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Sero-prevalence of serological of *Lawsonia intracellularis* in domestic pigs in South Korea

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Abstract

Proliferative enteropathy (PE) of pigs mainly been caused by *Lawsonia intracellularis*. To investigate the prevalence of *L. intracellularis* in South Korea, serum samples of 2,356 pigs from nine province domestic farms were tested using IgGs against ELISA kit. During 2017 to 2019, among of every age groups, the older age groups (>120days and sow) had significant higher positive rates than younger groups. The objective of the current study was to measure the seroprevalence of antibodies to *L. intracellularis* in different age groups in pigs in South Korea as a more sensitive measure of detection in this country.

Keywords: *Lawsonia intracellularis*; Elisa; age groups; domestic farm; South Korea

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Introduction

Lawsonia intracellularis is a causative agent of proliferative enteropathy (PPE) which is a major disease of swine worldwide. In Korea, it also costs a lot in swine industry, exists on most farms if not all farms. It is a gram negative obligate intracellular bacterium and causes acute, subacute and chronic intestinal disorders. The subacute and chronic forms of PPE are

associated with reduced growth rate and diarrhea, most frequently seen in 6-20-week-old pigs [1]. The acute forms in characterized by severe diarrhea and death in 12 to 30 weeks old or older pigs Serum IgG usually is detected 2 weeks [2] and fecal shedding 1 week after challenge [2]. However, as challenge trials are commonly terminated at 3-4 weeks post inoculation, little information about the duration of fecal shedding and humoral immune response is available. The longest reported

duration of fecal shedding detected by PCR was 10 weeks after experimental inoculation [2]. The humoral response of pigs against *L. intracellularis* infection is believed to be weak and short-lived [2]. The longest reported duration of serum antibodies against *L. intracellularis* in pigs was less than 2 months. In Korea, after the publications in 2014 [3], a few studies were focused on the antibody detection of *L. intracellularis*. This study aimed to investigate the presence of *L. intracellularis* by Elisa method and our findings demonstrate that the latest detection information would be greatly useful for future serological domestic farm monitoring.

Materials and Methods

Serological analysis of *L. intracellularis* was performed using 2,356 sera randomly collected between Jan, 2017 and Aug, 2019 from nine province Korean domestic farms. In detail, it have been examined 537 in 2017, 1,014 in 2018 and 805 in 2019 (Table). And the all samples were collected from sow, <30, 30-60, 60-90, 90-120, 120<, male pigs ages in nine domestic farms. To detect IgGs against *L. intracellularis*, commercial ELISA kits (bioScreen Ileitis Antibody ELISA) were used (cut-off value 30 S/P ratio).

Results

The positive rate of *L. intracellularis* in 2,356 pigs were 38.55% in 2017, 20.91% in 2018 and 24.97% in 2019, respectively. In detail, the sow group showed the highest positive rates 81.3% in 2017, 90% in 2018, and 64.8% in 2019 (Table). This means that we can assume the most of sows being infected with *L. intracellularis*, shed the bacteria through feces. On the other hand, the suckling and piglets showed a somewhat lower positive rate than old ages pigs. Also, the male pigs showed high positive rate (2017 and 2018). The <30 age group shows quite low seropositive rate, but this age group is not considerably suffered from *L. intracellularis* than other age groups (Figure). This remains a point of question about the

pathologic correlation between high prevalence and pathogenicity of sows and low prevalence and pathogenicity of their offspring. This part should be studied more.

Table: Relationship of pig age with antibody positive rate of the *Lawsonia intracellularis*, 2017 to 2019.

2017 Year		Ab(Serum)	
Age(days)	Number of samples	Positive	%
Sow	16	13	81.3
<30	80	21	26.3
30-60	88	15	17.0
60-90	101	24	23.8
90-120	43	13	30.2
120<	206	118	57.3
Male	3	3	100.0
unknown	0	0	0.0
Total	537	207	38.5
2018 Year		Ab(Serum)	
Age(days)	Number of samples	Positive	%
Sow	30	27	90.0
<30	147	1	0.7
30-60	152	0	0.0
60-90	195	5	2.6
90-120	255	49	19.2
120<	223	125	56.1
Male	5	5	100.0
unknown	7	0	0.0
Total	1,014	212	20.9
2019 Year		Ab(Serum)	
Age(days)	Number of samples	Positive	%
Sow	54	35	64.8
<30	43	0	0.0
30-60	113	3	2.7
60-90	149	16	10.7
90-120	143	21	14.7
120<	261	113	43.3
Male	2	1	50.0
unknown	40	12	30.0
Total	805	201	25.0

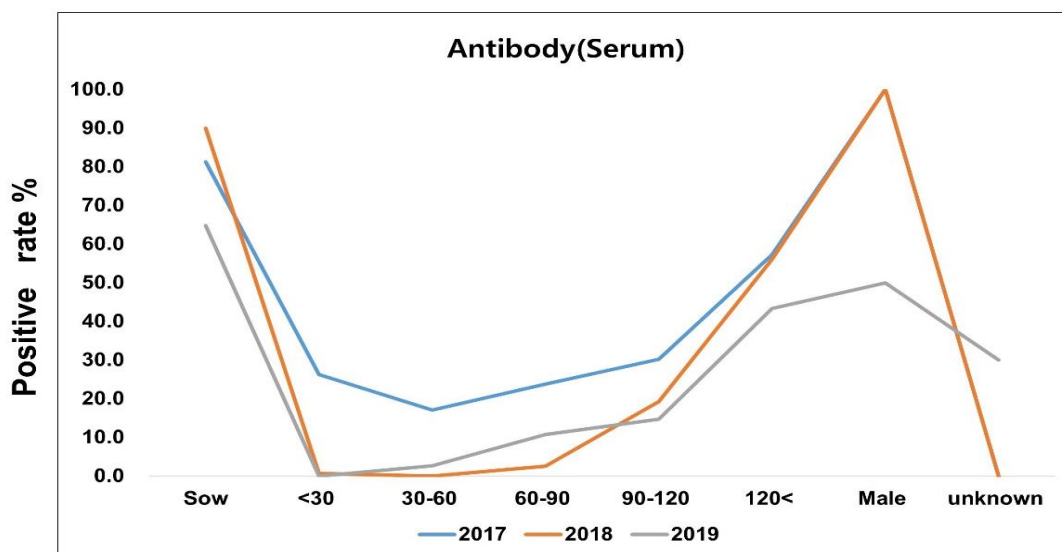


Figure: Seropositive rate of *Lawsonia intracellularis* in different age groups.

Conclusion and Discussion

We reconfirmed the high prevalence of *L. intracellularis* in Korean swine farms same as it was known in many previous studies. As we focusing on the swine groups which have diarrhea, we could find out the fact that *L. intracellularis* is particularly important for diarrhea of sow groups. The present study, prevalence of *L. intracellularis* in pigs in South Korea showed highly positive rate and it is likely that the previous South Korea study [3] underestimated the overall prevalence economic impact of *L. intracellularis*.

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