Managing bird sexual maturity

9

by Fabien Galea, Institut Sélection Animale BV (fabien.galea@hendrix-genetics.com)

Sexual maturity could be induced by several factors like body-weight, age and light duration. Too early sexual maturity, considering bird development and age, leads to prolapses, vent pecking and mortality. It is a big issue and this could strongly affect the egg producer's income.

Birds are very sensitive to light variation. The pineal gland, located in the bird's brain, produces a hormone called melatonin. Light duration affects the melatonin production, which synchronises the biological clock. Light modulates age of sexual maturity and bird behaviour (feeding and social interaction).

When open poultry houses are located close to the equator, the natural light variation is low and some pullet rearers and egg producers think that this does not affect the birds.

It is true that when birds are reared in decreasing day, sexual maturity is not affected. But in increasing day, even 30 minutes to one hour light duration variation is enough to induce sexual maturity. If flocks are too young or not developed enough, prolapses and their consequences appear.

When birds are reared in increasing day, natural light must be compensated by artificial light.

The golden rule is to fix the plateau light duration according to the maximum natural light the bird will be confronted with during the rearing period. Poultry houses used to rearing the birds from 5-16 weeks of age must be equipped with an operational lighting system, even if pullet rearers are using open house. A timer must be installed for more flexible utilisation and monitoring.

The proper use of artificial light around sunrise and sunset allows the control of sexual maturity and prevents prolapses and mortality.

This practice must be strictly applied to all open rearing buildings to ensure excellent egg production and secure egg producer incomes. ■

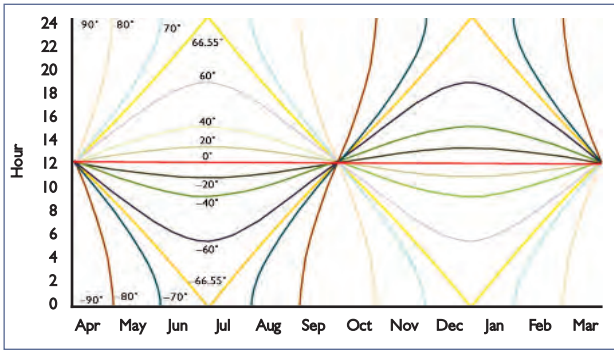

Fig. 1. Natural light duration according to month and lati-

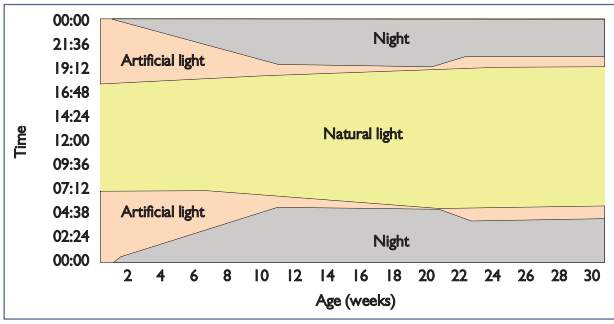

Fig. 2. Example of lighting program in increasing day.

Keeping a good feather cover

10

by Rafael Lera, Institut Sélection Animale BV (rafael.lera@hendrix-genetics.com)

Feathers have essential functions, from making flying possible to protecting the birds from minor mechanical injuries, not to mention the crucial role of providing insulation. Adequate feathering conditions definitely have an impact on feed intake and productivity. As one of the major causes of feather loss is feather pecking, plumage condition is considered an indicator of bird welfare and stress. Strategies for keeping an adequate feather cover are linked to nutrition, management, housing and equipment and health.

Nutrition

• Monitor protein and amino acids in the diet: sulphur containing amino acids (methionine and cystine) are essential for synthesis of feather keratin, but all essential amino acids should be properly balanced. Deficiency can cause abnormal plumage and trigger feather pecking behaviour.
• Ensure adequate levels of minerals, vitamins and especially sodium in the diet.
• Provide enough insoluble fibre via the feed: if there is a lack of fibre in the diet, pecking can develop as birds will eat feathers as a source of fibre. Some raw materials are more suitable as a fibre source (oilseed meal) than others (cereal byproducts) due to their particle size.
• Avoid too high energy level in the layer diet: since hens adapt their feed intake to energy level, it can lead to a reduction in the time spent eating and consequently higher risk of feather pecking due to boredom.
• Pay attention to diet changes. Feeding mash rather than pellets or crumbles also increases the time spent eating.

Management

• Maintain a good in-house climate: adequate ventilation is essential to avoid ammonia, excess humidity or dust. Variations in temperature and draughts are also a significant source of stress.
• Keep good quality litter in barn systems, so birds can dust bathe to maintain a good plumage.
• Lighting:
– Avoid direct bright sunlight.
– Light intensity should be even throughout the house and too high light intensity must be avoided, as well as bright spots. Dimmers can be used if needed.
– Some sources of light (fluorescents, flickering bulbs) can make birds more nervous. Use warm lights or even red lights to keep flocks calmer and control feather pecking.
• Ensure birds are properly beak trimmed (follow local regulations).
• Check that feeding and drinking systems are working properly (even feed distribution, right water pressure, no water leakage) to avoid any shortage of food and/or drinking water.

Housing and equipment

• Respect recommendations of available floor/cage space per bird: high stocking density is a major source of stress. Abrasion on the surfaces of the cages when overcrowding is another cause of feather loss.
• Install enough drinkers and feeders and make sure they are adequately distributed, so birds have easy access.
• In non-cage systems, nest boxes should be sufficient with easy access to minimise floor eggs. When hens lay on the floor, the vent is exposed and this can encourage pecking behaviour.
• Enrich the environment in barn systems: use perches and provide distractions to encourage foraging and keep birds busy.

Health and hygiene

• Control external parasites: some can directly affect the feather follicles (lice) but all can cause considerable stress (especially red mites)
• Monitor worm infestations and treat at transfer and later in lay if needed. Intestinal worms can cause enteritis and heavy stress.
• Control intestinal and general health by sanitising drinking water and using feed and litter free of mycotoxins: enteritis problems and diarrhoea affect absorption of essential nutrients necessary for adequate feathering and deficiencies can trigger feather pecking. ■

Vaccination

11

by Bart Stokvis, Institut Sélection Animale BV (bart.stokvis@hendrix-genetics.com)

Healthy birds are efficient producers! How can we keep them healthy?

Ensure a good micro-climate in the house, supply good quality feed and drinking water and apply good quality feed, correct lighting and continuous litter management. These are basic requirements.

Prevent the introduction of pathogens with a sufficient biosecurity program and use a 'tailor made' vaccination program against pathogens that cannot be excluded.

In layers, the main goal of vaccination is to protect the pullets against disease challenges during the production period.

Sometimes, protection during rearing is needed and in breeders, vaccination is used to supply a sufficient level of antibodies in the offspring.

To be able to put together a vaccination program, you need information about disease status and disease challenge.

Which diseases are present on the farm (endemic)? Which diseases are present in the area around the farm? What is the distance to neighbouring farms and what type of birds are kept on these farms. Is the health situation known?

In case of a separate rearing farm, what is the disease situation on the farm of origin and on the farm of destination? Are we dealing with single age or multi age farms; parent stock or commercial stock farms?

What are the costs of infection and how do they relate to the costs of vaccination?

Is it really necessary to vaccinate against a certain disease? What is the risk the flock gets infected? And what is the damage from an infection? If the risk of infection is big, but the consequences of an infection are small, you can decide to take this risk.

What are the costs of vaccination? Easy to calculate are the direct costs of the vaccine itself and of the costs of administering the vaccine.

However, these costs are not the only costs of vaccination. Most vaccines are not harmless. Vaccines challenge the birds to build up protection against pathogens.

These immune responses cost energy and some life attenuated vaccines induce mild disease symptoms, thus influencing feed intake and growth.

What is the availability of the vaccines? Which vaccines can you buy?

How do you want to administer the vaccine? The route of administration depends on the characteristics of the vaccine to start with. However, especially with live vaccines, you have different options for administration, for example: eye drop, spray, aerosol or drinking water application.

Which application gives the best result? What is technically possible? What are the labour costs?

Some vaccines require repeated vaccinations. You must prime and booster to acquire sufficient antibody levels.

When you vaccinate with vaccines targeting the same organ system, for instance the respiratory tract, you must keep enough distance between these vaccinations, at least seven days, preferably 14 days.

To conclude: It is impossible to design a general vaccination program. A vaccination program must be customised to the local situation, taking into account all the items mentioned above. ■

Controlling pecking

12

by Paul Grignon Dumoulin, Institut Sélection Animale BV (paul.grignondumoulin@hendrix-genetics.com)

Pecking can be responsible for important economic losses in layer farms due to the mortality observed. Different factors can influence intensity of pecking and they must be under control to prevent this problem.

Controlling prolapse

If birds have prolapse problems, access to the oviduct will be easier and injuries will be responsible for an ascendant infection with peritonitis and death of the layers. Light stimulation is very important to control this factor. Light stimulation should be delayed if the flock is underweight or not uniform at the end of the rearing period. Too fat birds can also get prolapse problems as there will be a lower elasticity and tone of the vent muscles that are involved in oviduct retraction in the body.
Too big egg size will also be a cause of prolapse (birds laying double yolk eggs).

Controlling beak trimming

Quality of beak trimming is important to prevent pecking. Beak trimming must be uniform, from an appropriate length and with a good cauterisation on the side of the beak.

Controlling house equipment

Respect of recommendations in term of density and farm equipment is also important. Too high densities will modify social interaction between birds with sometimes an aggressive behaviour. Inadequate nest/feeder/drinkers number, design or location in the house will be responsible for floor eggs; when laying, the vent of those birds will be more likely exposed and neighbours will hurt the cloaca/oviduct more easily. Keeping the birds busy during the day is also important: some farmers add equipment in the poultry house to entertain the birds.

Controlling light

Light is an important factor involved in pecking behaviour:

- Reduce light intensity: this should be the first factor to be controlled in case of pecking problems. When possible, use dimmers to reduce light intensity or in open house systems, add curtains on the house sides to make the house darker.
- Avoid direct sunlight in the house.
- Keep light uniform inside the house: no dark or too bright areas.
- Source of light is also important; if possible, bulbs are preferred to fluorescent lights that have a flickering effect and are a source of stress for the birds.
- Spectrum of light: use warm light colour (red/orange). Painting the light source in red can help to control pecking.

Feed management

Unbalanced feed can be responsible for pecking behaviour:

- Low salt level: addition of salt in the drinking water can stop pecking.
- Insoluble fibre content: 4.5% insoluble fibre in the feed is recommended.
- Amino acid content, in particular sulphur amino acids.
- Use of mash feed is better than crumble feed as feed consumption will be longer and will keep the birds busier during the day.

Avoid stress factors

Some other factors may be responsible for stress on the birds with sometimes pecking behaviour as a consequence:

- Parasites: internal (helminthiasis, source of enteritis) or external (red mites, lice) parasites are stress factors for the birds. These hygiene problems need to be fixed to prevent pecking problems.
- Environmental factors: dust, ammonia, uneven temperature inside the house, high humidity.
- High drinking water temperature.

Conclusion

Pecking is a multifactorial problem related to various management issues that need to be under control for good prevention. Never forget that prevention is always better than cure. ■

Good beak trimming

13

by Paul Grignon Dumoulin, Institut Sélection Animale BV (paul.grignondumoulin@hendrix-genetics.com)

Beak trimming is quite a common practice in layer farms. It is done for pecking prevention and to reduce feed wastage. But beak trimming is a delicate operation and any mistake can be responsible for economic losses (mortality or bad performance because of uneven flocks).

Age at beak trimming depends on the local regulation and type of housing. In general farmers apply it at day old or before 10 days of age in dark houses and in open house systems, it can be done twice at early age and around 8-10 weeks of age. Beak trimming at transfer is not recommended.

We recommend, every time it is possible, to carry out a single beak trimming in order to avoid stress and unnecessary suffering for the birds.

Types of beak trimming:

For more than 50 years, beak trimming was done with hot blades. The tools could be used both in hatchery and in the farms. Since a few years, hatcheries are able to use infra-red machines to get less stressful beak trimming on day old chicks.

Points of attention before beak trimming with a hot blade:

- Do not beak trim birds if the flock is not in good health or if it is suffering from vaccine reactions.
- Add vitamin K to the drinking water 48 hours prior to trimming and after to prevent haemorrhages.
- Check the equipment and make sure that the trimming blade has the right temperature, preferably by using a pyrometer. Estimating blade temperature by colour is common but brightness of the poultry house can interfere. You can use the hands to protect the blade to evaluate the right colour that must be a red cherry in the centre of the blade.
- If you see vibrant red throughout the blade this mean that you are using excessive temperature. Low temperature ⇒ poor cauterisation and bleeding.

High temperature ⇒ blister will form in the beak later.

Recommendations for the first hot blade beak trim:

- For more precise and uniform beak trimming with a hot blade, carefully choose the correct diameter hole on the beak-tipping machine, so as to cut the beak at least 2mm from the nostrils.
- The operator should be installed and seated comfortably in such a way as each beak will be cut in the same manner. The operator should be trained in order to get the right movement.
- Hold the chick in one hand, with the thumb behind the head, holding the head firmly in position resting the beak on the forefinger.
- Tilt the chick's beak upwards at an angle of 15° above horizontal and cauterise the reinforced side edges of the beak, to avoid unequal regrowth of the two mandibles. The upper part of the beak is growing more slowly than the down part, so if a beak is trimmed straight, the birds will have uneven beaks later.
- Cauterisation contact time should be between 2.0-2.5 seconds.
- Check the temperature of the blade (600-650° C), for each operator and machine every hour.
- Handle the chicks gently: put them into a box positioned at a comfortable height for the trimmer. After being trimmed, drop them gently on a box with wood shavings to prevent injury.
- Do not rush the process: a too high rate (number of birds/minute) could lead to a higher chance of errors and poor uniformity.
- Clean the blades with sandpaper after use on 5,000 chicks, and renew them after 20,000-30,000 chicks.
- Make sure the tongue of the bird does not get burned.

Recommendations to start chick's debeaked at day old:

- Keep the nipple line low enough so it is possible for the day old chicks to touch the nipple with the side of the beak (instead of using the top of the beak).
- Keep the water pressure low enough, so a water drop stays on every nipple.
- Leaking plates under the nipples can be filled with water for the first days.
- Use 360° nipples, or at least one per metre.
- Add extra baby drinkers if 360° nipples are not available.

Recommendations after beak trimming operation on the farm:

- Increase the water level in the drinkers and reduce the water pressure in the pipes to make it easy for the birds to drink.
- Make sure that the depth of the feed is adequate, do not empty the feeders for a week following beak trimming.

Recommendations for beak trimming at 8-10 weeks of age (maximum term within 70 days old):

- Blade temperature will be between 650-750° C, which corresponds to a cherry red colour. The use of excessive temperature causes a greater decrease in body weight.
- Cut the beak perpendicularly at a right angle to its long axis, so that after cauterisation about half of the length of the beak between the tip and the nostrils is left (4-5mm). The same length for both mandibles!
- The preferred cauterisation time is two seconds. Cauterise each mandible with care, particularly at the sides of the beak, so as to round off the sides of the beak and avoid lateral regrowth. The idea is to burn the germ cells on the side of the beak.
- Consistency and uniformity is an important factor and it is necessary that the people involved in this operation do the work in collaboration with each other.
- The preparation of a record of beak trimming quality control where operators can be evaluated can help in getting a job of higher quality and more uniformity.

Conclusion

Beak trimming is necessary to prevent pecking behaviour in layers and to achieve good flock productivity.

This operation needs to be done by trained people in order to avoid unnecessary suffering for the birds. Some countries are changing their regulations about beak trimming, sometimes with a ban of this practice due to welfare considerations. ■

ISA
A Hendrix Genetics Company

Poultry red mite

14

by Rafael Lera, Institut Sélection Animale BV (rafael.lera@hendrix-genetics.com)

The poultry red mite is a major concern for health and welfare of laying hens in many areas of the world and has a huge economic impact for egg producers.

Prevalence is extremely high in some regions and a recent survey estimates that more than 80% of European layer farms are infested. Red mites are small ectoparasites which are only found on the host when feeding on blood, during the dark period. They spend the majority of its lifecycle in cracks and crevices, where females lay the eggs. This means that hiding places in a poultry house are numerous and difficult to reach.

The lifecycle is very short: under favourable conditions the total cycle can be completed within seven days. Poultry houses have optimal environmental conditions for rapid development and therefore they can be quickly completely infested. Red mites show high resistance to starvation (they can survive beyond eight months without a blood feed). This makes total removal of mites at cleaning and disinfection unlikely. Infestation in subsequent flocks is therefore common.

Infestation by red mites has negative consequences not only in the welfare of the birds, but also in the economic performance of the flocks due to production losses and treatment costs:

- High stress in birds, resulting in altered behaviour: nervousness, feather pecking and cannibalism, floor eggs, smothering.
- Weakness, weight loss, increased sensitivity to pathogens, anaemia and significant mortality in severe cases.
- Decreased egg production, reduced egg weight and increased FCR.
- Impact on egg quality: weaker egg shell, blood stained eggs and even paler shell colour.

Red mites are also vectors of poultry pathogens like Newcastle disease virus, fowl pox virus, avian leucosis virus, Salmonella spp, E. coli, Pasteurella multocida (fowl cholera) and others.

Poultry red mites can even attack humans, causing skin irritation and dermatitis, thus becoming an occupational hazard.

Red mite control must be extensive: complete eradication is very difficult and when birds are in lay very few active products are available in many countries because of pesticides regulations. The objective is to reduce the risk of initial infestation by maximising control efforts in the period when the house is empty.

Once the flock is depleted, control should start with thorough cleaning (inside and outside the houses) and removing or sealing any obvious refuges. When the house is dry, an approved chemical acaricide should be sprayed, focusing in cracks and crevices.

Product rotation is recommended to reduce the risk of mites developing resistance to available chemicals.

Other methods have shown to be effective, like heating the house above 45°C, but it is costly and usually detrimental for farm equipment. Using mineral oils or biodiesel is also an option, having a suffocating action on mites.

Basic biosecurity and hygiene rules should be followed once the replacement flock is housed.

Then, monitoring of the presence of mites on a weekly basis is crucial, so early spot treatments can be used to limit their proliferation.

Chemicals used for classical spraying treatments are organophosphates, carbamates and pyrethroids, but their use in presence of birds is limited in many countries due to health issues and risks linked to residues in animal products.

The alternative methods of control are based on different types of actions. Some of them are already available but others, although promising, are still at experimental stages:

- Cyclical lighting programs.
- Desiccating products (silica, clay, fossil diatoms).
- Plant extracts.
- Natural insecticides obtained by fermentation of bacteria.
- Predators.
- Vaccination. ■

Pasted vents in chicks

15

by Ron Jöerissen, Institut Sélection Animale BV (ron.jöerissen@hendrix-genetics.com)

Day-old chicks and reptiles are both poikilothermic, which means that their body temperature follows that of their environment. Reptiles can function properly at a wide range of body temperatures by adjusting their metabolism accordingly.

Day-old chicks move from poikilothermic to homeothermic behaviour which is usually completed at about 5-6 days after hatch. Day-old chicks therefore differ from reptiles because they achieve ideal metabolism and development at an optimum body temperature of about 104°F and cannot adjust their metabolism according to environmental con-ditions. Metabolism is especially important for speedy absorption and utilisation of the yolk sac residue which provides the newly hatched chick with nutrients and maternal antibodies from the mother hen. The development of the intestinal tract for the transition from yolk sac digestion to normal feed digestion is also important at this stage.

It appears that white layer lines, when compared to other genetic lines, are more susceptible to developing 'pasted vents', which can be seen at about 3-4 days after placement. It seems that it is more difficult for white layer chicks to change to normal feed digestion and the correct body temperature is crucial to optimise metabolism for correct yolk sac utilisation and transition to feed digestion, in order to keep the phenomenon of pasted vents under control.

The house air temperature should be managed according to the actual body temperature of the chicks during their first 5-6 days of life and kept at 104°F on average. Automatically one will notice better development of the chicks during early brooding and lower first week mortalities.

As day-old chicks require good quality, easily digestible feed with a high concentrate of carbohydrates derived from first grade raw materials, feed quality also plays an important role. Starter feeds with elevated levels of grains like corn and wheat are preferred. In the old days it was common practice to feed the chicks with broken corn for the first few days of their life to avoid problems with early diarrhoea.

This practical approach can still be used by topping the regular starter feed with broken corn or rice for the first few days after placement. Special products that are sold as 'hatchling supplements' can be used for this purpose.

Keep in mind that the chicks also need to digest the remains of their yolk sacs during the days that the feeding is started. Therefore it is wise not to satiate them. Provide the first feed in regular small allocations given 5-6 times per day.

Overloading the chicks with feed when the yolk sacs are not fully utilised easily develops into a yolk sac infection with elevated chick mortalities during the first week of life.

As mainly E. coli bacteria will be found on infected yolk sacs, the origin of the chicks and especially the hatchery relates to the problems seen at farm level. In most cases these conditions could have been avoided by better focus on brooding conditions and especially correct body temperature of the chicks directly after placement.

The phenomenon of pasted vents is regularly seen in relation to chick quality and in the majority of cases the hatchery hygiene is questioned when it is seen at farm level. But, apart from exceptions, in the majority of cases the incidence of pasted vents can be overcome by better understanding of what really counts for the day-old chick from the day it enters the farm to start the brooding period. ■

Vaccination Part II

16

by Bart Stokvis, Institut Sélection Animale BV (bart.stokvis@hendrix-genetics.com)

In Vaccination Part I (International Poultry Production Volume 21 Number 8), I wrote an article about vaccination. It started with: "Healthy birds are efficient producers! How can we keep them healthy?" To summarise, it is about farming and it is about quality. Vaccinations are a supporting tool.

For a good start, you need good quality day old chicks. You supply them with good housing circumstances (temperature and light), you give them good quality feed and water and you manage them in the correct way. The introduction of pathogens, you prevent with a sufficient biosecurity program. Pathogens, which cannot be excluded, you manage, using a 'tailor made' vaccination program. This sounds simple and straightforward. Why doesn't it always work out well? Why are the results of an, on first sight good biosecurity and vaccination program, sometimes not as expected?

Biosecurity measures are as strong as the weakest link. Man is the weakest link. Most problems are the result of human mistakes. Pathogens are brought in because people violate biosecurity rules, most times not on purpose, but simply because they do not realise the consequences of their behaviour and because they do not understand the purpose/ background of the biosecurity rules.

Vaccination programs should prevent disease symptoms after the introduction of pathogens.

In this article, I address some reasons why vaccination programs are not working out well.

● Wrong diagnosis

Most important, everything starts with a correct diagnosis. Are the problems caused by a pathogen? Which pathogen is causing the problems? If the diagnosis is wrong, the vaccination program, based on this diagnosis, cannot work.

● Infection pressure

When the infection pressure is very high, instant, 100% protection through vaccination is difficult. But vaccines can still play an important role in these situations.

Vaccines decrease the susceptibility for disease and lower the level of excretion of pathogens. Thus, the spread of disease is slowed down and this lowers the infection pressure.

For airborne diseases, cooperation between farms or a governmental disease control program can be necessary to lower the infection pressure in a region.

● Maternal immunity and immune competence

Maternal immunity is very important for protection against diseases like IB Qx, chicken anaemia or avian encephalomyelitis.

Maternal derived antibodies, however, can also interfere with vaccinations, for instance vaccinations against Gumboro disease with modified live viruses.

Immune competency, the ability of a young chicken's immunity system to react to disease challenge, is developing with age and must be taken into account in the vaccination program.

● Multi age situations

Young and old birds are different in immunological status. In multi age situations, the pathogens always find susceptible birds to jump to. Multi age situations within farms can be managed within farms. Multi age situations between farms often are out of scope.

Some areas are very densely populated with poultry farms owned by different people or companies. How can you manage that? Are problems communicated? Is it possible to cooperate?

The need to vaccinate depends on choices your neighbours make and on the type of disease problems they have. For instance, if there is an outbreak of Gumboro disease in the area, you should know, so you can adjust your vaccination program.

ILT virus, also vaccine virus, can jump from house to house, but also from farm to farm. If you are running a broiler operation and the ILT situation on your neighbour's layer farm is not under control, you will suffer.

● Vaccine failures

There are different reasons for vaccine failures. What is the quality of the vaccine? Was the vaccine administered in the right way and at the right time?

These questions are often difficult to answer. What can you do? You can check the result of the vaccination, which is the combination of the two. Is the antibody response sufficient? On time? Check!

● Vaccine disappointments

Can the vaccines meet your expectations? Are your expectations realistic? A nice example is vector vaccines, based on Marek HVT.

We all know that this Marek vaccine needs time to build up immunity, let's say 7-14 days. Is it realistic to expect protection from an HVT-ND or HVT-IBD vector vaccine against infection with ND or IBD in the first two weeks of life?

What's the effect of using a hot strain gumboro vaccine on the vaccine take of other vaccines administered around that age?

● Compromises

In practice, it is not always possible to follow all the scientific vaccination rules. One of the mean reasons for compromises is that life of a rearing bird is too short to give all the vaccinations.

Always put new vaccination in; never take vaccinations out results in overfilled vaccination programs and the need to choose suboptimal vaccination intervals. Why do people choose specific application forms? Practical reasons and labor costs play a role.

ISA's slogan is: 'Breeding for 500 eggs!' Our birds will produce, without moulting, until 100 weeks of age. How can we protect our birds against diseases until 100 weeks? This is a challenge for the vaccine producers. Vector vaccines can do this.

What other new vaccination techniques will be developed? In feed formulations? Slow release depot vaccines? Coated antigens for drinking water application? ■