LOHMANN TIERZUCHT

´For every market the right egg´

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Feeding the modern long laying hen – 2016 and beyond

➤ Genetic progress will continue
➤ Better understanding of rearing as a basic investment
➤ Continuous focus on egg shell quality in late lay
➤ Nutrition – achieving more with less?
➤ Economic of high dense feed versus lower dense feed
➤ Raw material availability and new raw materials?
➤ Clean food - from clean feed
➤ Influence from animal welfare thoughts and retailers on egg production
Genetic progress will continue

- Major breeding traits are still performance oriented:
  - saleable egg numbers (high focus on egg shell quality)
  - Persistency => higher performance in aging flocks
  - FCR – feed conversion ratio as: kg feed/kg egg mass
  - Viability => longer working life period of hens

- This challenging targets need support from management & nutrition
Ongoing genetic work ...

BREEDING FOR SUCCESS ... TOGETHER
Distribution of cumulative egg number in 574 days of production - for one pure line from the LSL breeding program

On average 494 eggs (86 % production)

More than 50% of the hens produce already much more than 500 eggs
Cumulative egg numbers for single hens (first day of production at 21 weeks of age)
Egg numbers presented in laying sequences or respectively clutch sizes

\[ \text{I.e. 500 eggs in 515 days } \Leftrightarrow \text{97\% egg production} \]

- 3 eggs in the 1st clutch  \rightarrow  2 days off
- 25 eggs in the 2nd clutch  \rightarrow  1 day off
- 16 eggs in the 3rd clutch  \rightarrow  1 day off
- 180 eggs in the 4th clutch  \rightarrow  1 day off
- 68 eggs in the 5th clutch  \rightarrow  3 days off
- 108 eggs in the 6th clutch  \rightarrow  1 day off
- 31 eggs in the 7th clutch  \rightarrow  2 days off
- 17 eggs in the 8th clutch  \rightarrow  1 day off
- 19 eggs in the 9th clutch  \rightarrow  2 days off
- 22 eggs in the 10th clutch  \rightarrow  1 day off
- 11 eggs in the 11th clutch  \rightarrow  2 days off

500 eggs in 515 days => only 15 days vacation
Performance in laying % - and in egg mass output/week
The increase in laying performance – is mainly achieved by longer laying clutches
Together with longer viability
A lot of pure line hens already reach much more than 500 eggs
Today we already see even 500 eggs on commercial level in some farms

Genetic progress won’t stop - as long as geneticists still see variation on pure line level (extended flock size of pure lines)
Training eating capacity - a very urgent basis for optimal laying performance

post peak dip - due to too low feed intake - or low dense feed => causing lack of nutrients!!
Rearing – as basic precondition for optimal performance in lay

Physiology development of the pullet

Daily weight increase (gram)

0 2 4 6 8 10 12 14 16 18 20 22

Age (weeks)

source: Ysilevitz 2007 Israel
Take care of increase of body weight after transfer!

Growth and body weight (g) development curve of LOHMANN LB -CLASSIC

Please never forget - rearing continues after transfer!
- with optimal body weight related to the breed!
**Optimal limestone - the source of calcium - most important & cheapest tool for good egg shell quality**

<table>
<thead>
<tr>
<th>Feed type</th>
<th>Fine Limestone 0–0.5 mm</th>
<th>Coarse Limestone * 1.5–3.5 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer Phase 1</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Layer Phase 2</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>Layer Phase 3</td>
<td>15%</td>
<td>85%</td>
</tr>
</tbody>
</table>

* can be partly replaced by oyster shells

- If two sources of limestone are not available ⇒ in layer feed use only coarse limestone!
- In rearing feed use fine limestone!
Coarse limestone – how it should look like

Adding coarse limestone “on top“ of compound feed:

- works all around the world – in order to support egg shell quality
- very often has a positive effect on birds’ behavior – more docile & less anxious hens
Eggshell formation & importance of healthy liver – liver support

Intestine → Calcium → Calculm gland → Carbonate → Colour membrane

Protein hairs
Attach points
Shell membrane

Protein

Liver

source: provimi
Feeding on liver health – as support of egg shell quality

- **diets enriched in crude fat** => which have always a minimum amount of added oil/fat in the recipe

- Choline: needs to be added via the premix => most efficient with low cost; 
  - will always be the basis of fatty liver diets/supplements

- Vitamins: K3, E, B12, B1, folic acid

- Methionine / Betaine

- Mycotoxin binder to be used - if needed
  - together with a liver protection activity like
    ➤ “Silymarin” (flavonoide)

- Good liver health – good performance – good egg shell quality
Mycotoxins – an ongoing worldwide challenge – “take action”

Molecular mechanisms of mycotoxin action include four major points:

- Inhibition of protein synthesis and DNA adduct formation – Immune System / GIT / Liver / Kidney / Lung ...
- Membrane structure alteration, induction of oxidative stress and lipid peroxidation – IS / GIT / Liver ...
- Induction of programmed cell death (apoptosis) – IS / GIT ...
- Gene expression changes – expression of cell reaction mediators – IS / GIT / Liver ...

Consider: Long living animals can be more exposed to mycotoxines (e.g. layers and breeders) - as broilers for instance

Surai, 2006
Feeding the modern long laying hen – 2016 and beyond

- Continuous focus on egg shell quality in late lay

- The egg shell quality will be the “one-and-only-reason” when to sign off a high prolific layer flock with long viability

- Because production won’t stop under good management and nutritional condition
Nutrition – achieving more with less?

- When comparing feed for layer breeds – internationally – we see a high variation in overall nutrient density
- Especially when different energy evaluation system are used => different numbers – same feed level, or not?
- Corn-soy diets - with - or without added fat/oil ?
- Diets without any corn !? – or even without soya?
- We need to be prepared for periods of shortage in raw materials – together with high price volatility => reducing nutrient density to maintain economics?
Nutrition – achieving more with less?

- Using „nutrient uplift” in/of diets from Enzymes (NSP-enzymes & Phytase => less added phosphates needed)
- Reduced level of crude protein – and better formulation on digestible amino acids – with cost efficiency!
- Lower dense diets in order to influence birds’ satiety and behavior (in non cage systems)
- Organic diets with quite low density - with increased daily feed intake - but well performing hens!

- Good layer breeds are highly flexible …
Economic of high dense feed versus lower dense feed - Overall Feed efficiency?

Effect of feed dietary nutrient concentrations on feed cost, performance and revenue (Waller, 2007; Spring, 2013)
Economic of high dense feed versus lower dense feed - Overall Feed efficiency?

- According to the graph before formula costs don’t increase linear – the higher the intensity – the higher the cost of each step of further increase
- It might (or will) be more economical to feed layers with lower dense – and cheaper diets, and promote daily feed intake in order to achieve the needed daily nutrient intake
- Breeds with higher daily feed intake “willingness” are favourable ...
Raw material availability and new raw materials?

- We need to be prepared for periods of shortage in raw materials – together with high price volatility => reducing nutrient density to maintain economics?
- Or – being motivated to test and implement „new“ raw materials?
- New raw materials?
  - all cereals instead of corn
  - all protein carriers instead of soya & fish meal
  - all cereal- and oilseed byproducts
  - good rendered byproducts from slaughter processing
  - insects, larvae, algae, …
Clean food - from clean feed

- Health claims already have a great impact on agriculture and husbandry in „developed“ countries
- Consumers want to buy “healthy food” – and willing to pay for (no chemical & microbiological contamination)
- First & overall target – feed production only with save and clean raw materials (regular monitoring needed)
- If not available – feed processing needs to safeguard the target => feed hygienisation?
  - with physical treatment
  - with special additives?
  - already mostly in place in feed for breeding flocks
  - in the feed industry and in home/farm mixing?
Clean food - from clean feed

- Health claims already have a great impact on agriculture and husbandry in „developed“ countries
- Very important – if a developing country wants to export
- Trade barriers can easily be established
- For instance: the GMO – topic
- For instance: use of in-feed antibiotics (AGP’s) might cause resistance against important medicines for humans?
- Idea / suggestions: looking for alternatives of antibiotics and AGP’s ....
- It’s only a question of time – until this topic rises up to you!
Secondary plant compounds – targeting gut health – replacing AGP’s

Raw plant material

- Steam distillation
- Organic solvent extraction
- Supercritical fluid extraction

BREEDING FOR SUCCESS … TOGETHER
Secondary plant compounds – targeting gut health – replacing AGP’s

Systematic overview

Phenolic Compounds  (Vanilla *Vanillin*, Oregano *Carvacrol*)
Essential oils  (Lemon *Limonene*, Eukalyptus *Cineol*)
Pungent substances  (Chili *Capsaicin*, Ginger *Gingerol*)
Tannin agents  (Bark of oak *Gallic acid & Flavone*)
Bitter substances  (Hop *Humulon*)
Mucilage  (Flax *polysaccharides*)
Saponines  (Yucca *Solanine*)
Alkaloids  (Coffee *Coffein*, Tobacco *Nikotin*)
Secondary plant compounds – act synergistic

- Bactericidal (Gram+ and Gram- bacteria)
- Digestive (Enzymes, Serotonin)
- Antioxidant (free Radicals)

Carvacrol (Oregano)
Capsaicin (Chili)
Cinnamon aldehyde (Cinnamon)
Cineol (Rosmary)
Secondary plant compounds product
Secondary plant compounds – targeting gut health – replacing AGP’s

- they are derived from nature
- one need to know which are the active compounds
- one need to find them in nature
- extract, process and standardize
- create the optimal mix – in order to generate the synergistic effects

- finally you act as nature does – it’s all nature ....

- optimal alternative to classical AGP’s
Influence from animal welfare thoughts and retailers on egg production

- Retailers and supermarkets make themselves attractive when „swimming on the welfare wave“ => “we are the good ones, selling you a good feeling”
- In terms of feed: “without antibiotic growth promoters”
- In terms of eggs: “stop of cage production”
- In terms of meat, milk and eggs: “organic production”
- In terms of layers: “stop of beak treatment”
- All these ideas are rising up in more and more countries around the globe
Influence from animal welfare thoughts and retailers on egg production

- Has a very big impact in production process on farm level
- Means – increase of labor and costs
- Means increase of product price on farm level – to ensure economy of production – sometimes “some difficult”
- Nevertheless – sometimes a door-opener to get listed and have access to market
Finally I could “touch upon” only all this topics which I have in mind in regards to the given topic for this presentation

nevertheless I hope it was of some interest for you
Ongoing genetic work

What can you expect from Lohmann?

- Longer laying cycle
- Open communication with customers
- High emphasis on egg quality and egg mass
- More saleable eggs per hen housed
- Alternatively tested breeding stocks
- New innovative ideas
- New selection methods
What can you expect from Lohmann birds?

„Vital and docile layers with stable plumage, strong bones and performance-based feed consumption laying an egg with a robust shell EVERY DAY“
Thanks a lot for listening – questions are welcome!

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