



## 屠豚のレプトスピラ保有状況について

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# Researches for *Leptospira* in Marketed Swine

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Porcine leptospirosis has been reported from various parts of the world, and swine are indicated to be important hosts for *Leptospira pomona* which has also been demonstrated in other species including cattle and man. In our country a few reports<sup>5,7,9,10-12)</sup> indicated the serological presence of porcine leptospirosis, but none of leptospira strain have been isolated.

The following investigation were attempted to consider certain aspects of porcine leptospirosis in our country that seem to be of importance: (a) a determination of the incidence of leptospirosis in the swine population, (b) isolation of leptospira strain, (c) correlation of serological findings and pathological lesions.

## Materials and methods

The 99 swine serum samples which were collected at Sakai abattoir from Aug. 1954 to Mar. 1955 were tested by Schüffner-Mochter agglutination-lysis test (S-M test), and the positive titer was settled on 1:300 or more. The kidneys and the serum samples of the 175 swine from Dec. 1955 to Mar. 1956 were examined by means of culture, S-M test and pathological procedures as the former report on canine leptospirosis.<sup>8)</sup>

## Results

1. Microscopic examination and culture of leptospira. All of the 175 kidneys showed no leptospira as the result of the examination under dark-field microscopy, Levaditi's silver method and culture in Korthof's medium.

2. Serological examination. Only 13 of 274 serum samples (4.7%) were serologically positive as Table 1. Eight samples were positive with *L. icterohaemorrhagiae* (*L. ictero.*), one with *L. canicola*, 3. with *L. pomona* and remaining one showed same titers with *L. ictero.* and *L. canicola*.

3. The incidence of serological positive cases in each districts were shown in Table 2. Twelve of 13 serological positive cases were produced in Osaka (5.8%) and remaining one in Kyûsyû (1.8%). The sexual difference of the incidence was not observed, and the incidence was high (12.9%) in old large-sized swine (over one year), moderate (4.1%) in medium-sized (over 6 months) and none in under 6 months.

4. Pathological findings. Macroscopically, most of the 175 kidneys were scanty of the noticeable changes. Small white spots or streaks were seen chiefly in the cortex and corticomedullary zone in 13 cases, and histopathologically, they revealed the small lesion of focal interstitial nephritis which were intertubular and periglomerular in distribution.

Table 1. A serological survey of swine for leptospira antibodies.

Swine No.	District	Sex	Size	<i>L. andaman A</i>	<i>L. australis A</i>	<i>L. pomona</i>	<i>L. grippotyphosa</i>	<i>L. autumnalis</i>	<i>L. icterohaemorrhagiae</i>	<i>L. canicola</i>	<i>L. javanica</i>	<i>L. hebdomadis</i>	<i>L. bataviae</i>	<i>L. mochtarii</i>
49	Osaka	♀	M	100	0	100	100	30	<b>1,000</b>	100	10	0	0	10
69	Kyūsyū	♀	M	30	0	30	0	0	30	<b>300</b>	0	0	10	0
77	Osaka	♂	M	0	0	100	0	30	<b>300</b>	100	100	0	30	10
122	"	♀	L	0	10	0	0	30	<b>1,000</b>	300	0	0	0	0
123	"	♀	L	0	30	0	0	30	<b>1,000</b>	100	30	30	0	0
130	"	♀	M	0	0	10	0	30	<b>300</b>	<b>300</b>	0	10	0	0
131	"	♂	L	0	30	0	0	30	<b>1,000</b>	100	10	100	0	0
140	"	♂	M	0	0	<b>10,000</b>	0	100	100	30	0	0	0	30
141	"	♂	M	0	0	<b>1,000</b>	0	100	100	30	0	0	30	0
142	"	♂	L	0	0	0	0	0	<b>300</b>	30	0	0	0	0
150	"	♀	M	10	0	100	0	30	<b>1,000</b>	100	0	0	0	0
243	"	♂	M	0	0	0	0	0	<b>300</b>	30	0	0	0	0
266	"	♀	M	30	0	<b>1,000</b>	0	30	30	0	0	0	0	0

Note: L—Large-sized swine, M—Medium-sized swine.  
Main antibody titers are indicated in Gothic.

Table 2. Differences of the incidence of serological positive cases in each district, sex and size of swine.

		Number tested	Number positive	Percent
District	Osaka	207	12	5.5
	Kyūsyū	55	1	1.8
	Ehime	12	0	0
Sex	Female	139	7	5.0
	Male	135	6	4.4
Size	Large (over 1 year)	31	4	12.9
	Medium (over 6 months)	237	9	4.1
	Small (under 6 months)	6	0	0
Total		274	13	4.7

These lesions showed nodulous, chordal and moniliform areas of the infiltration of many lymphocytes, plasma cells, histiocytes and fibroblasts. In one case, several wedge-shaped scars were observed on the renal surface and the cortex. In addition to these lesions, 58 cases showed small aggregations of lymphocytes of nearly negligible size in cortex and medulla, which seemed doubtful to have any pathological significance.

Concerning to the correlation of serological and pathological findings significant results were not obtained, as none of the serological positive cases and 8.6% of the serological negative had definite interstitial nephritis.

Table 3. Correlation of leptospira antibodies and interstitial nephritis (i. n.).

Serological study	Number tested	Number of swine with			Total with i. n.	Percent
		no i. n.	slight i. n.	scarred		
Number of swine with antibodies	13	13(5)	0	0	0	0
Number of swine without antibodies	162	148(53)	13	1	14	8.6

( )—Number of the kidney having the small lymphocytic lesions of nearly negligible size.

Except the interstitial nephritis, there were no important findings. Fatty infiltration of uriniferous tubules, probably not pathologic, were seen in 22 cases. The obliteration of the arciform artery with the intra-arterial proliferation resembling to the vascular lesion of myoclonia congenita newborn pigs were observed in 2 cases.<sup>3)</sup> "Akute leuco-lymphozytäre interstitielle herdförmige Nephritis (JOEST)"<sup>4)</sup> was not observed in my materials.

### Discussion

As above-mentioned I did not succeed to demonstrate leptospira in the kidney of marketed swine, and only 13 (4.7%) of 274 serum samples had antibodies against leptospira, *L. ictero.*, *L. canicola* and *L. pomona*. It seemed that in swine population leptospirosis was not so prevalent as in the stray dogs as far as I examined. As 3 serum samples were positive with *L. pomona* in my researches, there is the possibility of *L. pomona* infection of swine in our country, which must be confirmed by the isolation of *L. pomona* strain.

As many of the *L. pomona* strains were isolated from the sick swine or foetus of abortion in foreign countries, such a material seemed to be more favourable for the isolation than marketed swine. It was noteworthy that GOCHENOUR<sup>2)</sup> recovered *L. pomona* from an explosive outbreak of disease in swine primary caused by the virus of hog cholera.

In our country leptospira antibodies were observed in swine population by YANAGAWA et al.<sup>10)</sup> (17.5% with the titers of 1:1,000), TSUBOSAKA et al.<sup>9)</sup> (22.4% in Kôchi), MISAO et al.<sup>5)</sup> (3.2% in Kyûsyû), YANO et al.<sup>12)</sup> (3.0% in Fukuoka) and NAKAYA et al.<sup>7)</sup> (16.2% in Kôchi), and following types were identified: *L. ictero.*, *L. canicola*, *L. autumalis* A, and *L. hebdomadis*. Concerning to *L. pomona*, only YANAGAWA<sup>11)</sup> referred to the existence of antibodies against it in Aomori.

The incidence of the serological positive cases showed no difference between both sexes, whereas it was comparatively higher in the large-sized swine of one year or more than the medium- and small-sized ones. Therefore, the aged swine seemed to be more advantageous for the serological survey.

As lymphocytic interstitial nephritis was considered to be the chief findings of procine leptospirosis,<sup>1,6)</sup> I gave my special attention to this change, but it was not so frequent and severe in the marketed swine as the stray dogs. No correlation was observed between serological results and interstitial nephritis.

### Summary

The incidence of leptospirosis in the marketed swine at Sakai abattoir were studied and following results were obtained.

1. All of the 175 kidneys showed no leptospira as the result of the examination under dark-field microscopy, Levaditi's silver method and culture in Korthof's medium.

2. Thirteen of 274 serum samples were serologically positive, of which 8 samples were positive with *L. icterohaemorrhagiae*, one with *L. canicola*, 3 with *L. pomona* and remaining one showed same titers with *L. icterohaemorrhagiae* and *L. canicola*. Twelve of 13 positive cases were produced in Osaka. The incidence was high (12.9%) in large-sized swine (over one year), and sexual difference of the incidence was not observed.

3. Histopathologically, slight interstitial nephritis were seen in 13 cases, but there were no correlation between these findings and serological results.

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