

Submission template for "Images in ..."

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TITLE OF CASE

Psoroptic mange treated with fluralaner in a Llama (*Lama glama*)

DESCRIPTION

A 7-year-old male castrated pack llama presented for chronic auricular crusting and pruritus. On presentation, there was severe crusting of the ear pinnae bilaterally with localized alopecia on the convex aspect of the pinna (Figure 1A). The crusting was malodorous and moderate serosanguinous to purulent discharge was seen bilaterally. The llama was actively scratching the ears with his back legs. Vital parameters were otherwise normal. The llama had been non-responsive to previous on-farm treatment (subcutaneous ivermectin, 0.2 mg/kg). Cytology of each ear was performed via skin scraping with oil and with staining to assess for mites and infectious agents. Ear cytology revealed a mixed bacterial infection (predominantly rods) with no yeast component. The cytology showed live mites belonging to the *Psoroptes* genus based upon morphological identification (Figure 2 and video). The llama was treated with an approximately 5 mg/kg oral dose of fluralaner (Bravecto Chewable, Merck). The owner reported resolution within 3 weeks afterwards. A 4-month recheck (Figure 1B) showed resolution of clinical signs, with no evidence of *Psoroptes* on cytology.

Fluralaner is a isoxazoline drug, which blocks GABA-gated and L-glutamate-gated chloride channels in the central nervous system in invertebrates, resulting in fatal hyperexcitation and death for the invertebrate. (1) The isoxazolines have been used for large animal patients when traditional parasiticides are ineffective, with examples being treatment for *Sarcoptes scabiei* in a pig that was non-responsive to previous ivermectin

treatment (2), as well as an alpaca that was previously treated with ivermectin. (3) Our llama case utilized a canine product, which may not be ideal for herbivores due to inactive ingredients of animal origin, however, a liquid formulation for poultry was just approved in the US, and this could serve as an option for future cases. This liquid poultry formulation was the one used for the previously mentioned alpaca sarcoptic mange case. (3) This case supports fluralaner use in llamas when common therapies are ineffective for *Psoroptes*.

LEARNING POINTS/TAKE HOME MESSAGE

- Clinicians should consider *Psoroptes* as a differential when presented with chronic, productive ear inflammation in camelids.
- As evidenced by this case, fluralaner may be an option to treat *Psoroptes* infestations in llamas when other treatments are not successful.
- Clinicians should be aware in some jurisdictions that *Psoroptes* is a reportable disease in livestock.

CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest.

ETHICS STATEMENT

As a retrospective case study this work is exempt from UTCVM's IACUC approval.

AUTHOR CONTRIBUTION STATEMENT

LR, JS, MH, CN, and CTM managed the clinical case and composed the manuscript. All authors reviewed the final submitted manuscript.

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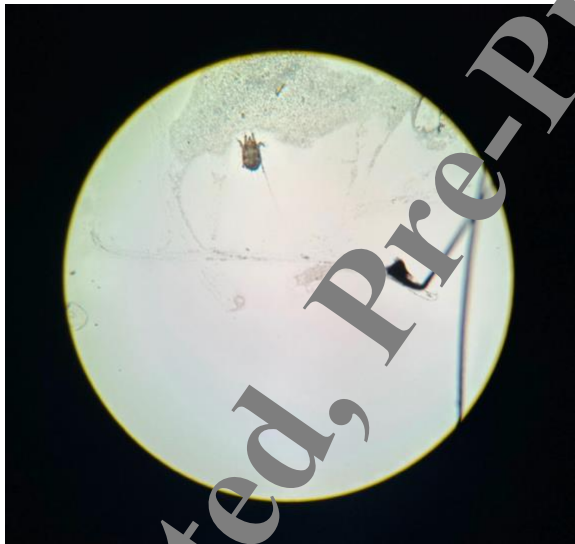
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FIGURE/VIDEO CAPTIONS

Figure 1: Initial presentation (A) of the left ear of a seven-year-old pack llama presented for chronic aural crusting, discharge and pruritus. B: The same ear approximately 4 months after treatment with fluralaner. Note the resolution, lack of alopecia and discharge.



Figure 2: Microscopic image of the *Psoroptes* spp. mite from the skin scrape cytology of the left ear of a seven-year-old pack llama. Note the funnel-shaped suckers (pulvilli) on segmented stalks (pedicles).



Video: Video of several *Psoroptes* spp. mites as seen microscopically on debris from the year of a seven-year-old pack llama presenting for chronic aural alopecia and pruritus.

[Video](#)

IMAGE QUIZ

MULTIPLE CHOICE QUESTION

What are the distinct microscopic characteristics of *Psoroptes* spp. mites?

POSSIBLE ANSWERS TO MULTIPLE CHOICE QUESTION

- A: Oval shaped body with long legs with funnel-shaped pulvilli on long, segmented pedicels
- B: Oval shaped body with a flattened underside and a convex dorsal surface
- C: Lengthy and elongated body with short legs
- D: Short, unsegmented pedicels.

CORRECT ANSWER

A: These are characteristics of the morphology of *Psoroptes*. B would be consistent with *Sarcoptes* spp., C would be consistent with *Demodex* spp, and D would be consistent with *Chorioptes* spp.