SELECTED FOR QUALITY **TETRA HB COLOR** PARENT STOCK

ΤΕΤΡΔ COLOR HR PARENT STOCK

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INTRODUCTION

Introduction

TETRA HB Color Parent stocks are bred to produce medium – growing, red feathered broilers for standard or free range systems. Parent lines are selected for growing ability, viability and efficient egg production.

Genetic selection of pure lines is an ongoing task for Bábolna TETRA geneticists to maintain and improve the quality and performance of our Grandparent, Parent and Commercial stocks.

Our manual is a guideline and information source for maximizing your profits and satisfaction with your Parent stocks; however special requests due to climatic or lighting conditions may require assistance from your nearest Bábolna TETRA specialist. We believe that by following this Management Guide and keeping accurate records, the results of your flock will gradually improve year by year.

BÁBOLNA TETRA Ltd.

Breeding scheme of TETRA HB Color



General Recommendations and Biosecurity of Poultry Farms

Isolation of the house is vitally important to reduce the possibility of introducing a disease organism into a clean house environment. Traffic of persons constitutes the largest threat to isolation and introduction of disease causing agents. Ideally, shower facilities and farm clothing are available for all employees and necessary visitors. If this is not possible, visitors should be limited to those that are necessary and they should be required to wear clean coveralls, new plastic or cleaned rubber boots, and hair covering.

- Disinfectant footbaths should be present at the entranceway to each house and should be replenished with fresh disinfectant daily.
- Doors should be kept locked at all times to prevent unwanted, improperly attired visitors from entering. "No Trespassing" signs should be prominently displayed on the doors and "Bio-security Zone" signs should be displayed at the farm entrance to warn visitors that they are entering a bio-secure area. Minimize the number of visitors, let them in only when it is required.
- Sanitation should begin with removal of all organic matter from the previous flock. Organic matter includes live and dead chickens, rodents, manure, feathers, etc. Growing birds on builtup litter is not recommended at any time.
- Dry cleaning should be done as soon as possible after the old flock is removed. Down time is very beneficial in allowing pathogens to die naturally. Dry cleaning should include the walls, rafters, ceiling, feed bins and other feed equipment, fans, vents, watering system, cages, etc.
- After dry cleaning has been completed, all surfaces should be washed with highpressure washing and an approved surfactant containing detergent.
- Following this wash down, apply a sanitizing agent approved for use in poultry houses. The sanitizing agent chosen should be broad spectrum in its activity and used according to manufacturer's directions.
- If allowed, fumigation of the house using an approved fumigant can also be used after returning all equipment to the house.
- Any equipment removed should be cleaned and disinfected before replacement prior to chick arrival.

Before the arrival of the new flock

- All equipment, including cages, brooders, interior surfaces of the building should be thoroughly cleaned and disinfected.
- All mechanical equipment, feeders, fans, curtains, etc. should be tested and brought into good working condition.
- Rodent control programs should be strictly enforced when the house is cleaned and empty. The use of baits, tracking powders, and all other available control methods must be implemented.
- Feed from previous flock should be removed and the feed bins, troughs, hoppers, and chains or augers cleaned and dried before the delivery of new feed.
- Raise the house temperature to 29-32°C (85-90°F) at least 24 hours prior to chick arrival to ensure the equipment is also warm. The desired relative humidity should be greater than 60%. This humidity level should be maintained for at least three weeks.
- Set light clocks to 23 hours day length with a light intensity as high as possible. If shadows are being cast onto any drinkers/nipples, the use of droplights is suggested to eliminate these shadows.
- Trigger nipples to ensure that they are in working order and set at the proper height. Nipples should be at the chick's eye level and bell drinkers should be on the floor. Supplemental drinkers should be used in floor brooding and removed slowly once the chicks are established and are clearly using the main drinking system.

Vaccination Programmes

Vaccination programs are varying among different countries, but veterinarians are aware of the country's own regulations.

1. Table: Example of a vaccination program for TETRA HB Color Parent stocks

Age	Disease		
	Marek's disease		
Day 1 (hatchery)	Newcastle (ND)		
	Infectious bronchitis (IB)		
Day 1 (farm)	Coccidiosis		
Day 5	Salmonellosis (live)		
Day 12	ND + IB var.		
Day 18	Gumboro disease (IBD)		
Day 28	Gumboro disease (IBD)		
Week 6	ND + IB var.		
Week 7	Salmonellosis (live)		
	Fowl pox		
Week 8	E. coli		
	Mycoplasma synoviae		
Week 9	Avian encephalomyelitis		
Week 11	IB var.		
Week 13	Avian rhinotracheitis (ART)		
Week 15	ND + IB		
	EDS		
Before transfer	ART, IB, IBD, ND		
	Salmonellosis (inactivated)		

By following some simple rules health status on the farm can be reserved.

- The risk of an infection of any kind of poultry disease can be minimized by isolating a flock from others, especially older flocks and by avoiding mixed-aged-flocks on the same farm.
- All building interior, including the drinking, feeding, heating and ventilation systems as well as the cages or slats and also the attached service areas and equipment has to be cleaned, disinfected and dried properly.
- After reinstalling the disinfected and dried equipment they have to be checked whether they work properly and are adjusted for the right height.
- Traps or poison for mice and flies have to be placed inside the building out of reach of the birds.
- Windows have to be covered by nets to keep wild birds outside the building.

Once the farm is disinfected and ready for a new flock, the entrance of people and vehicles has to be minimized. 24 hours before delivery the following things have to be done:

- 1. Start heating to reach the required temperature.
- 2. Check the drinking system and water temperature.
- 3. Put feed on the chick paper and in the feeders.
- 4. Check appropriate light intensity.

Temperature during brooding period

During the first 3 or 4 days chicks need 32-33°C depending on the brooding system. To reach the required temperature heating has to be started 24 hours prior to placing the day-old flock. The behaviour of the chicks is the best indicator of the temperature especially during night. By following some simple rules, we can ensure the conformity of the chicks during this fragile period.

- If the birds are calm and quiet and they spread equally in the house it means they feel comfortable.
- As the chicks are growing the temperature can be reduced to 30-31°C by the end of the first week.
- From the second week the temperature can be reduced by 2-3°C weekly until reaching 20°C.
- Always measure the temperature at birds' level.
- Besides the temperature it is essential to maintain proper humidity as well especially if brooding in cages. Relative humidity has to be kept between 40-60% by evaporating water (floor brooding) or watering the walks (cage brooding) if necessary.

Growth Management

MAIN POINT: Females and males MUST be reared separately.

Environmental factors, such as type of housing, ventilation and temperature, have a greater effect upon stocking rate than genetic make-up. Slatted floors, for example, will allow a tighter stocking rate than litter, while high temperatures especially if combined with high relative humidity necessitate a more liberal stocking rate. The following recommendations are given as a guide for litter units with an average temperature of about 20°C (68°F) at bird height. These rates should be reduced by 2% for each 1°C (2°F) rise in temperature above 20°C (68°F). It is advised to use dark houses with controlled lighting program, as they allow for better control of sexual maturity.

2. Table: Standards from 0-17 weeks of age

	Normal climate	Hot climate
Density	max. 10 female/m² max. 6 male/m²	max. 9 female/m² max. 5 male/m²
Feeders (through/pan)	15 cm/bird – 1 pan/12 birds	15 cm/bird – 1 pan/12 birds
Drinkers (round/nipples)	1 per 80 birds – 1 per 8 birds	1 per 60 birds – 1 per 6 birds
Ventilation	5m³/ kg liveweight/ hour	8m³/ kg liveweight/ hour

Feeding space

Insufficient feeding space during rearing will produce uneven birds at sexual maturity and result in reduced egg production. Standard should be regarded as the minimum requirements for satisfactory performance.

Drinking Space

- Water is an essential nutrient by itself. It can also influence all other nutrient intakes by controlling feed intake. For example, a restriction on water intake will cause a voluntary reduction in feed intake.
- To ensure that all birds find water when initially housed there should be a minimum light intensity of 20 lux at birds' level. This is especially important at day-old and where change of drinking system occurs when moving birds into the laying house.
- It is also recommended that extra drinkers are provided during the first week of life to minimize the incidence of non-starters or starve-outs.

• We highly recommend using round drinkers for chicks beak trimmed at the hatchery to avoid high mortality during the first week due to birds unable to use nipples.

Beak Trimming

Beak trimming need not be carried out routinely when stock is kept in controlled environment. But if experience from previous flocks suggests that it is necessary, it will be worthwhile first checking all other aspects of management before embarking on a program of beak trimming. The provision of more feeders and drinkers, more space per bird, correct nutritional components or improved ventilation may be the correct action to take.

- Infrared treatment is the most recommended method for beak trimming, which can be done soon after hatching, when chicks dried up.
- Beak trimming can also be done on both, males and females, at about 7-10 days of age. In order to reduce stress, it should be delayed for flocks where the brooding conditions have not been adequate.
- In open sided housing, routine beak trimming is recommended, as both bright light intensities and high temperatures may predispose undesirable behaviour. Care must be taken that all birds are correctly and uniformly beak trimmed.
- Each bird should mature with a rounded, but slightly shortened beak and be able to conduct normal feeding activity.

Monitoring body weight and uniformity during rearing

- Males and females should always be reared separately in order to implement different feeding and lighting program.
- The main purpose of the rearing period is to achieve the body weight and uniformity target at 20 weeks following a growth curve, close to the one stated in the technology.
- It is most important to obtain a regular weekly weight gain, as well as achieving the weekly target weights in the first few weeks to help develop a flock, which is uniform in size. This must be achieved before 10-12 weeks, as after this it is too late.

Body weight control

The birds must be weighed weekly from the first week. During the first 2 weeks, collective weights can be taken. Subsequently, the birds are weighed individually (minimum of 100 chicks). Weighing has to be done in the morning hours and on the same day of the week before feeding. The growth of a flock is normal and the birds can be considered equal if the difference between the individual and average weight is not more than 10%.

When the flock uniformity becomes too low, it is necessary to place those lighter and/or heavier birds in a separate pen. This selection must be done at 4 weeks.

3. Table: Nutritional recommendation for TETRA HB COLOR Parent stock (Growing period)

Feed Type		Starter I	Starter II	Grower	Pre-breeder
Nutrients		0-3 weeks	4-7 weeks	8-19 weeks	20-21 weeks
Crude protein	%	19.5	18.0	15.5	16.0
Met. energy	MJ/kg	12.0	11.7	11.5	11.7
Met. energy	kcal/kg	2870	2800	2700	2750
Amino acids					
Lysine	%	1.06	0.91	0.58	0.68
Methionine	%	0.43	0.42	0.38	0.38
Methionine+cysteine	%	0.76	0.75	0.67	0.68
Threonine	%	0.74	0.68	0.56	0.57
Tryptophan	%	0.23	0.21	0.15	0.17
Minerals					
Calcium	%	1.00	1.00	1.00	2.50
Phosphorus, av.	%	0.45	0.45	0.40	0.45
Sodium	%	0.16-0.18	0.16-0.18	0.16-0.18	0.16-0.18
Vitamins					
Vitamin A	IU/kg	10000	10000	10000	10000
Vitamin D₃	IU/kg	3200	3200	3200	3200
Vitamin E	mg/kg	80	80	65	100
Vitamin K₃	mg/kg	3	3	2	2
Vitamin B₁ (thiamine)	mg/kg	2	2	2	2
Vitamin B2 (riboflavin)	mg/kg	5	5	4	5
Vitamin B₄ (pyridoxine)	mg/kg	4	4	2	3
Vitamin B ₁₂ (cyanocobalamin)	mcg/kg	20	20	10	20
Panthotenic acid	mg/kg	12	12	8	10
Niacin	mg/kg	40	40	30	30
Biotin	mcg/kg	100	100	100	100
Folic acid	mg/kg	1	1	1	1
Choline chloride	mg/kg	400	400	300	400
Microelements					
Iron	mg/kg	50	50	50	50
Manganese	mg/kg	100	100	100	100
Copper	mg/kg	8	8	8	8
Zinc	mg/kg	80	80	80	80
lodine	mg/kg	1	1	1	1
Selenium	mg/kg	0.3	0.3	0.3	0.3

• Essentially **Starter** rations aim to produce a good skeleton, good organ development and help promote an active immune system. This is achieved by feeding the starter ad libitum during the first week with the correct balance and absolute levels of essential amino acids, for growth, development of the immune system, feathering and skin condition. Normally it is adequate to feed the Starter I. ration for 3 weeks, however, if for whatever reason body

weight is substantially less than the standard weight at 3 weeks, it is advisable to continue feeding Starter I. until body weight is on target.

• Whilst the **Grower and Pre-breeder ration** will be the lowest density ration that the bird receives, it is important that all nutrients are correctly included. Feeding portion is increasing; therefore it is essential to monitor the body weights weekly during this period.

	Body \	Weight	Feed Consumption						
Age (weeks)	(g)	(g)	(g/day)		(g/day) (g/week)		Cumulative (kg)		Feed Type
	Female	Male	Female	Male	Female	Male	Female	Male	
1	120	140	ad.lib.	ad. Lib.	87.5	140	0.1	0.1	
2	210	300	22.5	40	157.5	280	0.2	0.4	Starter I
3	300	480	32.5	40	227.5	280	0.5	0.7	
4	390	620	40	45	280	315	0.8	1.0	
5	480	740	43	50	301	350	1.1	1.4	Ctortor II
6	570	860	46	54	322	378	1.4	1.7	Starter II
7	660	980	50	58	350	406	1.7	2.1	
8	750	1100	55	62	385	434	2.1	2.6	
9	840	1220	57	66	399	462	2.5	3.0	
10	930	1340	59	70	413	490	2.9	3.5	
11	1020	1460	61	74	427	518	3.3	4.1	
12	1120	1580	63	78	441	546	3.8	4.6	
13	1220	1700	65	82	455	574	4.2	5.2	Crower
14	1320	1820	67	86	469	602	4.7	5.8	Grower
15	1420	1950	69	90	483	630	5.2	6.4	
16	1520	2100	71	93	497	651	5.7	7.1	
17	1620	2270	73	96	511	672	6.2	7.7	
18	1720	2440	76	100	532	700	6.7	8.4	
19	1820	2620	83	104	581	728	7.3	9.2	
20	1920	2800	93	108	651	756	8.0	9.9	Pre-breeder

4. Table: Weight development and Feed consumption of TETRA HB COLOR Parent stock (Growing period)

• Feeding the quantities and types of rations described in the schedule will not necessarily produce the body weights desired. If body weights vary significantly from those given in our guidance, appropriate changes should be made to the daily feed allocation.

Lighting program (first 2 weeks of age)

- The principle function of a lighting program is to influence the age at which a flock of birds becomes sexually mature.
- Age, and more particularly body weight, at first egg is the main factor, which determines the package of egg output. Egg numbers during the laying year decrease by 3-4 eggs for each 10 days delay in age at first egg.
- Lighting program is only effective if direct sunlight is blocked out of the building otherwise the time of maturity can vary. Due to this reason flocks moved to laying in autumn will start produce eggs a little later than stated in this manual.



• Hours and intensity of light must be kept on a moderate level (8 hours, 5-10 Lux) during the rearing period. Increase length at the age of 20 weeks.

Production Period

The target at the beginning of this period is 5-10% average production at 21 weeks of age.

TETRA HB Color Parent stocks often mature earlier, especially when birds go into production in late winter/spring time.

Management during production

TETRA HB Color Parent birds are suitable for alternative keeping systems during the production. Under hot climate it is advisable to provide shelter (house, trees, sheds) and extra drinking and living space for the birds. Controlled environmental houses are more sensible in allyear production programs.

5. Table: Housing standards during the production period

	Normal climate	Hot climate
Density	max. 8 birds/m²	max. 7 birds/m²
Feeders (through/pan)	15 cm/bird – 1 pan/12 birds	15 cm/bird – 1 pan/12 birds
Drinkers (round/nipples)	1 per 80 birds – 1 per 8 birds	1 per 60 birds – 1 per 6 birds
Ventilation	5m³/ kg liveweight/ hour	8m³/ kg liveweight/ hour

• Males should be fed separately, in case the feed is different (recommended).

- Body weight should be monitored every week until 30 weeks of age, then on a monthly basis.
- Overweighed hens lay fewer eggs during their production cycle; therefore daily feed consumption should be adjusted to the body weight standard.
- Feed amount **MUST be reduced** after peak production.

Feeding program

- Hens are usually transferred to the poultry house around 20 weeks of age. Body weight should be closely monitored until the onset of production. The level of feed intake in the production period is mainly affected by:
- Body weight, temperature, feathering, energy, texture of the feed, production intensity.
- Flock uniformity must be our main target. The more uniform the flock is the quicker will be the increase in production. It is advised to split the daily amount of feed giving the first round in the morning just before switching the lights on, and then distribute the rest of the feed after the peak laying hours.
- After peak production, daily feed amount need to be decreased gradually as birds start fattening.



Feed composition is different for hens and males. Males need less protein, calcium and amino acids than females. Their body weight should also be monitored, as overweight cocks are less effective, their mating activity is much lower. Comb size, colour are also good indicators of males' libido.

Feed Type		Breeder Female I	Breeder Female II	Breeder Male
Nutrients		22-44 weeks	45-66 weeks	22-66 weeks
Crude protein	%	16.5	15.5	14.5
Met. energy	MJ/kg	11.7	11.5	11.5
Met. energy	kcal/kg	2750	2700	2700
Amino acids				
Lysine	%	0.75	0.70	0.60
Methionine	%	0.39	0.38	0.38
Methionine+cysteine	%	0.68	0.65	0.65
Threonine	%	0.60	0.55	0.50
Tryptophan	%	0.17	0.16	0.15
Minerals				
Calcium	%	3.00-3.30	3.40-3.60	1.00
Phosphorus. av.	%	0.45	0.40	0.40
Sodium	%	0.16-0.18	0.16-0.18	0.16-0.18
Vitamins				
Vitamin A	IU/kg	10000	10000	10000
Vitamin D₃	IU/kg	3200	3200	3200
Vitamin E	mg/kg	100	100	100
Vitamin K₃	mg/kg	2	2	2
Vitamin B1 (thiamine)	mg/kg	2	2	2
Vitamin B ₂ (riboflavin)	mg/kg	5	5	5
Vitamin B₄ (pyridoxine)	mg/kg	3	3	3
Vitamin B ₁₂ (cyanocobalamin)	mcg/kg	20	20	20
Panthotenic acid	mg/kg	10	10	10
Niacin	mg/kg	30	30	30
Biotin	mcg/kg	100	100	100
Folic acid	mg/kg	1	1	1
Choline chloride	mg/kg	400	400	400
Microelements				
Iron	mg/kg	50	50	50
Manganese	mg/kg	100	100	100
Copper	mg/kg	8	8	8
Zinc	mg/kg	80	80	80
lodine	mg/kg	1	1	1
Selenium	mg/kg	0.3	0.3	0.3

6. Table: Nutritional Recommendation for TETRA HB COLOR Parent Stock (Production Period)

Depth of feed in the trough, number of feeds per day and texture of feed affect feed intake. Consumption levels are positively correlated with depth of feed in the trough and feeds per day. Increasing depth of feed and number of times per day that feed is given to the birds will help maintain feed intake during hot weather.

	Body Weight Feed Consumption							
Age (weeks)	(g)	(g)	(g/c	lay)	(g/w	eek)	Cumula	tive (kg)
	Female	Male	Female	Male	Female	Male	Female	Male
21	2020	2950	120	110	840	770	0.8	0.8
22	2120	3100	125	110	875	770	1.7	1.5
23	2210	3230	130	115	910	805	2.6	2.3
24	2290	3350	135	126	945	882	3.6	3.2
25	2365	3460	136	128	952	893	4.5	4.1
26	2435	3560	141	129	990	903	5.5	5.0
27	2500	3650	147	131	1030	914	6.5	5.9
28	2540	3760	153	132	1070	924	7.6	6.9
29	2580	3840	160	134	1120	935	8.7	7.8
30	2600	3900	160	135	1120	945	9.9	8.7
31	2610	3915	160	135	1120	947	11.0	9.7
32	2620	3930	160	136	1120	949	12.1	10.6
33	2630	3945	160	136	1120	951	13.2	11.6
34	2640	3960	160	136	1118	953	14.3	12.5
35	2650	3975	159	137	1116	956	15.4	13.5
36	2660	3990	159	137	1114	958	16.6	14.5
37	2670	4005	159	137	1112	960	17.7	15.4
38	2680	4020	159	137	1110	962	18.8	16.4
39	2690	4035	158	138	1107	964	19.9	17.3
40	2700	4050	158	138	1105	966	21.0	18.3
41	2710	4065	158	138	1103	968	22.1	19.3
42	2720	4080	157	139	1101	970	23.2	20.2
43	2730	4095	157	139	1099	972	24.3	21.2
44	2740	4110	157	139	1097	974	25.4	22.2
45	2750	4125	156	140	1095	977	26.5	23.2
46	2760	4140	156	140	1093	979	27.6	24.1
4/	2770	4155	156	140	1000	981	28.7	25.1
48	2780	41/0	156	140	1089	983	29.8	26.1
<u>47</u>	2790	4180	100	141	1086	980	30.8	27.1
51	2000	4200	100	141	1084	787	31.7	20.1
52	2010	4210	15.	141	1002	707	27.1	27.1
52	2020	4230	154	142	1078	003	35.2	30.1
5/	28/0	4243	154	142	1076	995	36.2	32.0
55	2850	4200	153	1/3	1076	998	37.3	32.0
55	2860	4270	153	1/3	1074	1000	38.4	34.0
57	2870	4305	153	143	1072	1000	39.5	35.0
58	2880	4320	153	143	1078	1002	40.5	36.1
59	2890	4335	152	144	1065	1004	41.6	371
	2900	4350	152	144	1063	1008	42.7	38.1
	2910	4365	152	144	1061	1010	43.7	39.1
62	2920	4380	151	145	1059	1012	44.8	40.1
63	2930	4395	151	145	1057	1012	45.8	41.1
64	2940	4410	151	145	1055	1016	46.9	42.1
65	2950	4425	150	146	1053	1019	47.9	43.1
66	2960	4440	150	146	1051	1021	49.0	44.2

7. Table: Weight development and Feed consumption of TETRA HB COLOR Parent stock (Production period)

*: Feed amount must be adjusted to the production intensity and uniformity. Check body weight weekly around the peak production, increase daily feed for hens, as intensity goes up.

**: After peak production (>30 weeks) it is very important to keep a balanced weight gain in your Parent flock to maintain good persistency. Weekly liveweight monitoring may be necessary.

Hatching Egg Care

Nests

- The production of clean eggs and the minimization of eggs laid on the floor are influenced greatly by the provision of sufficient, well sited and well maintained nest boxes. Floor eggs are less usable, increase work for farm staff and expose hatching eggs for potential bacterial infection. Therefore, we do not recommend using floor or dirty eggs for hatching.
- Nests should be well ventilated to discourage broodiness and their litter replenished regularly to prevent breakages and minimize bacterial contamination.

Egg collection

- Flock size and number of nests determines the number of hatching eggs.
- Collect eggs from nests at least 4 times a day. Most eggs will be laid during the morning hours, so collection times should be adjusted accordingly.
- Floor eggs must be collected and handled separately. Note must be taken of % of floor eggs, so management factors can be changed if necessary.

Egg handling

- Hatching eggs should always be placed on the tray with their pointed end down!
- Small/XL, dirty, cracked eggs are not suitable for hatching, they need to be collected and placed away from hatching eggs (over 52 g).
- Pallets need to be filled from the bottom, so warmer eggs will be on top. If eggs packed in a box, they should be cooled to egg store temperature before packed away.
- Embryonic cell division commences while the egg is travelling down the hen's oviduct (temperature about 41°C (106°F)). As soon as the egg is laid it cools to the temperature of its surroundings and cell multiplication slows down.
- If eggs are to be placed into an incubator within 3 days after being laid the optimum storage temperature is about 25°C (77°F).

- If eggs are being stored for 4 days or more before setting, hatchability is maximized by getting the egg temperature down to 13-16°C (55-61°F) as quickly as possible and storing at a relative humidity of about 75%.
- In cold weather, heat should be provided to maintain a minimum temperature of 16°C (50°F) in the egg store and avoid chilling.

Sexing day old chicks

- The feathering status of Parent generation determines the feathering of the commercial product. TETRA HB Color broiler is feather-sexed at hatch.
- Parent stock must contain Fast-feathering Males and Slow-feathering Females to result in feather-sexable commercial chicks. (Males-SF; Females-FF)

Fast feathering



Slow feathering



Production

8. Table: Production Targets for TETRA HB COLOR Parent Stock

Age		Egg Production	Chicks		
Weeks	HD (%)	Weekly	Cumulative	Weekly	Cumulative
21	9.7	0.7	0.7		
22	46.9	3.3	4.0		
23	75.0	5.2	9.2		
24	82.6	5.8	15.0	1.9	1.9
25	86.6	6.0	21.0	4.1	6.1
26	88.8	6.2	27.2	4.6	10.7
27	89.9	6.3	33.4	5.1	15.8
28	91.2	6.3	39.8	5.3	21.1
29	91.6	6.4	46.1	5.4	26.6
30	91.8	6.4	52.5	5.5	32.1
31	91.7	6.4	58.9	5.5	37.5
32	91.2	6.3	65.2	5.4	43.0
33	90.1	6.2	71.4	5.4	48.4
34	88.9	6.1	77.6	5.3	53.7
35	88.1	6.1	83.6	5.2	58.9
36	87.1	6.0	89.6	5.2	64.1
37	86.2	5.9	95.6	5.1	69.2
38	85.2	5.9	101.4	5.1	74.3
39	84.2	5.8	107.2	5.0	79.3
40	83.3	5.7	113.0	4.9	84.2
41	82.3	5.6	118.6	4.9	89.1
42	81.3	5.6	124.2	4.8	93.9
43	80.4	5.5	129.7	4.8	98.7
44	79.4	5.4	135.1	4.7	103.4
45	78.4	5.4	140.5	4.6	108.0
46	77.4	5.3	145.8	4.6	112.5
47	76.4	5.2	151.0	4.5	117.0
48	75.5	5.1	156.1	4.4	121.4
49	74.5	5.1	161.2	4.3	125.7
50	73.5	5.0	166.2	4.3	130.0
51	72.5	4.9	171.1	4.2	134.2
52	71.5	4.9	176.0	4.1	138.3
53	70.5	4.8	180.7	4.0	142.3
54	69.5	4.7	185.4	4.0	146.3
55	68.5	4.6	190.1	3.9	150.2
56	67.5	4.6	194.7	3.8	154.0
57	66.5	4.5	199.1	3.7	157.6
58	65.5	4.4	203.6	3.6	161.3
59	64.5	4.3	207.9	3.5	164.8
60	63.5	4.3	212.2	3.5	168.2
61	62.5	4.2	216.4	3.4	171.6
62	61.5	4.1	220.5	3.3	174.9
63	60.5	4.1	224.6	3.2	178.0
64	59.5	4.0	228.6	3.1	181.2
65	58.4	3.9	232.5	2.9	184.1
66	57.4	3.8	236.3	2.8	186.8



Male Management

Growing period

• First evaluation of the male's uniformity should be done at 4 weeks of age. Underweighted and underdeveloped males must be removed and put separately for 1-2 weeks. This time should be enough for them to catch up with the rest of the flock.

Transfer

Males should be at good sexual maturity at the time of transfer. Mixing females with males is carried out at 20-21 weeks of age. This procedure should be monitored for the following reasons:

- Good relationship between the birds and proper development of hierarchy is essential for successful future production.
- Underdeveloped, sexually immature males should not be transferred or must be removed from the flock.
- Comb size, colour and behaviour are the best indicators of male's libido.
- Remove aggressive males and keep them separately for observation. Hens may not be ready to accept them.
- Transfer more males then intended to keep later for selection basis.
- Ratio of males and females should be 1:10 by the offset of production.

Males at production

- Soon after transfer, body weight should be closely monitored for 2 reasons:
 - 1. Normal development of testicles
 - 2. Males are gradually excluded from the hen's feeders, therefore technology need to be prepared for separate feeding. Loss in body weight results in early retirement and lower libido in males.
 - 3. On the other hand, males stealing feed from the females feeder, when egg production is close to peak, which could result in males becoming overweight, while reduce peak production level. Monitoring female body weight and egg weight will show if this problem exist.

- Males must not lose weight during production, as they may not recover from excessive weight loss. They may become dull and inactive and need to be removed from the flock, eventually.
- Daily feed intake must not be reduced.
- Body weight must be monitored every 4 weeks after peak.
- Litter must be kept dry to avoid leg disorders, which affects the males' activity.
- Strewing grains in the litter will also positively stimulate mating.

Optimal mating ratio

In order to maintain fertility in your stock, adequate number of sexually active male is required. As birds age, and egg production level decrease, lower number of males is needed, so inactive males can be removed from the flock.

- Daily feed always need to be adjusted to the changing flock size. Typical ratio is 1:10; however, more males may be needed in hot climate, where their libido is lower due to the high temperature. Mating ratio should be reviewed fortnightly.
- Removal of non-working males needs to be an ongoing process during the production period. A so called "over-mating", when we have more than enough males in the building will result in abnormal behaviour and interrupted mating.
- Excessive loss of feathers on the back of the hen's head will indicate this problem. Moreover, feather loss and injuries on males due to constant fighting will cause welfare issues.
- If problems not solved immediately, fertility will decline in a very short period of time.
- Mating problems need to be monitored from 25 weeks of age.

Lighting Programmes

Controlled environment (dark house)

- When birds are reared in a controlled environmental house, onset of production is relatively easy to handle.
- After transferring the birds, hours of lighting must be increased until 16 hours.
- Do not decrease the length of lighting during the production period!

9. Table: Lighting program for TETRA HB Color Parent stocks

Age (weeks)	Length (hours)	Intensity (Lux)
21	10	35-40
22	12	35-40
23	13	35-40
24	14	35-40
25	15	35-40
26	16	35-40

• Full benefit will not be obtained if the house is not light-proof, especially when birds are being reared during a time of naturally increasing day length. In such circumstances, early sexual maturity and small egg size are potential problems.

Light intensity

Increase in light intensity should be done simultaneously with increasing daylength. It is very important that birds reach target body weight before taking more intensive light. Lux during laying period should be between 30 and 40. Higher is recommended to encourage the use of nest boxes, therefore minimizing floor eggs.

• Houses must be light proof to an intensity of 0.5 Lux during dark periods. Any light leakage must be avoided and solved.

Open house environment

- Light stimulation is not necessary when birds are transferred to an open sided or free range environment.
- Adjustment of lighting program is depending on the followings:
 - Natural daylight increases
 - Natural daylight decreases
- For example; when our flock starts production in late winter/spring, when natural day length increasing in Northern Hemisphere, it is advised not to transfer them before natural sexual maturity (21-22 weeks of age).
- Personalized lighting programs for regional climatic and lighting conditions are available from your Bábolna TETRA representatives.

Light intensity

In open sided houses it is important that the light intensity provided during the hours of artificial lighting is enough for stimulation. Lux should be at least 30, the same suggested for dark houses.

- Additional lighting hours should be equally divided between the beginning and at the end of the day. This will ensure that daylength remains constant and does not depend on natural changes of sunrise and sunset.
- Seasonal effects can be reduced if the light intensity emerging into the house is decreased.

Hot Climate Management

In the open house system of poultry keeping practiced in tropical climates it is not always possible for the Bábolna TETRA HB Color Parent Stock to fully express its genetic potential. However, there are various modifications to the management recommendations for controlled environmental conditions which can be adopted to minimize the loss of performance.

The main problems encountered when keeping birds at high temperatures are the followings:

- Difficulties of getting enough nutrients into the bird
- Change in method of heat loss used by the bird to maintain its body temperature after panting begins at about 28°C (82°F).
- Birds reduce their intake of energy as ambient temperatures rise because of the lower demand for heat production at higher temperatures.

There are two approaches to minimizing performance losses;

- Reducing the temperature of the bird's microclimate,
- Maximizing nutrient intake.

Housing



• Use roofing materials which have good insulation properties and reflect solar radiation. Natural materials like palm thatch usefully reduce penetration of solar heat.

- Where metal roofs are unavoidable they can be painted with a solar reflective product, or be fitted with a sprinkler along the ridge to reduce the heat radiated through to the house interior.
- Roof overhangs should be long enough to prevent direct sunlight falling on the birds, at least in the hottest part of the day.
- Ridge outlets should be fitted to permit bird heat to escape; ideally these should open away from the sun.
- Roofs should be as high as possible to minimize the temperature at the bird's level and maximize the natural air flow to the ridge.
- Mount fans vertically to create horizontal air movement at the bird's level (safety-guards must be fitted).
- Fogging the inside of the house with fine water droplets will reduce the air temperature and moisten the fleshy parts of the bird's head, so improving heat loss.
- Nozzle size should be small enough to ensure that the water droplet size is not too big.
- Vegetation and trees may be planted around the buildings to provide shade and reduce the amount of sunlight reflected from the ground.

It is important to note that in some countries welfare regulations may stipulate stocking rates, feeding and drinking space, which are different to those given in this manual. Regulations may also prohibit or restrict certain husbandry practices, such as beak trimming, toe clipping and dubbing.

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