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Short Communication

Successful management of sarcoptic and notoedric mange coinfection in a pet rabbit

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Abstract

A one-year-old mixed-breed rabbit was brought to the medicine ward of the Referral Veterinary Polyclinic at ICAR-Indian Veterinary Research Institute with a history of whitish, crusty lesions around the eyes, nostrils, and lips, persisting for the past 15–20 days. Upon clinical examination, the rabbit appeared dull, had a rough coat, and exhibited signs of pruritus, though all other clinical parameters were within normal limits. Skin scrapings taken from the affected areas were examined microscopically and revealed the presence of both sarcoptic and notoedric mites. Treatment was initiated with ivermectin at a dose rate of 200 µg/kg body weight subcutaneously, administered once weekly for four weeks. In addition, topical application of benzyl benzoate lotion and oral multivitamin syrup was given. The rabbit began showing signs of improvement by the second week and made a full recovery within four weeks, evidenced by the resolution of crusty facial lesions and regrowth of fur. Follow-up skin scrapings after the fourth week were free of parasites. This case illustrates the effective diagnosis and treatment of a dual mite infestation of sarcoptic and notoedric mange in a rabbit.

Keywords: Alopecia, Ivermectin, Notoedres, Rabbit, Sarcoptes.

Highlights

- A one-year-old mixed-breed rabbit with crusty lesions around the eyes, nostrils, and lips, along with dullness, pruritus and a rough coat
- Microscopic examination of skin scrapings confirmed a dual infestation of sarcoptic and notoedric mites.
- Treatment involved ivermectin (200 µg/kg, SC,weekly for 4 weeks), topical benzyl benzoate lotion, and oral multivitamin syrup
- Visible improvement began by the second week, with complete recovery and fur regrowth by the fourth week.
- Follow-up skin scrapings post-treatment were free of mites, confirming effective resolution of the mange infestation.

Domestic rabbits (*Oryctolagus cuniculus*) are widely raised across the globe for meat production, fur collection, and use in biomedical research. Their calm nature and ability to adapt to home environments have also made them increasingly popular as pets (Lorio & Villareal, 2023). Rabbits are susceptible to a range of skin ailments, particularly those caused by mite infestations, which can adversely affect their health and comfort (Espinosa et al., 2020). The primary mites affecting rabbits include *Psoroptes cuniculi*, *Sarcoptes scabiei* var. *cuniculi*, *Cheyletiella parasitivorax*, and *Notoedres cati* (Abd El-Ghany, 2022). Scabies, a skin disorder caused by *Sarcoptes scabiei* mites, affects more than 150 mammalian species, including rabbits, and is a major concern for commercial rabbit farming in India due to its high contagiousness and serious health implications (Hemachand & Revathi, 2023). *Notoedres cati* infestations in rabbits are rare (Darzi et al., 2007).

Mites are typically transmitted from one rabbit to another through direct skin-to-skin contact or by exposure to contaminated environments. Clinical signs associated with mite infestation are severe crusting, development of scales and scabs, and intense itching, though similar symptoms may also appear on the lips, nose, neck, legs, and occasionally around the genital area (Panigrahi et al., 2016). Multiple acaricidal agents have been utilized for the management of acariosis, with ivermectin administered orally or parenterally demonstrating consistent therapeutic efficacy (Eraslan et al., 2010). Thisstudy highlighted rabbit infestations by two different mite species and their successful management through subcutaneous ivermectin therapy.

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A One-year old rabbit of mixed breed was presented to the Medicine Ward of the Referral Veterinary Polyclinic at ICAR–Indian Veterinary Research Institute with the primary complaint of developing whitish, crusty skin lesions localized around the periorbital region, nostrils, and lips and pruritus (Fig. 1A and 1B). The owner reported that the skin lesions had gradually intensified over the last 15 to 20 days, causing concern due to their continuous presence and involvement of delicate facial regions. A thorough enquiry with the owner revealed that the rabbit was maintained in the poorly ventilated, wet and dirty cages.



Fig. 1. Clinical presentation of sarcoptic and notoedric mange in rabbit (A) Whitish crusty lesions around nostrils and lips before treatment (B) Picture showing crusty lesions around periorbital region

Clinical examination revealed that the rabbit appeared dull and lethargic, and showed signs of pruritus. A skin scraping was obtained from the affected areas, and subjected to heat digestion using a 10% potassium hydroxide (KOH) solution. Microscopic examination of the digested sample confirmed the presence of both *Sarcoptes scabiei* and *Notoedric cati* mites (Fig. 2). Sarcoptes mites (Fig. 2A) were characterized by a rounded body, four pairs of legs, and a flattened ventral surface. Whereas, Notoedres mites (Fig. 2B) were comparatively smaller in size, possessed a rounded body with four pairs of short legs, and exhibited a distinctive "thumbprint-like" pattern on the dorsal surface due to striations. Based on the case history, clinical manifestations, and microscopic identification of the ectoparasites, the condition was diagnosed as a co-infection of sarcoptic and notoedric mange in the rabbit.

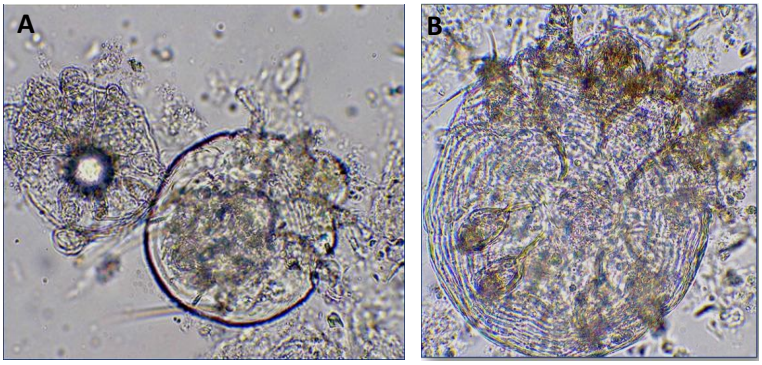


Fig. 2. Microscopic identification of mites from skin scraping (A) *Sarcoptes scabiei* showing rounded body and terminal anus (arrow) (400X) (B) *Notoedres cati* showing dorsal striations with thumbprint-like pattern (400X)

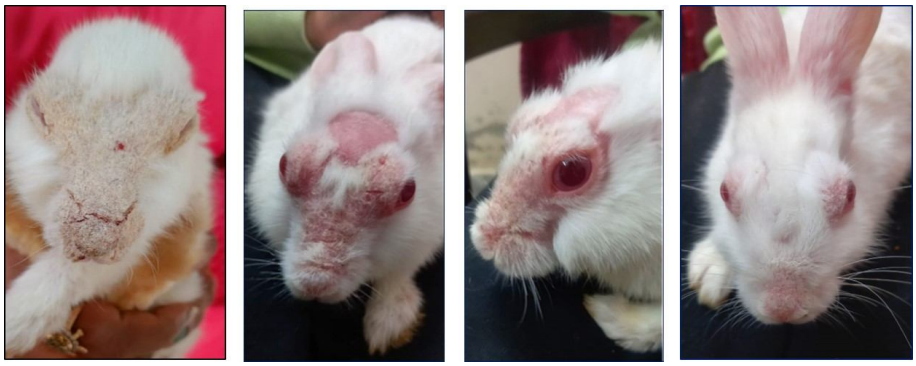


Fig. 3. Clinical improvement following treatment (A) Day 0 showing severe crusting (B) Second week showing reduction in crusts (C) Third week showing healing lesions (D) Fourth week showing complete resolution and hair regrowth

The treatment was initiated with ivermectin at the dose rate of 200 µg/kg b.wt subcutaneously weekly once for four weeks. In addition, benzyl benzoate lotion was advised to apply topically along with oral multivitamin syrup (syrup Vimeral®, 0.5 mL total dose PO BID for 30 days).This therapeutic regimen was selected based on the well-documented effectiveness of ivermectin in targeting sarcoptes and notoedres mites, along with the supportive role of Vimeral syrup in alleviating clinical symptoms and promoting overall recovery. Clinical signs, such as alopecia and pruritus, demonstrated significant improvement over the course

of the treatment (Fig. 3A, B and C). After four-week of therapy, complete healing of the crusty lesions and noticeable regrowth of hairs were observed (Fig. 3D). Skin scrapings conducted after four weeks tested negative for the presence of mites. These findings directly reflect the efficacy of the treatment protocol and its therapeutic success.

Sarcoptic mange (family Sarcoptidae) is a frequent condition in rabbits, marked by the distribution pattern of lesions, the presence of pruritus, and the distinctive morphology of mites observed in skin scrapings. Notoedric mange, a condition caused by an obligate ectoparasite from the Sarcoptidae family, induces severe dermatitis that can be fatal and is often accompanied by secondary systemic infections in small mammals such as rabbits, felids, and occasionally humans (Sharma et al., 2021).The diagnosis of sarcoptic mange typically depends on skin scraping examinations, though false-negative results can sometimes happen, requiring deeper scrapings (Hemachand & Revathi, 2023).

Both sarcoptic and notoedric mites are burrowing types, and confirmation involves a microscopic examination of the mites alongside the characteristic skin lesions (Rao et al., 2020). Under a microscope, mite species can be identified by their morphological features. Adult *Sarcoptes scabiei* mites have a round body shape, short legs, along with an elongated, unsegmented pedicle bearing a sucker on the anterior pair of legs. They possess a thick chitinous exoskeleton with large spines on the dorsal surface, a terminal anus, and various structures such as scales, cones, and blade-like setae on the back (Chitwood & Lichtenfels, 1972). The *Notoedres cati* mite is a small in size measuring approximately 150-225 µm in length.It exhibits a round body with four pairs of short legs, each ending in long, unsegmented pedicels equipped with suckers. Notably, the anus is located dorsally, distinguishing it from *Sarcoptes scabiei*, which has a terminal anus and exhibited a distinctive "thumbprint-like" pattern on the dorsal surface due to striations (Sivajothi et al., 2015).

The pathogenicity of *Sarcoptes* mites is attributed to their burrowing behavior, mechanical tissue damage resulting from excavation, irritation induced by mite secretions, hypersensitivity reactions to specific extracellular products, and the induction of interleukin-1 release (Wall & Shearer, 1997). Ivermectin was administered subcutaneously at a dosage of 200 micrograms per kilogram of body weight selectively targets glutamate-gated and gamma-aminobutyric acid (GABA)-gated chloride channels within the nervous system of mites, resulting in cellular hyperpolarization, paralysis, and ultimately, death (Galdhar et al., 2015; Sharma et al., 2021). The administration of ivermectin as described is consistent with the mechanism of action documented in previous research. Its effectiveness against sarcoptes and notoedric infestations is primarily due to its ability to induce paralysis and mortality in the mites, leading to their eradication.

In summary, early diagnosis and effective treatment led to the successful control of co-infection of both sarcoptic and notoedric mange in a rabbit. The combination of systemic ivermectin treatment, topical benzyl benzoate application, and supportive therapy with multivitamins led to complete clinical recovery within four weeks. This case highlights the importance of early detection, targeted therapy, and diligent follow-up in effectively treating mite infestations in rabbits and ensuring their full recovery.

Conflict of interest: The authors declare that they have no conflict of interest.

Author's contributions: BA, VS: Responsible for case management and clinical examination; PM, RMS: Conducted laboratory diagnostics and data interpretation; KM: Drafted the initial manuscript; NK, KD: Critically reviewed and revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

Data availability statement: All relevant data supporting the findings of this case report are included within the article. Additional details or materials can be made available by the corresponding author upon reasonable request.

Use of artificial intelligence tools: Author(s) hereby declare that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generator have been used during writing or editing of the manuscript.

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