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Ectoparasites as viral vectors in veterinary medicine: prevalence in companion animals

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INTRODUCTION & AIM

Ectoparasites in companion animals represent not only a clinical concern but also a major epidemiological factor due to their capacity to act as vectors for a wide range of pathogens, including viruses of zoonotic importance. Among these, *Rhipicephalus sanguineus*, the brown dog tick, holds particular significance as it has been associated with the transmission of the Crimean–Congo hemorrhagic fever virus (Nairoviridae) and certain members of the Flaviviridae family.
Given its widespread distribution and close association with domestic animals, *R. sanguineus* poses potential threats to both animal and human health. Within the One Health framework, understanding the prevalence and distribution of such vectors is crucial for assessing the epidemiological risks associated with viral transmission.

This study aimed to evaluate the prevalence of ectoparasites in companion animals and to analyze their potential role as vectors of viral and zoonotic pathogens in northeastern Romania.

METHOD

Location and period: The research was conducted at Medicrisvet Veterinary Clinic in Fălticeni, Suceava County, Romania, over the course of 2024.

Study design: A total of 100 clinical cases of dogs, cats, and small companion mammals were examined to identify and classify ectoparasite species and to assess their potential epidemiological and viral relevance.

Clinical observation and anamnesis: Each animal underwent a detailed clinical observation, focusing on morphology, coat quality, ear and eye condition, and general behavior (scratching, alopecia, restlessness).

Anamnesis included information on diet, habitat, contact with other animals, travel history, exposure to environmental factors, previous antiparasitic treatments, and overall medical history.
These data helped establish the clinical and epidemiological background of each case.

Clinical assessment: Animals underwent detailed clinical observation and anamnesis, including diet, habitat, prior treatments, and contact with other animals.

Sample collection: Skin scrapings, scales, crusts, and ear swabs were collected, preserved in 70% ethanol, and prepared for microscopic examination.

Microscopic examination: Mites (*Demodex cati*, *Otodectes cynotis*, *Sarcoptes scabiei var. canis*) were identified under light microscopy. *Rhipicephalus sanguineus* ticks were analyzed under a stereomicroscope and identified by morphological features.

Complementary analyses: Hematology, biochemistry, and serology (SNAP FeLV/FIV in cats) were performed as needed.

Data processing: The prevalence of each ectoparasite species and the seasonal distribution of infestations were calculated.
Results were analyzed in relation to climatic factors and potential vectorial capacity.
Special emphasis was placed on *Rhipicephalus sanguineus*, recognized as a **vector for Crimean–Congo hemorrhagic fever virus (Nairoviridae)** and members of the Flaviviridae family.

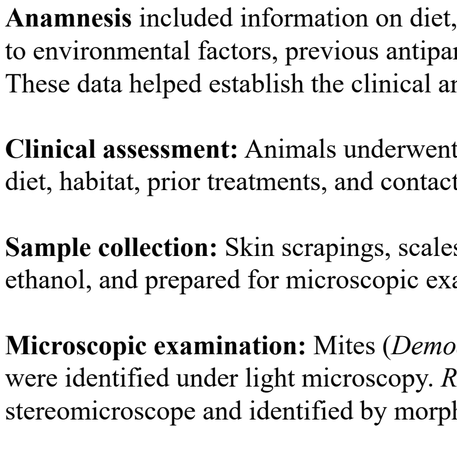

Figure 1. Developmental stages of the tick *Rhipicephalus sanguineus*: larva (a), nymph (b), adult female (c), and adult male (d). Source: Dantas-Torres F., *Parasites & Vectors*, 2013, 6:213. Reproduced under **CC BY 2.0** license.

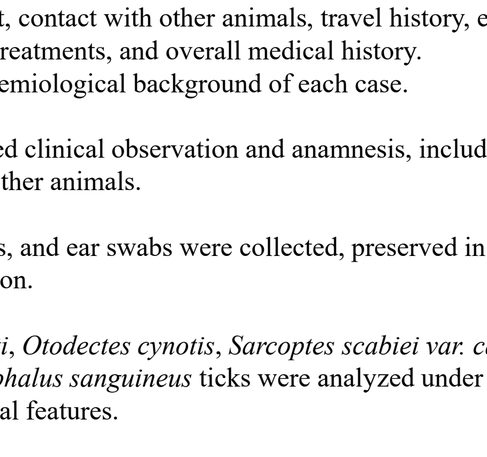

Figure 2. *Rhipicephalus sanguineus* collected from a dog (female, 11 months old, 5 kg).

RESULTS & DISCUSSION

Out of the 100 examined animals, ectoparasitic infestations were detected in a high proportion of cases, confirming the persistence of these vectors in domestic settings in northeastern Romania.

The most frequently identified species was *Rhipicephalus sanguineus* (54.8%), followed by *Demodex cati* (26.9%), *Otodectes cynotis* (11.5%), and *Sarcoptes scabiei var. canis* (6.7%). These results indicate that *R. sanguineus* is the dominant tick species, maintaining a strong ecological adaptation to urban and peri-urban environments.

Infestations were more frequent during the warm season (May–September), a period that coincides with increased vector activity and pathogen replication. This observation supports existing data from southeastern Europe linking climatic factors to the expansion of vector-borne diseases.

The epidemiological significance of *R. sanguineus* extends beyond parasitic infestations, as this species is recognized as a vector of Crimean–Congo hemorrhagic fever virus (Nairoviridae) and members of the Flaviviridae family. Its high prevalence in household animals may therefore indicate a potential risk interface between companion animals, humans, and wildlife.

The findings highlight the importance of ectoparasite surveillance as part of integrated *One Health* programs. The observed seasonal and species-specific patterns underscore the need for preventive control strategies, vector monitoring, and public awareness to reduce zoonotic viral risk.
Overall, these results contribute to the understanding of viral ecology in veterinary settings and reinforce the connection between vector biology, environmental change, and zoonotic emergence

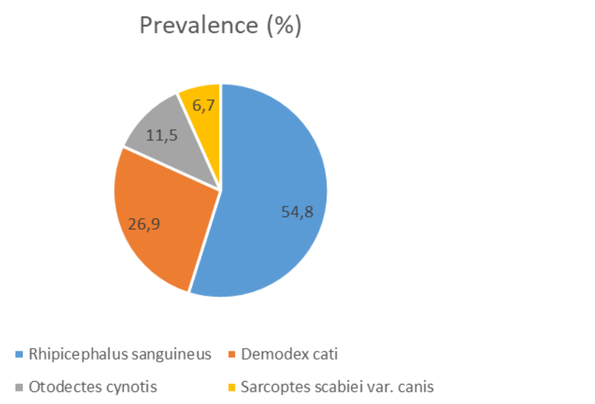

Figure 3. Prevalence of ectoparasite species identified in companion animals examined at Medicrisvet Clinic, 2024.

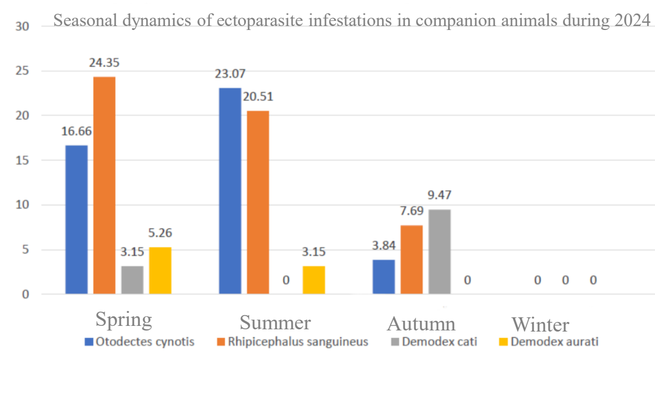

Figure 4. Seasonal dynamics of ectoparasite infestations in companion animals during 2024

CONCLUSION

- *Rhipicephalus sanguineus* shows a high prevalence in companion animals, confirming its role as a vector with viral relevance.
- The observed seasonal pattern indicates greater viral transmission risk in warmer months.
- Integrating ectoparasite surveillance into veterinary virology monitoring systems can enhance early detection and control of zoonotic threats.
- This study reinforces the *One Health* approach, linking animal, human, and environmental health through proactive vector surveillance.

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