



**„ION IONESCU DE LA BRAD” DIN IAȘI LIFE
SCIENCES UNIVERSITY OF IAȘI**



FIELD: VETERINARY MEDICINE

HABILITATION THESIS

**Contributions to the study
of the epidemiology and pathogenesis of
parasitoses in domestic and wild animals
in North-Eastern Romania**

Assoc Prof. OLIMPIA IACOB Ph.D

**2021
IAȘI**

ABSTRACT

Research in the field of parasitology and parasitic pathology has experienced an unprecedented and continuous development at an accelerated pace, difficult to control. The diversity of parasite species and their ubiquitous dispersion in the environment, determine multidimensional interactions that visibly or subtly influence the life of animals and humans.

The impact of parasites on animal and human health continues to surprise through new mechanisms of aggression exerted from the micromolecular level to the most complex organic system.

The consequences of parasitic aggression are reflected in the health of animals causing direct and indirect losses. Parasitic zoonoses induce pathologies in humans with consequences that are difficult to quantify. The impact of parasitic diseases on living organisms has caught my attention since the beginning of my university career.

In the habilitation thesis entitled "Contributions to the study of epidemiology and pathogenesis of parasites in domestic and wild animals in northeastern Romania" I presented briefly the results of research undertaken in this direction, as well as other results of my professional, scientific and academic career.

The thesis is structured in accordance with the legislation in force and with the regulation of the University for Life Sciences "Ion Ionescu de la Brad" from Iași, regarding the organization and development of the habilitation process. The results selected to highlight the evolution of the scientific career after obtaining the title of doctor in Medical Sciences, Veterinary Medicine, are presented in section B. I., grouped in two subchapters.

These include epidemiological and pathogenetic research in parasites in domestic animals, and epidemiological and pathogenetic research in parasites in wild animals, each including research on the use of modern methods in diagnosing parasites as well as the application of new therapeutic formulas with high efficacy.

SCIENTIFIC ACHIEVEMENTS

The scientific activity materialized through the publication of 125 research papers, of which 9 published in ISI-rated journals, with cumulative impact factor 8.3 and 95 citations, with Hirsch index 6 (according to Google Scholar), participation as director in two projects research and as a team member in six projects. The researches were grouped according to the taxonomic classification of parasites in classes, highlighting the results obtained and the identification for the first time of the species of parasites.

Protozoa include research on eimeriosis, cryptosporidiosis and giardiasis in the youth of ruminants (calves, malachites, kids, lambs), broilers and poultry, revealing the infectious capacity and involvement in the onset of enteric syndrome; theileriosis in water buffaloes and encephalitozoonosis in farmed foxes, reported for the first time, highlights the novelty and extent of the parasitic impact on animals. Trematodes include research on fasciolosis in sheep, induced by *Fasciola gigantica*, reported for the first time, and the devastating aggression exerted on the liver. Cestodoses were investigated in lambs and kids, induced by *Moniezia expansa* and *Moniezia benedeni*, reported for the first time, as well as the identification of a new intermediate host, called *Zygoribatula connexa*.

Research on nematodes focuses on epidemiological, clinical, paraclinical, anatomopathological, parasitological and therapeutic aspects of intestinal trichostrongylosis in naturally infested sheep and experimentally infested lambs. Research has shown the survival ability of trichostrongylids and the vulnerability of lambs. Epidemiological results have shown that pasture is a source of life, through the food provided to herbivores and a source of disease, through the parasitic elements it ingests with the grass.

Also, the involvement of biotic and abiotic factors in regulating the number of parasitic elements on the pasture was shown, the resistance of these parasitic elements to the oscillations of climate factors. The multiple aggression of trichostrongilides on the digestive system and digestion, the influence on the local and general metabolism, the impact on the process of raising lambs and on the quality of the obtained products were highlighted. The species were identified morphologically: *Nematodirus filicollis*, *N. spathiger*, *Trichostrongylus colubriformis*, *T. vitrinus* that irreversibly affected the small intestine of lambs.

Research on trichinellosis in pigs has highlighted epidemiological aspects regarding the prevalence of *Trichinella spiralis* in pigs in the area of Moldova; research on the viability of *Trichinella* larvae in frozen pork at the usual temperature of -15 °C; resistance of *Trichinella* larvae to repeated freezing-thawing and preservation of viability; checking the infecting capacity of frozen meat larvae for a long time, by experimental infection of laboratory mice. The

particular interest in trichinosis came from the fact that it is a severe parasitic zoonosis with a lethal impact on humans. The results showed the extraordinary ability of *Trichinella spiralis* to adapt to environmental conditions, long-term resistance to low temperatures (-20 °C), preservation of viability and infectious capacity, proving that by freezing, meat parasitized by *Trichinella spiralis* cysts remains a source infection for humans and animals. Research on horse habronemosis has highlighted skin lesions induced by *Habronema* larvae identified by biopsy and histological examination; detection of proinflammatory factors and their subsequent use as biomarkers in the early diagnosis of habronemosis.

Research on animal mites has brought to attention new issues, and the unique way of aggression of each species. In sheep, mites evolved concomitantly with other ecoparasitosis, constituting a model of polyparasitization. Skin lesions were induced by *Psoroptes ovis*, *Damalinia ovis*, *Melophagus ovinus* and Ixodidae ticks, which caused hyperkeratosis lesions, severe anemia localized and generalized loss of wool, abortions, other economic losses. Climate change and high temperatures have changed the behavior of Ixodidae ticks, causing massive sheep infestation in January-February, which draws attention to the new prophylaxis measures applied. Acariasis reported and described in laboratory rodents and turkeys completed reports with priority. Gastric miasis in pigs induced by the larvae of the *Musca domestica* species was reported for the first time in Romania. The aggression of the larvae caused catarrhal gastritis, hemorrhages, ulcerations, severe atrophy due to the contact of hundreds of larvae with the gastric wall.

In the second subchapter, researches on wild animals are presented, including the black goat (*Rupicapra rupicapra*), the ibex goat (*Capra aegagrus aegagrus*), the wild boar (*Sus scrofa*), the bear (*Ursus arctos*), the roe deer (*Capreolus capreolus*), the African pigmy hedgehog (*Atelerix albiventris*) and the marsh frog (*Polophilax ridibundus*). In black goats, massive lung infestations with Protostrongylidae and unique local reactivity with giant, multinucleate cells were highlighted, an aspect first described in Romania. In ibex goats, research on the digestive tract (abomasum and small intestine) has shown that wild ruminants are parasitized with Trichostrongilidae species, common to domestic ruminants, confirming the epidemiological role of reservoir and source of parasites for domestic animals.

In wild boar and bear, research has shown trichinosis induced by *T. spirallis* and *T. britovi*, which is a natural reservoir for well-preserved and a real risk of human disease. In the deer, skin parasitism with the *Lipoptena cervi* species was reported for the first time. In African pigmy hedgehogs, the mite induced by the species *Caparinia tripilis* in association with *Microsporum* spp. has been described for the first time. contributed to the healing of the hedgehog.

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Research on ranids has highlighted parasitism with acanthocephalus (*Acanthocephalus ranae*), parasites that anchor deep in the intestinal wall, causing ulcerative and granulomatous lesions, occlusions, digestive obstructions and fatal endings, aspects reported for the first time.

PROFESSIONAL ACHIEVEMENTS

The professional evolution in the period following the defense of the doctoral thesis (Nov. 30, 2000) focused on consolidating the knowledge in the field of parasitology and parasitic pathology and the permanent updating of scientific data. The interdisciplinary approach of the study and research topics, the increase of the knowledge area and the extension of the collaborations also allowed the involvement in scientific improvement projects and epidemiological surveillance studies. I was interested in participating in scientific activities and events held nationally and internationally, to help increase the visibility of the institution where I work and the country, in professional structures in the field of national and international veterinary parasitology.

Participation in courses on European food safety legislation, education and training in support of the growth and development of the knowledge-based society, on animal protection courses, have helped to broaden the horizon of knowledge to new methodological approaches and practical in interpreting epidemiological data.

I have participated in international scientific events, conferences, symposia, congresses, which have opened new perspectives on access to up-to-date scientific information, of high quality and consistency. I participated in the organization of national and international scientific events. I was also involved in the activities of continuing education of veterinarians or as a trainer in specialization activities of young people in the field of veterinary inspection.

I have worked as a reviewer for the following journals: International Journal of Agricultural Policy and Research; Animal Reproduction Science; Immunological Investigations; Acta Tropica; Journal of Equine Veterinary Science; Parasitology, Cambridge University Press; Brazilian Archive of Veterinary Medicine and Animal Husbandry; Journal of Agricultural Science and Technology A & Journal of Agricultural Science and Technology B, USA, Open Veterinary Journal. I coordinated two research projects as a director and participated as a member of the research teams in six other projects. Also, I participated as an expert evaluator, in the analysis of the national project proposals from the competitions launched by CNCSIS.

ACADEMIC ACHIEVEMENTS

Within the University of Agricultural Sciences and Veterinary Medicine in Iași, I worked as an assistant (1990-1994), teaching assistant (1994-1995), foreman (1995-2000), foreman dr (2000-2003), associate professor (2003-present), the promotions being obtained through a competition.

The disciplines taught during this period were: Diagnosis of parasitic diseases in animals (course and practical works), at the University Agricultural College section, Hygiene and veterinary laboratory; Parasitic Diseases Clinic (course and practical works), at the College of Clinics and Pharmacy; Parasitology and Clinical of parasitic diseases in animals: Helminthosis (course and practical works), at the Faculty of Veterinary Medicine; Parasitic pathology of herbivores (course and clinic); Clinic of parasitic diseases of ruminant animals (course and clinic), at the Faculty of Veterinary Medicine; General parasitology (course and practical works), at the Faculty of Agriculture, Biology department; Epidemiology of parasitic diseases and Diagnosis of parasitic diseases (master course). Since 2018, I teach the subject Parasitology and clinical lectures by species (course and practical works), to the students of Veterinary Medicine, the series with teaching in English. During this period I developed and wrote 12 books, manuals, chapters, monographs, treatises, to support students and specialists in veterinary medicine. In the books, are presented in a comprehensive manner scientific information, supported by original images of parasites macroscopic and microscopic lesions of organs induced by parasites, explanatory schemes of biological cycles, graphs, tables. During the activity I coordinated and guided over 60 undergraduate and dissertation papers.

An important academic activity was the participation as an official referent, in the analysis commission of some doctoral theses, defended within the University of Agricultural Sciences and Veterinary Medicine Iași and within the University of Agricultural Sciences and Veterinary Medicine of Banat, Timișoara.

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LONG TERM PLANS FOR EVOLUTION AND CAREER DEVELOPMENT

In the future, I will continue and diversify activities that cover all aspects of my career, from a scientific, professional and academic point of view, improving the interdisciplinary approach that I have used perseveringly during this period.

Scientifically, I will address new thematic areas to attract funding through research projects, increase the visibility of the institution, by publishing results in ISI-listed journals in the red and yellow areas and by participating in national and international scientific events. The research directions will be the following: molecular biology research on parasites, eco-parasitology studies on the environment, monitoring of parasite resistance to specific drugs, antiparasitic therapy with natural preparations, antiparasitic immunization of animals, methods of early diagnosis of parasitic infections animals.

Professionally, continuous and constant training will be a basic condition of prosperity and success. In this context, I will continue to participate in national and international scientific events to gain access to new scientific information, and I will expand my research in the field of parasitic zoonoses. I will develop the collection of parasites in the form of permanent preparations or preserved pieces, in order to provide students with macroscopic and microscopic study material of parasite species. I will participate in all activities organized by the University for Life Sciences "Ion Ionescu de la Brad" in Iasi and the Faculty of Veterinary Medicine, involved in professional activities.

Academically, from a didactic point of view, I will focus on updating the analytical program and improving the methods of information transfer and assimilation by students. The publishing activity will continue to be a concern, by writing and publishing scientific articles in prestigious journals, writing, in collaboration with specialists from the country and abroad, monographs and treatises, which would represent scientific landmarks for those interested in veterinary parasitology.