An update on piglet coccidiosis: is this disease still relevant?

Piglet coccidiosis is one of the most common causes of diarrhoea in suckling piglets. It is caused by the protozoan Cystoisospora suis (formerly Isospora suis). Studies conducted in Europe before the introduction of toltrazuril, the only effective anticoccidial drug registered for piglets, showed herd prevalence rates of 40-80% in different EU countries.

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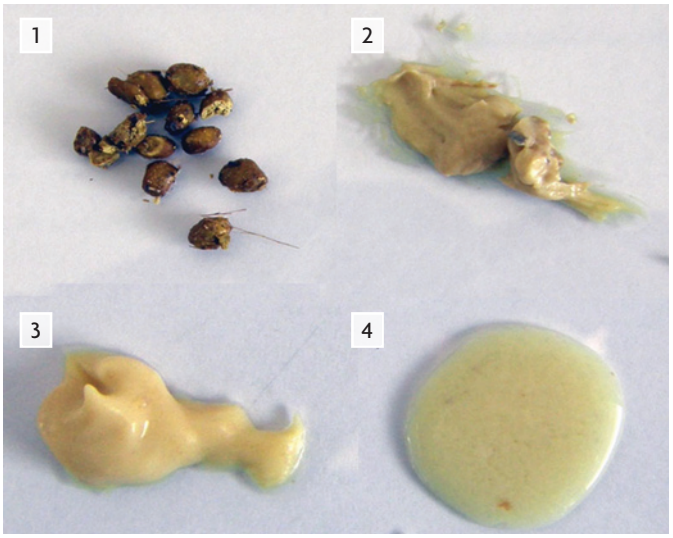
In the meantime, an estimated 50-90% of conventional piglet producers carry out metaphylactic treatment with toltrazuril, a highly effective drug. Under such conditions, is piglet coccidiosis still relevant?

C. suis is taken up directly from the contaminated environment and, after ingestion, infects cells of the inner lining of the small intestine, leading to destruction of superficial gut tissue. Excretion of parasite stages, so called oocysts, by acutely infected piglets in large amounts support the maintenance of the infection in a herd. Young piglets (<3 weeks of age) are particularly affected by the disease because their immune system is not sufficiently matured to effectively combat the infection with C. suis. Older animals, by contrast, are rarely affected by the disease or excrete parasite stages. Therefore, the sow plays no significant role in infection of the piglets, since highly resistant parasite stages shed with the faeces, so-called oocysts, are usually present in large amounts from previously affected litters and are a source of continuing infections since they can survive for weeks to months in the environment of the farrowing unit.



Faecal consistency in suckling piglets.
1: Normal and firm – healthy piglets.
2: Pasty, fatty – can be found in early phase of coccidiosis.
3: Semi-liquid – common form of diarrhoea in coccidiosis.
4: Liquid, with fluffs of clotted milk – during longer phases of diarrhoea, often with accompanying Clostridium perfringens infection.

The destruction of the intestinal tissue, which reaches a maximum 4-5 days after infection, causes inflammation which leads to transient non-bloody diarrhoea for 1-4 days. Faeces are mostly yellow and of 'sun-lotion' consistency. When diarrhoea persists, faeces can turn fluid and contain coagulated milk. The reduced ability of the affected intestines to absorb nutrients leads to weight loss and poor body condition, and this can also be observed in infected piglets without diarrhoea.

In very young animals, C. suis infections also disrupt the development of the gut microbiome, resulting in overgrowth of certain bacteria, especially clostridia.

Toxin production (for example by Clostridium perfringens type A or C) can exacerbate the disease and results in serious, sometimes fatal, intestinal inflammation, which cannot readily be controlled by antibiotic treatment. Litters affected by Cl. perfringens infections and

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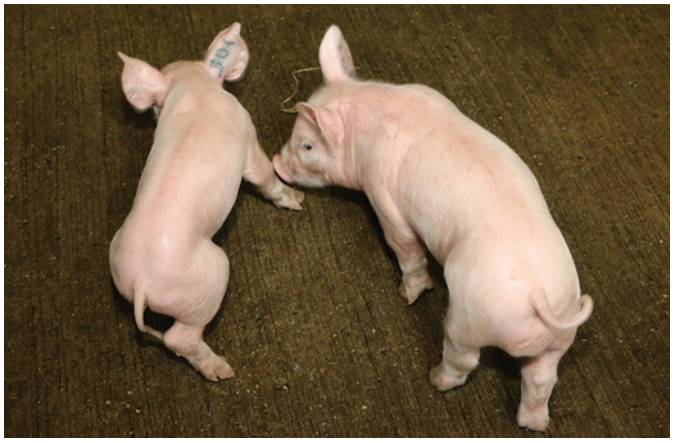
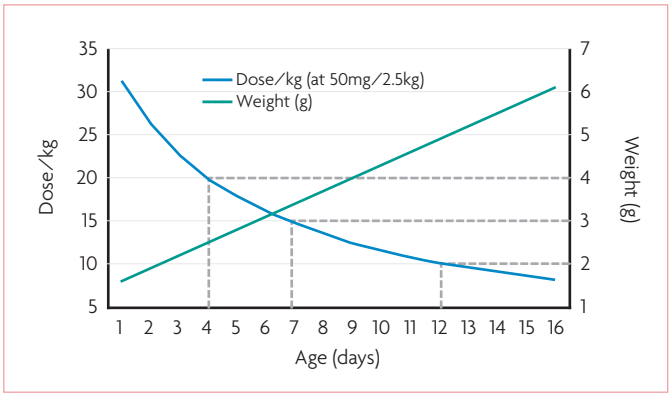
Yellowish, creamy faeces for some days are a hallmark of suckling piglet Cystoisospora suis (coccidiosis).

Coccidiosis, together with Clostridium perfringens, can cause heavy enteritis.



Litter mates are not equally affected by coccidiosis and consequently show uneven weight gain. In experimental infections piglets show poor growth in the acute phase of infection (left piglet), which can be avoided by treatment (right piglet).



The recommended dose for oral toltrazuril is 20mg/kg of body weight (BW). A dose of 50mg/piglet of 2.5kg BW on the fourth day of life and 300g of average daily BW gain results in a dose of only 15mg/kg BW on the seventh day of life and only 10mg/kg BW on the twelfth day of life.

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coccidiosis benefit from early anticoccidial treatment since this prevents overgrowth of Cl. perfringens and its attachment to the intestinal tissue at the site of primary damage by the parasites.

Infection with C. suis can be detected by faecal examination and different methods are available. The most sensitive method is oocyst detection in faecal smears using autofluorescence.

Several samples from each litter can be pooled and several pooled litter samples from each herd should be collected and examined.

Repeated sampling (for example at the beginning of the second and third week of life) is very important to reliably detect the infection since individual piglets excrete only for limited time periods of 1-4 days and diarrhoea and excretion are only poorly correlated.

After diagnosis of C. suis infection targeted prophylactic measures can be initiated. Since all piglets in an affected herd must be treated with toltrazuril individually by oral application, costs for treatment are not negligible. Several studies have estimated the costs of treatment (ca. €0.3/piglet) versus the financial losses due to coccidiosis which range from €0.6 and €3.0/piglet depending on the severity of the disease, so treatment is certainly the more economic option.

Lately, updated studies on the prevalence rates of C. suis in Europe show that the parasite is still very common.

Some 40-80% of the farms in different countries were positive, among them Germany (2018: 45% of the farms, 16% of the litters) Austria (71% of the farms, 33% of the litters), Czech Republic (71% of the farms, 12% of the litters) and Spain (83% of the farms, 78% of the litters). The parasite was also detected on farms applying oral toltrazuril.

This shows that C. suis and piglet coccidiosis are still commonly found. In experimental and field studies, the efficacy of toltrazuril was repeatedly demonstrated. When efficacy is poor the following reasons must be considered:

- Piglets can spit out or vomit out the drug. When correctly applied this should not happen too frequently.
- Toltrazuril is applied too late, when the parasite's development has proceeded to the point of tissue destruction and excretion of parasite stages, so that diarrhoea, overgrowth of clostridia and recontamination in the environment cannot be effectively prevented.
- Underdosing of the drug has only an incomplete effect. This is problematic when the dose calculated for piglets aged 3-5 days is applied to heavy piglets (later than recommended). On the seventh day of life, piglets with an average birth weight are already too heavy for the calculated dose to be given at 3-5 days old.
- Resistance to toltrazuril has been described, but does not seem to be very common so far. This state is characterised by the frequent excretion of parasites so faecal examination can help in making the diagnosis. In addition to treatment with toltrazuril, good hygiene is very important. After thorough cleaning between farrowings disinfectant must be applied in the correct concentration. Not all disinfectants for animal facilities are effective against coccidia.

The German Veterinary Society lists only selected disinfectants for this application. With a combination of timely treatment with the correct dosing and good hygiene, coccidia can be effectively controlled. Regular faecal examination is recommended to evaluate the efficacy of treatment.

Besides hygiene management, sufficient colostrum intake appears to support the piglets in combatting the initial infection with C. suis, as high anti-C. suis immunoglobulins in the colostrum of the sow was correlated with reduced diarrhoea and parasite excretion in an experimental study.

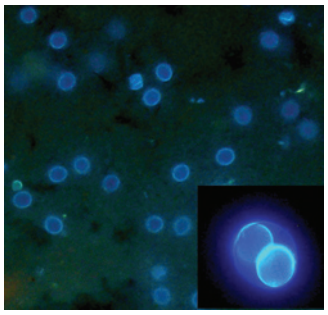
In summary, piglet coccidiosis is still common in Europe and appropriate control and diagnosis (with faecal examinations) are necessary to efficiently control the disease in European swine herds.

Although C. suis is a primary pathogen, the outcome of disease seems affected by a number of factors, including the overall health status of the herd, maternal immunity, and the presence of bacterial enteropathogens.

Antibiotic treatment appears to have little value in the control of coccidia-bacterial coinfections, but primary anticoccidial therapy can reduce the clinical signs and severity of coinfections. ■

References are available from the author on request

The detection of parasite stages in faeces, so-called oocysts, can be achieved by a simple fluorescence technique in faecal smears. Numerous oocysts are visualised as roundish blue stages (bottom right: magnified in detail) (From Joachim et al., 2018).



Prevalence of piglet coccidiosis on farms in different European countries (2017-2018) (From Petterson et al., 2019).