operation.

This CX1054 Male Management supplement highlights critical factors that are most likely to influence flock performance. Our technical information includes Cobb Management guides for grandparent stock, parent stock, hatchery, broiler, vaccination procedures, technical bulletins and a full range of performance charts (*Available at: <https://www.cobb-vantress.com/resource>*). Our recommendations are based on current scientific knowledge and practical field experience from around the world. You should be aware of local legislation, which may influence the management practice you choose to adopt.

Please use the CX1054 Male Management Supplement as a reference to your own flock management skills. Apply your knowledge and judgment to obtain consistently good results with the Cobb family of products.

CX1054 Male Characteristics

The CX1054 Male is a versatile male that performs well in all environments. It has a strong mating ability that allows this male to exceed in integrations with community nests and densities > 6 females / m². The CX1054 Male has excellent leg quality, good mobility and high livability through production.

The CX1054 Male provides a unique balance between breeder and broiler performance characteristics. This male has excellent feed conversion, livability and fertility, while broiler progeny exhibits improved feed conversion and livability.

CX1054 Male Management Highlights

- ✓ Provide proper weekly feed increases to achieve the weekly weight goal.
- ✓ Due to enhanced feed efficiency, use caution and do not overfeed at any age especially after moving to the production house.
- ✓ Apply beak treatment in the hatchery or at the farm at 5 to 6 days of age. This will help improve feed consumption and overall male uniformity.
- ✓ Sexual synchronization with females is crucial for optimum hen house performance (fertility / hatchability).
- ✓ If male maturity is behind females, males can be moved to the production house several days prior to females to help transition to the new environment and access the male feeder. If males and females are synchronized, they can be moved at the same time.
- ✓ The CX1054 Male has a large comb size and its ability to consume feed from the female feeder is normally limited to 3 to 4 weeks assuming a grill size of 60 mm in height is used.
- ✓ Weigh and handle males frequently post housing to closely monitor fleshing and body conformation.
- ✓ Overweight males at housing generally tend to mature more quickly after photostimulation. In this situation, poor sexual synchronization can lead to slatting of hens, male and female mortality and a higher incidence of floor and slat eggs. Overdeveloped males can be mated with the females at a later date or utilized for spike males.
- ✓ Use of a male feed ration can help control weekly weight gain.

Male Management

The key to obtaining good fertility from today's broiler breeders is to develop feeding and management programs that allow for correct development of the male's reproductive system while controlling the growth rate and capacity to deposit breast muscle.

The male growth profile is the single most important factor that correlates with flock fertility. Males should be weighed at least weekly from 1 to 30 weeks of age and at least every other week thereafter. Handle males by both legs during weighing and vaccinations. In order to minimize tissue reactions and stress, inactivated vaccines should be warmed to specific temperature guidelines. See further details in Cobb Vaccination Procedure Guide. (Available at: <https://www.cobb-vantress.com/resource/managementguides>).

Tracking growth and production records that include fleshing condition, BW curve, feeding program, weekly uniformity, percentage male ratio and all other management aspects can be very instrumental in fine tuning performance. Ask your Cobb technical service representative for our interactive spreadsheet that makes tracking easy and efficient.

Rearing

A good start in rearing is essential for weight uniformity as well as promoting good organ and skeletal development. Each of these factors correlates with male fertility potential. It is important for males to achieve the standard BW targets.

For best results, **males should be reared separately from females** until housing between 20 to 22 weeks of age. In brown out or dark out houses, sufficient light intensity and duration must be provided to ensure the proper feed amount is consumed during the brooding period.

Adequate feed, water and housing equipment is paramount to establishing flock uniformity and maintaining high flock fertility. The recommended male stocking density is between 3.6 to 4.3 males / m². In addition to floor space, sufficient feeder space is important to allow all males to eat simultaneously. Rapid, even feed distribution is essential for producing high quality males. The following feed space guideline is provided based on various types of feeding systems available:

Table 1
Feed Space Guideline

Trough	18 to 20 cm / bird
Round Pan	8 to 10 birds / pan
Oval Pan	10 to 12 birds / pan

A balanced starter ration in the form of mini pellets or crumble containing 2850 kcal / kg (11.92 MJ / kg), 19 % crude protein (CP), 0.93 % digestible lysine will allow the male to attain a BW of 150 g at 7 days of age. It is not necessary to use a pre-starter diet with high levels of CP (> 21 %) or digestible lysine (> 1.0 %).

Bodyweight (BW) Management and Uniformity

Males should never lose weight at any age. Research conducted on male reproductive physiology shows that sperm production potential is established at an early age. Males subjected to undue stress, often accompanied by a weight stall or decline in the first 15 weeks of life may lose reproductive potential.

BW development during the first 8 weeks largely determines frame size later in life. Heavier males tend to develop a larger frame size making it imperative that male weights be kept close to standard from 4 to 16 weeks of age. One way to accomplish this is to separate the heaviest males at 3 to 4 weeks of age by grading and controlling the BW during the growing period. This can be followed by a repeat grading at 8 weeks of age by handling all males and removing suboptimal males with visual defects including crooked and bent toes, spinal abnormalities, eye and beak abnormalities. Flocks with poor uniformity at 15 to 16 weeks can be graded on breast conformation in combination with wing resistance with the least developed males placed in a separate pen and given supplemental feed to help improve sexual development and conformation uniformity. The goal is to have > 95 % of the males properly conditioned by 20 weeks of age.

Maintaining flock uniformity is extremely important in managing today's high yielding males. This includes uniformity of BW, frame size and carcass conformation or fleshing. In slatted production houses where there is usually more pressure on litter quality due to higher bird density and a smaller amount of litter, uniform males maintained close to the Cobb standard weight express fewer leg defects leading to better mobility, higher mating frequency and more completed matings.

Transferring from Rearing to Production Houses

For best results, mate the males with BW closest to average with the females. Heavy males with no visible defects (skeletal or leg problems) can be used for spike males while small or suboptimal males should be removed from the population. Removing suboptimal males should be done on a regular basis in the early part of rearing (1 to 12 weeks of age), as it is essential to maximize fertility. Mate the heavier males with heavier females, and light males with light females. This mating scheme will ensure proper sexual synchronization between males and females and a proper BW differential. This greatly enhances hen receptivity and mating efficiency.

To obtain sexual synchronization, the lighting program for CX1054 Males and females is identical. Ensure that positive growth occurs in the first 4 weeks after light stimulation when testes undergo rapid development.

Table 2
Example of Proper Testicle Development

Age (Weeks)	21	22	23	24	26	28
Testes (g)	0.5	2	18	24	43	47
BW (g)	3120	3280	3430	3570	3780	3940
Testes/BW (%)	0.02	0.06	0.52	0.67	1.14	1.19

Monitor weights weekly and adjust feed accordingly. It is a good management practice to observe males and females' eating behavior constantly in the production period. If males are observed consuming feed from the female feeder, it may be necessary to hold the male feed amount constant for several weeks and increase the female feed amount to compensate for the feed males are consuming. Please consult with Cobb technical service about alternative feeding options.

In slatted houses, males must quickly identify and access water lines to ensure body condition does not stagnate or regress at any time after housing with females. For males to find water easily on the slats, it is important to train the males in rearing. For example, use chain feeder troughs at a height that requires the males to jump over the troughs all the time to get to the other side of the track for water. This will enhance mobility and facilitate males to jump on the slats after moving to the production house. It is crucial for males to find the water line on top of the slats when water is not available in the scratch area. Some operations use training slats in rearing placed under the water lines at a 40 to 45 cm height from the floor. This mimics the production house and ensures all males learn to jump on a slat to have access to water.

Over feeding after transfer may result in larger, over-fleshed males requiring additional energy for BW maintenance. Males may exceed the standard BW after housing with females by consuming feed from the female feeders. If the male BW increases too rapidly after housing up to 26 to 27 weeks of age, act immediately so males do not continue to increase BW too fast. Feed allocation may need to be adjusted to accommodate for male consumption of hen feed. Introduction of male feed with lower kcal and protein levels will also help manage male BW. Handling males frequently and scoring breast fleshing during this time period are the best ways to evaluate males and guide the feeding program.



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Sexual Synchronization with Females

It is important to ensure proper sexual synchronization between males and females. This is largely influenced by the BW development from 12 to 20 weeks of age and the differential between the sexes. A properly synchronized flock will have high hen receptivity and a high mating efficiency. A guide to determining the correct male ratio should take the following criteria into consideration:

1. Weight differential between males and females at transfer.
2. Body composition, frame size and maturity development between males and females at transfer.
3. Genetics - there are differences in maturation rates, temperament and activity levels between male breeds and strains. Specifically, the CX1054 Males tend to mature at an early age and need to be tightly managed with regard to BW and fleshing from puberty (12 weeks of age) until 20 weeks of age.

Maintaining control of male weight from transfer to flock depletion is an essential component of maximizing male fertility and persistency. Generally, the BW differential target between males and females at housing should be in a range of 15 to 25 % depending on the Cobb female cross being used. By 30 weeks of age, when sexual activity is at peak, the weight differential can be 10 to 15 %, again depending on the female cross. This differential allows for flexibility to manage the BW growth of the males while preserving good fertility. Review Table 3 for more information.

Table 3**Male and Female Weight Differential % (Dark Out)**

<i>Age Weeks</i>	<i>Cobb500 FF Female g</i>	<i>CX1054 Male g</i>	<i>BW Differential %</i>
20	2300	2860	24.3
22	2600	3280	26.2
25	3130	3670	17.3
30	3600	4045	12.4
40	3900	4310	10.5
50	4095	4510	10.1
60	4210	4710	11.9

The CX1054 Male can become sexually mature ahead of the female. If male maturation is ahead of the female, consider the following options:

- Light intensity can be reduced to 1 to 2 lux in rearing to delay sexual development.
- Analyze BW growth curve from 12 to 20 weeks of age. If average male BW is not on standard, make appropriate adjustments in feeding schedule to bring the flock back to standard.
- Males can be housed one week after females to allow females an additional week to mature.
- Begin with a lower male ratio when mixing. Depending on male quality and sexual synchronization, mix 6 to 7 % males in slatted houses (7 to 8 % in non-slatted houses) until peak production. Increase to 8 to 9.5 % at 30 to 31 weeks or at first spike.

The following management techniques can be considered if male maturity is later than females at transfer to the production facility:

- Maintain 10 lux light intensity during rearing for males if they are reared separately from females, otherwise follow females' light program. Insufficient light intensity during rearing may delay maturity onset.

SEXUAL SYNCHRONIZATION WITH FEMALES

- Increase weekly BW gain for males between 18 to 21 weeks.
- House and photostimulate males up to one week earlier than females to train them to the male feeder and accelerate maturation. This can also be done in rearing when males have their own rearing house.

Some house setups incorporate restaurant feeding for males to ensure they consume 100 % of their feed after mixing. There are multiple ways to implement restaurant feeding. A common one is to drop a separation net during feeding in order to have the males eat in their own feeding systems (see illustration below). Before lifting the net (releasing the males), make sure that females have finished their feed.

It is optimal to incorporate a male drinker line within the restaurant area. This allows the males to drink while females are still consuming feed. If there is no drinker line in the male restaurant area, males should be released after their feed is consumed (45 to 50 minutes). Closely monitor male comb development until 27 weeks to ensure they are not able to consume feed from the female feeders.



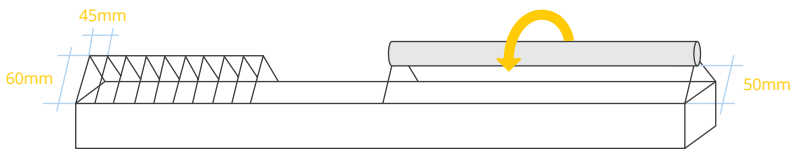
Male Management During Production

Adequate feed distribution is critical when managing uniform growth in the production cycle. Different feeding systems should be managed to distribute a measured amount of feed per male as quickly and uniformly as possible.

It is highly recommended to use Separate Sex Feeding (SSF) in production. With SSF, males do not have access to the female feed and vice versa. A typical SSF plan would include a male exclusion system placed on the female feeder (grill, roller bar, plank or wooden board) and a line of pans, troughs or tube feeders for the males.

The exclusion grill should create both a vertical 60 mm and horizontal 45 mm restriction (See illustration of Female Track Feeder). In systems with a plank or roller bar restriction, the vertical restriction should be 50 mm. This type of system can serve a dual purpose in countries that mandate a minimal area for bird perching. The CX1054 male will quickly develop a large comb that will exclude him from the female feeder system by 23 to 24 weeks.

Different exclusion methods on a female track feeder. A grill on the left and a roller bar on the right.



It is equally important to keep the females from eating from the male feeder. Keep the male feeder at a height that allows the males to stretch slightly while eating and prevents female access. The entire male feeder should be stable and not allowed to swing. Feeder height needs to be frequently adjusted by observing feeding behaviors at least once a week up to 30 weeks of age. In production the feeding equipment for males has been traditionally round and oval pan feeders. Recently, chain feeders placed against the side wall have also become an option as chain feeders can be more stable than pan feeders and feed distribution can be better checked and evaluated. Position feeders away from other equipment that would allow females to perch and access male feeders.



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Productive males have uniform red colored combs, wattles and eye rings. Beaks should be rounded with no sharp edges that may cause injury to females or other males.

Regressing or sub-optimally conditioned males first exhibit a loss of color around the eyes. Management intervention options to recover these males include separating them from the flock and providing additional feed for several days. Males that have lost all color in the comb and wattles should be removed from the flock. Testicular regression in these males is irreversible.

Training males to use male specific feeders is the key to the success of Separate Sex Feeding (SSF).

Males need to quickly identify and use their specific feeders. The best option is to have the same type of male feeder in rearing and production. In houses where pan feeders are used during rearing, training should include a mini slat (60 to 70 cm) under the drinker line to help train males and teach them to jump. This can be particularly helpful when males will be housed to slatted production houses.

After 30 weeks, feed allocations should be modified according to weight trends. Ideally, small increases of feed should be provided to maintain a slight weight increase throughout the production period and ensure all males are receiving sufficient nutrition to sustain activity level and interest in females. Using a separate male ration can increase the feed volume while still controlling male BW during production.

The CX1054 Male weight standard is designed to keep the male light early in production with a consistent positive growth of about 20 to 25 g per week from 30 weeks to depletion. Please refer to the weight standards charts for details.

The male feeder should be on a winch system so that it can be raised and refilled daily to prepare for the following day's feeding. It is essential to ensure that all pans are being used and receive the same feed quantity to allow all males equal and simultaneous feed access each feed day. Under normal circumstances, the female feeder is usually started first to move females to their feeder before the male feeder is lowered.

Male Conformation and Fleshing

In addition to weight control, male conformation and fleshing should be monitored to help gauge male condition. Breast fleshing should be frequently palpated by hand with the objective of maintaining a "V" shape for as long as possible. Fleshing should cover the tip of the keel. However the keel should still feel prominent.



Explanation of fleshing scores

FLESHING 1

Severely under conditioned breast and very thin. No wing resistance. Unacceptable male.



Not Acceptable

FLESHING 2

Thin breast from top (wing area) down. More keel bone exposed. Flaccid wing resistance.



Lean

FLESHING 2.5

V shaped breast with more fleshing in upper breast part near the wings. Stronger wing resistance and minimum condition for most males for good fertility.



Ok

FLESHING 3

More rounded breast with more breast deposition on the side of the keel. (Similar to fleshing 2.5, fleshing 3 is good and preferred for males during the production period.)



Ok

FLESHING 4

Wide breast on top (wing area) and down to end of the keel. This condition will become more noticeable after 50 weeks.



Too Heavy

FLESHING 5

Very wide breast (dimple in keel area). Severely over fleshed male for all the male lines. Fertility would be negatively affected.



Excessive

Table 4
Optimum Fleshing Score for Males

Age Weeks	1	2	2.5	3	4	5	Fleshing Score (Weighted Average)
20		25%	50%	25%			2.50
25		15%	55%	30%			2.60
30		5%	60%	35%			2.65
35		3%	60%	35%	2%		2.70
40		1%	53%	40%	6%		2.80
45		1%	50%	40%	9%		2.85
50			45%	43%	12%		2.90
55			40%	45%	15%		2.95
60			30%	55%	15%		3.00



The pictures above illustrate how to evaluate male fleshing in rearing and production. Males with prominent keels are usually scored a 2 (picture on the left), males with V shaped breast with more fleshing in upper breast are usually scored a 2.5 (picture in the middle), while males with fleshing that reaches and covers the keel on both sides are usually scored a 3.

A breast conformation score between 2.5 and 3 is ideal at peak production while a small percentage of males will move to a 4 toward the end of the production period. Cobb technical representatives can provide an interactive spreadsheet to register fleshing scores. A weighted average can be calculated and graphed.

Unproductive males should be removed from the flock as they are found. Depending on labor availability, male condition and house design, a male selection based on BW results in better male uniformity and enhanced fertility. The best results are achieved when selections are done at 25, 35, 45 and 55 weeks. This management technique may be most beneficial in countries where spiking is not an option.

TABLE 5: BW AND NUTRIENT INTAKE GUIDE (REARING)

Feed Intake, Nutrient Intake, and BW Guide for CX1054 Male (Rearing)						
Week	BW* (/bird) g	Nutrient Intake (/bird/day)			Feed Intake**	
		Energy Kcal	Protein g	Dig. Lysine mg	Feed Type	g/bird/day
1	150	68	4.5	222	ST	24
2	335	92	6.1	300	ST	32
3	520	122	8.1	398	ST	43
4	690	147	9.8	480	ST	52
5	840	154	8.3	342	GR	57
6	980	165	8.9	367	GR	61
7	1120	170	9.1	378	GR	63
8	1250	175	9.4	389	GR	65
9	1385	177	9.5	393	GR	66
10	1510	180	9.7	400	GR	67
11	1630	186	10.0	413	GR	69
12	1740	188	10.1	418	GR	70
13	1865	195	10.5	433	GR	72
14	1985	201	10.8	447	GR	74
15	2115	211	11.3	469	GR	78
16	2250	225	12.1	506	DL	80
17	2400	237	12.7	533	DL	85
18	2560	252	13.5	567	DL	90
19	2715	268	14.4	603	DL	96
20	2860	283	15.2	637	DL	101
21	3120	300	16.1	675	DL	107
22	3280	313	16.8	704	DL	112
23	3430	324	17.4	729	DL	116
24	3570	332	17.8	747	B1	119

* Weights correspond to the weekly age based on the placement or hatch date. Between 2 to 20 weeks, weights should be taken when the crop is empty (dry BW) or at least 6 to 7 hours after the last feeding. Another option is to weigh the birds after the lights come on and before feeding takes place. In the case of applying late morning feeding and weighing the flock before feeding, deduct 100 g from the BW from 21 weeks and onwards to obtain a dry BW standard for the males.

** Feed intake is designed based on Cobb 500 recommended specifications (see page 21-22) and for guide purposes only. It has to be adjusted based on actual nutritional specifications to achieve the target BW and optimum conditions for the birds.

Feed type: ST = starter, GR = grower, DL = developer, B1 = Breeder 1

Table 6

Example of feed allocation when males consume feed from the female feeding system after mixing

Age Weeks	CX1054 BW g	Weekly BW Gain g	Male Feed g
19	2715	155	96
20	2860	145	100
21	3120	260	102
22	3280	160	102
23	3430	150	102
24	3570	140	108

The table above is just an example for a flock mixed at 20 to 22 weeks of age. It is not intended to be followed. Actual feed amounts may vary based on different feed specifications and management practices.

Feed is maintained constant for several weeks due to males consuming feed from the female feeding system. Each company will need to determine how much of the male feed to reallocate to the female feed track while taking caution to preserve the recommended female feed allocation. If the males show reduced BW gain, more feed can be given in the male feeding system.

TABLE 7: BW AND NUTRIENT INTAKE GUIDE (PRODUCTION)

Feed Intake, Nutrient Intake, and BW Guide for CX1054 Male (Production)						
Week	BW (/bird) g	Nutrient Intake (/bird/day)			Feed Intake*	
		Energy Kcal	Protein g	Dig.Lysine mg	Feed Type	g/bird/day
25	3670	337	18.1	758	B1	120
26	3780	344	18.4	774	B1	123
27	3870	347	18.6	781	B1	124
28	3940	349	16.8	646	Male	129
29	4000	350	16.9	648	Male	130
30	4045	352	16.9	652	Male	130
31	4080	353	17.0	654	Male	131
32	4110	355	17.1	657	Male	131
33	4140	356	17.1	659	Male	132
34	4170	358	17.2	663	Male	133
35	4195	359	17.3	665	Male	133
36	4220	361	17.4	669	Male	134
37	4245	362	17.4	670	Male	134
38	4270	364	17.5	674	Male	135
39	4290	365	17.6	676	Male	135
40	4310	367	17.7	680	Male	136
41	4330	368	17.7	681	Male	136
42	4350	370	17.8	685	Male	137
43	4370	371	17.9	687	Male	137
44	4390	373	18.0	691	Male	138
45	4410	374	18.0	693	Male	139
46	4430	375	18.1	694	Male	139
47	4450	376	18.1	696	Male	139
48	4470	377	18.2	698	Male	140
49	4490	378	18.2	700	Male	140
50	4510	379	18.2	702	Male	140
51	4530	379	18.2	702	Male	140
52	4550	380	18.3	704	Male	141
53	4570	381	18.3	706	Male	141
54	4590	382	18.4	707	Male	141
55	4610	383	18.4	709	Male	142
56	4630	384	18.5	711	Male	142
57	4650	385	18.5	713	Male	143
58	4670	386	18.6	715	Male	143
59	4690	387	18.6	717	Male	143
60	4710	388	18.7	719	Male	144
61	4730	388	18.7	719	Male	144
62	4750	389	18.7	720	Male	144
63	4770	390	18.8	722	Male	144
64	4790	391	18.8	724	Male	145
65	4810	392	18.9	726	Male	145

* Feed intake is designed based on Cobb 500 recommended specifications (see page 21-22) and for guide purposes only. It has to be adjusted based on actual nutritional specifications to achieve the target BW and optimum conditions for the birds. Feed type: B1 = Breeder 1, Male = Male Feed

Male Ratio

The single most important factor in determining the correct ratio is male quality at housing. Male quality evaluation should be focused on BW, flock uniformity, and fleshing condition of the individual males.

Considerations in determining the correct male to female ratio:

✓ Male condition/housing type

The target male ratio in slatted production houses is between 8 to 9 %. In 100 % deep litter houses, the ratio can be increased to 9 to 10 % and in some cases higher based on the sexual synchronization. The male ratio can be adjusted according to the sexual maturity of the males and females and the availability of housing to hold extra males for spiking.

✓ Female cross

If the male has matured more quickly than the female, then fewer males are needed. Excessive male weight and advanced male maturity could result in slatting of young hens.

✓ Spiking program

When spiking is utilized, lower mixing ratios can be considered at photostimulation.

Spiking

Spiking is the addition of young broiler breeder males into an older flock to compensate for the decline in fertility that usually occurs after 45 weeks of age. This decline can be due to a decrease in mating interest (natural post 35 to 40 weeks of age), a reduction in sperm quality (natural post 55 weeks), lower mating efficiency (poor management leading to males with physical conditions such as weight or leg and feet disorders) and excessive male mortality resulting in a reduced male to female ratio.

Types of spiking programs:

- ✓ Extra males are moved to a separate house/farm at transfer and held until moved to older flocks. Alternatively, the males are moved to another flock and held in a separate pen until used to spike that flock.

- ✓ Designated houses can be used specifically for raising extra males to supply spike males to 38 to 40 weeks old hen flocks. When using a separate spike male rearing farm, the number of males placed with pullets at day-old can be reduced to 10 to 11 %.

Important criteria:

- ✓ Spiking with the CX1054 Male in slatted production houses should occur when the male ratio goes below 7 % (spike back to 9 %).
- ✓ In production houses without slats, house 9.5 to 10 % males at transfer. Allow the ratio to decrease to 7.5 % by 40 weeks of age through removal of suboptimal males before spiking back to 9 %.
- ✓ Spike with a minimum of 20 % additional males to increase the male ratio back to 9 %. Spiking with an insufficient number of males is generally ineffective due to primary male dominance resulting in high mortality in spiking males.
- ✓ Spike males should be good quality and free of physical defects. It is common practice to run a heavier BW in males if spiking programs are involved. Males must be at least 25 weeks of age with a minimum weight of 4.1 kg and sexually mature. The BW differential between spike males and primary males should be as low as possible to ensure a high success rate.
- ✓ Regularly remove suboptimal primary males. This practice helps to accurately determine the remaining male ratio. Spike males are then added to increase the ratio to original levels.
- ✓ At housing, when an early spiking is probable, it may be possible to start with fewer males (7 to 8 % at 20 to 22 weeks of age) and to add extra males as needed over time to increase to 9 to 10 %. This will improve female receptivity at mixing.
- ✓ A slight feed increase for males right after spiking (2 to 3 g/bird/day) could be beneficial since spiking significantly increases male mating activity.
- ✓ Flock data has repeatedly shown that having a spiking program in place prior to a fertility decrease, produces the best results. Many times, historical flock data can help guide when a flock should be spiked. For optimal results, the hen flock should be between 35 and 40 weeks of age and spiking can be done with normally scheduled management procedures. Spiking once in the life of the flock is normally sufficient. Flocks spiked twice on an 8 to 10 weeks interval also produce good results. Spiking is usually not economical beyond 55 weeks of age.

- ✓ One of the greatest risks with a spiking program is the possibility of introducing unwanted disease or parasites into the spiked flock. Spike males should come from a single source flock. The source flock should be serologically tested 5 to 7 days before moving. Any positive or suspect results should lead to postpone of the move.

Intra-Spiking

Intra-spiking means exchanging 25 to 30 % of original males between houses from the same farm, without importing any young males, to create a similar stimulus to mating activity as the one created by spiking. Intra-spiking improves fertility when done relatively early in production (<45 weeks) and two intra-spikings, done at 40 and 48 weeks of age, can produce even better results. Intra-spiking is inexpensive, easy-to-practice, and most importantly, rarely presents a biosecurity risk.

Summary

Achieving excellent fertility starts with rearing a uniform flock of healthy males. Having males properly prepared in terms of weight and fleshing prior to photostimulation will help ensure they are ready to adjust to the new environment in the production house. A successful transition to the hen house, with controlled weekly weight gains and timely, even feed distribution and meeting their daily nutritional requirements will promote healthy and viable males throughout the production cycle. Uniform males at housing will lead to uniform males at 30 weeks and thereafter. Uniform male flocks are essential to achieve > 90 % hatchability over multiple weeks. Please refer to the Cobb Breeder Management Guide for additional detailed information on male management. (Available at: <https://www.cobb-vantress.com/resource/managementguides>).

NUTRITION

Recommended Nutrient Levels for Cobb500 Breeders							
Phase Age (Days)	Unit	Starter 0 - 28	Grower 29 - 105	Developer 106 - 1 st Egg	Breeder 1 1 st Egg - 266	Breeder 2 > 267	Male*
Metabolizable Energy**	MJ/kg	11.92	11.30	11.72	11.72	11.72	11.30
	kcal/kg	2850	2700	2800	2800	2800	2700
	kcal/lb	1293	1225	1270	1270	1270	1225
Crude Protein	%	19.0	14.5	15.0	15.0	14.5	13.0
Calcium	%	0.95	0.95	1.20	3.00	3.20	0.95
Av. Phosphorus	%	0.45	0.42	0.42	0.42	0.38	0.42
Sodium	%	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24
Chloride	%	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.24
Potassium	%	0.60	0.60	0.60	0.60	0.60	0.60
Linoleic Acid	%	1.00	1.00	1.00	1.25	1.25	1.00
Digestible Amino Acids							
Lysine	%	0.93	0.60	0.63	0.63	0.60	0.50
Methionine	%	0.42	0.31	0.33	0.33	0.31	0.28
M + C	%	0.70	0.51	0.54	0.55	0.52	0.48
Tryptophan	%	0.20	0.13	0.14	0.14	0.13	0.12
Threonine	%	0.65	0.45	0.47	0.47	0.45	0.44
Arginine	%	0.98	0.66	0.69	0.69	0.66	0.55
Valine	%	0.67	0.45	0.47	0.47	0.45	0.38
Isoleucine	%	0.64	0.42	0.44	0.44	0.42	0.40

Digestible Amino Acid Levels					
Recommended Digestible Amino Acid Levels Based on Amino Acid / Lysine Ratios					
Phase Age (Days)	Unit	Starter 0 - 28	Grower / Developer 29 - 1 st Egg	Breeder 1 st Egg +	Male*
Lysine	%	100	100	100	100
Methionine	%	45	52	52	55
M + C	%	75	85	87	95
Tryptophan	%	21	22	22	24
Threonine	%	70	75	75	87
Arginine	%	105	110	110	110
Valine	%	72	75	75	75
Isoleucine	%	68	70	70	80

* Change to male feed is suggested at 28 weeks of age. The higher nutrient level in breeder feed may assist with testicular development in the final phase of male sexual maturity at 24 to 30 weeks. However, it can be earlier at 21 to 22 weeks if males are consuming feed from female feeders.

** If the energy level needs to be adjusted for local conditions, then all other nutrients (protein/amino acids) need to be adjusted at the same ratio.

- ✓ The energy values are based on AMEn apparent metabolizable energy corrected by nitrogen, WPSA.
- ✓ The amino acids values are based on Standardized Ileal Digestibility (SID) assays.
- ✓ At least 0.75 to 1 % of the fat in developer and breeder feeds should be oil (fat) added as a feed ingredient, the remaining fat being inherent from other feed ingredients. "Added" oil (fat) is required throughout the year in tropical and subtropical regions or during the hot summer months.
- ✓ The Cobb nutrient recommendations are based on crumble feed. If mash feed is provided, increase 50 to 100 kcal / kg to the energy recommendations.

Supplementary Vitamins and Trace Elements

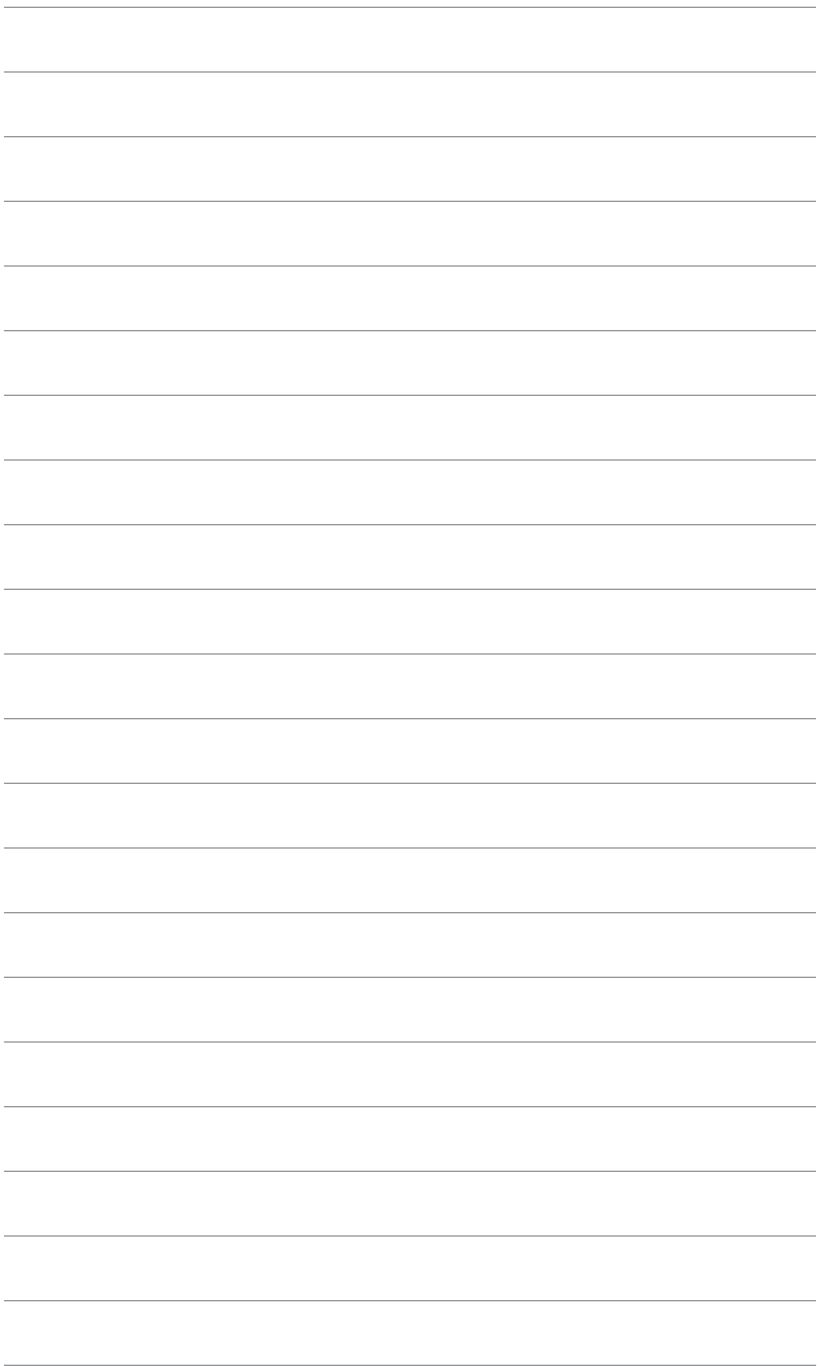
Recommended Supplementary Levels of Vitamins and Trace Elements Per Metric Tonne Basis

Nutrients	Unit	Starter / Developer / Males	Breeders in Production
Vit. A (Maize Diets)	KIU*	10,000	12,000
Vit. A (Wheat Diets)	KIU*	11,000	13,000
Vit. D3	KIU*	3,500	3,500
Vit. E	KIU*	100	100
Vit. K	g	3	6
Thiamine	g	2.75	3.00
Riboflavin	g	8	13
Pantothenic Acid	g	15	20
Niacin	g	40	50
Pyridoxine	g	3	6
Folic Acid	g	2	3
Vit. B12	g	0.025	0.035
Biotin (Maize Diets)	g	0.25	0.30
Biotin (Wheat Diets)	g	0.300	0.375
Choline	g	500	500
Manganese	g	100	120
Zinc	g	100	110
Iron	g	20 - 50	40 - 55
Copper	g	10 - 15	10 - 15
Iodine	g	1.5	2.0
Selenium	g	0.30	0.30

*KIU = thousand international units

g = grams

Supplementary levels of vitamins and trace elements should always be reviewed to ensure total levels do not exceed those set in local legislation.





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