



Knowledge

Ileitis: holding performance and profitability for ransom

SUMMARY

Ileitis is a common enteric disease facing grow/finish pigs. Three forms of the disease – subclinical, chronic and acute – cause significant economic impacts in the swine

industry. Lost revenues resulting from poor performance make ileitis control necessary to increase profitability.

Current diagnostic methods detect and monitor *Lawsonia intracellularis*, the bacteria responsible for

ileitis, in herds and help determine the best control method. Targeted treatment with Denagard® (tiamulin) 10 Medicated Premix, for example, has been found to be effective in controlling the spread of disease.⁸

Ileitis, or porcine proliferative enteropathy (PPE), is the most common enteric disease found in grow/finish pigs. According to the National Animal Health Monitoring System (NAHMS) 2000 Swine Report, clinical ileitis was found in 36.9 percent of all sites tested. Reports of clinical ileitis increased to 75 percent for sites with more than 10,000 pigs. The NAHMS report also indicated that 96 percent of U.S. swine herds and 28 percent of pigs are seropositive for ileitis.

Nathan Winkelman, DVM, owner of Swine Services Unlimited, Inc. in Morris, Minn., notes that the prevalence of ileitis is ubiquitous throughout the swine population.¹ He sees a higher incidence of acute (bloody) ileitis in market weight pigs during the

summer because hot weather can trigger the disease. He also sees a higher occurrence of chronic (non-bloody) ileitis in growing-age pigs during the summer months.

Lawsonia intracellularis is the Gram-negative obligate

intracellular bacterium responsible for this enteric disease. It is characterized by the proliferation of immature intestinal epithelium cells and thickening of the mucosa of the ileum, jejunum and large intestine.



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Signs of disease

Clinical signs of ileitis fall into three categories – subclinical, chronic and acute – and cause economic losses in the form of:

- Reduced growth performance
- Chronic diarrhea
- Acute hemorrhagic diarrhea
- Death

The subclinical form of PPE is where *L. intracellularis* infection occurs with no apparent clinical signs of the disease. The chronic form of ileitis commonly occurs in pigs between six and 20 weeks of age, and results in diarrhea and poor growth rate. Also called porcine intestinal adenomatosis (PIA), this form of the disease causes soft and loose, watery and/or pasty diarrhea that resembles cement. There also may be undigested feed present in the diarrhea. Pigs may appear gaunt and there often is a dramatic weight variation within the group.



The chronic form of ileitis, also known as porcine intestinal adenomatosis (PIA), causes soft and loose, watery and/or pasty diarrhea that resembles cement.

Milder chronic and subclinical cases of ileitis may be difficult to detect because clinical signs are less apparent. In milder cases, lesions are confined to the ileum², causing reduced digestion and poor growth but not diarrhea because water levels in the feces are normal.

The acute form of ileitis, also known as proliferative

haemorrhagic enteropathy (PHE), is more dramatic and severe than subclinical and chronic forms.² Cases of acute ileitis usually affect pigs in the finishing phase.

A stressful event, such as marketing the first animals from a barn, may turn subclinical ileitis into clinical ileitis. Signs of PHE include hemorrhage into the distal ileum resulting in bloody or black diarrhea. In some cases, sudden death occurs with no apparent clinical signs.

Poorly performing pigs

Producers will have lighter weight pigs at market if they see clinical ileitis in their herds.¹ With an enteric disease like ileitis, a pig's performance is attacked in many ways with varying degrees of severity depending on the exposure dose of the organism and other factors.

Pigs will show a decrease in average daily gain (ADG), because the first clinical sign of disease is reduction in feed intake. A proliferation of immature intestinal epithelium cells and necrosis of these fast-growing cells affects feed efficiency because nutrients are not absorbed properly. There may also be a decrease in water intake. As the disease progresses, slow growth causes light weight pigs and increased mortality rates plague performance.

A study by Paradis et al. shows the effects of subclinical ileitis on performance. They found that all pigs given various doses of *L. intracellularis* inoculum had significant decreases in performance, including decreases in daily weight gain and feed conversion.³ Pigs challenged with low doses of the organism did not have diarrhea or gross lesions at necropsy, yet performance was significantly impacted.

Also, Winkelman says that he has seen a 30 percent decrease



Subclinical and chronic forms of ileitis occur in pigs between six and 20 weeks of age. Pigs may appear gaunt and there often is a dramatic weight variation within the group.

in ADG due to subclinical ileitis.¹ He stresses that it's important for veterinarians and producers to determine when subclinical ileitis affects swine herds because it can produce negative economical effects.

In a trial performed by Walter, et al., clinical ileitis had a significant impact on performance in young growing pigs.⁴ The trial included two groups – Group 1 was inoculated with a virulent pure culture of *L. intracellularis* but was not medicated, while Group 2 was exposed to the same disease challenge but was medicated with tiamulin, the active ingredient in Denagard Medicated Premix. Treatment with Denagard was initiated when clinical signs appeared nine days after the disease challenge.

The study demonstrates the effect ileitis can have on diseased pigs if left untreated.⁴ Table 1 has a summary of performance results.

Winkelman stresses that prevention of ileitis should be the producer's and veterinarian's primary goal. Lost revenues resulting from poor performance make ileitis control important and necessary to increase profitability.

Table 1. Growth performance for 28 days in pigs inoculated with *L. intracellularis* and either treated with tiamulin in the feed days 9 to 37 (Group 2), or fed the same ration without medication (Group 1)

Treatment Groups	Group 1 (n=8)	Group 2 (n=8)	P value
Denagard	0 g/ton	35 g/ton	
ADG (lb.)	0.90	1.16	0.007
ADFI (lb.)	1.67	1.85	0.029
ADG:ADFI	0.54	0.63	0.01

Course of disease

Feces from infected pigs are the main source of new infections in susceptible animals.⁵ Pigs will typically break with clinical diarrhea in five to seven days after challenge with high levels of the organism in the inoculum. With lower levels of *L. intracellularis* inoculums, clinical signs often will appear in 10 to 12 days. Pigs can sporadically shed *L. intracellularis* for up to 12 weeks after clinical signs have abated. Even subclinically infected pigs can shed *L. intracellularis* in the feces, particularly after being stressed.⁵

Tests to help determine when *L. intracellularis* is affecting pigs are useful for diagnostics and determining the dynamics of ileitis in a swine herd. When diarrhea appears, *L. intracellularis* can be identified with fecal polymerase chain reaction (PCR) tests. The immunoperoxidase monolayer antigen (IPMA) test is a preferred serology test. It takes 14 days post-exposure in challenge models before pigs will seroconvert. Lower exposure levels typically will take longer to detect seroconversion.

At 21 days post-exposure in challenge models, typically 90 percent or more of the pigs will be seropositive. Peak *L. intracellularis* shedding, diarrhea and lesion scores are found at 18 to 24 days after disease challenge. At 28 to 35 days, cell-mediated and mucosal immunity take effect and the disease begins to subside. By day 35, diarrhea and clinical

signs are gone in the majority of pigs in challenge models. See Figure 1.

Diagnosis

Because ileitis causes a range of problems and *L. intracellularis* can be shed from infected animals for weeks, it is imperative to properly diagnose the disease.

Each stage of infection with *L. intracellularis* must be evaluated as a whole.⁶ The evaluation can be based on several factors, including: the percentage of seropositive pigs, the percentage of PCR-positive pigs, and observation of a clinical problem represented by diarrhea or poor growth performance.

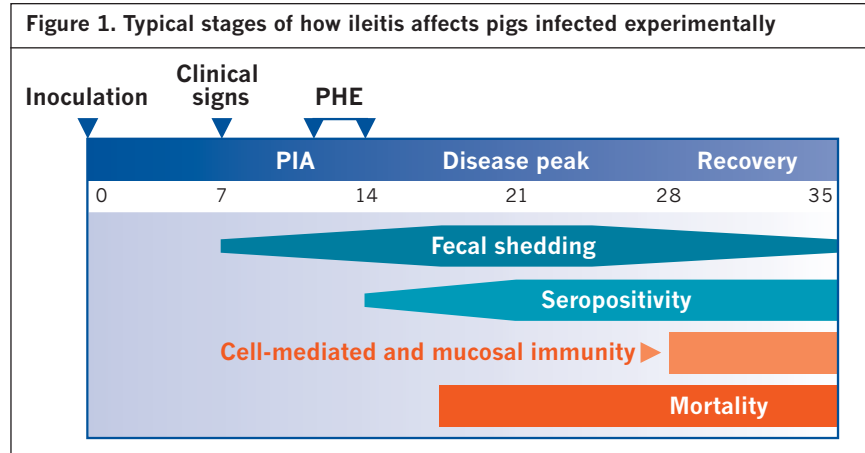
Ileitis can be diagnosed through postmortem or antemortem testing. If pigs are dead or found stricken with severe diarrhea, perform post-mortem tests to determine if *L. intracellularis* is present. The organism can be found anywhere in the intestinal tract, with a concentration found in the

terminal ileum. Veterinarians should send fixed tissue samples in buffered formalin from suspect areas to a diagnostic laboratory where an immunohistochemistry (IHC) test, which is highly sensitive and accurate, can be performed.

In live animals, fecal PCR can be used to diagnose the disease in its early stages. Take a pea-sized portion directly from the rectum and send to a diagnostic laboratory. Serology testing, specifically IPMA, is a good way to detect subclinical ileitis because clinical signs like diarrhea are not present. This test helps define when pigs are exposed to *L. intracellularis*. Winkelman uses IPMA to test different age groups within a growing herd. He will test 20 to 30 animals in each group every 2 to 3 weeks because the serologic response often is short-lived. He says both tests can be used to monitor the health of the herd. Serology results can help determine the method and timing of ileitis treatment and control.

Control strategies

Operations with a history of ileitis must have a plan to minimize repercussions from the disease. To control the disease, antibiotic treatment timing must be targeted to successfully decrease *L. intracellularis* shedding.





Because ileitis causes a range of problems, including the gaunt, slow-growing pig pictured above, and because *L. intracellularis* can be shed from infected animals for weeks, it is imperative to properly diagnose the disease.

Continuous dosing may alter the disease transmission dynamic between pigs in a pen. Some medication strategies recommend preventing *L. intracellularis* infection with a high level of continuous antibiotics. However, this practice may actually extend the period of susceptibility to *L. intracellularis*, thus delaying infection until removal of antibiotics.⁷

Continuous exposure to high levels of antibiotics lowers the exposure of pigs to *L. intracellularis*, thereby delaying active immunity⁸ or preventing infection. This also leaves pigs susceptible to *L. intracellularis* infections after antibiotics are removed.

The key is to allow exposure to *L. intracellularis* without allowing clinical disease.

Targeted antibiotic use allows for natural exposure and gives pigs a chance to develop their own immunity. However, it can be difficult to establish when an outbreak starts and when it relates to the build-up of the bacteria in the group.⁹ There can be many variations in the time of disease onset between farms. Diagnostic testing mentioned previously can help pinpoint when pigs have developed antibodies and estimate when they were exposed to *L. intracellularis*.

Treating susceptible pigs with targeted doses of Denagard 10 Medicated Premix prior to an anticipated outbreak will help control the spread of disease. Administer Denagard 10 at 35 grams per ton for at least 10 days. Two or three targeted

treatments may be warranted. Winkelman found that this targeted treatment can allow for natural exposure of *L. intracellularis* without allowing clinical disease.¹

Constant monitoring of an ileitis control program is needed to make sure the chosen strategy is effective.



Denagard 10 Medicated Premix offers cost-effective ileitis control through a targeted control program.

Caution: Do not feed undiluted. Do not use in feeds for animals other than swine. Not for use in swine weighing over 250 lbs. Contraindication: Swine being treated with Denagard (tiamulin) should not have access to feeds containing polyether ionophores (e.g., lasalocid, monensin, narasin, salinomycin and semduramycin) as adverse reactions may occur. See product label for directions for use and additional information.

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