

A CASE REPORT OF *SARCOPTES SCABIEI* IN LABORATORY RABBITS AT THE INSTITUTE FOR MEDICAL RESEARCH (IMR)

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SUMMARY

In this case report, two New Zealand White (NZW) rabbits presented to the Laboratory Animal Resource Unit (LARU) at the Institute for Medical Research (IMR), Malaysia, with intense scratching, itching, and reduced appetite. They exhibited dry, crusty lesions on the ears, nose, and paws, with ear discharge forming thick black crusts. The diagnosis was confirmed through deep skin scrapings, revealing *Sarcoptes scabiei* mites under a microscope and electron microscopy. The rabbits were successfully treated with subcutaneous Ivermectin at 0.3 mg/kg every 14 days for three treatments, leading to complete recovery in seven weeks. Subsequent skin scrapings confirmed the absence of mites. *Sarcoptes scabiei* is a zoonotic mite that can infest humans through direct contact with infested animals, potentially affecting research outcomes. Comprehensive treatment and thorough environmental disinfection are essential to prevent disease spread. In this case, sarcoptic mange in the rabbits was successfully treated.

KEYWORDS: *Sarcoptes scabiei*, Sarcoptic mange, zoonotic disease, rabbit, ivermectin

INTRODUCTION

Sarcoptic mange, caused by the mite *Sarcoptes scabiei*, infests the epidermis of humans and many mammals. While subspecies are typically host-specific, cross-species transmission can occur. Mange affects various host species globally (Kevin et al., 2019). Direct contact with an infested host is the main transmission route. The mite lives in skin tunnels, causing seborrheic dermatitis, erythematous papules, hyperemia, and partial alopecia (Seongjun et al., 2020). Commonly affected areas include the ears, skin, limbs, and mouth corners, leading to difficulty eating and potentially death if untreated (Veena et al., 2022). *Sarcoptes scabiei* is visible under a microscope. While not always definitive, skin scrapes are simple, quick, and crucial for diagnosing parasitic infestations (Keith et al., 2017). Specific acaricides, such as Ivermectin, Abamectin, Doramectin, Eprinomectin, and Selamectin, are effective against mange in rabbits (Kachhawa et al., 2013). Ivermectin, administered subcutaneously at 0.3-0.4 mg/kg and repeated after 14 days, has proven effective (Plumb DC, 2011; Kaplaywar et al., 2017). This case report documents the successful treatment of sarcoptic mange in laboratory rabbits using subcutaneous Ivermectin and thorough environmental management.

CASE DESCRIPTIONS

Animals

Four 4-week-old male rabbits were purchased for laboratory use in March 2022 and housed in individual cages for observation. Initially, all rabbits appeared healthy, with no abnormalities during physical exams, and they maintained normal appetite, bowel movements, and urination. However, after two weeks, two rabbits showed signs of infestation. They were sent to the Laboratory Animal Resource Unit (LARU) at the Institute for Medical Research (IMR), Malaysia, for further examination and treatment.

Clinical signs

The two infested rabbits exhibited symptoms of pruritus, crusting on the nose, and lesions spreading to the ears and paws. Rabbit No. 1 had mild alopecia, dry crust-like lesions on the ears, white induration of the ear pinna, and thick black ear canal crusts due to excessive discharge. Rabbit No. 2 showed crusted debris near the muzzle, which was itchy and led to severe scratching, spreading the lesions to other areas, with thick, dry crusts on both ear pinnae. Detailed clinical signs are provided in Table 1 and Figure 1.

Table 1. Clinical signs

Identification No.	Findings			
	Appetite	Bowel	Urination	Clinical signs
No.1	Reduce	Normal	Normal	<ul style="list-style-type: none"> i. Dry crust-like lesions of both ear pinna ii. Mild alopecia on the ears iii. Ear discharge iv. Thick black crust filled the ear canal
No.2	Reduce	Normal	Normal	<ul style="list-style-type: none"> i. A crusted debris was observed near the rostral of the muzzle ii. Itchy and pruritic iii. Severe scratching iv. Thick, dry crusts on both sides of the ear pinna (bilaterally)

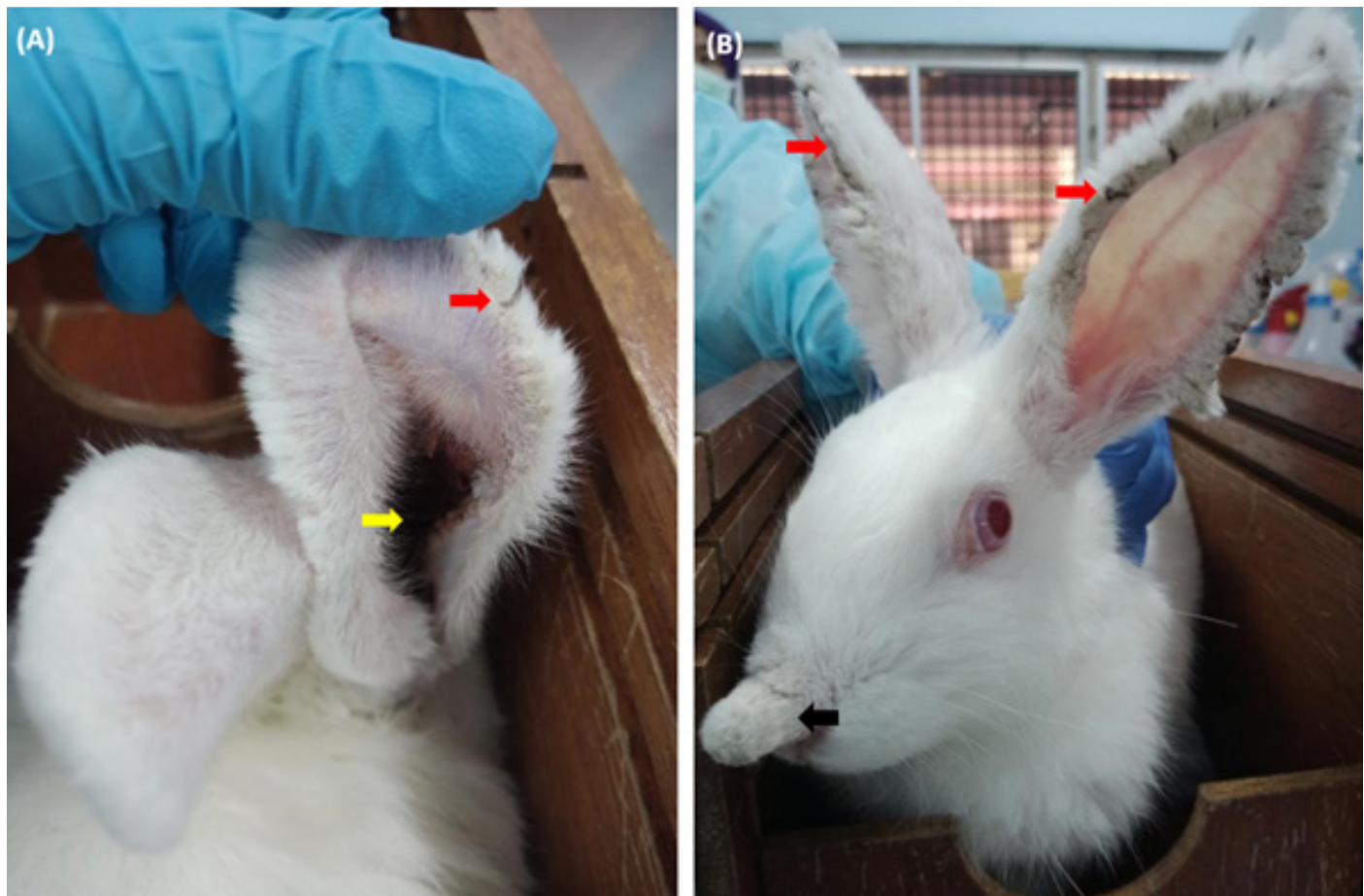


Figure 1. (A) Rabbit No. 1 shows white induration on the right ear pinna (red arrow) and a black crust filling the ear canal (yellow arrow). (B) Rabbit No. 2 displays crusted debris near the muzzle, causing an 'elongated' nose (black arrow) and thick, dry crusts on both ear pinnae (red arrow).

Laboratory diagnosis

Following the procedure outlined by Charles *et al.* (2016) for confirmatory diagnosis, deep skin scrapings were taken from the lesions and examined using direct microscopy. The scrapings were placed on a glass slide with mineral oil, covered, and examined under 100X and 400X magnification for mites, larvae, or ova. Hair pluck samples were also taken from the infested area and examined similarly. Additionally, ear swab samples were collected and analyzed. For scanning electron microscopy (SEM), the specimens were washed, fixed in 70% ethanol, dehydrated using increasing ethanol concentrations, and dried using a critical point dryer. The dried mites were then mounted, sputter-coated with gold, and examined with SEM.

RESULTS

Microscopic

Examination of skin scrapings and hair pluck slides from both infested rabbits revealed the presence of adult *Sarcoptes scabiei* mites using direct microscopy at 100x magnification. However, all ear swab samples tested negative for ectoparasites. A scanning electron micrograph (SEM) showed a dorsal view of *Sarcoptes scabiei* with an ovoid flattened body, triangular dorsal scales, and sucker-like pulvillus at the leg tips. Figure 2 illustrates the microscopy results confirming the presence of parasites in the skin scrapings and hair pluck samples from the infested rabbits.

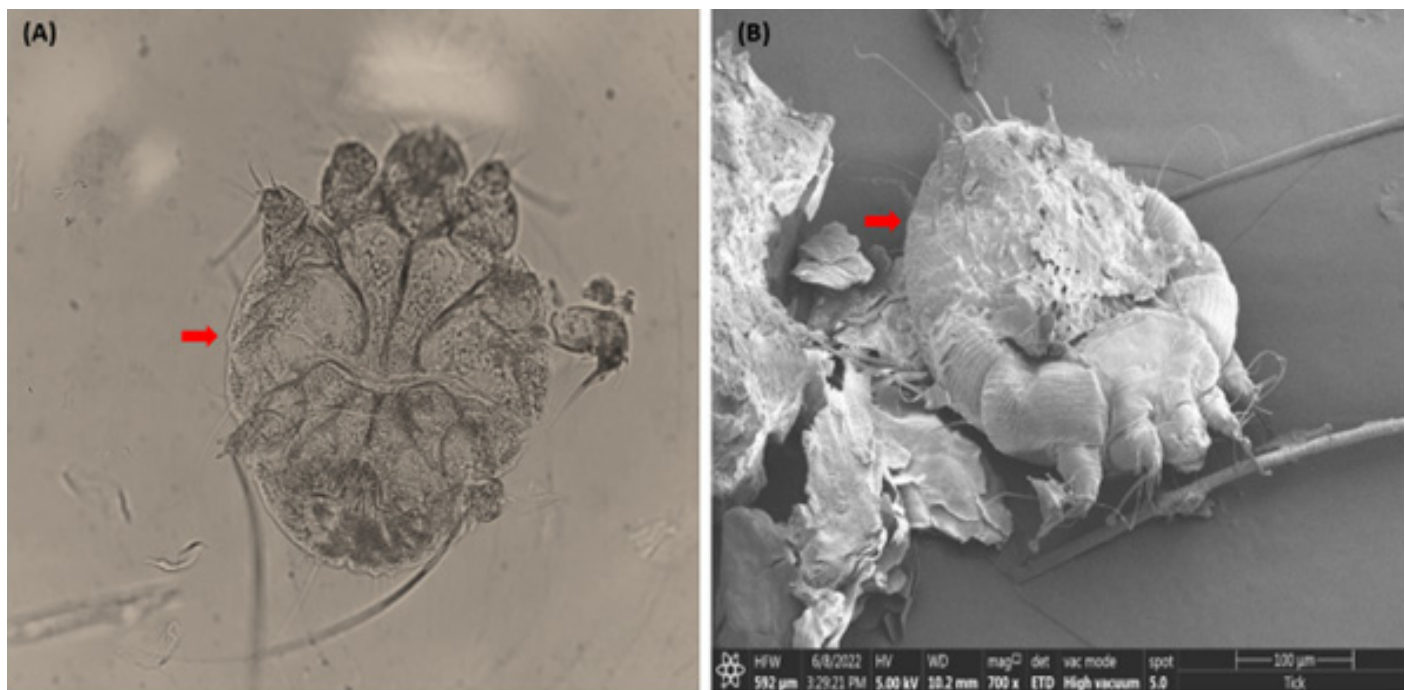


Figure 2. (A) Skin scraping from a rabbit showing *Sarcoptes scabiei* (red arrow) under 100x magnification with a light microscope, viewed from the ventral side. (B) *Sarcoptes scabiei* (red arrow) in scanning electron microscopy (SEM), partially covered by keratin flakes dorsally, with visible triangular dorsal scales and suckers on the foremost leg pairs.

Treatment

The infested rabbits were treated with 1% Ivermectin injections at a dosage of 0.3 mg/kg body weight, administered subcutaneously every 14 days for three treatments, as recommended by Plumb's Veterinary Drug Handbook. Following treatment, the rabbits' alopecic areas began regaining hair, and signs of sarcoptic mange improved. No side effects were observed, and all rabbits responded well to the treatment, fully recovered, with scratching and crust production stopped. Seven weeks after the third treatment, skin scrapings tested negative for mites, indicating complete recovery. Progress and observations are detailed in Table 2.

Husbandry Management

All equipment, cages, and areas were thoroughly cleaned and disinfected. The infested rabbits were isolated, and their cage was replaced, with the old ones thoroughly cleaned and disinfected. Animal handlers wore personal protective equipment (PPE), including gloves, masks, shoe covers, and disposable gowns, all of which were discarded in a biohazard bin.

DISCUSSION

The standard diagnosis for mange caused by *Sarcoptes scabiei* in rabbits involves microscopic examination of skin scrapings from the lesions. In this case report, the presence of mites under the microscope and visible skin lesions confirmed the diagnosis of sarcoptic mange. Other researchers have used similar diagnostic methods (Kachhawa *et al.*, 2013; Kumar *et al.*, 2018). The samples were also examined using scanning electron microscopy (SEM) to achieve higher-quality images. The clinical signs observed, such as intense scratching, alopecia, and crusty lesions on the ears, nose, and paws, were consistent with previous findings (Kaplaywar *et al.*, 2017). Ivermectin, a broad-spectrum antiparasitic drug, was administered subcutaneously at a dosage of 0.3 mg/kg every 14 days for three treatments, as Plumb's Veterinary Drug Handbook recommended. This treatment successfully resolved the infestation. Preventing the spread of mange and other infections requires rigorous husbandry management and environmental hygiene. In this case, all equipment, cages, and areas were thoroughly cleaned and disinfected. Ensuring handler safety through appropriate PPE was also a priority to prevent disease transmission to humans. The present case reports mange infestation in rabbits and its successful treatment with subcutaneous administration of Ivermectin at a dosage of 0.3 mg/kg body weight along with proper husbandry management is effective in control of mange in rabbits.

Table 2. Summary of the sample collection, diagnostic method, results, treatment and progress following the completion of treatment

Identification No	Sample	Diagnostic method	Result	Treatment	Progress after 3rd treatment
No. 1	Scraped crusts	Examination using a direct microscopic technique, and scanning electron microscopy (SEM)	Presence of adult <i>Sarcoptes scabiei</i>	1% Ivermectin 0.3mg/kg body weight subcutaneously every 14 days interval Three series of treatments	The alopecic area began to grow hair
	Hair pluck	Examination using a direct microscopic technique.			No scratching
	Ear swab	Examination using a direct microscopic technique.	Negative for ectoparasites		No new crusts were produced
					No side effects were observed
					Post-treatment: Skin scraping negative for the presence of mites
No. 2	Scraped crusts	Examination using a direct microscopic technique and scanning electron microscopy (SEM)	Presence of adult <i>Sarcoptes scabiei</i>	1% Ivermectin 0.3mg/kg body weight subcutaneously every 14 days interval three series of treatments	Dry crusted the muzzle and both ear pinna fell off
	Hair pluck	Examination using a direct microscopic technique			New hair began to grow slowly compared to rabbit ID No. 1
	Ear swab	Examination using a direct microscopic technique	Negative for ectoparasites		No scratching
					No new crusts were produced
					No side effects were observed
					Post-treatment: Skin scraping negative for the presence of mites

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REFERENCES

- Charles, M. H., and M. Robinson, eds. *Diagnostic Parasitology for Veterinary Technicians*. 5th ed. Elsevier Saunders, 2016. Chapter 13, 232-36.
- Choe, S., S. Kim, K.-J. Na, T. C. Nath, B. A. Ndosu, Y. Kang, M. M. Bia, D. Lee, H. Park, C. Eamudomkarn, H.-K. Jeon, and K. S. Eom. "First Infestation Case of Sarcoptic Mange from a Pet Rabbit *Oryctolagus cuniculus* in the Republic of Korea." *Korean J. Parasitol.* 58, no. 3 (2020): 315-19. <https://doi.org/10.3347/kjp.2020.58.3.315>.
- Kachhawa, J. P., S. Lachhawa, M. Srivastava, A. Chahar, and N. K. Singh. "Therapeutic Management in Rabbits." *Intas Polivet* 14 (2013): 306-08.
- Kaplaywar, S., J. Jyothi, and S. G. S. Murthy. "Resolving Sarcoptic Mange Infection in a New Zealand White Rabbit." *The Pharma Innovation Journal* 6, no. 11 (2017): 641-42.
- Keith, A. H., and P. P. Adam. *Small Animal Dermatology: A Color Atlas and Therapeutic Guide*. 4th ed. W. B. Saunders Company, 2017, 612-33.
- Kevin, D. N., J. D. Bradley, K. M. Schmitz, and M. J. Yabsley. "A Review of Sarcoptic Mange in North American Wildlife." *International Journal for Parasitology: Parasites and Wildlife* 9 (2019): 285-97.
- Kumar, A., R. Kumar, Archana, and N. Kumari. "A Successful Treatment Report on Rabbits Infected with Sarcoptic Mange." *The Pharma Innovation Journal* 7 (2018): 1-3.
- Kumar, V. V. V., M. H. Effendi, N. D. R. Lastuti, N. Triakoso, and M. P. Fiorenza. "Prevalence and Severity of Scabies (*Sarcoptes scabiei*) on Rabbits in Kuala Lumpur City." *J. Parasite Sci.* 6, no. 1 (2022): 23-28.
- Plumb, D. C. *Plumb's Veterinary Drug Handbook*. 7th ed. Saunders, 2011, 1986-87.