

Paratyphoid Revisited

by **Dr Wim Peters**

Paratyphoid is arguably the most dangerous disease that pigeons are liable to contract. It has been around for decades – centuries probably – and yet we, the fanciers and the medical support teams backing the sport, have failed to deal adequately with this threat to our birds. Paratyphoid in pigeons is caused by the bacterium *Salmonella typhimurium* var. Copenhagen with antigenic structure 0;1;4;12; H;i;1;2. Fage typing reveals types 2 and 690 in more than 90% of cases.

Many fallacies abound concerning its existence, mode of spread, treatment and prevention. Let us look at some of them.

There is a general belief amongst fanciers that rodents, rats particularly, are the main source of infection for pigeons. So strong is this belief that if a fancier admits to having rats on his premises, all sick birds are quickly said to be paratyphoid victims, infected by bacteria brought in by the rats. It is rumoured that the rodents drink the pigeons' water and that their supposed habit of dragging their tails through the drinking bowl, spreads the germs, causing infection. Were they actually to do so one could easily believe that they are the main culprits but, contrary to popular belief, they are NOT the cause of pigeons getting typical pigeon paratyphoid.

Do not misunderstand me, I am not saying that rats do not disseminate disease organisms. They certainly do. Hantavirus pulmonary syndrome (HPS), Murine typhus, Rat bite fever, Typhoid fever, *Salmonella enterica* var *typhimurium*, Leptospirosis and Eosinophilic meningitis are just some of the diseases transmitted to man. So they do transmit Salmonellas - and possibly that's where the belief originates - but so do other animals. Pigs, bovines, chickens – in fact all animals can serve as *Salmonella* hosts for man. But in 99% of cases pigeon paratyphoid comes from other pigeons. And it is because the disease can exist in pigeons without causing any symptoms – in a carrier state – that it can remain in a loft undetected and is allowed the opportunity to transmit its germs to the loftmates.

It is normal practice that no-one will allow a sick pigeon into his loft. This makes enough sense, so much so that all fanciers follow the rule. But

carriers? A study by Baaij in Holland, where he tested the droppings in race panniers after races, found that 28.4% of the 1018 tests made on droppings, were positive for *Salmonella typhimurium* bacteria. And tests done at the end of the racing season revealed that 73% of the panniers were infected. If one considers that on-one in his right mind is going to send an ailing pigeon to a race, one can conclude that all these positive droppings were made by healthy-looking pigeons carrying the bacteria. Which indicates firstly, the difficulty in recognizing the pigeons that are carriers and secondly, the very high incidence of the disease amongst pigeons. As a result of which the disease can so easily be introduced of into a loft by new pigeons, bought at a sale or elsewhere. So fanciers, beware! Especially of the birds from European countries, as more of them appear to be infected compared to the local birds. In South Africa, particular care must therefore be employed when birds bought at MDPR sales are brought into the loft. But all new introductions into a loft, particularly from foreign countries, need to be treated with circumspection. (Do not rely on the quarantine period of the pigeons at Government facilities to sort this out. A *Salmonella* carrier could quite happily sit out his 4 weeks there and continue spreading germs when he is released.)

The big danger that carrier pigeons pose is that 1. they are not recognizable and 2. they do not cause disease immediately. There are various reasons for this. The *Salmonella* germs which they excrete are not passed out all the time but intermittently only. This has the effect that detection becomes more difficult and one can only test dropping samples that were collected over a period of about 5 days to be sure that the infection is detected. It also slows the onset of spread to the loftmates. Not all birds will become ill immediately. Depending on the health and resistance of the pigeons and the hygienic conditions in the loft, the spread of the disease may go unnoticed for a long time. It is important to understand that the chance of becoming infected, depends as much on the number of bacteria taken in as anything else. If a susceptible pigeon should swallow only a few germs it is possible that it will not become infected. (Loft cleanliness will therefore help to curb spread of the disease). Taking in large numbers however, may swamp the bird's immune system, the germs will proliferate, cause disease and the pigeon could either become ill or become another carrier. In any event it will then also become an excreter of bacteria in its droppings. This process may take many months – years even - with the resulting difficulty that the disease outbreak is not readily coupled to the introduction of the new pigeon.

A fallacy which is often expressed by pigeon fanciers is that their pigeons 'have a bit of paratyphoid but that they gave the birds XYZ antibiotic and everything is fine now'. There are two problems with the statement above.

1. There is no such thing as a 'bit of paratyphoid'. The pigeons either have it or they do not. There are no half-measures. The disease is so serious that if it is present (and confirmed), the fancier should – out of care for his fellow fanciers – cease racing. Because that bird will infect the racing pannier and be a source of infection that week and all other weeks unless the pannier is disinfected thoroughly. (And we know that fanciers are very lax when it comes to disinfecting the panniers!). The statement above –i.e. the claim that they had paratyphoid but cleared it up, is usually made if the fancier's birds had loose green droppings and he initiated a broadspectrum antibiotic to which the causative bacteria (it probably would have been E coli) was susceptible.
2. The second problem is that the fancier used an antibiotic – probably for about 4 or 5 days – and claimed to have cured the problem. If his problem had been Salmonella, it would have, after just one treatment, been far from over. One just cannot cure paratyphoid in such a short time. At best the symptoms would have been reduced and a carrier state could have been created. Which is just bad, maybe even worse. We'll come back to this later but let me state here; there is no antibiotic that is 100% effective in clearing up a paratyphoid outbreak.

I am extremely hesitant to pen down the symptoms of a paratyphoid infection. Most fanciers are aware of some of them. Many claim to be able to make the diagnosis from the appearance of the droppings from sick birds. Closer to the truth is maybe that any set of symptoms that are unconfirmed, could have been caused by paratyphoid. The symptoms depend entirely upon which organs are affected and any organ or life system in the body can become diseased. If you can think it, it could be paratyphoid. Such is the nature of the disease; it is serious, widespread and occurs in many guises. The disease might be hyperacute, where the birds are sick one day and dead the next, acute, where they linger on for three days before dying, or chronic, where a gradual wasting away occurs. When a carrier condition is present there could even no symptoms at all.

A further complication of the disease is that it can affect the fertility of either cock or hen. The cock will usually become infertile if both testes are affected but some birds could become subfertile. When the hen is infected

one commonly finds a gradual wasting away and any eggs that are laid can transmit the infection. This state usually proceeds to sterility. Any eggs that are laid can give rise to infected young which in turn could be carriers. Alternatively the babies may die when a few days old, they may die in-shell, or the eggs fail to hatch with the embryo dying after 10 days or so of hatching. The well-known 'black eggs' are then formed.

It is well to remember that the circovirus lowers the body's resistance to disease in general, paratyphoid included. So should circovirus be present, one could expect to encounter paratyphoid cases. In such case the presence of Salmonellas will greatly increase the pathogenicity of circovirus. In these events it is a wise procedure to culture the samples from a circovirus outbreak in order to ascertain the presence or absence of paratyphoid, in order that the necessary remedial steps can be taken.

The seven most common presentations of the disease are severe diarrhoea, torticollis, infectious arthritis, subcutaneous abscesses, chronic wasting away with or without infertility, acute or chronic death or the carrier state, where no symptoms would be observable. More than one of these complexes can occur together in one pigeon. But please do not think that because a bird does not show one of these symptoms that it cannot be paratyphoid. Anything (symptomwise) is possible.

1. Diarrhoea is seen in pigeons of all ages. It is typically a loose, green, voluminous and fetid dropping. It is important to distinguish it from the typical paramyxo dropping which appears as a watery splash with a 'worm' of faeces in the middle. The droppings from paramyxo do not have any white urates from the kidney as the disease is practically a kidney disease. In the paratyphoid dropping the urates are usually visible, often stained greenish – yellow.
2. Torticollis occurs when a Salmonella abscess forms in the brain. The balance of the bird is affected and a typical 'stargazer' results. Stargazers are very difficult to distinguish from paramyxo patients as this disease can cause a similar picture.
3. Infectious arthritis is seen either as a wing swelling in the shoulder joint of an affected pigeon with wing drooping or as lameness due to an infected joint somewhere in the foot or leg. The 'ankle' joint is a favourite location. Acutely infected pigeons with drooping wings will sit and tremble from the pain in their shoulder joint.

4. Subcutaneous abscesses can occur over the whole body but are most often found just below the eye as a pea-sized swelling containing hard, yellow and dry pus. Very often that will be the only sign in that pigeon that something is amiss.
5. Acute deaths can occur at any age. Babies in the nest a few days old may succumb but even adult birds, apparently healthy, may die acutely. Acute deaths can occur from various causes but it is important that the cause of death be established. Chronic death usually follows a protracted period of poor eating and listlessness.
6. Infertility in both hens and cocks can often be caused by paratyphoid and is usually – not always – accompanied by wasting away.
7. The carrier state may be present in totally unexpected birds. Do not assume that because a pigeon originates from such and such champion flyer that paratyphoid cannot be present. It can. The disease has the habit of striking in the most unexpected places!

Diagnosis.

In a carrier pigeon the diagnosis can be made from a culture done on the accumulated droppings collected over 5 or 6 days. While the droppings are being collected it is advisable to keep the sample refrigerated.

Dead and clinically sick pigeons that can be sacrificed, are best examined at postmortem, followed by a bacterial culture done on all the organs of the carcass. A culture from the joint fluid in birds with a 'wing boil' will usually confirm a diagnosis of paratyphoid.

Dead babies in the nest and 'black eggs' are also best autopsied and the organs cultured.

In poultry, a serum test that relies on antibody/antigen reaction, is commonly used to test for salmonellosis. The same test would work for pigeons but all birds that have previously been vaccinated would react as if they were positive. The test would therefore only be useful to detect unvaccinated carriers.

Treatment and Prevention

The treatment of paratyphoid is fraught with problems. As said before there is no antibiotic that is 100% effective. At the moment Baytril (active ingredient enrofloxazine) is the best drug available and is said to destroy the carrier status. Many other antibiotics have been and are used but the possibility of creating carriers must always be borne in mind. The use of a vaccine following antibiotic therapy is highly recommended.

Lowering the pH of the drinking water is a very good method of controlling the disease. The use of probiotics to support this regime is also highly recommended. Lowering the pH of the intestinal content inhibits the growth and colonization of the bowel by Salmonella, E coli and other pathogenic organisms. It is a practice which should be followed routinely in all lofts. When faced with an outbreak of paratyphoid I would recommend that this approach is used on a continuing basis. It can be given in addition to other medications or by-products.

The protocol for treating paratyphoid in a loft should follow these lines;

1. Immediately instigate treatment with Baytril for 10 days. The 10 day treatment is necessary to eliminate possible carriers. The usual dosage rate is 1ml/litre but up to 3 mls/litre may be necessary, particularly in cold weather.
2. Following the Baytril treatment ALL birds should be vaccinated with an effective paratyphoid vaccine, strictly following the manufacturer's recommendations.
3. Begin bowel acidification (lowering the pH) with Apple Cider Vinegar (ACV), lemon juice or a similar substance and give a good probiotic product over the feed. Ordinary grape vinegar will perform bowel acidification quite adequately.

Besides the ravaging effect that paratyphoid has on breeders and young birds, the disease has an erosion effect on racers with the result that they perform below their genetic potential. Many such birds would therefore be culled not because they're not good enough but because their health, though appearing to be up to standard, is actually below par.

A final warning to all fanciers; Do not ever underestimate the potential effect of paratyphoid on your pigeons. It is a truly pigeon's worst enemy!!

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