

# **C**OCCIDIOSIS IN DOMESTIC PIGEON: REVIEW ON DIAGNOSIS, CONTROL, AND PREVENTION.

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## **ABSTRACT**

**C**occidiosis in domestic pigeon (*Columba livia*) is still considered as one of the main diseases affecting performance of the birds reared under intensive production systems. The disease is most commonly seen in young pigeons and only rarely in adult birds. Infections in domestic pigeons are typically mixed and commonly include *Eimeria columbarum* and *Eimeria labbeana*. Although extensive research has been carried out using molecular techniques for the characterisation of *Eimeria* spp, practical use of these techniques are not available today, except in the research laboratories. There are a number of important diagnostic methods currently available such as oocyst counts, lesion scoring and clinical signs. The impacts of subclinical cases always go undetected. There are various chemotherapeutic agents available for the treatment of coccidiosis in pigeon. However, interpretation of the efficacy of

## **Introduction:**

Coccidiosis is one of the most common and highly pathogenic obligatory enteric protozoans affecting poultry in the world. Juvenile pigeon mortality due to coccidiosis varies from 5% to 70% and pigeons between the third to fourth months were highly susceptible (Al-Rubaie, 2013). The literature around the world describes nine species of the genus *Eimeria* and one of the genus *Isospora*, but only three species are of significance: *Eimeria columbae*, *E. columbarum* and *E. labbeana*, which are characterized by varying degrees of virulence (Balicka-Ramis & Ramisz,

*anticoccidial agent is difficult. Another problem difficult to address include the growing resistance against other drugs, such as sulfonamides and amprolium. Coccidiosis in adult domestic pigeon as perceived by some not a major problem, economic impact of coccidiosis is underestimated and optimisation of anticoccidial programmes might be advantageous to the pigeon production. In addition to this, a link between subclinical coccidiosis and bacterial enteritis complicates choosing the right treatment. Implementing sound shuttle and rotation programs can be part of the answer in order to not only control clinical, but also subclinical coccidiosis. The purpose of this review is to provide a brief overview and interpretation of the, for the poultry industry, most practically relevant insights on diagnosis, control, prevention and the impact of coccidiosis on the overall gut health of domestic pigeon*

**Keywords:** *Coccidiosis, Eimeria, diagnosis, anticoccidial, toltrazuril*

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1998). The occurrence of these species was found in domestic pigeons (*Columba livia domestica*) and rock pigeons (*Columba livia livia*) (Al-Rubaie, 2013). Coccidiosis of pigeons may occasionally be seen in young squabs, especially when reared intensively and when hygiene is poor, while older ones serve as carrier and remain apparently healthy. The parasites affect the health of pigeons and are among the most common pathogens which reduce flight effectiveness (Ramesh, 2015). Coccidiosis in pigeon and poultry usually runs without clear clinical manifestations. The pigeons look healthy, but they are less active. In sporting pigeons faster tiring and watery diarrhoea occur. In young individuals the disease is acute. Sick pigeons fledge badly; the feathers are dead and brittle. Loss of weight and expelling faeces streaked with blood are characteristic symptoms. Mortality in young ranges from 5% to 70%, moreover the inhibition of growth and balance disorders are observed (Al-Rubaie, 2013). The most vulnerable to infections are carrier and sporting pigeons, as they perform a large number of flights in the so-called racing season. This leads to substantial exhaustion of birds and, consequently, increases their susceptibility to various diseases, including infections with salmonellosis, paramyxoviruses, circoviruses, trichomoniasis, etc.

(Romaniuk K. 2000; Szeleszczuk P. Aktualne 1996). The parasites affect the health of pigeons and are among the most common pathogens which reduce flight effectiveness (Szeleszczuk P. Aktualne 1996).

For the control of coccidiosis in pigeon, chickens and turkeys, a number of preventive medications have been approved for use world-wide, but reduced sensitivity and resistance are increasingly important as no new anticoccidial compounds are known to be under development (Aleksandra & Pilarczyk, 2014). Fundamental research on coccidiosis today is mainly focused on improving molecular techniques that might result in improved diagnostics or the development of recombinant vaccines; but hitherto molecular techniques have not solved many practical questions on what kind of prevention is adequate for a certain pigeon or poultry production unit (Gussem, 2007). So, although significant and promising steps have been made in describing the biology, diagnosis, epidemiology and prevention of coccidiosis, a number of issues important to the industry are not sufficiently addressed today (Gussem, 2007).

The purpose of this review is to provide a brief overview and interpretation of the, for the poultry industry, most practically relevant insights on diagnosis, control, prevention and the impact of coccidiosis on the overall gut health of domestic pigeon.

### **Diagnosis and drug sensitivity testing**

*Eimeria* still remains one of the effective parasites of birds, difficulty in diagnosis of coccidiosis pose a major problem in pigeon and poultry industry. The classical parasitological methods of diagnosis are laboured intensive and therefore costly (Gussem, 2007). Oocyst per gram (OPG) counts in faeces or litter have a poor relation with the impact of the parasite on the performance of a flock (Johnson and Reid, 1970). Identification of different species based on morphology of oocysts is very challenging and requires expertise. Lesion scoring is an interpretation based on macroscopic visible lesions caused by *Eimeria*, usually following a scoring system from zero to four (Gussem, 2007; Johnson and Reid, 1970). The method is extremely labor intensive, sometimes subjective and only reliable when performed by skilled people. The correlation between lesion scores and performance is believed to be stronger than with OPG but still there is a difficult appreciation of the level of lesions towards impact on performance, especially at subclinical levels. Aleksandra, B., & Pilarczyk, B. (2014) shows that, a limitation is for instance the fact that *E. labbeana*,

although quite pathogenic, does not cause typical lesions and is mostly disregarded when using this method. Lesion scoring still remains the most frequently applied diagnostic method today (Gussem, 2007).

Diagnosis of clinical disease caused by *E. Labbeana* is quite easy and action (therapy on the short term, change of preventive means on the long term) can be swift.

### **Prevention and control of coccidiosis**

There are basically two means of prevention of coccidiosis: chemoprophylaxis and vaccination.

Chemoprophylaxis using so-called anticoccidial products (ACP) or anticoccidials in the ration is by far the most popular (Chapman, 2005). Sometimes the term 'coccidiostats' are used with regard to ACP but in reality most of the ACP currently in the market are coccidiocidal and not just static (Gussem, 2007). Generally two groups of anticoccidials are considered, ionophorous antibiotics or 'ionophores' and synthetically produced drugs, also denominated as 'chemicals'. Chemicals were the first type of drugs being used in treatment and later on in prevention of coccidiosis. In 1948, sulphaquinoxaline was the first drug administered in the feed continuously and at lower doses (Chapman, 2003, McDougald, 2003). Most of the initially marketed chemicals have disappeared from the market. The main reason for this is the rapid selection for resistance in coccidia when these chemicals were used, requiring their judicious use, switching to another drug before resistance has built up. This limits the commercial potential which, in combination with increasingly high costs associated with registration of anticoccidials, explains the short life-cycles of some chemicals. Krautwald-Junghanns, Zebisch & Schmidt, (2009) discussed chemotherapeutic options in the management of coccidiosis in pigeon using amprolium, sulfonamides, clazuril, and toltrazuril. The fact that these chemicals are still being marketed is a demonstration of their value in the control of coccidiosis in pigeon and thus an indication of the more limited potential for resistance build-up compared to the ones which disappeared. Study by (Krautwald-Junghanns, Zebisch & Schmidt, 2009) shows that clazuril and toltrazuril are the best treatment options. The Reasons to use toltrazuril include the growing resistance against other drugs, such as sulfonamides and amprolium, the extended effectiveness compared with other substances, for example, clazuril, and the ability of pigeons to develop immunity during treatment. The resistance status of

chemicals can be assessed using ASTs (McDougald et al., 1987; Peek and Landman, 2003; Naciri et al., 2004).

Live vaccination, as indicated higher, is today less applied in broiler production. Two types of vaccines are discriminated, attenuated and virulent (Chapman et al., 2002). Attenuated vaccines lack a part of the life cycle (less asexual reproductive cycles) of the original strain they were derived from, and as a consequence have a lower reproductive and pathogenic potential. This is a major advantage towards performance of virulent coccidial vaccines, but because of the lower reproductive potential of attenuated vaccines, production costs are significantly higher. Another discrimination to be made is vaccines consisting of anticoccidial-sensitive strains and others made of more or less resistant strains. The main advantage of the live ACP sensitive vaccines is their ability to alter the level of resistance in a certain coccidial population. There are several reports on this very interesting feature of vaccines (Mathis, 2003; Chapman and McFarland, 2004; Mathis and Broussard, 2006; Peek and Landman, 2006), still many questions remain on how many consecutive grow-outs should be applied to overcome or prevent resistance to the different anticoccidials marketed.

### Conclusion

Although coccidiosis has been the subject of a lot of research over the last decades, a number of very significant questions remain unanswered. As pigeon production is gaining a lot of popularity, the industry need more research on the accurate diagnosis and efficacious ACPs.

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