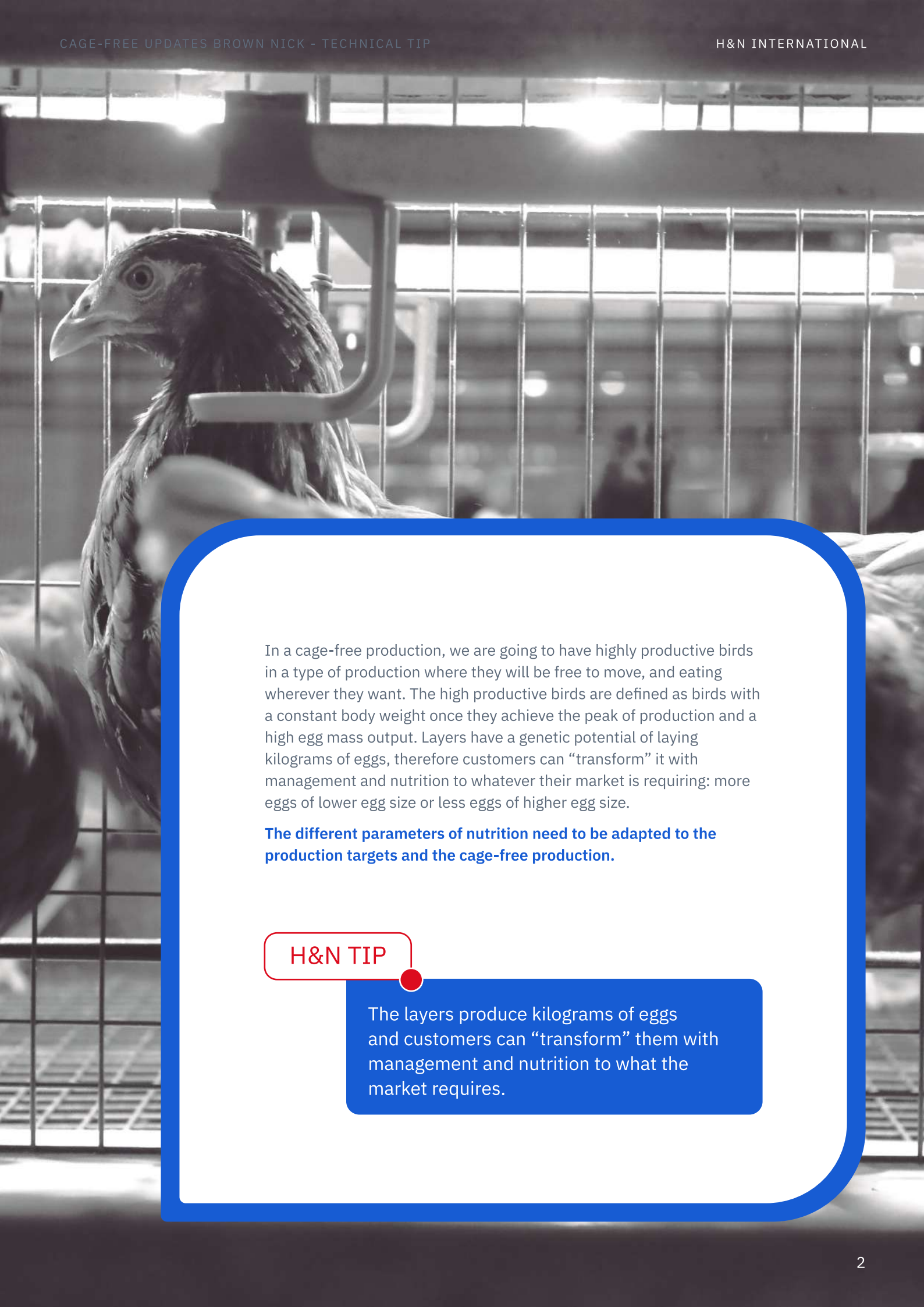




■ Cage-free formulation update for Brown Nick

TECHNICAL TIPS

H&N is working towards to maximize egg production improving the genetic potential of the birds every year. Nowadays, the production in cage is not the only way of doing it, in Europe and United States of America are growing the production sites with hens out of the cages. Therefore, as an advance of the new management guide for cage-free production, we would like to give some nutritional advice for our H&N birds in cage-free productions.



In a cage-free production, we are going to have highly productive birds in a type of production where they will be free to move, and eating wherever they want. The high productive birds are defined as birds with a constant body weight once they achieve the peak of production and a high egg mass output. Layers have a genetic potential of laying kilograms of eggs, therefore customers can “transform” it with management and nutrition to whatever their market is requiring: more eggs of lower egg size or less eggs of higher egg size.

The different parameters of nutrition need to be adapted to the production targets and the cage-free production.

H&N TIP

The layers produce kilograms of eggs and customers can “transform” them with management and nutrition to what the market requires.

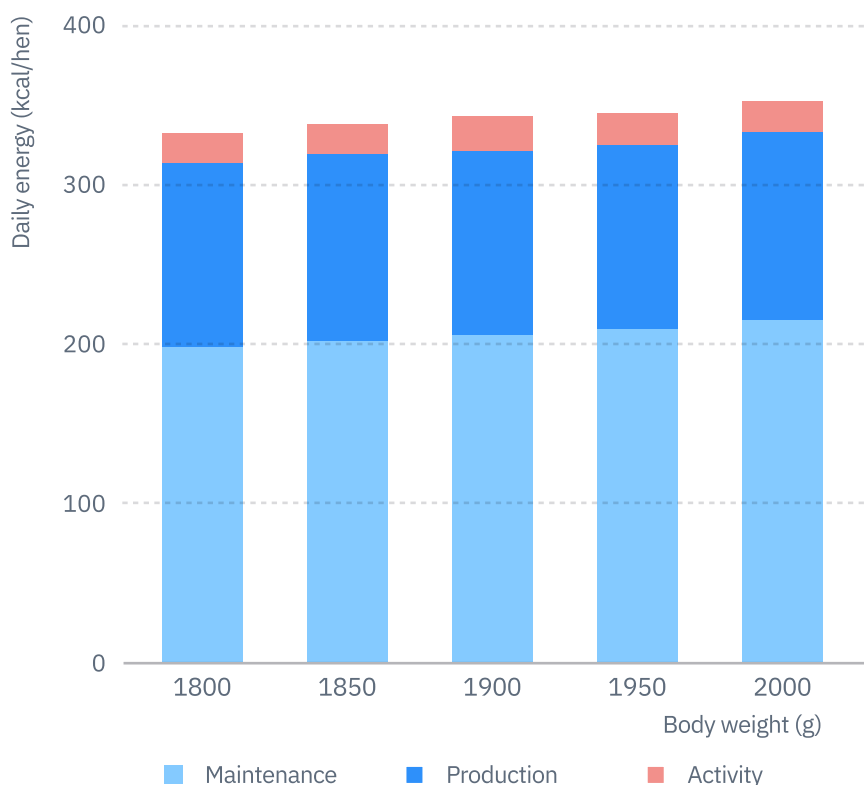


CAGE-FREE FORMULATION

Energy

Energy is the most expensive parameter of the feed. The energy needs of the layers are driven mainly by the maintenance need, and it is determined by the body weight of the bird.

Graphic 1. Effect of body weight in energy needs



The body weight effect isn't usually considered when formulation is done but it has a huge impact in the eating behavior of the birds. A heavier bird in a cage-free production has higher needs, she will be searching for feed for longer time and will be unsatisfied if she doesn't get what she needs; while a small bird will need less time but she will eat the leftovers of what the big ones didn't want.

The egg mass production needs will also have an impact in the energy but it will have a lower impact than the body weight.

In a cage-free production, we need to consider that the layer hens will have additional needs of energy due to the activity of being out of the cage. This additional need is affecting directly to the maintenance needs, we estimate it will increase around an 8% of the maintenance needs of the bird (Graphic 1).

After the peak of production as the body weight of the birds will not change much, the energy needs will be flat during almost whole production.

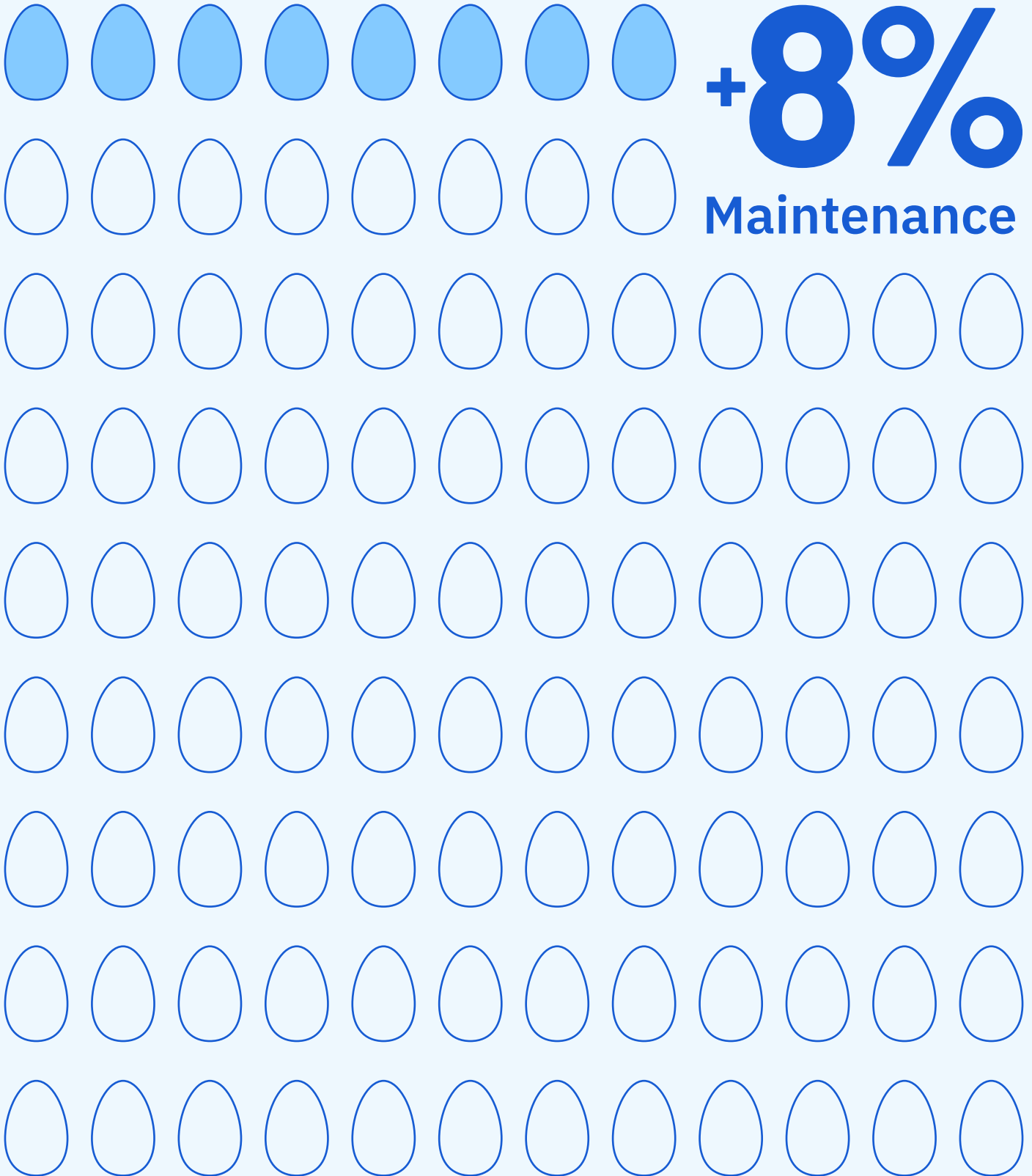
There are differences among breeds and flocks in body weight, it is necessary to have information about it and adjust the formulation. Historically we haven't worried much about it, we relied on the capacity of the layer to selfregulate the feed intake based on its needs.

H&N TIP

The cage-free production hens have an activity affecting directly to the maintenance needs, we estimate it will increase around an 8% the maintenance needs.

However in the cage-free production we can't rely that the bird will balanced itself when there is a lack of energy in the diet.

As the birds have the freedom to eat wherever they want, they could have an unbalanced nutrient intake and it would impact the performance and would show unwanted behaviors.



CAGE-FREE FORMULATION

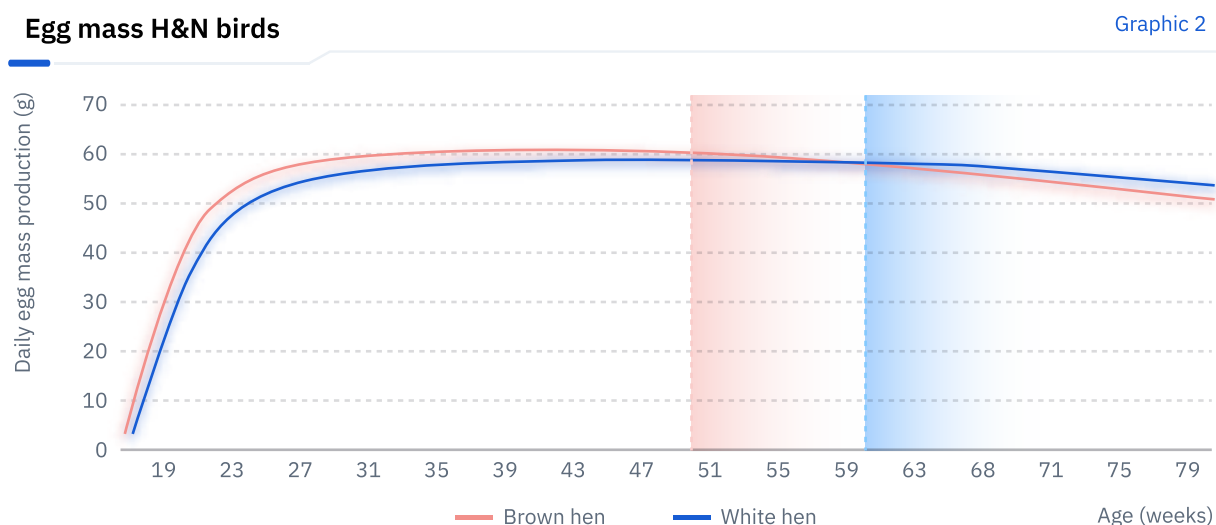
Amino acids

The amino acids needs are mainly driven by the egg mass production, so these means:

01

We shouldn't change the amino acid intake if the egg mass production doesn't drop.

If we review the egg mass produced by the layer hens, we see that the egg mass starts dropping significantly beyond 50 weeks in brown birds and 60 weeks in white birds. (Graphic 2).



The needs of this birds at 50 weeks isn't dropping as it was in the past; the work in longevity done by the geneticist has extended the high needs of amino acids because the egg mass production isn't dropping as it used to.

However, it is a common practice to change to a more diluted feed after week 45-50. With this practice, we hope the bird can get the nutrients

by increasing the feed intake, but it doesn't need to happen and in a cage-free production could be even more difficult to make it happen.

If the bird isn't getting the right amino acid nutrition the bird will sacrifice body weight, drop egg size or even decrease egg production. Furthermore, we could see undesirable behavior like feather peaking or cannibalism.

02

We can control the size of the egg with the amino acids nutrition.

Sometimes the market values more a specific size of eggs than others, so when the birds achieve the targeted egg weight and we want to avoid bigger eggs we need to adjust the whole amino acid intake.

Making a formulation based on egg mass production will allow to have same egg numbers but at the size we want. **The reduction of the whole profile of amino acids is a better way of controlling the egg size than just modifying the level of methionine. If only the level of methionine is adjusted then the ideal protein ration is changed and in longer term it has an impact in bird performance, welfare and health.**



■ CAGE-FREE FORMULATION

Feeding management

1 In a cage production

We can control what feed is offered to the layer hen and she can't make a big selection.



2 In a cage-free production

the free movement takes from us the control of the feeding. Therefore, in the cage-free production there is a lot to do about how to make the layer hens eat what they need.

3 Nutrient intake

It will be about working on a combination of management practices at the farm and feed structure at the feed mill, to achieve the right nutrient intake. Please see our specific tech tip about it.

H&N TIP

We need to teach birds to eat what they need with a combination of management at the farm and feed structure so birds will have the right nutrient intake.

Please see our specific tech tip about it.

■ CAGE-FREE FORMULATION

H&N recommendations in cage-free production

In H&N we believe that a nutrition based on egg mass and body weight is a method that can fit all birds, no matter the season or the flock, it will provide the producers the information to have the right nutrition for the actual high productive birds of H&N.

READ BEFORE USE

There are some points about the recommendations:

Energy

01

It is given as a range of daily needs: due to the different systems and sources where the nutritionist can get information of the energy of the raw materials, (NRC, INRA, FEDNA, CVB, Additive companies...) we only can suggest a range and each nutritionist must make the necessary adjustments.

- **The needs are shown for a Brown Nick bird of 1900 grams body weight.**

If the body weight is different, the requirement must be adjusted. The adjustment should be done as ± 4 cal/bird/day, every time there is a ± 50 grams in the body weight.

Brown Nick bird
of 1900 grams



+4 kcal

-4 kcal

Protein

02

It is a recommendation in case:

- **There isn't enough information about the composition of the raw materials.**
- **Formulations based on less than 6 amino acids.**
In case of wheat based diets, it is recommended to include isoleucine.

Total amino acids

03

The values shown in the tables is a calculation from the digestible amino acids values. The calculation is based on a total digestibility of the diet of 85%.

For those that use total amino acids for layer formulation, you need to make the adjustments based on the available raw materials you work with.


Brown Nick Cage-Free recommendations / PULLETS

Nutrient		0-5 Weeks	6-10 Weeks	11-17 Weeks
MEn	kcal/kg MJ	2900-2950 12.15	2800-2850 11.75	2700-2750 11.30
Crude protein	%	20-19	18-17	15.5-14.5
Lysine	%	1.18	1.01	0.66
Lysine (Dig)	%	1.00	0.86	0.56
Methionine	%	0.52	0.46	0.31
Methionine (Dig)	%	0.44	0.39	0.26
Met. + Cysteine	%	0.88	0.81	0.56
Met (Dig) + Cys	%	0.75	0.69	0.48
Threonine	%	0.78	0.70	0.46
Threonine (Dig)	%	0.66	0.60	0.39
Tryptophane	%	0.23	0.21	0.16
Tryptophane (Dig)	%	0.19	0.18	0.13
Isoleucine	%	0.81	0.77	0.50
Isoleucine (Dig)	%	0.69	0.65	0.43
Valine	%	0.92	0.79	0.53
Valine (Dig)	%	0.78	0.67	0.45
Argenine	%	1.24	1.06	0.70
Argenine (Dig)	%	1.05	0.90	0.59
Calcium	%	1.05	1.00	0.90
Phosphorus (total)	%	0.75	0.70	0.58
Phosphorus (available)	%	0.48	0.45	0.37
Phosphorus (Dig)	%	0.41	0.38	0.32
Sodium	%	0.18	0.17	0.16
Potassium	%	0.50	0.50	0.50
Chloride	%	0.20	0.19	0.16
Crude Fiber	%	3.00	3.50	4.50

Brown Nick in production / **PRODUCTION (1/3)**

Egg Mass	58-60 g/d				
MEn	kcal/hen/day	315	-	332	-
	MJ/hen/day	1.321	-	1.390	-
Crude protein	g/hen/day	-	18.3	-	-
Feed intake	g/hen/day	110	115	120	125
Lysine	976	0.888	0.849	0.814	0.781
Lysine (Dig)	830	0.755	0.722	0.692	0.664
Methionine	488	0.444	0.425	0.407	0.391
Methionine (Dig)	415	0.377	0.361	0.346	0.332
Met. + Cysteine	898	0.817	0.781	0.749	0.719
Met (Dig) + Cys	764	0.694	0.664	0.636	0.611
Threonine	684	0.621	0.594	0.570	0.547
Threonine (Dig)	581	0.528	0.505	0.484	0.465
Tryptophane	234	0.213	0.204	0.195	0.187
Tryptophane (Dig)	199	0.181	0.173	0.166	0.159
Isoleucine	781	0.710	0.679	0.651	0.625
Isoleucine (Dig)	664	0.604	0.577	0.553	0.531
Valine	854	0.777	0.743	0.712	0.684
Valine (Dig)	726	0.660	0.632	0.605	0.581
Argenine	1016	0.923	0.883	0.846	0.812
Argenine (Dig)	863	0.785	0.751	0.719	0.691
Na	190	0.173	0.165	0.158	0.152
K	500	0.455	0.435	0.417	0.400
Cl	190	0.173	0.165	0.158	0.152

Brown Nick in production / **PRODUCTION (2/3)**

Egg Mass	55-57 g/d				
MEn	kcal/hen/day	310	-	326	-
	MJ/hen/day	1.297	-	1.365	-
Crude protein	g/hen/day	-	18	-	-
Feed intake	g/hen/day	110	115	120	125
Lysine	941	0.856	0.818	0.784	0.753
Lysine (Dig)	800	0.727	0.696	0.667	0.640
Methionine	471	0.428	0.409	0.392	0.376
Methionine (Dig)	400	0.364	0.348	0.333	0.320
Met. + Cysteine	866	0.787	0.753	0.722	0.693
Met (Dig) + Cys	736	0.669	0.640	0.613	0.589
Threonine	659	0.599	0.573	0.549	0.527
Threonine (Dig)	560	0.509	0.487	0.467	0.448
Tryptophane	226	0.205	0.196	0.188	0.181
Tryptophane (Dig)	192	0.175	0.167	0.160	0.154
Isoleucine	753	0.684	0.655	0.627	0.602
Isoleucine (Dig)	640	0.582	0.557	0.533	0.512
Valine	824	0.749	0.716	0.686	0.659
Valine (Dig)	700	0.636	0.609	0.583	0.560
Argenine	979	0.890	0.851	0.816	0.783
Argenine (Dig)	832	0.756	0.723	0.693	0.666
Na	190	0.173	0.165	0.158	0.152
K	500	0.455	0.435	0.417	0.400
Cl	190	0.173	0.165	0.158	0.152

Brown Nick in production / **PRODUCTION (3/3)**

Egg Mass	52-54 g/d				
MEn	kcal/hen/day	304	-	320	-
	MJ/hen/day	1.273	-	1.340	-
Crude protein	g/hen/day	-	17	-	-
Feed intake	g/hen/day	110	115	120	125
Lysine	906	0.824	0.788	0.755	0.725
Lysine (Dig)	770	0.700	0.670	0.642	0.616
Methionine	453	0.412	0.394	0.377	0.362
Methionine (Dig)	385	0.350	0.335	0.321	0.308
Met. + Cysteine	833	0.758	0.725	0.695	0.667
Met (Dig) + Cys	708	0.644	0.616	0.590	0.567
Threonine	634	0.576	0.551	0.528	0.507
Threonine (Dig)	539	0.490	0.469	0.449	0.431
Tryptophane	217	0.198	0.189	0.181	0.174
Tryptophane (Dig)	185	0.168	0.161	0.154	0.148
Isoleucine	725	0.659	0.630	0.604	0.580
Isoleucine (Dig)	616	0.560	0.536	0.513	0.493
Valine	793	0.721	0.689	0.661	0.634
Valine (Dig)	674	0.613	0.586	0.561	0.539
Argenine	942	0.856	0.819	0.785	0.754
Argenine (Dig)	801	0.728	0.696	0.667	0.641
Na	180	0.164	0.157	0.150	0.144
K	500	0.455	0.435	0.417	0.400
Cl	180	0.164	0.157	0.150	0.144



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