Selected Diseases of Racing Pigeons Part 2.

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3. Paratyphoid Infection

In pigeons, this bacterial disease is caused most commonly by *Salmonella typhimurium* variety **copenhagen**, but other species of *S. typhimurium* can also cause infection in pigeons. If there is any good news about variety **copenhagen**, it is that, firstly, it seems to be virtually confined to pigeons, although there have been occasional outbreaks of this type in chickens. Secondly, although *Salmonella* spp. very often readily cross from one species to another (witness the ongoing concerns about the spread of this infection from food-producing animals and birds — notably chickens — to humans), variety **copenhagen** very rarely infects humans. Thirdly, unless antibiotics have been underdosed in a loft consistently, **copenhagen** is often highly susceptible to a wide range of antibiotics.

One of the best if not the actual best is **Baytril** (enrofloxacin). The second best product is either Cephalexin or Amoxicillin. Treat for a minimum of 10 days with any of these products, and at the same time, it often helps to vaccinate during treatment. Avoid training for at least a week during these treatment periods, and **don't race your birds while they are infected. It is immoral and very unsportsmanlike to transmit this infection to your competitors.**

Paratyphoid disease is usually spread in the droppings of actively infected pigeons or in the droppings of birds that are silent carriers of the infection. It can also be spread through the egg as a result of infection of the ovary of the hen. Rats and mice are obvious culprits in the spread of some types of paratyphoid. According to Dr David Marx, USA, it is a rare loft that doesn't have infected birds, a finding that may surprise many scrupulously clean fanciers who consider their lofts to be paratyphoid-free. It is a common finding that newly introduced, healthy looking birds may be a source of this infection — which is why wild pigeons or strays from another loft should not be allowed into your loft. Naturally, it is always possible that your own race birds may have been exposed to one or more paratyphoid-infected birds during shipping, so racing is always a risk, not only for paratyphoid infections, but others as well — *E. coli*, coccidiosis, paramyxovirus, etc..

Outbreaks are common during the breeding season, especially later on in the season after the parents have had to rear several rounds of youngsters on their own. In this situation, they are severely stressed, and their resistance is down. At this time there has also been quite a drain on the immune system of the parents, because their bodies attempt to include protective substances (antibodies) in the yolk of the eggs and in crop milk. This process results in lowered antibodies in the parents, and they become very susceptible to infections such as paratyphoid.

According to Dr Marx, classical paratyphoid is common in breeding cocks which can become sick and die very quickly — the bird is fine one day and dead the next. Hens can become sick in the same way, but this form is more common in cocks. In hens, paratyphoid is a more chronic disease in which the affected hens often have severe weight loss ("going light"), sticky droppings containing a lot of mucus, swollen wing joints ("wing boil") and affected livers. Another clue to paratyphoid is eggs that turn black and appear rotten. Such eggs

were once fertile, began to develop, and then the embryo died of the infection. (If eggs are infertile in the first place, they stay clear for the whole incubation period.) The organisms can contaminate the surface of the egg as it is laid, or it can be incorporated in the egg as it was being formed in an infected ovary (same with *E. coli* infections). Another key characteristic of paratyphoid infection is youngsters that begin to hatch but die in the shell. Diarrhoea, dehydration and death in 7-10 day-old youngsters in the nest can occur. Often, only one of the two will get sick and die.

Sore joints in the legs and wings, with or without swelling of these joints, can occur, especially in hens. Characteristically, the elbow joint is often affected, producing the "wing boil" mentioned earlier. Tilted heads and twisted necks as the result of infection of the brain can occur in paratyphoid infections, **but are more commonly associated with paramyxovirus infections.** Both paratyphoid and paramyxovirus infections can cause birds to pass a lot of fluids. In paratyphoid infections, the fluid is from a true diarrhoea because it comes from the intestines and contains a lot of mucus, possibly some small gas bubbles, and even blood, and may have a detectable odour. In paramyxovirus infection, much of the so-called diarrhoea is actually clear fluid coming from the kidneys which are often severely affected by the virus, and as a result, are unable to perform their natural function of concentrating urine. There is often a pool of fluid from the kidneys, in the centre of which is a small "snake" of normal droppings from the intestines.

Whenever you are faced with an outbreak of paratyphoid infection in your birds, **the first thing to avoid is the use of lime or any other alkaline substance on floors or perches.** Reason: paratyphoid bacteria (and *E. coli, among others)* like alkaline conditions which actually favour their multiplication, something you want to avoid at all costs. Floor dressings such as sodium acid bisulphite create acidic conditions that these bacteria find hostile for their reproduction. To prevent transmission through drinking water contaminated by droppings, you can add a teaspoon of household chlorine bleach (sodium hypochlorite) to a gallon of water to kill the bacteria. For other purposes, some fanciers like to use cider vinegar in drinking water, which effectively produce an acidic environment that is also unfriendly to paratyphoid organisms.

Another approach is to make use of "friendly" bacteria. There are commercial products available for pigeons, as well as capsules of these bacteria for human use. One inexpensive source of these friendly bacteria is plain yogurt, but you must buy the product that contains **live** cultures of bacteria (it's my understanding that yogurt containing either live or killed bacteria are available in Australia - buy the one containing live cultures of bacteria). This approach of using "friendly" bacteria is based on research conducted by a scientist named Esko Nurmi in 1973. Working in Finland, this man developed a procedure in which he fed litter and droppings from salmonella-free, clean, healthy flocks of chickens, to normal, day-old chicks. Afterward, he found that these chicks were resistant to a challenge dose of salmonella organisms given to them by mouth. The principle behind this process is that "good" bacteria in the droppings of clean flocks of birds colonised the intestines of these chicks and simply overwhelmed sites of invasion by salmonella organisms. The same principle applies when a broody chicken scratches in the soil and calls her chicks to pick in that area. The intestines of these chicks are colonised very quickly with masses of "good"

bacteria picked up in the soil at this time. In other words, this defence network **competes with** and **excludes** disease-producing bacteria — hence the expression **competitive exclusion**. The means by which this protection against salmonella and other disease-producing bacterial organisms is accomplished are not completely understood. However, there are two known mechanisms that operate to protect birds against disease when the principle of competitive exclusion is applied. Firstly, the "good" bacteria in the normal droppings seem to form within the intestine, a physical barrier that may be as much as 10-12 bacteria deep. These protective bacteria actually bind to specific sites on the inner surface of the intestine, and by this means, prevent contact by *Salmonella* sp. with the inner surface of the intestine, and so, prevent these disease-producers from breaching the wall of the intestine and entering the bloodstream.

The second process that occurs is an actual chemical alteration in the intestine. The "good" bacteria in clean droppings are anaerobic species (an = without; aerobic = oxygen), ie, they are able to live and reproduce in an environment in which levels of oxygen are low. In such a situation, the life processes of these bacteria are completed in an anaerobic state. In such an anaerobic environment, these organisms produce and excrete **lactic acid** as one of the by-products of their life processes. In turn, the lactic acid that is excreted by these bacteria into the surrounding environment of the intestine, creates a shift from a normally alkaline state to a more acidic, hostile condition in the intestine.

The importance of this fact needs to be re-iterated: many disease-producing bacteria like Salmonella sp. and *E. coli*, for example, like to live in a slightly alkaline environment — such as the intestines — where they can reproduce well. In an acidic environment, they are prevented from reproducing, and their numbers drop dramatically, in some cases by 97% or more. One of the many "good" bacteria present is the *Lactobacillus* sp. that we also find in yogurt and similar products used for human food.

Other "good" bacteria that are also present in yogurt include two species of lactic acid-producing *Streptococcus*, among others. The *Lactobacillus* sp. bacteria not only colonise the intestines, but they also attach to the wall of the crop, and are mixed with food that has just been eaten. As the food moves into the proventriculus and gizzard, and then into the intestine, the "good" ***Lactobacillus*** sp. bacteria move mechanically with it and multiply in the intestine. However, scientific information obtained from experiments using several pure cultures of *Lactobacillus* sp. in chickens showed that this organism alone was not capable of conferring on chickens, the desired resistance to *Salmonella* spp.. Additional methods had to be incorporated along with the use of *Lactobacillus* sp..

A few basic products incorporating these ideas of using "good" bacteria to combat *Salmonella* sp. infections have been examined in the poultry industry. One of these products is called "an unidentified culture". In this situation, intestinal contents from chickens known to be salmonella-free are incubated in a warm, anaerobic environment. The bacteria that are grown in this way are not specifically identified, but this culture is then fed to the birds. The second of these products is called "a defined culture", meaning that **specifically identified bacteria** from a culture of intestinal contents of normal chickens are included in a mix of bacteria that may contain up to 50 different species of bacteria.

There are also products called "probiotics" which are cultures of only a very few kinds of

bacteria, ie, for example, the kinds that are found in yogurt. One such starter product for preparing yogurt at home contains a *Lactobacillus* sp., as well as two identified species of Streptococcus. One species of *Streptococcus*, that produced lactic acid, for example, was found to inhibit the growth of 75-85% of disease-producing strains of *E. coli*, but only 45% of livestock varieties of *Salmonella* spp..

In poultry, only the "unidentified culture" appears to be effective against salmonella organisms. "Defined cultures" and "probiotics" are more effective against disease-producing strains of *E. coli*, for example.

A fairly recent development is a mix of 29 bacterial types that is sprayed on newly hatched chicks. The birds pick at their down and of course, swallow the bacteria sprayed on them. These bacteria reproduce in the intestines and block the attachment of *Salmonella* spp.. It is possible that this spray could be helpful in pigeons as well.

In the poultry industry, these types of products have been used in at least three situations:

1. They are given to day-old chicks to allow the rapid colonization of the intestine with "good" bacteria which protect against infection by Salmonella sp..
2. In mature breeder chickens, these products are used if there has been an outbreak of salmonella infection. Birds are first treated with an appropriate antibiotic, after which they are given the "unidentified culture" to prevent re-infection.
3. At times of stress, these products are given to increase the numbers of "good" bacteria that, in turn, will increase the acidity of the intestines, and thereby decrease the risk of an outbreak of intestinal disease.

For pigeons, you can buy commercial products that contain "friendly" bacteria said to be derived from pigeons, or you can use common yogurt that contains friendly bacteria.

These products are **alive**, ie, they contain live bacteria, and in order to be useful, the bacteria have to remain alive. So, exposure to sunlight or heat during periods of storage will adversely affect these cultures. **They must not be mixed in water that contains chlorine, iodine or other disinfectants, simply because these chemicals will kill the desirable bacteria in the culture. Similarly, they can't be used when there are antibiotics in the water, for the same reason.**

To further assist the "friendly" bacteria, you can add some whey (from a milk or cheese-producing company) to the drinking water. Whey contains the sugar lactose which these bacteria use a source of food, and from which they produce lactic acid to acidify the intestines. The additional use of acidifying substances like cider vinegar was mentioned earlier.

On an equally practical level, some fanciers feed their birds, especially youngsters, right on the floor of the loft, so that they pick up cultures of normal "friendly" bacteria from their own environment. A similar approach would be to sprinkle fresh droppings from old birds that are known to be clean, on the floor of the young bird loft. There are obvious risks to these procedures, especially if the weather is damp and the floor tends to stay wet: in the dampness, worm eggs and coccidia are able to reach a stage of development that allows them to infect the youngsters. Disease-producing bacteria, including *E. coli* and paratyphoid organisms, can also begin to multiply in the billions in damp conditions and become a threat to the youngsters.

Next month I shall discuss Respiratory Diseases, Worms, Coccidiosis and E-coli infections.