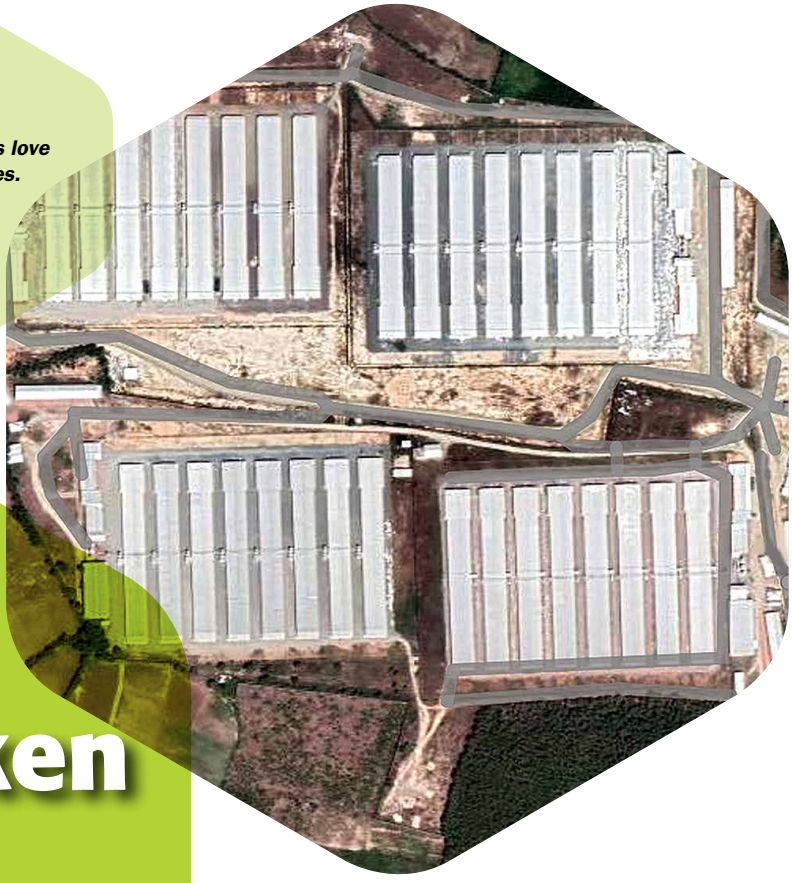


Mycoplasmas love multi-age sites.

Can Asian native chicken production survive if antibiotics are banned?

CHRIS MORROW* discusses the current scenario for native chicken production in Asia, including disease challenges with muti-age production sites, and provides a future perspective on antibiotic-free native chicken production.

In the next decade it is anticipated consumer and regulatory pressure to remove antibiotics from animal production systems will see the cessation of routine administration of antibiotics. This will happen in many steps, at different rates in different countries, by legislation then implementation but it will happen. First in major intensively farmed species (chickens for example) and then minor species (ducks, geese etc). The major pressure driving this will be AMR (antimicrobial resistance) – a human medical problem caused by overuse of antibiotics.

Importance of biosecurity

In the 1960s and 70s in the industrialized chicken world it was realized that without effective biosecurity in the design and running of integrations that production sites tended to accumulate health problems over time. They became "chicken sick". The operational convenience of having all parts of an operation on one geographic site was also convenient for pathogens that got onto that site. Initially antibiotics could help maintain the health of stock on these big sites, but it was realized for various reasons that this was not sustainable. Antibiotics could not eliminate these infections (we have proved that!).

Industrial sized chicken breeding programs had to separate parts of production, and the push to produce healthier products meant that the leaders and more successful companies became more biosecure,

to keep pathogens out. In turn their products (genetic stock) became more attractive to their customers. To this end, Ross Breeders became the first company to have isolated single age sites for all parts of its poultry genetic programmes.

Major disease challenges

There were also pressures to accelerate genetic progress which meant that large programmes were needed to maintain selection pressure. Elimination and maintenance of *Salmonella* Pullorum, mycoplasma and avian leukosis virus (ALV) freedom were foremost, and since then zoonotic *Salmonella* control has become important. To be sure of freedom from *Salmonella* and mycoplasmas it was also important to eliminate use of antibiotics because they could hide the infections (especially when serology is the screening test for the control programme). Since that time there has been a large consolidation of companies such that the genetic programmes have become very large whilst still providing genetic and health improvements

Looking at Asia the popularity of native (or yellow) chicken commands a premium and drives demand for this product. There are still many companies with their own breeding programs (some just selecting the next generation's foundation stock from available birds on their farms). These local programmes generally are very antibiotic dependent often because of ineffective biosecurity. Historically, acquired resistance in mycoplasma has usually been solved by changing antibiotics but production without antibiotics is severely affected. These breeding programmes in my experience are "chicken sick".

Mycoplasma

Now there is the removal of antibiotic programs, without compensatory vaccination, one sees respiratory disease in the breeders especially as they come into lay, with poor production and day-old chick quality. Additionally, the progeny still needs antibiotics to stop post-vaccinal reactions. This "reaction" is from vertical transmission of the mycoplasma, usually both *Mycoplasma gallisepticum* and *M. synoviae* and aggravated by

Figure 1: Traditionally farms grow bigger becoming multiage sites with new birds challenged on arrival. Don't replicate this with expansion. These sites become chicken sick increasingly over time as bird dependant pathogens build up.

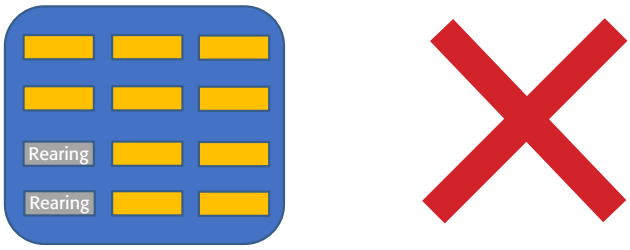
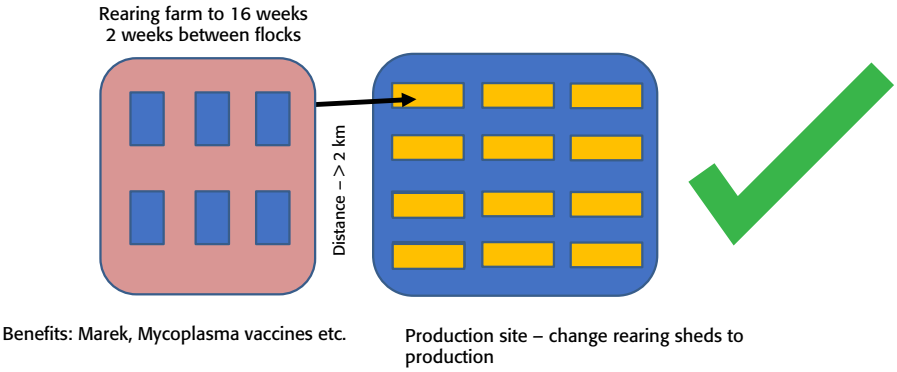


Figure 2: All in all out is the best strategy for a farm but if this is not possible expand by moving rearing to a new remote site (Change existing rearing sheds into production sheds). Here the vaccination program can prepare the new birds for the expected challenges on the production site.



respiratory vaccines. LaSota Newcastle vaccine is extremely potent at triggering this.

So, can these programs operate without antibiotics? Well, the breeding program would have to eliminate mycoplasmas or at least be able to stop early challenge so live vaccines have time to stimulate immunity and stop wild strains from circulating. Killed mycoplasma vaccines do not eliminate infection so are only of limited use especially in infection control. Vertical transmission of mycoplasmas could be stopped by live vaccines and even used to eliminate mycoplasma from the nucleus flocks and their progeny, but they take about 5 weeks after administration to provide enough immunity and the wild strain challenge needs to be minimized during this time. They have not been demonstrated to provide immunity until 3 weeks of age and this may be a function of the maturity of the chicken's immune system rather than the vaccine. So, 8 weeks of biosecurity is preferred before challenge.

One age – one production site

The current attitude in Asia is that a production site can be designed (without effective intergenerational biosecurity) and then it is a technical problem for the veterinary staff to maintain production and health (with antibiotics!) – central planning at its best!

Native chicken breeding

Seemingly this problem is unknown to financiers who lend significant amounts of money to native chicken integrators to build these chicken colosseums. Coloured bird breeders with high health status can be obtained from specialist industrial sized breeding programs but there are still perceived (marketing) benefits from having at least some lines (male lines usually) from an inhouse breeding programme. In addition to selection, genetic progress in these native breeding programs is

maintained by blending lines from the west and the east. Unfortunately, improvement in health status is a lower priority and thus difficult to achieve. Now we are seeing problems with mycoplasma control, ALV and Hepevirus (big liver spleen disease) in these programs. The mycoplasma problem will become the major problem when antibiotics are removed.

Multi-age production sites

Multi-age production sites that are never empty may be the reality for the next 20 years and the control of mycoplasma in local primary breeding stock and the ability to rear birds for the multi-age production sites with effective mycoplasma vaccination is a necessity when antibiotics are restricted. These current multi-age farms will probably be converted into broiler farms as companies realize the necessity of single age farms, or remote isolated rearing farms at the least, to improve the mycoplasma status. Some of these integrations do not currently grow broilers. The airborne transmission of mycoplasmas means that a distance of at least two kilometres may be needed to isolate rearing farms from production, and the implementation of biosecurity measures within the farming base will be critical.

In the 1970s the west also used some other strategies to decrease and control the impact of mycoplasma in chickens. This included heat treatment of eggs before incubation. This is like short period incubation during eggs storage (SPIDES), but higher temperatures are used and there are losses in hatchability. However, this has the advantage that resistance is unlikely to develop.

Future predictions for native chicken production

There will be a consolidation of native chicken breeding programs within countries, with a definition of health standards like imported breeds.

Vaccination against wild mycoplasma infection will be used, and to make these effective rearing sites will be constructed remote from production sites. This will give benefits for vaccine effectiveness for mycoplasmas and Mareks vaccines by letting immunity establish before challenge. Zoonotic *Salmonella* control will emerge based on live vaccines (and history might judge current reluctance for live *Salmonella* vaccines by veterinary authorities harshly).

Financiers of poultry integrators should consult veterinarians about biosecure farm design before placing their financing assets at risk. The sooner an integration moves to biosecure, the more assured is its survival and prosperity. Likewise, governments funding disease control programs (like ALV control) should ensure money is not wasted by first having underlying capital infrastructure, industry structure and biosecurity in place. AP

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