

Print ISSN : 0972-8813
e-ISSN : 2582-2780

[Vol. 23(1) January-April 2025]

Pantnagar Journal of Research

(Formerly International Journal of Basic and
Applied Agricultural Research ISSN : 2349-8765)



G.B. Pant University of Agriculture & Technology, Pantnagar



ADVISORY BOARD

Patron

Prof. Manmohan Singh Chauhan, Ph.D., Vice-Cancellor, G.B. Pant University of Agriculture and Technology, Pantnagar, India

Members

Prof. A.S. Nain, Ph.D., Director Research, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. Jitendra Kwatra, Ph.D., Director, Extension Education, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. S.S. Gupta, Ph.D., Dean, College of Technology, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. A.H. Ahmad, Ph.D., Dean, College of Veterinary & Animal Sciences, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. Alka Goel, Ph.D., Dean, College of Community Science, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. R.S. Jadoun, Ph.D., Dean, College of Agribusiness Management, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. R.P.S. Gangwar, Ph.D., Dean, College of Post Graduate Studies, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. Avdhesh Kumar, Ph.D., Dean, College of Fisheries, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. Subhash Chandra, Ph.D., Dean, College of Agriculture, G.B. Pant University of Agri. & Tech., Pantnagar, India

Prof. Anil Kumar Gaur, Ph.D., Dean, College of Basic Sciences & Humanities, G.B. Pant University of Agri. & Tech., Pantnagar, India

EDITORIAL BOARD

Members

A.K. Misra, Ph.D., Ex-Chairman, Agricultural Scientists Recruitment Board, Krishi Anusandhan Bhavan I, New Delhi, India & Ex-Vice Chancellor, G.B. Pant University of Agriculture & Technology, Pantnagar

Anand Shukla, Director, Reefberry Foodex Pvt. Ltd., Veraval, Gujarat, India

Anil Kumar, Ph.D., Director, Education, Rani Lakshmi Bai Central Agricultural University, Jhansi, India

Ashok K. Mishra, Ph.D., Kemper and Ethel Marley Foundation Chair, W P Carey Business School, Arizona State University, U.S.A

Binod Kumar Kanaujia, Ph.D., Professor, School of Computational and Integrative Sciences, Jawahar Lal Nehru University, New Delhi, India

D. Ratna Kumari, Ph.D., Associate Dean, College of Community / Home Science, PJTSAU, Hyderabad, India

Deepak Pant, Ph.D., Separation and Conversion Technology, Flemish Institute for Technological Research (VITO), Belgium

Desirazu N. Rao, Ph.D., Honorary Professor, Department of Biochemistry, Indian Institute of Science, Bangalore, India

G.K. Garg, Ph.D., Ex-Dean, College of Basic Sciences & Humanities, G.B. Pant University of Agri. & Tech., Pantnagar, India

Humnath Bhandari, Ph.D., IRRI Representative for Bangladesh, Agricultural Economist, Agrifood Policy Platform, Philippines

Indu S Sawant, Ph.D., Principal Scientist, ICAR National Research Centre for Grapes, Pune, India

Kuldeep Singh, Ph.D., Director, ICAR - National Bureau of Plant Genetic Resources, New Delhi, India

M.P. Pandey, Ph.D., Ex. Vice Chancellor, BAU, Ranchi & IGKV, Raipur, Director General, IAT, Allahabad, India

Muneshwar Singh, Ph.D., Ex-Project Coordinator AICRP- LTFE, ICAR, Indian Institute of Soil Science, Bhopal, India

Omkar, Ph.D., Professor (Retd.), Department of Zoology, University of Lucknow, India

P.C. Srivastav, Ph.D., Professor (Retd.), Department of Soil Science, G.B. Pant University of Agriculture and Technology, Pantnagar, India

Prashant Srivastava, Ph.D., Soil Contaminant Chemist, CSIRO, Australia

Puneet Srivastava, Ph.D., Director, Water Resources Center, Butler-Cunningham Eminent Scholar, Professor, Biosystems Engineering, Auburn University, United States

R.K. Singh, Ph.D., Ex-Director & Vice Chancellor, ICAR-Indian Veterinary Research Institute, Izatnagar, U.P., India

Ramesh Kanwar, Ph.D., Charles F. Curtiss Distinguished Professor of Water Resources Engineering, Iowa State University, U.S.A.

S.N. Maurya, Ph.D., Professor (Retired), Department of Gynaecology & Obstetrics, G.B. Pant University of Agri. & Tech., Pantnagar, India

Sham S. Goyal, Ph.D., Professor Emeritus, Faculty of Agriculture and Environmental Sciences, University of California, Davis, U.S.A.

Umesh Varshney, Ph.D., Honorary Professor, Department of Microbiology and Cell Biology, Indian Institute of Science, Bangalore, India

V.D. Sharma, Ph.D., Dean Life Sciences, SAI Group of Institutions, Dehradun, India

V.K. Singh, Ph.D., Director, ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, India

Vijay P. Singh, Ph.D., Distinguished Professor, Caroline and William N. Lehrer Distinguished Chair in Water Engineering, Department of Biological and Agricultural Engineering, Texas A & M University, U.S.A.

Editor-in-Chief

Manoranjan Dutta, Ph.D., Ex Head, Germplasm Evaluation Division, National Bureau of Plant Genetic Resources, New Delhi, India

Managing Editor

S.N. Tiwari, Ph.D., Professor (Retd.) & Ex-Director Research, G.B. Pant University of Agriculture and Technology, Pantnagar, India

Assistant Managing Editor

Jyotsna Yadav, Ph.D., Research Editor, Directorate of Research, G.B. Pant University of Agriculture and Technology, Pantnagar, India

Technical Manager

S.D. Samantaray, Ph.D., Professor & Head, Department of Computer Engineering, G.B. Pant University of Agriculture and Technology, Pantnagar, India

Development

Dr. S.D. Samantaray, Professor & Head

Brijesh Dumka, Developer & Programmer

CONTENTS

<i>In-silico</i> analysis of curcumin conjugates targeting the Wnt signaling pathway in Breast Cancer Stem Cells	1
KANCHAN GAIROLA and SHIV KUMAR DUBEY	
Investigating <i>in vitro</i> direct antagonistic effect of endophytic bacteria against <i>Alternaria brassicicola</i>	8
SHIVANGI KRISHNATRA and A. K SHARMA	
Impact of altitude on photosynthetic and biochemical profile of <i>Didymocarpus pedicellatus</i> R.Br.: an antiurolithiatic Himalayan herb	18
DIVYA and PREETI CHATURVEDI	
Impact of Integrated Nutrient Management (INM) on growth, yield, quality and soil fertility status in sugarcane-ratoon system	25
JYOTI PAWAR and DHEER SINGH	
Mapping and evaluation of soil macronutrient and micronutrient status in Muzaffarnagar district of India	32
RAUSHAN KUMAR and G. R. SINGH	
Study of shift in cropping pattern in northern dry zone of Karnataka	45
ASHWINI HEBBAR and SUMA A. P.	
Changing weather conditions during summer and early monsoon season in the <i>Tarai</i> region of Uttarakhand	51
SHIVANI KOTHIYAL and R.K. SINGH	
Nutrients enhancing flowering characteristics in Mango (<i>Mangifera indica</i> cv. Dashehari) under medium density planting	57
KULDEEP, ASHOK KUMAR SINGH and SHAILESH CHANDRA SHANKHDHAR	
Nutrients and antioxidants potential of star fruit (<i>Averrhoa carambola</i> L.)	66
ABHIMA K. MOORTHY and LAKSHMY P. S.	
Physico-chemical and anti-nutritional properties of predigested composite flour mix from corn and green gram	76
MANISHA RANI and ANJU KUMARI	
Standardisation and quality evaluation of coconut milk yoghurt	84
RINIYA THAJ and LAKSHMY P. S.	
Study on growth performance and morphometric traits of Chaugarkha goat kids in Almora hills of Uttarakhand	93
UMA NAULIA and B. N. SHAHI	

Bacterial isolates from tracheo-bronchial aspirates of healthy and pneumonic cattle ASMITA NARANG, CHARANJIT SINGH, MUDIT CHANDRA and DHIRAJ KUMAR GUPTA	99
Successful management of notoedric mange in two domestic cats: A case report ASMITA NARANG, GURPREET SINGH PREET, JASNIT SINGH and HARKIRAT SINGH	106
Dietary supplementation of formulated fish-specific mineral mixtures improved the growth, nutrient composition and health status of <i>Cyprinus carpio</i> fingerlings ABHED PANDEY, UDEYBIR SINGH CHAHAL and ANJU VIJAYAN	110
Impact of deep cryogenic treatment on microstructural and electrical properties of recycled aluminium alloys BIRENDRA SINGH KARKI and ANADI MISRA	118
Assessing farmers' attitudes and factors influencing livelihood diversification in Nainital District of Uttarakhand NEHA PANDEY, AMARDEEP and V.L.V. KAMESWARI	126
Perceived Benefits of Tribal Sub Plan (TSP) Project on tribal beneficiaries in Udham Singh Nagar District of Uttarakhand ARPITA SHARMA KANDPAL, JITENDRA KWATRA, VLV KAMESWARI and AMARDEEP	133

Successful management of notoedric mange in two domestic cats: A case report

ASMITA NARANG¹, GURPREET SINGH PREET², JASNIT SINGH¹ and HARKIRAT SINGH³

¹Department of Veterinary Medicine, ² Department of Teaching Veterinary Clinical Complex, ³Department of Veterinary Parasitology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana

*Corresponding author's email id: gurpreet754@gmail.com

ABSTRACT: This report describes a case of notoedric mange in two cats in a single household and successful management with ivermectin therapy. A six-month-old tom cat was presented to Small Animal Clinics, Teaching Veterinary Clinical Complex (TVCC), Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana with a primary complaint of severe itching and alopecic lesions on the face and ears for the past 10 days. Owner also had intense pruritus over the hands and small erythematous crusted papules on the wrists and arms. Upon physical examination, crust formation was observed along with hyperkeratosis and alopecia distributed over ear margins, face, and legs. The cat exhibited intense pruritus. All vital parameters were within normal limits. Laboratory examination of skin scrapings from the lesions showed the presence of adult mites of *Notoedres cati*. Thus, the cat was diagnosed with Notoedric Mange. The affected cat was treated with Inj. Ivermectin @ 200 µg/kg SC once a week for three weeks along with oral prednisolone @ 0.5 mg/kg OD for 3 days, then alternate days for 3 times, and oral administration of 2 ml of multi-vitamin and mineral syrup daily. Significant improvement was noticed by complete clinical recovery in two weeks along with the absence of mites in skin scrapings after 14 days post treatment.

Keywords: Cat, ivermectin, *Notoedres cati*, prednisolone, zoonotic

Notoedric mange, also known as feline scabies, is highly contagious skin disease in cats caused by a burrowing mite, *Notoedres cati*. The mite can opportunistically infest other animals viz., dogs and rabbits (Narang *et al.*, 2020). Notoedric mange is zoonotic, thus requires immediate and appropriate treatment and education to the owners about handling the cats (Foster and Foil, 2003). The mite is transmitted between cats and to humans by direct contact, and rarely indirectly from the contaminated environment. Various stages of the mite viz. eggs, larvae, nymphs and adults live in the skin and don't survive out of the host (Deplazes *et al.*, 2016). The mites are smaller than *Sarcoptes*, and life cycle is similar to that of the sarcoptic mange mite (Scott *et al.*, 2001).

Notoedric mange is considered as a rare skin condition in cats and is mainly seen in stray cats. Cats with this condition are presented with severe pruritis and skin lesions viz., papules, alopecia, erythema, excoriations, crusts, scales, hyperkeratosis and lichenification. The initial lesions appear on the edge of ear pinna, and further spread on head and neck. The lesions sometimes can spread on the legs and perineum, which is facilitated by cat's habit of self-grooming (Miller *et al.*, 2017). Disease if not

treated, can prove fatal to both young and adult cats (Deplazes *et al.*, 2016). The condition is successfully treated with macrocyclic lactones. The present communication reports notoedric mange in two cats and its successful management with subcutaneous ivermectin therapy.

Case History and observations

A six-month-old male cat was presented with a primary complaint of severe itching and alopecic lesions on the face (Figure 1), ears (Figure 2), and limbs (Figure 3) for the past 10 days to Small Animal Clinics, TVCC, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. The owner also informed about pruritis over his hands along with small erythematous crusted papules on the wrists and arms (Figure 4). Normal appetite and activity of the cat was informed. Alopecia and crusty lesions reportedly started from the ear pinna and gradually progressed to other facial regions. The owner also informed similar but mild lesions in other cats and that both the cats were kept indoors and reared in and outside of the house. The spread of infection from one cat to another was reported. Cat was thoroughly examined for the presence of lesions on different parts of the body. Upon physical

examination of the presented cat, crust formation was observed along with hyperkeratosis and alopecia distributed over the ear margins, face, and legs. The cat exhibited intense pruritus. All vital parameters were within normal limits.

Deep skin scrapings were collected from different sites presenting lesions, using a #10 blunt scalpel blade in 10% potassium hydroxide solution and were sent for laboratory examination. Microscopic examination of skin scrapings from the lesions showed infestation of adult mites of *Notoderes cati* (Figure 5-6). The mites were identified as *Notoedres cati* based on their shape and presence of dorsal anus and morphology of legs, suckers and position of anus as described by Soulsby (1982). The diagnosis of Notoedric mange in the cat was made based on its clinical presentation, a skin scraping examination, and consideration of its zoonotic potential.

The cat was treated with Inj. chlorpheniramine maleate @ 0.4 mg per kg bwt intramuscular followed by inj. Ivermectin 0.2 mg S/C (total dose) once a week for 3 weeks and Liq. Povidone-iodine (1:1 dilution) over the lesions topically twice a day, in addition to supportive care which included oral prednisolone @ 0.5 mg/kg for 3 days OD then alternate days for 3 times for control of pruritus. Similar, treatment was prescribed for the fellow cat with mild lesions which was not presented to us. Efficacy of the drug was assessed on the basis of

clinical recovery and skin scrapings examination at weekly intervals post therapy. Both the cats responded well after one shot of ivermectin. Remission of clinical signs and marked progressive improvement in both the cats was observed on 7th day of treatment. Following the treatment, no unfavourable effects were noticed. By day seven, the itching had stopped. Skin scrapings were found negative 14 days post treatment and animal showed marked improvement in clinical symptoms (Figure 7).

DISCUSSION

The present communication reports successful therapeutic management of *Notoedres cati* associated mange infestation in cat with ivermectin. Notoedric mange is clinically characterized by intense pruritic and crusting lesions on the ears, head, neck, back, and feet and but can spread over the entire body (Bowman *et al.*, 2008). Similar lesions and site of distribution was observed in this case. Due to contagious nature of notoedric mange and similar clinical manifestations, it was presumed that the fellow cat was suffering from same condition and was given the same treatment. The fellow cat responded well to the treatment and thus the diagnosis was confirmed. The important point for consideration is that if one cat is diagnosed with

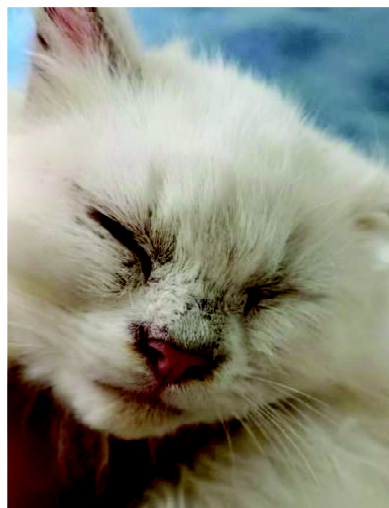


Fig. 1: Cat having alopecia and hypotrichosis on the face



Fig. 2: Tip of ear showing scaling, exudation and crust formation



Fig. 3: Ventral area of paw in cat showing alopecia, scaling, exudation and crust formations



Fig. 4: Forearm of owner showing small erythematic crusted papules on the wrist



Fig. 5: *Notoedres cati* mite recovered from skin scrapping of cat (40X)

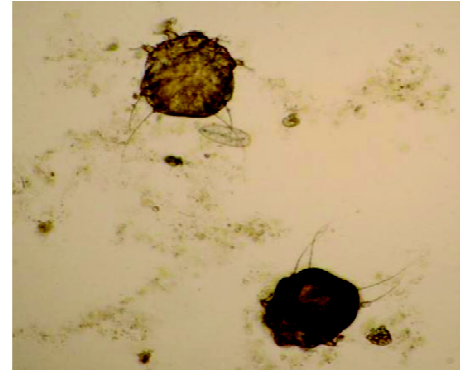


Fig. 6: Multiple *Notoedres cati* mites along with eggs recovered from skin scrapping of cat (10X)

feline scabies, all the cats at same household require similar therapeutic protocols.

Lesions of notoedric mange appear initially on the edge of ear pinna (Miller *et al.*, 2017), and then spread on head and neck, and ultimately covers the entire body (Scott *et al.*, 2001). In the present case, only the facial region was involved. The characteristic itching and hair loss pattern are often sufficient for diagnosing notoedric mange in cats (Foster and Foil, 2003). Mange lesions in cats cover the entire body and the cat presented to us was suffering acutely, whereas Sivajothi *et al.* (2015) reported a case of notoedric mange in two cats with chronic skin problems and intense pruritus as a chief complaint.

There are other reports mentioning that affected cat owners suffered from intense pruritus and lesions on their hands (Sivajothi *et al.*, 2015), which was also observed in this case. The affected owner was advised to get consultation by a human dermatologist. A presumptive diagnosis of mange in humans can be based on history of contact with the affected cats and history of pruritus and distribution of inflammatory papules on hands. Humans develop intense pruritus without any mite burrows within a few hours of initial contact with the infested cats. As *Notoedres cati* mange is contagious to humans and other animals, owners of infected cats need to exercise caution while handling them, and thus the disease requires prompt and adequate treatment (Foster and Foil, 2003).

The affected cat was treated with subcutaneous



Fig. 7: Cat after 3 treatments with ivermectin showing marked improvement, hair growth and complete remission of clinical signs

ivermectin once a week for three treatments. No adverse reactions were observed during or post treatment. These findings are in accordance with Kumar *et al.* (2008). Scott *et al.* (2001) also reported subcutaneous injections of ivermectin as a choice of treatment for notoedric mange in cats and rodents, besides selamectin as a spot on (Chand *et al.*, 2014). However, successful treatment of notoedric mange by oral administration of ivermectin twice weekly was also reported (Sivajothi *et al.*, 2015). Ivermectin acts on GABA neurotransmission at some sites blocking intraneuronal stimulation of excitatory

motor neurons, which leads to flaccid paralysis. Adams (2001) suggested that ivermectin may exert its effect through action on glutamate-gated Cl^- ion conductance at the postsynaptic membrane or neuromuscular endplate. The present case's successful recovery demonstrated the value of subcutaneous ivermectin medication in treating feline scabies in cats.

Summary

This report details the successful treatment of notoedric mange, caused by *Notoedres cati*, in two cats using ivermectin. Ivermectin was administered subcutaneously at 200 µg/kg weekly for three weeks, leading to complete clinical recovery and absence of mites in skin scrapings.

REFERENCES

- Adams, H.R. (2001). Veterinary Pharmacology and Therapeutics. 8th Edn., Iowa State University Press, Ames, LOWA, USA, Pp. 1025- 1029.
- Bowman, D.D., Hendrix, C.M., Lindsay, D.S. and Barr, S.C. (2008). Feline clinical parasitology. John Wiley & Sons, 469p.
- Chand, N., Singh, H., & Singh, R. S. (2014). Successful therapeutic management of notoedric mange in rodents. Journal of Parasitic Diseases, 38, 61-63.
- Deplazes, P., Eckert, J., Mathis, A., von Samson-Himmelstjerna, G. and Zahner, H. (2016). Parasitology in veterinary medicine. In Parasitology in Veterinary Medicine. Wageningen Academic, 653p.
- Foster, A.P., Foil, C.S. and British Small Animal Veterinary Association (2003). BSAVA manual of small animal dermatology. Edt. Foster, A.P. and Foil, C.S. 2nd edn. BSAVA, Gloucester, UK, Pp. 203-214.
- Kumar, K.S., Selvaraj, P., Vairamuthu, S., Srinivasan, S.R. and Kathiresan, D. (2008). Ivermectin therapy in the management of notoedric mange in cats. *Tamil Nadu Journal of Veterinary and Animal Sciences*, 4:240-241.
- Miller, W.H., Griffin, C.E. and Campbell, K.L. (2017). Muller and Kirk's small animal dermatology. Elsevier Health Sciences, 950p.
- Narang, A., Randhawa, C.S., Sidhu, S. and Kaur, P. (2020). Notoedric mange in two rabbits-case report. *The Haryana Veterinarian*, 59(SI):136-138.
- Scott, D., Miller, W. and Griffin, C.M. (2001). Kirk's small animal dermatology. Philadelphia: WB Saunders, 1995, Pp.970-87.
- Sivajothi, S., Sudhakara Reddy, B., Rayulu, V.C. and Sreedevi, C. (2015). Notoedres cati in cats and its management. *Journal of Parasitic Diseases*, 39: 303-305.
- Soulsby, E.J.L. (1982). Helminths, arthropods and protozoa of domesticated animals. 7th edition, Bailliere Tindall, 10 Greycourt Place, Pp. xiii+-809).

Received: March 13, 2025

Accepted: April 14, 2025