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CONTROL OF PARASITIC CONTAMINATION OF GREEN AREAS IN URBAN ENVIRONMENT - BELGRADE EXPERIENCE

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ABSTRACT

A steady increase in the number of dogs is a serious sanitary-epidemiological problem of urban areas. Those animals permanent contaminated those areas with faeces which present a significant health problem from human. Most frequent parasites are eggs of zoonotic helminthes Toxocara canis, Dipylidium caninum, Ancylostomidae spp., Taenia spp., Toxascaris leonina, Trichuris vulpis i Strongyloиdes stercoralis and protosoa oocysts of Giardia intestinalis, Amoeba spp. and Cryptosporidium spp. Infections are most exposed to children who play there and often unwashed hands placed in the mouth, introducing and parasite eggs in it. Soiled streets are also epidemiological and ecological problem. Stepping over dog feces on their shoes can bring the parasite eggs in the house and from there to infection is only a step. From these reason permanent control of parasitic contamination of public places (green areas, parks) and adequate control is only way of protection of human population in urban environmental condition.

Keywords: *geohelminths, protosoa, urban environment, zoonoses, control*

INTRODUCTION

In urban environment green areas and parks are the main place where children play and present areas for recreation of city people, but also are the places where dog owners running their pets and places we encounter non-owner dogs-usually former pets. During his stay in those places dogs contaminated it by their faeces, and besides its unpleasant appearance and odor, dog feces is a high epidemiological danger because dogs are carriers and hosts of a large number of zoonotic parasites species [1,2,3,4,5,6].

Increasing the number of owner and non-owner (stray) dogs in urban areas this type of pollution is a growing global problem. Commenting on the results of parasitological examination of green areas in in cities around the world, we will see that those polution in Madrid is 9% , London 15-17 % , Michigan 19 % , Kansas 20.6% , Utrecht 23% , Belgrade, Paris and Prague 28 % , Dublin, 32 % , Tokoshima 63 % and etc. [7,8,9,10,11,12].

If it is known that more than 5% of the contaminated urban areas poses a serious threat to people's health is our opinion that this is not to comment [13].

METHOD OF PARASITIC CONTROL CONTAMINATION OF GREEN AREAS

In order to solve the problem of fecal and parasitological contamination of public areas basic starting point is a regular examination were green spaces and dog faces caught on them in order to gain insight into the epidemiological situation and start the rehabilitation and eradication of contaminated places. Also, it is necessary for local governments to define the program of non-proprietary control animals in their environment.

Samples of grass and soil with green areas in our climate condition were collected from march to october. Material for examination was taken on the basis of indicators of bioclimatic conditions prevailing in the same area leading to the method of bioclimatograme by uvarov which the components have temperature and humidity in the average values for the studied area . This is of particular importance in assessing the results with respect to embrionation of geohelminths in soil (become infective), under certain conditions like the of optimum temperature and humidity [14,15].

Materials for examination take into account the aggregate soil sample which number depends on the size of the site and the sand is taken from each of the childern wells with send in these locations . Each sample was packed in a plastic bag to which a label on the outer side where the recording location , the sample number and date of sampling.

Samples of dog's faeces are raised with the same location in the same intervals as samples of soil, grass and sand. Materials for review to take into account the aggregate sample of faeces, each sample is packaged in plastic bags marked in this manner.

The examination is carried using native preparation, with sedimentation method, the flotation method, and the sedimentation - flotation method [16]. Assessment of the infection will be performed by the methodology described by McMaster and Stoll and determination of eggs, oocysts and adults parasites is performed morphometric analysis based on morphological characteristics of the keys given by Euzeby and Soulsby [17,18].

WAY OF SOLVING PROBLEMS – BELGRADE EXPERIENCE TO 2012

In order to solve this environmental problem in Belgrade is approached in several ways - by adopting strategies to solve the problem of non-proprietary dogs in the city of Belgrade, the introduction of eco-zones or parks for dogs, baskets with plastic bags to collect feces of dogs from the streets by the owners and regular control of parasitic green spaces and dog faces caught on them in order to gain insight into the epidemiological situation and start the rehabilitation and eradication of contamination.

In the area of Belgrade is the research carried out continuously since 1993. On the basis of the control of parasitic contamination of land from parks and other green areas between 1993 to 2002 [5,19]. The presence of the locations parasite eggs was found 65.90% of the examined samples. This was followed by the first reactive in terms of cleaning the playgrounds so that in the period 2003-2007 [1,20,21,22,23,24]. The contamination has been established at 45.90% of the area. The following progress has been made by introducing during 2008-2009 in central city districts has taken root system of baskets with plastic bags from dog feces (Dogi-pot system). During 2011 in in some parks are form of eco zones or parks for dogs .On the basis of parasitic control of soil contamination from the parks during the 2012 presence of parasite eggs was found in over 40% less than in the period 2008-2009 [25,26].

A special segment of solving this problem in Belgrade has been the adoption of problem-solving strategies non-owner of dogs and cats in the city of Belgrade, which was adopted at the Belgrade City Assembly held 21.9.2011. The city of Belgrade has become one of the few cities that has a strategy to solve the problem of non-proprietary dogs and it is a document that defines the principles, objectives and measures to solve the problem in terms of non-owner dogs carry out administration of local

government. With this approach, our company ranks among the developed countries, on the basis of scientific approach to solving the problem of abandoned animals about the quality of the strategy is the fact that similar benchmarks in the European Parliament Written Declaration Pursuant to Rule 123 of the Rules of Procedure on dog population management in the European Union No 0026/2011 of 06.10.2011 (taken almost a month after the adoption of our strategy) [27].

In developing this strategy for the City of Belgrade and its implementation was guided by the principle of humanity , combining the method of euthanasia without (no kill strategy) and CNR method "catch - treat - let " (CNR - catch - neuter -release), with special emphasis on the protection of human and animal health, and applying measures of education, control and sanctions against irresponsible owners whose negligence and disregard of positive legal rules and moral principles directly cause an increase in the number of abandoned dogs.

The present results indicate that the implementation of this strategy has been to stabilize the population of stray animals on the streets with a tendency to decrease application CNR system; Application NO KILL (not euthanasia) components CNR system effects growth of the population of dogs within the active implementation of mass sterilization 2010, gave as a result 50 % smaller increase of abandoned dog's full cooperation with them and with all the other organizations that animal welfare goal [28,29].

Unlike the previous years, the non-owner dogs are covered by the Action Plan of the city that has taken root a few years ago and that includes spaying and dehelmintisation before returning to the streets. As a result, today the emphasis is placed on the primary contaminant of ownership by irresponsible dog owners let the public lands without a leash and basket and which are identical risk and non-owner dogs, in addition to fecal contamination of large parks mostly just come from pet dogs. This problem will be solved by the introduction of the communal police and the penal provisions as well as training dog's holders of responsive owned by dogs but the process is time consuming and requires a significant commitment of all segments of society.

CONCLUSION

A steady increase in the number of dogs and non-owner equity, represents a serious environmental problem of urban areas. Both groups of dogs constantly dirty public green areas their feces. In this way it becomes possible human infection of zoonotic agents. In order to properly remediate contaminated areas in Belgrade we implement continuous control of green areas and since 2011 were made Strategies for addressing non-owner of dogs in the City of Belgrade. In addition, they introduced eco-zone (dog park) in the park and formed an environmental police. Implementation of the Strategy has led to the population of homeless animals reduced to an acceptable level, and parasitic contamination of city parks has decreased by more than 40%.

Given that there has been a change in the city we can only hope that it will not terminate the current activities related to the control of green areas and implementation of strategies are be continued.

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REFERENCES

[1] Pavlović, I., Savić, B., Jovičić, D., Jovanović, L., Elezović-Radovanović, M. (2013). Ekološki značaj parazitske kontaminiranosti zelenih površina u gradovima. Beograd. Ecologica XX, 71, 453-456.
[2] Childs, J. E. (1985). The Prevalence of Toxocara species Ova in Backyards and Gardens of Baltimore. Maryland. American Journal of Public Health, 75, 1092-1094.
[3] Mangaval, J.F., Pavlović, I. (2005). Intestinal Parasites (Helminths) Cestoides Order: Cyclophyllidea Dipyllidium caninum In P. Karamel: Atlas of Medical Parasitology, Carlo denegri Fondation & Infectious Disease, Unit A, Tropical and Parasitology Service Amedeo di Savoia Hospital Turin, Italy (CD rom).
[4] Dubinski, P. (1998). Epidemiology of toxocariosis in rural and urban areas. Parasitology International 47, 128.
[5] Pavlović, I., Kulišić, Z., Erski-Biljić, M., Milutinović, M. (1997). Role of dogs of environmental contamination with eggs of Echinococcus granulosus. Archivos Internationales de la Hidatidosis, Vol. XXXII, 278.

[6] Elaine, A. A. C., Regina, L. R. (2011). Toxocariasis: visceral larva migrans in children. Jornal de Pediatria 87 (2), 100-110.
[7] Demirci, M., Kaya, S., Çetin, E.S. Arıdoğan, B.C. Önal, S. Korkmaz, M. (2010). Seroepidemiological Investigation of Toxocariasis in the Isparta Region of Turkey. Iranian Journal of Parasitology, 5,2, 52-59.
[8] Gothe, R., Reichler, I. (1990). Toxocara canis: Nachweishaufigkeit und Befallsextensitet bei Muterhundien und ihre wurfen unterschiedlicher Rassen und Halting in Suddeutchland. Tierrätzlitche Praxis 18, 293-300.
[9] Jansen, J., Van Knapen, F., Schreurs, M., Van Wijngšarden, T. (1993). Toxocara ova in praks and send boxes in the city of Utrecht. Tijdschr Dieregneeskund 11, 4, 118-119.
[10] Pavlović, I., Kulišić, Z., Petković, D., Terzin, V., Ćurčin, Lj., Terzin, D., Ćurčin, K. (2009). Parasites contamination of grasy areas of Belgrade in period 2003 - 2007. Beograd. Abstracts book of International Scientific Conference on Globalization and Environment. 155-156.
[11] Valkunova, J. (1982). Parasitological investigations of childerns sand boxes and dog faeces from public areas in old housing districts of Prague. Folia Parasitologica 29, 25-32.
[12] Pavlović, I., Surlan, N. (2003). Rezultati parazitološkog pregleda zelenih površina opštine Stari grad tokom 2002. godine. Beograd. Zbornik radova Stručnog skupa kontrola štetnih organizama u urbanoj sredini, VI beogradska konferencija sa međunarodnim učešćem. 143-150.
[13] Woodruff, A.W. (1976). Toxocariasis as a public health problem. Environent and Health, 84, 29-31.
[14] Jović, A. (2011). Uticaj ekoloških faktora na prevalencu geohelminata od posebnog biomedicinskog značaja na zelenim površinama grada Beograda-Master rad. Beograd. Fakultet za primenjenu ekologiju Futura.
[15] Pavlović, I., Kulišić, Z., Milutinović, M. (1997). Rezultati parazitološkog ispitivanja peščanih igrališta za decu u užem centru Beograda. Beograd. Veterinarski glasnik 51, 1-2, 61-65.
[16] Pavlović, I., Anđelić-Buzadžić, G. (2011). Šabac. Parazitske bolesti domaćih životinja sa osnovima parazitologije. 94-110, Visoka poljoprivredna škola strukovnih studija u Šapcu.
[17] Soulsby, E.J.L. (1977). Helminth, Arthropods and Protozoa of Domesticated Animals.151-219, Bailler, Tindall and Casstell ed. London.
[18] Euzeby, J. (1981). Diagnostic Experimental des Helminthoses Animales. Paris ITVS. 65-124.
[19] Pavlović, I., Milutinović, M., Radenković, B., Janković, Lj., Vučinić, M., Kulišić Z. (2000). Higijenski aspekt gradskih parkova - rezultati parazitološkog ispitivanja centralnih parkova Beograda. Tara, Srbija. Zbornik radova XI savetovanja dezinfekcija, dezisekcija i deratizacija u zaštiti životne sredine sa međunarodnim učešćem. 233-237.
[20] Pavlović, I., Teodor, B., Stojanović, D. (2003). Rezultati parazitološkog pregleda parkova i bazenčića za pesak u vrtićima Požarevca i Kostolca. Beograd. Zbornik radova Stručnog skupa kontrola štetnih organizama u urbanoj sredini. VI beogradska konferencija sa međunarodnim učešćem. 159-163.
[21] Pavlović, I., Stevanović, S. (2005). Metode parazitološke kontrole kontaminiranosti zelenih površina u urbanim sredinama. Beograd. Knjiga apstrakata konferencije Životna sredina i ljudsko zdravlje sa međunarodnim učešćem. 133-134.
[22] Pavlović, I., Ivanović, S. (2006). Ehinokokoza/hidatidoza, bolest životinja i ljudi. Beograd. Naučni institut za veterinarstvo Srbije i Ministarstvo poljoprivrede, šumarstva i vodoprivrede. 1-32.
[23] Pavlović, I. (2006). Geohelminths – emerging zoonotic disease in urban areas. Neum, Bosna and Herzegovina. Proceedings of the VIII International Symposium in Animal Clinical Pathology And Therapy Clinica Veterinaria. 1-4, CD rom.
[24] Pavlović, I., Kulišić, Z., Momčilović, J., Mišić, Z., Krstić, D. (2007). Basic measure to control and sanation of parasitic contamination of green areas in urban environmental condition. Beograd. Abstracts of International Conference on Environment and Sustainable Development. 78-79.
[25] Pavlović, I., Kulišić, Z., Ljubić, B., Radivojević, S., Terzin, V., Stokić-Nikolić, S., Rajković, M., Anđelić-Buzadžić, G. (2010). Raširenost parazitskih infekcija pasa i kontaminiranost javnih površina - rizik nastanka humanih infekcija. Beograd. Zbornik VII kongres mikrobiologa Srbije. 1-2. CD rom.
[26] Pavlović, I., Terzin, V., Terzin, D., Stanković, B., Petković, D. (2010). Toxocara canis – epidemiološko-zdravstveni značaj. Beograd. Zbornik predavanja Simpozijuma veterinara male prakse SIVEMAP 2010. 246-247.
[27] Annonimus (2011). European Parliament Written Declaration pursuant to Rule 123 of the Rules of Procedure on dog population management in the European Union No 0026/2011.
[28] Pavlović, I., Terzin, V. (2012). The influence of the new strategy to resolve the problem of ownerless dogs and cats in Belgrade on the preservation of environmental conditions. Belgrade. The Book of Abstracts for the International Scientific Conference on Innovative Strategies and Technologies in Environment Protection. 44-46
[29] Terzin, V., Čukić, B., Vukićević-Radić, O., Prokić, B., Radenković-Damnjanović, B., Pavlović, I., Dimitrijević, S., Marković, M., Tufegdžić, N. (2011). Strategija rešavanja problema nevlasničkih pasa i mačaka u urbanim sredinama – primer Beograda. Zlatibor. Srbija. Zbornik refereata i kratkih sadržaja 22. savetovanja veterinara Srbije (sa međunarodnim učešćem). 316-319.