

41:

RUSSIAN JOURNAL OF NEMATOLOGY, 2013, 21 (1), 41 – 49

OBSERVATIONS ON THE NEMATODE FAUNA OF TERRESTRIAL MOLLUSCS OF THE SOFIA AREA (BULGARIA) AND THE CRIMEA PENINSULA (UKRAINE)

ELENA S. IVANOVA, MARIANNA S. PANAYOTOVA-PENCHEVA AND SERGEI E. SPIRIDONOV

Short surveys on the nematode fauna of terrestrial molluscs in Sofia, Bulgaria and Crimea, Ukraine were performed. The composition of nematode fauna was compared with data from the literature and in our records of nematode fauna from different regions of continental Europe and the British Isles. Two nematode species, *Angiostoma dentiferum* Mengert, 1953 and *Agfa tauricus* Korol & Spiridonov, 1991 were found parasitising three and four, respectively, out of a total of 23 host species. The composition of nematode fauna was similar in both surveys, though the dominant nematode species in each region were different, with *A. dentiferum* in Bulgaria and *A. tauricus* in Crimea. Both morphological and molecular methods have demonstrated the complete identity of material from the two regions. The reexamination of our own material of *A. dentiferum* from Belgium has confirmed its similarity to that from Bulgaria and Crimea by molecular characteristics, and slightest morphological differences. Morphologically, *A. dentiferum* from Bulgaria, Crimea and Belgium corresponds well with its original description from Germany (Mengert, 1953). We assume that the re-description of *A. dentiferum* by Morand & Spiridonov, 1989, based on the material from France, is that of a closely related but different species, which is distinguished by presence vs absence of lateral alae and shorter spicules. Although the data on the distribution of parasitic nematodes of terrestrial molluscs in Europe are inconsistent, it seems that *A. tauricus* tends to be present in the south-east of Europe and absent from more northern territories where it is replaced by *A. flexilis* though the host range for both species is similar.

Key words: *Angiostoma dentiferum*, *Agfa tauricus*, morphology, morphometrics, r-DNA, SEM

42:

COMPTE RENDUS DE L'ACADÉMIE BULGARE DES SCIENCES, 67(1), 57-60

MOLECULAR GENETIC DATA OF LUNG WORM *VARESTRONGYLUS SAGITTATUS* (NEMATODA: PROTOSTRONGYLIDAE)

MARIANA PANAYOTOVA-PENCHEVA, ZINA IVANOVA, EVELINA SHIKOVA

Protostrongylids represent a cosmopolitan group of parasites spread under the influence of various geographical and climatic factors, therefore they can serve as a suitable model in evolutionary and biogeographical studies. In the present work some molecular-genetic characteristics of *Varestrongylus sagittatus* of Protostrongylidae family have been determined for the first time. Genomic DNA has been extracted from intact individual male specimen obtained from a red deer

from Bulgaria. Polymerase chain reaction (PCR) has been performed to amplify the second internal transcribed spacer (ITS-2) of the ribosomal DNA of the nematode. The nucleotide sequence of the ITS-2 of *V. sagittatus* has been determined by direct sequencing of the PCR product in both directions using NC1/NC2 primers. The length of the fragment has been estimated to 561 bp.

Key words: Protostrongylidae, *Varestrongylus sagittatus*, PCR, sequencing, ITS-2 of rDNA

43:

ACTA ZOOLOGICA BULGARICA, 67(4), 561-566

OCCURRENCE OF THE NEMATODE *THELAZIA CALLIPAEDA* RAILLIET AND HENRY, 1910 (SPIRURIDA, THELAZIIDAE) IN WILD CARNIVORES IN THE RUSSIAN FAR EAST

IRINA M. ODOEVSKAYA, ALEXANDER V. KHRUSTALEV, VLADIMIR M. SHAITANOV, IVAN V. SERIODKIN, MARIANA S. PANAYOTOVA-PENCHEVA

Occurrence of the nematode *Thelazia callipaeda* Railliet and Henry, 1910 parasitising eyes of wild carnivores in the Russian Far East is studied. The hosts recorded in the course of the study are sable, *Martes zibellina* (492 studied, 28 infected); racoon dog, *Nyctereutes procyonoides* (11 studied, 5 infected); fox, *Vulpes vulpes* (3 studied, 2 infected); Asiatic black bear, *Ursus thibetanus* (1 studied, 1 infected); lynx (*Lynx lynx*) (1 studied, 1 infected). Sable, Asiatic black bear and lynx are new host records. Canids are considered the principal hosts for this parasite species. Morphology of *T. callipaeda* is studied and a short diagnostic description with morphometrics is given based on specimens from sable. Special attention is given to the arrangement of sensory structures of the male posterior end. The typical pattern is seven pairs of precloacal papillae, two pairs of paracloacal papillae and four pairs of postcloacal papillae. However, the papillae number and their position demonstrate substantial variation that prevents the reliable use of this character in the species diagnostic of the genus *Thelazia*.

Key words: parasitic eye infection, *Thelazia callipaeda*, carnivores, sable

44:

**BULGARIAN JOURNAL OF VETERINARY MEDICINE, 2016,
19 (2), 153–162**

***DIROFILARIA IMMITIS* INFECTION IN CARNIVORES FROM BULGARIA: 2012–
2013 UPDATE**

M. S. PANAYOTOVA-PENCHEVA, R. L. MIRCHEV & A. P. TRIFONOVA

Helminthological necropsies of 489 carnivores (325 golden jackals, 115 red foxes, 4 martens, 3 wolves, 27 domestic dogs and 15 cats) from Bulgaria were carried out in 2012–2013 aiming to establish infection with *Dirofilaria immitis* (Nematoda: Onchocercidae). The infection was found in the golden jackals, red foxes and domestic dogs. Adult worms were located in the heart (55.24%) or both in the heart and pulmonary arteries of the hosts (27.97%). Often in the place of localisation of the helminths macroscopic lesions as obturation of pulmonary arteries, thickness and granulation of the inner surface of pulmonary arteries, damaged atrioventricular valves were observed. The prevalence of infection was 37.54%, 25.22% and 33.33% in the golden jackals, red foxes and domestic dogs respectively. The infection intensity in the jackals varied between 1 and 19 specimens per animal (mean 4.1), in the foxes it was between 1 and 15 specimens (mean 4.79) and in the dogs –between 1 and 34 specimens (mean 14.43). Comparison of our data with those from literature showed a trend towards increased spread of infection in Bulgaria and South Europe in recent years. Morphometric description of *D. immitis* in materials from golden jackals, red foxes and domestic dogs was performed too. This is the first report in materials from golden jackals and red foxes.

Key words: Bulgaria, *Dirofilaria immitis*, domestic dogs, golden jackals, morphometric description, prevalence, red foxes

45:

ACTA MORPHOLOGICA ET ANTHROPOLOGICA, 2017, 24 (3-4), 21-29

**MORPHOMETRIC FEATURES OF THREE LUNGWORMS IN MATERIALS FROM
WILD BOARS FROM BULGARIA**

VASSILENA DAKOVA, MARIANA PANAYOTOVA-PENCHEVA

A necropsy of wild boars from some regions of Southwest Bulgaria showed an infection with three lungworm species from family Metastrongylidae - *Metastrongylus pudentotectus*, *M. salmi* and *M. elongatus*. The collected parasites were used for a morphometric description of the species. The results were compared with the existing ones in the literature. It was established that as a whole the morphometric features of the species correspond to such described by other authors in materials from Bulgaria and abroad.

Key words: *Metastrongylus elongates*, *Metastrongylus pudentotectus*, *Metastrongylus salmi*, wild boars, morphometric description

46:

[ACTA MORPHOLOGICA ET ANTHROPOLOGICA, 2017, 24 \(3-4\), 30-39](#)

MORPHOMETRIC FEATURES OF *OESOPHAGOSTOMUM DENTATUM*, *O. QUADRISPINULATUM* AND *ASCAROPS STRONGYLINA* IN MATERIALS FROM WILD BOARS FROM BULGARIA

VASSILENA DAKOVA, MARIANA PANAYOTOVA-PENCHEVA

A necropsy of wild boars from three regions of Southwest Bulgaria showed an infection with two oesophagostomid species (*Oesophagostomum dentatum* and *O. quadrispinulatum*) and one gastric spirurid (*Ascarops strongylina*). The collected parasites were used for a morphometric description of the species. The results were compared with the existing ones in the literature. It was established that the morphological features of the species from wild boars were the same as those from domestic pigs given by other authors. Diversity in the metric data was observed. However, metric features specific for the species were within the limits given by other authors.

Key words: *Oesophagostomum dentatum*, *Oesophagostomum quadrispinulatum*, *Ascarops strongylina*, wild boars, morphometric description

47:

[PARASITOLOGY RESEARCH, 2018, 117: 3391–3397](#)

FIRST REPORT ON *PROTOSTRONGYLUS CUNICULORUM* (NEMATODA: PROTOSTRONGYLIDAE) IN THE EUROPEAN BROWN HARE (*LEPUS EUROPAEUS PALLAS, 1778 L.*) FROM BULGARIA

MARIANA PANAYOTOVA-PENCHEVA, VASSILENA DAKOVA & ANETKA TRIFONOVA

A nematode species from the Protostrongylidae family, unknown in the parasite fauna of Bulgaria until now, was found in the bronchi of a European brown hare (*Lepus europaeus* Pallas, 1778 L.) from a southwestern region of the country. At first the systematic identification of the found specimens was attributed to two possibilities—*Protostrongylus terminalis* Passerini (1884) Schulz, Orlov & Kutass, 1933 and *Protostrongylus cuniculorum* (Joyeux & Gaud, 1946) Schulz & Kadenazii, 1949. The autonomy of these two species was discussed based on data available in the literature. Morphological and morphometric data about the male and female specimens are provided in the present materials. After comparing these data with the ones available in the

literature, the helminths were related to the species *P. cuniculorum*. *P. cuniculorum* is reported for the first time as part of the helminth fauna of the European brown hare from Southeastern Europe and Bulgaria in particular.

Key words: European brown hare, *Lepus europaeus* L, *Protostrongylus cuniculorum*, *Protostrongylus terminalis*, Morphometric features

48:

**BULGARIAN JOURNAL OF VETERINARY MEDICINE, 2019,
22 (4), 478-486**

EPIDEMIOLOGY OF LUNG PARASITES OF EUROPEAN BROWN HARE (*LEPUS EUROPEUS* L.) FROM BULGARIA

M. S. PANAYOTOVA-PENCHEVA, A. P. TRIFONOVA, V. I. DAKOVA & CH. ZHELEV

During the period 2009–2016, seven hundred and ninety lungs from brown hares (*Lepus europeus* L.) from different regions of Bulgaria were investigated for presence of parasites. The results showed that 11.14% of the lungs were parasitised. Four parasite species were established: two nematodes – *Protostrongylus tauricus* and *P. cuniculorum* (recorded for the first time as a part of the helminth fauna of the country), one cestod – larval form of *Taenia pisiformis* – *Cysticercus pisiformis* and one arthropod – larval form of *Linguatula serrata* – *Pentastomum denticulatum*. The infected hares came mainly of the south parts of the country. The highest prevalence of infection was observed in the South West region, followed by the South Central and South East regions. From the northern parts of the country parasites were established only in the northeastern districts near to Black Sea and Danube River. The ratio of prevalence of infection in female vs male animals was 1.4:1. Infections with protostrongylids and cysticerci were established at the earliest in hares at the age of 4–6 months and with *P. denticulatum*: in hares between 7 and 9 months. The prevalence of infection varied in animals from the different age groups. The highest prevalence of infection was observed in the young (4–6 months) and adult hares (over 3 years of age).

Key words: Bulgaria, *Cysticercus pisiformis*, *Lepus europeus*, lung parasites, *Protostrongylus tauricus*, *P. cuniculorum*, *Pentastomum denticulatum*

**PATHOMORPHOLOGICAL STUDIES ON WILD BOARS INFECTED WITH
METASTRONGYLUS SPP., *ASCAROPS STRONGYLINA*, AND
*MACRACANTHORHYNCHUS HIRUDINACEUS***

MARIANA PANAYOTOVA-PENCHEVA, KATERINA TODOROVA, VASSILENA
DAKOVA

Introduction: Pathomorphological changes in the lungs, stomach, and small intestines of wild boars infected with *Metastrongylus* spp., *Ascarops strongylina*, and *Macracanthorhynchus hirudinaceus* were investigated. Material and Methods: Dissection of 11 wild boars was performed, and parasitised organs were histologically investigated by common techniques. Results: Macroscopic lesions in the lungs infected with *Metastrongylus* spp. were seen within the apical parts of the large lobes, irregular in form, pale greyish in colour, and compact in consistency. The main pathohistological findings were: the presence of parasite forms, and lymphocytes and neutrophils in the lumen of bronchi and bronchioles, desquamation of the bronchial and bronchiolar epithelium, emphysema, thickening of alveolar septa, hyperaemia, alveolitis, infiltration of the interstitial tissue with giant cell, monocytes and eosinophils, and peribronchial and disseminated lymphoid hyperplasia. The principal observations accompanying infection with *A. strongylina* were inflammation and focal mucosal damage in the stomach, the latter clearly demarcated from the surrounding tissues. Severe injuries in the place of attachment of *M. hirudinaceus* to the wall of the small intestine were seen. Intestinal villi, underlying mucosa, and submucosa were destroyed, and an intense inflammatory reaction was present. Conclusion: The histopathological lesions showed wide diversity, varying from mild to severe; but none of them were lethal.

Key words: wild boar, *Metastrongylus* spp., *Ascarops strongylina*, *Macracanthorhynchus hirudinaceus*, histopathological lesions.

DIROFILARIA IMMITIS IN BULGARIA: THE FIRST GENETIC BASELINE DATA AND AN OVERVIEW OF THE CURRENT STATUS

M. PANAYOTOVA-PENCHEVA, V. ŠNÁBEL, V. DAKOVA, V. ČABANOVÁ, S. CAVALLERO, A. TRIFONOVA, R. MIRCHEV, Z. HURNÍKOVÁ, Z. VASILKOVÁ, M. MITERPÁKOVÁ

Dirofilaria immitis, the agent of canine dirofilariosis, is a common parasite of domestic and wild carnivores with zoonotic potential and worldwide distribution, being endemic in many countries. Bulgaria is among European countries recognized as endemic for this heartworm parasite. In the present study, *D. immitis* adults recovered from pulmonary arteries of domestic dog and golden jackal originating from the Pazardzhik region in southern Bulgaria, and from red fox originating from the Plovdiv region in central-southern Bulgaria, were genetically analyzed in nuclear targets. The first PCR amplification of the internal transcribed region 2 (ITS2) of the ribosomal DNA with previously published *D. immitis*-specific primers yielded single fragments in size of 302 bp that is characteristic for these heartworms. PCR products of three isolates, resulted from the second amplification of the 5.8S-ITS2 region (235 bp) with pan-filarioid primers, were subjected to direct DNA sequencing. Identical nucleotide composition was detected across the screened target region for these Bulgarian isolates. When the 5.8S-ITS2 sequences were phylogenetically compared to the GenBank-retrieved *D. immitis* sequences in a worldwide context, the neighbor-joining analysis has shown three discrete clades. The first clade was composed of *D. immitis* isolates from Europe (including the studied Bulgarian samples), Asia and South America, in the second clade samples from Asia and South America were placed, whereas the third clade was formed by two Brazilian dog isolates originated from the north and southeast part of the country. The purpose of the present study was to verify the taxonomic characterization of *D. immitis* nematodes from Bulgaria based on morphology and compare their genetic structure with filariae obtained from the different world regions using molecular assays. It also summarizes previous epidemiological and ecological studies on the parasite distribution and prevalences in different hosts and regions undertaken so far in Bulgaria.

Key words: *Dirofilaria immitis*; Genetic; Clade; Golden jackal; Red fox; Dog

51:

BULGARIAN JOURNAL OF VETERINARY MEDICINE, 2021, 24, NO 4, 608-613

TICKS AND ASSOCIATED TICK-BORNE PATHOGENS FROM DOGS AND RED FOXES FROM BULGARIA

M. S. PANAYOTOVA-PENCHEVA, B. VICHOVA, V. I. DAKOVA & D. S. SALKOVA

Climate changes in recent years led to a sharp rise in the tick population and an increase in the number of animals and people with tick-borne infections. The domestic and wild carnivores, especially the dogs, have a huge role for the distribution of ticks in certain areas. In this study 60 ixodid ticks collected from domestic dogs and red foxes from Bulgaria have been investigated for infection with *Ehrlichia canis*, *Hepatozoon canis*, *Babesia* spp., and *Rickettsia* spp. The results showed that the dogs were infected with two tick species - *Rhipicephalus sanguineus* (72%) and *Ixodes ricinus* (28%). The red foxes were infected with only one species - *I. ricinus*. Out of all *R. sanguineus* ticks, 43.6% were female and 56.4% male. The opposite was observed for *I. ricinus* - female specimens (86.7%) were significantly more prevalent than males (13.3%). Similar trend was found out for *I. ricinus* collected from red foxes - 66.7% of the ticks were female and 33.3% male. Infectious agents were found in 31.7% of the investigated ticks. *Ehrlichia* spp. was established in 79% and *Rickettsia* spp. in 21% of the infected ticks. *Ehrlichia* spp. was found only in ticks collected from dogs. The majority of the ticks infected with *Ehrlichia* spp. were *Rh. sanguineus* (93.3%) and only one tick was *I. ricinus* (6.7%). Four ticks were positive for *Rickettsia* spp., two were *Rh. sanguineus* and two - *I. ricinus*, one of the latter was found on a fox. This is the first report about detection of *Ehrlichia* spp. in *Rh. sanguineus* ticks from Bulgaria as well as *Rickettsia* spp. in *I. ricinus* ticks collected from red foxes from this country.

Key words: Bulgaria, dog, *Ehrlichia canis*, *Ixodes ricinus*, red fox, *Rhipicephalus sanguineus*, *Rickettsia* spp.

52:

**COMPTE RENDUS DE L'ACADÉMIE BULGARE DES SCIENCES,
2014, 67, NO 1, 49-56**

**ECOLOGICAL AND BIOLOGICAL PECULIARITIES AND ADAPTATION
PROPERTIES OF EUROPEAN ISOLATE OF *TRICHINELLA NATIVA***

IRINA ODOEVSKAYA, VIKTOR ASEEV, SERGEY MOVSESYAN, MICHAIL VORONIN,
MARIANA PANAYOTOVA-PENCHEVA, SVETLOZARA PETKOVA, VALERIA
DILCHEVA, ALEKSANDER DEMIASZKIEWICZ

Biological properties of *Trichinella* obtained from muscles of common fox from Central Region of Russia have been studied. Results of passages of specimen from this isolate through laboratory rats and mice are given. A variability of morphometric indices depending on change of trichinellae environment is shown. It is proven that the form and size of trichinellae capsules depend on the

parasite's strain and species of host in the muscles of which these helminths lie. Molecular genetic identification, morphological data and biological properties of trichinellae from fox muscles support their identity as *Trichinella nativa*.

Key words: *Trichinella nativa*, *Vulpes vulpes*, natural isolates, reproduction potential, adaptation to host, form index of capsules, resistance to freezing

53:

**COMPTE RENDUS DE L'ACADEMIE BULGARE DES SCIENCES,
2015, 68, NO 8, 1015-1020**

**HOST ORGANISM IMMUNOBIOLOGICAL REACTIVITY IN CONDITIONS OF
EXPERIMENTAL TRICHINELLOSIS OF WHITE RATS**

ROSA PETROSYAN, SERGEY MOVSESYAN, MANIA NIKOGOSYAN, IRINA
ODOYEVSKAYA, MARIANA PANAYOTOVA-PENCHEVA, MIKHAIL VORONIN,
NADEZHDA TERENINA

Changes in plasmocyte reaction and mitotic activity in spleen in conditions of experimental trichinellosis of white rats were studied. A degree of immunobiological transformation of spleen cells directly depended on stage of *T. spiralis* development. Stimulating effect of trichinellae was observed at early intestinal and early muscular stages of the parasite's development, and at these stages high level has been noted for blastocytes, mitoses and plasm cells. *Trichinella* larvae at migration stage correlated with decrease in proliferation level and numbers of cells of plasm type meaning a suppression of immune reaction of the host.

Key words: *Trichinella spiralis*, trichinellosis, rats, spleen, marrow, plasmocytes, mitotic activity

54:

ACTA MORPHOLOGICA ET ANTHROPOLOGICA, 2019, 26 (3-4), 145-152

**CARNIVORES AND IXODID TICKS AS IMPORTANT FACTORS IN THE
EMERGENCE, CIRCULATION AND DISTRIBUTION OF DANGEROUS
INFECTIONS**

DELKA SALKOVA, MARIANA PANAYOTOVA-PENCHEVA, VASSILENA DAKOVA,
ZUZANA HURNIKOVA, MARTINA MITERPAKOVA, BRONISLAVA VÍCHOVÁ, VIK-
TÓRIA ČABANOVÁ

Climate changes in the recent years led to a sharp rise in the tick population and an increase in the number of animals and people with tick-borne infections. The domestic and wild carnivores, especially the dogs, have a huge role for the distribution of ticks in certain areas. It is necessary to

carry out a complex fight against the ticks and diseases transmitted by them, which includes systematic control of the tick population in a given area, as well as in-depth studies on their contamination with particular pathogens, especially those causing zoonoses. This work presents a short review on the recent research on the role of carnivores and ticks in the emergence, circulation and distribution of some dangerous viral, bacterial and parasitic infections.

Key words: carnivores, ixodid ticks, vector-borne diseases

55:

ZOOLOGICHESKII JURNAL, 2020, 99, 8, 866–876

**TAXONOMIC CLASSIFICATION OF THE CESTODE ORDER
CYCLOPHYLLIDEA VAN BENEDEEN IN BRAUN 1900**

S. MOVSESYAN, M. PANAYOTOVA-PENCHEVA, N. TERENINA, M. NYKOGOSYAN,
M. VORONIN

A modern taxonomic structure of the cestode order Cyclophyllidea has been developed, with 7 suborders, 25 families and 27 subfamilies being considered as valid. Corrections to the taxonomic rank and authorship of some families have been made. An analysis of literature data concerning modern molecular genetic studies on the taxonomy has been performed. The positions and validity of such groups as Tetrabothridea and Mesocestoididae are discussed. The most characteristic morphological traits of each suborder of the helminthes included in this order are given: Acoleata Skrjabin 1940, Anoplocephalata Skrjabin 1933, Davaineata Skrjabin 1940, Hymenolepidata Skrjabin 1940, Mesocestoidata Skrjabin 1940, Taeniata Skrjabin et Schulz 1937, Nematotaeniata Spassky 1958.

Key words: Cyclophyllidea, morphology, taxon, classification

56:

ACTA MORPHOLOGICA ET ANTHROPOLOGICA, 2020, 27, 3-4

**FIRST REPORT OF FELINE THELAZIOSIS IN BULGARIA AND MORPHOMETRIC
DATA OF *THELAZIA CALLIPAEDA* RAILLIET ET HENRY, 1910 IN PRESENT
MATERIALS**

VASSILENA DAKOVA, MARIANA PANAYOTOVA-PENCHEVA

Thelazioses are ocular parasitic diseases in a number of mammals, including humans. The genus *Thelazia* includes 14 species, among which is *Thelazia callipaeda* Railliet et Henry, 1910, which is known to parasitize in domestic dogs, raccoon dogs, domestic cats, red foxes, European rabbits, monkeys, and humans. In 2019 one domestic cat from Sofia region, Bulgaria, was referred to

veterinary practitioner with symptoms of conjunctivitis. Thirty-five nematodes of *T. callipaeda* species were collected from both eyes of the cat. They were examined by light microscopy, and the most important morphometric features of the species were described. The obtained results were compared with existing ones in the literature. This is the first reported case of thelaziosis in a domestic cat from Bulgaria.

Key words: eyeworm; domestic cat; *Thelazia callipaeda*; morphometric data; Bulgaria

57:

ACTA ZOOL. BULG., 2021, 73 (1), 113-118

NEW DATA ON HELMINTH PARASITES OF THE STONE MARTEN *MARTES FOINA* (ERXLEBEN, 1777) (CARNIVORA: MUSTELIDAE) IN BULGARIA

MARIANA PANAYOTOVA-PENCHEVA & VASSILENA DAKOVA

The aim of the present study was to update information about the species composition of helminth parasites from the stone marten *Martes foina* in Bulgaria. Seven stone martens were necropsied and the parasites found in them were identified. In total, eight taxa of parasitic worms were identified. These were two cestode species, *Mesocestoides* sp. and *Taenia* sp., and six nematode species: *Crenosoma petrowi* Morosov, 1939, *Filaroides martis* (Werner, 1782), *Sobolevingylus petrowi* Romanov, 1952, *Eucoleus aerophilus* (Creplin, 1839), *Pearsonema plica* (Rudolphi, 1819), and *Spirocerca melesi* Tazieva, 1971. Morphometric data on *Spirocerca melesi* and *Pearsonema plica* based on the present materials are provided. The registration of *S. melesi* is a new record for Bulgaria and South-eastern Europe as well as the registration of this parasite in the stone marten is a new host record.

Key words: *Spirocerca melesi*, *Pearsonema plica*, morphometric description

58:

ANNALS OF PARASITOLOGY, 2021, 67(4), 575–581

BIODIVERSITY OF LUNG HELMINTHS IN TERRESTRIAL MAMMALS FROM EASTERN EUROPE

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NADEZHDA B. TERENCEVA, MARIANA S. PANAYOTOVA-PENCHEVA,
ALEKSANDER W. DEMIASZKIEWICZ, MIKHAIL V. VORONIN,
DMITRY N. KUZNETZOV

This review provides the results of many years of original studies of the authors published in different journals and compilations taking into account an analysis of literature data. The studies on biological diversity of lung helminths of terrestrial mammals were performed by the authors in Armenia, Bulgaria and Poland. Literature data on European Russia were also taken into account. Sixteen animal species from the families Cervidae (six species), Bovidae (nine species) and Leporidae (one species) were investigated. In these animal taxons 27 helminth species from the families Dictyocaulidae (five species), Protostrongylidae (20 species), and Taeniidae (two species) have been found. Lung nematodes *Muellerius capillaris* and *Protostrongylus hobmaieri*, as well as zoonotic parasite *E. granulosus* were found to be common for all the countries studied. Also, relatively many species appeared common between several studied regions. Taking into account morphology, ecology and life cycles, we support a validity of genera *Echinococcus* and *Alveococcus* in the structure of the subfamily Echinococinae of family Taeniidae.

Key words: lung helminths, terrestrial mammals, Armenia, European Russia, Bulgaria, Poland

59:

ACTA MORPHOLOGICA ET ANTHROPOLOGICA, 2022, 29, 1-2

BIODIVERSITY OF ENDOPARASITES IN DOMESTIC CATS AND DOGS FROM THE SOFIA CITY, BULGARIA

MARIANA S. PANAYOTOVA-PENCHEVA

During the period 2019-2021 fecal samples of domestic cats and dogs from the regions of Sofia, Bulgaria, were investigated by the ovsocopical methods of Fulleborn, serial sedimentations and modified technique of Bearman. Most of the registered parasites were nematodes (22% in cats; 23.8% in dogs), followed by protozoa (8% in cats; 9.5% in dogs), and cestodes (4% in cats; 4.8% in dogs). Parasites were found in 30% of the 50 fecal samples obtained from cats: *Aelurostrongylus abstrusus* (10%), *Capillaria aerophila* (2%), *Toxocara cati* (16%), *Dipylidium caninum* (4%), *Cystoisospora* sp. (8%). Parasites were found in 38% of the 21 samples from dogs: *Toxascaris leonina* (9.5%), *Trichuris vulpis* (9.5%), *Uncinaria stenocephala* (14.3%), *D. caninum* (4.8%), *Cystoisospora* sp. (9.5%). Morphometric features of eggs and larvae of the established parasites were described in present materials. Some of data concerning *A. abstrusus* were supplied for the first time in materials from Bulgaria.

Key words: *Aelurostrongylus abstrusus*, *Capillaria aerophila*, *Toxascaris leonina*, *Toxocara cati*, *Trichuris vulpis*, *Uncinaria stenocephala*, *Dipylidium caninum*, *Cystoisospora* sp.

60:

MEDICINSKAYA PARASITOLOGIA I PARASITARNIE BOLEZNI, 2, 38-44

**CHANGES IN PLASMA CELLS OF WHITE RATS UNDER EXPERIMENTAL
INFECTION WITH TRICHINELLOSIS**

S.O. MOVSESYAN, R.A. PETROSYAN, M.A. NIKOGHOSYAN, M.V. VARDANYAN, M.S.
PANAYOTOVA-PENCHEVA, A.W. DEMIASZKIEWICZ, N.B. TERENINA, M.V.
VORONIN, T.A. MALYUTINA

For experimentally infected rats with *Trichinella spiralis* (Owen, 1835) Railliet, 1895, spleen and bone marrow are shown to play an important role in the host immune responses. We have studied a role of plasma cells in formation of protective responses for experimental *Trichinella* infection of white rats. It's been established that a degree of immunological transformation directly depended on a stage of *Trichinella spiralis* in the host. A stimulating effect of *Trichinella* has been shown at early intestinal and early muscular stages of the parasite's development. In these periods, high levels of blast cells with mitoses and high number of plasma cells were noticed. A suppressive effect of *Trichinella* at migration stage was accompanied by decrease of proliferation level and numbers of plasma cells, leading to suppression of the host immune response. Also, a sinusoid-like flow of plasmacytic reaction and mitotic activity of spleen cells had been noted. During studies of morphological composition of peripheral blood increase in eosinophils' numbers was noted. This fact may be explained by the migration of *Trichinella* larvae, which may cause defensive reactions in the host (eosinophils are excreted into blood).

Key words: *Trichinella spiralis*, white rats, bone marrow, tear, defense reactions of the organism

61:

IZVESTIA RAN. SERIA BIOLOGICHESKAYA, 2023, № 5, 507–519

**LIFE CYCLES OF LUNG HELMINTHS IN TERRESTRIAL MAMMALS FROM
EASTERN EUROPE AND THEIR BIOLOGICAL CLASSIFICATION**

S. O. MOVSESYAN, M. A. NIKOGHOSIAN, R. A. PETROSIAN, N. B. TERENINA, M. S.
PANAYOTOVA-PENCHEVA, A. W. DEMIASZKIEWICZ, M. V. VORONIN, D. N.
KUZNETSOV, AND M. V. VARDANYAN

This article has been prepared based on the results of many years of the authors' studies in the framework of scientific cooperation between Academies of Science of Russia, Armenia, Bulgaria and Poland. It is a continuation of one published in *Annals of Parasitology: Biodiversity of Lung Helminths in Terrestrial Mammals from Eastern Europe* (2021). To determine the biological diversity of lung helminths various vertebrate hosts were studied, including 7 species from Armenia, 13 from Russia, 7 from Bulgaria and 10 from Poland, as well as many invertebrate

potential hosts, mainly land mollusks. Three types of development cycles were found to be characteristic for lung helminths: 1 – Nematodes from family Dictyocaulidae developing in a direct way without using intermediate hosts, geohelminths or monoxenous type of development. 2 – Those nematodes life cycles of which include intermediate hosts which are mainly land mollusks. These are species from family Protostrongylidae – biohelminths, dixenous type. 3 – Life cycles also include intermediate hosts, but here they are vertebrate. This type includes cestodes *Echinococcus granulosus* and *Alveococcus multilocularis* – biohelminths, dixenous type.

62:

VETERINARY PARASITOLOGY, 321 (2023): 109984

QUESTION OF AGENT OF CAMEL BALANTIDIOSIS SOLVED: MOLECULAR IDENTITY, TAXONOMIC SOLUTION AND EPIDEMIOLOGICAL CONSIDERATIONS

LORENA ESTEBAN-S'ANCHEZ, MARIANA PANAYOTOVA-PENCHEVA, MONEEB QABLAN, DAVID MODRÝ, LADA HOFMANNOVA, FRANCISCO PONCE-GORDO

Domestic camels (*Camelus bactrianus*, the Bactrian camel; and *Camelus dromedarius*, the dromedary) are pseudo-ruminant herbivores kept as livestock in rural, inhospitable regions (cold deserts and dry steppes of Asia, arid to semi-arid regions of Africa, western and central Asia). Their close contact with humans makes them a potential reservoir for zoonotic parasite infections, as has been suggested for human balantidiasis. However, there is confusion about the ciliate species that infects camels: *Infundibulorium cameli* was originally described in dromedaries, but this name has almost never been used and most authors identified their findings as *Balantiooides coli* and, to a lesser extent, *Buxtonella sulcata*, a cattle ciliate. To clarify the taxonomic status of the parasite and the corresponding zoonotic significance for camels, we performed morphological characterization of cysts and genetic analysis (SSU-rDNA and ITS markers) of *B. coli*-like isolates from Bactrian camels from Bulgaria and from dromedaries from Spain and the United Arab Emirates. Our results indicate that the camel ciliate is not *B. coli*, nor is it *B. sulcata*, but is a different species that should be placed in the same genus as the latter. Thus, camels are not a reservoir for human balantidiasis. Although the correct genus name would be *Infundibulorium* according to the principle of priority, this would lead to confusion since this name has almost fallen into disuse since its initial description, but *Buxtonella* is almost universally used by researchers and veterinarians for the cattle ciliate. We therefore propose to apply the reversal of precedence and use *Buxtonella* as the valid genus name. Consequently, we propose *Buxtonella cameli* n.comb. as the name for the camel ciliate.

Keywords: Domesticated camels, *Infundibulorium*, *Buxtonella*, *Balantiooides*, Taxonomy, Zoonotic importance

63:

**INTERNATIONAL JOURNAL FOR PARASITOLOGY: PARASITES AND WILDLIFE
22 (2023) 199–204**

***PROTOSTRONGYLUS CAPRAE* ZDZITOWIECKI ET BOEV, 1971 (NEMATODA:
PROTOSTRONGYLIDAE) – FIRST RECORD IN ALPINE IBEX (*CAPRA IBEX*
LINNAEUS, 1758) FROM EUROPE**

MARIANA PANAYOTOVA-PENCHEVA, MARTIN VISSER, STEFFEN REHBEIN

In the course of a survey of the endoparasites of Alpine ibex (*Capra ibex*) from Austria, examination of the lungs revealed male *Protostrongylus* nematodes presenting morphological characters which differed from those of the three *Protostrongylus* species previously reported from this host. Fragments of 16 adult male and 4 adult female nematodes extracted from the lung tissue of two female ibex following peptic digestion were subjected to close microscopic examination. Based on their morphology, the lungworms were identified as *Protostrongylus caprae* Zdzitowiecki et Boev, 1971. This species was originally described from Siberian ibex (*Capra sibirica*) in Asia and previously only reported from this host from Kazakhstan and Mongolia. The identification of *P. caprae* in Alpine ibex represents a new host and geographical record and reinforces the interest to further study the parasite diversity of wild ungulates for a better understanding of complex host-parasite associations and biogeography.

Keywords: *Protostrongylus caprae*, Protostrongylidae, *Alpine ibex*, Europe

64:

**TRADITION AND MODERNITY IN VETERINARY MEDICINE, 2024, VOL. 9, NO
1(16): 94–105**

**HONEY BEE DISEASES AND THEIR CONTROL IN BULGARIA AND ESTONIA: A
REVIEW**

DELKA SALKOVA, MARIANA PANAYOTOVA-PENCHEVA, SIGMAR NAUDI

The Western honey bee (*Apis mellifera*) is a species of crucial economic, agricultural and environmental importance. Honey bee colonies suffer from numerous pathogens. These include various bacteria, viruses, fungi and parasites. The aim of the present work is to review and compare information on the most important bee diseases and their control in Bulgaria and Estonia. Based on the data about honeybee diseases from available research and those supplied by the National Reference Laboratories of Bulgaria and Estonia it could be said that in both countries the main problem for beekeeping are the diseases varroosis, noseosis, American foulbrood, and European foulbrood. Estonia seems to be one of the few countries in the world where *N. apis* (43%) is still

individually prevalent, while in Bulgaria nosemosis caused by *N. ceranae* (98%) predominates. Principles of prevention and treatment of bee diseases are similar in both countries and comply with European recommendations.

Key words: *Apis mellifera*, bee diseases, Bulgaria, Estonia, control

65:

JOURNAL OF VETERINARY RESEARCH, 2024, 68

MORPHOLOGICAL AND MOLECULAR CHARACTERISATION OF THE NEMATODE PARASITE *GRAPHIDIOIDES AFFINIS* (SECERNENTEA: TRICHOSTRONGYLIDAE) IN PATAGONIAN MARAS, *DOLICHOTIS PATAGONUM*, KEPT IN A ZOO IN SOFIA, BULGARIA

MARIANA PANAYOTOVA-PENCHEVA, ZDZISŁAW LASKOWSKI, ANNA MARIA PYZIEL

Introduction: Patagonian maras, rodents endemic to South America, are classified as a near-threatened species. Various factors affect their health including parasitic diseases. The aim of this study was to perform morphometric, molecular and phylogenetic characterisation of one such parasitic disease agent, the nematode *Graphidioides affinis*, specimens of which were found in captive Patagonian maras. Material and Methods: In March 2023, 18 Patagonian maras kept at the Sofia Zoo in Bulgaria were investigated with the use of coprological methods. Following the investigation, the animals were dewormed with the use of albendazole. Dead adult nematodes found in the faeces of dewormed maras were collected and preserved in 70% ethanol, and morphometrically, molecularly and phylogenetically analysed. Results: The morphometric analyses confirmed the nematodes to be *Graphidioides affinis*. The partial nucleotide sequences of the small subunit ribosomal rDNA (*SSU*), the internal transcribe spacer 2 (*ITS2*) and the large subunit ribosomal DNA (*LSU*) of *G. affinis* were obtained. These are the first available nucleotide sequences of this parasite. The phylogenetic analyses of the species showed its distinctiveness in comparison to other gastrointestinal nematodes, as it was grouped separately. Conclusion: The Patagonian maras kept in a European zoo retained their original parasitofauna which are related to South America.

Keywords: *Dolichotis patagonum*, *Graphidioides affinis*, morphometry, molecular data, phylogenetic analysis

66:

**INTERNATIONAL SCIENTIFIC CONFERENCE: "TRADITION AND MODERNITY
IN VETERINARY MEDICINE – 20 YEARS FACULTY OF VETERINARY MEDICINE
AT THE UNIVERSITY OF FORESTRY", 2014, 307-313**

**SCREENING STUDY FOR MICROFILAREMIA IN CANIDS
FROM DIFFERENT REGIONS OF BULGARIA**

MARIANA PANAYOTOVA-PENCHEVA, ANETKA TRIFONOVA, ROSSEN MIRCHEV,
DELKA SALKOVA

Screening study for microfilaremia in canids from different regions of Bulgaria was performed. Three filariid species were found in the dogs, golden jackals and red foxes – *Dirofilaria immitis*, *D. repens* and *Acanthocheilonema reconditum*. In the most cases of the dogs with microfilaremia *D. repens* was found with the infection extensity (IE) 4.9 %, followed by *D. immitis* (4.2 % IE) and *A. reconditum* (3.5 % IE). In the golden jackals were established *D. immitis* (16.3 % IE) and *A. reconditum* (4 % IE). The most ranged species in the red foxes was also *D. immitis* (25% IE), in the less cases was established *A. reconditum* (15 % IE) and in the least – *D. repens* (5 % IE). Microfilariae by the three above mention species were found in the dogs from Veliko Tarnovo region and *D. repens* and *A. reconditum* were predominated. Only *D. immitis* was established in the gods originated from the South regions of the country (Plovdiv, Pazardjik and Smolyan). Microfilariae of *D. immitis* were found also in the golden jackals and red foxes from the regions of Plovdiv, Pazardjik and Burgas.

Key words: *Dirofilaria immitis*; *Dirofilaria repens*; *Acanthocheilonema reconditum*; *Canis familiaris*; *Canis aureus*; *Vulpes vulpes*

67:

**INTERNATIONAL SCIENTIFIC CONFERENCE: "TRADITION AND MODERNITY
IN VETERINARY MEDICINE – 20 YEARS FACULTY OF VETERINARY MEDICINE
AT THE UNIVERSITY OF FORESTRY", 2014, 301-306**

USE OF HOMEOPATHIC REMEDIES IN PARASITOLOGY

DELKA SALKOVA, MARIANA PANAYOTOVA-PENCHEVA, SERGEY MOVSESYAN

The trend in modern treatment of parasitic diseases in animals is aimed at finding new, environmentally friendly means, minimizing the risk of accumulation of harmful substances in the body of the treated animals and later in that of the consumer - humans, as well as avoiding the growing resistance to the antiparasitic agents used. Although homeopathy has been used for more than 200 years in human medicine, studies on the effect of homeopathic treatment in animals and in particular in parasitic diseases are few. This work presents literature data on experiments carried out in this regard.

Keywords: homeopathy, animals, parasitic diseases

68:

RUSSIAN JOURNAL OF PARASITOLOGY, 1, 93-103

ALTERNATIVE METHODS FOR CONTROL OF PARASITIC DISEASES IN ANIMALS

D. SALKOVA, M. PANAYOTOVA–PENICHEVA

Traditional methods of control of parasitic diseases in animals with large dosages of chemotherapeutic drugs (anthelmintics) are losing popularity due to helminths developing resistance to them, while public becomes more sensitive to chemical residues in animal products. Recent studies show, however, that many helminth-caused diseases can be effectively controlled through use of less conventional methods such as plant extracts, natural enemies of helminths and other ecological features.

Keywords: biological control, helminthosis, plant extracts, natural enemies of helminths.

69:

RUSSIAN JOURNAL OF PARASITOLOGY, 2014, 1, 14-22

DIVERSITY AND MORPHOMETRIC DATA OF BLOOD FILARIAL LARVAE IN CARNIVOROUS FROM BULGARIA

M. PANAYOTOVA–PENICHEVA, A. TRIFONOVA, R. MIRCHEV, S. MOVSESYAN

During the period 2012–2013 investigations of blood samples from domestic dogs (*Canis familiaris*), golden jackals (*Canis aureus*) and red foxes (*Vulpes vulpes*) originated from different regions of Bulgaria were performed aiming to document diversity and morphometric characteristics of established filarial larvae. Following features of microfilariae were analyzed: peculiarities in the shape, body length and maximum body width. According to the morphological characteristics three types of larvae were observed. Larvae of the first type were with pointed anterior end and long, thin, straight and sharp tail; those of the second type were with obtuse anterior end and sharp tail, often ending as an umbrella handing; larvae of the third type were with obtuse anterior end and thin, sharp tail, in the most cases curved as a hook. Established filarial larvae were related to following species – *Dirofilaria immitis*, *D. repens* and *Acanthocheilonema reconditum*. The lengths of microfilariae of the dogs which we related to *D. immitis* ranged between 237 and 350 μm and mean value was 297 μm . Microfilariae' length related to *D. repens* ranged from 305 to 420 μm (mean 365 μm) and those of *A. reconditum* were from 223 to 287 (mean 261) μm . In golden jackals length of microfilariae was from 253 to 344 (mean 309) μm for *D. immitis* and 224–285 (mean 250) μm for *A. reconditum*. In red foxes microfilariae' length ranged as follows: from 246 to 320 (mean 281) μm for *D. immitis*, from 291 to 355 (mean 321) μm for *D. repens* and from 223 to 263 (mean 245) μm for *A. reconditum*.

Keywords: morphometric features, microfilariae, *Dirofilaria immitis*, *D. repens*, *Acanthocheilonema reconditum*, *Canis familiaris*, *C. aureus*, *Vulpes vulpes*

70:

PROCEEDINGS OF THE INTERNATIONAL SCIENTIFIC CONFERENCE "20 YEARS OF THE FACULTY OF VETERINARY MEDICINE AT THE UNIVERSITY OF FORESTRY", 2014, 238-244

ACTUAL DATA ON *PROTOSTRONGYLUS TAURICUS* (NEMATODA: PROTOSTRONGYLIDAE) IN MATERIALS FROM BULGARIA

MARIANA PANAYOTOVA-PENCHEVA, ANETKA TRIFONOVA, CHAVDAR JELEV, ROSSEN MIRCHEV, DELKA SALKOVA

In order to study the pulmonary helminth fauna of the wild hare, helminthological autopsies of lungs from hares from different regions of Bulgaria were performed. In the districts of Blagoevgrad and Plovdiv, infection with *Protostrongylus taurucus* (Nematoda: Protostrongylidae) was found. The established extensiveness of invasion was 11.7%, and the intensity varied between several tens to several hundreds of specimens in one animal. A morphometric description of the species was performed based on the present materials. The obtained data were compared and analyzed with data from other authors from Bulgaria and abroad.

Keywords: pulmonary parasites, *Protostrongylus taurucus*, wild hare, *Lepus europeus*, Bulgaria

71:

INTERNATIONAL SCIENTIFIC CONFERENCE: "TRADITION AND MODERNITY IN VETERINARY MEDICINE – 20 YEARS FACULTY OF VETERINARY MEDICINE AT THE UNIVERSITY OF FORESTRY", 2014, 228-237

SOME ALTERNATIVE REMEDIES FOR CONTROL OF VARROOSIS

DELKA SALKOVA, MARIANA PANAYOTOVA-PENCHEVA, ROSSEN MIRCHEV

The ectoparasitic mite *Varroa destructor* Anderson and Trueman, 2000 is recognized as the most serious parasite of honey bee (*Apis mellifera*) worldwide, inflicting much greater damage and higher economic costs than all other known apicultural diseases. Besides its direct parasitic influence, the mite is appeared as a vector of many viral diseases in the bee colony and that's way its harmful impact on the bees is increased. The mite has developed resistance to the most of the acaricide drugs. In this connection recently the scientists have focused their efforts on finding and testing new spare agents for control of varroosis. The present work is a review on the performed in this field experiments as well as their effectiveness.

Key words: *Varroa destructor*, Varroosis, *Apis mellifera*, alternative treatment, essential oils, acaropathogenic fungus.

72:

**PROCEEDING OF THE IX WORKSHOP ON BIOLOGICAL ACTIVITY OF METALS,
SYNTHETIC COMPOUNDS AND NATURAL PRODUCTS, 2014, 67-71**

HONEYBEE POLLEN AS BIOINDICATOR FOR ENVIRONMENTAL POLLUTION

DELKA SALKOVA SALKOVA, MARIANA PANAYOTOVA-PENCHEVA

Bee products possess therapeutic properties and are the source of many essential trace elements that is way they are regarded as valuable foods. Honeybee pollen is one of the most popular bee products used as a diet complement with immunostimulant effect. On the other hand, bee pollen as a product derived from the pollen of flowers around the hive, gives valuable information about the environmental situation in a given area. As the bees flit about collecting pollen and nectar from flowering plants, they also collect any pollutants that may have settled onto the plants from the air or been drawn up from the ground. The presence of pollutants in these products can lower their quality, which in consequence may endanger human health. In this work some investigations on the use and effectiveness of bee pollen as a bioindicator of environmental pollution with different trace elements, thoroughly heavy metals and pesticides, are presented.

Keywords: honeybee pollen, trace elements, toxic heavy metals, pesticides, environmental pollution

73:

RUSSIAN JOURNAL OF PARASITOLOGY, 2015, №1, 75-78

SOME BEE PRODUCTS AS ANTIPARASITIC REMEDIES

D. SALKOVA, M. PANAYOTOVA-PENCHEVA, S. MOVSESYAN

Honeybee gives people one of the most valuable and healthy foods. These are honey, propolis, royal jelly, bee pollen, bee venom, wax. The healing properties of bee products are described in manuscripts discovered in ancient Egypt, Greece and China. Many of them are widely used in medicine for the treatment of bacterial and viral infections, to enhance the immunity of organism, for treatment of poorly healing wounds, in a variety of tumor diseases, in the gastro-intestinal diseases, promote the potency and fertility. Bee products have comparable healing properties to established drugs but they have fewer side effects. In this work we present some of the experiments that explore the impact of bee products to different parasites.

Key words: parasites, bee products, honey, propolis, bee venom, antiparasitic properties

74:

PROCEEDINGS OF SIXTH WORKSHOP “EXPERIMENTAL MODELS AND METHODS IN BIOMEDICAL RESEARCH”, 2015, 95-104

ANTIPARASITE REMEDIES APPLIED TO RUMINANT ANIMALS FROM THE CERVIDAE FAMILY.

M. PANAYOTOVA-PENCHEVA, D. SALKOVA, A. TRIFONOVA

The present study represents a review of the literature on the experience accumulated in the antiparasite treatment of the ruminant animals of the Cervidae family distributed in Bulgaria as well as of species close to them. The summed-up literature data show that among the tested anthelmintics a good effect against the gastrointestinal parasites have displayed oxfendazole, albendazole, thiabendazole, mebendazole, fenbendazole, luxabendazole and tetramisolum. Febantel is also one of them having shown a relatively positive effect also against the dictyocaulus infection. No so good effect reaching up to unsatisfactory one against the lung helminths, especially protostrongylids, has been demonstrated by the preparations cambendazole, levamisole and rintal. Ivermectin has been most efficient in the struggle both against the gastrointestinal and lung nematodes. Its efficacy in the fight against the pulmonary helminthoses has been better when applied at higher doses such as 400µg/kg body weight and in its subcutaneous and pour on administration as compared to the per oral one. The attempts for controlling the extrapulmonary protostrongylidoses with levamisole and rintal have proven to be unsuccessful. Ivermectin has been in that respect the best of the rest of the anthelmintics but also at the high dosage (400µg/kg body weight) though even in these cases its effect has been incomplete. The treatment of trematode infections with albendazole has shown rating of efficiency between 20 and 80 per cent in per oral and almost 100 per cent in the intraruminal administration. Niclosamide has been effective in monesiosis. Ivermectin has been tested also as a remedy for fighting the external parasites in the deer. It has been highly effective in nasopharyngeal and subcutaneous myiasis, ticks, mange mites and lice.

Key words: parasite treatment; deer; Cervidae

75:

PROCEEDINGS OF SIXTH WORKSHOP “EXPERIMENTAL MODELS AND METHODS IN BIOMEDICAL RESEARCH”, 2015, 105-110

PRELIMINARY STUDIES ON THE SPREAD OF *VARROA DESTRUCTOR* AND *NOSEMA* SPP. IN CERTAIN AREAS OF BULGARIA

D. SALKOVA, K. GURGULOVA, S. TAKOVA, M. PANAYOTOVA-PENCHEVA

Biodiversity of ecosystems is largely provided by pollinator activity of honeybees. The parasitoses in bees caused by *Varroa destructor* and *Nosema* spp. play a very important role in colony losses, thus attracting the attention of many scientists. In the present work are made preliminary studies on the spread of varroosis and nosemosis in 66 samples from 11 regions of the country. Methods of OIE -MDTVTA are used for the identification of *Varroa destructor* and *Nosema* spp. and determining the degree of invasion in samples of bees from colonies died in the winter-spring period of 2015. It is found that the *Varroa destructor* is established in 16.6% of samples, and the degree of invasion in the bees is in the range 0.5% to 100%. Spores of *Nosema* spp. is demonstrated in 41%, the degree of invasion per bee is in the range of 3.105 / bee to 26.106 / bee. Mixed infections of both parasites are observed in 24.2% of samples analyzed. 18.2% of samples were negative for both parasites. Studies on the project continued in other areas of the country, by including methods for identification and distinguish species *N. apis* and *N. ceranae*.
Key words: *Apis mellifera*, *Varroa destructor*, *Nosema* spp., spread, colony losses

76:

RUSSIAN JOURNAL OF PARASITOLOGY, 2015, 3, 15-19

STUDY OF THE SUSCEPTIBILITY OF *HELIX POMATIA* (MOLLUSCA, HELICIDAE) TO PROTOSTRONGYLIDS (NEMATODA: PROTOSTRONGYLIDAE) IN MULTIPLE INFECTION

PANAYOTOVA-PENCHEVA M., S. MOVSESYAN, D. SALKOVA, M. VORONIN

Objective: to study the susceptibility of snails of the species *Helix pomatia* to repeated invasions with protostrongylids. Materials and methods: Four consecutive experimental infections of snails of the species *H. pomatia* were carried out every 14-20 days. Two weeks after each infection, some of the snails were dissected to determine the extensiveness and intensity of invasion, the coefficient of penetration of larvae into the snails and the stage of larval development. Protostrongylid larvae were obtained from the legs of the snails, which were examined under a microscope after compression. The results obtained were statistically processed using the Statistica 7 program. Results and discussion: It was found that after each new invasion, the intensity of invasion and the coefficient of penetration increase. The studies show that the snails remain susceptible to invasion with protostrongylids with repeated infections. After the 3rd and 4th infestations, the relative penetration rate of larvae into snails is lower than after the 1st and 2nd infestations. This suggests that there are mechanisms in the host that limit the increase in invasion intensity with repeated infestations.

Keywords: *Helix pomatia*, protostrongylids, experimental infestations, susceptibility to reinfestation

77:

PROCEEDINGS OF THE TENTH WORKSHOP ON BIOLOGICAL ACTIVITY OF METALS, SYNTHETIC COMPOUNDS AND NATURAL PRODUCTS, 2015, 142-147

HONEY BEES AND THEIR PRODUCTS AS INDICATORS OF ENVIRONMENTAL POLLUTION WITH PESTICIDES

D. SALKOVA, M. PANAYOTOVA-PENCHEVA

In the present work a literature review of the experiments that explore the using of honey bee and their products as bio-indicator of environmental pollution with pesticides is presented. In all cases of pesticides implementation certain amounts of them have been always accumulated in the bees and their products. Bees in this respect, which are in a constant contact with the atmosphere, plants, waters and soils are the object of numerous ecological studies aimed at establishing their role in the detection of polluted areas. A great attention is also being paid to the honey bee products which also yield information about the state of the surroundings inhabited by the bees. Honey is most often tested for pollutants followed by the bee body, pollen, wax, propolis and faecal masses of the bees. The studies on the royal jelly, nectar honey and honeydew are in single numbers. According to the researchers the pollutants accumulate in the bees and their products to different extents. Pesticides have been established in the bodies of honey bees in larger quantities with relevance to the honey. Most of the authors show that bee honey is a suitable tool for monitoring the pollution with pesticides.

Key words: bee products, bioindicators, honey bees, honey, pesticides, pollution

78:

RUSSIAN JOURNAL OF PARASITOLOGY, 2016, 37(3), 345–369

HOST-BASED FORMATION OF FAUNA OF LUNG HELMINTHS, ITS BIOLOGICAL AND TAXONOMIC CLASSIFICATION

S. MOVSESYAN, M. PANAYOTOVA-PENCHEVA, A. DEMIASZKIEWIZ, M. VORONIN

Object of study: Studies of pulmonary helminths of different groups were conducted. A biological and taxonomic classification of these species was proposed. Materials and methods: 16 species of the families Cervidae, Bovidae, Leporidae and humans were examined for pulmonary helminths in Russia (Southern and Central), Armenia, Bulgaria, Poland. The detected helminths were examined using a set of traditional and advanced helminthological methods. Results and discussion: 23 species of helminths were found in the lungs of the studied mammals, including 1 from Taeniidae (*Echinococcus granulosus*), 4 from Dictyocaulidae and 18 from Protostrongylidae. We divided the species composition of these helminths into a total of three biological groups. The first biological group included helminths of the family Dictyocaulidae. The life cycles of these helminths are monoxenic (they are geohelminths). The second group includes helminths of the

family Protostrongylidae. Their life cycles include intermediate species - land snails, and therefore they are dioxenous (biohelminths). The third group includes the causative agent of a dangerous zoonosis - *Echinococcus granulosus*. These cestodes also develop according to the dioxenous type, but their intermediate hosts are vertebrates, and their definitive hosts are also vertebrates, mainly carnivorous. A taxonomic classification for helminths of the Protostrongylidae family has also been proposed.

Keywords: biodiversity, pulmonary helminths, definitive hosts, intermediate hosts, geographical distribution, zoonoses

79:

AGRICULTURAL SCIENCE AND TECHNOLOGY, 2016, 8(3), 175 – 182

HONEY BEES AND THEIR PRODUCTS AS INDICATORS OF ENVIRONMENTAL POLLUTION: A REVIEW

D. SALKOVA, M. PANAYOTOVA-PENCHEVA

In the present work a literature review of the experiments that explore the use of honey bees and their products as bioindicator of environmental pollution is presented. The greatest number of studies has been carried out on contaminations with heavy metals, followed by pesticides, radionuclides and other substances. Pb, Cd and Zn have been the most looked for metals. Zn and Cd have been mainly deposited on the surface of the bee body while Ni, Cd, Pb and Co have been released with the excrements most often. In all cases of pesticide implementation certain amounts of them have been always accumulated in the bees and their products. According to the researchers, pollutants accumulate in the bees and their products at different extents. Heavy metals and pesticides have been established in the bodies of honey bees in larger quantities in comparison to honey. Most of the authors reported that bee honey is a suitable tool for monitoring pollution with heavy metals and pesticides but the opposite assertions have been also expressed. A suggestion for the presence of a bio-barrier function of the bee organism against contaminants has been forwarded. It has been established that pollen is the most suitable indicator for radioactive pollution. As a whole, the present review shows that bees and their products are suitable models for bio-monitoring of the environmental pollution of different nature.

Key words: honey bees, bee products, bioindicators, pollution, heavy metals, pesticides

80:

PROCEEDINGS OF VII WORKSHOP ON EXPERIMENTAL MODELS AND METHODS IN BIOMEDICAL RESEARCH, 2016, 84-93

ANTIPARASITE REMEDIES APPLIED IN MOUFLONS (*OVIS MUSIMON*) AND OTHER WILD SHEEP

M. PANAYOTOVA-PENCHEVA, V. DAKOVA, D. SALKOVA

The selection and use of antiparasitic remedies in wild sheep present one of the challenges to the wildlife managers and veterinarians. The present study represents a review of the literature on the experience accumulated in this respect. The summarized literature data show the following: The benzimidazoles most often have been applied for treatment of parasites in wild sheep. Their effectiveness varies according to the parasite species. It has been high against gastrointestinal nematodes and relatively lower against lungworms. Some drugs, for example oxfendazole has been 100% effective against *Moniezia* spp. It has been established that albendazole is readily accepted even by fastidious animals. Two-day treatment has been recommended during the treatment with mebendazole. For long-term control of protostrongylids free-choice availability of fenbendazole-medicated salt has been recommended as a potentially effective management tool. Ivermectin is other medicine tested for treatment of wild sheep. Applied parenterally it has been effective in control of the lung nematodes of *Protostrongylus* genus and mites *Psoroptes ovis*. The dosage of 600 µg/kg body weight is recommended for parenteral use. The results of orally administrated ivermectin are contradictory – in some cases the drug has been ineffective against lungworms, in others it has had good effect. Most probably this depends on the dosage and scheme of treatment. The parasites more difficult for cure, independently of kind of remedies, have been protostrongylids and *Trichuris* spp. Experiments have shown that repeated administration of some anthelmintics may contribute to the development of parasite resistance. Other ones have demonstrated positive effect of biological control on the gastrointestinal nematodes in animals in captivity.

Key words: mouflon, bighorn sheep, parasite treatment, benzimidazoles, ivermectin

81:

PROCEEDINGS OF VII WORKSHOP ON EXPERIMENTAL MODELS AND METHODS IN BIOMEDICAL RESEARCH, 2016, 79-84

COMPARATIVE ANALYSIS BETWEEN FIELD AND LABORATORY DIAGNOSIS OF NOSEMATOSIS AND VARROOSIS ON HONEYBEE

D. SALKOVA, K. GURGULOVA, S. TAKOVA, M. PANAYOTOVA-PENCHEVA

In 2015 and 2016 were conducted laboratory tests for parasites of 163 samples of bees of 105 apiaries from different regions of the country. Among 76 beekeepers were carried out survey for

observed signs characteristic of these diseases. Results of laboratory tests were compared with the manifested symptoms of the field. The purpose of this study was to compare the clinical signs observed by beekeepers, and the results of laboratory analysis. Laboratory tests on samples of bees show a high degree of infestation with spores of *Nosema spp.* (52.8%) and the mite *Varroa destructor* (12,9%) alone and 18.4% in mixed invasion of both parasites. Negative are 15.9% of the samples. In many cases the anamnestic data is not confirmed by laboratory results. Comparing survey results on the field and laboratory studies conclude that nosemosis prevails while beekeepers indicate varroosis as a major problem. According to data from surveyed beekeepers on signs of parasitic diseases of the apiary at 39.6% it comes to varroosis, but only 2.6% - for nosemosis. Mixed invasion of the two parasites indicate 28.9 percent surveyed beekeepers and the same percentage (28.9%) of them have not observed signs of parasitic diseases. This study confirms the necessity of laboratory testing for accurate diagnosis.

Key words: honeybees, nosemosis, varroosis, clinical signs, laboratory analyzes

82:

**PROCEEDINGS OF THE CENTER FOR PARASITOLOGY OF THE INSTITUTE OF
ECOLOGY AND EVOLUTION OF THE RUSSIAN ACADEMY OF SCIENCES, 2016,
49, 91-92**

***ANGIOSTRONGYLUS DASKALOVI (NEMATODA: METASTRONGYLOIDEA) IN
BADGERS FROM BULGARIA***

M. PANAYOTOVA-PENCHEVA, A. TRIFONOVA, V. DAKOVA, D. SALKOVA, S.
MOVSESYAN

Angiostrongylids are nematodes of order Strongylida, superfamily Metastrongyloidea (Anderson et al., 2009). In most of the cases they parasitize in the pulmonary arteries and the heart of their final host which are insectivores, rodents, felids and canids. The man can also be infected by some of those parasites, although he is a nonspecific host. Intermediate hosts are different species of mollusks. The present work describes some cases of parasitizing of badgers (*Meles meles* L.) from Bulgaria with angiostrongylids.

83:

PROCEEDINGS OF THE CENTER FOR PARASITOLOGY OF THE INSTITUTE OF ECOLOGY AND EVOLUTION OF THE RUSSIAN ACADEMY OF SCIENCES, 2016, 49, 151-152

PREVALENCE AND DISTRIBUTION OF *NOSEMA* SPP. AND *VARROA DESTRUCTOR* IN HONEYBEE COLONIES IN BULGARIA

D. SALKOVA, T. GEORGIEVA, K. GURGULOVA, S. TAKOVA, M. PANAYOTOVA-PENCHEVA, S. MOVSESYAN

Nosemosis is a parasitic disease of adult honey bees (*Apis mellifera*) caused by two species of microsporidia, *Nosema apis* (Zander, 1909) and *Nosema ceranae* (Fries et al., 1996). The disease occurs throughout the world, including Europe and Bulgaria respectively. The parasitic mite *Varroa destructor* (Anderson and Trueman, 2000), is considered one of the most serious pests to beehives, causing great economic loss to the beekeeping industry (Baker and Peng, 1995). The purpose of this study was to compare the results of laboratory analysis for *Varroa destructor* and *Nosema* spp. of bee samples, obtained from professional and amateur beekeepers in period of two years (2014–2015).

84:

PROCEEDINGS OF THE XI WORKSHOP ON BIOLOGICAL ACTIVITY OF METALS, SYNTHETIC COMPOUNDS AND NATURAL PRODUCTS, 11, 104-109

A SHORT REVIEW ON THE EXPERIENCE OF ANTHELMINTIC TREATMENT IN WILD BOARS

VASSILENA DAKOVA, MARIANA PANAYOTOVA-PENCHEVA, DELKA SALKOVA

A literary survey has been made about the use of anthelmintics in the European wild boar. The most frequently used anthelmintics have been from the Benzimidazole group (Albendazole, Mebendazole, Febantel, Fenbendazole, Flubendazole). They have been used against gastrointestinal and lung nematodes. Their effect has been strongest against gastrointestinal strongylids, it has been less effective against lungworms and *Capillaria* have been least affected species. Another popular group is that of tetrahydropyrimidine (Pyrantel, Morantel). They have been very efficient against intestinal nematodes. The efficiency against lung nematodes has been also good, with the egg output being stopped, although their adulticid effect has been smaller. Imidazotiazoles (Levamisol, Tetramisol) are a third anthelmintic group that is used in wild boars. The effectiveness of the Imidazotiazole group has been very good against gastrointestinal and lung nematodes, but the risk of drug overdose and intoxication has been higher than the other groups.

Studies about the Ivermectin from the Avermectin group have shown that this drug is suitable for treatment of gastrointestinal and lung nematodes and mites, but the effect against *Capillaria* spp. and *Trichuris* spp. has been insufficient.

85:

RUSSIAN JOURNAL OF PARASITOLOGY, 2017, 40(2), 124-128

ON THE PARASITES OF GENUS *ANGIOSTRONGYLUS* (NEMATODA: ANGIOSTRONGYLIDAE) AND SOME CASES OF *ANGIOSTRONGYLUS DASKALOVI* IN BADGERS FROM BULGARIA

M. PANAYOTOVA-PENCHEVA, A. TRIFONOVA, V. DAKOVA, D. SALKOVA, S. MOVSESYAN

During the research on filarial infections in wild animals in Bulgaria, nematodes of the genus *Angiostrongylus* were found in the heart and pulmonary arteries of badgers. The discovered specimens were examined morphologically and metrically, which allowed us to identify them as *Angiostrongylus daskalovi*. A morphometric description of the species is given in accordance with the present materials.

Keywords: *Angiostrongylus daskalovi*, lungworms, badger, *Meles meles*, Bulgaria

86:

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE “BIOLOGICAL DIVERSITY AND CONSERVATION PROBLEMS OF THE FAUNA – 3”, 2017, 57-61

MONITORING ON THE PARASITOFUNA OF CERVIDS FROM BULGARIA

DAKOVA V., M. PANAYOTOVA-PENCHEVA, S. MOVSESYAN

Monitoring of the parasitofauna of three cervid species from Bulgaria has been performed in the course of one year. Fecal samples and internal organs of red deer, fallow deer and roe deer from eleven regions of the country have been investigated. The established parasites have been identified to genus and where it has been possible to species. The prevalence of infection has pointed. The species *Eimeria robusta* and *E. asymerica* are recorded for the first time as a part of Bulgarian parasitofauna and *Varestrongylus sagittatus* as a part of parasitofauna of fallow deer in our country.

87:

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE “BIOLOGICAL DIVERSITY AND CONSERVATION PROBLEMS OF THE FAUNA – 3”, 2017, 287-291

DETECTION OF *NOSEMA* SPP. IN BEE SAMPLES FROM DIFFERENT REGIONS OF BULGARIA

D. SALKOVA, K. GURGULOVA, M. PANAYOTOVA-PENCHEVA, S. MOVSESYAN

Nosemosis is a disease of honey bees, affecting bee colonies worldwide, including Bulgaria. Causative agents are microsporidia *Nosema apis* and *N. serane*, which represent highly specialized parasitic fungi. *Nosema serane* is a relatively new parasite of the European honeybee (*Apis mellifera*) and its geographic distribution is not yet sufficiently studied. In a 3 year project between NDRVMI and IEMPAM-BAS during 2015-2016 were examined 165 bee samples from 107 apiaries, located in 19 districts of the country. Samples were sent to the NRL “Honeybee health” mainly from colonies with different pathological problems such as abnormal behavior, depopulation of beehives, weakness and high mortality of colonies. To proof spores of *Nosema* spp. used light microscopic examination. The identification of the species was performed by PCR reactions. The results indicate the prevalence of *Nosema* spp. spores in the tested samples (71.5%). Although nosemosis is not included in the OIE list of the notifiable bee diseases, it can have very negative effects on bee colonies and cause big losses to beekeeping and agriculture.

88:

PROCEEDINGS OF THE INTERNATIONAL SCIENTIFIC CONFERENCE “BIOLOGICAL DIVERSITY AND FAUNA CONSERVATION PROBLEMS – 3”, 2017, 189-193

COMPARATIVE ASSESSMENT OF THE CHEMICAL COMPOSITION OF VARIOUS MUSCLE GROUPS IN TREMATODOSIS

M. MKRTCHYAN, S. MOVSESYAN, M. PANAYOTOVA-PENCHEVA

The aim of this study was to analyze changes in the chemical and physicochemical parameters of cattle meat in cases of mono and mixed trematode invasions. Animals in the first group were intact (control), the second group was infected with *Fasciola hepatica*, the third with *Dicrocoelium lanceatum*, and the fourth with a combination of *Fasciola* and *Dicrocoelium*. From each carcass, average samples were taken from different muscle groups: *m. deltoideus*, *m. longissimus dorsi*, and *m. biceps femoris*. The results showed that the chemical composition of meat depends on the

infestation of the animals. Trematode invasion influences the chemical composition, physicochemical properties, and nutritional value of the meat.

89:

**WORLD ACADEMY OF SCIENCE, ENGINEERING AND TECHNOLOGY
INTERNATIONAL JOURNAL OF BIOENGINEERING AND LIFE SCIENCES, 2018,
VOL:12, NO:8, 247-250**

LUNG PARASITES IN STONE MARTENS (*MARTES FOINA* L.) FROM BULGARIA

VASSILENA DAKOVA, MARIANA PANAYOTOVA-PENCHEVA

The present work focused on the study of pulmonary helminth-fauna of the stone marten in Bulgaria in terms of which the data are little. For the purpose, four stone martens were helminthologically necropsied according to the common technique. In addition, some of the injured lung parts were investigated after their boiling in lactic acid and subsequent compression. Four nematode species from different families of order Strongylida and Trichocephalida were found in the lungs. These were *Crenosoma petrowi* Morosov, 1939; *Eucoleus aerophilus* Creplin, 1839; *Filaroides martis* Werner, 1782 and *Sobolevingylus petrowi* Romanov, 1952. Some of the parasite structures with taxonomic importance were measured and described. According to our best knowledge, the species *F. martis* and *S. petrowi* are recorded for the first time as a part of the helminth-fauna of Southeast Europe and Bulgaria in particular.

Key words: Bulgaria, *Crenosoma petrowi*, *Eucoleus aerophilus*, *Filaroides martis*, lung parasites, *Sobolevingylus petrowi*, stone martens

90:

**PROCEEDINGS OF THE XI WORKSHOP “EXPERIMENTAL MODELS AND
METHODS IN BIOMEDICAL RESEARCH”, 2020, 25-30**

**PARASITES AND ANTIPARASITIC TREATMENT OF CAGED LABORATORY
RABBITS**

VASILENA DAKOVA, KATERINA TODOROVA, PETAR DIMITROV, MARIANA
PANAYOTOVA-PENCHEVA

The aim of the present study was to determine the possible parasitism of laboratory rabbits and the effectiveness of the subsequent treatment. Helminths of two nematode genera were detected - *Passalurus*, with an extensiveness of invasion (EI) of 10.5% and *Nematodirus* with an EI of 5.3%,

as well as protozoa of the genus *Eimeria* (EI 57.9%), represented by the species *E. magna*, *E. media* and *E. perforans*. Of the *Eimeria* species, the *E. media* species was detected in the most animals. Three of the rabbits parasitized with *Eimeria* had pronounced clinical signs of the disease. The parasitized animals were treated individually according to the established parasitological status with Fenbendazole at a dose of 25mg/kg, Sulfachlorpyrazin 30% at a dose of 1g per liter of water for 10 days and multivitamin preparations. The parasitological status of the rabbits was examined again on day 10 and 40 after treatment, and if parasites were detected, treatment was again carried out with the appropriate antiparasitic agent for the respective etiological agent. The results of the study showed the following: Treatment of laboratory rabbits with signs of eimeria with Sulfachlorpyrazine and multivitamin preparations leads to their clinical recovery, but does not stop the carriage and excretion of oocysts. The administration of fenbendazole leads to the cessation of the excretion of nematode eggs of the genera *Passalurus* and *Nematodirus*, but 40 days after treatment, the excretion of *Passalurus* eggs is again observed, which indicates that a single treatment with fenbendazole is not sufficient for the final cure of rabbits from *Passalurus*.
Keywords: laboratory rabbits, *Eimeria*, *Passalurus*, *Nematodirus*, antiparasitic treatment

91:

**INTERNATIONAL SCIENTIFIC RESEARCH CONGRESS DEDICATED TO THE
30TH ANNIVERSARY OF BAKU EURASIA UNIVERSITY, 2022, 1218-1223**

PARASITE INFECTIONS IN CARNIVORES FROM THE SOFIA ZOO, BULGARIA

M. PANAYOTOVA-PENCHEVA, V. DAKOVA

There are a number of negative consequences of distribution of parasite deceases in the zoos - secondary deficiencies or other infectious diseases in animals, impaired reproduction, risk of fatal outcome, risk of transmission of parasite zoonoses to the contacted humans. In view of this, the goal of the present work was to perform parasitological examinations of the animals from the predator section of the Sofia Zoo, if necessary, to perform antiparasite treatments and to be traced their effectiveness. Carnivores of 26 species were examined for the presence of gastrointestinal and lung parasites. Parasite eggs of *Toxascaris leonina* were found in the faeces of one lion (*Panthera leo*) and one cougar (*Puma concolor*). Eggs from the Ascarididae family were found in one Eurasian brown bear (*Ursus arctos arctos*). The lion and cougar were treated with combined preparation of milbemycin oxime and praziquantel (Milprazon 12.5 mg/125 mg tablets for dogs weighing at least 5 kg®, KRKA, Slovenia). The brown bear was treated with a combined preparation of ivermectin and praziquantel (Noromectin Praziquantel Duo, 18.7 mg/g + 140.3 mg/g Oral Paste for Horses®, Norbrook Laboratories (Ireland) Limited). The effect of the treatment was monitored by examining control faecal samples on the seventh, thirtieth and sixtieth day thereafter. Faecal tests of all three animals were negative on day 7 after treatment. They were negative on days 30 and 60 for the lion and bear. Reappearance of *T. leonina* infection in the cougar occurred 30 days after treatment and she was treated with three tablets of another preparation, each tablet of which contained Praziquantel 50mg, Pyrantel embonate 144mg and

Fenbendazole 200mg (Cestal plus®, Ceva Animal Health, Bulgaria). No parasite eggs were found in the faeces of cougar for 60 days thereafter. No adverse reactions to the drugs were observed in any of the three animals.

Key words: *Toxascaris leonina* in lions and cougars; ascarids in bears; anthelmintic treatment in zoo carnivores

92:

**8TH INTERNATIONAL BLACK SEA COASTLINE COUNTRIES SCIENTIFIC
RESEARCH CONFERENCE, 2022, 212-222**

**SITUATION AND CONTROL OF ECHINOCOCCOSIS IN BULGARIA OVER THE
LAST TWENTY YEARS**

D. SALKOVA, M. PANAYOTOVA-PENCHEVA

Echinococcosis is a biohelminthosis caused by parasites of *Echinococcus* spp. (Cestoda: Taeniidae). Final hosts for these tapeworms are carnivores, mainly canids, and intermediate - Almost all mammals, including humans. The disease is of global importance for public health, and the economic burden of losses for humans and animal husbandry is billions of dollars a year. The aim of this study was to collect information from research and official documents from European institutions on the distribution of echinococcosis among humans and animals in Bulgaria over the last 20 years, which will provide guidelines for effective control of this zoonosis. The collected data show that from 2006 to 2020 Bulgaria is first in the European Union in the number of reported cases of people with established cystic echinococcosis. This ranks it among the highly endemic countries for the disease. The assessment of the actual prevalence of the parasitosis in our country is difficult due to the high proportion of asymptomatic carriers, lack of diagnostic focus to seek this diagnosis, lack of targeted epidemiological studies in humans and animals- intermediate and final hosts of the parasites. Based on the summarized and analyzed data, recommendations for limiting the distribution of the echinococcosis in the country are given.

Keywords: Echinococcosis, Bulgaria, distribution, research

93:

TRADITION AND MODERNITY IN VETERINARY MEDICINE, 2023, VOL. 8, NO 1(14): 88–94

EXPERIENCE IN TREATMENT OF CAPTIVE LIONS, COUGARS AND BEARS WITH ASCARID INFECTIONS: A REVIEW

MARIANA PANAYOTOVA-PENCHEVA

Parasite control in captive animals is often difficult and have a row of specificities. Ascarid infections are among the most common parasitoses in animals, especially for captive ones. The aim of this study was to review the experience in treatment of ascaridoses in lions, cougars and bears. Drugs, dosages and schemes of treatment are presented. Bibliographic reference showed that over the years, piperazine, pyrantel pamoate, benzimidazoles and ivermectin were the most used medicines to treat *Toxascaris leonina* in lions and cougars and *Baylissascariasis* spp. infections in bears. Based on the summarized data fenbendazole applying in extended schedules or a dosage of 15 mg/kg body weight could be recommended for treatment of ascarid infections in bears, and ivermectin at a dose of 0.2–0.3 mg/kg body weight twice in four weeks interval could be recommended for treatment of ascarid infections in lions. Combined preparations of drugs from different pharmaceutical groups have also shown high efficiency and can be successfully used in such cases.

Key words: anthelmintics; ascaridosis; bears; *Panthera leo*; *Puma concolor*

94:

DER ZOOLOGISCHE GARTEN, 85 (2016) 280–308

EXPERIENCE IN THE IVERMECTIN TREATMENT OF INTERNAL PARASITES IN ZOO AND CAPTIVE WILD ANIMALS: A REVIEW

MARIANA PANAYOTOVA-PENCHEVA

The selection and the use of antiparasitic remedies in the animals in zoological gardens and those bred in captivity present one of the challenges to the wildlife veterinarians. The latter have to be flexible enough in the choice of medicines and schemes of treatment of the animals they take care of. The present study is aimed at adding more information in that respect. A number of cases of ivermectin treating of mammals, birds, reptiles, amphibians and fish bred in captivity are presented in it. The tolerance to the drug in the different animals, species of the parasites influenced by it, dosages, schemes of applying and some other peculiarities in the system animals–diseases–anthelmintic treatments are discussed.

Key words: Anthelmintic treatment; Captive wild animals; Ivermectin; Wildlife; Zoos