CHARACTERIZATION OF *Prunella vulgaris* L. EXTRACTS IN TERMS OF POLYPHENOL TOTAL CONTENT (TPC)

Keywords: ethanolic extract, microwave and ultrasound extract, *Prunella vulgaris* L., antioxidant activity.

INTRODUCTION

Prunella vulgaris L. (Order: Lamiales; Family: Lamiaceae; Genus: Prunella) is a herbaceous, perennial, rarely annual and biennial plant, native to Eurasia, North America and northwest Africa, but which subsequently spread and adapted to all continents, preferring acidic, neutral or basic soils, with a sandy, loamy or clayey texture, respectively shady, cool and humid places in temperate zones located at an altitude between 5 and 2500 m.

Recent studies (BO-HOU et al., 2024; DAG et al., 2017) have shown that the methanol or water extract of this plant exhibits antihyperglycemic activity, contributes to the inhibition of systemic anaphylaxis, is used as an antioxidant and may have antiviral and antibacterial effects, anti-inflammatory, pro-apoptotic, neuroprotective and antitumor effects. Recently, it has been shown that the species can be used as a remedy anti-HIV. As a remedy against herpes simplex virus type 1 and 2 and also has antioxidant and cardioprotective effects (LING, 2021).

MATERIAL AND METHODS

The *Prunella vulgaris* species appeared spontaneously in the fields of Doicești, Dâmbovița county, and was harvested from the first year of growth, in the months of June-August.

In the laboratory of the Research Institute of the University of Pitești, in November 2024, ethanolic extracts of *Prunella vulgaris* were obtained by ultrasound and microwave, and in order to establish the polyphenol content of the Prunella vulgaris species, the following materials were used: Folin Ciocâlteu reagent, 99.2% absolute ethyl alcohol, 96% ethyl alcohol, distilled water, sodium carbonate powder, *P. vulgaris* extracts.

The polyphenol content for each *P. vulgaris* extract was determined using the regression equation obtained from the gallic acid calibration curve.

RESULTS AND DISCUSSION

The total polyphenol content analyzed in ethanolic extracts of *Prunella vulgaris* species varies from 35.12 to 39.10 mg GAE/100 g (in the case of the extract obtained by ultrasound) and from 47.70 to 142.84 mg GAE/100 g (in the case of the extract obtained by microwave) depending on the concentration of the solvent used.

The maximum inhibition ratio was obtained in the case of the *Prunella vulgaris* extract obtained by ultrasound (77.15%), and the minimum ratio (38.65%) was recorded in the case of the extract obtained by microwave.

The antioxidant activity is more pronounced in the case of the *Prunella vulgaris* extract with an ethyl alcohol concentration of 96% obtained by ultrasound (77.15%), and for the extract obtained by microwave, a maximum inhibition ratio of 76.20% was obtained, which reinforces the idea that both extraction methods can be used to obtain ethanolic extract of *Prunella vulgaris* species with an increased content of polyphenols and high antioxidant activity.

CONCLUSIONS

The analysis of the total polyphenol content data expressed in mg GAE/100 g revealed that ethyl alcohol with a concentration of 96% is the optimal solvent used to extract polyphenolic compounds by both extraction methods.

The total polyphenol content analyzed in ethanolic extracts of *Prunella vulgaris* species varies from 35.12 to 39.10 mg GAE/100 g (in the case of the extract obtained by ultrasound) and from 47.70 to 142.84 mg GAE/100 g (in the case of the extract obtained by microwave) depending on the concentration of the solvent used, the extraction method applied, the extraction conditions and the amount of extract used.

The antioxidant activity is more pronounced in the case of the *Prunella vulgaris* extract with an ethyl alcohol concentration of 96% obtained by ultrasound (77.15%), and for the extract obtained by microwave, a maximum inhibition ratio of 76.20%.

Both extraction methods can be used to obtain ethanolic extract of *Prunella vulgaris* with an increased content of polyphenols and high antioxidant activity.

Bucăloiu Constanta

University of Pitești, The interdisciplinary doctoral school, str. Târgul din Vale, Nr. 1, Pitești, Romania

E-mail: ionelabucaloiu@yahoo.com

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THE IMPACT OF BIOTIC AND ABIOTIC STRESSORS ON PULSE CROPS IN THE REPUBLIC OF MOLDOVA

[1]CÎRLIG Natalia, [2]IURCU-STRĂSTARU Elena, [1]ȚÎȚEI Victor, [2]BIVOL Alexei, [2]RUSU Ștefan, [1]GUȚU Ana

1. "Alexandru Ciubotaru" National Botanical Garden (Institute) of Moldova State University, 18 Padurii street, MD 2002, Chişinău, Republic of Moldova.
2. Institute of Zoology of Moldova State University, 1 Academiei Street, Chisinau, Republic of Moldova

Introduction: Global climatic change combined with population growth is imposing a huge pressure on demand for food and forage resources. The *Fabaceae* plants species are currently in high demand due to their edible fruits and seeds with high content of protein, but being all from the same botanical family, included in various genera, these species also have certain common morpho-biological, physio-ecological and agro-technological characteristics, which represent them in several agrobiological aspects.

Material and Methods: The research was carried out on the experimental sectors of the National Botanical Garden (Institute) "Alexandru Ciubotaru" Moldova State University during the growing seasons of 2023-2024, on experimental plots planted with annual of *Fabaceae* species: pea (*Pisum sativum*), soybean (*Glycine max*), common bean (*Phaseolus vulgaris*), faba bean (*Vicia faba*), white lupine (*Lupinus albus*), chickpea (*Cicer arietinum*), lentil (*Lens culinaris*).

Figure 1. Plants affected by multiple diseases: a, b – helminth infections associated with downy mildew and powdery mildew; c, d - faba bean plants with high tolerance to biotic factors, a -lentil plants in differen, c – lupin phenological stages

Tab. 1. The degree of attack of diseases and pests in the Fabaceae species investigated on the experimental plots of NBGI, 2024, Central area of R. Moldova

Species	Disease / pest	Pathogen / parasite	Frequency, %	Intensity, %
Pea (*Pisum sativum*)	Powdery mildew	Erysiphe pisi,	30	**26**
	Downy mildew	Peronospora pisi,	26	**22**
	Rust	Uromyces pisi,	18	**25**
	Septoria leaf spot Anthracnose	Septoria pisi,	15	**13**
	Aphids	Mycosphaerella pinodes	34	**30**
	Weevils	Acyrthosiphon pisum	14	**10**
		Sitonia lineatus,	18	**15**
	Pea moth	Bruchus pisorum	28	**24**
		Cydia nigricana	12	**8**
Soybean (*Glycine max*)	Downy mildew	Peronospora manshurica Ascochyta sojaecola	36	**34**
	Ascochyta blight Septoria leaf spot	Septoria glycines	32	**30**
	Powdery mildew	Microsphaera diffusa	28	**25**
	Stem blight	Diaporthe phaseolorum var.sojae	25	**22**
	Pea weevil	Sitonia liniatus	20	**17**
	Pulse pod borer moth	Etiella zinckenella	18	**15**
	Agriotes beetles	Agriotes spp.	15	**13**
			12	**10**
Common bean (*Phaseolus vulgaris*)	Ascochyta blight	Ascohyta phaseoli	40	**37**
	Rust	Uromyces phaseoli	38	**35**
	Anthracnose	Colletotrichum lindemuthianum	32	**30**
	Black rot	Xanthomonas campestris pv phaseoli	25	**23**
		Acanthoscelides obtectus		
	Bean weevil	Aphis fabae	20	**17**
	Black bean aphid		18	**15**
Faba bean (*Vicia faba*)	Downy mildew	Perenospora fabae	22	**19**
	Faba bean rust	Uromyces viciae-fabae	20	**17**
	Root rot	Fusarium oxysporum	18	**15**
	Aphids	Aphis spp.,	17	**15**
White lupine (*Lupinus albus*)	Downy mildew	Perenospora lupinus	23	**20**
	Powdery mildew	Erisyphe lupinus	25	**22**
	Bean weevil	Acanthoscelides obtectus	20	**17**
	Aphids	Aphis fabae	15	**13**
	Bean seed fly	Delia platura	10	**7**
Chickpea (*Cicer arietinum*)	Rust	Uromyces ciceri-arietini	18	**15**
	Chickpea blight	Mycosphaerella rabiei.	20	**17**
	Broadbean weevil	Bruchus rufimanus ,	15	**12**
	Agriotes beetles	Agriotes spp,	15	**12**
Lentil (*Lens culinaris*)	**Ascochyta blight**	**Ascophyta lens,**	**25**	**23**
	Rust	**Uromices lens,**	**18**	**15**
	Root rot	**Fusarium oxysporum v. fabae**	**15**	**12**
	Bean weevil	**Acanthoscelides obtectus,**	**18**	**14**
	Aphids	**Aphis fabae**	**15**	**13**

Results: . The most severe impact was caused by the following pathogens: ascochyta blight – *Ascochyta spp*., powdery mildew – *Erysiphe pisum,* downy mildew – *Perenospora spp.*, septoria leaf spot – *Septoria spp.*, stem blight – *Diaporthe phaseolorum var. sojae*, with major values from 15% up to 40% degree of attack, varying among the tested species. The species *Phaseolus* spp. and *Glycine max* were the most susceptible to diseases, being severely affected by ascochyta blight, powdery mildew and downy mildew. The records of entomological parasitic impact and expresses their association with the researched crops. The diversity and severity of the detected plant diseases were analysed comparatively by species. Thus, 26 pathogens with specific etiology and symptoms for each of the 7 Fabaceae species were identified. The most damage was caused to the species *Faseolus* spp. and *Glycine max* – up to 40% degree of attack by ascochyta blight (*Ascochyta* spp.), followed by powdery mildew, downy mildew, anthracnose and rusts.

Conclusion:The results of the physiological and phytosanitary research conducted on 7 species of the Fabaceae family in 2023-2024. The species *Phaseolus* spp. and *Glycine max* were found to be the most vulnerable under the impact of environmental factors. The monitoring and sampling activities revealed the presence of 8 species of parasitic insects, which also caused considerable damage to Fabaceae plants.

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LABORATORY IDENTIFICATION OF *Sarcocystis* spp. IN BIOLOGICAL SAMPLES FROM PIGS SLAUGHTERED FOR COMMERCIAL AND HOUSEHOLD CONSUMPTION IN DOLJ COUNTY, ROMÂNIA

[1] **Ioana Cornelia BORONTEA, [2]Constanţa TÎMBURESCU, [3]Ionelia Claudia GOGA**

[1]Ioana Cornelia BORONTEA-*DSVSA-LSVSA Craiova,* ***Romania,*** [2]Constanţa Tîmburescu- *DSVSA-LSVSA Craiova,* ***Romania,*** [3]Ionelia Claudia Goga-*The Museum of Oltenia Craiova, Nature Sciences Department,* ***Romania.***

Abstract. Through a series of sampling and examination of skeletal muscle samples collected from a total of 10,410 pigs, of which 10,314 were sacrificed normally in the three slaughterhouses in Dolj county between 2019-2024, and 96 were sacrifice for private consumption, it was found that in 17 samples (0.16%), the parasite *Sarcocystis* spp. was identified (order Sarcosporidia, family Sarcocystidae, Poche, 1913; subfamily Sarcocystinae, Poche, 1913; genus *Sarcocystis*, Lankaster, 1882). This is one of the dangerous parasites for both animals and humans. The presence of sarcocysts in the striated muscles, was highlighted through macroscopic and trichineloscopic examination by compression of the samples at LSVSA Dolj. In the absence of molecular biological analyses, a method we currently do not have access to, the identification of species was not possible.
Keywords: *Sarcocystis* spp., pigs, Dolj.
Rezumat. Identificarea de laborator a speciei *Sarcocystis* spp. în probe biologice prelevate de la porci sacrificaţi pentru consum comercial şi casnic în judeţul Dolj, România. Printr-o serie de prelevări și examinări de probe de musculatură scheletică recoltate din totalul de 10410 porcine din care 10314 au fost sacrificate normal în cele trei abatoare din județul Dolj în perioada 2019-2024, iar 96 au fost sacrificate pentru consum propriu, s-a constatat că în 17 probe (0.16%) am identificat parazitul *Sarcocystis* spp. (ord.Sarcosporidia, fam. Sarcocystidae, Poche, 1913; subfam. Sarcocystinae, Poche, 1913; genul *Sarcocystis*, Lankaster, 1882), acesta fiind unul dintre paraziții periculoși atât la animale, cât și la om. Prezența sarcochiștilor la nivelul musculaturii striate a fost evidențiată prin examinarea macroscopică și trichineloscopică prin compresie a probelor în LSVSA Dolj. În absența unor analize biologice moleculare, metodă de care nu dispunem în prezent, identificarea speciei nu a fost posibilă.

Cuvinte cheie: *Sarcocystis* spp., porci, Dolj.

INTRODUCTION Zoonoses still remain a current problem worldwide. Sarcocystosis, also called sarcosporidiosis, as a disease, is a parasitic disease one, common to humans and several species of domestic and wild animals. The *Sarcocystis* spp. parasite was discovered in 1843, in Switzerland for the first time in the muscle tissue of the house mouse by Miescher F., and in Romania in 1959 the first data on sarcocystosis in deer were reported (FISCHER & ODENING, 1998; JENSEN et al., 1986; RIMAILA-PARNANEN & NIKANDER, 1980; ȘUTEU 1975, 1997; ȘUTEU & MIRCEAN, 1996; ȘUTEU & COZMA, 1998;). In humans, the muscular sarcocystosis in our country was diagnosed (Panaitescu, Gh. Cristea, V. Jula and Eugenia Cristea for the first time in 1978. For a long time, the biological cycle was unknown. At first, it was considered non-pathogenic and with its description in 1972, it began to be studied in more depth in domestic and wild animals in several countries. Studies conducted on farm animals by Ghila I. et al. (1985) mention that cattle were infested in 0.17 – 1.0% of cases, sheep – 0.9 – 5.1% and pigs in 0.2 – 0.9% of cases, in Bihor County (Romania). In 1996, O. Rotaru found that microscopic examination of muscle tissue fragments from 800 cattle, sheep, goats and pigs that are intended for human consumption, revealed a very high incidence of 70-96% of parasitism with intracellular schizogonic forms (BRIGGS et al., 1993; DUBEY et al., 1992; DUBEY & BWANGAMOI, 1994, YE et al., 2018; GJERDE, 2013; IEPURE & RUSU 1985; KALYAKIN & ZASUKHIN, 1975).*Sarcocystis* spp. are intracellular protozoan parasites belonging to the phylum Apicomplexa, with a heteroxenous life cycle involving carnivores as definitive hosts and herbivores or omnivores as intermediate hosts. In swine, infections are most commonly caused by *Sarcocystis miescheriana*, a species transmitted through ingestion of sporocysts excreted in the feces of carnivores, particularly canids (DUBEY et al., 1989). Once ingested, the parasites undergo asexual reproduction in the vascular endothelium, followed by encystment in skeletal muscles, including the diaphragm, tongue, and intercostal muscles.Although *Sarcocystis* infections in pigs are often asymptomatic, high parasite loads may cause clinical signs such as fever, myositis, or even sudden death in severe cases. More frequently, the disease remains subclinical, with parasitic cysts being discovered incidentally during post-mortem meat inspections. The identification of sarcocysts is thus of particular importance in the context of food safety and zoonotic risk, especially considering that some *Sarcocystis* species are potentially transmissible to humans through the consumption of undercooked or raw meat (CASTRO-FORERO et al., 2022).In many rural areas, pigs are slaughtered outside of official veterinary control systems, often for household consumption. This practice significantly increases the risk of undiagnosed parasitic infections entering the food chain. Macroscopic examination of muscle tissue during home slaughter, followed by confirmatory methods such as compression trichinoscopy, remains a practical approach for preliminary parasitological screening under such conditions (EFSA, 2013).*Sarcocystis* spp. presents an evolutionary cycle that includes as definitive hosts (intestinal form) in general, carnivores and humans, and as intermediate hosts (muscular form) a wide variety of mammals, birds, reptiles, fish and humans. The ingested parasites cross the intestinal walls, enter the blood and reach the muscle tissue where they form cysts, especially in: the masseter muscles, the chest, shoulder, trunk and thigh muscles. As a rule, cysts, located in the muscle tissue of animals, are transmitted to humans through insufficiently cooked or thermally prepared meat, reaching the human intestine where they release merozoites, which penetrate the intestinal epithelium and cause digestive disorders of varying severity (OLTEANU, 1999). The present study aims to evaluate the occurrence and diagnostic detectability of *Sarcocystis* spp. in pigs slaughtered for personal consumption by employing both macroscopic inspection and trichinoscopic examination of diaphragmatic muscle samples.

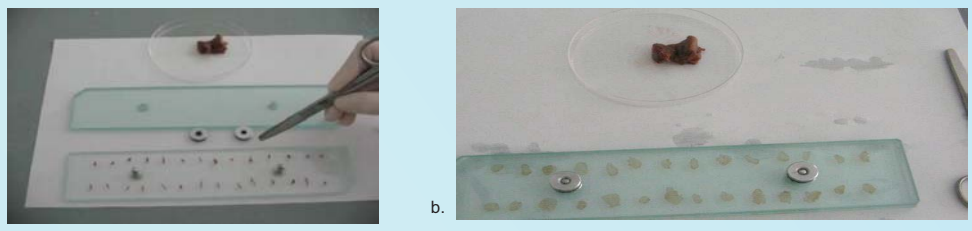


Fig 1 (a, b). Trichineloscopic exam – spread (a), compression (b) (photo: Tîmburescu & Borontea, 2024).

MATERIAL AND METHODS Muscle samples were collected from the diaphragmatic pillar muscles of 96 domestic pigs (*Sus scrofa domesticus*) slaughtered for personal consumption in rural households. The animals were not subjected to prior veterinary inspection, and sampling was performed post-mortem during routine househ. This work describes the presence and morphological characteristics of *Sarcocystis* spp. identified in skeletal muscle samples collected from a total of 10,410 pigs. Of these, 10,314 animals were slaughtered under standard conditions in the three officially approved slaughterhouses of Dolj County between 2019 and 2024, while 96 pigs were slaughtered for personal consumption. Particular attention is given to the parasitic burden observed and the potential complications associated with high tissue invasiveness, as well as to the zoonotic impact on the definitive host – humans – especially in cases of consumption of undercooked or raw infected meat.old processing. This study was conducted on a total of 5,376 biological samples (skeletal muscle tissues) suspected of sarcocystosis, collected from 96 pigs slaughtered for personal consumption. Additionally, a set of 560 biological samples was randomly selected from pigs slaughtered in authorized slaughterhouses and subjected to both macroscopic inspection and compression trichinoscopy; all examined samples in this group tested negative for *Sarcocystis* spp. infection. It is noteworthy that all muscle samples were transported to the laboratory in refrigerated containers, maintained at a constant temperature of 4°C to preserve tissue integrity. According to the specialized literature, optimal preservation methods for molecular identification of *Sarcocystis* spp. include freezing at –20°C, refrigeration at 4°C, or fixation in 90% ethanol. The parasite and its intramuscular sarcocysts were identified primarily through trichinoscopic examination by compression, although macroscopic detection was possible in cases of severe and chronic infestations. The method employed followed the protocol outlined in the 'Standard Operational Procedure for the Identification of Parasite Species of the Genus *Sarcocystis* spp. in Animals by Trichinoscopy' (ȘUTEU et al., 1997). For trichinoscopic analysis, certain muscle samples were preserved at 4°C during transport to the laboratory to ensure the integrity of tissue and cysts. The examination focused on striated muscle tissue, using a protocol analogous to that applied for the detection of *Trichinella* spp., which involves sectioning 28 oat-grain-sized pieces from each muscle along the direction of the fibers. These sections were positioned in fields numbered 1 to 28 on the lower plate of the trichinoscope compressor. Each was then compressed using the upper plate. The trichinoscopic examination was conducted under 40× magnification for routine screening, with 80× magnification employed for enhanced detail and confirmation of morphological structures. The assessment consistently began with field 1 and proceeded sequentially through field 28. In each field, both the muscle tissue and the surrounding fluid were meticulously examined for the presence of sarcocysts (Figs. 1a, b).

RESULTS AND DISCUSSIONS The primary objective of this study was the macroscopic identification and microscopic characterization of sarcocysts located in striated muscle tissue, using trichinoscopic examination by compression. Sarcocystosis is a chronic parasitic disease that primarily affects the muscular system of intermediate hosts, leading to the formation of distinct cysts within the intramuscular connective tissue. Despite its zoonotic and epizootological significance, sarcocystosis remains an underdiagnosed and undervalued parasitosis in Romania. The biological cycle of *Sarcocystis* spp. is obligately heteroxenous, involving a strict predator–prey relationship between the two hosts. The asexual developmental stages occur exclusively in the intermediate host—typically a prey species—while the sexual stages are restricted to the definitive host, which is usually a carnivorous animal. In the present study, pigs originating from farms and rural households serve as intermediate hosts, acquiring infection through ingestion of sporocysts present in contaminated feed, water, or the environment.Muscle samples were collected bilaterally from the diaphragmatic pillar muscles of 96 pigs slaughtered for personal consumption. Of these, 17 samples tested positive for *Sarcocystis* spp. confirmed through compression trichinoscopy, with several cases also exhibiting visible macroscopic lesions. Trichinoscopic examination was performed systematically, and in instances where suspicious structures were identified, the fields were further investigated using a higher magnification objective (100×) for enhanced resolution. In cases of diagnostic uncertainty, additional tissue samples were collected and re-examined through repeated compression until definitive results were obtained (Fig. 2). The diagnosis of sarcocystosis caused by *Sarcocystis* spp. in intermediate hosts can occasionally be made during slaughter; however, it is not considered a reliable diagnostic method unless macroscopic evidence is present. Specifically, the identification of fusiform, yellowish-white, granular cysts containing rounded corpuscles within and located between muscle fibers is required for a presumptive diagnosis (Fig. 3). In the 17 muscle samples from pigs slaughtered for personal consumption, sarcocysts measuring between 0.5 and 1.5 mm were identified, visible to the naked eye an aspect that facilitates suspicion of disease during sanitary-veterinary meat inspection. It is important to note that species-level identification of *Sarcocystis* can only be achieved through molecular biology techniques, which were not available for this study. However, it is well established that the species with zoonotic potential are *Sarcocystis suihominis* and *Sarcocystis bovihominis* (OLTEANU, 1999). In humans, intestinal sarcocystosis is acquired through the consumption of raw or undercooked beef or pork containing mature sarcocysts. In animals, infection occurs via ingestion of sporocysts excreted in the feces of definitive hosts, contaminating pastures, feed, or water sources. Given the public health relevance and the potential impact of sarcocystosis, preventive measures are essential. These include avoiding the consumption of raw or insufficiently heat-treated meat (cooked below 60°C), or freezing meat at –20°C for at least 3 days prior to consumption. Non-compliance with these recommendations may lead to toxic syndromes in humans, caused by sarcocystin, with clinical manifestations such as anxiety, nausea, gastrointestinal pain, and edema, typically lasting between 24 and 36 hours. The detection of sarcocysts through both macroscopic observation and trichinoscopic confirmation underscores the importance of thorough meat inspection, even in animals slaughtered outside of authorized facilities. The identification of lesions during gross examination can serve as an early indicator for targeted parasitological analysis. The size range and appearance of the cysts are consistent with previously documented infections in swine, most frequently attributed to *Sarcocystis miescheriana* (DUBEY et al., 1989; CASTRO-FORERO et al., 2022).

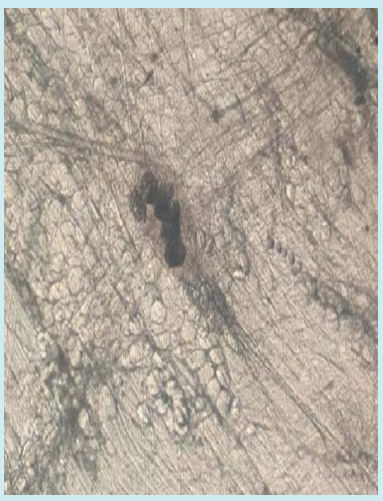


Figure 2. *Sarcocystis* spp. – Cysts, visualization of pig muscle fiber with trichinoscope by compression, 80X objective (photo: Tîmburescu & Borontea, 2024).

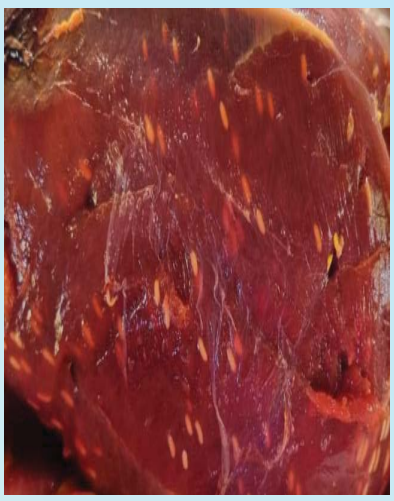


Figure 3. Sarcocystis spp.– Cysts, macroscopic view, muscletissue in a pig slaughtered for own consumption (photo: Borontea & Tîmburescu, 2024).

CONCLUSIONS Muscle samples from both diaphragmatic pillarmuscles from the 96 pigs sacrifice for own consumption and 17 samples were confirmed macroscopically, which is an advantage in the sanitary-veterinary examination of meat, leading to suspicion of disease. The trichinelloscopic examination by compression followed with confirmation of the presence of sarcocysts that vary in size between 0.5 and 1.5 mm. In this context, the monitoring of sarcocystosis in domestic (cattle, sheep, dogs, cats) and wild (bear, wild boar) animals from different habitats has a bioecological, medical and veterinary importance in preventing the transmission of sarcocysts to humans and other mammals involved in the biological cycles of parasites, which is why measures to reduce the level of infestation in wild animals are required.

REFERENCES

BRIGGS M. B., LEATHERS C. W., FOREYT W. J. 1993. *Sarcocystis felis* in captive cheetahs (*Acinonyx jubatus*). *Journal Helminthology.* Soc. Wash. **60**: 277–279.
CASTRO-FORERO S. P., BULLA-CASTAÑEDA D. M., LÓPEZ BUITRAGO H. A., DÍAZ ANAYA A. M., MADEIRA DE CARVALHO L. M., PULIDO-MEDELLÍN M. O. 2022. *Sarcocystis* spp., a parasite with zoonotic potential. *Bulgarian Journal of Veterinary Medicine*. **25** (2): 175 – 186.
DUBEY J. P., SPEER, C. A., FAYER R., 1989. *Sarcocystosis of animals and man*. Boca Raton: CRC Press. 215 p.
DUBEY J. P., HAMIR A. N., KIRKPATRICK C. E., TODD K. S., RUPPRECHT C. E. 1992. *Sarcocystis felis* sp. (Protozoa: Sarcocystidae) from the bobcat (*Felis rufus*). *Journal. Helminthology.* Soc. Wash. **59**: 227–229.
DUBEY J. P. & BWANGAMOI O. 1994. *Sarcocystis felis* (Protozoa: Sarcocystidae) from the African lion (*Pantheraleo*). Journal. Helminthologyc. Soc. Wash. **61**: 113–114.
DUBEY J. P., CALERO-BERNAL R., ROSENTHAL B.M., SPEER C. A., FAYER R. 2016. *Sarcocystosis of animals and human.* 2nd ed.; CRC Press: Boca Raton. USA. 52–59.
EFSA (European Food Safety Authority), 2013. Scientific Opinion on the public health hazards to be covered by inspection of meat (swine). *EFSA Journal*, 11 (6), p. 3266. https://doi.org/10.2903/j.efsa.2013.3266
FISCHER S. & ODENING K. 1998.Characterization of bovine *Sarcocystis species* by analysis of their 18S ribosomal DNA sequences. *Journal Parasitology*. **84**: 50–54.
GJERDE B. 2013. Phylogenetic relationships among *Sarcocystis* species in ruminants inferred from mitochondrial DNA sequences. *Parasitology*. **140** (3): 359–370.
GJERDE B. 2013.Phylogenetic relationships among Sarcocystis species in cervids, cattle and sheep inferred from the mitochondrial cytochrome c oxidase subunit I gene. Int. J. Parasitology. **43**: 579–591.
IEPURE V. & RUSU V. 1985. Sarcosporidioza la bovine, ovine, porcine, tăiate în abatorul Tecuci. În: *Protozooze la om şi animale.* 78.
JENSEN R., ALEXANDER A. F., DAHLGREN R. R., JOLLEY W. R., MARQUARDT W. C., FLACK D. E., BENNET B. W., COX M. F., CRAVANS R. L. 1986. Eosinophilic myositis and muscular sarcocystis in the carcases of slaughtered cattle and lambs. AM. *Journal Veterinary.* Res. 47, 587.
RIMAILA-PARNANEN E., NIKANDER S. 1980. Generalised eosinophilic myositis with sarcosporidiosis in a Finnish cow. Nord. *Veterinarmed*. 32, 96.
ȘUTEU E. 1975. Aspecte actuale si reconsiderări privind biologia sarcosporidiilor. Revista de bacteriologie, virusologie, parazitologie, epidemiologie. **20** (2): 65-70.
ȘUTEU E. 1999. Sporozooze mai puțin cunoscute. Rev. Rom. Med. Vet. **9**(3): 69.
ȘUTEU E. & COZMA V. 1998. Bolile parazitare la animalele domestice. Edit. Ceres. București.
ȘUTEU E., COZMA V., NEGREA. O., GHERMAN C., MIRCEAN VIORICA. 1997. Cercetări privind ciclul evolutiv al speciilor de *Sarcocystis* diagnosticate la animale în Romania. Al VII-lea Congres Național de Medicină Veterinară, Voineasa, 21-24 octombrie. 199.
ȘUTEU E. & MIRCEAN VIORICA. 1996. Semnalarea infestației cu *Sarcocystis porcifelis* la mistreț *(Sus scrofaferus).* Rev. Rom. Med. Vet. **6**(2): 165-167
ȘUTEU E., VARTIC N., COZMA V. 1997. Diagnosticul și tratamentul parazitozelor la animale. București. 54.
YE Y., LIANG Y., HU J., HUANG Z., ZHANG Y. 2018.First isolation of *Sarcocystis caninum* sarcocysts from two domestic dogs (*Canis familiaris*) from China. Parasitology. Res. 1**17**: 3613–3618.
KALYAKIN V. N. & ZASUKHIN D. N. 1975. Distribution of Sarcocystis (Protozoa: Sporozoa) in vertebrates. Folia parazitologica (Praha). **22**: 289-307.

RESEARCH ON THE LETHAL DOSE OF AZOXYSTROBIN FOR THE SPECIES *Carassius gibelio* (Bloch, 1782)

Keywords: azoxystrobin, lethal dose, carassus gibelio, behavioral and physiological changes.

INTRODUCTION

Azoxystrobin is a methacrylate compound structurally related to natural strobilurins, which are compounds derived from some fungal species and act by inhibiting electron transport in pathogenic fungi.

In order to establish the lethal dose of azoxystrobin for the species of *C. gibelio*, a case study was initiated and carried out.

General objective: to identify the concentration of doses of azoxystrobin with direct/indirect effects on the physiology and behavior of the species of *C. gibelio*.

Hypotheses launched:

1. exposure of the species of *C. gibelio* to a dose of azoxystrobin between 1-2 mg/L azoxystrobin does not induce physiological and behavioral changes in the first 48 hours.
2. exposure of the species of *C. gibelio* to a dose of azoxystrobin between 2.1-5 mg/L azoxystrobin induces physiological and behavioral changes and can be lethal after a certain time interval.
3. exposure of the species of *C. gibelio* to a dose of azoxystrobin between 5.1-7 mg/L azoxystrobin is lethal in the first 48 hours.

MATERIAL AND METHODS

Eight specimens of *C.gibelio* were exposed for 8 days to a dose of 1, 2, 3, 4, 5, 6, 7 mg/L azoxystrobin.

Working method used: observation.

Sample used: The research was carried out in November 2024 on a sample consisting of 56 specimens of *C. gibelio*, with a length between 2-8 cm and a weight between 10-80 grams.

RESULTS AND DISCUSSION

Exposure of *C. gibelio* species to a dose of 1 mg/L azoxystrobin does not induce physiological and behavioral changes.

In the case of specimens exposed to a dose of 2 mg/L of azoxystrobin for 24 and 48 hours, the same situation was observed, while the exposure of these specimens to the same dose for an interval between 72 and 190 hours led to the recording of a state of slight agitation in their behavior.

For specimens exposed to a dose of 3 mg/L of fungicide, agitated behavior was observed throughout the monitoring interval and, starting with the third day, a slight weight loss of 0.3 grams/specimen/48 hours.

For specimens exposed to a dose of 4 mg/L fungicide, a very agitated behavior and a slight weight loss of 1 gram/specimen/48 hours were observed throughout the monitoring interval.

In the first 24 hours of exposure of goldfish specimens to a dose of 5 mg/L azoxystrobin, a very agitated behavior was observed, while their exposure to the same dose for a period between 48 and 168 hours also had the effect of decreasing the weight of these specimens by 1-1.3 grams.

Exposure to a dose of 5 mg/L azoxystrobin led to the death of the tested specimens on the eighth day.

For specimens exposed to a dose of 6 mg/L azoxystrobin, a very agitated behavior was observed in the first 24 hours after exposure. At 48 hours after exposure, the specimens began to lose weight by 2 grams, so that at 72 hours after exposure, the death of all specimens was observed.

In the case of specimens exposed to a dose of 7 mg/L azoxystrobin, a very agitated behavior was observed in the first 24 hours after exposure. At 48 hours after exposure, the death of all specimens was observed.

CONCLUSIONS

The research confirmed the hypotheses launched at the beginning of the study, namely that exposure of *C. gibelio* species to a dose of 1-2 mg/L azoxystrobin does not induce physiological and behavioral changes in the first 48 hours.

The research also confirmed the second and third hypotheses launched, namely that exposure of *C. gibelio* species to a dose of 2.1-5 mg/L azoxystrobin induces physiological and behavioral changes, respectively that exposure of *C. gibelio* species to a dose of 5.1-7 mg/L azoxystrobin is lethal at 168 hours (in the case of specimens exposed to a dose of 5 mg/L), respectively 48 hours after exposure (in the case of specimens exposed to doses of 6 and 7 mg/L, respectively).

Bucăloiu Ionela

University of Pitești, The interdisciplinary doctoral school, str. Târgul din Vale, Nr. 1, Pitești, Romania

E-mail: ionelabucaloiu@yahoo.com

THE STRUCTURE OF THE ICHTHYOFAUNA IN THE DAM LAKES OF THE PREAJBA VALLEY (SOUTHWEST ROMANIA)

[1]GOGA Ionelia Claudia, [2]TÎMBURESCU Constanţa, [3]BORONTEA Ioana Cornelia

[1]Ionelia Claudia Goga-*The Museum of Oltenia Craiova, Nature Sciences Department,* ***Romania,*** [2]Constanţa Tîmburescu- *DSVSA-LSVSA Craiova,* ***Romania,*** [3]Ioana Cornelia BORONTEA-*DSVSA-LSVSA Craiova,****Romania.***

Abstract. The ichthyological research started in 2008 and carried out in the 10 artificial basins of the Preajba Valley lake complex, highlighted 14 fish species classified in four orders: Esociformes, Cypriniformes, Perciformes and Siluriformes and six families: Esocidae, Cyprinidae, Cobitidae, Percidae, Centrarchidae, Siluridae. Compared to the total number of fish species in Romanian waters, it can be considered that the diversity of the species identified by us in the studied ecosystems is small. The lakes where the research was carried out are small in surface area and particularly vulnerable to the natural and anthropogenic environmental factors that act on them. The ichthyological material collected was analyzed from an ecological point of view following the interpretation of quantitative biocenotic indices (frequency and abundance). The ecological situation of the species following the interpretation of the biocenotic indices is characteristic of the existing habitats, the number of species being conditioned by their size, but also by the recorded anthropogenic impact. Thus, it is found that the number of species increases progressively with the distance from the springs and as the habitats become more spacious. The purpose of this study is to present the situation of the ichthyofauna in a lacustrine ecosystem specific to the Oltenia Plain, having the status of a protected natural area of national interest, subject to the environmental challenges of the urban and rural environments in proximity.

Keywords: ichthyological, Preajba Valley, biocenotic indices.

Rezumat. Structura ihtiofaunei din lacurile de baraj de pe cursul Valea Preajba (Sud - Vestul României). Cercetările ihtiologice începute în anul 2008 efectuate în cele 10 bazine artificiale din complexul lacustru Valea Preajba, au pus în evidență 14 specii de pești încadrate în patru ordine: Esociformes, Cypriniformes, Perciformes şi Siluriformes şi şase familii: *Esocidae*, *Cyprinidae*, *Cobitidae*, *Percidae*, *Centrarchidae*, *Siluridae*. Raportat la numărul total de specii de pești din apele României, se poate considera că diversitatea speciilor identificate de noi în ecosistemele studiate, este mică. Lacurile unde s-a realizat cercetarea sunt mici ca suprafață și deosebit de vulnerabile față de factorii de mediu naturali şi antropici care acţionează asupra lor. Materialul ihtiologic prelevat a fost analizat din punct de vedere ecologic în urma interpretării indicilor biocenotici cantitativi (frecvenţa şi abundenţa). Situatia ecologică a speciilor în urma interpretării indicilor biocenotici este caracteristică habitatelor existente, numărul speciilor fiind conditionat de mărimea acestora, dar și de impactul antropic înregistrat. Astfel, se constata că numărul de specii crește progresiv odată cu distanța față de izvoare și cu cât habitatele devin mai spațioase. Scopul acestui studiu este de a prezenta situația ihtiofaunei dintr-un ecosistem lacustru specific Câmpiei Olteniei având statut de arie naturală protejată de interes naţional, supusă provocărilor environmentale ale mediilor urban şi rural din proximitate.

Cuvinte cheie: ihtiologic, Valea Preajba, indici biocenotici.

INTRODUCTION The Preajba Valley lake complex is located in Dolj County, 6 km south of Craiova Municipality, in the Oltenia Plain platform, being part of the "Preajba-Făcăi Lake Complex" Protected Area. The main watercourse is the Preajba Valley, with a length of 9.6 km, and its right tributary, the Bătrâna Valley (Ciliboaica), has a length of 6.8 km. 1200 meters before the confluence with the Jiu River, the main watercourse joins the Craiovița collector channel, managing to cross all the relief steps on the left of its collector in the East-West direction. Tourist developments were made between 1976 and 1979, damming this small tributary of the Jiu River, and through this intervention on the minor riverbed, the lakes were created, 13 tourist developments that were provided with dams and surface spillways, fed by strong springs located at the morphological contact between the Romanaților Plain (Câmpul Leu-Rotunda) and the high terrace of the Jiu River, but there are also other categories of springs that feed the lakes, the valley springs that appear at the contact between the slope and the banks of the lakes. Due to the anthropogenic impact and intense eutrophication phenomena, ten water accumulations are also present in the area, with variable surface and depth (Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13) (IONUȘ et. al., 2014).

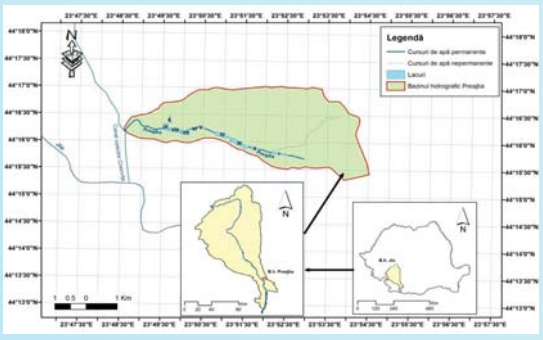


Figure 1. Framing of the Preajba river basin at national and regional level (GIS processing of vector data after orthophotoplan, 2009).

Figure 2. The hydrographic network of the Preajba basin: springs, streams and dam lakes.

Figure 3. Transverse valley profile.

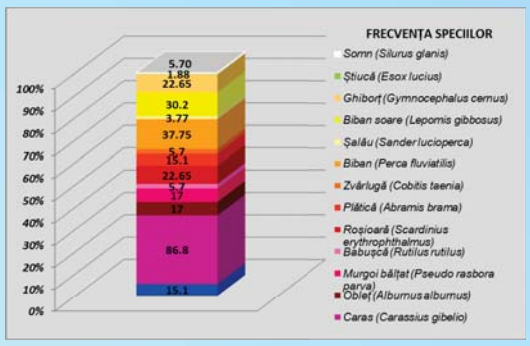
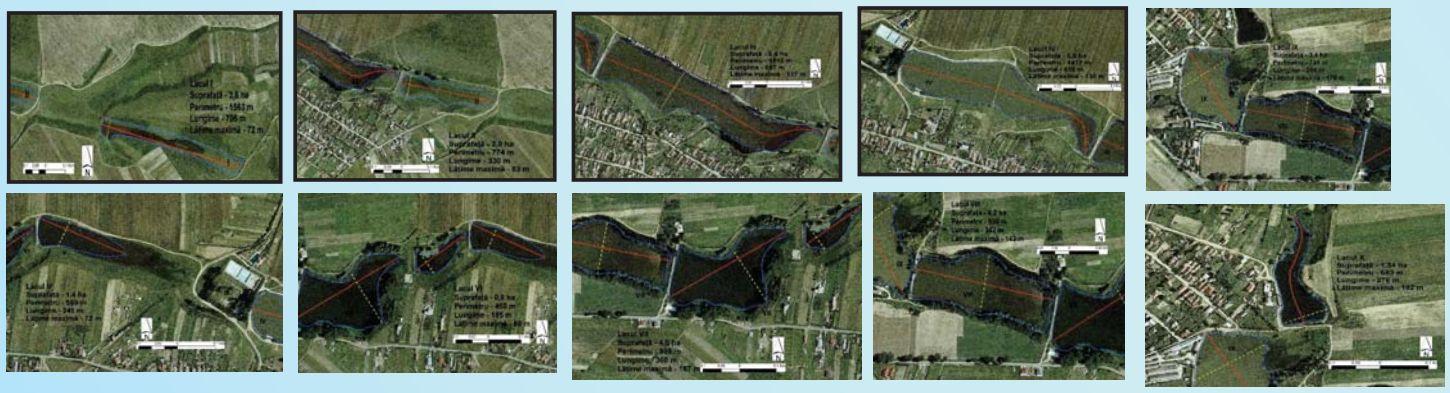


Figure 14. Graphical representation of the frequency of fish species in lakes.



Figures 4 -13. Morphometric situation of the lakes in the Preajba Valley watershed (Source: orthophotomap measurements 1:5,000, 2009).

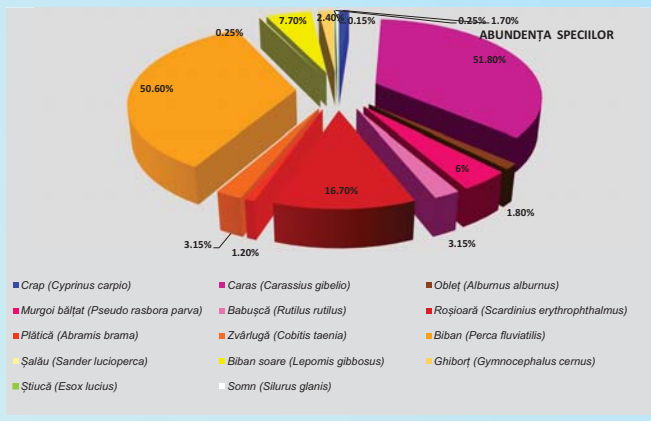


Figure 15. Graphical representation of the abundance of fish species in lakes.

MATERIAL AND METHODS The sampling of ichthyological material was carried out quarterly in all 10 lakes, except for periods when the weather was unfavorable (late autumn, winter). The main collection points on the Preajba Valley were established starting from upstream to the downstream area. In the absence of electronarcosis equipment, the collection was done with various monofilament nets with a length of between 50-100 m and a mesh size of 40 - 60 mm, but also by fishing with a fishing rod by amateur fishermen in the area. 832 fish specimens were collected, weighing between 90g and 422g. The ichthyological material was subjected to taxonomic determination, an attempt was made to use the current valid nomenclature for all species, according to the latest systematic revisions (NELSON, 2006; OȚEL, 2007; KOTTELAT & FREYHOF, 2007; www. Fish Base). The situation of the species following the interpretation of the quantitative biocenotic indices (frequency and abundance) is characteristic of the existing habitats, the number of species being conditioned by their size, but also by the recorded anthropogenic impact. Thus, it is found that the number of species increases progressively with the distance from the springs and as the habitats become more spacious.

No. crt	1	2	3	4	5	6	7
Species	Esox lucius Linnaeus, 1758	Cyprinus carpio Linnaeus, 1758	Carassius gibelio (Bloch, 1782)	Alburnus alburnus (Linnaeus, 1758)	Pseudorasbora parva (Temmink & Schlegel, 1848)	Rutilus rutilus (Linnaeus, 1758)	Scardinius erythrophthalmus (Linnaeus, 1758)
F % (frequency)	1,88	15,10	86,8	17	17	5,70	22,65
A% (abundance)	0,15	1,70	51,80	1,80	6	3,15	16,70

No. Crt.	8	9	10	11	12	13	14
Species	Abramis brama (Linnaeus,1758)	Cobitis taenia Linnaeus, 1758	Silurus glanis Linnaeus, 1758	Perca fluviatilis Linnaeus, 1758	Sander lucioperca (Linnaeus, 1758)	Gymnocephalus cernuus (Linnaeus, 1758)	Lepomis gibbosus (Linnaeus, 1758)
F%	15,10	5,70	5,70	37,75	3,77	22,65	30,20
A%	1,20	3,15	0,25	50,60	0,25	2,40	7,70

F%(species frequency)	P (number of samples in which a species occurs)	P (total number of observed samples)	p/Px100
A%(species abundance)	n (number of individuals of a species)	N (number of individuals of all species in the samples)	n /N x100

Table 1. Frequency (F%- p/Px100 where p: number of samples in which a species appears; P: total number of samples observed) and Abundance (A%- n /N x100 where n: number of individuals of a species; N: number of individuals of all species in the samples) - of fish species present in the lakes on the Preajba Valley river.

RESULTS AND DISCUSSIONS In order to establish the structure of the ichthyofauna (BĂNĂRESCU, 1964; NALBANT, 2003) from these lakes, seasonal collections were made using monofilament nets. 832 individuals were collected and the quantitative variations of the catches were influenced by the climatic conditions existing at the time of collection, but also by the anthropogenic impact in the area. The collected fish belong to 14 species respectively (*Esox lucius* Linnaeus, 1758; *Cyprinus carpio* Linnaeus, 1758; *Carassius gibelio* (Bloch, 1782); *Alburnus alburnus* (Linnaeus, 1758); *Pseudorasbora parva* (Temmink & Schlegel, 1848); *Rutilus rutilus* (Linnaeus, 1758); *Scardinius erythrophthalmus* (Linnaeus, 1758); *Cobitis glanis* Linnaeus, 1758; *Gymnocephalus gibbosus* (Linnaeus, 1758) families. Of the 14 species determined, 12 of them are autochthonous and only 2 species are acclimatized allochthonous: *Pseudorasbora parva* (the murgoi murgai) and *Lepomis gibbosus* (the sunfish). According to the Standard Form for the designation of the protected natural area "Preajba-Făcăi Lake Complex", drawn up by the Ministry of Environment, Waters and Forests (Directorate for Nature Conservation and Biological Diversity), as well as scientific works that have as their subject the Preajba Valley hydrographic basin, in addition to the species captured and described below, other species are also mentioned that we did not find in the catches, but which were reported by amateur fishermen in the area, namely: the gypsy (*Umbra krameri*), the sand hog (*Gobio kessleri*), the plevușca (*Leucaspius delineatus*), the eel (*Misgurnus fossilis*). The 14 described species are present both in natural waters and in the waters of artificial basins in Oltenia, and the share is represented by the order Cypriniformes with the families Cyprinidae and Cobitidae, which include 8 species; followed by the order Perciformes with two families: Percidae and Centrarchidae represented by 4 species and the orders Esociformes and Siluriformes with one species each, distributed differently in the ten lakes, as follows: Ord. Esociformes, Fam. Esocidae (*Esox lucius* Linnaeus, 1758 - collected from lake X); Ord. Cypriniformes, Fam. Cyprinidae (*Cyprinus carpio* Linnaeus, 1758 - collected from lakes I, II, III, IV, V, VII, VIII, IX; *Carassius gibelio* (Bloch, 1782) - collected from lakes I, II, III, IV, V, VI, VII, VIII, IX, X; *Alburnus alburnus* (Linnaeus, 1758) - collected from lake VII; *Pseudorasbora parva* (Temmink & Schlegel, 1848) - collected from lakes I, II, III, IV, V, VII, VIII, IX; *Rutilus rutilus* (Linnaeus, 1758) - collected from lake VII; *Scardinius erythrophthalmus* (Linnaeus, 1758) - collected from lakes I, II, III, IV, V, VII, VIII, IX; *Abramis brama* (Linnaeus, 1758) - collected from lakes I, II, III, IV, V, VII, VIII, IX); Fam. Cobitidae (*Cobitis taenia* Linnaeus, 1758) - collected from lakes I, II, III, IV, V, VI, VII, VIII, IX; Ord. Siluriformes, Fam. Siluridae (*Silurus glanis* Linnaeus, 1758) - collected from lake X; Ord. Perciformes, Fam. Percidae (*Perca fluviatilis* Linnaeus, 1758 - collected from lakes I, II, III, IV, V, VI, VII, VIII, IX; *Sander lucioperca* (Linnaeus, 1758) - collected from lakes VII, VIII; *Gymnocephalus cernuus* (Linnaeus, 1758) - collected from lakes VII, X; Fam. Centrarchidae (*Lepomis gibbosus* (Linnaeus, 1758) - collected from lakes I, II, III, IV, V, VI, VII, VIII, IX (GOGA, 2016). A different spatial distribution of species was observed starting from upstream to downstream, determined by the fluctuating pressure exerted by the abiotic and biotic environment. In Table1. The two biocenotic indices of the species sampled according to the constancy of the species are represented, where the frequency is represented by the number of samples in which a species appears and the total number of samples observed, and the abundance is given by the number of individuals of a species and the number of individuals of all species in the samples. According to Table 1, following the interpretation of the quantitative biocenotic indices (frequency and abundance), on the ichthyological material analyzed from an ecological point of view, it can be concluded that the euconstant species with the highest frequency in catches is Carassius gibelio (F=86.8%) (Fig. 14), followed by Perca fluviatilis (F=37.75%) and Lepomis gibbosus (F=30.2%) as accessory species, and Scardinius erythrophthalmus, Gymnocephalus cernuus, Alburnus alburnus, Pseudorasbora parva, Cyprinus carpio, Abramis brama, Rutilus rutilus, Cobitis taenia, Silurus glanis, Esox lucius, Sander lucioperca are accidental species with a low percentage of biocenotic indices (F< 25%). In terms of abundance, the same species Carassius gibelio (A=51, 80%) (Fig. 15) was present in most catches with a large number of individuals, in relation to the other species, having a presence in all categories of standing waters from the plain to the hilly area, with a very high resistance to diseases, oxygen deficiency and freezing periods. The lakes of the Preajba Valley with depths that do not exceed 2-3 m, favored an optimal climate for the development of this species through the calm water flow, the temperature and the submerged vegetation, but also the zooplankton that it consumes non-selectively, leading to the multiplication of this species, so that it dominates in number of individuals in the ten lakes. (NICOLESCU et al., 1999). This peaceful species is closely followed by Perca fluviatilis (50.60%), a predatory species in the biocenosis of these lakes, with a preference for the muddy substrate in the center of the lakes, where they find chironomids, worms and amphipods in abundance, but also fish that are exclusively part of the trophic chain of adult specimens. Species with a lower percentage of abundance are: Scardinius erythrophthalmus, Lepomis gibbosus, Pseudorasbora parva, Cobitis taenia, Rutilus rutilus, Alburnus alburnus, Cyprinus carpio, Abramis brama, Silurus glanis, Esox lucius, Sander lucioperca.
The ecological situation of the species following the interpretation of the quantitative biocenotic indices (frequency and abundance) is characteristic of the existing habitats, the number of species being conditioned by their size, but also by the recorded anthropogenic impact. Thus, it is found that the number of species increases progressively with the distance from the springs and as the habitats become more spacious.

CONCLUSIONS In conclusion, we can say that the ichthyofaunistic research carried out by us in all seasons except the winter season in the ten lakes, highlighted the presence of the 14 fish species with a different spatial distribution, starting from upstream to downstream, determined by the fluctuating pressure exerted by the abiotic and biotic environment.

Being small lakes, they are particularly vulnerable to the natural and anthropogenic environmental factors that act on them. Compared to the total number of fish species in Romanian waters, it can be considered that the diversity of the species identified by us in the studied ecosystems is small.

Most of the species originate in the pre-existing rheophilic ecosystem before the dam, to which new species such as Esox lucius and Silurus glanis were added, which were introduced in 2006 in Lake X by fishermen, the species being brought both from natural ponds in the Danube Meadow and from farms. Referring to the ichthyofaunistic composition, we can say that species from the Cyprinidae family (7 species) dominated, followed by the Percidae family (3 species), and with the fewest species are the Esocidae (1 species), Cobitidae (1 species), Siluridae (1 species) and Centrarchidae (1 species) families.

Although the structural and functional characteristics of this area are similar (hydrographic network, lithological substrate, water chemistry, climatic potential, morphometric characteristic
s, trophic structure), the composition of fish populations is different. There are species that have been encountered in a single lake such as Silurus glanis and Esox lucius (lake X), Alburnus alburnus and Rutilus rutilus (lake VII); in two lakes (lake VII and X) Gymnocephalus cernuus and Sander lucioperca (lake VII and VIII) or in all ten lakes such as the species Carassius gibelio.

The frequency and abundance of species in these lakes is given by the specificity of the microhabitat that these species prefer in the lakes where they were identified. The distribution of species is more or less uniform, except for the species Silurus glanis, Esox lucius, Alburnus alburnus, Rutilus rutilus, Gymnocephalus cernuus with preference for lakes (VII, VIII, X).

Given their ecological particularities expressed previously, most of the species present in the lakes are specific to stagnant ecosystems but also rheophilic, they are cosmopolitan, with increased resistance to variations in the eutrophic environment. Among the identified fish species, it was found that most are polyphagous, consuming both animal (aquatic invertebrates) and plant food (macrophytes, phytoplankton and detritus), followed closely by ichthyophagous species with a preference for small fish species and aquatic invertebrates (Silurus glanis, Esox lucius, Perca fluviatilis). We can highlight the fact that the distribution of species in the ten lakes with a slight agglomeration in lakes VII and IX, is given by environmental factors, especially food, with a lower concentration in lakes VI and X, where the values of environmental factors are far from the optimal conditions of these species. The species identified in the ten lakes are eurytopic, having a specificity for both flowing and stagnant ecosystems, but also a high adaptability to eutrophic environmental conditions.

REFERENCES

BĂNĂRESCU P. 1964. Fauna R. P. R. Pisces, Osteichthyes. Edit. Academiei R. P. R. Bucureşti. 195-216, 225-247, 561-647, 691-813, 866-872, 866-872, 897-909.
GOGA IONELIA CLAUDIA 2016. Studii privind ihtiofauna din Bazinul Hidrografic Valea Preajba şi încărcătura sa parazitară. Teză de doctorat. Bucureşti. 279p.
IONUȘ OANA, GOGA IONELIA CLAUDIA, AVRAM MARGA. 2014. Morphological and morphometric analysis of the Preajba Valley Lakes (Dolj County, Romania). Lakes, reservoirs and ponds.Târgoviște. 8(2): 2-13
NALBANT T. 2003. Checklist of the fishes of Roumania. Part. One: freshwater and brackishwater fishes. Studii şi Cercetări. Biologie. Universitatea Bacău. 8: 122-127.
NELSON J. S. 2006. Fises of the world. 4 th Edition. New Jersey. USA. 601 pp.
Nicolescu N., Cioboiu Olivia, Brezeanu Gh. 1999. Date preliminare asupra structurii comunităților algale fitoplanctonice din lacuri mici de acumulare din Câmpia Olteniei. Lacurile de acumulare din România. Edit. Univ. Al. I. Cuza. Iaşi. 135-142.
OȚEL V. 2007. Atlasul peștilor din Rezervația Biosfera Delta Dunării. Edit. Centrul de Informare Tehnologică Delta Dunării. Tulcea. 481 pp.
URECHE D., BATTES K. W., PRICOPE F., STOICA I. 2004. Perspective monitoring of fish communities from Buzău River,s Basin. Anal. Șt. Ale. Univ. Al. I. Cuza din Iaşi. Biol. Animală. 50: 229-243.
KOTTELAT M. & FREYHOF J. 2007. Handbook of European Freshwater Fishes.Printed by Imprimerie du Democrate SA, Delemont, Switzerland. 637 pp.
***. 1970-1975. Harta topografică 1:50.000.
***. 2000. Legea 5/2000 privind regimul ariilor protejate din județul Dolj (Complexul Lacustru Preajba-Făcăi).
***. 2006. www. Catalog of Life.2006 Annual Checklist: http :// annual.sp2000.org. /search _ scientific. php (Accesat: iulie, 2024).
***. 2011. Starea actuală de conservare. Măsuri pentru atingerea unei stări de conservare favorabilă. Aria naturală protejată "Complexul Lacustru Preajba – Făcăi". Proiect cofinanțat din Fondul European de Dezvoltare Regională http://www.arealprotejat.ro/index.php
***. 2014. Fauna Europaea.Version 2.6.2 2014. www. Faunaeur. org. (Accesat: martie, 2024).
www. Fish Base: http :// www.fishbase.org/search.php (Accesat: iulie, 2024).

RESEARCH ON THE FAUNA OF MOLES, HEDGEHOGS AND SHREWS (MAMMALIA) IN THE TINCA AREA (BIHOR COUNTY, ROMANIA)

[1]ILIE Aurelian Leonardo, [2]GOGA Ionelia Claudia

Abstract. The paper presents the results of the researches performed between 2000-2024 regarding the moles, hedgehogs and shrews species from the Tinca area (Bihor county, Romania) and some of their ecological and ethological aspects. Seven species were identified, belonging to 3 families and 5 genera.
Keywords: moles, hedgehogs, shrews, Tinca area.
Rezumat. Cercetări asupra cârtițelor, aricilor și chițcanilor (Mammalia) din zona Tinca (județul Bihor, România). Lucrarea prezintă rezultatele cercetărilor efectuate de autori în perioada 2000-2024 privind speciile de cârtițe, arici și chițcani (Mammalia) din zona Tinca (județul Bihor, România) și unele aspecte ecologice și etologice ale acestora. Au fost identificate 7 specii, aparținând la 3 familii și 5 genuri.
Cuvinte cheie: cârtițe, arici, chițcani, zona Tinca.

INTRODUCTION

The Tinca area is located in the south-western part of the Bihor county, at the contact of the Miersig plain and the Holod depression. The average altitude is 115 m, the climate is temperate-continental and the vegetation belongs to the oak layer. The hydrographic system is represented by the Crișul Negru river. The Tinca village includes the Tinca, Râpa, Belfir, Gurbediu and Girișu Negru villages (Fig. 1). Papers and books regarding the moles, hedgehogs and shrews species in the area were published by ILIE A.L.(2014a,b; 2016a, b, c; 2017; 2019; 2020; 2022); ILIE L. C., ILIE A. L. (2018 a, b); ILIE & MARINESCU, 2018; 2021). The aim of this paper is a synthesis of these works on the mentioned species and some of their ecological and ethological aspects from this part of Romania.

Figure 1. The location of Tinca area (original).

MATERIAL AND METHODS

Research regarding the presence of the moles, hedgehogs and shrews species, their ecology and ethology began sporadically in 2000, then systematically performed starting 2005 till 2024 in different locations from the Tinca village. The species were captured by traps, others were identified by direct observation, by the pellets of owl species or traces of their presence in nature. Different guides were used for the identification of these species and their traces in nature (BANG et al., 1985; MACDONALD & BARRET, 1995; OLSEN, 2012; MURARIU, 2000).The conservation status of these species was published in different sources: (BOTNARIUC & TATOLE, 2005; GOGA, 2012).

RESULTS AND DISCUSSIONS

In the analyzed period, the following species were identified in the Tinca area:

EULIPOTYPHLA ORDER,

TALPIDAE FAMILY:

Talpa europaea (Linnaeus, 1758) - Examined material: a common species throughout the area in the underground terrestrial environment where it digs numerous galleries (ILIE, 2014a). These communicate with the outside through the well-known earthworm burrows: many molehills, Tinca, June 23, 2015 (ILIE, 2016a); one specimen, the Gurbediu forest,May 19, 2015 (unpublished data) (Fig. 2);one specimen, Tinca, May 16, 2020(ILIE, 2020). ILIE identifies a 100 % albino specimen, July 17, 2015, Girișu Negru (ILIE, 2016a). The author also notes the rapidity of movement, despite its cumbersome appearance, of a specimen discovered at the edge of the Tinca forest, June 7, 2015, and his sound is a bizarre combination of a grunt and a squeak (ILIE, 2016a). Common species in Romania, wherever the soil is rich enough in humus (GOGA, 2012). Conservation status: least concern.

Figure 2. *Talpa europaea* (photo: Ilie A.).

Figure 3. *Erinaceus concolor* - traces (photo: Ilie A.).

ERINACEIDAE FAMILY:

Erinaceus concolor Martin, 1838 - Examined material: ILIE identifies one female specimen with two baby hedgehogs in the personal garden, Tinca, July 2, 2003 and one specimen, in the same location, August 5, 2006; many traces, Tinca, August 21, 2014 (Fig. 3); one albino specimen on a meadow between Tinca and Husasău de Tinca, November 12, 2015 (ILIE, 2016a); three specimens, Tinca, June 20, 2015 (ILIE, 2014a; 2016a);two excrements who contained seeds of fruits, peels of grapes, Tinca, January 12,20, 2018 (ILIE & MARINESCU, 2018); one excrement who contained the seeds of hawthorn, the Tinca forest, October 6, 2018 (ILIE & ILIE, 2018); two excrements who contained remains of insects (coleopterans belonging to Carabidae and Scarabaeidae families), Tinca, July 1; August 20, 2019 (ILIE, 2019); four juvenile specimens, the Râpa forest, July 25, 2019; one specimen, Tinca, the entirely May-October months,2020 (ILIE, 2020); one specimen, Tinca, April 30 (Fig. 4); May 7, 28; the entirely July and August months, 2021; two specimens, Tinca, June 24, 2021(ILIE & MARINESCU, 2021); one specimen, Râpa, December 4, 14,2021; February 2, 2022; September 22, 2022; one female with four juvenile specimens, Tinca, April 6, 2022; one specimen, Tinca, May 2; June 12, 28-30; July 21-30; August 10; September 25, 28; October 4, 11, 2022 (ILIE, 2022). The presence of the species in the cold season confirms data from scientific literature (MURARIU, 2000). In 2016, ILIE identified a series of excrements whose content he analyzed: Excrement 1:L=2.5cm, l=o.8cm, contained only elytrons of Carabidae (Coleoptera) – Harpalus Latreiile, 1802 and Pterostichus Bonelli, 1810 genera, Tinca, March 4, 2016 (Fig. 5). Excrement 2:L=6.2cm, l= 0.7cm, contained only seeds of fruits, Tinca, July 12, 2016. Excrement 3:L=4cm, l=1cm, contained only elytrons of carabids (Harpalus Latr., Pterostichus Bon.), Tinca, June 15, 2016. Excrement 4:L=3.1cm, l=1cm, contained the remains of a specimen Gryllotalpa gryllotalpa Linnaeus, 1758 (Orthoptera, Gryllotalpidae) as well as the remains of carabid coleopterans (elytron, pronotum, antenna), Tinca, June 20, 2016. Excrement 5:L=4cm, l=1.1cm and excrement 6:L=4.5cm, l=1cm, contained remains belonging of a beetle from Cerambycidae and Carabidae families (Coleoptera), as well as of two specimens of Chrysomelidae family: Chrysolina sturmi Westhoff, 1882 (one male and one female), Tinca, June 24, 2016. Excrement 7:L=4.5cm, l=1.1cm, contained remains of Gryllotalpa gryllotalpa L, as well as remains of Carabidae, Tinca, June 24, 2016. Excrement 8:L=3.5cm, l=0.8cm, contained remains of Gryllus campestris Linnaeus, 1758 (Orthoptera, Gryllidae) as well as remains of little Carabidae, Tinca, June 25. Excrement 9:L=5cm, l=1cm, contained remains of cricket and seeds of spontaneous Apiaceae, Tinca, June 25 (ILIE, 2016c). Common species in the Tinca area and in Romania, having predominantly crepuscular and nocturnal activity. Useful species, feeding on numerous species of insects harmful to agriculture. Conservation status: least concern.

Figure 4. *Erinaceus concolor* (photo: Ilie A.).

Figure 5. Hedgehog- excrement (photo: Ilie A.).

SORICIDAE FAMILY:

Crocidura suaveolens (Pallas, 1811) - Examined material: one specimen, Tinca, October 14, 2005. On December 1, 2014, ILIE observed that a cat attacked and ate the head of a specimen of the species but not the body. Cats generally avoided attacks on shrews, preferring to eat rodents and small birds (ILIE, 2016a); one specimen, Tinca, November 10, 20, 2021; one specimen, Tinca, May 6, 2022(ILIE, 2022) (Fig. 6). Insectivorous relative common species in the area and Romania, having predominantly crepuscular and nocturnal activity. Conservation status: least concern. Crocidura leucodon (Hermann, 1780) - Examined material: one specimen, Râpa, May 12, 2005; one specimen, Tinca, August 18, 2006 (ILIE, 2016a); one dead specimen, Tinca, October 15, 2016.(ILIE, 2016b) Relative common species in the area and in Romania, having a similar living environment, activity and type of feeding to those of the previous species. Conservation status: least concern. Neomys fodiens (Pennant, 1771) - Examined material: many traces on the shores of the Crișul Negru river, Tinca, December 24, 2014(ILIE,2014b);January 3, 2016;one captured specimen, Tinca, June 3,2015,near the Crișul Negru river, having the following sizes: total lenght = 12.4 cm, tail lenght = 4 cm, head lenght = 3 cm (ILIE, 2016a). It digs tunnels at the water s edge, sometimes using the tunnels of moles or various species of rodents. Diurnal, sometimes nocturnal activity. Relative common species in the area and in Romania, near waters. Conservation status:least concern. Sorex araneus (Linnaeus, 1758) - Examined material: one specimen, Tinca, March 10, 13, 2017 (ILIE, 2017); one specimen, the edge of the Gurbediu forest, June 20, 2017; one specimen, Tinca, October 10, 2018 (ILIE & ILIE, 2018b); two excrements, L=4mm,l=1mm,Tinca, November 8, 2017 (ILIE & ILIE, 2018a); one specimen, the edge of the Rîpa forest, July 3, 2019; one specimen, the edge of the Tinca forest, May 28, 2020 (unpublished data). Crepuscular and nocturnal activity. Common species in the area and in Romania. Conservation status: least concern. Sorex minutus (Linnaeus, 1766) - Examined material: one specimen, Tinca, August 2, 2007; one specimen, Gurbediu, July 13, 2008 (ILIE, 2016a). Crepuscular and nocturnal activity. Common species in the area and in Romania. Conservation status: least concern. The presence of these species in the cold season confirms data from scientific literature (MURARIU, 2000).

Figure 6. ***Crocidura suaveolens*** (photo: Ilie A.).

CONCLUSIONS

During the analyzed period, 7 species belonging to 3 families and 5 genera were reported in the Tinca area. According to Red list of vertebrates from Romania (BOTNARIUC & TATOLE, 2005) there were registered 7 least concern species. Some species were observed in thecold season.

REFERENCES

BANG P., DAHLSTROM P., CUISIN M. 1985. Giude des traces danimaux. Edit. Delachaux et Niestle. Paris. 240pp.

BOTNARIUC N & TATOLE VICTORIA.2005. Cartea Roșie a vertebratelor din România. Edit. Academiei Române. București. 181pp.

GOGA IONELIA CLAUDIA. 2012. Catalogul colecției de mamifere din patrimoniul Muzeului Olteniei. Edit. Antheo. Craiova. 175pp.

ILIE A. L. 2014a. New faunistical researches from Tinca (Bihor county, Romania). Muzeul Județean Argeș. Argesis. Studii și Comunicări. Seria Științele Naturii. Pitești. 22: 61-72.

ILIE A. L. 2014b. New faunistical data from Tinca area (Bihor county, Romania). University of Oradea. Human education today for tomorrow world. Oradea. 11: 86-93.

ILIE A. L. 2016a. Monografie faunistică. Organismele vertebrate din zona Tinca (Județul Bihor, România). Edit. Sitech. Craiova. 267 pp.

ILIE A. L. 2016b. Faunistical data from Tinca area (Bihor county, Romania) during April-November, 2016. Muzeul Județean Argeș. Argesis. Studii și Comunicări-seria Științele Naturii. Pitești. 24: 31-40.

ILIE A. L. 2016c. Researches regarding peculiarities of the feces belonging to some carnivorous and insectivorous mammals. Romanian Journal of Biology-Zoology. 61(1-2):109-116. Bucharest.

ILIE A. L. 2017. Faunal observations from Tinca area (Bihor county, Romania) during November 15, 2016-April 1, 2017. Muzeul Județean Argeș. Argesis. Sudii și Comunicări-seria Științele Naturii. Pitești. 25: 35-49.

ILIE A. L., MARINESCU MARIANA.2018. Data about the fauna of vertebrates from Tinca area (Bihor county, Romania) during the hiemal season 2017-2018. Annals of the University of Oradea. Fascicle:Ecotoxicology, Animal Husbandry and Food Science and Technology. Oradea. 27A: 81-86.

DIVERSITY AND DYNAMICS OF THE SPREAD OF MICROORGANISMS FROM THE ENTEROBACTERIACEAE FAMILY WITH AN ETILOGICAL ROLE IN ACUTE DIARRHEA DISEASES

Nadejda Guțu Moldova State University, Doctoral School Natural Sciences

The Enterobacteriaceae family is very numerous, with various features, and represents the largest taxonomic unit, which includes 44 genera, of which 25 are involved in human pathology. They inhabit the intestines of humans and animals, being spread with feces everywhere in the environment and can cause food poisoning and acute diarrheal disease.

The purpose of this study was to identify the microorganisms from the Enterobacteriaceae family most frequently involved in acute diarrheal diseases and to analyze the dynamics of their spread at the MTA Buiucani Public Health Medical Institution, Chișinău municipality.

The research was conducted between 2011 and 2023. A total of 2,393 strains (17.9%) of enterobacteria were isolated and identified from the 13,359 clinical samples received at the Microbiological Laboratory of the Public Health Medical Institution AMT Buiucani, Chișinău, for the diagnosis of acute diarrheal disease outbreaks. The etiological confirmation of the disease was made based on coproculture, following the methodological instructions "Microbiological Diagnosis of Intestinal Infections" recommended by the Ministry of Health of the Republic of Moldova.

During the study period, from the total number of samples taken (13359) from patients with acute diarrheal diseases, 2393 (17.9%) strains of microorganisms from the Enterobacteriaceae family were isolated and eight conditionally pathogenic agents were identified – *Klebsiella* spp., *Enterobacter* spp., *Proteus* spp., *Citrobacter* spp., *Escherichia coli* with hemolytic properties, *Morganella* spp., *Serratia* spp. and *Providencia* spp., with a share of 94.15% and 2 pathogens – *Shigella* spp. and *Salmonella* spp., with a share of 5.85%.

The etiological spectrum of conditionally pathogenic agents was dominated by *Klebsiella* spp. (43.71%), followed, with a smaller percentage, by *Proteus* spp. (14.33%), *Citrobacter* spp. (13.12%), *Enterobacter* spp. (10.99%) and Escherichia coli with hemolytic properties (8.73%). The lowest share belonged to *Serratia* spp. (1.42%), *Providencia* spp. (1.09%) and *Morganella* spp. (0.75%) (Fig. 1). The etiological spectrum of pathogens was dominated by *Salmonella* spp. (5.35%), while *Shigella* spp. had a share of 0.51%.

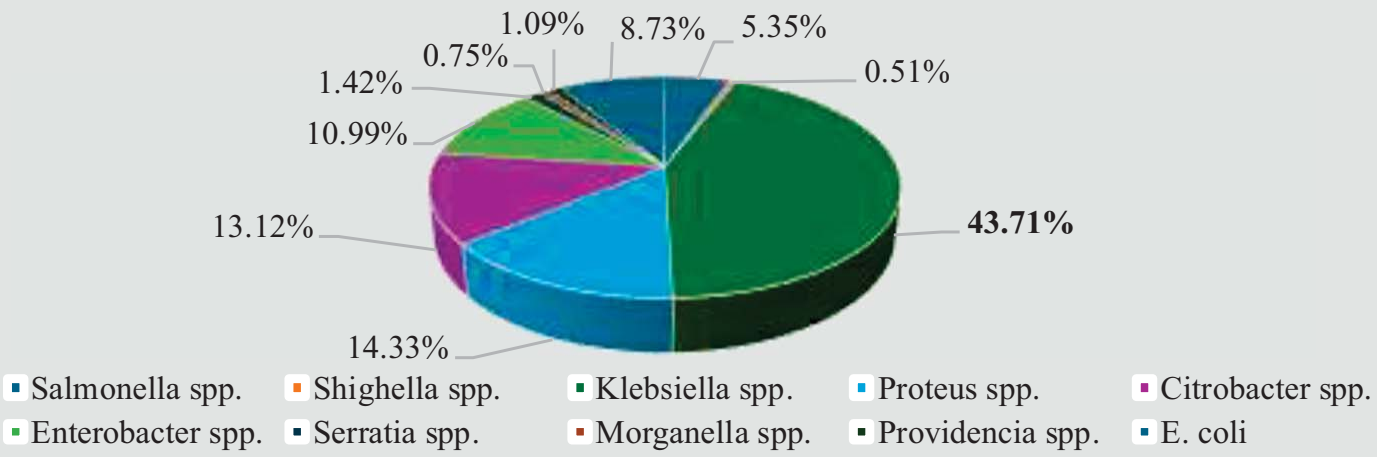


Figure 1. Etiological spectrum of strains from the Enterobacteriaceae family isolated during the study period

The quantitative indices of strains from the *Enterobacteriaceae* family show that acute diarrheal disease was most frequently caused by *Klebsiella* spp., with the highest value recorded in 2017 (54.93%) and the lowest in 2023 (31.9%) (Fig. 2). The proportion of conditional pathogen indices during the study period showed a slow decrease in values, except for *Citrobacter* spp. (20.22%) and *E. coli* with hemolytic properties (15.85%), which recorded their highest values in 2022. The *Proteus* genus reached its peak in 2012 (27.57%), *Enterobacter* spp. in 2018 (28.16%), and *Serratia* spp. in 2019 (4.21%). The *Morganella* genus was recorded during the study period in 2012, 2014, 2017, and between 2019-2022, with values ranging from 0.41% to 3.68%. In other years, it was not identified.

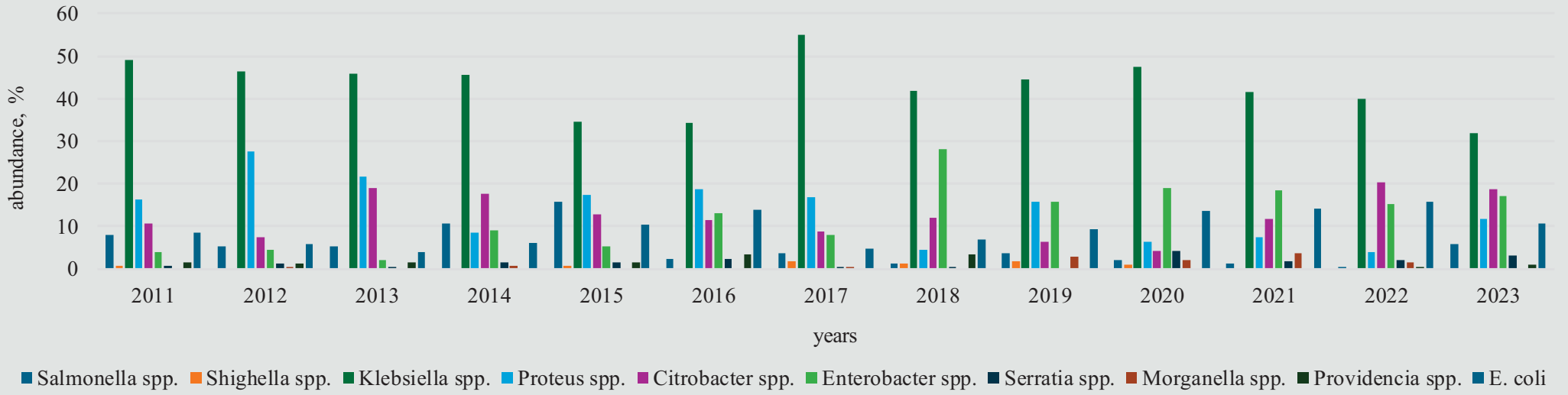


Figure 2. Share of quantitative indices of representatives of the Enterobacteriaceae family identified during the study period.

The highest circulation of microorganisms from the Enterobacteriaceae family was registered in the period 2011-2014 (10.2%-11.58%), the lowest – in 2020 (3.97%) (Fig. 3). Starting with 2021, a slow increase in positive results is observed. Microorganisms from the Enterobacteriaceae family were isolated annually, with the exception of the genera *Morganella* and *Providencia* (conditionally pathogenic) and *Shigella* (pathogenic), which in some years were not identified.

Figure 3. Dynamics of the circulation of microorganisms from the Enterobacteriaceae family during the study period.

The results obtained during the study period highlight the importance of monitoring the incidence of Enterobacteriaceae with etiological roles in (ADD) to prevent acute bacterial diarrhea.

The study was carried out as part of the doctoral project with the topic ”Pathogenic agents of acute diarrheal diseases - morpho-cultural peculiarities, identification methods, antibiotic resistance and spread dynamics in Chisinau”.

MOLDOVA STATE UNIVERSITY
INSTITUTE OF ZOOLOGY
Laboratory of Parasitology and Helminthology
60, Alexei Mateevici str., MD 2009, Chisinau,
Republic of Moldova Tel.: +373 69142464;
E-mail: *olegchihai@yahoo.com*

HELMINTHS FAUNA EPIDEMIOLOGIC ASSESSMENT IN THE HOUSE MOUSE (*Mus musculus*, Linaeus,1758)

CHIHAI Oleg, RUSU Ștefan, ZAMORNEA Maria

AIM: The house mouse epidemiological helminth fauna assessment, with the bioecological, nosological, and zoonotic characteristics identification

The highest level of the **frequency** index was found in *Syphacia obvelata* with 10/31 (infected animals/total animals), followed by *Mastophorus muris* – 8/31, *Plagiorchis elegans* – 4/31, *Syphacia stroma* – 4/31, *Strongyloides ratti* – 4/31, *Trichuris muris* – 4/31, *Capillaria hepatica* – 4/31, *Skrjabinotaenia lobata* – 3/31, *Taenia taeniaeformis larvae* – 3/31, *Taenia pisiformis larvae* – 3/31, *Mesocestoides lineatus larvae* – 2/31, *Catenotaenia cricetorum* – 2/31, *Paranoplocephala omphaloides* – 2/31, *Rodentolepis straminea* – 2/31, *Heligmosomoides polygirus* – 1/31.

The **nosological characteristic** includes 3 categories of 14 total helminthiases: 1 (14.29%) trematodiasis (plagiorchiasis), 5 (35.72%) cestodiases (strobilocercosis, catenoteniasis, mesocestoidiasis, paranoplocephalosis, skrjabinoteniasis), and 7 (50.00%) nematodiases (syphacioisis, strongyloidiasis, capillariasis, heligmosomiasis, trichuriasis, rodentolepiasis, mastophorosis).

The **epidemiological characteristics** denotes 2 categories of parasitic species (zoonotic, rodent-specific): 8 (53.34%) **zoonotic species** (*P. elegans*, *M. lineatus larvae*, *T. taeniaeformis larvae*, *T. pisiformis larvae*, *S. stroma*, *S. obvelata*, *S. ratti*, *C. hepatica*), and 7 (46.67%) **rodent-specific species** (*S. lobata*, *P. omphalodes*, *C. cricetorum*, *H. polygyrus*, *M. muris*, *R. straminea*, *T. muris*).

The **zoonotic characteristic** includes: 3 **direct zoonotic** helminths species (*S. obvelata*, *S. stroma*, *S.ratti*); 1 **sapro-zoonotic** helminths species (*C. hepatica*); 1 **meta-zoonotic** helminth species (*P. elegans*); and 3 **cyclo-zoonotic** helminths species (*T. taeniaeformis larvae*, *T. pisiformis larvae*, *M. lineatus larvae*).

ACKNOWLEDGMENTS: The research was carried out within the State Program 010701 "*Evaluation of the structure and functioning of biocenoses, aquatic and terrestrial habitats under the influence of biotic and abiotic factors in the context of ensuring ecological security and the well-being of the population*".

MOLDOVA STATE UNIVERSITY
INSTITUTE OF ZOOLOGY
Laboratory of Parasitology and Helminthology
60, Alexei Mateevici str., MD 2009, Chisinau,
Republic of Moldova Tel.: +373 69142464;
E-mail: *olegchihai@yahoo.com*

Innovative strategy for the helminth infections control in wild carnivores

PATENT: MD 1447 Y 2020.07.31

AUTHORS: CHIHAI Oleg, ZAMORNEA Maria

APPLICATION FIELDS: Veterinary pharmacology, Parasitology

AIM: The aim of this study is to develop a novel method for controlling/reducing parasitic infections in wild canids to strengthen bioecological and epidemiological security in both natural and anthropized ecosystems.

SOLUTION: The innovative process is based on the production of baits for the treatment of wild canids, as a medicinal form for the administration optimisation of drugs to wild canids. This process includes the homogenization of food (wheat flour, meat meal, vegetable oil) and medicinal (Albendazole) components, extrusion and portioning into parallelepiped briquettes and as a medicinal component the antiparasitic medicine is used, according to each bait dosage.

ADVANTAGES: The administration of pharmaceutical bait for wild canids is optimized to enhance its attractiveness or acceptability, while being precisely dosed and safeguarded from environmental factors.

BENEFICIARIES:
- The Society of Hunters and Fishers R. M. (06.07.2020).
- The "CODRII" Nature Reserve (30.05.2023).
- The College of Veterinary Doctors R.M. of 03.11.2023

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ON THE INFLUENCE OF NATURAL BIOLOGICALLY ACTIVE SUBSTANCES ON THE MAIN BIOCHEMICAL PARAMETERS OF BLOOD

Osipciuc Galina

National Institute for Applied Research in Agriculture and Veterinary Medicine

Table 1. The content of total protein and some protein fractions in the blood serum of chickens

Index	Group	Statistical indicator			
		Before the experiment (age 4 days)		After the experiment (age 38 days)	
		M±m	Lim	M±m	Lim
Protein g/l	Experienced	24,15 ± 1,102	20,14-29,11	40,14 ± 0,938	38,40-44,80
	Control			37,86 ± 1,015	32,40-39,80
Albumin g/l	Experienced	9,90 ± 0,895	6,50-12,40	20,95 ± 0,773	18,16-23,15
	Control			20,61 ± 0,734	18,32-22,38
Globulin g/l	Experienced	14,25 ± 0,716	12,83-16,71	19,18 ± 0,817	17,37-21,65
	Control			17,19 ± 0,813	13,82-18,96
Albumin/globulin ratio	Experienced	0,68	-	1,092	-
	Control			1,198	-

In the study of the effect of extracts made from medicinal plants of the families Asteráceae (Compósitae) and Lamiaceae (Labiatae) and amyloyodine on the main biochemical parameters of blood (protein, albumin, total globulin, albumin-globulin ratio (tab.1), glucose, triglycerides, cholesterol (tab.2), the ratio of albumins to the number of globulins per unit of blood volume, the triglycerides-glucose index (TyG) and the ratio of triglycerides to cholesterol – (Ty/Cs) (tab.3) it was revealed that the use of these means contributes to the accumulation of energy resources and activation of metabolism with simultaneous saving of energy costs (despite the period of active growth); increase in the hydrophilicity of tissues, due to which the transportation of cations, anions, bilirubin, bile salts, vitamins, and some fatty acids is more intensive; an increase in the level of globulins, which contributes to more intensive immunization (hence a speedy recovery) and intensification of the protein-synthesizing function of the liver, as a result of which there is a faster synthesis and transfer of hormones. The TyG index showed that these drugs do not contribute to the development of insulin resistance and do not provoke the development of calcification of the renal tubules or stenosis of blood vessels. There is also a better absorption of nutrients entering the body and a more intensive formation of new cells of a growing body, which is indicated by the concentration of cholesterol. Thus, the use of products containing natural biologically active substances has a positive effect on the processes occurring in the growing body, which is reflected in the main biochemical indicators of protein and carbohydrate-lipid metabolism.

Table 2. The main indicators of carbohydrate-lipid metabolism in chickens

Index	Group	Statistical indicator			
		Before the experiment (age 4 days)		After the experiment (age 38 days)	
		M±m	Lim	M±m	Lim
Glucose mmol/l	Experienced	8,88±0,800	6,31-9,64	12,84±0,827	9,6-14,8
	Control			11,40±0,937	8,6-14,8
Triglycerides mmol/L	Experienced	1,15±0,492	0,64-2,39	1,07±0,198	0,96-1,23
	Control			0,95±0,309	0,96-1,24
Cholesterol mmol/L	Experienced	3,76±0,435	2,84-4,31	3,96±0,260	3,64-4,16
	Control			3,62±0,342	3,14-4-11

Table 3. TyG and Ty/Cs exchange indicators in chickens

Index	Group	Before the start of the experiment (age 4 days)	After Experience ends (age 38 days)
TyG Index	Experienced	4,85	5
	Control		4,88
Triglyceride : Cs ratio	Experienced	1,15: 3,76 (0,307)	1,07: 3,962 (0,290)
	Control		0,95: 3,622 (0,263)

CONCLUSIONS

The main indicators of protein and lipid-carbohydrate metabolism indicate that the medicinal plants from the families Asteraceae (Asteraceae) and Clearworms (Lamiaceae) and a preparation containing iodine with amylodextrin (amyloyodine) are used by us:

1) do not have a negative effect on the body;
2) allow you to increase metabolism.

ON THE INFLUENCE OF NATURAL BIOLOGICALLY ACTIVE SUBSTANCES ON THE MAIN BIOCHEMICAL PARAMETERS OF BLOOD

Table 1. The content of total protein and some protein fractions in the blood serum of chickens

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Analysis of the data obtained indicates that in the experimental group, all processes in the body of chickens during their rearing proceeded somewhat more actively and with less energy consumption.

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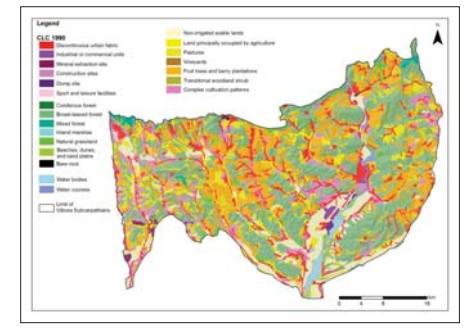
LAND USE AND GREEN SPACE ANALYSIS USING REMOTE SENSING AND GIS TECHNIQUES IN THE SUBCARPATHIANS VÂLCII, SOUTH-WEST OLTENIA REGION, ROMANIA

Drăguleasa Ionuț-Adrian (1), Cioboiu Olivia (2), Măceșeanu Daniela Mihaela (2), Alexandru Anca Florentina (2), Zaharia Alexandra Lucia (3)

1) University of Craiova, Doctoral School of Science, Faculty of Sciences, Str. A. I. Cuza 1, 200585, Craiova, Dolj, Romania

2) The Oltenia Museum, Craiova, Str. Popa Şapcă, No. 8, 200422, Craiova, Romania

3) University of Craiova, Faculty of Sciences, Geography Department, Str. A. I. Cuza 1, 200585, Craiova, Dolj, Romania



XXXII-th edition - 18-20 September 2025, Craiova, Romania

Introducere

Land use and land cover change (LULC) is the most obvious indicator of changes on the Earth's surface (KOSCHKE et al., 2012; PHAN et al., 2020) that affect the provision of ecosystem services, posing a challenge to achieving sustainable development (AOUISSI et al., 2021; JI et al., 2021). Tourism is widely recognized as key to achieving the 17 United Nations Sustainable Development Goals (SDGs) and their 169 associated targets (ABDOU et al., 2020).

The purpose of this study is to analyze land use in the Subcarpathians Vâlcii from 1990 to 2018 using cartographic information and Corine Land Cover, and to examine land use and green spaces using satellite images in the South-West Oltenia Region, as well as other available databases, such as the National Institute of Statistics (NIS).

The research objectives of the study are (1) to provide a set of continuous annual land use/cover maps of the Subcarpathians Vâlcii, Romania, and (2) to analyze the dynamics of land use/cover and green spaces in the South-West Oltenia Region, Romania. The maps generated during this study can provide a foundation for research on other key scientific questions related to the land system and ecological changes in the Subcarpathians Vâlcii, Romania.

Methods, source and gathering of statistical data

To create the Corine Land Cover CLC (1990, 2012, 2018) land use map of the Subcarpathians Valley, we used the following databases: to represent the relief (hillshade), we used ASTER GDEM, version 2 (***. https://geo-spatial.org/vechi/blog/aster-gdem-versiunea-2). The Corine Land Cover land use (CLC 1990, CLC 2012, CLC 2018) was downloaded from the Copernicus website (***. https://land.copernicus.eu/pan-european/corine-land-cover), and satellite images were downloaded from the EarthExplorer website ***. https://earthexplorer.usgs.gov/.

ArcMap 10.7.2 software was useful as a means of spatio-temporal representation and analysis using a Geographic Information System (DRĂGAN et al., 2024a; ROTARU et al., 2024).

Field of study

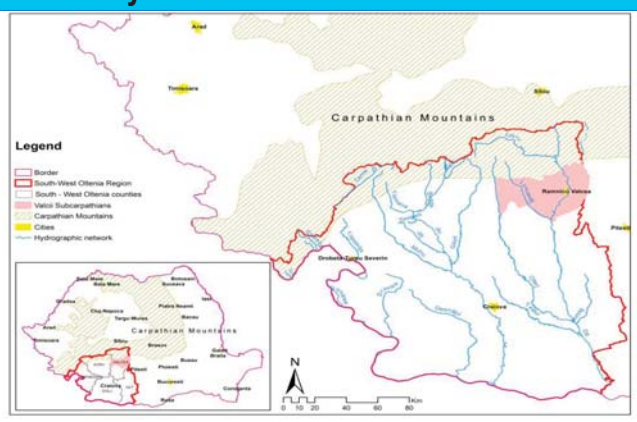


Figure 1. Location of the Subcarpathians of the Vâlcii in regional and national contexts.S
ource: author-processed data using ArcGIS 10.7.2.

A subdivision of the Getic Subcarpathians, the Vâlcii Subcarpathians are located in the southern part of the country (Fig. 1), on both sides of the Olt River, and constitute one of the oldest settlements in Romania (ROANGHEȘ-MUREANU, 2012, p. 51).

Results & Discussions

The 1990 Subcarpathians Vâlcii land use data show that the largest areas were occupied by deciduous forests, fruit tree and shrub plantations, discontinuous urban spaces, non-irrigated arable land, predominantly agricultural land, and areas of complex crops (Fig. 2).

A comparative analysis between 2012 and 2018 indicated increases in land use for the following CLC classes (Fig. 3): mineral extraction areas, fruit tree and shrub plantations, deciduous forests, and mixed forests.

Figure 2. Land use pattern in the Subcarpathians Vâlcii in 1990.
Source: author-processed CORINE Land Cover data.

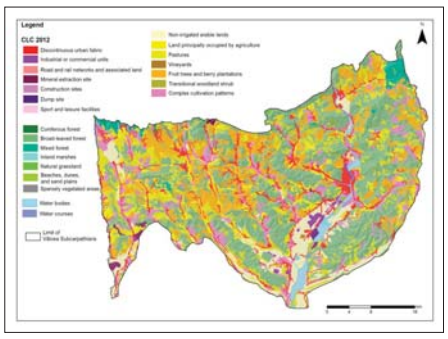


Figure 3. Land use pattern in the Subcarpathians Vâlcii in 2012.
Source: author-processed CORINE Land Cover data.

Analysis of the statistical data for land use in 2018 (Fig. 4) shows that deciduous forests predominate, followed by fruit tree and shrub plantations, pastures, predominantly agricultural lands, complex crop areas, discontinuous urban spaces, and non-irrigated arable lands. In 2018, the smallest areas were those occupied by natural meadows, vineyards, networks of communication routes and associated lands, sports and leisure facilities, and sparsely vegetated areas.

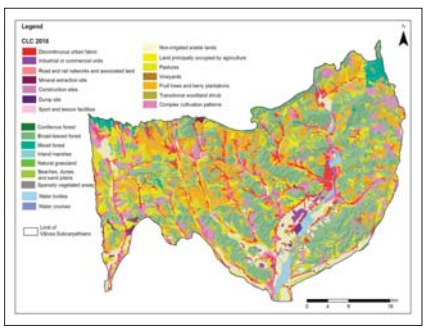


Figure 4. Land use pattern in the Subcarpathians Valley in 2018.
Source: author-processed CORINE Land Cover data.

The smallest areas (under 100 hectares) were occupied by rocks, construction areas, and sports and leisure facilities (only 15 hectares). The difference in land use between the year 1990 and the years 2012 and 2018 is remarkable, with 1990 having no poorly vegetated areas.

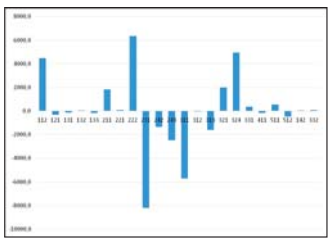


Figure 5. Differences in hectares between CLC 1990 and CLC 2012.

Differences were also recorded between 2012 and 2018 and between 1990 (first year analyzed) and 2018 (last year analyzed). Figures 6 and 7 graphically depict these differences.

In 2012, unlike 1990 (Fig. 5), notable differences were recorded in classes 112 (discontinuous urban space), 222 (fruit tree and shrub plantations), 231 (pastures), 311 (deciduous forests), and 324 (forest–reedbed transition).

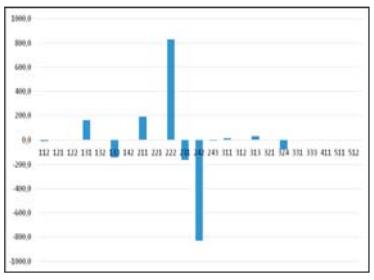


Figure 6. Differences in hectares between CLC 2012 and CLC 2018.

In 2012, unlike 2018 (Fig. 6), notable differences were recorded in classes 222 (fruit tree and shrub plantations) and 242 (complex crop areas).

We extracted green spaces and land use data for the South-West Oltenia Region from Landsat 5 TM satellite images (26.05.2000–30.08.2000), Landsat 7 ETM+ satellite images (26.05.2012–30.08.2012), Landsat 8 OLI/TIRS satellite images (23.05.2022–28.08.2022) (USGS) and Corine Land Cover (CLC) (Copernicus Monitoring Service) for the years 2000, 2012, and 2018.

To analyze the evolution of green spaces for 2000–2022 (Fig. 8), we generated three vegetation indices (NDVI) for the years 2000, 2012, and 2022, from which we extracted the green surfaces and calculated their area.

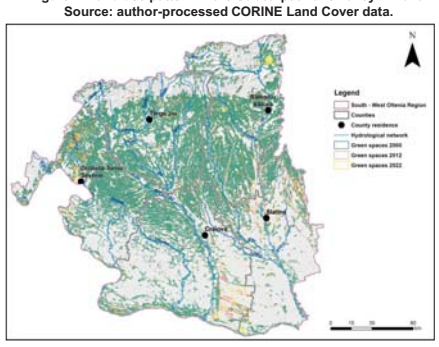


Figure 8. Evolution of green spaces for the period 2000–2022.
Source: author-processed https://earthexplorer.usgs.gov/ data, 2024.

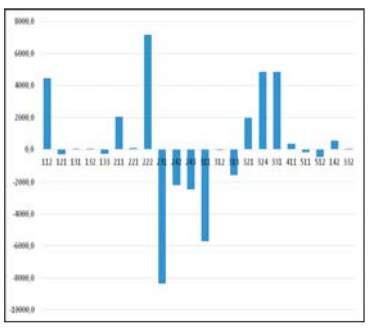


Figure 7. Differences in hectares between CLC 1990 and CLC 2018.

In the differences recorded between 2012 and 2018, the classes with the highest values were 222 (fruit tree and shrub plantations) and 231 (pastures). In 2018, fruit tree and shrub plantations covered 26410.3 ha, unlike in 1990, when they covered 33552.1 hectares. In 1990, unlike in 2018 (Fig. 7), notable differences were recorded in classes 112 (discontinuous urban space), 222 (fruit tree and shrub plantations), 231 (pastures), 311 (deciduous forests), 324 (forest–reed transition), and 331 (beaches, dunes, sands).

Based on the graph in Figure 9, we can conclude that between 2000 and 2022, the area was characterized by a total decrease of 262.26 km^2 in green surfaces. There was a slight increase of 274.88 km^2 between 2000 and 2012, while between 2012 and 2022, the South-West Oltenia Region area was characterized by a decrease of 537.14 km^2.

To study the correlation between the evolution of land use and green spaces, we extracted land cover data for the years 2000 and 2022 from the Corine Land Cover database and the satellite images mentioned above using a supervised classification method. The changes were analyzed using Change Detection, which detects and calculates each changed pixel (Fig. 10).

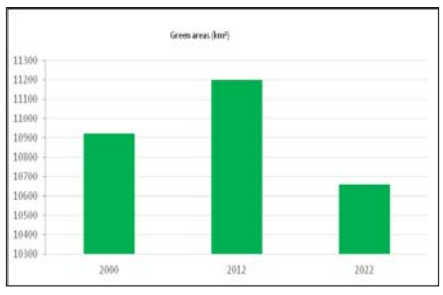


Figure 9. Evolution of green spaces between 2000 and 2022.

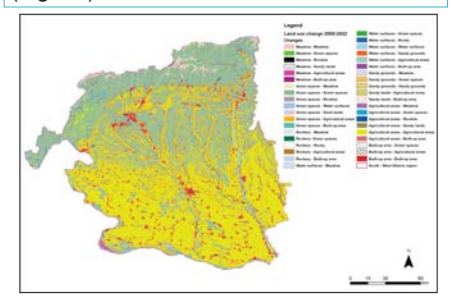


Figure 10. Land use change between 2000 and 2022.
Source: author-processed ***.
https://land.copernicus.eu/pan-european/corine-land-cover
data, 2024.

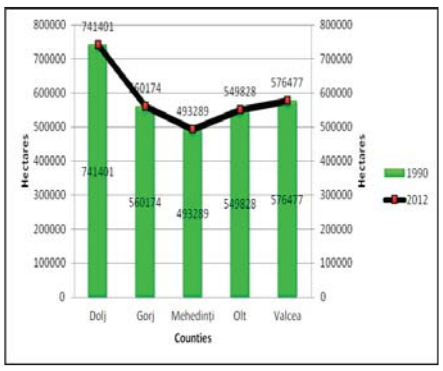


Figure 11 Land area in the counties of the South-West Oltenia Region. Source: author-processed INS data, 2025.

According to the INS, the total land area in the South-West Oltenia Development Region in 1990 and 2012 was 2921169 hectares. The same is true for all five counties in the region, i.e, the land area in both years was the same for all the counties.

The largest area was Dolj County (741,401 hectares), while the smallest area was Mehedinți County (493,289 hectares) (Fig. 11).

Conclusions

In conclusion, Geographic Information System (GIS) techniques save time, and the results are visually interactive and offer the possibility of geoprocessing, interpolation, rasterization, and vectorization of statistical data, with the cartographic information being more suggestive and accurate. GIS programs have in common a multitude of diverse functions and procedures for analyzing raster or vector datasets for any relief unit, tourist area, development region, or country.

Using high-resolution satellite images superimposed on processed geodata led to an accurate assessment of land use in the South-West Oltenia Region, Romania. According to TACHE et al. (2023), the use of land ownership data, whether private or state, and the overlay of processed geodata with high-resolution satellite images represents a great methodological advantage in identifying the most accurate land use and change relationships in the Subcarpathians Vâlcii, South-West Oltenia Region, Romania.

References

ABDOU A. H., HASSAN T. H., EL DIEFI M. M. 2020. A Description of Green Hotel Practices and Their Role in Achieving Sustainable Development. *Sustainability*. **12**(22): 9624. https://doi.org/10.3390/su12229624 (accessed December, 2024).

AOUISSI H. A., PETRIŞOR A.-I., ABABSA M., BOSTENARU-DAN M., TOURKI M., BOUSLAMA Z. 2021. Influence of Land Use on Avian Diversity in North African Urban Environments. *Land*. **10**(4): 434. https://doi.org/10.3390/land10040434 (accessed December, 2024).

DRĂGAN A., CREŢAN R., LUNGU M. A. 2024a. Neglected and Peripheral Spaces: Challenges of Socioeconomic Marginalization in a South Carpathian Area. *Land*. **13**(7): 1086. https://doi.org/10.3390/land13071086 (accessed December, 2024).

JI Q., LIANG W., FU B., ZHANG W., YAN J., LÜ Y., YUE C., JIN Z., LAN Z., LI S., YANG P. 2021. Mapping Land Use/Cover Dynamics of the Yellow River Basin from 1986 to 2018 Supported by Google Earth Engine. *Remote Sensing*. **13**(7): 1299. https://doi.org/10.3390/rs13071299 (accessed December, 2024).

KOSCHKE L., FÜRST C., FRANK S., MAKESCHIN F. 2012. A multi-criteria approach for an integrated land-cover-based assessment of ecosystem services provision to support landscape planning. *Ecological Indicators*. **21**: 54-66. https://doi.org/10.1016/j.ecolind.2011.12.010 (accessed December, 2024).PHAN T. N., KUCH V., LEHNERT L. W. 2020. Land Cover Classification using Google Earth Engine and Random Forest Classifier—The Role of Image Composition. *Remote Sensing*. **12**(15): 2411. https://doi.org/10.3390/rs12152411 (accessed December, 2024).

ROANGHEȘ-MUREANU A.-M. 2012. Turismul balnear și climateric. Subcarpații Vâlcii, Edit. Universității din București. 296 pp.

ROTARU M.-A., CREŢAN R., JUCU I. S., IANĂŞ A.-N., TÖRÖK-OANCE M. 2024. How Can Digital Maps of Religions Inform Us about Fractionalization and Polarization in Post-Communist Romania? *Religions*. **15**(7): 763. https://doi.org/10.3390/rel15070763 (accessed December, 2024).

TACHE A.-V., POPESCU O.-C., PETRIŞOR A.-I. 2023. Conceptual Model for Integrating the Green-Blue Infrastructure in Planning Using Geospatial Tools: Case Study of Bucharest, Romania Metropolitan Area. *Land*. **12**(7): 1432. https://doi.org/10.3390/land12071432 (accessed December, 2024).

***. National Institute of Statistics, TEMPO online: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table (accessed January, 2025).

***. https://geo-spatial.org/vechi/blog/aster-gdem-versiunea-2 (accessed December, 2024).

***. https://land.copernicus.eu/pan-european/corine-land-cover (accessed December, 2024).

***. https://earthexplorer.usgs.gov/ (accessed December, 2024).

THE LOCAL POPULATION'S PERCEPTION OF URBAN GREEN SPACES IN SOUTH-WEST OLTENIA REGION OF ROMANIA

Drăguleasa Ionuț-Adrian (1), Niță Amalia (2), Cioboiu Olivia (3), Măcești Daniela Mihaela (3), Alexandru Anca Florentina (3)
1) University of Craiova, Doctoral School of Science, Faculty of Sciences, Str. A. I. Cuza 1, 200585, Craiova, Dolj, Romania
2) The Oltenia Museum, Craiova, Str. Popa Şapcă, No. 8, 200422, Craiova, Romania
3) University of Craiova, Faculty of Sciences, Geography Department, Str. A. I. Cuza 1, 200585, Craiova, Dolj, Romania

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Introducere

According to CHEN et al. (2022), visitor satisfaction with urban green spaces is extremely useful for planning the sustainable urban and peri-urban development of a well-defined geographical space or territory and can simultaneously increase people's awareness of environmental protection and psychological well-being.

According to POPESCU et al. (2024), artificial intelligence technologies are being increasingly used in urban green infrastructure (GI) planning to find the best solutions to minimize the effects of climate change in large cities. Urban plans represent the main tool for urban spatial planning (SLAVE et al., 2023; PETRIȘOR et al., 2025). Among green infrastructure elements, ecological corridors are explicitly mentioned in official documents on protected natural areas, biodiversity, climate change, the Carpathian Convention, and the National Development Plan 2007-2013 developed in 2005 (POPESCU & PETRIȘOR, 2021). This research aimed to explore in detail the local population's perception of urban green spaces.

Materials and Methodology

In this research, the methodological approach was based on the administration of a structured questionnaire to a sample of 100 people from the South-West Oltenia region. The main objective was to assess residents' perceptions of urban green spaces, identify the factors influencing these perceptions, and highlight relevant trends for sustainable urban development.

The collected data were processed using the SPSS program (version 15.0), and the analysis focused on the methodological directions described below. The research used several statistical methods, each selected depending on the specifics of the hypotheses formulated and the nature of the available data. The methods included a t-test for independent samples, ANOVA, Chi-Square test, Pearson correlation, and regression analysis. These methods were selected to highlight relationships, differences, or influences between socio-demographic variables and respondents' perceptions of urban green spaces.

Results & Discussions

In the sample of respondents, the percentage of females is higher than that of males, with 35 male respondents (35% of the total respondents) and 65 female respondents (65% of the total respondents).

The majority of respondents come from urban areas, while fewer come from rural areas, with 81 respondents (81% of the total respondents) from urban areas and 19 (19% of the total respondents) from rural areas.

The distribution of respondents by age is as follows: 44 respondents (44% of the total respondents) fall into the age range of 18-29 years, 14 respondents (14% of the total respondents) are 30-39 years old, 26 respondents (26% of the total respondents) are 40-49 years old, 12 respondents (12% of the total respondents) are 50-59 years old, and 4 respondents (4% of the total respondents) are "over 60 years" of age.

In terms of education, 5 respondents (5% of the total respondents) have completed high school, and 95 respondents (95% of the total respondents) have completed higher education (bachelor, master, doctorate).

In terms of employment, 33 respondents (33% of the total respondents) are students, 64 respondents (64% of the total respondents) are employees, and 3 respondents (3% of the total respondents) are retired.

Field of study

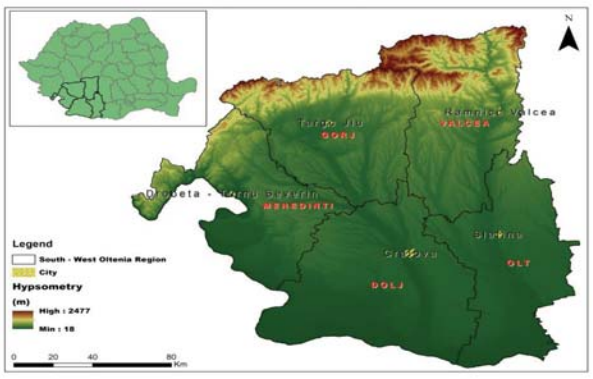

Figure 1. The geographical location of the counties of the South-West Oltenia region at national level.
Source: data processed by authors in ArcGIS 10.7.2

The South-West Oltenia development region mainly includes the traditional counties (Fig. 1) that formed the basis of the political and administrative entity of Romania—Oltenia (ERDELI & CUCU., 2007, p. 402; IONUȘ et al., 2015). The South-West Oltenia region comprises a complex mosaic of green spaces in an extremely varied urban landscape, stretching from high-density urban cores to smaller peri-urban areas.

According to Figure 2, 100% of the respondents chose the option "Yes"; 0% of respondents chose the option "No" or "I don't think so".

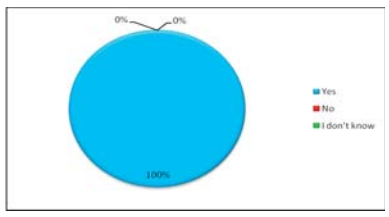

Figure 2. Do urban green spaces provide opportunities for rest and recreation?
Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 3 reflects how the respondents evaluated rest and recreation spaces in terms of the development of urban green spaces on a scale from 1 to 5: 4 respondents gave a score of 2 (2% of all respondents), 7 respondents gave a score of 3 (7% of all respondents), 29 respondents gave a score of 4 (29% of all respondents), and 60 respondents gave a score of 5 (60% of all respondents).

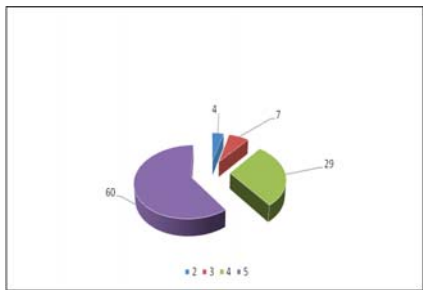

Figure 3. Do you consider rest and recreation spaces an important factor in the development of urban green spaces?
Source: Data processed by the authors using Microsoft Excel 2010.

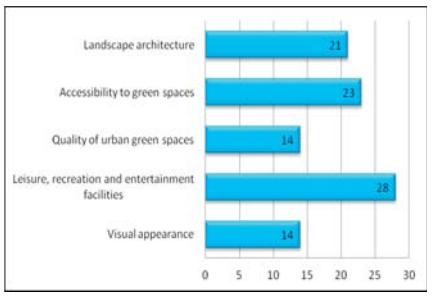

Figure 4. Which of the following characteristics of the aesthetic, social, and environmental image represent strategic objectives
for the establishment of new green spaces? Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 4 reflects the respondents' preferences regarding the characteristics considered strategic objectives for the establishment of new green spaces.

To assess the perception of the potential for capitalizing on urban green spaces, the respondents were asked to give a score, ranging from 1 to 6, to each benefit provided to cities by these green spaces. The distribution of the scores given by respondents was divided into three ranges (Fig. 5).

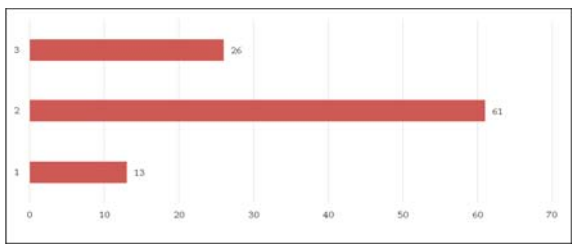

Figure 5. On a scale of 1 to 6, which of the following benefits to cities has the potential for capitalizing on urban green spaces? Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 6 reflects the respondents' opinions on whether the smart city represents a model of the innovative development of urban spaces.

This shows that the majority of respondents (89%) see the smart city as a model of innovative development for urban spaces, while a very small percentage (1%) disagree with this perspective. A smaller number of respondents are in the uncertainty zone (6%) or believe that there may be innovation but are not sure (4%).

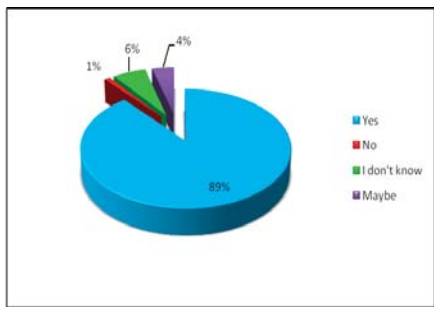

Figure 6. Does the smart city represent a model for the innovative development of urban spaces?
Source: Data processed by the authors using Microsoft Excel 2010.

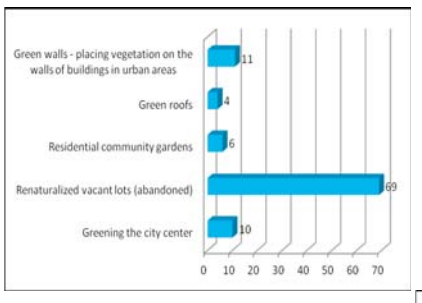

Figure 7. Which of the following categories of green solutions do you consider appropriate for the development and valorization of urban green spaces? Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 7 reflects the respondents' preferences regarding the categories of green solutions considered appropriate for the development and valorization of urban green spaces.

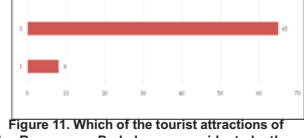

Figure 11. Which of the tourist attractions of Nicolae Romanescu Park do you consider to be the most important?
Assign a number to each attraction (on a scale from 1 to 6).
Source: Data processed by the authors using Microsoft Excel 2010.

The data reveal that the majority of respondents (52 out of a total of 100) fell into range 2, thus expressing the perception that the urban green spaces in the region are of average quality. In addition (Fig. 8), 34 respondents were in range 3, meaning that they perceive the quality of the urban green spaces in South-West Oltenia to be high, while 14 respondents were in range 1, indicating the perception of these spaces as low-quality.

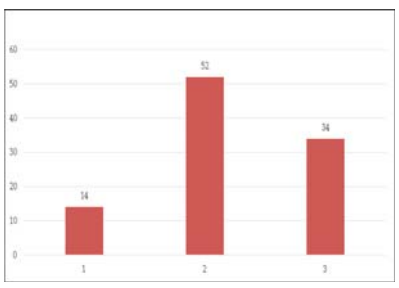

Figure 8. Assessing the quality of urban green spaces in the South-West Oltenia region.Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 9 reflects the opinions of the respondents regarding the impact of the lack of urban green space on the health of the population.

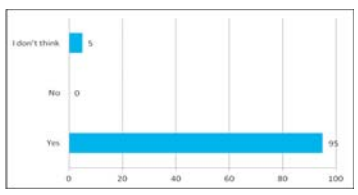

Figure 9. Is the lack of urban green space a factor that affects population health?
Source: Data processed by the authors using Microsoft Excel 2010.

The graph in Figure 10 reflects the opinions of the respondents on whether they consider Nicolae Romanescu Park to be the largest green space area in the Oltenia region.

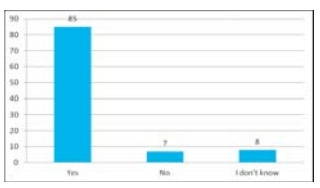

Figure 10. Do you consider Nicolae Romanescu Park the largest green space area in the Oltenia region?
Source: Data processed by the authors using Microsoft Excel 2010.

Figure 11 shows the distribution of the results across these ranges, which reveals that most respondents (65 out of 100) considered the attractions to have an average potential for capitalization (range 2), while 27 respondents considered the potential to be high (range 3), and 8 respondents considered it to be low (range 1).

Conclusions

From the correlational analysis of the data, we can conclude that the formulated research hypothesis H1, which posits that there is a significant correlation between the level of importance given to the development of green spaces, the appreciation of the quality of these green spaces, and the perception of the potential for the capitalization of green spaces, is confirmed. This confirmation is based on the results obtained, which showed significant positive correlations between the three variables studied. Specifically, the level of importance given to the development of green spaces has a significant correlation with the appreciation of the quality of these green spaces and the perception of their potential for capitalization. In other words, people who consider the development of green spaces to be important tend to better appreciate the quality of these spaces and see a greater potential for their capitalization. Consequently, this research hypothesis is supported by the data obtained in this study, and its confirmation suggests that residents' perceptions and evaluations of urban green spaces are influenced by the degree of importance given to the development of these green spaces.

References

CHEN X., WANG Y., HUANG T., LIN Z. 2022. Research on Digital Experience and Satisfaction Preference of Plant Community Design in Urban Green Space. *Land. 11*(9): 1411. https://doi.org/10.3390/land11091411 (accessed January, 2025).
ERDELI G. & CUCU V. 2007. *Romania: Population, Human Settlements, Economy.* Edit. Transversal. București. 213 pp.
IONUȘ OANA, LICURICI MIHAELA, PĂTROESCU MARIA, BOENGIU S. 2015. Assessment of flood-prone stripes within the Danube drainage area in the South-West Oltenia Development Region, Romania. *Natural hazards.* 75: 69-88. https://doi.org/10.1007/s11069-013-0720-0 (accessed January, 2025).
PETRIȘOR A.-I., BRAGUȚA E., ȚUGULEA A., TACHE A.-V., HAREA O., MOGÎLDEA V., POPESCU O.-C., ANDRONOVICI D., BEJAN I. 2025. Using Geospatial Information Tools to Plan Green Infrastructures in Response to Climate Changes: Examples from Bucharest, Romania and Chișinău, Moldova. *Urban Science*. 9(3): 62. https://doi.org/10.3390/urbansci9030062 (accessed January, 2025).
POPESCU O. C., TACHE A.-V., PETRIȘOR A.-I. 2024. Connecting nature and technology: using artificial intelligence to plan greener cities. *Present Environment and Sustainable Development*. 18(2): 345-354. https://doi.org/10.47743/pesd2024182019 (accessed January, 2025).
POPESCU O. C. & PETRIȘOR A.-I. 2021. Green infrastructure and spatial planning: a legal framework. *Oltenia, Studii și Comunicări Seria Științele Naturii*. Muzeul Olteniei Craiova. 37(1): 217-224. http://olteniastudiisicomunicaristiintelenaturii.ro/cont/37_1/IV.%20ECOLOGY%20%20THE%20ENVIRONMENT%20PROTECTION/29%20Popescu%20&%20Petrisor.pdf (accessed January, 2025).
SLAVE A. R., IOJĂ I.-C., HOSSU C.-A., GRĂDINARU S. R., PETRIȘOR A.-I., HERSPERGER A. M. 2023. Assessing public opinion using self-organizing maps. Lessons from urban planning in Romania. *Landscape and Urban Planning*. 231: 104641. https://doi.org/10.1016/j.landurbplan.2022.104641 (accessed January, 2025).
***. National Institute of Statistics, TEMPO online: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table (accessed January, 2025).

THE INTERNATIONAL SCIENTIFIC CONFERENCE
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COMPARATIVE RESEARCH ON INVASIVE INSECT COMPLEXES IN PEA CULTURE IN THE CENTRAL AND SOUTH-EASTERN AREA OF *THE REPUBLIC OF MOLDOVA*

[1]BIVOL Alexei, [1]IURCU-STRAISTARU Elena, [1]RUSU Stefan, [2]Cîrlig Natalia
1. Institute of Zoology MSU, 1 Academiei Street, Chișinău, Republic of Moldova
2. Alexandru Ciubotaru" National Botanical Garden (Institute), 18 Padurii Street, Chisinau, Republic of Moldova

Introduction: Pea cultivation holds significant agri-food, fodder, and industrial value for the Republic of Moldova. Its economic potential can be fully realized by promoting key activities aimed for improving crop quality and maximizing the yields of grains and pods. Pea crops are annually threatened by invasive insect species, highlighting the need for thorough research into the impact of certain highly damaging pests.

Material and Methods: The research was carried out on the production and experimental sectors of the National Botanical Garden (Institute) "Alexandru Ciubotaru" Moldova State University during the growing seasons of 2024-2025, on experimental plots planted with annual of *Fabaceae* specie pea (*Pisum sativum L*).

Figure 1. Research conducted on experimental plots for the pea crop

Results: Phytosanitary monitoring, conducted across different phenological stages of the crop, revealed the presence of 14 particularly harmful invasive insect species from 4 orders and 8 families. The most notable ones, based on assessments of population density, frequency, and intensity of crop damage, were more insects detected in the soil since the germination phase. These include the wireworm larvae of click beetles: *Agriotes lineatus* L. and *Agriotes ustulatus* L., such species as *Agrotis segetum* Schiff., *Autographa gamma* L. As the crop matures, weevil species like *Sitona lineatus* L. and *Bruchus pisorum* L. become prevalent. In later growth stages, adult plants are attacked by several aphid species - *Acyrthosiphon pisum* Harris, *Myzus persicae* Sulzer, and *Aphis gossypii,* as well as by flies (*Liriomyza huidobrensis* L., *Liriomyza trifolii* L., *Delia platura* L.), pea thrips (*Kakothrips robustus* Uzel), and the pea moth (*Cydia nigricana* Fabr.).

Table 1. Dynamics of the Assessment of the Presence of Invasive Insect Complexes Accumulated on Productive and Experimental Pea Plots (March-June, 2025).

Species identified	Date of phytosanitary records and analyses			
	20.03	29.04	29.05	28.06
Agriotes spp.,	+	++	++	++
Agrotis segetum Schiff.,	+	+++	+++	++
Autographa gamma L.	+	++	++	++
Acyrthosiphon pisum Har.	-	+	++	+++
Sitonia lineatus L	-	+	++	+++
Bruchus pisorum	-	-	++	++
Cydia nigricana	-	-	++	+++
Myzus persicae Sulzer,	-	-	+++	++++
Aphis gossypii	-	-	++	++
Liriomyza huidobrensis L.	-	-	+	++
Liriomyza trifolii L.,	-	-	+	++
Delia platura L.,	-	+	+	++
Cacothotrips robustus Fuzel.	-	+	+	++

Legend:- no individuals present; +presence of 3 to 5 individuals; ++ Presence of 5 to 10 individuals; +++ Presence of more than 10 individuals per m² of pea plants in the plot.

Conclusion: The results of this research, carried out in the Central and South-Easterns regions of the Republic of Moldova, contribute to understanding the parasitic impact on pea crops and support the development of forecasts and integrated pest management strategies.

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STUDY OF THE DIVERSITY OF ECTOPARASITIC FAUNA IN GAME-RELATED GALLIFORMES IN THE NORTHERN REGION OF THE REPUBLIC OF MOLDOVA

RUSU Ștefan, ERHAN Dumitru, ZAMORNEA Maria,CHIHAI Oleg, RUSU Viorelia, GOLOGAN Ion

Institute of Zoology MSU, 1 Academiei Street, Chișinău, Republic of Moldova

Introduction: The common pheasant (*Phasianus colchicus* L.), along with other wild game birds, plays a key role in maintaining natural reservoirs of parasites that are common to wildlife, domestic animals, and even humans. In this context, the study of their parasitic fauna is of special significance, both theoretically and practically. Understanding the parasitic fauna of game birds is especially important in order to prevent the spread of parasitic agents not only among other wild and domestic animals but also to humans

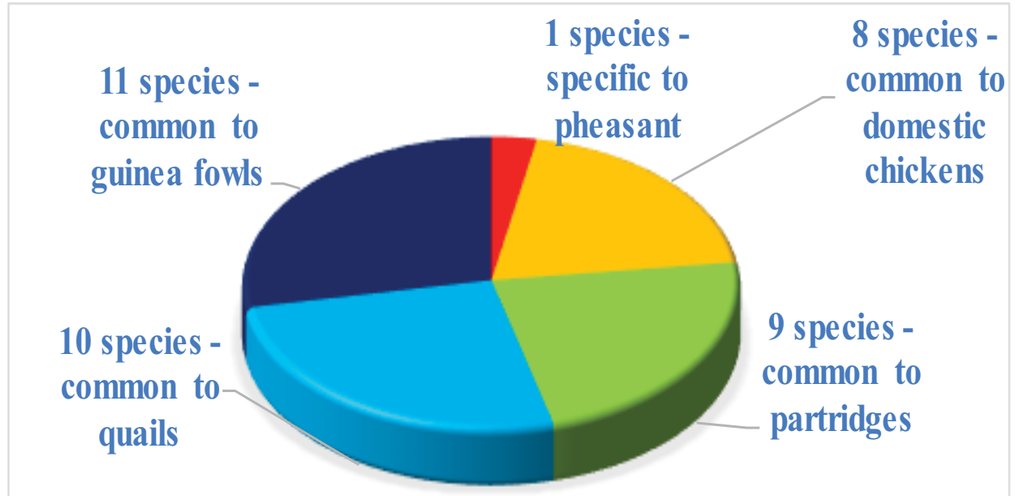
Results: **The research on the ectoparasitic fauna of game birds in the Northern Region of the Republic of Moldova highlighted a rich variety of ectoparasites in pheasants from the following families:**

Philopteridae Family – 7 species: *Cuclotogaster cinereus* with EI = 13.1% and II = 16.0 ex; *Cuclotogaster heterographus* with EI = 69.7% and II = 131.0 ex.; *Goniocotes chrysocephalus* with EI = 54.7% and II = 76.3 ex.; *Goniocotes microthorax* with EI = 30.1% and II = 63.2 ex.; *Goniodes colchici* with EI = 39.5% and II = 94.0 ex.; *Goniodes dissimilis* with EI = 9.6% and II = 7.0 ex.; *Lipeurus caponis* with EI = 29.0% and II = 41.0 ex.

Menoponidae Family – 3 species: *Amyrsidea perdicis* with EI = 30.5% and II = 91.0 ex.; *Menacanthus stramineus* with EI = 72.0% and II = 107.0 ex.; *Menopon gallinae* with EI = 30.3% and II = 62.0 ex.

Ceratophyllidae Family – 2 species: *Ceratophylus gallinae* with EI = 12.2% and II = 25.0 ex.; *Ceratophylus hirundinis* with EI = 21.6% and II = 40.0 ex.;

Dermanyssidae Family – 2 species: *Dermanyssus gallinae* with EI = 54.7% and II = 74.0 ex.; *Dermanyssus hirundinis* with EI = 15.0% and II = 30.4 ex.



Specificity of the ectoparasite species identified in pheasant (*Phasianus colchicus* L.).

The investigations were carried out within the State Program (2024-2027) (Subprogram code: 010701).

Research on the ectoparasite fauna of wild game birds in the Northern Zone of the Republic of Moldova revealed a rich diversity of ectoparasites in pheasant (*Phasianus colchicus* L.), belonging to the following families: Family Philopteridae – 7 species (*Cuclotogaster cinereus, Cuclotogaster heterographus, Goniocotes chrysocephalus, Goniocotes microthorax, Goniodes colchici, Goniodes dissimilis, Lipeurus caponis*). Family Menoponidae – 3 species (*Amyrsidea perdicis, Menacanthus stramineus, Menopon gallinae*). Family Ceratophyllidae – 2 species (*Ceratophylus gallinae, Ceratophylus hirundinis*). Family Dermanyssidae – 2 species (*Dermanyssus gallinae, Dermanyssus hirundinis*).

THE PARTICULARITIES OF THE ECOLOGICAL-GENETIC DIFFERENTIATION OF MICROTIN SPECIES IN THE ANTHROPIZED LANDSCAPE OF THE REPUBLIC OF MOLDOVA

Veaceslav Sîtnic, *Institute of Zoology, Moldova State University, Chişinău, Republica Moldova*

Abstract. *Genus Microtus is presented in republic of Moldova by two sibling species from "arvalis" group, Microtus arvalis (s. str.) and Microtus rossiaemeridionalis. Material were collected in 12 sites. A total of 516 genetic tests were performed. 188 individuals of M.arvalis and 92 – M.rossiaemeridionalis were identified through genetic methods. Both species has coexistence. Most findings of M.arvalis were in agrocoenosis, and M.rossiaemeridionalis in arboreal-shrubby coenoses.*

MATERIALS AND METHODS

• Samples for genetic research were collected from individuals captured in 12 locations in the districts of Ialoveni (Sociteni, Dănceni, Horăşti), Ungheni (Rădenii-Vechi, the "Plaiul Fagului" scientific reserve) and Edineț (Ruseni) during the period 1985-2024. For this purpose, 1 ha marking nets installed on alfalfa fields, forest strips, orchards, pastures, wheat fields, where microtines have a higher population, were used. A total of 516 genetic tests were performed. The density was determined based on the results obtained over 4-5 days using snap traps or from marking nets over a week. (NISTREANU et al., 2021). Diagnosis of the species by the method of hemoglobin electrophoresis in polyacrylamide gel with a concentration of 8% was carried out in the laboratory by the Maurer method (DOBROHOTOV et al., 1982; MAURER, 1971). Tris-HCl (pH = 8.9) was used as a gel buffer solution, and tris-glycine (pH = 8.3) as a buffer solution for electrodes. The type of hemoglobin was determined in erythrocyte hemolysates, albumins and transferrins - in blood plasma and acetate hydrogenase - in kidney extracts, using standard histochemical staining methods (KUTNIUK et al., 1986).

RESULTS AND DISCUSSIONS

• According to other researchers, the most frequently encountered species of microtines in the republic is *M.arvalis*, being reported in about 66% of the registered locations (ZAGORODNIUC et al., 1994). The studied microtine species are widely distributed. The range of each of them covers the entire territory of the country (SÎTNIC, 1999; SYTNIC et al., 1995; SYTNIC, 1999; TIKHONOVA et al., 2006). However, some clear trends in spatial and biotopic differentiation have been recorded. *M.arvalis* is more frequently found in agrocenoses and, primarily, in perennial forage grasses, and *M.rossiaemeridionalis* – in arboreal-shrub cenoses (forest curtains, orchards). For the first species, the territory of the country represents an optimum area, and for the twin species this geographical space constitutes the western limits of the distribution. *M.rossiaemeridionalis* was not identified in Romania and in the regions bordering Ukraine, primarily in the Chernivtsi region (TESLENKO, 1986). Tab. 1. presents the ratio between the species of the genus *Microtus* in different biotopes.

• The species *M.arvalis* and *M.rossiaemeridionalis* were differentiated by the type of hemoglobin (Hb). The basic fraction of hemoglobin is identical in both species, and the minor (fast) one is missing in *M.arvalis* and is a marker in *M.rossiaemeridionalis* (DOBROHOTOV&MALÎGHIN, 1982). A total of 280 individuals were diagnosed, of which about 2/3 belonged to the species *M.arvalis*. The population of both species was determined absolutely in all localities.

• Systematization of the data, taking into account the fluctuation of the numerical population, demonstrated the predominance of the species *M.arvalis* in all phases of oscillation, the share being higher in the phase of decrease (Tab. 1).

• The blood plasma proteins, albumin and transferrin, were studied in 56 individuals, of which 35 belonged to the *M.arvalis* species and 21 – to the *M.rossiaemeridionalis* species.

• Albumin (Alb) has an identical electrophoretic mobility in both species, being represented by a single type. Only two rare variants were determined in the *M.arvalis* population. Thus, this protein is monomorphic in both species.

• Transferrin (Tf) was represented by some and the same types in the *M.arvalis* and *M.rossiaemeridionalis* populations. According to the data obtained, in both species this protein is polymorphic, being controlled by three codominant alleles: TfA, Tf B , Tf C (they are listed in order of decreasing mobility of the corresponding protein variants). In both species the most frequent allele is Tf B , the Tf C allele is rare; The interspecific differentiation at the Tf locus is small. The level of variability of this locus in the *M.arvalis* population (H = 0.336) is slightly lower compared to the *M.rossiaemeridionalis* population (H = 0.453). Lactate dehydrogenase (Ldh-1 and Ldh-2) was studied in 124 individuals, of which 91 belonged to the species *M.arvalis* and 33 – *M.rossiaemeridionalis*. The enzyme was represented by three types – ¬ in the population of the first species and by one type – the second. The Ldh-1A allele was identified in both species, which determines the "fast" variant, and the Ldh-1B allele only in *M.arvalis*, which determines the "slow" variant. The second locus was invariable. It is worth noting that only in two out of five localities in M.arvalis was the Ldh-1B allele identified, in the others – only the Ldh-1A allele.

In general, the Ldh-1B allele was less frequent in the *M.arvalis* population, and the level of variability of the Ldh-1 locus is low (H=0.162). The level of polymorphism, in general, is high in perennial grass fields, where ecological conditions are more favorable. However, it is impossible to explain the variability only by the action of selection, without taking into account the effect of isolation and gene drift, especially during the phase of population depression, when the importance of the "founder effect" increases. We demonstrate this fact on the example of a simple single-locus model. Let the population consist of a series of isolated groups of individuals with a reduced population, with an identical frequency of alleles A and B, and qA=0.9 and q B =0.1. If by chance only two individuals from each group participate in the formation of the next generation, then by decomposing the binomial (qA + qB)2 the probability of groups with a different concentration of alleles A and B is calculated. It turns out that only in 44% of the groups both alleles are preserved, and in 66% of the groups the presence of allele A will be recorded and allele B will be eliminated, which is consistent with the experimental data regarding lactate dehydrogenase. In the population, however, the frequency of alleles A and B will remain invariable.

CONCLUSIONS

It was established that *M.arvalis* is more frequently found in agrocenoses, and *M.rossiaemeridionalis* – in arboreal-shrub cenoses. For the first species, the territory of the country represents an optimum zone, and for the twin species this geographical space constitutes the western limits of distribution. M.arvalis dominates by about 66%.

• It was determined that transferrin (Tf) in both species is polymorphic, being controlled by three codominant alleles: TfA, Tf B , Tf C . In both species, the most frequent allele is Tf B, the Tf C allele is rare. The level of variability of this locus in the *M.arvalis* population (H = 0.336) is slightly lower compared to the *M.rossiaemeridionalis* population (H = 0.453).

• Lactate dehydrogenase was represented by three types ¬in the population of the first species and by one type – in the second. The Ldh-1A allele was identified in both sible species, which determines the "fast" variant, and the Ldh-1B allele only in *M.arvalis*, which determines the "slow" variant. The second locus was invariable.

Table 1. Fluctuation of the weight (%) of microtine species at different phases of the oscillation

Species	Peak phase	Decline phase	Depression phase	Growth phase
M.arvalis	62,5 %	77,8%	57,1%	68,6%
M.rossiaemeridionalis	37,5%	22,2%	42,9%	31,4%
Total effective	56	45	42	137