

*Extensive trial work shows Lincomix® is effective against ileitis.*

## A new option for controlling ileitis

Lincomix® Feed Medication recently received FDA clearance for use in controlling porcine proliferative enteropathy (PPE, ileitis). Extensive trial work was conducted to confirm that Lincomix is effective and to determine the optimal level of Lincomix to combat the disease.

Nathan Winkelman, DVM, is the owner of Swine Services Unlimited, Inc. in Morris, Minn. His practice consists of veterinary consultation with pork producers, as well as conducting swine health research trials. Ileitis has been the focus of a good share of his research, examining how the disease affects pig performance and evaluating various therapeutic agents to control it.

Winkelman provides the following summary of research conducted to analyze the use of Lincomix for ileitis.

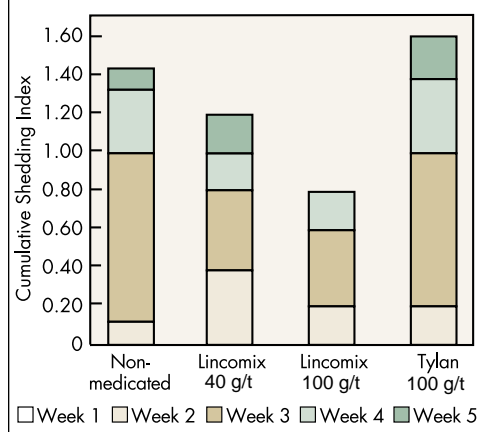
### Trial setup

A trial to determine the optimal level of Lincomix to control ileitis involved 100 pigs, four to five weeks of age.

The four treatment groups were divided into pens of:

1. Non-medicated controls
2. Pigs fed Lincomix at 40 g/t of feed
3. Pigs fed Lincomix at 100 g/t of feed
4. Pigs fed tylosin at 100 g/t of feed

**Figure 1. Cumulative Shedding Index Based on Percent PCR-Positive Weekly Samples by Pen**



Because Tylan\* (tylosin) was the only feed medication approved for control of ileitis in the United States at the time of the trial, it was used as the positive control in this study.

Researchers induced ileitis by challenging all pigs with two divided doses of mucosal homogenate containing *Lawsonia intracellularis*, the primary etiologic agent of ileitis. Fecal samples were collected weekly from two pigs in each pen and stored for polymerase chain reaction (PCR) analysis. Beginning three weeks post-challenge, one pig from each pen was necropsied to provide information on progression of the disease.

In addition, individual body weights, feed consumption by pen, and mortality were recorded through Day 35.

The study conclusions show:

- Shedding was found to be significantly reduced at week three (peak shedding) for both the Lincomix groups (see Figure 1). The decreased shedding was associated with better growth and feed intake, and reduced clinical signs.
- The Lincomix groups consumed significantly more feed than the tylosin or non-medicated groups (see Table 1). Average daily gain (ADG) and feed conversion efficiency (FCE) also were significantly better for all treatment groups vs. non-medicated pigs.
- All medicated pigs had significantly less mortality than non-medicated pigs (see Table 1). Based on the substantial mortality that occurred in the non-medicated group, the degree of disease challenge was severe.
- Lincomix, at 40 g/t, delivered a \$3.77 per pig advantage over tylosin at 100 g/t (see Figure 2). The marginal value for pigs treated with Lincomix at 40 g/t was \$8.82/pig vs. \$5.05/pig for those treated with tylosin.

### Two supporting trials

Follow-up studies evaluating the effectiveness of Lincomix Feed Medication in addressing induced ileitis in 312 pigs showed these results (see Table 2), which were attributed to healthier pigs:

- Lincomix at both 40 and 100 g/t significantly reduced diarrhea and abnormal clinical days

**Table 1. Least Square Means for Variables of Interest**

MEASURE	GROUP			
	NON-MEDICATED	TYLAN 100 g/t	LINCOMIX 40 g/t	LINCOMIX 100 g/t
ADFI (kg/day)	.477 <sup>a</sup>	.527 <sup>a</sup>	.577 <sup>b</sup>	.573 <sup>b</sup>
ADG (kg/day)	.095 <sup>a</sup>	.168 <sup>b</sup>	.232 <sup>b</sup>	.241 <sup>b</sup>
Gain/Feed	.18 <sup>a</sup>	.32 <sup>b</sup>	.39 <sup>b</sup>	.42 <sup>b</sup>
Mortality (%)	52 <sup>a</sup>	16 <sup>b</sup>	4 <sup>b</sup>	12 <sup>b</sup>

<sup>a,b</sup>Differ significantly (p<0.05)

**Table 2. Results of Clinical and Performance Variables for 312 Pigs Challenged with *Lawsonia intracellularis***

MEASURE	CONTROL	LINCOMIX 40 g/t	LINCOMIX 100 g/t
Mortality (%)	12.7 <sup>a</sup>	12.5 <sup>a</sup> (0%)	7.1 <sup>b*</sup> (44%)
Diarrhea Days	61.9 <sup>a</sup>	44.6 <sup>b</sup> (28%)	40.0 <sup>b</sup> (35%)
Abnormal Clinical Days	45.0 <sup>a</sup>	31.9 <sup>b</sup> (29%)	28.1 <sup>b</sup> (38%)
ADFI (lbs.)	1.60 <sup>a</sup>	1.50 <sup>a</sup>	1.60 <sup>a</sup>
ADG (lbs.)	0.53 <sup>a</sup>	0.60 <sup>b</sup> (13%)	0.65 <sup>b</sup> (23%)
FCE (ADG/ADFI)	0.32 <sup>a</sup>	0.39 <sup>b</sup> (22%)	0.39 <sup>b</sup> (22%)

Figures in parentheses represent % improvements over controls  
 Within rows, values with different letters indicate a significant difference (p<0.05).  
<sup>\*</sup>p = 0.04 contrasts using Freeman-Tukey transformation on pen counts.

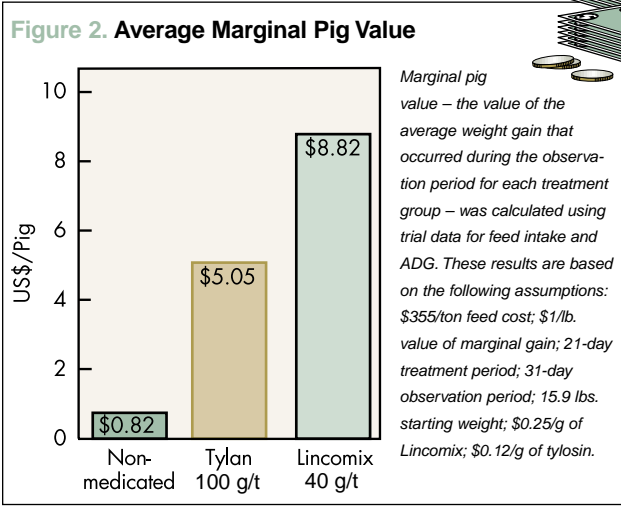
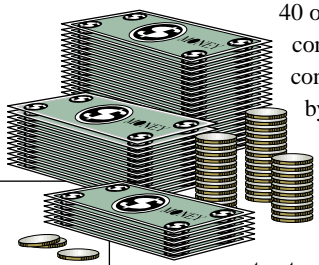
- Lincomix at both 40 and 100 g/t significantly improved ADG and FCE compared with no treatment
- Lincomix at 100 g/t also significantly reduced mortality compared to the controls

In these trials, pigs were randomly assigned to receive Lincomix in feed, at one of two doses (40 or 100 g/t), or no treatment. Each pig was challenged with an oral dose of *L. intracellularis* that was significantly higher than normal exposure, over two consecutive days. Animals were then observed until 10 to 20 percent had developed clinical signs of disease. At that time, the pigs assigned to treatment started receiving Lincomix in feed daily for 21 days. Control animals received no treatment. Clinical and performance assessments were made across the study duration. Necropsies were conducted at the end of the study or at death.

Overall, these trials presented a greater challenge for determining the efficacy of Lincomix against PPE than would normally be experienced in the field. The antibiotic intervention occurred on Day 7 of the trial, after development of significant diarrhea. This makes the results even more impressive given that feed antibiotics are known to better control ileitis **before** severe clinical outbreaks. The initiation of treatment occurred when 25 to 28 percent of the pigs, respectively, already had diarrhea scores.

It's also important to note that these trials used feed medication as the sole treatment for a severe clinical outbreak of diarrhea. In normal field conditions, water medications and injectable antibiotics usually would be used in conjunction with feed antibiotics.

The trials show the use of Lincomix at either 40 or 100 g/t given in feed for 21 consecutive days is effective in controlling ileitis, as determined by significant reduction of diarrhea and abnormal clinical days, and improved ADG and feed conversion efficiency (FCE) compared to no treatment. Therefore, even when given after a PPE challenge, Lincomix at 40 and 100 g/t is highly effective in reducing clinical signs, mortality, fecal shedding and gross PPE lesions.



Lincomix is a registered trademark of Pharmacia & Upjohn Company.  
 \* Tylan is a trademark of Elanco Animal Health, a division of Eli Lilly and Company for its brand of tylosin.