Looking at disease from a new angle

Gone are the days of simple diseases when a pathogen reacted with the chicken to produce a disease with a manifestation of clinical signs that were consistent with what our text books told us.

Today's diseases often have a multifactorial aetiology that is modified by a host of influences from management, nutrition and environment and, thus, can present a plethora of clinical pictures.

As a consequence, we hear phrases like wet litter, malabsorption, stunting, poor uniformity, respiratory and leg weakness to describe what many farmers consider to be disease entities – sometimes they are, sometimes they are not!

New role for veterinarians

This being the case, today's poultry veterinarians are no longer 'detectors of lesions and dispensers of antibiotics' but they are the detectives who have to unravel all the clues at the crime scene and come up with a solution that will resolve the problem and restore the birds to optimum performance as quickly as possible. In many instances disease diagnosis is virtually synonymous with performance maintenance.

If we look at the modern broiler, its ever shortening life-span means that as the years go by each day becomes a greater percentage of its total life.

This has interesting and worrying consequences for compensatory growth, vaccination and medication (see Fig. 1). In this article we will explore this idea further and highlight some of the key factors that impinge on disease to modify its manifestation and consequences.

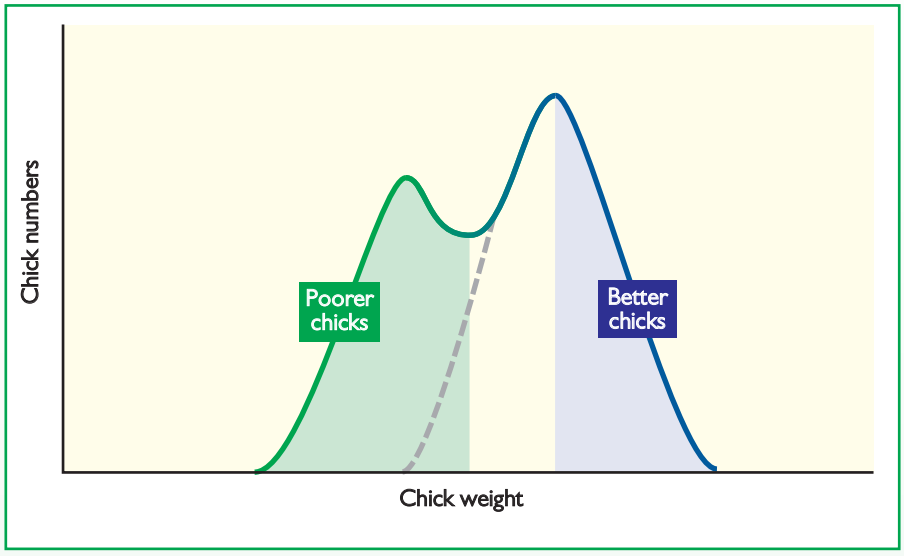

Fig. 2. The impact of a biphasic weight distribution.

In doing this, we need to appreciate that disease is no longer delineated by clear boundaries and that grey areas do exist in the regions between disease and suboptimal performance.

A logical starting point is to consider what our broiler or layer needs if it is to give us maximal or optimal (maximal cost effective) performance as these will be the factors, which, if not present at an adequate level, will define our disease or the extent of its manifestation or severity.

Chick quality imperative

First of all we need to start off with a fit, well nourished and stress free chick that on placement eats, drinks and grows. This is perhaps best defined by considering the

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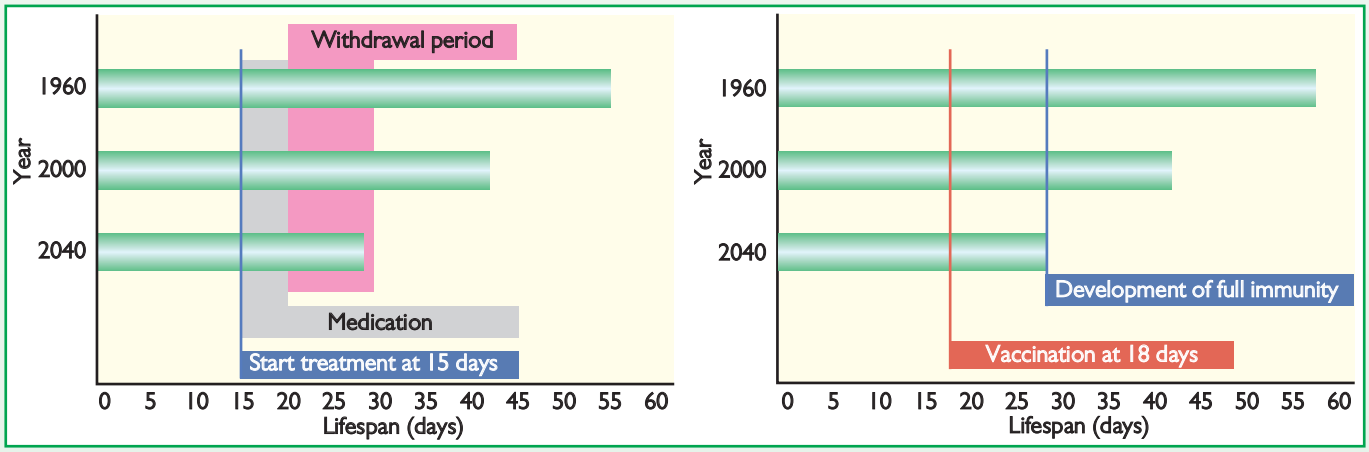
Fig 1. The effect of declining processing age on medication with a potentiated sulphonamide for five days with a 10 day withdrawal period (left) and on vaccination at 18 days (right).



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chick and its weight at seven days of age. However, we are not growing one chick but a whole flock, so in this assessment of the seven day old chick, be it by weight or another yardstick, we also need to consider the uniformity of that parameter.

Starting with the breeder

If we are talking weight (see Fig. 2) the last thing that is needed is to have seven day weights that have a biphasic distribution because those in the lighter group will always be at a competitive disadvantage on the ground in the broiler house. At best the weight difference will be maintained and, at worse, exaggerated.

Thus, broiler health starts on the breeder farm. Obviously we do not want to be receiving vertically transmitted pathogens such as mycoplasma or Salmonella enteritidis nor pathogens that can be picked up from the egg shells in the hatcher such as Aspergillus fumigatus, the cause of brooder pneumonia, or any of the various bacteria that cause yolk sac type problems.

Thus, breeder flock health and nest box and hatchery hygiene both significantly impact on first week broiler or table egg pullet health.

But, there is much more to the day olds we receive. Firstly, do they have an adequate nutrient package in their yolk sacs to optimally sustain them after they hatch in the hatchers, during transportation to the farm and during their first few days on the farm? Here we are obviously talking about fats and proteins, but the importance of the yolk as a source of certain key vitamins should not be overlooked.

Managing the hatch window

One of the buzz words of recent years has been 'hatch window' and the importance of this to a good start on the farm should not be overlooked.

In the old days chicks could quite easily hatch out over, say, three days. Those which hatched out first would have a disadvantage on placement in that they would be more dehydrated and more of the nutrient reserves in their yolk would be used up.

If we reduce the hatch window we are reducing the number of hours over which the chicks hatch off so, in terms of what we have just mentioned, we must be improving uniformity if we reduce the hatch window.

In the hatchery we must reduce the stresses to the chick, such as additional dehydration or chilling, and once on the farm the science and practice of good stockmanship must come to the fore.

We must ensure that each and every chick drinks and eats and that all are comfortable in their new environment. Chicks, and for that matter older birds, tend to become lazy when they sit so we should consider regularly disturbing them because once on their feet they are likely to go and drink and then eat before they sit down again. When we do this it must be with a 'gently, gently' approach – we do not want to panic the birds or stress them. We should never forget that if we want growth in our birds they must eat and drink!

In this first week we should not shy away from culling because diseased birds are sources of infection to their hatch mates and small, weak birds will be more likely to succumb to any disease in the offing and then become a risk to the others.

Achieving target weight

Obviously seven day weights will be breed and environment dependent but in most situation we should be looking at seven day weights of at least 160-170g.

Situations arise in which poor seven day weights, of say 95-100g are associated with all sorts of disease problems. In such scenarios, while there may be merits in countering the specific problems seen, many of these will disappear if you can get the seven day weights to somewhere near what they should be. Usually in such scenarios this can be achieved by taking a very close look at the early management of the flock and rectifying all the shortfalls in management that you detect.

From the outset it must be appreciated that a dynamic harmony exists between the quality of the litter and the atmosphere in a poultry house. If this is disturbed problems such as wet litter and associated noxious gases in the atmosphere or dry litter and high dust levels will arise.

Either of these is bad news when we are talking about respiratory disease and the former scenario can also be linked into all sorts of problems such as pododermatitis, hock burn, staphylococcal arthritis, femoral head necrosis and various forms of enteritis.

When it comes to ammonia levels it must be remembered that once man can detect ammonia in the atmosphere the levels are high enough to impact on respiratory disease. This is done by countering the disease control activity of the tracheal cilia and the pulmonary macrophages, which are key cells in the local defence mechanism of the respiratory tract.

Also, it is well worth remembering that chickens are not six foot tall and the air that they breathe in is very different, and often much worse, than the air the stockman breathes in. If you do not believe me, try lying on the broiler house floor for half an hour only breathing in the air the chickens are breathing in!

Litter management

Once the litter has been 'lost' and become wet and greasy it is hard to recover and it will impact on bird health. Thus, it is very important to have a philosophy of preventative, rather than curative, management for litter problems.

But, remember the dynamics between the litter and the atmosphere. In tropical regions it is hard enough to effectively manage cooling pads during the hot rainy season, but this is made virtually impossible if the cooling pads are badly fitting and have big gaps between them through which large volumes of hot air with a high humidity are drawn into the house.

With the cooler air already in the house much of this extra humidity (water) from the hot air will find its way into the litter when this hot incoming air is cooled inside the house rather than being cooled in the cooling pads.

It is also worth remembering that litter is very much like cement – it can take a lot of water and then the addition of just a little more can have a dramatic effect on its consistency or quality!

So, there is a huge interface between management and disease and those who with the best management invariably produce the best birds and have the best costings.

Now we need to think how all this equates to disease or, more precisely, disease or health management. First and foremost we can not assume that all our staff know all the intricacies of modern bird management and, even if they did there would be differences of opinion.

If two people managing the same flock, for example the houseman and the night supervisor, have different approaches to countering the same undesirable scenario and they both try to implement their approach we have a recipe for problems.

For this very reason and in order to bring consistency across all the flocks in a company standard operating procedures (SOPs) are essential. Think of the problems of interpreting seven day weights if some farms in the company thought Day 1 was the day the chicks were placed, while others thought Day 1 occurred at the end of the first 24 hours on the ground. It would in fact make data comparisons a worthless exercise.

Many companies have SOPs but these must be checked to ensure that all pertinent issues are addressed by the SOP and any changes that have come with time are incorporated into the SOP. These may include such things as subtle changes to the day on which a particular vaccine is given or the criteria for changing the contents of a foot dip when the product used has changed.

Dangers of assumption

The real danger is head office generating the change to the SOP and then assuming that everyone has received it. To avoid the errors that could arise from such an

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assumption, why not put out a simple form with each SOP amendment that the farm manager and, if appropriate, staff have to sign to say it has been received, read, understood and placed in the SOP folder? This would then be returned to the sender.

However, we must not assume that just because a farm has received an SOP, that all the staff on the farm operate in accordance with it. This is where the veterinarians and/or the QA team come into play.

These people should regularly audit farms to ensure that total SOP compliance is occurring and where non-compliances are identified they should be immediately rectified with appropriate training of staff.

Synergistic team effort

These exercises should not be viewed as a witch-hunt on behalf of senior management, but rather as a synergistic team effort to ensure that everything is being done as it should so that the flock is given every possible opportunity for optimum performance.

If you have staff who can not accept this and are constantly fighting against SOPs and their implementation then perhaps, in 2007, these people should not be in your team.

Finally, we now have to accept that broiler divisions or table egg divisions can not operate in isolation.

The computer phrase GIGO (Garbage In: Garbage Out) is just as applicable in poultry production. The hatchery can not produce first class chicks from substandard eggs, the broiler or egg division can not perform if it is receiving poor feed and, in the case of broilers, you can not expect first class performance if seven day weights and day old chick quality are lacking.

Thus, what we have said relating to SOPs and auditing is just as relevant to all divisions, be they breeder, hatchery or feed mill.

If you have a veterinarian who is hell bent on finding lesions and dispensing antibiotics you need to convert him into a livestock professional who is capable of seeing the bigger picture and all that it entails.

He must be able to fully comprehend how all the key facets of production, such as management, nutrition, environment, hygiene and health, interact and utilise his knowledge of all of these to optimise the production and the financial returns from each and every flock he is responsible for. ■