



TETRA

SELECTED FOR QUALITY

TETRA SUPER HARCO

PARENT STOCK
MANAGEMENT GUIDE

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Introduction

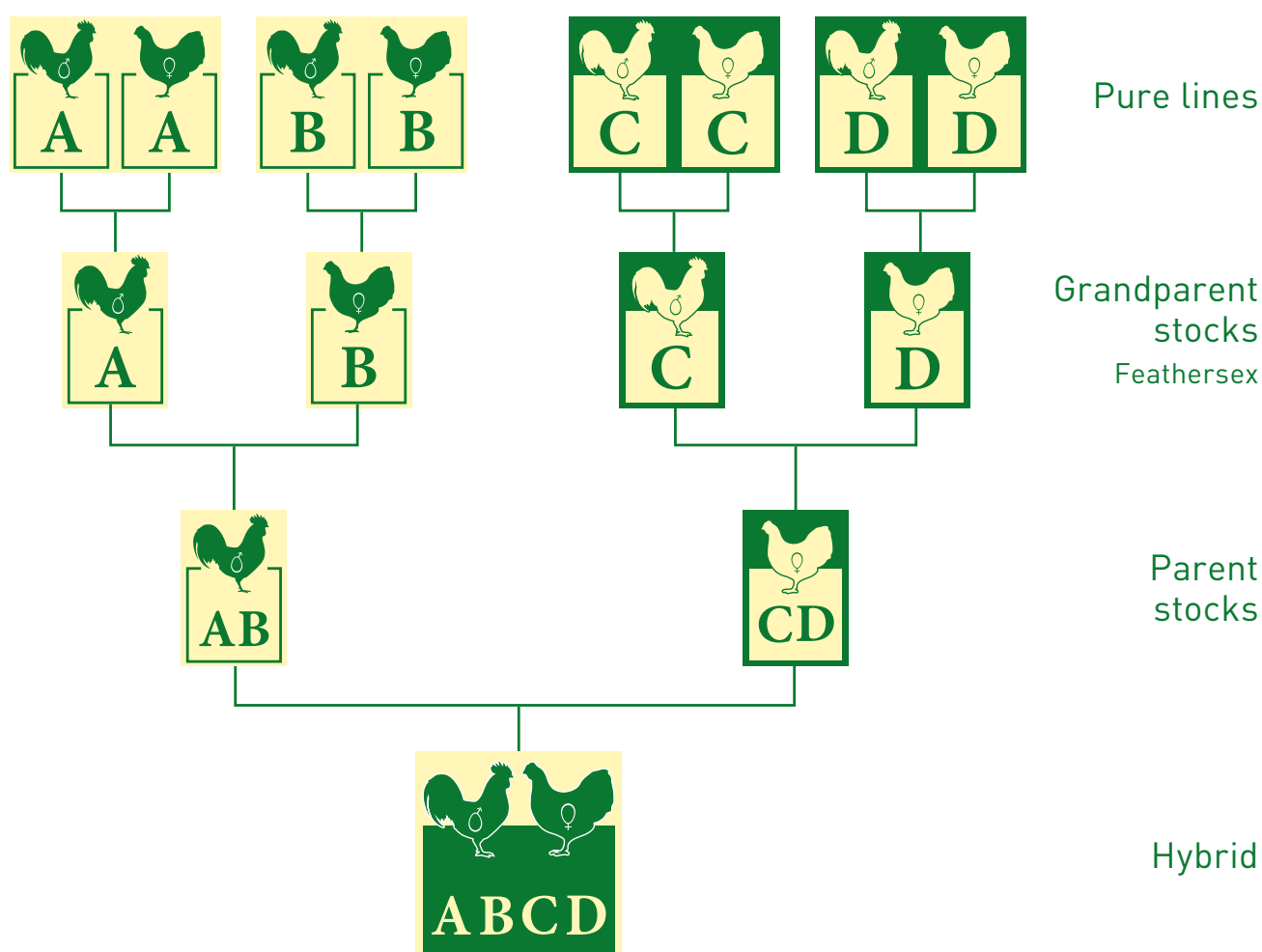
TETRA SUPER HARCO Parent stocks are bred to produce dual-purpose, black and barred feathered birds for free range systems. Parent lines are selected for growing ability, viability and efficient egg production.

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. We give high priority to economic efficiency, long and balanced production and top egg quality in order to guarantee high return on our partner's investments.

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 SUPER HARCO



General rules for cleaning and disinfecting poultry houses

Isolation of the house is vitally important to reduce the possibility of introducing a disease organism into a clean house environment. People traffic constitutes the largest threat to isolation and introduction of disease causing agents. Ideally, shower facilities and farmclothing 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. Remembering that people spread many diseases from farm to farm will help to encourage less people traffic to and from farms.
- 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 built-up 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. The 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 high-pressure 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 prior to replacement prior to chick arrival.

Before the arrival of the new flock

- All equipment, including cages, brooders, interior surfaces of the building, and any other equipment used 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 any other control method available should 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.



Veterinary control

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 other 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 unauthorized 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. Prepare feed ready for the birds
4. Check appropriate light intensity

Vaccination programs

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

1. Table: Example of a vaccination program for TETRA SUPER HARCO Parent Stock

Age	Disease
Day 1 (hatchery)	Marek
	Newcastle (ND)
	Bronchitis (IB)
Day 1 (farm)	Coccidiosis
Day 5	Salmonellosis (live)
Day 12	ND + IB var.
Day 18	Gumboro
Day 28	Gumboro
Week 6	ND + IB var.
Week 7	Salmonellosis (live)
Week 8	Fowl pox
	E. coli
	Mycoplasma syn.
Week 9	Avian Encephalomyelitis
Week 11	IB var.
Week 13	Pneumo virus
Week 15	ND + IB
Before transfer	EDS
	TRT, IB, G, ND
	Salmonellosis (inactive)

Temperature during brooding period

During the first 3 or 4 days chickens need 32-34°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 behavior of the chickens 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 out equally in the house it means they feel comfortable.
- As the chicks are growing the temperature can be reduced to 30-32°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 the bird's 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.

HUSBANDRY Growing period - principles

- Male and Female Lines of TETRA SUPER HARCO Parent stock must always be reared separately. Male line is much heavier and needs different feeding and monitoring system than the Female line.
- 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 0-20 weeks of age

	Male	Female
Density	6-8 birds/m ²	7-10 birds/m ²
Feeders (through/pan)	15cm/bird – 1 pan/12 birds	10cm/bird – 1 pan/35 birds
Drinkers (round/nipples)	1 per 80 birds – 1 per 8 birds	1 per 120 birds – 1 per 8 birds
Ventilation	5m ³ / kg liveweight /hour	5m ³ / 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. Therefore the provision of an adequate number of well distributed drinking points is a key factor in egg production.
- To ensure that all birds find water when initially housed there should be a minimum

light intensity of 20 lux at the bird's 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 our stock is kept in controlled environment housing. 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 behavior. 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

- The main purpose of the rearing period is to achieve the bodyweight 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.

Bodyweight 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).

- At 14 days of age, start recording individual body weight in order to calculate uniformity (CV%).

$$CV\% = \frac{\text{standard deviation}}{\text{average bodyweight}} \times 100$$

- Uniformity and regular selection is foremost important in breeder flocks. Proper selection is indispensable for high performance.

- When the flock uniformity becomes too low, it is necessary to place those lighter and/or heavier birds in a separate pen. The first selection must be done at 4 weeks of age.
- Continuously monitor body weight and adjust feed amount if necessary.
- Make another selection around 14-15 weeks of age. Eliminate sexing errors from the flock, adjust feed allocation for both males and females if necessary, but try to follow the targets stated in the manual.
- Final selection takes place between 20-21 weeks of age. Bodyweights for both sexes should be on target and flock should look uniform and ready to be transferred.
- The growth of a flock is normal and the birds can be considered equal if CV is below 10%.

Weighing always has to be done in the morning hours and on the same day of the week before feeding.

3. Table: Nutritional recommendation for TETRA SUPER HARCO PS - Male (Growing period)

Component		Starter I.	Starter II.	Grower	Pre-lay
		0-3 weeks	4-7 weeks	8-16 weeks	17-20 weeks
Crude protein	%	19.50	18.20	15.50	15.50
Metabolized Energy	MJ/kg	11.80	11.70	11.70	11.70
Crude fat	%	3.00	2.90	3.60	3.50
Fibers	%	3.60	4.00	4.50	4.30
Amino acid (digestible)					
Lysine	%	1.06	0.91	0.58	0.68
Methionine	%	0.43	0.42	0.38	0.38
Meth+cystine	%	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	%	1.15	1.10	1.20	1.50
Phosphorus	%	0.74	0.77	0.77	0.78
Available phosphorus	%	0.45	0.45	0.44	0.45
Sodium	%	0.16	0.16	0.18	0.18
Vitamins					
Vitamin A	NE/kg	12 560	12 560	10 690	13 500
Vitamin D ₃	NE/kg	3 520	3 520	3 590	3 750
Vitamin E	mg/kg	81	81	69	100

4. Table: Nutritional recommendation for TETRA SUPER HARCO – PS Female (Growing period)

Component		Starter I.	Grower	Pre-lay
		0-8 weeks	9-17 weeks	17-20 weeks
Crude protein	%	18.00	15.0	17.0
Metabolize energy	MJ/kg	11.50	11.30	11.40
Amino acids [digestible]				
Lysine	%	0.82	0.56	0.58
Methionine	%	0.36	0.27	0.29
Meth+cystine	%	0.61	0.49	0.5
Threonine	%	0.70	0.50	0.52
Tryptophan	%	0.19	0.14	0.13
Minerals				
Calcium	%	1.00	1.00	2.00
Available phosphorus	%	0.45	0.40	0.42
Sodium	%	0.15	0.15	0.15
Vitamins				
Vitamin A	NE/kg	10000	8000	13 500
Vitamin D ₃	NE/kg	3 000	3 000	3 000
Vitamin E	mg/kg	20	20	60

- Essentially a **Starter** ration aims 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 (Male line), however, if for whatever reason body weight is substantially less than the standard weight at 3 weeks, it is advisable to continue feeding Starter until body weight is on target.
- Whilst the **Grower and Pre-lay ration** will be the lowest density ration that the bird receives, it is important that all nutrients are correctly included. Feed restriction is not recommended during this period as it may be difficult to achieve the correct body weight at first egg. Feeding portion is increasing; therefore it is essential to monitor the body weights weekly during this period.

5. Table: Weight development and Feed consumption of TETRA SUPER HARCOPS Male and Female (Growing period)

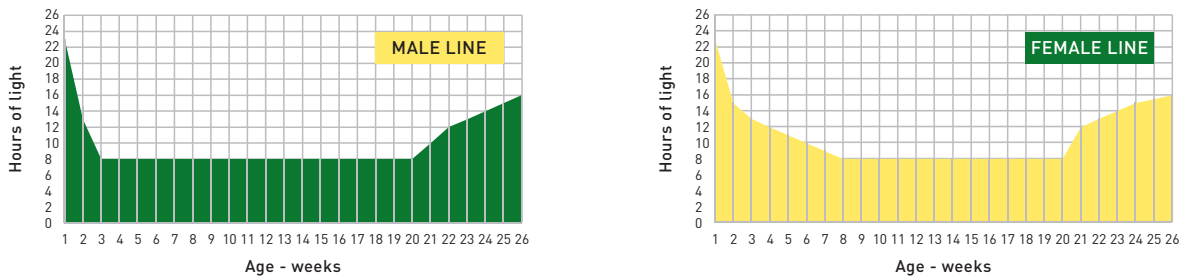
Weeks	MALE - TETRA SUPER HARCO		FEMALE - TETRA SUPER HARCO	
	Males		Females	
	Bodyweight (g)	Daily feed intake	Bodyweight (g)	Daily feed intake
1	130	Ad libitum	75	14
2	255	32	120	19
3	390	37	170	27
4	505	43	255	35
5	610	47	350	42
6	715	50	450	47
7	820	54	550	51
8	925	59	670	56
9	1 030	62	795	60
10	1 135	65	920	64
11	1 240	68	1030	68
12	1 350	71	1140	73
13	1 460	74	1230	76
14	1 570	77	1320	79
15	1 685	80	1400	82
16	1 810	82	1470	86
17	1 945	85	1540	89
18	2 080	88	1590	92
19	2 220	94	1635	Ad libitum
20	2 360	101	1680	

- 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

- 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-day 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 few weeks later than stated in this manual.
- Lighting program is different for TETRA SUPER HARCO PS males and females. Males need less hours during its growing period; therefore it is necessary to keep different genders in a separate building.

1. Figure: Differences in lighting program for TETRA SUPER HARCO Parent stocks – (Growing period)



6. Table: Lighting program for Controlled Environment Houses TETRA SUPER HARCO Parent stock

Age	Males		Females	
	Length	Intensity	Length	Intensity
Days	Hours	*Lux	Hours	Lux
0	24	60	24	40
1	23	60	23	40
2	22	60	23	20
3	18	40	16	20
4	16	30	16	10
5	15	20	16	10
6	14	15	16	10
7	13	10	15	10
8	12	10	15	10
9	11	10	15	10
10	10	5	15	5-10
11	9	5	15	5-10
12	8	5	15	5-10
13	8	5	15	5-10
14	8	5	14	5-10
Weeks				
3			13	
4			12	
5			11	
6	8	5	10	5-10
7			9	
8			8	
8-20			8	
21	10	35-40	12	15-20
22	12	35-40	13	15-20
23	13	35-40	14	15-20
24	14	35-40	15	15-20
25	15	35-40	15.5	15-20
26	16	35-40	16	15-20

*Lux= Lumen/m²

HUSBANDRY - Production period

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

Females mature early, at 20 weeks of age. Laying may start around 22-23 weeks, especially when birds goes into production in late winter/spring time.

Management during production

TETRA SUPER HARCOPS 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 all-year production programs.

Feeding program

- Males and females should be fed separately, in case the feed is different (recommended) for proper weight control.
- 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 bodyweight standard.
- Feed amount MUST be reduced after peak production in males.

Control of uniformity

- Hens are usually transferred to the poultry house around 20 weeks of age. Bodyweight should be closely monitored until the onset of production. Daily feed amount must be adjusted to avoid fattening.
- 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.
- The level of feed intake in the production period is mainly affected by:
 - » Body weight, temperature, feathering, energy, texture of the feed, production intensity

- Laying hens primarily alter their daily food intake to accommodate changes in their requirement for energy. Therefore factors which alter the bird's demand for energy, such as ambient temperature, automatically alter the bird's intake of food. If there has been no modification of the ration formulation, changes in daily intake will result in changes in all nutrient intakes, and changes in the intake of amino acids, vitamins, minerals, anti-coccidials etc. will correspondingly affect bird performance.
- Hens do not totally adjust intake at the extremes of temperature or dietary energy concentration. At high temperatures or with high energy concentrations it tends to reduce energy intake too much and egg output suffers.
- Hens with low bodyweight lay fewer eggs, whereas higher body weight at the beginning of the production seems an advance until the peak period.

7. Table: Weight development and Feed consumption of TETRA SUPER HARCO Parent Stock Male and Female (Production period)

Weeks	MALE - TETRA SUPER HARCO PS		FEMALE - TETRA SUPER HARCO	
	Bodyweight (g)	Daily feed intake (g)	Bodyweight (g)	Daily feed intake (g)
21	2485	115	2050	Ad libitum * daily feed intake 115-120 g/ bird
22	2610	118	2125	
23	2745	123	2210	
24	2875	130	2300	
30	3250	135	2425	
35	3500-3700	**140-150	2500-2600	
40				
45				
50				
60				
65				

**** 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.**

8. Table: Nutritional recommendation for TETRA SUPER HARCO Parent Stock (Production period)

Component		Males	Females
		in production	21-66 weeks
Crude protein	%	16	17.7
ME	MJ/kg	11.6	11.4
Amino acids (available)			
Lysine	%	0.7-0.75	0.8
Methionine	%	0.38	0.34
Meth+cystine	%	0.68	0.57
Threonine	%	0.6	0.57
Tryptophan	%	0.16	0.14
Minerals			
Calcium	%	1.35	3.78
Available phosphorus	%	0.45	0.27
Sodium	%	0.18	0.11
Vitamins			
Vitamin A	NE/kg	13500	13500
Vitamin D ₃	NE/kg	3 650	3000
Vitamin E	mg/kg	110	80

** Although we propose a male feed for production, target weights can be reached by restricting the feed and monitoring body weight. However, specific feed with lower protein and Calcium and higher Vitamin E level encourage slower weight gain and better sperm quality.*

- 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.
- Feed particle size is also an important factor. High ration of fine particle increase dust in the building and decrease feed intake, while high ration of coarse particles increase feed separation.
- Optimal size is 1-3mm during the production period.

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 52g).

- 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

- **TETRA SUPER HARCO commercial** male and female chicks can be distinguished by their color; a male chick is barred, female is black.



Production goals for TETRA SUPER HARCO Parent stocks

9. Table: Production goals for TETRA HB Color Parent Stock Females

Age	Egg production		Number of eggs per hen HH		Hatching eggs /hen	No. of saleable chicks	No. of saleable chicks
Weeks	HH%	HD%	Weekly	Cumulative	Weekly	Weekly	Cumulative
20	1.9	2	0.1	0.1			
21	17.3	18	1.2	1.3			
22	38.4	40	2.7	4.0	0.7	2.0	2
23	55.7	58	3.9	7.9	1.5	3.0	5.0
24	73.9	77	5.2	13.1	2.6	4.1	9.0
25	83.5	87	5.8	18.9	3.6	4.6	13.7
26	86.9	90.5	6.1	25.0	4.4	4.8	18.5
27	87.8	91.5	6.1	31.1	4.7	4.9	23.3
28	87.8	91.5	6.1	37.3	5.0	4.9	28.2
29	87.8	91.5	6.1	43.4	5.2	5.0	33.2
30	87.8	91.5	6.1	49.6	5.3	5.0	38.2
31	87.6	91.3	6.1	55.7	5.5	5.0	43.2
32	87.4	91	6.1	61.8	5.5	5.0	48.3
33	87.2	90.8	6.1	67.9	5.6	5.1	53.3
34	86.9	90.5	6.1	74.0	5.6	5.0	58.4
35	86.7	90.3	6.1	80.1	5.6	5.0	63.4
36	85.5	90	6.0	86.1	5.6	4.9	68.3
37	85.0	89.5	6.0	92.0	5.6	4.9	73.2
38	84.6	89	5.9	98.0	5.6	4.9	78.0
39	84.1	88.5	5.9	103.8	5.6	4.8	82.9
40	83.6	88	5.9	109.7	5.6	4.7	87.6
41	83.0	87.4	5.8	115.5	5.5	4.6	92.2
42	82.5	86.8	5.8	121.3	5.5	4.5	96.7
43	81.9	86.2	5.7	127.0	5.5	4.4	101.1
44	81.3	85.6	5.7	132.7	5.5	4.3	105.4
45	80.8	85	5.7	138.3	5.4	4.2	109.7
46	80.2	84.4	5.6	144.0	5.4	4.2	113.8
47	79.6	83.8	5.6	149.5	5.3	4.1	117.9
48	79.1	83.3	5.5	155.1	5.3	4.0	121.9
49	78.6	82.7	5.5	160.6	5.3	3.9	125.8
50	78.0	82.1	5.5	166.0	5.2	3.8	129.6
51	77.4	81.5	5.4	171.5	5.1	3.7	133.4
52	76.9	80.9	5.4	176.8	5.1	3.7	137.0
53	76.3	80.3	5.3	182.2	5.1	3.6	140.6
54	75.7	79.7	5.3	187.5	5.0	3.5	144.1
55	75.1	79.1	5.3	192.7	4.9	3.4	147.5
56	74.3	78.2	5.2	197.9	4.9	3.3	150.8
57	73.4	77.3	5.1	203.1	4.8	3.2	154.0
58	72.5	76.3	5.1	208.1	4.7	3.1	157.2
59	71.6	75.4	5.0	213.2	4.7	3.1	160.2
60	70.8	74.5	5.0	218.1	4.6	3.0	163.2
61	69.9	73.6	4.9	223.0	4.5	2.9	166.1
62	69.1	72.7	4.8	227.8	4.4	2.9	169.0
63	68.2	71.8	4.8	232.6	4.4	2.9	171.9
64	67.3	70.8	4.7	237.3	4.3	2.8	174.7
65	66.4	69.9	4.6	242.0	4.2	2.8	177.5
66	65.6	69	4.6	246.6	4.2	2.8	180.3

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, color and behavior 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 than 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, bodyweight 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 bodyweight results in early retirement and lower libidos 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 bodyweight 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.
- Bodyweight 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 required. As birds ages, and egg production level decrease, lower number of males 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 cocks libido is lower due to the high temperature. Mating ration 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 behavior 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 program

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!
- 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.

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**.

Hot climate management

In the open house system of poultry keeping practiced in tropical climates it is not always possible for the Bábolna TETRA 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 micro-climate,
- Maximizing nutrient intake.

Housing



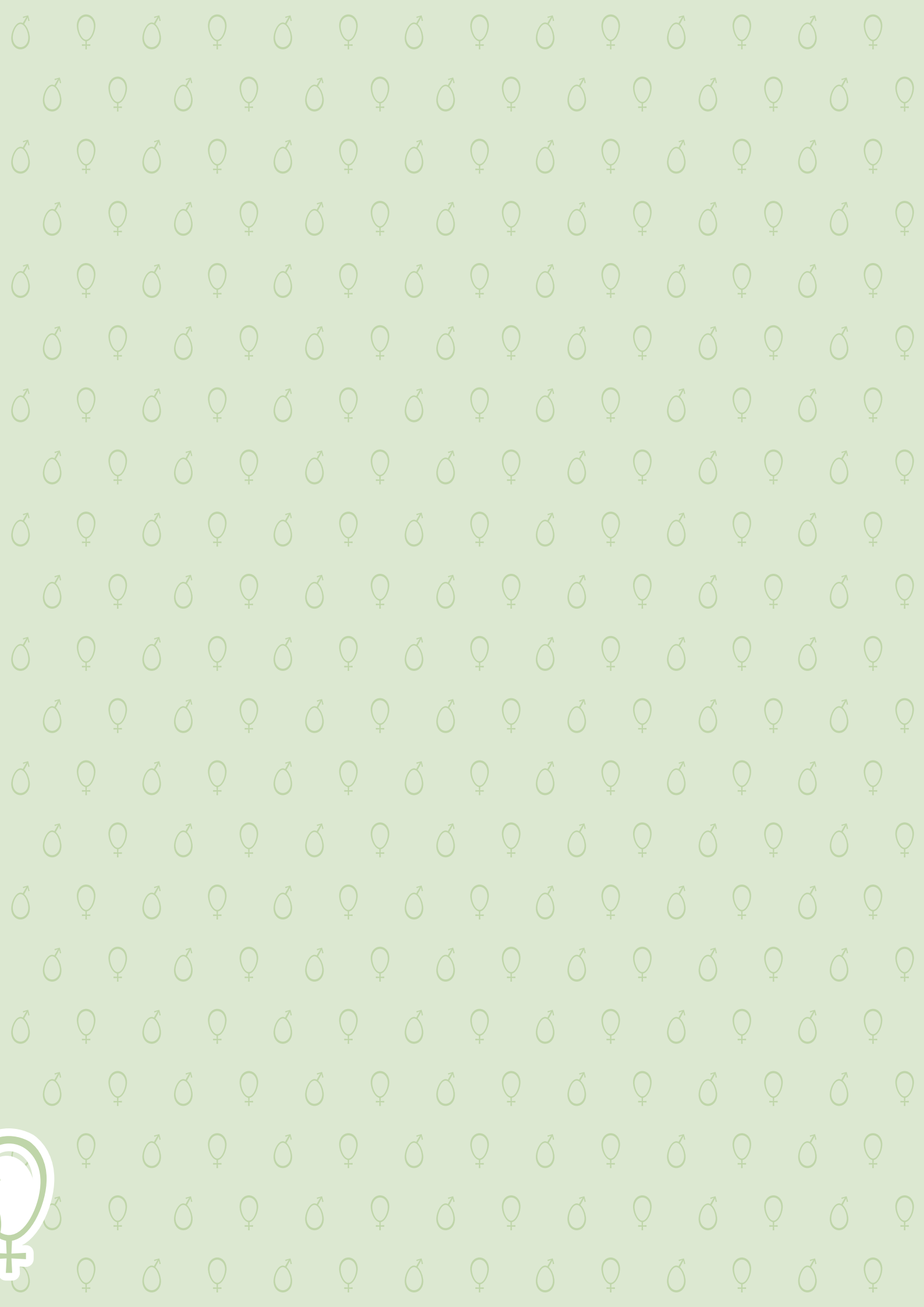
- Use roofing materials which have good insulation properties and reflect solar radiation. Natural materials like palm thatch usefully reduce penetration of solar heat.
- Where metal roofs are unavoidable they can be painted with a solar reflective product, or be fitted with a sprinkler along the ridge to

reduce the heat radiated through to the house interior.

- Where water is at a premium, sprinkler systems can incorporate a recycling pump.
- 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 space 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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