The Poultry Practice
POULTRY PRODUCTION PRACTITIONERS

NEWSLETTER

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INTRODUCTION

We are deep into winter now and generally in South Africa poultry producers remember the disastrous outbreak of Avian influenza that happened two years ago. It is time to review farm biosecurity and maintain constant vigilance.

We also need to ask ourselves the question whether we as a country are more prepared for an outbreak now than we were then. At that time there was much confusion as to how to effectively kill large amounts of birds quickly in an approved manner, how to effectively and quickly dispose of the mortalities and infected materials, how to prevent the spread of the disease. There were numerous instances where the delays in dealing with these issues proved catastrophic. Are we more ready now? Is the process streamlined? As a country we seem to enjoy living on the edge. While other countries plan meticulously for disasters, once we have dealt with the issue, all interest in the topic disappears and it is almost as if it has never happened. This is a grave mistake.

Poultry farm management is in a large part about putting systems in place and then testing that the systems are adhered to. Farmers often want to find the latest exotic disease in the face of poor production, but the fact of the matter is that attention to basics is invariably the medicine that needs to be taken.

There are well established guidelines and directives that ensure that a farm will have the best chance to produce optimally and avoid disease incursions. It is important to introduce systems that are robust enough to survive when the manager resigns. The most successful poultry farms are those with reproducible systems that work regardless of the staff changes or challenges. We see many farms where problems are caused by lack of effective systems. The Poultry Practice audit sheets are designed to encourage adherence to basic good management. This is an online tool which we have developed, and it has proven very effective. Speak to your vet about using this tool.

Education and staying ahead of the game are cru-

cial to optimal poultry production. Try to attend the information days given by the various breeds, learn more about the diseases and systems. Todays poultry farmer must be a bit of everything... manager, poultry specialist, labour expert, water expert. Make use of the opportunities that exist to learn more.

Please send your questions to deryn@thepoultrypractice.co.za

Herman, Deryn, Ferdi & Nadia

Figure 1 - SHS in a layer hen (courtesy of the poultry site)

NOT EVERY SWOLLEN HEAD IS CORYZA

Poultry are susceptible to sinus infections and this often manifests as a swollen head. It is important to note that any infection of the sinuses will cause a swollen head. Swollen heads are therefore no diagnostic but rather a symptom of quite a few diseases. Recently, there have been a few outbreaks of "swollen head". It is important to try and get to the bottom of the problem in order to handle it correctly.

In this article, I propose to discuss SHS as there have been issues in layer and breeder flocks recently. Turkey rhinotracheitis (TRT), Avian Pneumovirus (APV), Swollen head syndrome (SHS) are all names for the disease caused by avian metapneumovirus. Interestingly, this disease was first described in South Africa in the 1970s. Since then it has been found world wide with the exception of Australasia. There are 4 subtypes of this virus but it seems that one subtype will protect against infection by others.

This disease is highly infectious and can be carried by wild birds to susceptible flocks. Initial symptoms may include coughing and sneezing. If you look carefully the foamy eye discharge and nasal discharge is apparent. Occasional swollen heads are detected and in laying birds, a drop in egg production of up to 70% has been recorded. Twisted necks and disorientation may occur as the result of the middle ear infection. The disease can be devastating in broilers with very high mortalities. Mortality is generally low but can increase to up to 50% in isolated instances. In fact, chickens are quite resistant to this disease but when there are other challenges like poor ventilation, other infections, stress, the disease can cause significant losses. It is important to take samples to exclude other diseases that also cause swollen heads like MG, coryza, Newcastle, ORT. SHS can be diagnosed by PCR but generally this is only effective on the very early infections. By the time the swollen heads are manifest, the virus has disappeared and other organisms are more likely to be isolated.

Vaccination is an important tool against this disease. There are live and inactivated vaccines available and these should be used. Live vaccines can be administered via the drinking water or sprayed. It is important to vaccinate as early as possible for this disease, as the maternal antibodies do not seem to give enough protection. Avoid using IB or Newcastle vaccines at the same time. When the risk of infection is high, the vaccination of in lay birds is recommended.

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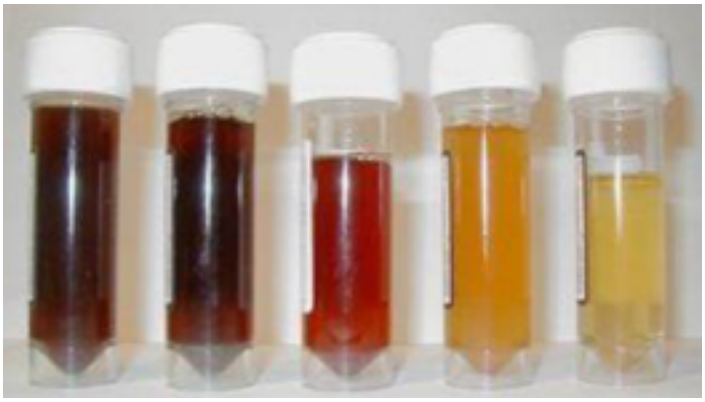
BLOOD SAMPLING FOR SEROLOGY TESTING

Serology is the scientific study of serum, in which the diagnostic identification antibody levels in the serum, also known as titres is performed. These antibody levels are formed when the bird's immune

system develops antibodies after a bird is exposed to an antigen, either by vaccination or field exposure. The laboratory uses the serum portion of the blood (the clear yellow liquid) that forms after the clot develops. The handling of blood samples and serum quality will influence laboratory results and poor-quality samples lead to erroneous and misleading results.

The following conditions can affect the blood samples:

- Bacterial contamination can happen if the samples are exposed to higher temperatures for longer periods of time. This can occur if blood samples are left in a hot car or in direct sunlight or in a warm environment.
- If birds are dehydrated (in especially hot weather or due to stress), they can produce poor serum samples that are gelled. This serum cannot be tested.
- Serum from birds after a recent meal appear cloudy due to excess fat in the serum. These fatty samples interfere with ELISAs.
- Blood in the process of forming a clot should not be frozen as it will then not separate into serum.
- The blood samples should not be shaken or allowed to roll around as this can rupture red blood cells. This process is called haemolysis and makes serum appear red or pink in colour. Haemolysis interferes with laboratory tests measuring antibody levels.
- Only the two samples on the right hand side are suitable for testing.



HOW TO BLEED

1. Pierce the vein on the inside of the chicken's wing with a sharp needle and collect blood in the tube. Ensure that the level of blood in tubes is between half and two thirds.
2. If a syringe & needle is used to bleed, remove the needle before placing the blood into the tube as pushing it back through the needle can cause haemolysis.
3. Leave the tube for the clot to form, it is best to lay the tubes flat as more serum can form than when placed in a vertical position. After clotting, loosen the clot from the sides of the tube with a straightened paper clip. There should be a clear straw-coloured serum on the top of the dark red clot.
4. Make sure that tubes coated with anticoagulants are NOT used.
5. For submission to the laboratory, place the test tubes in the blood box. Mark the blood of each house on the sticker provided.

6. Submit the tubes in a blood box within 24 hours together with a completed sample waybill.

Dionne Rauff is the National Diagnostic Manager of Deltamune laboratories.

IS A GRID-TIED SOLAR SYSTEM A GOOD INVESTMENT?

As our national grid struggles to cope with ever increasing energy demand and as energy costs continue to rise, more and more businesses and home owners are turning to renewable energy as an alternative and or supplementary supply to traditional municipal power.

When evaluating whether a solar system is a good option it is important to define what your requirements are and what your limitations are. If your requirement is to go completely off-grid then the type of system and the associated expense will be quite different from whether you are considering a solar system as a long-term investment that will reduce, but not replace, your energy consumption from the national grid.

Deciding on whether a solar system is a good investment is dependent on several factors the most important of which are:

- What are my farm's energy requirements?
- What do I pay for electricity?
- What is the cost of a solar system?
- What size solar system can I and should I install?
- How much energy will a solar system produce?

To see why these are important questions and to set about answering them let us consider an example case of a typical 250kW solar system on a farm.

OPERATION OF A GRID-TIED SOLAR SYSTEM

A grid-tied solar system is one that is connected to a facility's existing electrical infrastructure and operates in parallel with an existing municipal supply. The facility will be supplied from a combination of solar and municipal power based on the size and production of the solar system.

Figure 1 shows the power profile of a farm being supplied only by the grid. The red portion of the graph is the farm's usage over a normal day. The farm operates between 150-300kW typically.

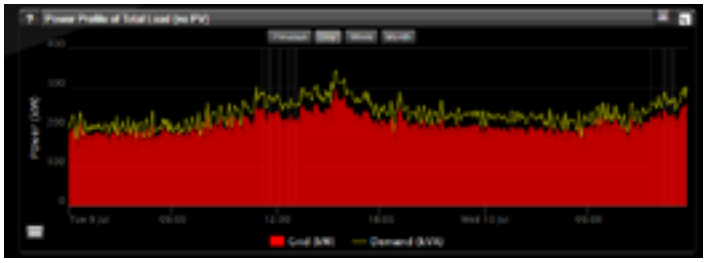


Figure 1 - Power profile of farm supplied by the grid

Figure 2 shows the production of a 250kW solar system over the same time-period. The shape of the graph is typical of a solar system in winter. Switching on in the early morning, rising to a peak of around 180kW at midday and tapering off in the afternoon till switching off in the evening.

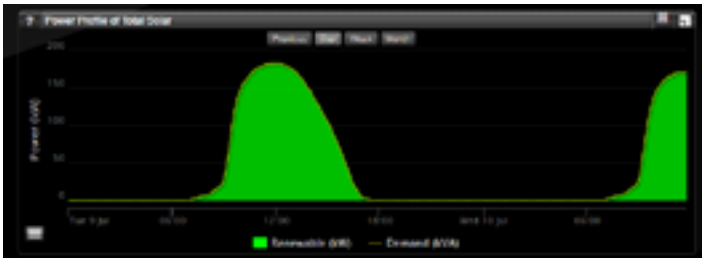


Figure 2 - Power profile of a typical 250kW solar system in winter.

Now consider Figure 3 which shows the farm being supplied by both the solar system and the grid. Notice how at night the farm is pulling power only from the grid and as the solar system increases its output during the day, the farm pulls less power from the grid. By utilising less power from the grid, the

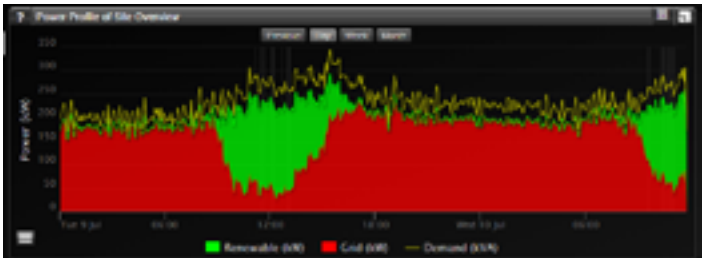


Figure 3 - Power profile of farm being supplied by a solar system and the grid.

farm is saving money on its electricity bill. This saving reduces the farm's operating expenses and is what justifies the initial investment in the solar system.

What is important to note with this grid-tied system is that there is no storage capacity and that any excess power produced will be pushed back into the grid (essentially it is wasted as you get no financial benefit for doing so). Furthermore, the system does not operate independently of the grid and if there are supply interruptions the solar system will also switch off. Despite this, the correctly sized solar system can still be an excellent investment.

FINANCIAL RETURN

So, we can see how a grid-tied solar system can reduce your farm's electricity bill but by how much and is it worth the expense? Figure 4 shows the monthly electricity savings for the farm with the 250kW solar system. The monthly saving varies month to month because of varying solar production and seasonal

Figure 4 - Electricity savings for a farm with a 250kW solar system

electricity tariffs. As seen in Figure 4, monthly savings range between R30k-R43k for this farm.

As tariffs continue to increase year on year the monthly savings will also increase. Payback period is based on the upfront cost of the system, the production of the system and how much it offsets your electricity bill. Typical payback periods for commercial solar systems in South Africa conservatively range from 4-7 years.

SIZING YOUR FARM'S SOLAR SYSTEM

For a grid-tied solar system without storage, the size of the system should be based on your farm's power profile and the space available to install the system. The power profile of the farm can be reasonably estimated from monthly electricity bills or accurately measured by logging consumption data with a power analyser or similar device on the main incomer. The optimum size solar system for a commercial operation like a farm should be closely matched to the day time power usage of the farm.

Solar systems on farms can either be installed on available roofs (warehouses, offices, broilers etc.) or on the ground. The roof space or land space will be a limiting factor for the maximum system size that can be installed. Ground mounted systems tend to be more expensive but produce more power. Solar Engineering companies can create accurate models of a solar plant from Google Earth images. These models will simulate solar system production which is then compared to the farm's power consumption to produce a financial model of potential savings.

Over the last few years the price of solar panels

has dropped by at least 50% meaning solar systems have become significantly cheaper as the bulk of the cost of a solar system lies with the panels. Payback periods have become shorter by several years. The

Figure 5 - 250kW ground mount solar system on a farm in South Africa

falling costs of solar systems coupled with the rising cost of electricity have led many businesses to consider the installation of a supplementary source of energy as a matter of when not if.

If you are interested in exploring the possibility of a solar system for your farm, feel free to contact me at pasquale@terrafirma-solutions.com

P.Campanella (Pr. Eng. (Electrical) , BSc. Eng. (Electrical))

LOOKING AT AVIARY SYSTEMS IN ITALY

I had the privilege to visit aviary type production systems in Italy. Eggs coming from these systems are regarded as free range. There are now very few conventional cage systems in Italy, as the consumer demand in Europe is now for the free range. The systems appear to work very well, and production and mortality were within the standard. In the houses I visited, 30 000 birds were accommodated per house. The systems had automatic nest boxes, so labour was minimal and eggs very clean.

The farmers emphasized the importance of training the birds in rear to use the system. Birds in rear were trained to jump by putting the water line on a platform. All in all, a very interesting trip (courtesy of Afrivet). Special rearing cages for aviary systems were in place but it is possible to floor rear the birds, as long as there is training involved.

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Figure 1 - Layers in the aviary production system (photo courtesy of Deon Venter- Afrivet)

Figure 2 - The automatic nest box system with egg collection (photo courtesy of Deon Venter- Afrivet)

GENERAL CONTROL OF RODENTS IN COMMERCIAL POULTRY FACILITIES (Part 1)

The house mouse (Mus musculus) Norway rat (Rattus norvegicus), and roof rat (Rattus rattus) are commonly found in and around livestock and farm facilities. Enclosed and insulated commercial poultry facilities provide ideal rodent habitat because of a nearly unlimited amount of shelter, food and water. As a result, these facilities may support large rodent populations, which in turn, may pose significant economic problems to a poultry manager.

Rodents consume and contaminate feed, gnaw on structural, mechanical, electrical and various utility components and weaken concrete slabs and walkways via their burrowing activities. Norway rats and large populations of mice are particularly destructive to building insulation. Most common types of insulation including rigid foam and fiberglass are susceptible to damage.

The actual monetary costs of rodent damage to poultry operations are difficult to assess accurately. Operational shutdowns due to electrical or mechanical malfunctions as a result of rodent damage can cost a facility thousands of rand overnight. The repair and / or replacement of building insulation is expensive in both monetary value and time. Energy losses and the resultant effects on poultry production magnify the expense.

Conducting effective and efficient programs to control rodents in commercial poultry operations are challenging – even for pest control professionals. Rodents may infest the entire length of a facility from the pit to the roof. Rodent baits may not be readily taken by all the rodents because of the large amount of food (grain, eggs, chicks, and various insects) and water are readily available to the rodents. Finally, if baits are not carefully applied, they quickly become contaminated by dust, feathers, poultry manure, and insects, rendering them unattractive to rodents.

RODENTS AND POULTRY DISEASES

Rodents and other wildlife can be involved in the transmission of several poultry diseases such as fowl cholera, salmonella amongst others.

Currently, there is a widespread concern in the poultry industry regarding salmonella. Studies have showed that salmonella infection in natural wild rodent populations is low in general, but several different species of Salmonella have been carried by rats and mice inhabiting poultry farms from around

the country. These include: Salmonella Enteritidis, (SE), S. typhimurium, S. Dublin and others. It is difficult however, to determine whether rodents introduce the bacteria into a poultry operation or, if they pick up the bacteria from an already infected house. It is likely that both scenarios occur. The frequency at which rats and mice cause primary salmonella infection in poultry operations is not known.

In general, rodents, like other wild animals, insects, and people, can carry diseases directly into poultry facility. And they can spread or accelerate the spread of established diseases from contaminated areas to uncontaminated areas via their droppings, feet, fur, urine, saliva, or blood. As an example, mice may travel through infected poultry manure and then contaminate the food and water of healthy birds several hundred feet away or introduce a disease to nearby uninfected houses.

CONDUCTING RODENT INSPECTIONS

The first, and perhaps most important step in controlling rodents in poultry houses is to conduct a visual inspection of the premises. Rodent sightings, droppings, burrows, tracks, pathways, fresh gnawing, and dead rodents indicate areas where rodents are active.

Rodents living in farm buildings are most active just after dusk an again shortly before dawn. If rodents are seen repeatedly during the day, it indicates an established infestation. To get the most accurate assessment of the problem, premises should be inspected using a good flashlight, with the lights out at either dusk or predawn. If rodents are present, the inspection will reveal the location, distribution, and severity of the infestation. It will prove valuable in determining control procedures – such as the most important areas to bait or place traps. After a control program is completed, an inspection will also reveal the program's effectiveness.

Because mice produce between 40 – 100 droppings in a single evening and rates about 20 – 50, droppings are on of the more common signs seen by poultry personnel when the rodents themselves are not noticed.

The burrows entrances of rodents are another readily seen sign of activity. The insulated walls and ceilings are common nesting locations for rodents and their nest entrances are easily spotted. Rodents also burrow into dry poultry manure, and the ground below slab walkways. If rats are active around the premises, their burrows are often evident along the exterior of the building foundations.

RAT AND MOUSE FACTS

House mice are non-descript, brownish to greyish rodents with relatively large ears and small eyes. They weight about 14 grams. An adult is about 14 to 19

cm long including the 7.5 to 10 cm long tail. Norway rats are large, roust animals whose fur colour ranges from reddish to greyish brown on the back and sides and grey to yellow-white underneath. They are about 33 to 46 cm long including the 15 to 21.5 cm tail. Average weight is about 310 grams, and few individuals exceed 500 grams. In comparison, the roof rat is a smaller, sleeker rat usually coloured blackish to grey, with a grey to white underside. A roof rat, in contrast to the Norway rat, has a tail longer than its body, larger ears, a more pointed snout, and more prominent eyes.

Although rodents often feed on cereal grains, they will eat many kinds of food including garbage, insects, meat, fruit and vegetables, and even manure. House mice are sporadic feeders, nibbling bits of food, making as many as 20 – 30 short visits to food per night eating only tiny amounts during each visit. Rats tend to get their daily food at one or two locations. Rats require 15 – 30 ml of water daily (unless feeding on moist or succulent foods). House mice can survive for long periods without free water.

Rodents have impressive capacities for reproduction – especially in poultry facilities, it is important to control them diligently and early, before they reach populations that could cause significant damage. For example, in a single year a female mouse produces about 6 to 8 litters, each litter averaging 5 to 6 pups. The pups are born 19 to 21 days after mating, and they can reach reproductive maturity in 6 to 10 weeks. The Norway rat produces about 4 to 7 litters, averaging 8 to 12 pups with similar gestation period as the mouse. Rats reach reproductive maturity between 8 to 12 weeks. Both rats and mice have natural life spans ranging from 5 to 12 months. Where both rats and house mice exist on the same premises, rats may exclude house mice from the areas where the rats are active. Once the rats are eliminated however, the mice often flourish.

RODENT SENSES

HEARING

Rodents use hearing to locate objects to within a few centimetres. Rats and mice have a frequency range of 50 kilohertz or more, which is much more than humans, who have a range of about 20 kilohertz. Rodents make high frequency noises in various situations, such as in mating, but the function of theses sounds are poorly understood.

TASTE

Rodents have a highly developed sense of taste, which allows them to detect some chemicals at parts-per-million concentrations. This taste sensitivity may lead to bait rejection if the baits are contaminated with insecticide odours or other chemicals. Use of fresh, food quality grain ingredients are the best guarantee of good bait attractability and acceptance.

SMELL

Odour is one of the rodent's most important senses. Rodents mark objects and pathways with urine or glandular secretions. Rodents use their sense of smell to recognise the odours of the pathway to and from food sources and of members of the opposite sex who are ready to mate, to differentiate between members of their own colonies and strangers, and to tell if a stranger is a strong or weak individual.

VISION

Rats and mice have poor vision beyond about a metre, but they are very sensitive to motion up to 9 to 15 metres away. For the most part, rodents are colour-blind, but very light-coloured or reflective objects may stand out in their environment and cause initial avoidance among sensitive rodents. Rodents are most active at night when light levels are low, at which time they rely less on their eyesight than they

do on their other senses, particularly smell, touch, and hearing.

TOUCH

Rodents have a highly developed sense of touch, due to very sensitive body hairs and whiskers (vibrissae), which they use to explore their environment. A rodent in a familiar area relies heavily on the senses of touch and smell to direct it through time-tested movements learned by exploration and knowledge of its home range. Rodents prefer a stationary object on at least one side of them as they travel and thus commonly move along walls, a fact that is very useful when designing a control program. In captivity, rodents will hide quite contentedly in a clear glass jar, since it feels enclosed and secure to them.

Justin Janus is the owner of Tantus trading and offers rodent control services. He can be contacted on justin@tantus.co.za. Specific control measures for rodents will be dealt with in the second article to be published in volume 6

SOURCES

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LESSONS FROM THE PAST

MAJOR RISKS FOR POULTRY PRODUCERS.

(this is the first in a series of two articles on risks in the poultry industry)

INTRODUCTION

Poultry production is not for the feint hearted, it is a high-risk business.

Some years ago, a major producer tasked an auditing firm to conduct a risk analysis on the company. After several weeks of work and a hefty bill, the auditors concluded that the main risk to the business was the loss of data. This is a demonstration of the famous saying by Donald Rumsfeld:

"unknown unknowns are phenomena which cannot be expected because there has been no prior experience or theoretical basis for expecting the phenomena."

Losing data will not stop growth, egg production or consumers buying the product. When conducting risk analysis in poultry production, those that have theoretical and practical experience in poultry production should guide producers.

We can summarize risks in poultry production into two major categories: interruption of supply and damage to a brand. Some practical examples from the past will illustrate this.

INTERRUPTION IN SUPPLY

The outbreak of avian influenza in 2017 in South Africa and other parts of the world is a good practical and recent example. The disease had wiped out entire breeder and layer flocks, and this resulted in a major interruption in egg supply. The disease had also interrupted the supply of grand parents to many parts of the world.

Marek's disease is rare in modern poultry production, mainly because of the effective use of vaccines. However, poor quality control over the store and use of vaccine had led to major outbreaks in some producers, resulting in an interruption in hatchable eggs for many months.

Salmonella enteriditis is a major risk in poultry production, especially in broiler breeders because

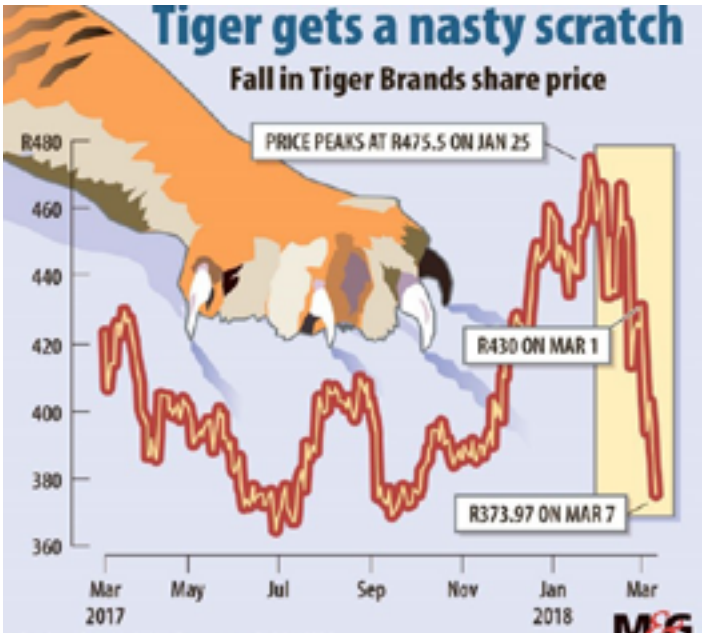
of vertical transmission. Infection of grandparent flocks led to the culling of these flocks, leading to a major disruption in broiler parent supply.

Chemical toxicity can have widespread and significant effects. High mortality in breeders because of accidental contamination is not an uncommon finding. Some coccidiostats can cause serious and irreversible fertility problems in males. Many of us will still remember the effects of heavy metal poisoning because of contaminated zinc, truly one of those unknown unknowns.

Damage to infrastructure also poses a significant risk, especially rate limiting facilities like feed mills and hatcheries. Hatcheries had burned down in the past, breakdown of the mixer in a feed mill can bring production to a standstill for several days.

The constant supply of water and electricity is becoming a practical threat. Many producers have to cart in water, and some had reverted to managing the water pump stations for local municipalities. ESKOM is threatening to cut electricity supply to municipalities not paying their accounts. This would lead to a disaster if the supply to it also affects producers., one can only run for so long on standby generators.

DAMAGE TO A BRAND



Food safety has become one of the leading factors that drive consumer confidence.

The recent outbreak of Listeria caused major damage to various brands. Listeria is not the only organism that can cause this, there are also many examples of Salmonella and various strains of E. coli that have led to major recalls.

Comments by politicians or spokes persons for organisations can also cause major damage, not only to a particular brand, but to an industry. One of the better know examples is the comments that Edwina Curry, then the deputy minister of agriculture in the UK, made on national television about the salmonella status of the UK laying flocks. Egg consumption fell by approximately 80% overnight.

"I have been doing this for years" is a phrase that we hear far too often, this leads to complacency. In the forthcoming editions of our newsletter we will give some practical guidelines on identifying the risks in your organization, as well as plans to manage them.

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