



## Thoughts on Feeding Breeders and Pullets

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## The Responsibility of the Nutritionist

Since Breeders are restrict fed, the Nutritionists' responsibility is to:

- Clearly define the nutrient levels needed for the bird at each phase of production
- Understand season and temperature influences
- Select high quality ingredients that are appropriate for breeders and for the time of year



## The Responsibility of the Nutritionist

Formulate a feed that does not need regular revision

Breeder nutrition is about **Feed Management**

- Production managers need a consistent high quality feed in order to "learn" how to feed their birds
- A feed that continually changes makes it very difficult to manage weights and egg production



## Breeders Do Not Understand Percentages

- We all to often get asked: what Crude Protein, Lysine, Methionine or ME level a breeder diet should have?
- Since nutrients are allocated to the bird, it is not the concentration in the feed. But, rather the daily intake that is important
- A bird receiving peak feed of 140 grams/ requires a feed with higher nutrient density than one receiving 175 grams/day



## Birds Do Not Understand Percentages

Lets take for example; a common breeder feed

	Feed	Daily Intake 140g/day	Daily Intake 170g/ day	Daily Requirement
ME kcal/kg	2850	400 kcal	485 kcal	450 kcal
Crude Protein	16.0 %	22.3 gram	27.2 gram	?
Lysine (Dig)	0.73 %	1022 mg	1240 mg	950 mg
M + C (Dig)	0.59 %	826 mg	1003 mg	850 mg
Calcium	3.2 %	4.5 gram	5.4 grams	5.0 gram



## Birds Do Not Understand Percentages

- Understand the daily nutrient requirement of the bird
- Know the nutrient levels of your feed

**Allocate the amount of feed based on this knowledge**



## How Much Do We Need to Restrict the Growth of the Modern Broiler Breeder?



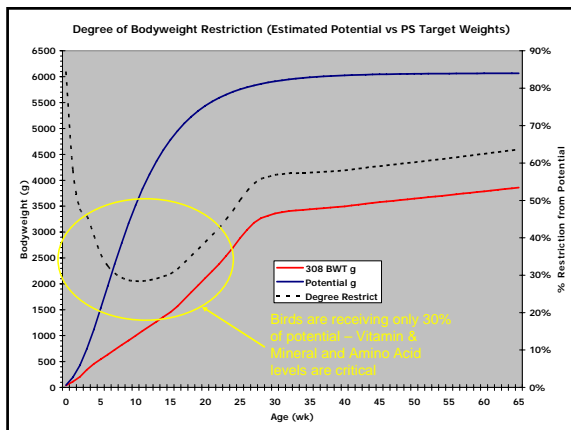
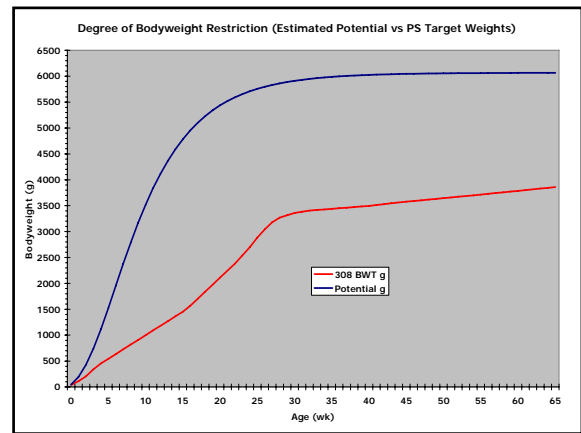
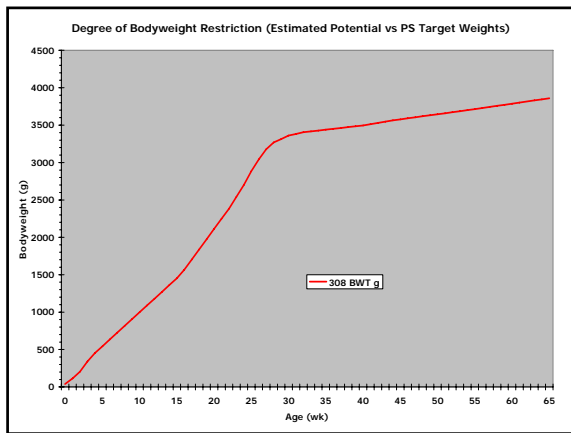
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## Restrict Feeding

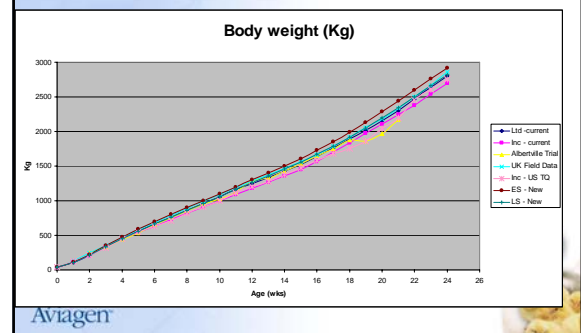
- Feed restriction during rearing is essential for broiler breeders
  - Controls body weight
  - Delays maturity
  - Improves egg production
  - Reduces mortality
- Programs vary but uniformity is essential
  - Skip-a-day
  - Everyday



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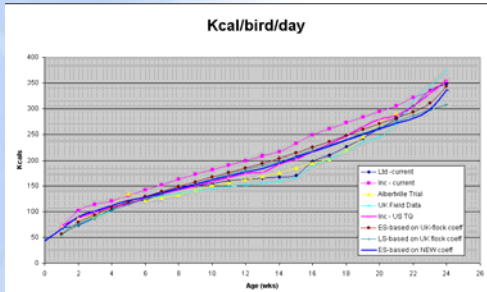


## Pullet Body Weights



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## Pullet ME Intake



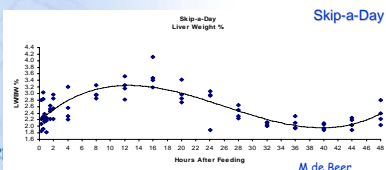
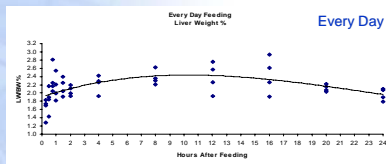
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## Study by Marc deBeer

- 120, 16 wk old breeder pullets
- 48 fed everyday (ED) since 4 wks
- 72 fed skip-a-day (SKIP) since 4 wks
- Total intake controlled to maintain equal BW
- At 112 d old (16 wks) :
  - 48 ED pullets were fed 74 g breeder grower
  - 72 SKIP pullets were fed 148 g breeder grower

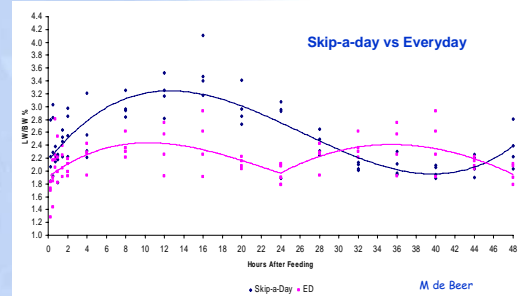
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## Relative Liver Weight



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## Relative Liver Weight



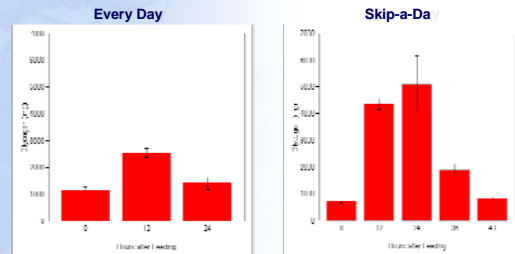
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Livers from 16 week old pullets, fed Everyday or Skip-a-day, 12 hours after feeding

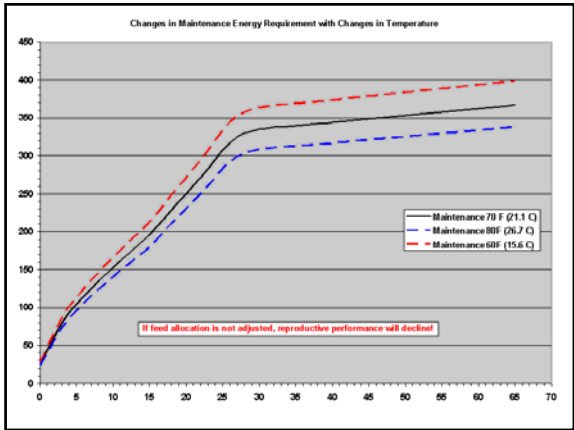
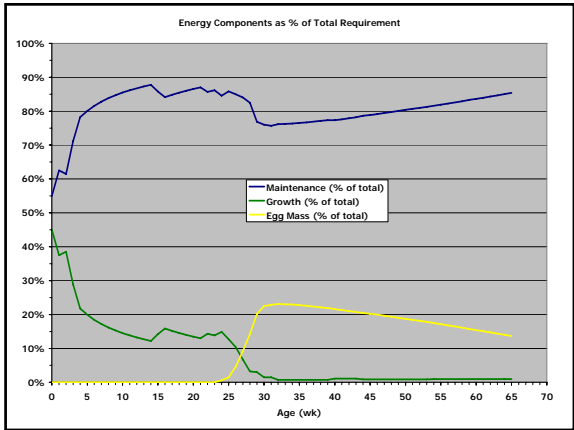
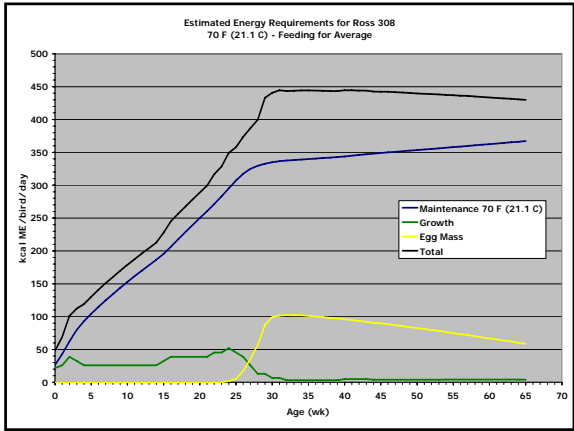
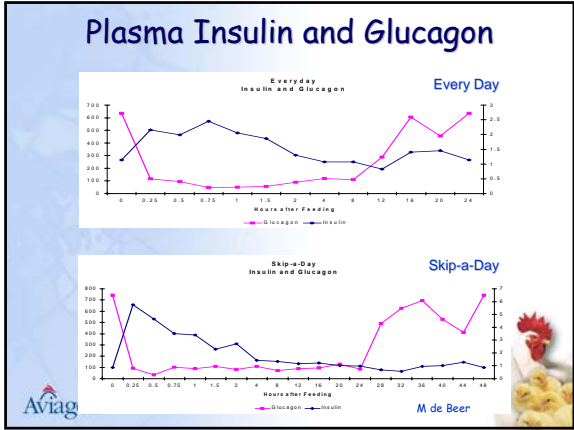
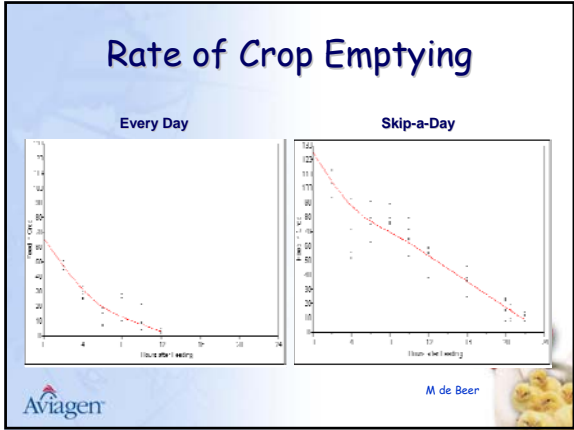
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## Liver Glycogen



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M de Beer



## Temperature effect on energy requirements

- From base of 20°C (68°F), energy intake adjustments should:
  - ↑ approx. 30 kcal/bird/day if ↓ from 20° to 15°C (68° to 59°F)
  - ↓ approx. 25 kcal/bird/day if ↑ from 20° to 25°C (68° to 77°F)
- Influence at >25°C (77°F) not as straight forward
  - >25°C (77°F) – control feed composition, feed amount and environmental management to reduce heat stress
- Required energy intakes vary according to age
  - (e.g. pullet versus hen)



## Protein & Amino Acids



## Protein vs. Amino Acids

- Crude Protein is used as a measure of the amino acid content of the feed. It does not give any information about the actual amino acid levels.
- Formulating to minimum digestible amino acids will ensure that the requirements for that phase of production are met, while minimizing excesses which need to be excreted.



## Protein vs. Amino Acids

- Critical amino acids in breeder feeds:
  - Methionine, Lysine, Isoleucine and Tryptophan
- If feed is formulated to contain sufficient levels of these amino acids, egg production, fertility, egg size and metabolism will be optimized



## Excess Protein and Heat Stress

- Excess protein must be metabolized, this requires energy, which generates heat. This aggravates heat stress under hot conditions
- Under hot conditions:
  - Body temp will rise by 1°C - 1 to 3hrs after feeding
  - Reduce excess crude protein
  - Utilize highly digestible ingredients
  - Utilize additional fat to meet Energy levels (replace some of the grain with fat)



## Crude Protein vs. Amino Acids

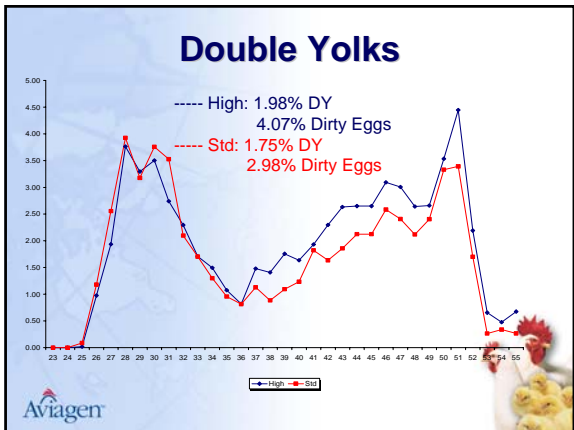
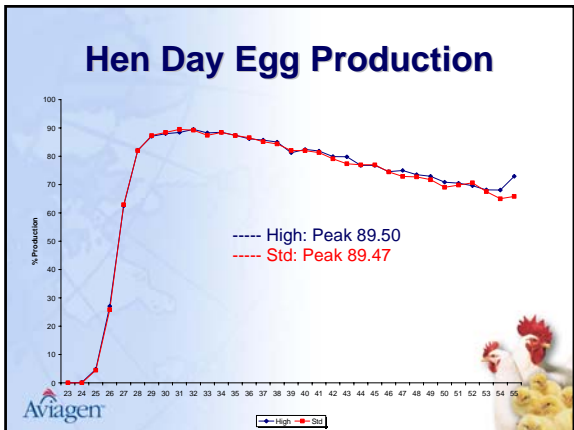
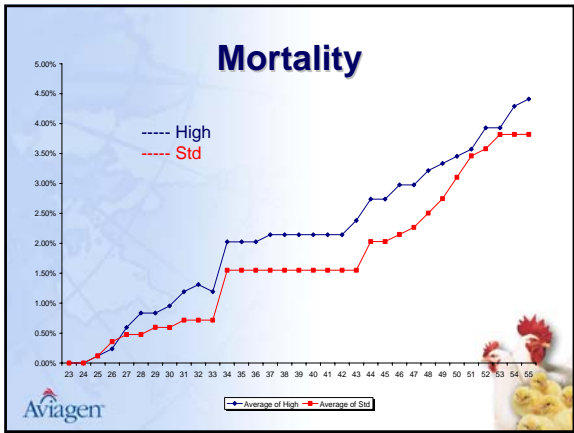
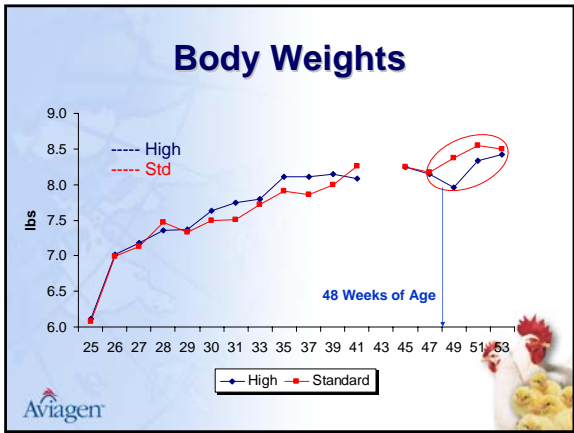
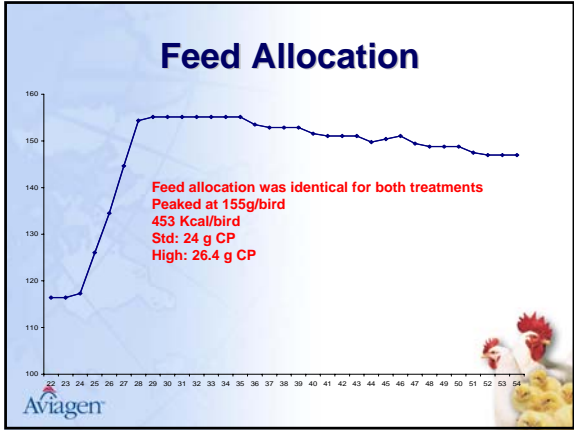
Dig AA	Min Level	CP 16.5%	CP 16.0%	CP 15.5%	CP 15.0%	CP 14.5%
Lysine	0.56	0.78	0.75	0.72	0.68	0.64
Met + Cys	0.59	0.59	0.59	0.59	0.59	0.59
Threonine	0.44	0.55	0.53	0.51	0.49	0.44
Isoleucine	0.45	0.62	0.60	0.58	0.56	0.48
Tryp	0.145	0.17	0.165	0.16	0.15	0.145
Cost/ MT		\$175.88	\$174.79	\$173.74	\$172.69	\$171.66

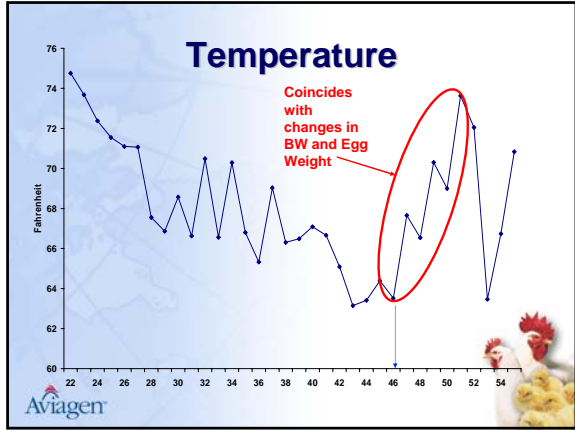
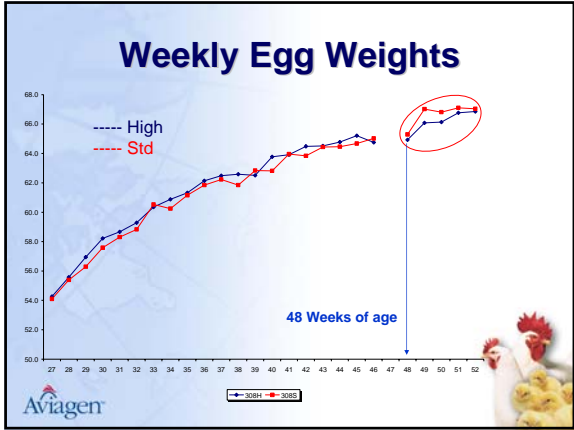


### Breeder Diets

	Standard		High	
	%	mg/bird/day	%	mg/bird/day
ME (kcal/kg)	2920	453 kcal	2920	453 kcal
CP	15.5	24	17.0	26.4
Dig Lys	0.70	1085	0.80	1240
Dig M+C	0.58	899	0.58	899
Dig Ile	0.59	915	0.66	1023
Dig Val	0.65	1007	0.71	1100
Dig Trp	0.15	232	0.17	264

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### Performance Summary

	TE/HH	HE/HH	% HE	Fer-tility %	HOF %	HOS %	Chick Weight g	Mor-tality %	g CP/ dozen HE
Std	157.8	148.5	94.1	92.6	92.1	85.3	40.71	3.93	525
High	158.8	148.5	93.5	92.9	91.8	85.3	40.86	4.54	575

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### Daily Amino Acid Intake mg/b

Reference	Lysine		M+C		Threo		Isoleu		Valine		Arginine		Tryp	
	Tot	Dig	Tot	Dig	Tot	Dig	Tot	Dig	Tot	Dig	Tot	Dig	Tot	Dig
US	1152	1025	990	890	830	755	895	800	990	890	1445	1330	270	230
UK	1125	1000	915	825	800	700	850	775			1125	1035	265	230
de Beer		890		900		610		830		790		1020		243
Fisher		890		621		560		600		690		800		186
NRC	765		700		720		850		750		1110		190	
Brzl Rost		920		800		745		825		825		1050		211
NEW	1070	950	950	850	800	700	830	765	890	810	1100	1020	250	220

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### Vitamin Nutrition Impact on Progeny

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- ### General Observations
- Vitamin and Trace mineral levels are Marginal
  - Most research was conducted 15 to 20 years ago:
    - Breeders Peak fed 165 to 170 grams - now 145 to 155 grams are common
    - Peak Egg Production 65 to 70% - we now see 85 to 90% peaks
    - Integrators have lowered Vitamin levels to save money
  - Field rickets at 5 to 7 days of age may be triggered by poor Breeder nutrition rather than Broiler nutrition
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## Influence of Breeder and Broiler Nutrition on Early Chick Growth

- Ross 308 chicks from commercial breeder farms
- 2 farms at 31 weeks; 2 farms at 42/45 weeks
- 2 farms normal vitamins; 2 farms 'boosted' vitamins
- Broiler starter; 100% or 120% of Ross Manual amino acid levels.

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## Study Design

Parent Age	Vitamin Booster
31 Week	Yes
31 Week	No
45-46 w	Yes
42 w	No

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## Added Vitamin Supplementation

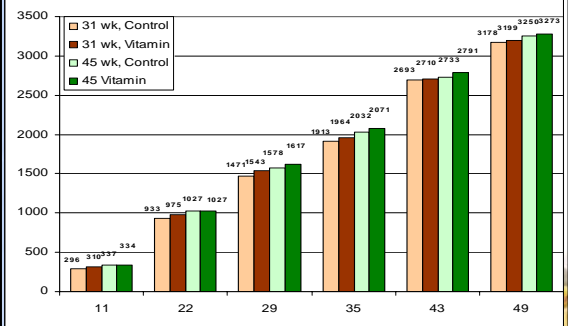
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Vitamin	Unit	Level Base	Addition	Total in Feed
A	iu/kg	14000		14000
D <sub>3</sub>	iu/kg	3500		3500
E	iu/kg	100	54	154
K	mg/kg	6	6	12
Thiamine (B1)	mg/kg	3.5	3.5	7
Riboflavin (B2)	mg/kg	20		20
Pyridoxine (B6)	mg/kg	8	2	10
B12	ug/kg	40	30	70
Pantothenic acid	mg/kg	22	5	27
Nicotinic Acid	mg/kg	57.5	32.5	90
Biotin	mg/kg	400	225	625
Folic	mg/kg	3.5	1.5	5
Vit. C	mg/kg		100	100

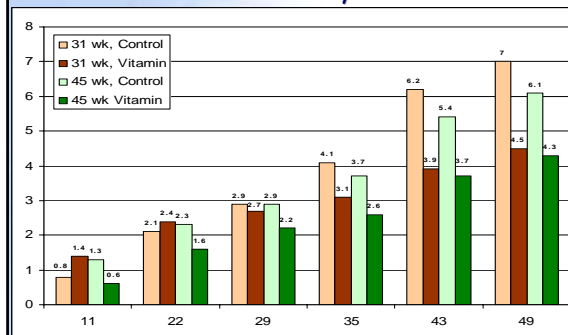
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## Breeder Vitamin Addition on Progeny Body Weights



## Breeder Vitamin Addition on Progeny Mortality



## Influence of Extra Vit E in Breeder Diet on Fertility (source: the Netherlands)

	Control	Extra Vit E
Vit E in egg (mg/kg)	60	110
Candling clears 60 weeks	17.3 a	12.2 b
Candling clears 64 weeks	26.9 b	17.9 a

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## Breeder Feeding Management

### Practical Considerations



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## Male Feeders Must Be Secure



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## Summary - Nutrition of the Modern Broiler Breeder

- Energy
  - Ensure proper intake achieved
  - Adjust for temperature change
- Protein/ Amino Acids
  - Follow product recommendations and avoid excessive protein intake
- Vitamins/Minerals
  - Follow product recommendations and use reliable sources

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## Summary - Nutrition of the Modern Broiler Breeder

- Growth restriction vs growth potential
  - Requires continuing monitoring
- Feeding Management
  - Follow product recommendations...cannot escape "hands-on" management
- Economics of breeder feed costs
  - **Caution**...can "save dimes and lose dollars"

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Thank  
You!

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