

# MITES, MOTHS AND LARVAE

Based on her extensive in-practice experience, Dr Aine Seavers MVB MRCVS discusses the role of mites, larvae, and butterflies/moths in various canine and feline conditions including reverse sneezing, skin rashes, and lepidopterism

History taking remains one of the fundamental cornerstones of veterinary diagnosis. This article reviews examples of the importance of the 'Who, What, Where and When' aspects of clinical presentation, especially in certain specific 'allergic' or 'neurotic' cases. In the cases discussed, complete resolution of dermatological, airway and behavioral disorders was achieved by addressing the role parasites and insects played in inducing the clinical disease syndromes.

## Resolving reverse sneezing

Contrary to popular belief, reverse sneezing in dogs is not most often a sign of an allergy nor is it incurable. Reverse sneezing is commonly caused by *Pneumonyssoides caninum* or nasal mites. This world-wide condition is not commonly diagnosed, however, resulting in distressing life-long suffering for the dog. Additional to the reverse sneezing sign, the mites can cause nasal pruritus, serous discharge, epistaxis, hyposmia, and, more rarely, excessive lacrimation, central nervous system disturbances, orbital cellulitis, and abscessation.

Correct miticidal therapy eliminates the suffering of our patients, many of whom may have spent years with nasopharyngeal inflammation and distress. The vast majority of reverse sneezing dogs can be cured rapidly, even those dogs that have spent many years reverse sneezing. One would expect some degree of irritation and scarring in those pets to impede a full recovery but often this is just not the case. In a related discussion on a veterinary e-forum I learned that, among a cohort of ten dogs placed on milbemax therapy by their vets, there was complete resolution in days, even in patients suffering more than six years of clinical signs. The potential to cure the majority of cases makes a miticidal trial an ethical and affordable option for our patients. I use Milbemycin as my preferred miticide. *Given that Milbemycin is also acutely microfilaricidal in recently imported pets or those living in high heartworm-incidence countries, always initially run a heartworm detection blood test in any dog not on any heartworm preventative.* Milbemycin dose ranges of 0.5mg/kg to 1mg/kg every seven to 10 days x 3 occasions are suggested. I use 1mg/kg every tenth day with great success. If the dog is unillable, topically applied Selamectin can be used. Selamectin is applied using the correct size of dog vial for the patient. The product is applied every two weeks x 3 applications. Relief is usually seen in 48 hours. Some regimes include doses of up to 24mg/kg of Selamectin, but at that high a dose application, alopecia can occur at the applied sites. The active ingredient Selamectin can be impeded by hair, so depending on heartworm status and pelt type, Selamectin remains my second choice.

If I am concerned about the degree of pharyngeal irritation present prior to the miticidal use, I administer an intravenous dexamethasone product some hours before commencing treatment. Prednisolone PO can be used instead.

In pets where the above glucocorticoid therapy is contra-



Figure 1. Nasal mites. Photograph courtesy of Sue Foster.

<https://vimeo.com/1025315541>

Link to video showing nasal mites. Courtesy of Dr Sue Foster.

indicated, the milbemycin can be administered by itself. In those pets, pill in the morning, preferably at the veterinary clinic so if any issues do occur, a vet is on hand to address any reaction. I have pilld many dogs without the use of a glucocorticoid so don't stress if that is not an option for a given patient. However, depending on the dog's geographical haunts, ensure a negative heartworm status before you instigate the milbemycin mite treatment.

<https://vimeo.com/1025314626>

Link to video showing reverse sneezing condition.

## Diagnostics

Diagnosis is most often made simply by pattern recognition. Retrograde nasal flushing as described by Marks and others (1994) appears to be more effective in identifying mites than anterograde flushing. An antibody (Ab) test has been developed but is not used widely in endemic countries because of the high seroprevalence.

A circulating eosinophilia (>2.2 X 10<sup>9</sup> eosinophils/litre) may also be noted with 28 per cent of dogs.

Adult mites are oval, pale yellow 1mm to 1.5mm in length (two to three times the size of *Otodectes*) with all the legs on the anterior half of the body. The mites can survive for 19 days in a cool, humid environment so direct nose-to-nose contact is not always needed to infest pets. Mites are occasionally, but rarely, observed on the muzzles of dogs.

## From nasal mites to nasal fly larvae

Let's not forget about feline patients when it comes to 'oddities' causing sneezing. There are none odder than the following case in one of my feline patients. A six-year-old semi-feral cat was presented with a several-month history of episodes of odd and unexplained behaviour, most often triggered when the cat was walking along the darker areas of his house especially the below stairs hallways. The cat would suddenly stop to hiss and spit at nothing in particular and/or would stop walking normally, to suddenly twitch and

skin-roll, then sit and furiously 'rattlesnake-shake' the end of his tail. At that point, the cat would commence laboured breathing: first, open-mouth panting and then closed-mouth breathing with nasal snorting that was akin to the sound of a human trying to clear a blocked nostril.

The cat was clinically normal when presented to the clinic but was unmanageable in the consult room.

We admitted the cat for further observation. The kennel lights were turned down and the cat left to adjust to his surroundings. After a short time, the cat commenced hissing and twitching and I observed several dry, creamy, oval-shaped objects suddenly appear at the nares, slowly working their way forward and outwards. As these objects emerged from the nostrils, the cat settled down.

The object on the right emerged from the nares and protruded straight out; it was not stuck to the ventrum of the nares. The left 'object' came halfway out, then retreated into the nares again. The objects were photophobic and withdrew rapidly from a camera flash. The objects were dry, not mucoid or dripping exudate, and had the appearance of a flattened sesame seed. There were no signs on the nares or mouth that the cat had attempted to lick or groom the nasal area nor any sign of a chronic nasal discharge. Differential diagnosis of the sneezing and hyperaesthesia was a migratory, aberrant nasal parasite of unknown origin. The primary culprit was suspected to be a nasal bot. Sneezing and a mucopurulent nasal discharge can be seen as a marker for the presence of the parasite.

Humans report a stinging painful reaction. Rarely, secondary bacterial spread from mucosa to meninges may occur. Eye infections can occur in humans.

The most striking feature of this cat's condition was the forced expiration; something this cat did share with another case reported by Dr Sarah Webb.

The cat was unapproachable for injections and unillable at home so we chose a combination product of Imidacloprid + Moxidectin (Advocate), given this product's range of parasitological activity against many of the life-stages of endo and ectoparasites.

Ivermectin, Abamectin, Moxidectin and Closantel are registered for use against nasal bot. Ivermectin is not successful in some cases. Capstar could in theory work and now we have the loxazoline options. Because of the migratory aspect/suspicion, I would tend to still choose Advocate and keep the loxazoline in reserve.

The owner applied this product Day One and Day 10, and an Emodepside + Praziquantel product Day Seven and Day 21. At re-check one month later the cat was normal and remained so until it died many years later.

The cat lived in an urban environment about 200km from any sheep. However, at least two of the families living on the street had weekend hobby farms in sheep country and would return with fleeces and carcasses.

The cat frequented all of these gardens on a daily basis. As a precaution, he was treated monthly with the aforementioned Moxidectin product.

In the ensuing years, when shown videos of idiopathic feline hyperaesthesia (IFHS) in other cats, I always remember this nasal bot case and the potential for wandering, migrating parasites to trigger sudden unexplained bursts of manic twitching and neuro-itch-pain, similar to that seen in IFHA.



Figure 2. Bots appearing at the external nares in a cat. Photograph courtesy of Dr Sarah Webb.

The adult nasal bot is a hairy, yellowish, bee-like fly about the size of a common horse fly active during summer and early fall. Larva: 20mm to 30mm long; larvae in the nostrils of sheep move up the nasal passages to the nasal/ frontal sinuses for eight to 10 months. Development of the first instar larva may be delayed for one to nine months to assist over the wintering cycle. Larvae pupate in the soil for one to two months depending upon temperature. Adults may live as long as 28 days.

### From nasal fly larvae to perineal fly larvae

I first encountered this presentation when one of my most clients reported that her three indoor cats had begun to over-groom their perineal area whenever they came out of the spare bathroom. Upon investigation, the owner noted that the urine in the trays appeared to contain dead "worms". There had been no change of food or environment. Initially, the owner saw 'creatures' in the faeces, not the urine, and had decided it was evidence of a tapeworm infestation. The owner administered an oral and then a topical intestinal dewormer product some 14 days apart. There was partial resolution of the problem, then the 'creatures' appeared in the urine, at which point she alerted me to the issue and I requested a sample.

Macroscopically, the 'creatures' looked like a blob of dried blood. Microscopically, they were unlike anything I had seen before, but if a louse and a centipede were to have offspring, then this is what this 'creature' would look like. The parasitologist's report back determined it to be the 'larvae of the lesser house fly/faecal fly (*Fannia* spp.)'. These flies are attracted to odours, watery faeces, urine etc. and can be quite a pest in poultry houses. The larvae on their own reputedly hardly ever cause problems, but can lead to myiasis. They are however significant mechanical vectors of some major infectious diseases. We decided that the over-grooming was being triggered by a combination of mild myiasis and fly-worry.

Compost bins outside the window were a possible originating source of the flies. The owner removed the outside bins, supplied new cat trays and litters, and had the house and gardens treated with commercial insecticides. The over-grooming stopped and never re-occurred.



Figure 3. Larvae in nasal cavity. Photograph courtesy Dr Sarah Webb.

### Compost bins: not good for allergen avoidance

Several unforeseen issues can arise with compost heaps and bins; however, of specific relevance to this article I want to highlight, in particular, *Pelodera nematodes*. *Pelodera* Dermatitis is caused by the larvae of *Pelodera Strongyloides*. Adults live in decaying or damp, decaying vegetation in contact with the ground; for this reason, moldy hay or compost mounds are areas of high risk. The larvae are about 1.5 times the size of a normal Demodex mite.

Clinical signs include papular erythematous lesions on paws, hind limbs, lower abdomen, chest, and tail.

The condition is self-limiting. Gentle bathing removes any crusts. Allow to dry and administer a single ivermectin injection (observing all the usual constraints in relation to breed issues). Prednisolone at 0.5mg/kg for three to five days is recommended plus antibiotics, if needed to control inflammation and infection. Remove contaminated bedding and spray the area with an environmental topical spray.

### Lepidopterism

Butterfly/moth allergy or lepidopterism is more common than one might think. With increased pet travel, it's good to have some local and overseas differentials to add to the list of triggers for intense rash presentations that can't be linked to the usual known trigger factors. Skin contact with the adult



Figure 4. The lesser house fly. Photograph courtesy of Jan Slapeta, Associate Professor in Veterinary Parasitology, University of Sydney.



Figure 5. Butterfly allergy is more common than one might think. Photograph courtesy of Michael Gunn.

or larval forms of certain butterflies and moths can produce severe irritation and inflammation which is often referred to as lepidopterism. Some caterpillars can have:

- 'envenomous' hairs which have venom containing a high histamine content; or,
- 'irritating' hairs depending on the species of caterpillar and the sensitivity of the patient; or,
- non-envenomating hairs that induce a mechanical irritation.

The hairs cause weals and rashes which are mostly transitory, but can persist for days. The animal or human rapidly descends into agony minutes after the hairs make contact with skin. The medication of choice is an antihistamine as well as cool bathing and a topical lignocaine lotion application. Caterpillar hairs can become airborne and can be inhaled. However, in the case of Hairy Mary Caterpillars (*Anthela varia*), they can actively spit out hairs often directly into a pet's eyes. This can be very painful for the pets. All parts of the cocoon may also be allergenic to some individuals.

Next time you encounter an acute onset rash, often intensely painful, in a patient, check recent exposure to natural environments and other open spaces with trees. Consider lepidopterism in the differential diagnosis and treat promptly. Risk of exposure extends beyond just the summer seasons so the recommendation for prophylaxis by avoiding contact with caterpillars has to be extended beyond just the outdoors and/or beyond direct contact with caterpillars in summer. For example, at the end of a recent Christmas season, as I climbed up a ladder to take down the decorations on our real Christmas tree, I was met by hundreds of pairs of eyes staring at me. Caterpillars were lined up en masse along

every branch. Then suddenly, as one, they closed their eyes and became camouflaged back on the branches. We ended up having to wrap the tree in bed sheets and release an insect-fogger tin underneath it all, before we could take the tree out of the house and straight to the local waste facility.

### Further Reading

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## READER QUESTIONS AND ANSWERS

### 1. SIGNS OF REVERSE SNEEZING IN DOGS COMMONLY ALSO INCLUDE:

- A. Nasal pruritus
- B. Epistaxis
- C. Coughing
- D. Vomiting
- E. A+B
- F. C+D

### 2. WHICH OF THE FOLLOWING IS APPROPRIATE THERAPY FOR NASAL MITES?

- A. Milbemycin
- B. Praziquantel
- C. Selamectin
- D. Artificial Tears
- E. None of the above
- F. A or C

### 3. IN RELATION TO NASAL BOTS, WHICH OF THE FOLLOWING IS CORRECT?

- A. The larvae are photophilic
- B. Larva grow to 20mm to 30mm long in the nostrils of sheep
- C. The adult is a small, red-coloured fly
- D. The adults only live for 28 hours

### 4. WHICH OF THE FOLLOWING IS FALSE?

- A. The Lesser House Fly/ Faecal Fly (*Fannia* spp.) is very attracted to odours, watery faeces, urine etc
- B. *Fannia* adult flies are major mechanical vectors of some major infectious diseases
- C. *Pelodera* Dermatitis is caused by the larvae of *Pelodera Strongyloides*
- D. The larvae are about five times larger than a normal *Demodex* mite

### 5. WHICH OF THE FOLLOWING IS FALSE?

- A. Lepidopterism is where skin contact with the adult or larval forms of certain butterflies and moths can produce severe irritation and inflammation
- B. The risk of lepidopterism is limited to the summer months or access to the outdoors
- C. Caterpillars can have 'envenomous' hairs, 'irritating' hairs, or mechanical irritation
- D. All parts of the cocoon may also be allergenic to some individuals

ANSWERS: 1E, 2F, 3B, 4D, 5B.