

The Trend of Parasitic Diseases among the Population of Osječko-baranjska County During the Period 1996–2010 – Croatia

Zvominir Tucak¹, Ida Parčetić-Kostelac², Tatjana Tušek³, Antun Beus², Gordana Jurić-Lekić², Ivan Valek², Anica Sabo², Marin Periškić⁴ and Sanda Vladimir-Knežević⁵

¹ »J. J. Strossmayer« University, Faculty of Agriculture, Osijek, Croatia

² Public Health Institute of Osječko-baranjska County, Osijek, Croatia

³ College of Agriculture, Križevci, Croatia

⁴ Croatian Veterinary Institute »Zagreb«, Veterinary Department, Vinkovci, Croatia

⁵ University of Zagreb, Faculty of Pharmacy and Biochemistry, Zagreb, Croatia

ABSTRACT

*Our manuscript shows infestation of the different population (by age groups, and by sex) with endoparasites and ectoparasites from 1996 till 2010, through seasons (spring, summer, autumn, winter). Parasitological examinations which were done at »Public Health Institute« of Osječko-baranjska county, and which were done at total of 3667 patients, were the methods of direct parasitological diagnostic for proof of parasitic elements in clinical samples, and the methods of indirect parasitological diagnostic, serological examination for proof of antibodies to antigens in the serum of the patients or of the asymptomatic parasite carriers. Development of causers of the diseases (parasites) is depending on the season^{1,2,4,6-11,15,17}. Results of our researches were processed with statistical program called Statistica 8.0 (StatSoft. Inc 1984–2008). From statistical parameters arithmetic middle (\bar{x}), standard deviation (s), and standard error of the arithmetic middle ($s\bar{x}$), are shown. Testing of the significance of differences between independent samples was done with *t*-test (ANOVA), and is shown in the chart using the appropriate letters (*a,b,c*). Determined parameters of total infestation and endoparasitic infestation, and total infestation and ectoparasitic infestation show statistically significant difference on the risk level of 0.05 regardless of the age or the sex group of the population of Osječko-baranjska county. Determined parameters of monitoring infestation (endoparasitosis and ectoparasitosis) have shown statistically significant difference on the risk level of 0.05.*

Key words: parasitic, diseases

Introduction

Environmental milieu of Osječko-baranjska county contains large potential (woods, venison, pets (dogs, cats, birds)) which can cause infestation with endoparasites or ectoparasites of the population^{2,3,5,13,14,16-21}. Our manuscript is focused on detection of the parasitic diseases of the population in order to take needed actions on time to prevent diseases.

Materials and Methods

Parasitological examinations which were done at »Public Health Institute« of Osječko-baranjska county, and which were done at total of 3667 patients, were the methods of direct parasitological diagnostic for proof of parasitic elements in clinical samples, and the methods of indirect parasitological diagnostic, serological examination for proof of antibodies to antigens in the serum

of the patients or of the asymptomatic parasite carriers^{1,4,6–11,15}. Results of our researches were processed with statistical program called Statistica 8.0 (StatSoft. Inc 1984–2008). From statistical parameters arithmetic middle (\bar{x}), standard deviation (s), and standard error of the arithmetic middle (\bar{sx}), are shown. Testing of the significance of differences between independent samples was done with t-test (ANOVA), and is shown in the chart using the appropriate letters (a,b,c).

Results and Discussion

Comparing given results in the Table 1 by parameters of total infestation, endoparasitic and ectoparasitic infestation of the population of Osječko-baranjska county, within the fifteen-year period of monitoring, there is statistically significant difference of 95% between total infestation and endoparasitic infestation, and between total and ectoparasitic infestation-as shown in Table 1.

Determined parameters of monitoring infestation of the population of Osječko-baranjska county through seasons within the fifteen year period, show statistically significant difference on the risk level of 0.05 between endoparasitic infestation and ectoparasitic infestation-as shown in Table 2.

TABLE 1
RELATION OF ECTOPARASITIC AND ENDOPARASITIC INFESTATION OF THE POPULATION OF OSJEČKO-BARANJSKA COUNTY IN THE FIFTEEN-YEAR PERIOD, FROM 1996 TILL 2010

Year	Total infestation (1996.–2010.) a	Ectoparasitic infestation (1996.–2010.) b	Endoparasitic infestation (1996.–2010.) c
1996	361	272	89
1997	332	294	38
1998	349	295	54
1999	253	169	84
2000	375	182	193
2001	280	159	121
2002	197	79	118
2003	340	162	178
2004	209	89	120
2005	158	70	88
2006	166	47	119
2007	162	65	97
2008	189	113	76
2009	160	91	69
2010	136	66	70
Σ	3667	2153	1514
\bar{x}	244.47	143.53	100.93
s	86.85	85.58	42.40
\bar{sx}	22.37	22.11	10.96
a, b, c		ab*, ac*	
*P < 0.05			

TABLE 2
THE TREND OF THE TOTAL ENDOPARASITIC AND ECTOPARASITIC INFESTATION OF THE POPULATION OF OSJEČKO-BARANJSKA COUNTY BY SEASONS, IN THE FIFTEEN-YEAR PERIOD, FROM 1996 TILL 2010

Parasitic infestation	Total infestation (1996.–2010.) a	Endoparasitic infestation (1996.–2010.) b	Ectoparasitic infestation (1996.–2010.) c
Total	3667	1514	2153
Autumn	1011	308	703
Winter	1296	550	746
Spring	678	260	418
Summer	682	249	433
\bar{x}	1466.80	576.20	890.60
s	1256.58	538.31	721.54
\bar{sx}	324.70	139.10	186.44
a, b, c		bc*	
*P < 0.05			

TABLE 3
DISPLAY OF THE TOTAL ENDOPARASITIC AND ECTOPARASITIC INFESTATION OF THE POPULATION OF OSJEČKO-BARANJSKA COUNTY BY AGE GROUPS IN THE FIFTEEN-YEAR PERIOD, FROM 1996 TILL 2010

Life age	Total infestation (1996.–2010.) a	Endoparasitic infestation (1996.–2010.) b	Ectoparasitic infestation (1996.–2010.) c
Total	3667	1374	2293
0–14	1782	730	1052
15–49	1344	513	831
50–60	541	131	410
\bar{x}	1833.50	687.00	1146.500
s	1325.96	520.65	809.40
\bar{sx}	342.63	134.53	209.15
a, b, c		/	
*P < 0.05			

TABLE 4
DISPLAY OF THE TOTAL ENDOPARASITIC AND ECTOPARASITIC INFESTATION OF THE POPULATION OF OSJEČKO-BARANJSKA COUNTY BY SEX IN THE FIFTEEN-YEAR PERIOD, FROM 1996 TILL 2010

Sex	Total infestation (1996.–2010.) a	Endoparasitic infestation (1996.–2010.) b	Ectoparasitic infestation (1996.–2010.) c
Total	3667	1374	2293
M	1692	699	993
W	1975	540	1435
\bar{x}	2444.67	871.00	1573.67
s	1067.99	442.81	661.00
\bar{sx}	120.40	114.42	170.80
a, b, c		/	
*P < 0.05			

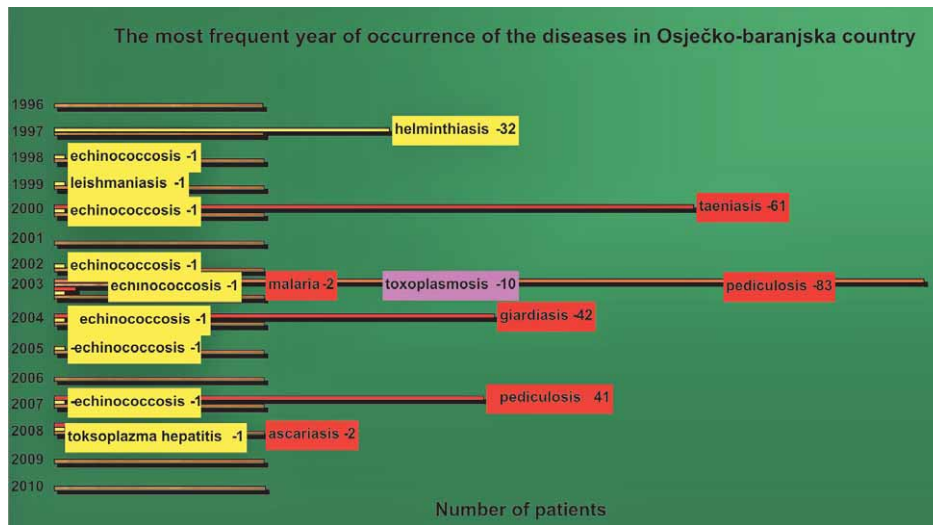


Fig. 1. The trend of parasitic diseases in Osječko-baranjska county, from 1996 till 2010 – by diseases and their biggest frequency of occurrence by years and seasons: Autumn (from October till December). Legend: *Echinococcosis of the second and multiple localisation caused by *Echinococcus granulosus*

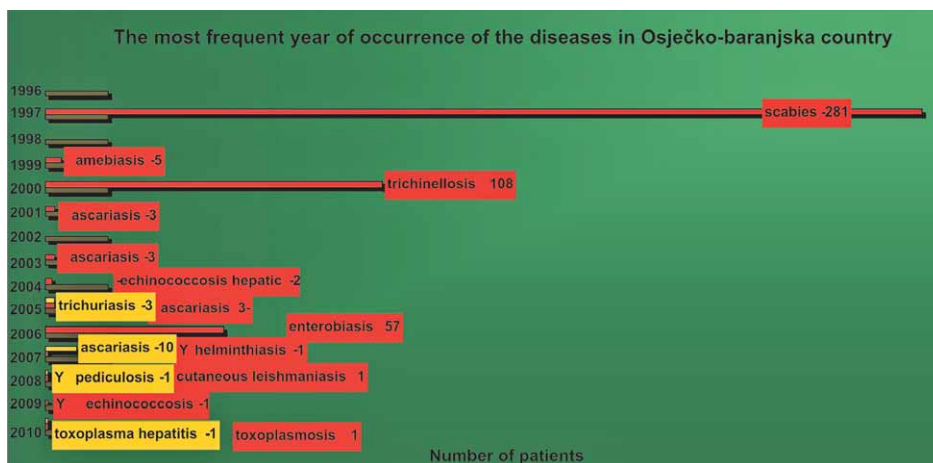


Fig. 2. The trend of parasitic diseases in Osječko-baranjska county, from 1996 till 2010 – by diseases and their biggest frequency of occurrence by years and seasons: Winter (from January till March). Legend: *Amebiasis, unspecified; **Ascariasis with intestinal complications; ***Other specified intestinal helminthiasis; ****Lice caused by *Pediculus humanus corporis*; *****Echinococcosis hepatic caused by *Echinococcus granulosus*.

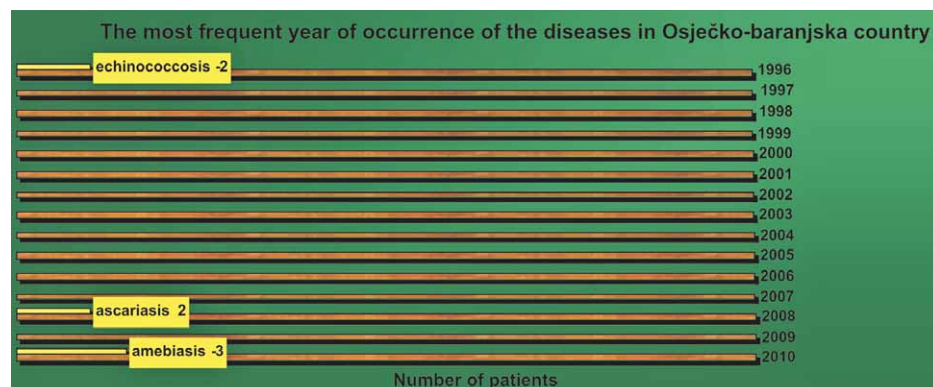


Fig. 3. The trend of parasitic diseases in Osječko-baranjska county, from 1996 till 2010 – by diseases and their biggest frequency of occurrence by years and seasons: Spring (from April till June).

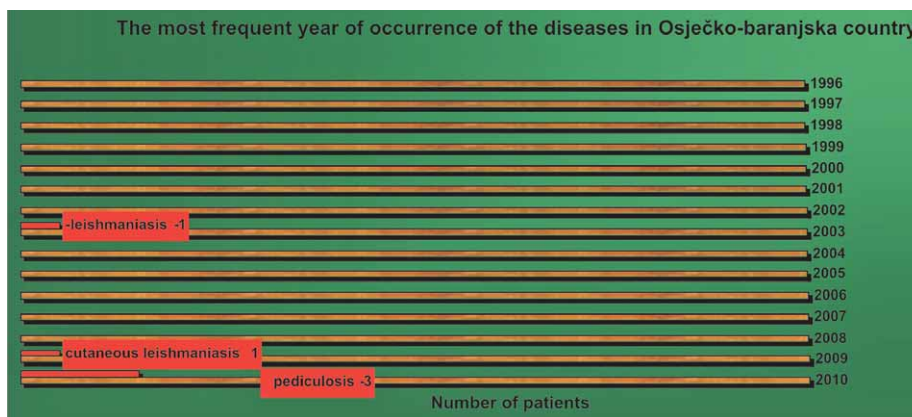


Fig. 4. The trend of parasitic diseases in Osječko-baranjska county, from 1996 till 2010 – by diseases and their biggest frequency of occurrence by years and seasons: Summer (from July till September). Legend: *Leishmaniasis, unspecified; **Lice (pediculosis).

In the Table 3 determined impacts of the parasitic infestation on the parameter of age group of the population, or in Table 4 on the parameter of sex group of the population of Osječko-baranjska county, didn't show statistically significant difference of 95%.

Conclusions

Determined parameters of the total infestation and endoparasitic infestation, as well as total infestation

and ectoparasitic infestation show statistically significant difference on the risk level of 0.05 regardless of age, or sex group of the population of Osječko-baranjska county.

Determined parameters of monitoring infestation of the population of Osječko-baranjska county through fifteen-year period in relation to type of infestation (endoparasitosis and ectoparasitosis) show statistically significant difference on the risk level of 0.05.

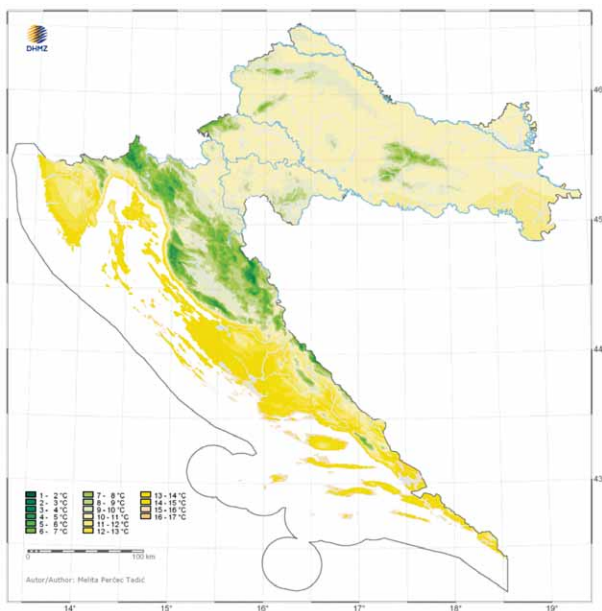


Fig. 5. Zanimović K, Gajić-Čapka M, Perčec Tadić M, Vučetić M, Milković J, Bajić A, Cindrić K, Cvitan L, Katuškin Z, Kaučić D, Lisko T, Lončar E, Lončar Ž, Mihajlović D, Pandžić K, Patarčić M, Srnec L, Vučetić V (2008), Climatological maps for period 1961–1990, for Croatia: Medium annual air temperature. Climate atlas of Croatia 1961–1990, 1971–2000. National Hydro-meteorological Institute, Zagreb, 200 pages | with the permission and kindness from Mr. mr. sc. I. Čačić and Mrs. mr. sc. M. Perčec Tadić.²²

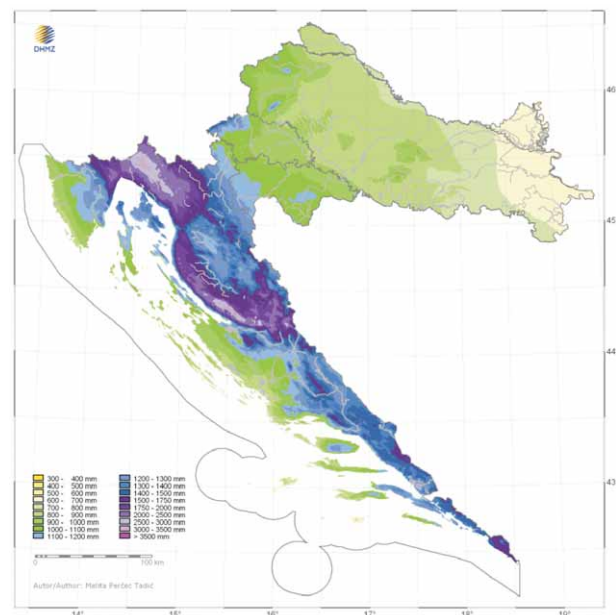


Fig. 6. Zanimović K, Gajić-Čapka M, Perčec Tadić M, Vučetić M, Milković J, Bajić A, Cindrić K, Cvitan L, Katuškin Z, Kaučić D, Lisko T, Lončar E, Lončar Ž, Mihajlović D, Pandžić K, Patarčić M, Srnec L, Vučetić V (2008), Climatological maps for period 1961–1990, for Croatia: Medium annual rainfall quantity. Climate atlas of Croatia 1961–1990, 1971–2000. National Hydro-meteorological Institute, Zagreb, 200 pages/with the permission and kindness from Mr. mr. sc. I. Čačić and Mrs. mr. sc. M. Perčec Tadić.²²

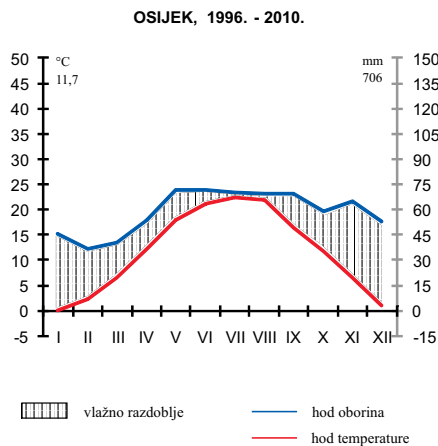


Fig. 7. Climate diagram by Walter. Vlažno razdoblje – humid period; Hod oborina – Rainfall gait, Hod temperature – Temperature gait. Source: Meteorological data for Osijek, for period 1996–2010, Croatian Air Traffic Control; Zagreb, branch Osijek; Department of Aviation Meteorology/ with the permission and kindness from Mr. B. Sc. Ing Ž. Lazanin, and thanks to Mrs. mr. sc. T. Peremin – Volf, for making the graph.¹²

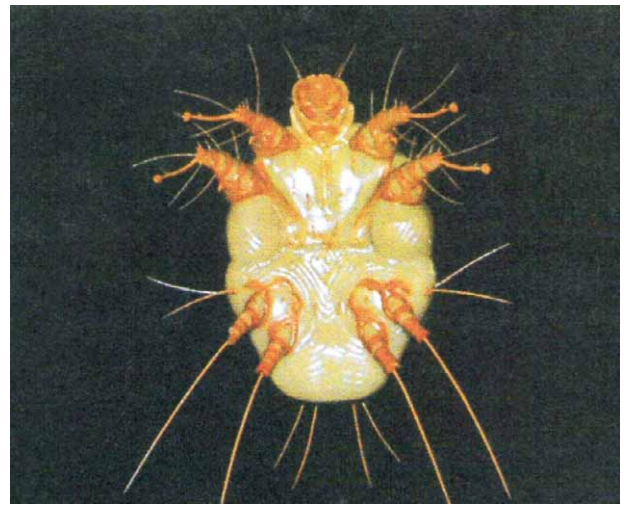


Fig. 8. *Sarcoptes* – a mite. Rupić V. Parasitic diseases. In: Rupić V. ed. Health protection of domestic animals, infectious and parasitic diseases. Zagreb: Croatian Dairy Association; 2009, page 290.

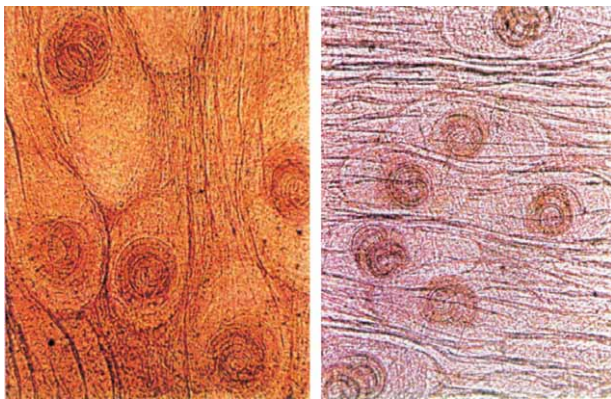


Fig. 9. Encapsulated larvae of *Trichinella* in diaphragm muscle. Rupić V. Parasitic diseases. In: Rupić V. ed. Health protection of domestic animals, infectious and parasitic diseases. Zagreb: Croatian Dairy Association; 2009, page 282.

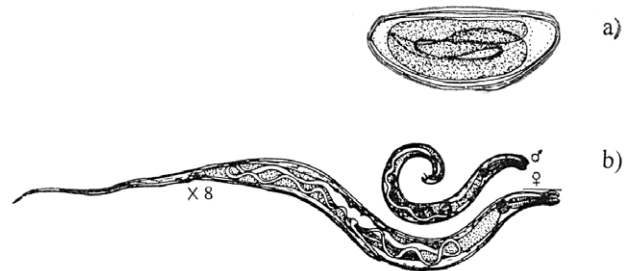


Fig. 10. *Enterobius vermicularis*; a) embryonated egg (x 400), b) adult worm (male and female) (x 8). Jawetz E, Melnick J. L, Adelberg E. A. Addition: Medical parasitology. In: Jawetz E, Melnick J. L, Adelberg E. A, ed. Review of medical microbiology. Zagreb: Školska knjiga; 1980, pages 778, 780.

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Z. Tucak

»J. J. Strossmayer« University, Faculty of Agriculture, Kralja Petra Svačića 1d, 31000 Osijek, Croatia
e-mail: ztukak@pfos.hr

KRETANJE PARAZITSKIH BOLESTI STANOVNIŠTVA OSJEČKO-BARANJSKE ŽUPANIJE U RAZDOBLJU 1996.–2010. GODINE – REPUBLIKA HRVATSKA

SAŽETAK

Naš rad iskazuje invadiranost različite populacije stanovnika (po dobnim skupinama i spolu) endoparazitima i ektoparazitima od 1996.–2010. godine po godišnjim dobima (proljeće, ljeto, jesen i zima). Utvrđivanju bolesti kod 3 667 bolesnika korištene su metode izravne parazitološke dijagnostike za dokaz parazitskih elemenata u kliničkim uzorcima i metode neizravne parazitološke dijagnostike tj. serološke pretrage za dokaz protutijela na parazitske antigene u serumu bolesnika ili asimptomatskih parazitonoša. Razvoj uzročnika bolesti (parazita) u ovisnosti je o kalendarskom razdoblju^{1,2,4,6–11,15,17}. Rezultati istraživanja obrađeni su pomoću statističkog programa Statistica 8.0 (StatSoft.Inc 1984.–2008.). Od statističkih parametara prikazana je aritmetička sredina (\bar{x}), standardna devijacija (s) i standardna pogreška aritmetičke sredine ($s_{\bar{x}}$). Ispitivanje značajnosti razlika između nezavisnih uzoraka obavljeno je pomoću t-testa (ANOVA) i prikazano u tablici pomoću odgovarajućih slova (a,b,c). Utvrđeni parametri ukupne invadiranosti i endoparazitske invadiranosti, te ukupne invadiranosti i ektoparazitske invadiranosti pokazuju statistički značajnu razliku na razini rizika od 0,05. bez obzira na dobnu kategoriju i spol stanovnika Osječko-baranjske županije. Utvrđeni parametri praćenja invadiranosti stanovnika Županije po godišnjim dobima unutar petnaestogodišnjega razdoblja u odnosu na oblik invadiranosti (endoparazitoza i ektoparazitoza), imaju izraženu statistički značajnu razliku na razini rizika od 0,05.