

## OCCURRENCE OF ANTIBODIES AGAINST *CHLAMYDOPHILA ABORTUS* IN SHEEP AND GOATS IN THE SLOVAK REPUBLIC

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**Abstract:** *Chlamydomphila abortus* is one of the most important causative agents of enzootic abortion and other chlamydial infections of sheep and goats. The presence of specific serum antibodies to *Chlamydomphila abortus* was studied in sheep and goats breeding in the Slovak Republic by the complement fixation test. 22,040 sheep and goats were examined during 5 years. Specific anti-*Ch. abortus* antibodies were found in 2,360 out of 20,878 sheep sera examined (11.7%), and in 85 out of 1,162 examined goats (7.7%). The occurrence of antichlamydial antibodies indicates the importance of performing screening examinations in commercial breeding with the aim of reducing the spread of this disease between animals, and also interrupting the spread and transmission from animals to human.

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### INTRODUCTION

Chlamydiae are obligatory intracellular non-motile gram-negative organisms characteristic by nonsynchronous multimorphic developmental cycle. The zoonotic chlamydiae with reservoirs in mammals are *Chlamydomphila abortus*, *Chlamydomphila felis*, and possibly *Chlamydomphila pneumoniae*, members of the family Chlamydiaceae. Until recently, this family contained only four species: *Chlamydia psittaci*, *Chlamydia trachomatis*, *Chlamydia pneumoniae*, and *Chlamydia pecorum*. After the revision by Everett *et al.* in 1999 [3], on the basis of analyses of ribosomal RNA, a new genus of *Chlamydomphila* has been established, some species were renamed, and some strains of *Ch. psittaci* and *Ch. trachomatis* were assigned to new species. Both *Chlamydia* spp. and *Chlamydomphila* spp. cause chlamydia, an infectious disease of mammals and birds transmitted to human with the wide spectrum of clinical symptoms.

The first naturally occurring *Ch. psittaci* infection of mammals other than man was reported in 1941 by Gönner [4], who found that this infectious agent caused pneumonia and inapparent infections in laboratory mice. During the past three decades, spontaneous infections of many species of domestic and wild animals with this pathogen were identified etiologically as the cause of diseases, disguised in a variety of clinical symptoms.

In Slovakia, the presence of antibodies against antigens of *Ch. psittaci* in mammals has been reported in many species of animals, including cows [1, 8, 11], pigs [1, 8], sheep [1, 8, 9], goats [1, 8], horses [1, 8] dogs [5], cats [12], small rodents [2, 8], etc.

The etiologic agent of chlamydia of sheep and goats is *Chlamydomphila abortus* (formerly *Chlamydia psittaci*, mammalian abortion strains or serotype 1). The disease is listed in List B according to OIE. Clinically is characterized by enzootic chlamydial abortion in the last month

of pregnancy, stillbirths or premature births of weak kids with low birth weight and by occurrence of polyarthritis in lambs. Occasionally, some affected goats develop a persistent cough, polyarthritis or keratoconjunctivitis. In males, *Ch. abortus* can cause vesiculitis, epididymitis and orchitis.

Chlamydiosis caused by *Ch. abortus* has a zoonotic character and can be transmitted to humans. The most common way of transmission is by inhalation of infected aerosol from urine, foetal fluids and stools, but also after a short stay in a room where infected animals have been. Inhalation of infected material from animals may result in chlamydial respiratory disease in non-pregnant humans. In pregnant women, especially in the second trimester of pregnancy, are infections caused by *Ch. abortus* associated with several cases of abortion and severe chlamydiosis characterized by pelvic inflammatory disease, chronic abdominal pain, increased vaginal discharge, fatigue, and general malaise.

The aim of this study was to examine the occurrence of the specific antichlamydial antibodies in sheep and goats in Slovakia for 5 years.

## MATERIALS AND METHODS

22,040 animals (20,878 sheep and 1,162 goats) were examined during the years 2001-2005 for the presence of antichlamydial antibodies at State Veterinary Institutes of the Slovak Republic (Bratislava, Nitra, Dolný Kubín, Zvolen, Košice and Prešov). Examinations were performed in order to identify the aetiology of reproductive defects, before an auction-sales, before sales, in quarantine, and also in order to identify the source of infection of human chlamydiosis.

Blood samples were examined by micro and macro-method of complement fixation (CF) recommended by OIE in Paris. A species specific antigen of *Ch. abortus* produced specifically for CF (BIOVETA Ivanovice na Hané, LINE Brno, Virological Department SAV Bratislava) was used. The animals, whose sera reacted at the titre 1:64 and higher, were considered positive. In some cases, results have been confirmed by using the ELISA test aimed at detecting of specific antibodies *Ch. abortus* in serum of ruminants. ELISA test is based on the recombinant antigen specific for *Chlamydomphila abortus* and *Chlamydomphila psittaci*.

## RESULTS AND DISCUSSION

In 2001, 6,195 blood samples from sheep and 277 from goats were serologically examined (Tab. 1). Of the total number of sheep's sera examined, 527 were positive at the titre 1:64-1:1024, which represented 8.1%. In the group of goats, 40 animals were positive (14.4%) (Tab. 2). All positive animals came from one breeding farm (Pleš, district Lučenec).

In 2002, total of 6,385 blood samples of sheep were examined, of which 695 were positive from the titre 1:64 to

**Table 1.** Prevalence of the antibodies against *Chlamydomphila abortus* in the sheep in Slovak Republic

Year	Total of examined animals	Positive		Titre
		N	%	
2001	6,195	527	8.1	1:64-1:1024
2002	6,385	695	10.8	1:64-1:1024
2003	2,297	232	10.1	1:64-1:1024
2004	2,591	363	13.6	1:64-1:1024
2005	3,410	543	15.9	1:64-1:4096
Together	20,878	2,360	11.7	

**Table 2.** Prevalence of the antibodies against *Chlamydomphila abortus* in the goats in Slovak Republic

Year	Total of examined animals	Positive		Titre
		N	%	
2001	277	40	14.4	1:32-1:256
2002	154	16	10.4	1:32-1:128
2003	190	1	0.53	1:64
2004	379	11	2.9	1:64-1:128
2005	162	17	10.5	1:64-1:128
Together	1,162	85	7.7	

1:1024 (Tab. 1). The comparison of antichlamydial antibodies prevalence in 2001 and 2002 confirmed an increase from 8.5% to 10.88%. From the total of 154 examined sera from goats, 16 (10.4%) were seropositive, which represented 4% decrease by comparison with the year 2001 (Tab. 2).

In 2003, from 2,297 of sheep blood sera, 232 (10.1%) were positive at the titre 1:64-1:1,024. Only one of 190 goats' samples was positive at the titter 1:64.

In the year 2004, a total 2,591 sheep blood sera were examined. Specific antichlamydial antibodies were detected in 363 cases (13.6%) in titre 1:64-1:1,024 (Tab. 1). Also, 379 goats were examined for chlamydiosis and only in 11 of them antichlamydial antibodies were diagnosed (Tab. 2). The total percentage of positive goats increased from 1.9% in 2003 to 2.9% in 2004.

In 2005, a total of 3,410 sheep blood sera were examined, of which 543 were seropositive. Antichlamydial antibodies were frequently detected in titres 1:512-1:4,096, which are the levels often found in cases of abortion suspected of being caused by chlamydia. The total percentage of positive results in sheep increased from 13.6% in 2004 to 15.9% in 2005. From 162 goats examined, 17 were positive (10.5%) in titres 1:64 and 1:128 (Tab. 2).

Enzootic abortions of sheep and goats were reported for the first time in 1950, when *Chlamydomphila abortus* (previously *Chlamydia psittaci*) as etiologic agent of this disease was isolated [10]. After that, the disease was diagnosed in many countries around the world, including the Slovak Republic.

A higher incidence of abortion is seen in the last, fifth month of pregnancy. Transmission is possible by ingestion and by aerosol, but venereal transmission is also possible. *Ch. abortus* can be also found in the faeces and urine, as well as in goat's milk. Pregnant ruminants shed large numbers of *Ch. abortus* in the placenta and uterine discharges when they abort or give birth, and then may excrete decreasing numbers of bacteria for a few weeks. In sheep, shedding occurs from one day before, to 2-3 weeks after an abortion, but in some cases *Ch. abortus* can be found in the reproductive secretions for at least 2-3 years. Goats can begin to shed bacteria more than 2 weeks before an abortion. Both sheep and goats can be chronic carriers, which is dangerous not only for animals, but also for humans. There are several reports of human abortion, or severe respiratory disease in non-pregnant humans, derived from chlamydiae from aborting sheep [6] or goats [7, 13]. The majority of these reports are abortions between the 14<sup>th</sup>-36<sup>th</sup> weeks of pregnancy in pregnant sheep, or goats' farmer's wives exposed to chlamydiae mainly during lambing. Non-pregnant humans, e.g. breeders, veterinarians, and employees of slaughterhouses, vaccine manufacturing workers, and laboratory scientists, can acquire infection by inhalation of infected material from these animals.

During the years 2001-2005, 22,040 sheep and goats were examined serologically for the presence of anti-*Ch. abortus* antibodies. The results of serological examination have confirmed the occurrence of antibodies against this pathogen. From the total of 20,878 examined sheep 2,360 were positive (11.7%); antichlamydial antibodies were also diagnosed in 85 (7.7%) of 1,162 examined goats. In the observed period, the percentage of positive sheep increased from 8.1% in 2001 to 15.9% in 2005; in goats, a high percentage of positive animals were recorded in 2001 (14.4%), which then decreased to 0.53% in 2003, and from 2004 again started to increase. All these results indicates that *Ch. abortus* is still present in the sheep and goat breeds in the Slovak Republic. It is therefore important to seek out suspect animals and perform screening examinations in commercial breeding with the aim of reducing the spread of this disease between animals, and interrupting the spread and transmission from animals to human.

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