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# Findings of specific antibodies against Maedi-Visna virus in sheep population in the region of Vojvodina

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## *Abstract*

Maedi-visna disease is a viral disease present in sheep. The virus is an ovine progressive pneumonia virus from ovine lentivirus species. Maedi-visna disease is spread all over the world and can be found in many countries. Symptoms of the disease are very often hidden and develop very slowly, but economic losses can be significant and the final result is always death. Maedi-visna virus causes changes mostely in lungs, udder, brain and joints. Clinical symptoms that can apper at first are apathy, weight loss followed by weakness and exhaustion. The aim of this study was to perform an analisys for the presence of specific antibodieas against Maedi-visna virus among sheep in Vojvodina with ELISA method. Blood samples were collected from 1500 sheep and 320 samples were found positive, which makes 21% of positive findings. The samples were collected from three different regions in Vojvodina and the percentage of positive findins varied from 14 – 30%, depending on the region. Among a certain number of blood samples taken from rams (88), in this study, positive findings were gained from 6 rams, what makes 6,81%. Analysis was done among the breeds and mixed breeds. This number of positive samples should be considered a significant finding and much more attention should be given to serological and clinical findings of Maedi-visna disease in Vojvodina region.

***Key words:*** Meadi-visna, serology, prevalence, sheep

## *Introduction*

Progressive pneumonia of sheep and maedi are terms used for chronical disease in sheep. Maedi-visna disease can be manifested as progressive pneumonia, artritis, mastitis and slow growth in lambs. This disease is very closely connected with encephalitis and artritis in goats. Maedi visna virus is one of the *Lentvirinae* viruses and they can cause a persistant infection in sheep with lymphproliferation in lungs, uder tissue, brain and joints. Virus isolates of naturaly infected sheep are geneticaly different and there aro no two identical isolates (Jolly and Narayan, 1989). The difference in pathogenicity in different isolates hs not been prooved yet (Pritchard et al, 1995). There is a great similarity with other lentiviruses that can cause encephalitis and artritis in goats (Markom et al, 1991, Cheevers and McGiure, 1988, Petursson et al, 1992). The earliest data come from Southern Africa and US (Straub, 2004, Randall et al, 1988, Watt et al 1990) and today the disease can be found in most of the countries known for sheep raising. Sheep and goats are the pnly species known to be susceptible for the infection, experimental infection in other species gave no results (Straub 2004, Lacerenza, 2006). In US, the infection is widely spread and seroprevalence in different states can vary from 1-68% (Straub, 2004, Randall et al, 1988, Christodoulopoulos, 2006, Pritchard and Dawson, 2000). In research done in Canada a flock prevelance of 12% was found (Simard, 1991). In Serbia some research was done during the past few years on seroprevelance in sheep and introduction of the diease to teh breeders and field veterinarians (Bugarski 2008, Vidić 2011).

The ways of infecton spreading are not yet completely known, but the sheep are susceptible for the infection at any age. Incubation period is very long and most of the sheep with clinical symptoms are

older then 3 years. Symptoms develop slowely, the first symptom is apathy, weight loss and exhaustion. Respiratory difficulties can not be seen at first, but when the flock is moving, ill sheep stay behind. Clinicaly the disese lasts 3-10 months and it always ends lethaly. Some of the sheep do not have any respiratory problems and the only symptoms are weight loss and weakness of sheep. Changes in uder also develop slowely and can be seen only in third lactation or after. Arthritis can be found in infected sheep 1-6 years old, when carpal joints are swolen, so sick sheep limp and loose weight (Blacklaws, 2004). The virus can be identified by complement fixation method and neutralisation test, but in most of the countries serological methods are used for diagnostics of maedi visna, like agae gel immunodifussion test, indirect immunofluorescence test and ELISA test (Roić et al 2011).

It is important to identify the presence of maedi-visna infection because of the long incubation period, but control of this disease is complicated because there is no treatment, no vaccine and the possibilities of prevention are limited.

## *Material and Methods*

The research is done in three epizootiological regions: Sombor (northern Backa), Subotica and Zrenjanin, from which 1500 sheep blood samples were taken (500 samples from each region). A total number of 88 rams from 32 flocks in 19 settlements were examined. The average age was 3.1±1.43 year. The examined rams were from different breeds: Merinolandschaft breed, Ile-de-France breed, Suffolk breed, Tsigai, Charollais and crossbreeds. Some of the rams were raised on pastures (27.27%) and the rest were kept in stalls. The animals stayed on the pastures as long as the weather conditions remain favourable, and the others were in the stalls with or without yards.

Detection of specific antibodies against Maedi-visna virus (MVV) was done wit hELISA test CHEK-IT-CAEV/MVV, IDEXX Lab. The results found were divided into negative, suspitious and positive.

## *Results and Disscusion*

The results are shown in Tables 1-5. In blood samples from Northern Backa (Sombor region), possitive results were found in 31% of samples and suspicious in 6% of the samples. Positive samples were found in all 6 municipalities of this region (Table 1).

**Table 1.** The results of analysis in sheep blood samples for the presence of specific antiobodies against Maedi-visna virus in Northern Backa region (Sombor)

| Municipality | No of samples | No of positive | % of positive | No of suspicious | % of suspicious | No of positive & suspicious | % of positive & suspicious |
|---|---|---|---|---|---|---|---|
| Apatin | 45 | 13 | 28,88% | 9 | 20% | 22 | 48,88% |
| Bačka Topola | 110 | 43 | 39,09% | 9 | 8,1% | 52 | 47,27% |
| Kula | 65 | 22 | 33,84% | 4 | 6.15% | 26 | 40% |
| Odžaci | 65 | 37 | 56,92% | 2 | 3,07% | 39 | 60% |
| Sombor | 140 | 37 | 26,42% | 5 | 3,57% | 42 | 30% |
| Vrbas | 75 | 3 | 4% | 1 | 1,33% | 4 | 5,33% |
| **Total** | **500** | **155** | **31%** | **30** | **6%** | **185** | **37%** |

In blood samples from Northern and middle Banat (Zrenjanin region), possitive results were found in 14,6% of samples and suspicious in 2% of the samples. Positive samples were found in 6 out of 8 municipalities of this region and the largest number of positive animals was found in Kikinda (Table 2 and 3).

**Table 2.** The results of analysis in sheep blood samples for the presence of specific antiobodies against Maedivisna virus in Northern Banat region (Zrenjanin)

| Municipality | No of samples | No of positive | % of positive | No of suspicious | % of suspicious | No of positive & suspicious | % of positive & suspicious |
|---|---|---|---|---|---|---|---|
| Kikinda | 60 | 17 | 28,33% | 4 | 6,66% | 21 | 35% |
| Novi Kneževac | 30 | 7 | 23,33% | - | - | 7 | 23,33% |
| Čoka | 60 | 9 | 15% | 2 | 3,33% | 11 | 18,33% |
| **Total** | **150** | **33** | **22%** | **6** | **4%** | **39** | **26%** |

**Table 3.** The results of analysis in sheep blood samples for the presence of specific antiobodies against Maedivisna virus in Middle Banat region (Zrenjanin)

| Municipality | No of samples | No of positive | % of positive | No of suspicious | % of suspicious | No of positive & suspicious | % of positive & suspicious |
|---|---|---|---|---|---|---|---|
| Novi Bečej | 70 | 10 | 14,28% | 1 | 1,42% | 11 | 15,71% |
| Nova Crnja | 20 | - | - | - | - | - | - |
| Sečanj | 30 | - | - | - | - | - | - |
| Zrenjanin | 170 | 25 | 14,70% | 3 | 1,76% | 28 | 16,47% |
| Žitište | 60 | 5 | 8,33% | - | - | 5 | 8,33% |
| **Total** | **350** | 40 | 11,42% | 4 | 1,14% | 44 | 12,57% |

In blood samples from Northern Backa (Subotica region), possitive results were found in 18,4% of samples and suspicious in 1% of the samples. Positive samples were found in 4 out of 5 municipalities of this region and the largest number of positive animals was found in Ada (Table 4).

**Table 4.** The results of analysis in sheep blood samples for the presence of specific antiobodies against Maedivisna virus in Northern Backa region (Subotica)

| Municipality | No of samples | No of positive | % of positive | No of suspicious | % of suspicious | No of positive & suspicious | % of positive & suspicious |
|---|---|---|---|---|---|---|---|
| Ada | 82 | 22 | 26,82% | 1 | 1,21% | 23 | 28,04% |
| Senta | 105 | 24 | 22,85% | - | - | 24 | 22,85% |
| Mali Iđoš | 15 | - | - | - | - | - | - |
| Kanjiža | 149 | 34 | 22,81% | 4 | 2,68% | 38 | 25,50% |
| Subotica | 149 | 12 | 8,05% | - | - | 12 | 8,05% |
| **Total** | **500** | **92** | **18,4%** | **5** | **1%** | 97 | 19,4% |

The results of sheep sera analysis for the presence of specific antibodies against MVVfrom all three regions Sombor, Zrenjanin and Subotica, are shown in Table 5.

**Table 5.** Total results of analysis in sheep blood samples for the presence of specific antiobodies against Maedi-visna virus in all three regions (Sombor, Zrenjanin and Subotica)

| Municipality | No of samples | No of positive | % of positive | No of suspicious | % of suspicious | No of positive & suspicious | % of positive & suspicious |
|---|---|---|---|---|---|---|---|
| Sombor | 500 | 155 | 31% | 30 | 6% | 185 | 37% |
| Subotica | 500 | 92 | 18,4% | 5 | 1% | 97 | 19,4% |
| Zrenjanin | 500 | 73 | 14,6% | 10 | 2% | 83 | 16,6% |
| **Total** | **1500** | **320** | **21,33%** | **45** | **3%** | **365** | **24,33%** |

According to the total results after analysis of 1500 sheep sera samples for the presence of specific antibodies against MVV, 21,33% of positive sheep was found, while in 3% of sheep he result was suspicious (Tabe 5.). Gained results show that the level of seroprevelance is signficant.

From a total number of 88 rams from 32 flocks in 19 settlements that were examined, 6,81% (6 rams) were positive to MVV. Equal number of rams- three, with positive serology finding for MVV was raised on pastures and in stalls.

One of the most important factors that influenced the spreading of this disease in different countries (such as Denmark, Norway, Finland and United Kingdom) is trade of animals without control. In these countries different seroprevelances were found (Berriatua et al 2003, Ravazzolo et al 2001, Simard and Morley 1991, Sihvonen et al 1999, Gjerset et al 2007, Watt et al 1990, Christodoulopoulos 2006) The level of seroprevelance grows with ageing of the animals and it can be from 11-27% in sheep one year old, up to 81-93% in animals over 6 years old (Ravazzolo et al 2001). The percentage of seropositive animals is higher in the flocks with lung ademotosis.

Lambs can get the infection during milk sucking or after a contact with infected sheep. Infection within the flock spreads fast and a large number of animals is found seropositive two years after introducing the infected animal to the flock. Incubation is long, it can be 2-3 years long and the infection is transmited by droplets, but the animals can be infected by contaminated food and water also.

Disease with clinical symptoms appears in sheep over 2 years old and mostly can be seen when the prevalence is over 50%. Even though the infection is very common in many flocks, the clinical symptoms are rarely seen. The main economical loses, due to the MVV infection, come from the influence of subclinical infection to the productivity of infected flock.

In different countries different diagnostic test are used. With ELISA test, antibodies can be discovered soon after the infection (Straub 2004, Randall et al 1988). Slow apperiance of antibodies after MVV infection has to be taken into the consideration when a negative finding is disscussed. Passively gained antibodies can last for 6 months and serological examination of sheep before this age has a limited value. The value of positive findings is limited because the prevelance can be high in a flock, especially in older animals, but positive serology finding does not mean that symptoms and leasures have to be a consequence of the infection with MVV. In the past the only way of control was eradication of the disease with complete distruction of the sheep in a region and a total renewal of the flock. But it is possible to reduce the prevelance in two ways (Straub 2004, Randall et al 1988). One way is to take away the lamb from sheep right after birth, so that the colostrum is denied. The lamb receives colostrum from cows and is raised totaly sepreted from the sheep, or infected flock. This method is succsessful in in raising an infection free flock (Lerondelle and Ouzrout 1990) and useful in keeping the genetic mterial of the animals. The other way is to detect seropostive animals and to separate tem. All of the sheep and goats on a farm re tested annually and seropositive nimals and their offspring younger then one year are casted away. It is

ideal if they are beeing slotered but that is not economically justified and they have to be kept separately from seronegative sheep. Seronegative flock has to be kept isolated from the infected sheep, people and equipement wich comes into contact with seropositive animals. Testing of the animals has to be continiued annually until a negetive result is gained two years in a row. Bringing new animals to a flock has to be from a seronegative flock. Treatment is not applicable.

## *Conclusion*

This number of positive samples should be considered a significant finding and much more attention should be given to serological and clinical findings of Maedi-visna disease in Vojvodina region. It is important to fight against he disease, because of the losses that appear due to the death of animals, separation of the ill animals and their sloughtering, expences of analysis and control and alo the limited trade. MVV infection has been detected in sheep population in Vojvodina, so this diease deservs more attention and more research is to be done in the region.

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