



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM
TIMISOARA
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH
IN APPLIED LIFE SCIENCES"



13-14 November 2025

Prevalence of *Dipylidium caninum* in dogs and molecular confirmation in fleas

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Abstract: Dipylidiosis, caused by the cestode *Dipylidium caninum*, is a helminthic infection with zoonotic potential that remains frequently underdiagnosed in veterinary practice. The aim of this study was to assess the prevalence of flea infestation in dogs and to identify the presence of *D. caninum* in the involved vectors using molecular biology techniques. Between March 2023 and June 2024, a total of 100 samples were collected from Gorj and Caraș-Severin counties, originating from both shelters and private households. Fecal samples were analyzed coprologically using the Willis flotation method, while the collected fleas were subjected to PCR for the detection of parasitic DNA. Coprological examination revealed a 6% prevalence of *D. caninum* infection, whereas 89% of the examined dogs were infested with fleas. The identification of *D. caninum* DNA by PCR was confirmed in all 12 randomly selected flea samples analyzed. No statistically significant differences were observed according to age or breed; however, the sex distribution showed a slight variation among positive cases. The concurrent presence of fleas and the detection of parasitic DNA confirm the major role of ectoparasites in the transmission of canine dipylidiosis. The results highlight the necessity of strengthening flea control measures and implementing regular internal deworming programs to reduce the risk of transmission to both animals and humans.

• Introduction

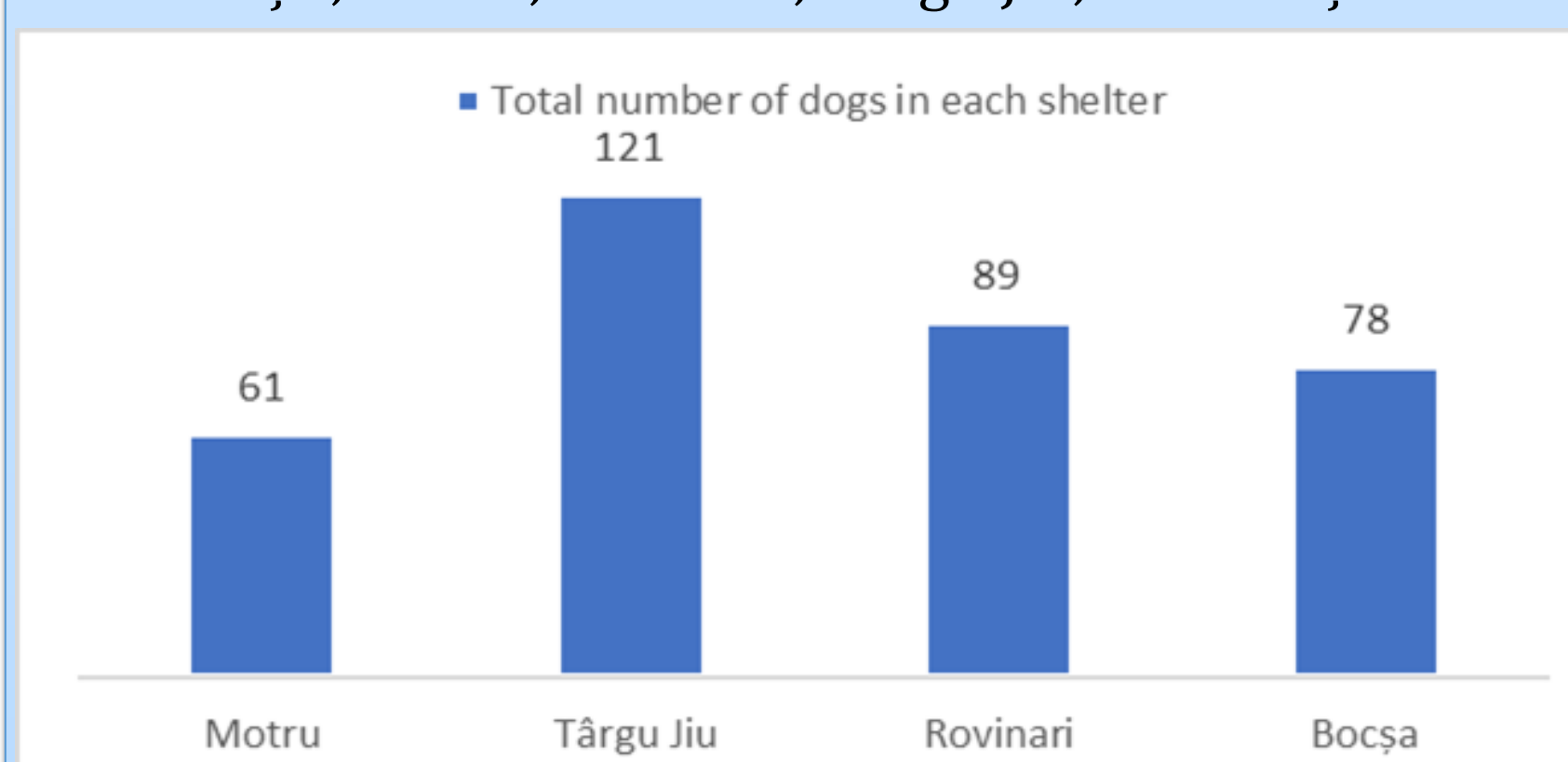
Dipylidiosis is an underdiagnosed zoonotic infection caused by the cestode *Dipylidium caninum*, transmitted through fleas and lice that act as intermediate hosts. Dogs and cats serve as definitive hosts, while humans—especially children, may become accidental hosts through close contact with infested pets. Most infections are asymptomatic or present with mild, nonspecific signs, making diagnosis and prevention difficult.

The disease is cosmopolitan, with higher prevalence in urban areas where dense dog and cat populations favor transmission. Reported infection rates range from 4–60% in dogs. Factors such as climate change, urbanization, and poor ectoparasite control contribute to the persistence and spread of the parasite.

The findings emphasize the essential role of fleas as biological vectors and highlight the need for consistent ectoparasite management, accurate diagnostic methods, and routine deworming to reduce the zoonotic risk posed by *D. caninum*.

• Material and method

The study, conducted between March 2023 and June 2024 in Gorj and Caraș-Severin counties, aimed to evaluate *Dipylidium caninum* infection in dogs through clinical, parasitological, and molecular methods. A total of 100 samples, fecal and flea specimens, were collected from both privately owned and sheltered dogs in Bărbăești, Motru, Rovinari, Târgu Jiu, and Bocșa.

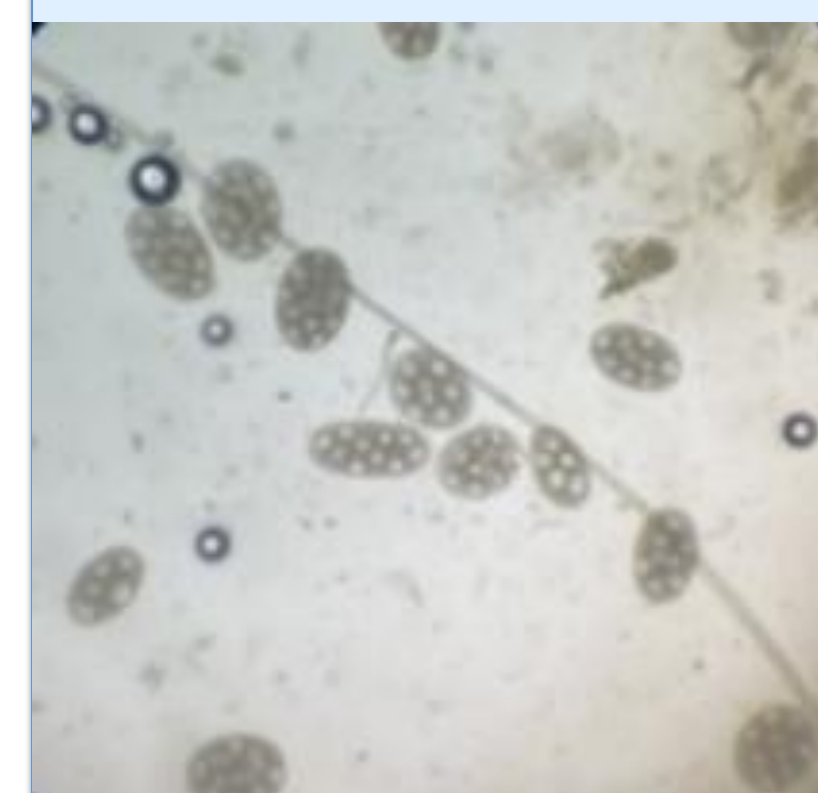
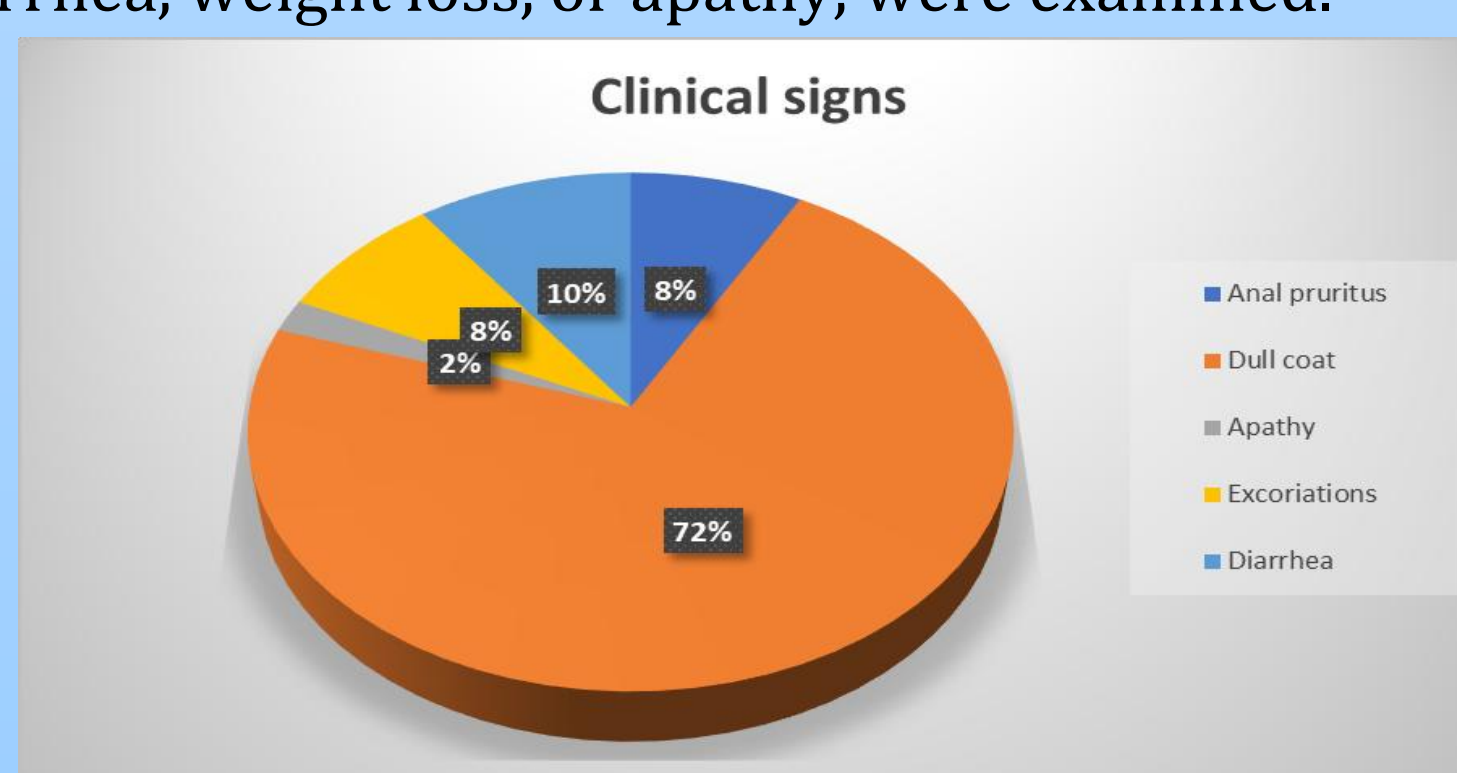


Fecal samples were collected from fresh material, stored at +4°C, and analyzed within 24 hours. In shelters, pooled samples were taken from kennels housing several dogs.

Fleas were collected by combing the coat and preserved in 70% ethanol at +2°C to +8°C. Fecal samples were examined macroscopically and by the Willis flotation method to detect parasitic elements. DNA extracted from fleas was analyzed by PCR targeting a 267 bp fragment of the *rrnS* gene (*Taenia* spp.), and the results were confirmed by agarose gel electrophoresis and UV visualization.

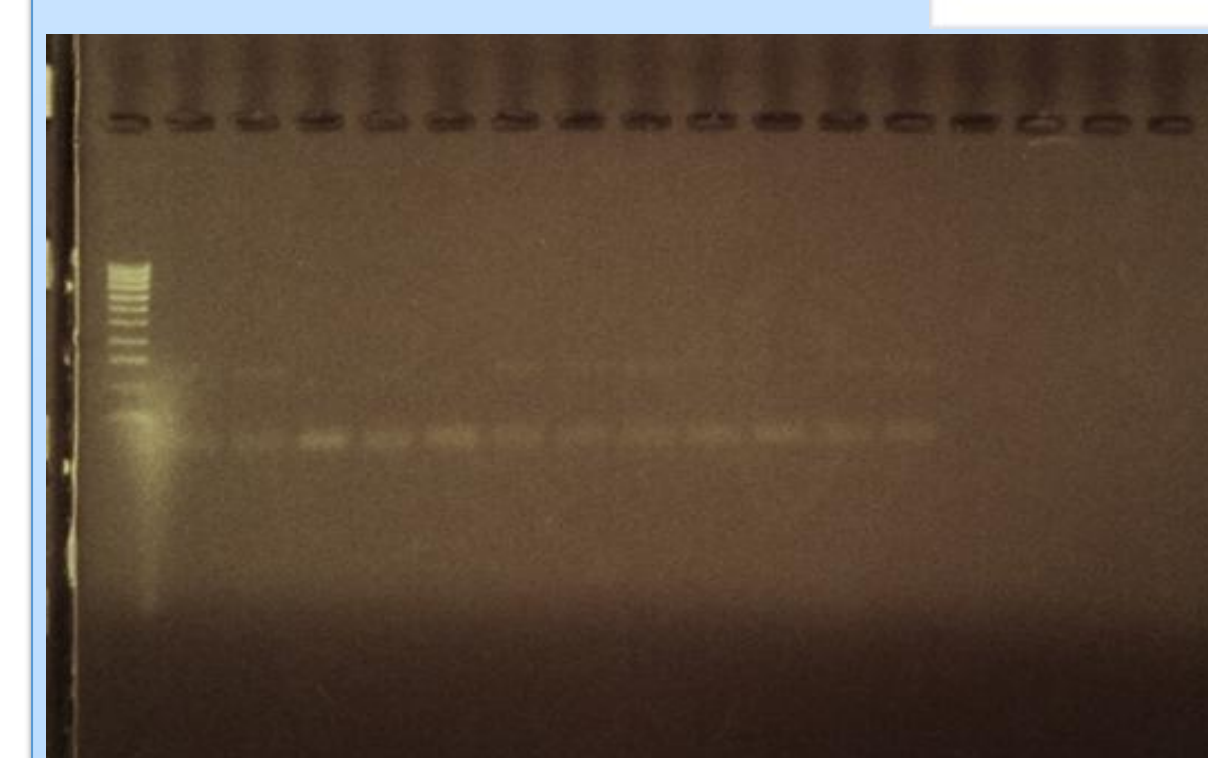
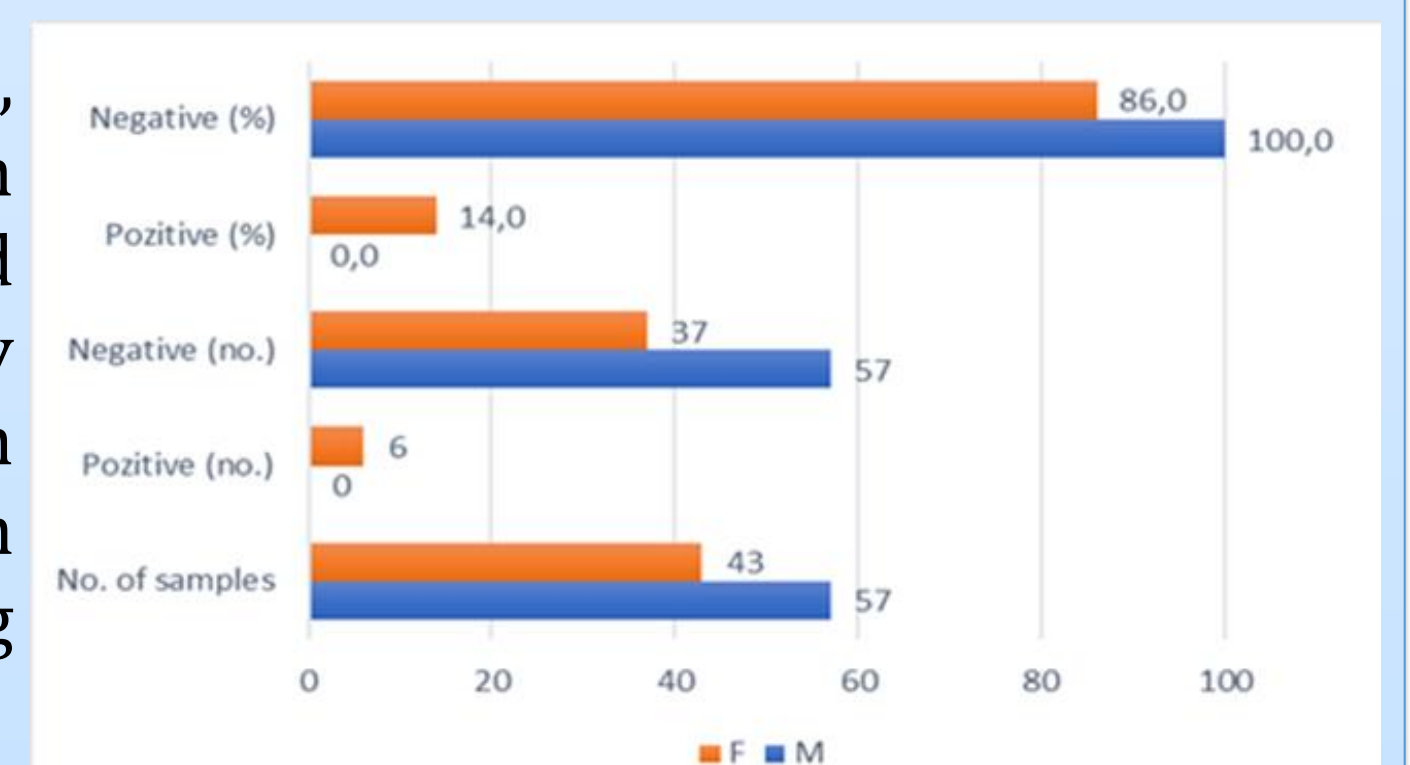
• Results and discussions

A total of 100 dogs showing at least one clinical sign of parasitic infection, such as: anal pruritus, diarrhea, weight loss, or apathy, were examined.



Coprological examination by the Willis flotation method revealed a 6% overall positivity rate for *Dipylidium caninum* oncospheres. Positive samples were detected in four cases from Gorj County and two from Caraș-Severin County. No significant differences were found between age groups or between purebred and mixed-breed dogs, although sex-related variations were statistically significant.

Of the 100 dogs examined, 89 were infested with fleas. Infestation showed no significant variation by age, sex, or breed, with positivity rates between 50% and 100%, indicating a high overall prevalence.



PCR analysis of DNA extracted from 12 fleas confirmed *Dipylidium caninum* in all samples, demonstrating that fleas are major biological vectors of the parasite.

This study confirms and expands current knowledge on the global distribution and epidemiology of *Dipylidium caninum*, emphasizing the essential role of fleas as biological vectors in its transmission. Reported prevalence rates vary widely worldwide, ranging from low levels in some regions of Europe and the Americas to higher values in Africa and Asia, reflecting differences in environmental conditions, flea density, and parasite control practices. Studies from Ethiopia, the United States, and Europe demonstrate that infection rates depend on host management, geographic factors, and diagnostic methods used. Molecular and coproantigen-based assays have proven more sensitive than conventional flotation techniques, revealing that many infections remain undetected.

• Conclusions

The study revealed a 6% prevalence of *Dipylidium caninum* in dog fecal samples and an 89% flea infestation rate, with all tested fleas positive for the parasite's DNA. These results indicate that *D. caninum* infection is underdiagnosed and widely distributed, confirming fleas as major biological vectors and emphasizing the need for regular deworming and effective ectoparasite control to prevent this zoonotic infection.