



## Trichinellosis as an ecological problem in the Republic of Croatia

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### ABSTRACT

*Trichinellosis is considered to be a dangerous invasive zoonosis that has become the most serious public health threatening problem within invasive diseases in the last decade. The most frequent source of invasion for people is consuming of insufficiently boiled or baked and non-properly dried pork containing Trichinella spp. Monitoring of epidemiological and epizootiological situation in Croatia has shown the biggest prevalence of the disease in the areas of east Slavonija, which are marked as endemic regions. East Slavonija is well known for its traditional way of breeding and slaughtering swine, as well as for its specific processing of meat products. This way of keeping swine enables contacts with silvatic reservoirs of trichinellosis and, on the other side, gives possibility of invading wild animals by eating carrions from trichinellotic domestic swine. Rats and other sinantropic rodents, as well as non-caring out the systematic deratisation and inappropriate removing of pork with Trichinella spp. are of big importance in spreading and conveying this disease. Our primary aim in this paper was to point out the problems concerning this disease from ecological view, especially in cases when the regulations about its eradication have been carried out, as well as to provide statistical analysis of its prevalence in the endemic areas of east Slavonija.*  
(Keywords: trichinellosis, swine, game, zoonosis, ecology)

### INTRODUCTION

According to Pozio (1995), Murrell and Pozio (2000), the prevalence of people fallen ill from trichinellosis in the World has significantly increased in the last ten years. The authors find the reasons for this trend in human manipulations with eco-system, wars, political problems of developing countries and rapid changes in food distribution and market system.

In the Republic of Croatia, number of sick people increased during the Homeland War (1991-1995), and even more in the years of reintegration of territorial entirety (1996-1999) (Gašpar and Marinculić, 2000; Rimac et al., 2001a). The greatest number of people were infected by consuming trichinellotic pork from domestic boar, while lower number were infected by consuming insufficiently termically processed meat from shoot wild swine, badger or bear (Beus, 1999). Due of the highest prevalence of people fallen ill in east Slavonija, especially in Vukovarsko-srijemska county, this area was marked as endemic region for trichinellosis in Croatia. Game was found to play significant role in epizootiology of this disease because of the parasites' constant presence within them (Tucak et al., 2000; Kovač et al., 2001; Vučemilo et al., 2001). This situation has resulted with issuing sub-legislative regulations, which determine

particular measures for eradication and prophylaxis of the disease. Primary, this refers to obligatory trichinelloscopic inspection of meat originated from slaughtering for household purposes. In the cases of positive findings, all the swine from infected yard were compulsory slaughtered and their carrions were removed in a proper way. Due to the fact rodents, and especially rats, are found to be the most important reservoirs and vectors in conveying this disease, providing of systematic deratisation in endemic region is obligatory. Inadequate veterinary-sanitary supervision, non-existing of systematic deratisation, sanitary disorder, unsolved question of trash deposits and removing of carrions, confiscates and waste animal matter for sure have participated in spreading of the disease, as well as presented serious ecological problem in the war and post-war periods. It was postulated that these problems gradually have to be solved.

In the aim to check the efficiency of mentioned measures for eradication and prophylaxis of the disease, we have analyzed frequency of positive findings from inspected samples of meat brought for examination to the veterinarian surgeries in Vukovarsko-srijemska county in the last three years (1999-2001).

## MATERIALS AND METHODS

Examinations were carried out by the classic method of trichinelloscopy with registering the number of positive samples for the parasites from genus *Trichinella* in the total number of examined samples of meat. The places of examinations were the veterinary organizations in the area of Vukovarsko-srijemska county during 1999, 2000 and 2001. According to the aims of the investigation, all the pork samples were separated in few statistical groups. The yearly data were separated by months and 11 surgeries.

General descriptive statistical methods were used for the data analysis, while ANOVA was used for determining statistically significant differences in relative number of positive pork samples by months and years.

Data were analyzed by the meanings of statistical computer program SPSS 10.0.

## RESULTS AND DISCUSSION

In three mentioned years, the total number of 543.911 pork samples were inspected, from which 4.831 were found to be positive (0.89%), which is presented in *Table 1*. It is obvious from *Figure 1* that number of inspected and positive swine had decreasing trend during the examination period of three years.

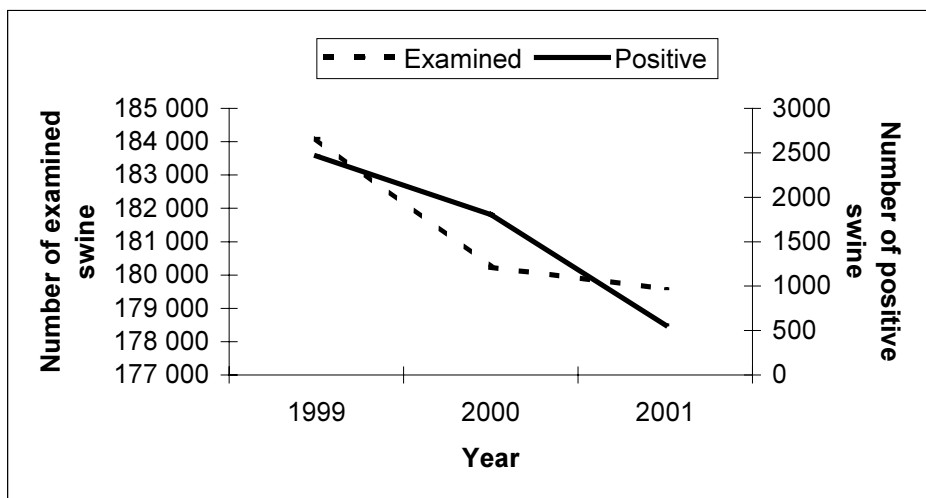
**Table 1**

**Number of inspected and positive swine and relative share of positive samples in examined population during the monitored period**

<b>Year</b>	<b>Examined</b>	<b>Positive</b>	<b>Relative share (%)</b>
1999	184.097	2463	1,34
2000	180.232	1806	1,00
2001	179.582	562	0,31
<b>Total:</b>	<b>543.911</b>	<b>4831</b>	<b>0,89</b>

**Figure 1**

**Total number of examined and positive swine during the three monitored years**



**Figure 2**

**Percentage of positive swine in the total number of examined swine by years**

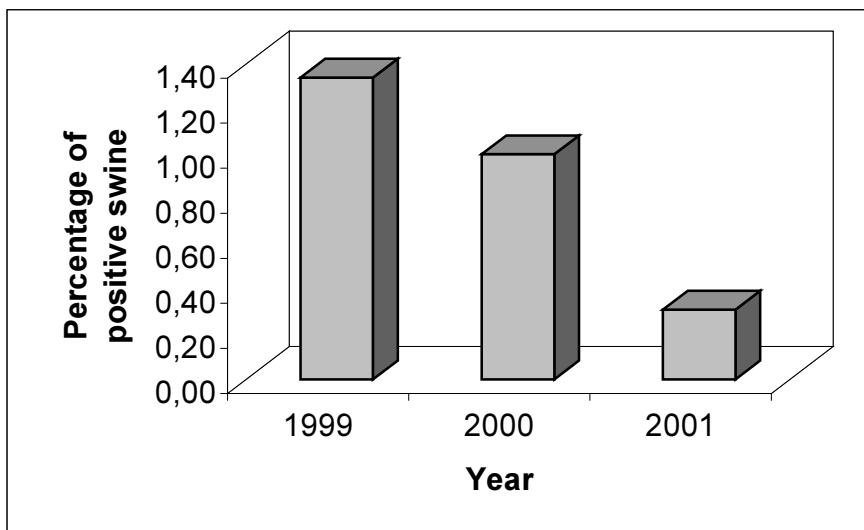


Figure 2 is presenting the percentage of infected swine in the total examined population separated for each year. The significant fall in the number of positive swine is especially seen in 2001 compared to 1999 (number decreased for 432.26%, respectively).

**Table 2**

**F-values from ANOVA for influence of month and veterinary organization on occurring of positive results for each year separately**

Year	F - values	
	Influence of month	Influence of veterinary organization
1999	0,847 <sup>n.s.</sup>	11,561**
2000	1,469 <sup>n.s.</sup>	8,958**
2001	2,080*	2,489**

\*  $P < 0,05$ ; \*\*  $P < 0,01$ ; <sup>n.s.</sup>=non significance

ANOVA for the influence of veterinary organization on occurring of trichinellosis has shown highly significant differences for every monitored year separately ( $P < 0.01$ ), which is presented in *Table 2*. Influence of each month in a year on positive results in 1999 and 2000 was insignificant, while in 2001 it was found to be significant ( $P < 0.05$ ). ANOVA for influence of year on positive results in Vukovarsko-srijemska county has shown justifiable differences in middle relative values ( $F = 21,252^{**}$ ). However, F-test has not given the answer if the difference was justifiable between the averages of all the groups or only few of them. Testing of justify of differences between averages from various groups was carried out by the meanings of the method from J.S. Tukey, modified by Snedecor (*Snedecor and Cochran, 1967*). Mentioned method has shown that only one out of the three differences was higher than calculated value D ( $D = 1.242$ ). This refers to the difference between the years 1999 and 2001, while between 1999 and 2000, as well as between 2000 and 2001, the difference was not justifiable. Therefore, there is justifiable difference between mentioned group with the significance of 5% ( $P < 0.05$ ), which means that the number of positive swine has significantly decreased in 2001 compared to 1999 in Vukovarsko-srijemska county, and this is in accordance with the investigations carried out by *Rimac et al. (2001b)*.

### CONCLUSIONS

Systematic carrying out of measures for preventing spreading and eradication of trichinellosis in the Republic of Croatia, especially in the endemic region of east Slavonija, was sufficient for decreasing number of swine infected with the parasite from genus *Trichinella*, which significantly reduced danger for people' infection.

ANOVA for influence of veterinary organization has shown the spots in the endemic region of Vukovarsko-srijemska county that present the biggest centers of trichinellosis in Croatia.

Total eradication in endemic regions will hardly be carried out due to the fact the parasite is present in the population of wild animals, which presents significant epizootiological, but also ecological problem.

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