USE OF PROBIOTICS IN RACING PIGEONS

By Dr Colin Walker BSc, BVSc, MRCVS, MACVSc (Avian health)

The bacteria-host relationship

Through evolution, bacteria and warm-blooded animals have closely associated themselves to form a closed system for mutual benefit. Through trial and error, over millennia, populations of bacteria have evolved that are indigenous to their animal host. The animal host receives the benefits of aid in the digestive process, manufacture of essential nutrients, protection against other undesirable bacteria, assistance in control of water in the body and other metabolic advantages. The bacteria in return receive temperatures favorable for their growth, a constant supply of nutrients and essential substances in the form of the body's secretions. Because of the exact nature of this relationship, there are bacterial populations that are the most favorable for the host animal.

Changes

Each member of this mutually beneficial relationship is profoundly influenced by the other. When certain changes occur in the host, corresponding changes are reflected in bacterial populations in the bowel. Bacterial changes may occur as a result of stress, diet change, antibiotic therapy and other factors. Conversely, as the resident bacterial population changes, there are subsequent changes in the animal's activity. These include alterations in the host's ability to digest its food and its ability to protect itself from bowel disease. The animal host then has the problem of getting back to an ideal relationship with its normal resident population of bacteria. Hopefully it can accomplish such a relationship before subsequent challenges again upset the ideal state.

Where animals are not stressed, have an appropriate diet, are not crowded, are not given drugs, do not contract infection or metabolic diseases and live in a clean environment, an ideal level of intestinal bacterial population may be maintained on a rather steady basis. In fact, no differences are generally reported in numerous trials under these ideal conditions.

Imbalance

The conditions described above, however, do not fit the environment under which our pigeons race. Even in the best lofts, under the best managers, birds are subjected to various stresses. This means that disruption of the normal balance of intestinal bacteria can be a common event. If an ideal state is maintained, there is optimal utilization of nutrients and a resistance to harmful organisms. This has been shown in numerous experiments.

What is a probiotic?

The organisms that are normally found in the bowel of healthy non-stressed animals are called

probiotics. The probiotic concept involves the refeeding or reintroduction of these bacteria to an animal. Many studies in many countries have shown that, although these bacteria can control and exclude other harmful bacteria, they are in fact the most likely to be disrupted by stress. Most probiotic products consist of naturally occurring living cultures of specific strains of Lactobacilli and enteric Streptococcus (Enterococcus).

Restoring the balance

Once it was established that the feeding of certain live bacteria to animals has the potential to produce beneficial effects under certain circumstances, ie when the normal bacterial balance has been disrupted, the actual delivery of these organisms from the laboratory to the animal became the next hurdle. Pharmaceutical companies have now overcome this. The large Japanese pharmaceutical company Yakult manufactures a human probiotic (Lactobacillus casei) as a milk-based drink in Victoria. This is distributed through the eastern States of Australia. One million bottles are consumed by Australians every week. Fourteen million are consumed in Japan every day! Interestingly, in people, studies have shown that individuals who drink 'Yakult' and are exposed to diseases such as Salmonella are much less likely to become unwell. Probiotic use in people has also been shown to decrease the chance of bowel cancer. As many of the harmful bacteria produce toxins that are carcinogenic, ie can induce cancer, their exclusion can decrease the risk of this disease.

In birds, there are gel preparations of probiotics for individual dosing and also water-soluble powders to treat the flock. These provide selected beneficial live bacteria with excellent stability when protected from extreme heat and moisture. Because of the intimate relationship between the host animal and its bacterial population, it is important that the correct organisms are supplied in probiotic preparation for any given species. Probiotic supplements need to be prepared with a particular species in mind and the more types of normal bacteria that can be provided, the better. For use in pigeons, therefore, multi strain avian-origin probiotic supplements are used. Mode of action

And so how do they work?

Competitive inhibition - It is known that the beneficial bacteria produce lactic acid, hydrogen peroxide, antibiotic and other substances that help keep potential pathogens under control. As many fanciers are aware, the most likely potential invaders are E. coli and Candida (yeast or thrush) and in fancy birds, Salmonella. These organisms are opportunists, waiting to cause disease whenever pigeons become stressed. Stress causes disruption to the normal bowel bacteria and gives these organisms a chance to invade. The pH in the bowel in health is mildly acidic. With E. coli infection, it becomes alkaline. Anything that acidifies the bowel will create a hostile environment for the E. coli, thus making it harder for the organisms to survive. This is why the addition of controlled levels of various acids to the drinking water exerts a beneficial effect with these infections and also why the older practice of adding apple cider vinegar (acetic acid) to the water can help. The lactic acid produced by probiotics produces

the same result. In addition to weakly acidifying the bowel, probiotics do much more to help the bird in that they produce protective slime layers that coat the bowel lining and also preferentially occupy receptor sites on the bowel wall, in the process excluding bacteria such as E. coli. They therefore offer an effective natural way of combating the problem without the need for antibiotics. In addition, there is no risk associated with their use as there can be with acids. By treating the birds, we are simply flooding the bowel with beneficial bacteria, which, through their normal activity, re-establish health.

Appetite stimulation - Probiotics appear to have a strong appetite stimulatory effect. They are known to produce digestive enzymes and B vitamins. These effects help the bird to get the maximum nutrition from their grain. One recently reported study in America demonstrated that hand-raised cockatiel chicks weaned at 6 weeks of age, supplemented every second day with probiotics, were 14% heavier at weaning than chicks that received no probiotics.

Immune stimulation - Recent work by scientists throughout the world indicates that probiotics stimulate general immunity.

Use of probiotics

So when can the fancier use probiotics to his advantage?.

After any stress - It is well known that stress induces a disruption of the normal bowel bacteria and that the beneficial bacteria are the first ones to be lost with stress. Once these beneficial bacteria are removed from their normal environment by stress, many more are lost from the digestive tract and are replaced by an overgrowth of non-beneficial bacteria. This can result in diarrhoea, loss of performance, decreased appetite and in the stock loft, inhibited growth and limited weight gain in the youngsters. Probiotics restore the balance of beneficial to non-beneficial bacteria. They are best given as soon as possible after the stress or just before the time of the stress. By doing so, disease or performance problems may be avoided.

In the stock loft - Use probiotics regularly in the stock loft as part of routine management, particularly during the breeding season. Use two to three times weekly when the stock birds are feeding youngsters. This helps the birds resist E. coli (often associated with wet nests) and ensures that the birds get the maximum nutrition possible out of their seed at a time that often puts real demands on them. Probiotic use will help the parents produce vigorous robust young.

In the race loft - Probiotics can be used in the race loft to both treat and prevent E. coli and Candid infections. Stress disrupts the bowel bacteria, giving E. coli and yeast the opportunity to cause disease. In lofts where these are a problem, probiotics can be used whenever E. coli or yeasts are seen under the microscope, when the droppings become green or green and watery, or when there are weather

conditions that favor E. coli, in particular when the weather is cold and damp or humid. In such lofts, it is a good idea to give probiotics routinely as part of the loft's disease management program, with the focus here being on disease prevention rather than waiting for disease to appear. When E. coli and yeast flare-ups are a problem, our challenge is to identify the stress that caused the flare up while at the same time helping the birds clear the E. coli and yeast through use of probiotics. With no on-going stress, the droppings will appear normal within 24 hours of the start of probiotic use. Having said all that, probiotics are not a cure-all. A non-response to probiotics can be expected in one of two situations:

When the stress is on-going - It is important to identify and if possible eliminate any predisposing stress to ensure a good response to treatment. I draw the analogy here of trying to dry a floor without turning the tap off. Stress can come from a problem with the loft environment or management or may be associated with one of the more serious diseases such as canker, respiratory infection, Coccidia or worms. With identification and correction of the underlying stress, a good response to probiotics can be expected.

Severe E. coli infection - Severe infections pass the point where it is possible to treat them successfully with either probiotics or bowel acids and it becomes necessary to use stronger medication such as sulphur-based antibiotics. These actually kill the E. coli but they should be used with caution as they also kill many beneficial bacteria, can compromise feather quality and cause nausea in the birds. If given, they should be given for only 1 - 2 days and it is best to use them early in the week so that the birds have a couple of days between their use and basketing. Treating with probiotics can, however, often prevent the infection progressing to the point where these antibiotics need to be used.

Post race - The stress of racing itself causes disruption to the normal bowel population. Fanciers will have noticed that the droppings of birds that have raced often take 24 - 48 hours to return fully to normal. With my own birds, I find that if they come home to probiotics, then the next morning it is much more likely that the droppings will be normally formed and brown and that the bird will continue with a feather down drop. Probiotics can be combined with electrolytes and vitamins.

Postweaning - At this time, we don't want to use drugs. We want to develop a strong natural immunity. Probiotics specifically stimulate this.

Following antibiotic use - Particularly during racing, probiotic use after antibiotics hastens the re-establishment of the normal bowel population.

Moulting - Maintaining a healthy bowel during moulting aids in on-going nutrient delivery to the developing feather in the feather follicle and decreases the chance of fret marks, etc.

In the show loft - Probiotics can help birds resist Salmonella. Although all pigeons are susceptible to Salmonella, clinical disease is seen more commonly in fancy breeds rather than racing birds. Certain breeds are particularly susceptible, e.g. Modenas, Show Homers and the high flying breeds, especially Doneks. The way an outbreak is managed depends on the severity of the problem. Regular probiotics have been shown to help birds resist the disease.

It has become the belief of some fliers lately that fit racing birds should have sterile (i.e. absolutely no bacteria) in their bowels. I can understand how this belief originated in that, with some bacteria, notably E. coli, the fewer we can see on faecal smears the better. However, to extend this to all bacteria is a definite mistake. Let me state here that there is absolutely no evidence in the scientific literature to support the belief that a healthy racing pigeon has no bacteria in its bowel. In fact, quite the opposite is the case. What we want is a healthy mixed population of normal bacteria doing their job to help maintain the health of the bird. For many years, I have been examining many droppings every day. Many of these come regularly from top lofts and I have never seen a dropping with no bacteria. Fanciers with their own microscopes will notice that when their birds are at the peak of fitness, bacteria are visible in their droppings. Closer to home, I have won twelve open VHA Federation races with between 2000 and 9000 birds competing and, despite examining my birds' droppings on a weekly basis, have never found a single sterile dropping. The experts tell us that the only situation in which a pigeon's bowel would become sterile is either through antibiotic abuse or heavy metal poisoning. The last thing you want to do is lose the beneficial population of bacteria in your birds' bowels. I feel that there are already enough theories in pigeon racing, so let's stick to what is known to be fact.

Probac

Probac is a multi strain avian-origin probiotic made specifically for pigeons. It is the probiotic preparation that I recommend. It can be added to the drinking water at the rate of 1 teaspoon to 4 liters or added to the grain (after first moistening with a seed oil, ½ - 1 ml per kg) at the rate of 1/3 teaspoon (1 gram) to 1 kg.

Note on Probiotic Use

In some metropolitan areas, the addition of fluoride or chlorine to drinking water may interfere with the action of probiotics. In metropolitan areas, treatment plants are situated throughout the water distribution network. According to Australian authorities, the concentration of fluoride and chlorine throughout most of the network is too low to exert an effect. However, the concentration in the water of fanciers close to a treatment plant may be high enough to kill the probiotics. These substances will,

however, evaporate from treated water if it is allowed to stand for 24 hours. Fanciers in any doubt are best to set aside water to be medicated with probiotics for 24 hours before use. Simply standing the required volume of water in several buckets awaiting use is adequate.

Alternatively, most water-soluble probiotic preparations can be added to the seed. Indeed, with some preparations, this ensures a more immediate and effective delivery of the probiotics to the digestive tract.

Probiotic use really is at the forefront of avian veterinary practice. Modern technology involved in probiotic preparation protects the probiotics against stomach acids, bile salts and digestive enzymes so that large numbers of live organisms arrive in the bowel after ingestion to exert their various beneficial effects. Interestingly, human probiotic preparations are being developed to target specific bacterial infections. In man, a bacterium Bacillus cereus causes a gastroenteritis. This infection is not fatal but is responsible for many lost days of work annually in the population. Rather than being prescribed antibiotics, patients are prescribed a specific probiotic ‘yoghurt’ that controls the infection. According to the companies involved, with this technology now in place, more difficult organisms like E. coli, which have a large number of strains and mutate more readily, will be tackled. Once available, these preparations will be beneficial and useful to fanciers as they will mean that these infections can be managed without resorting to form-reducing antibiotics.