

A study on the occurrence of Leptospirosis in the goat population in Northern Vietnam

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Introduction

Leptospirosis is a zoonosis, which can be transmitted from animal to animal and from animal to human. The original natural carrier is rodents. The disease has been reported for a long time in the world and is known under different names such as Weil's disease, Canicola fever, hemorrhagic jaundice, mud fever, swine-herder's disease and Bragg fever (Russel, 1994).

The *Leptospira* consist of 2 species: *L. interrogans* (pathogenic leptospira) and *L. biflexa* (non-pathogenic leptospira). The pathogenic *Leptospira* can be distinguished from the non-pathogenic leptospira e.g. by DNA analysis. *Leptospira* can be killed at 50°C within 10 minutes. However, it can survive well in low temperature conditions. The main way of *Leptospira*'s invasion into the host body is through the digestive membranes and injured skin. Other ways of infection are through the genital tract, and an infected male can transmit the disease to a female.

Research on the epidemiology of the disease shows that diseased animals are the second reservoirs and the germ is excreted into the environment through the urethra. There are two kinds of carrier: the original carriers are wild animals and rodents; the second carriers are livestock after a short or long course of being infected with the disease. Research of many scientists in the world show that although 212 different serovars were discovered, in each country and animal species distinguishable *Leptospira* serovars and strains exist.

In Vietnam, animal housing and feeding conditions are poor, so the disease is easily transmitted from animal to animal and from animal to workers. According to Dao Trong Dat et al. (1966) serum-positive rates were 26.6% in pigs, 38.4% in buffalo, 25.0% in dogs and 21.0% in cattle (cow and bull). Vu Dinh Hung and Nguyen Thi Dien (1968-1978) reported that cattle, pigs and dogs could be infected with *Leptospira* at high levels: cow and bull at 38.0%, buffalo 3.1%, pigs 22.9% and dog 26.5%. According to the statistical figures of the Serology Section of The National Veterinary Diagnostic Center (1995), serum-positive rates (Microscopic Agglutination Test) in cattle were 50.0%, pigs 32.5%, dogs 75.0% and goats 31.4%.

Materials and methods

The research was carried out from 1994 to 2000. Serum samples from goats were taken from different geographical regions (mountain, highland and lowland), and sera were treated and tested by MAT (Serology Section, 1995) on the slide according to the Leptospirosis diagnostic regulation of OIE (1996). MAT with live antigen is the standardized serological test for diagnosing Leptospirosis, widely used in the world as a routine test in order to check whole herds because of its preciseness and rapidity. Antigens used are a set of 12 strains, which is representative for 12 prevalent serovars in Vietnam. Antigens are cultured and grown in EMJH medium with a density of 180 – 190 millions per ml after a 4-day-incubation period.

Results and discussion

The results from the table above show that goats raised in mountainous regions had the highest infection, followed by lowland and highland. This is due to the fact that the mountainous regions of Vietnam are jungles with many areas of bush, streams and wild animals. This is the optimal

environment for leptospira survival. According to research, natural reservoirs of *Leptospira* are wild animals, rodents, foxes, infected livestock and rats. Trap (1988) said that rats and wild animals were the main carriers. Results from Khera (1986) showed that rats are life-carriers of the disease. Nguyen Nhu Thanh et al. (1997) showed that there are disease germs everywhere in nature. According to our results, leptospirosis incidence of goats in Vietnam, 36,7% on average, was higher than found by other researchers. This difference was probably due to poor veterinary hygiene, lack of vaccination or other disease protective methods, consumption of contaminated food etc.

Table 1. Leptospirosis incidence of goats by geographical region

Order	Geographical areas	Samples tested	Positives	Percentage
1	Lowland	245	111	45.30
2	Mountain	415	206	49.63
3	Highland	1390	436	31.36
Sum		2050	753	36.73

Table 2 shows that the percentage of goats infected with the disease in the spring and summer (43.8%) was higher than in autumn and winter (27.6%). This result coincides with the epidemiological features of the disease. In Vietnam, the spring is characterized by continuous small showers causing high humidity. The summer is sunny but with sudden heavy rainfalls often causing flooding. This provides very good conditions for *Leptospira*'s survival and development. Le Do (1982) noted that in Vietnam, Leptospirosis outbreaks occurred all the year around, but mainly in the spring and summer seasons.

Table 2. Leptospirosis incidence of goats in different seasons

Season	Samples tested	Positives	Percentage
Spring and summer (from February to July)	1156	506	43.77
Autumn and winter	894	247	27.62

Table 3. The Leptospirosis incidence of goats by gender

Gender	Samples tested	Positives	Percentage
Male	319	141	44.20
Female	1731	539	31.13

Male goats were infected with the disease at a higher level than females. Infection of male goats was 44.20% and in female goats 31.13%. This can be explained by the fact that male goats were sexually more active than the females because of natural sexual contacts and no artificial insemination applied. Also male goats were not supplied with enough nutritious food so the health and resistance against the disease decreased.

In Vietnam, the main serovars infecting goats were *L. icterohaemorrhagiae*, *L. pomona*, *L. bataviae*, *L. grippotyphosa*, *L. javanica* and *L. tarassovi* mitisjohnson, with 40.8%, 30.4%, 20.3%, 17.7%, 17.4% and 17.0% respectively.

The most effective treatment was Neodexin, as 96.7% of the sick animals recovered. The next was antiserum against *Leptospire*s, with 93.8% recovered and with Amtyo 90.6% recovered. According to Frankel et al. (1970), *Leptospire*s were susceptible to Penicillin and Streptomycine, whereas in our studies only 65.0% of the treated goats recovered. This is understandable because antibiotics have been used when not necessary, and this has resulted in antibiotic resistance in the bacterium. Using Penicillin and Streptomycine late in the disease will not be a successful treatment (Frankel et al., 1970).

Table 4. *Leptospirosis incidence of goats by serovars*

Order	Serovars	Infected number	%
1	L.australis	27	3.5
2	L.autumnalis	79	10.5
3	L.bataviae	153	20.3
4	L.canicola	100	13.3
5	L.grippotyphosa	133	17.7
6	L.hebdomadis	52	6.9
7	L.icterohaemorrhagiae	307	40.8
8	L.javanica	131	17.4
9	L.pomona	229	30.4
10	L.sejroe hardjobovis	50	6.6
11	L. sejroe saxkoebing mus 24	25	3.3

Table 5. *The result of antibiotic therapies*

Order	Antibiotics	Treated goats	Dosage	Serum test after 03-week-treatment		
				Neg	Pos	%
1	Erythroxin	20	2ml/10 kg BW	15	5	75.00
2	Chlotradesone	20	2ml/10 kg BW	16	4	80.00
3	Gentamycin 4%	20	2ml/10 kg BW	16	4	80.00
4	Penicillin + Steptomycine	20	1.000.000 IU/ 40 kg BW(each)	13	7	65.00
5	Amtyo*	32	2ml/10 kg BW	29	3	90.63
6	Neodexin*	30	2.5ml/10 kg BW	29	1	96.67
7	Antiserum	16	10ml/50 kg BW	15	1	93.75

Two products of Hanvet (mixture of antibiotics)

Conclusions

1. Goats in Vietnam are infected with *Leptospira* at a mean proportion of 36.7%.
2. In spring and summer, *Leptospirosis* infection was higher than in autumn and Male goats were often more infected with the disease than females.
3. The main serovars discovered in goats were *L.bataviae*, *L.grippotyphosa*, *L.icterohaemorrhagiae*, *L.javanica*, *L.pomona* and *L.tarassovi mitisjohnson*.
4. Highly effective therapies were Neodexin, *Leptospira*-antiserum and Amtyo

References

- Dao Trong Dat, 1966. Report on *Leptospirosis* of livestock in some provinces. Veterinary Science and Technique.
- Le Do, 1982. Some comments on *Leptospirosis* outbreaks in pigs in Northern Vietnam and controlling result. Veterinary Information, Vietnam Institute for Veterinary Research, pp 4-6.
- Nguyen Nhu Thanh, Nguyen Ba Hien and Tran Thi Lan Huong, 1997. Spirochetaceae Family, Veterinary Microbacteriology. Agricultural Publishing House, pp 147-156
- Serology Section, The National Veterinary Diagnostic Center, 1995. Diagnosis of *Leptospirosis* by using MAT. Official document of NVDC.

Vu Dinh Hung and Nguyen Thi Dien, 1968-1978. Leptospirosis in livestock and man. The results of researching Veterinary Science and Technique 1968-1978, pp 226-232.

Frankel S., S. Reitman and A.C. Sonnerwizth, 1970. Leptospira. Gradwohl's clinical laboratory methods and diagnosis, pp 1377.

Khera S.S, 1986. Epidemiology and control of leptospirosis in India. Lectures notes on Veterinary epidemiology and economics. Indian Veterinary Research Institute, pp 504-510.

Russell, L., 1994. Leptospirosis. Scientific meeting for leptospirosis, pp 5-7.

OIE, 1996. Manual of standards for diagnostic tests and vaccines, pp 186-190.

Trap D, 1988. Small wild mammals as a source of leptospirosis. *Revue scientifique et technique*, 7:885-889.