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Editors

W. Christopher Scruton

Stephen Claas

Layout

David Brown

Logo Design

Ruth Cronje, and Jan Swanson;
based on the original design by Dr. Robert Dunlop

Cover Design

Sarah Summerbell

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EFFICACY OF AN AVIRULENT *LAWSONIA INTRACELLULARIS* VACCINE IN SWINE

J. Knittel, J. Kroll, M. Mathes, F. Sick, and M. Roof
Boehringer Ingelheim Vetmedica, Inc., Ames, Iowa USA

Lawsonia intracellularis is the causative agent of porcine proliferative enteropathy (PPE/Ileitis)(1). Porcine proliferative enteropathy (PPE) is a common enteric disease of grow-finish swine, which may result in poor growth rates, diarrhea and stunting. It also may be presented as sudden death or bloody diarrhea in late finishing pigs and replacement gilts. An avirulent isolate of *Lawsonia intracellularis* was developed to reduce PPE in pigs. The purpose of this study was to demonstrate the efficacy of an avirulent isolate of *Lawsonia intracellularis* in the reduction of PPE in pigs vaccinated at 3 weeks of age.

Forty-eight healthy 3-week-old pigs of mixed breed and sex were divided into 5 treatment groups. Groups 1, 2, and 3 received different intranasal doses with a 2-ml volume of the *L. intracellularis* vaccine strain NP40. Group 1 had 10 pigs that received a high dose of vaccine. Group 2 had 14 pigs that received a medium dose of vaccine. Group 3 had 10 pigs that received a low dose of vaccine. Group 4 had 9 pigs that were challenged but not vaccinated. Group 5 had 5 pigs that received no treatment throughout the study. On day 0, the pigs in groups 1, 2 and 3 received the predetermined vaccine doses. Twenty-eight days after vaccination all pigs in treatment groups 1, 2, 3 and 4 received a virulent pure culture challenge of the parent *L. intracellularis* strain N343. No antibiotics were used throughout the study. Fecal samples were collected from all pigs weekly for polymerase chain reaction testing. Individual pig weights were recorded at the time of challenge and at termination of the study to determine differences in average daily gains. The animals were scored daily on a scale of 1-4 for parameters consisting of stool consistency, behavior, appetite, body condition and hair coat. The pigs were necropsied 21 days after challenge and the small and large intestines were evaluated for the presence of gross and microscopic lesions. Sera were collected weekly and tested with an

Immuno-fluorescent antibody test (IFAT) for the presence of anti-*L. intracellularis* antibodies.

Fecal swabs positive by PCR first appeared at 21 days post vaccination (2/10 in the high dose vaccine group and 1/14 pigs in the medium dose group). Vaccine shedding peaked 28 days after vaccination (5/14 in the medium dose group and 2/10 in the low dose group) and was no longer observed in the vaccinated groups for the remaining study. After challenge, 6/9 pigs were positive on day 49 in the challenge control group with no other groups shedding. Shedding was significantly higher in the challenge controls than the vaccinated groups' ($p \leq 0.05$) at the termination of the study. Gross and microscopic lesions typical of PPE were significantly more prevalent in challenge control pigs compared to vaccinated pigs ($p \leq 0.05$). Antibodies against *L. intracellularis* were significantly more prevalent in the high dose group on day 28, in the high and medium dose groups on day 35, and in all groups on days 42 and 49 compared to the strict control pigs ($p \leq 0.05$). Average daily gains (ADG) were calculated from day 28, the day of challenge, to day 49, the termination of the study. Average daily gains were apparently reduced in the non-vaccinated challenge control pigs compared to all other groups. Average daily gains of vaccinees were similar to the non-infected strict control pigs.

This study demonstrated the effectiveness of the avirulent *L. intracellularis* isolate in reducing lesion development, fecal shedding and productivity losses associated with PPE in pigs. The use of a vaccine for the prevention of PPE caused by *Lawsonia intracellularis* would aid the swine industry by facilitating efficient production of pigs including more uniform rates of gain and time to market.