Diagnosis and management of the itchy horse

Background: Out in the field, it can be particularly challenging to work up a case of the itchy horse. The history can be vague, the patient is large with a dense coat, and the microscope is located back at the practice. Management can also cause frustration for both the clinician and the client, with tasks that may be manageable for dogs and cats proving impractical in ponies and horses.

Aim of the article: This article outlines some of the common causes of pruritus in horses, how to get an accurate diagnosis, and how to treat them effectively.

ALTHOUGH the definition of pruritus has been stated as the ‘unpleasant sensation that triggers a desire to scratch’ (Ikoma and others 2006), scratching is not necessarily a clinical sign readily displayed by horses that are pruritic. They are far more likely to bite, rub or chew at sites that are itchy, and these signs are considered indicative of pruritus in equine medicine.

The presentation of pruritus in horses is highly distressing to owners. Not only can the horse inflict a significant degree of self-trauma, but paddock fencing, field shelters, and even expensive rugs will not go unharmed in a horse’s attempt to resolve a persistent itch. There are numerous home therapies, and clinicians are often presented with a patient that has already been bathed in shampoo or cream that may not have had its ingredients stated on the bottle. Therefore, a good history is paramount, followed by a suitable clinical examination and sampling. Most dermatological samples obtained from a primary visit can be interpreted in-house for a very limited cost. All that is required is a decent microscope, slide and paraffin oil.

History
A thorough history should be taken when dealing with a pruritic case. Signalment of a case is obviously important (age, breed, sex etc), but much of what needs to be acquired can be ascertained from asking the following six questions (White 2015):

■ Is the horse actually pruritic? Pruritus often presents with chewing/biting, stamping or rubbing. This can be focal or generalised in distribution, with many secondary skin changes appearing from self-inflicted trauma.
■ How did the problem present and how has it changed?
■ How has the owner treated the horse, and what effect has this had? This is especially important, as owners will have inevitably applied something to the horse’s skin, whether the ingredients are stated on the bottle or not.
■ What is the horse’s normal routine and environment? It is also important to gauge whether the horse has contact with other horses, and if any other in-contacts (horses/people) are affected regarding contagion.
■ What is the horse’s diet (including turnout pasture)?
■ Is there a seasonality to the horse’s pruritus, or any potential triggers?

Physical examination
A general examination of the horse is vital. This could reveal indicators of another cause of dermatological disease and pruritus, such as pars pituitary intermedia dysfunction (PPID), pemphigus foliaceus or liver disease (Knottenbelt 2012). It is important to move the horse into a well-lit area for dermatological examination, not only to identify any possible ectoparasites, but to characterise the lesions and clinical pattern of the case presentation.

KEY LEARNING OUTCOMES

After reading this article, you should:

- Understand the structured approach to diagnosing pruritus in the horse;
- Be able to provide a suitable differential list for pruritus in the horse;
- Understand the diagnostic techniques available for investigating pruritus in the horse;
- Understand suitable therapies for parasitic causes of pruritus in the horse;
- Understand suitable therapies for allergic causes of pruritus in the horse.

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Equine

It is imperative to discern whether the pruritus is generalised or focused to a particular body region. This can significantly affect the likelihood of certain differential diagnoses (Fig 1).

Taking samples
Suspicion of parasitic cause for pruritus in equine species is of high priority, and sampling is relatively straightforward. Box 1 lists the equipment required for sampling. The following samples should be taken upon an initial consultation:

- Coat brushings: Brush the coat using a stiff brush. I prefer using a denture tooth brush and a clear petri-dish for collection of extracted material. Then clip the brushed area and repeat the brushing process. This can help to capture mites and lice hiding deeper beneath heavily coated/feathered areas (Bergvall 2005).
- Hair plucks: These can be used for identification of louse eggs (Bergvall 2005). Should dermatophytosis be suspected, peripheral lesion hair plucks can be submitted for rapid dermatophyte qPCR, or fungal culture as a gold standard. These should be stored in a sterile bottle or paper envelope for transport.
- Tape strips: Acetate tape strips can be applied to pruritic areas to identify mites and lice. In cases of tail head/rump pruritus, it is imperative to sample the perianal area with sellotape to identify <i>Oxyuris equi</i> eggs (Reinemeyer and Nielsen 2014).
- Cytology: Exudative lesions can readily be sampled by impression smear onto a microscope slide or acetate tape, and cytology of the impression viewed by Wright-Giemsa (Diff-Quik) stain. This technique is particularly useful in gaining a rapid diagnosis of pyoderma.

Should these samples not produce a significant diagnosis, the second consultation should involve the collection of skin scrapings and possible punch biopsy, depending on the clinical picture. Superficial scrapes can be used to identify parasites such as <i>Chorioptes</i> species (Fig 2) and <i>Trombicula autumnalis</i>.

**Fig 1:** Chart demonstrating the most common differentials of equine pruritic disease and their associated predilection sites. Atopic dermatitis, dermatophytosis and pemphigus are associated to all sites and are generalised by nature.

**BOX 1: EQUIPMENT REQUIRED FOR ROUTINE DERMATOLOGICAL EXAMINATION**

- Sellotape
- Scissors
- Microscopy slides
- Paraffin oil and pipette
- Scalpel blades
- Artery forceps
- Denture toothbrush
- Petri dish
- Local anaesthetic
- Biopsy punch (6 to 8 mm)
- Microbiological swabs
- Sampling pots
autumnalis. Deeper scrapings can be used for identification of burrowing mites, such as Demodex species, which could be suspected in PPID or systemically compromised patients (Bergvall 2005, Knottenbelt 2012).

Demodicosis is exceptionally rare in equine patients. If no parasites can be identified, it is still justified to treat for parasitic causes before investigation of other pruritic diseases (Fig 3). Tissue culture can be performed from punch biopsy should dermatophilosis be suspected. Multiple punch biopsies (at least 12) should be taken following cytological indication if an attempt to diagnose pemphigus foliaceus is to be made (Vandenabeele and others 2004). This will normally present with crusting and possible pruritus. Other rare causes of pruritus, such as hepatocutaneous syndrome or paraneoplastic pruritus (Fig 4), require further blood work to aid in diagnosis, and even possible rectal palpation and abdominal ultrasonography.

The most common parasitic and infectious
Equine

**Table 1: Differential diagnosis for equine pruritus**

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Infectious</th>
<th>Immunological</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lice</strong></td>
<td>Haematopinus asini, Damalinia equi</td>
<td>Atopic dermatitis</td>
<td>Drug reaction</td>
</tr>
<tr>
<td><strong>Mites</strong></td>
<td>Chorioptes species, Sarcoptes scabiei, Trombicula autumnalis, Dermanyssus gallinae</td>
<td>Culicoides hypersensitivity</td>
<td>Hepatic dysfunction</td>
</tr>
<tr>
<td><strong>Biting flies and insects</strong></td>
<td>Contact hypersensitivity</td>
<td>Multisystemic eosinophilic epitheliotropic syndrome</td>
<td></td>
</tr>
<tr>
<td><strong>Fungal</strong></td>
<td>Dermatophiliosis, Malassezia dermatitis</td>
<td>Food allergy</td>
<td>Paraneoplastic pruritus</td>
</tr>
<tr>
<td><strong>Bacteria</strong></td>
<td>Dermatophytosis, pyodermia, Staphylococcal folliculitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endoparasite</strong></td>
<td>Oxyuris equi</td>
<td></td>
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**Infectious dermatoses**

**Pediculosis**
Both Damalinia equi (Fig 5) and Haematopinus asini are host-specific obligate parasites, but are able to survive for a number of weeks in rugs and bedding. They are always spread by contact, and asymptomatic carriers exist. Due to the inability of lice to reproduce above 39°C, the incidence of pediculosis is much higher during the autumn and winter months. Young and geriatric animals are most often affected, most likely because their winter haircoat if often left unclipped. Topical treatment is recommended, but coat clipping is advisable to ensure penetration of insecticidal agents to the skin.

**Chorioptic mange**
Chorioptes bovis (feather mites) complete their life cycle on the host during a three-week period, but can survive in the environment for approximately 70 days, allowing for a significant degree of re-infestation if the environment is not treated. The limbs of the horse are predominantly affected.

**Table 2: Common medical therapies used for ectoparasite control**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Drug</th>
<th>Product</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediculosis and trombiculidiasis</td>
<td>5% w/v Cypermethrin (cis:trans 50:50)</td>
<td>Deosect (Zoetis)</td>
<td>Thoroughly spray the horse twice, two weeks apart</td>
</tr>
<tr>
<td></td>
<td>0.08% v/v Piperonyl butoxide</td>
<td>0.04 w/v pyrethrum extract</td>
<td>Thoroughly bathe the horse twice, two weeks apart. Rinse off after 20 minutes</td>
</tr>
<tr>
<td>Chorioptic mange</td>
<td>1% Selenium sulphide</td>
<td>Head and Shoulders Clinically Proven Solutions (P&amp;G)</td>
<td>Thoroughly bathe affected arease once a week for four weeks. Rinse off after 20 minutes</td>
</tr>
<tr>
<td></td>
<td>0.25% w/v Fipronil</td>
<td>Frontline Spray (Boehringer Ingelheim)</td>
<td>Apply generously to clipped limbs, until the skin is soaked. Wash limbs with shampoo before application</td>
</tr>
<tr>
<td></td>
<td>10 mg/ml Doramectin</td>
<td>Dectomax (Elanco)</td>
<td>Two subcutaneous injections at 0.3 mg/kg, two weeks apart</td>
</tr>
<tr>
<td>Culicoides hypersensitivity</td>
<td>5% Lime sulphur solution</td>
<td>LimePlus Dip (Dechra)</td>
<td>Wash limbs with shampoo before application of the dip. 50 ml diluted in 1 litre of water, applied to the affected region. Do not rinse</td>
</tr>
<tr>
<td></td>
<td>25% Benzyl benzoate</td>
<td>Killitch (Carr &amp; Day &amp; Martin)</td>
<td>Pour on over the mane and tail head and work in</td>
</tr>
<tr>
<td></td>
<td>4% w/v Permethrin (cis:trans 80:20)</td>
<td>Switch (Day Son &amp; Hewitt)</td>
<td>Pour on over the mane and tail head and work in</td>
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</table>
and sampling for mites is most easily achieved when the hair of the limb is short/clipped; long feathers inhibit capture of the mites by superficial brushing. Crusting and alopecia as a result of self trauma is very common (Fig 6). Despite the classic presentation, sampling can sometimes prove unrewarding, which has led me to suspect that some horses carry a degree of hypersensitivity to these mites, accounting for the excessive pruritic reaction, yet apparent low burden of mites.

**Trombiculidiasis**

*Trombiculid* adults and nymphs are free living, and are normally found in areas based on chalky soil. Infestations tend to occur during the late summer and early autumn, with larvae and nymphs identified in the serous ooze from pruritic lesions. However, due to their short feeding period on the host, locating larvae and adults can prove difficult.

**Oxyuris equi**

Female pinworms reside in the dorsal colon as adults, but deposit large numbers of eggs within the perianal region in what appears to be a suicidal event (Reinemeyer and Nielsen 2014). The eggs are deposited using a highly proteinaceous fluid. This has been hypothesised to cause direct irritation to the skin, or possible immunogenic reaction. What is apparent is that some individuals do not display tail rubbing behaviour despite harbouring a pinworm burden.

The identification of eggs on tape impression or dead adults and proteinaceous material at the perianal region is indicative of infection, but it is not uncommon for owners to scupper this stage of investigation by washing the area before examination.

Treatment is directed towards appropriate anthelmintic control, targeting egg laying adults. However, no anthelmintic product is currently recognised as specific for treatment of *Oxyuris equi*. As such, choosing an effective wormer can prove difficult, especially considering the continued threat of anthelmintic resistance. Benzimidazole appears to have the fewest reports of resistance in cases of pinworm. Therefore, it may be appropriate to treat affected horses with repeated doses of anthelmintics such that younger L4 larvae are
Equine killed as they mature. At present, I use three doses of fenbendazole or pyrantel embonate, at two- to three-week intervals in persistent severely affected cases. The use of rectally administered or perianal topical anthelmintics is sometimes suggested, but it is unclear if these are beneficial.

Treatment

Although the majority of therapies for ectoparasites in the horse are topical, systemic application of doramectin offers a fast, temporary resolution of Chorioptes mites (Rendle and others 2007). However, not only is this product unlicensed for use in equine species, but its effect on intestinal helminths at the recommended subcutaneous dose is not well documented in horses, despite common use of avermectins in the control of parasitism in livestock animals (Baltzell and others 2015). Implications, such as anthelmintic resistance, should be considered when selecting doramectin for use in horses.

Parasitic causes of pruritus are often contagious, and decontamination of stable facilities is of upmost importance. Clearing bedding and washing down floors and walls with a commercial bleach product is usually sufficient. The frustrating treatment point is in-contact animals, and their associated stabiling, which is often adjacent to that of the treated animal. Many animals may be asymptomatic carriers, especially with regards to chorioptic mites and pinworms. As such, it is advisable to check in-contact animals and to advise control in an appropriate and sympathetic manner.

Pyoderma

Skin infections involving bacteria are very variable in their pruritic level, and can present more painful than itchy. However, bacterial infections can often be secondary to trauma following pruritus (Fig 7). Identification of infectious microorganisms relies on cytology for basic diagnosis, which can then lead to topical therapy. Impression smears or tape impressions are a useful first-line test, which can later be followed by tissue biopsy if required.

Although systemic use of antimicrobials can be efficacious in pyoderma cases, they can be associated with adverse events and increased costs of treatment. An added concern is that of antimicrobial resistance following such use. As such, the use of topical agents for the treatment of superficial bacterial infections is preferable. A plethora of products are available, although there is limited evidence for their efficacy. However, a review of the use of chlorhexidine, benzoyl peroxide, sodium hypochlorite and silver sulfadiazine in small animal practice can easily be translated into equine practice (Mueller and others 2012) (Table 3).

Fungal infection

Dermatophytosis is rarely pruritic in horses. Superficial dermatophytosis more commonly presents with crusting, in association with alopecia that can be generalised, or more focal in nature (‘ringworm’). Diagnosis is achieved via PCR or culture of plucked hairs from the periphery of the lesions. Deep fungal infections require a biopsy culture for confirmation of diagnosis.

Malassezia overgrowth in the intermammary region of mares has been reported to be intensely pruritic. These cases result in tail rubbing and irritation of the abdomen (White and others 2006). The treatment of fungal infections in horses can vary. Superficial dermatophytosis is usually self-limiting, but topical treatment is often pursued to

<table>
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<th>Table 3: Commonly used topical antimicrobial agents</th>
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<tbody>
<tr>
<td>Drug Product</td>
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<tr>
<td>Chlorhexidine gluconate, Miconazole nitrate Malaseb (Dechra)</td>
</tr>
<tr>
<td>Benzoyl peroxide Paxutol (Virbac)</td>
</tr>
<tr>
<td>Sodium hypochlorite Vetericyn Spray (Innovacyn)</td>
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<tr>
<td>Silver sulfadiazine Flamazine cream (Smith and Nephew)</td>
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Fig 7: Traumatic superficial pyoderma over the left shoulder of a horse, as a result of atopic dermatitis
help hasten recovery from this highly contagious condition. Topical 2 per cent enilconazole (Imaverol; Elanco) is the most popular solution, and is applied to the affected areas four times, with three- to four-day intervals. Chlorhexidine gluconate and miconazole nitrate (Malaseb; Dechra) at 2 to 4 pet cent can be considered effective in the treatment of intermammary Malassezia. Treatment of deep mycosis is more frustrating, and the use of systemic antifungals is both lacking in evidence and expensive. Griseofulvin (5 to 10 mg/kg or 100 mg/kg given orally every 24 hours) is occasionally used, but precautions should be taken regarding its use in pregnant animals, and handling by pregnant women, due to potential teratogenic effects.

**Allergenic dermatoses**

Despite the high prevalence of Culicoides hypersensitivity within the equine population (which is often diagnosed on clinical signs alone) (Fig 8), other cutaneous manifestations of hypersensitivities are relatively rare. Pruritus and urticaria are the common clinical presentations of both equine food allergy and equine atopy. To distinguish between the two, horses can be fed a novel exclusion diet to aid the diagnosis of feed allergy. This can be made up of 5 to 10 kg of lucerne nuts per day for four to six weeks. Many horses in the UK have not been exposed to Timothy hay, which is a suitable alternative to lucerne nuts. Should the pruritus resolve, previous feeds can be reintroduced to identify the offending substance. Diagnosis by serology and intradermal tests are not well established for Culicoides hypersensitivity (Schaffartzik and others 2012) and most serological reactions are considered to have poor reproducibility, failing to correlate with the intradermal allergen test (IDAT) (Fig 9). False-positive reactions are also considered common.

If pruritus persists despite performance of a food exclusion trial, then a diagnosis of equine atopy can be made. This can be seasonal or non-seasonal in appearance, depending on the allergens involved. Management of these cases can be divided into the following four broad categories.

**Allergen avoidance**

The most effective means of controlling an allergen is to eliminate the causal factor. This is more easily said than done, and identifying allergens associated with atopy in horses is notoriously variable. The gold standard form of testing is the IDAT, and is most commonly performed by referral dermatologists. Storage mites, moulds, danders and pollens are considered the most important allergens to procure a reaction. Appropriate use of lightweight wrap rugs (Boett) can provide a suitable barrier to biting flies and Culicoides midges, especially when peak flight times during the twilight hours cannot be avoided. Any clothing used should be washed once a week at 60°C to remove potential build-up of dust mite allergens. This is often onerous and time-consuming for owners. Washing the horse once a week with shampoo is a suitable compromise, as it has other therapeutic benefits (ie, sensation of cooling of the skin, improving the skin barrier [desmosomes and lipid content], removal of surface microbes), as well as removing the allergens from the horse’s skin.
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Barrier function
Attempts to minimise transepidermal water loss in canine species is achieved through the use of topical shampoos containing linoleic acid, such as Allermyl (Virbac) or Coatex (VetPlus) (Olivry and others 2010). Cooler seasons can inhibit owners from performing this.

Dietary supplementation with essential fatty acids can also be attempted, and some success has been noted with supplements such as flaxseed/linseed oil (O’Neill and others 2002). This supplement has one of the highest natural sources of alpha-linoleic acid, and can easily be gradually introduced to the diet.

Allergen-specific immunotherapy
Identification of causal antigens by IDAT is beneficial for the formulation of allergen-specific immunotherapy (ASIT). Although very few blinded control trials exist to justify its use in horses, recent retrospective studies suggest some benefit to its use as an adjunctive therapy in allergic horses (Loeffler and others 2018). ASIT is usually given by intradermal injection. Regardless of the protocol used, and the increment increase in dose, a minimum of 12 months should be allowed to evaluate whether the treatment has been effective so as to avoid seasonal variation in allergen load.

ASIT is also known to take up to nine months to have a significant effect. Unfortunately, its use for Culicoides hypersensitivity has shown minimal benefit, nominally due to the lack of specificity regarding which Culicoides proteins are responsible for the hypersensitivity reaction, and the concentration of the proteins achieved in ASIT.

There is one published report regarding the use of a Trichophyton species vaccine (Insol Dermatophyton; Boehringer Ingelheim) to minimise the clinical signs of Culicoides hypersensitivity (Gehlen and others 2016). The results were not significant, but there was discussion of a potential basis for the vaccine constituents encouraging an immunomodulatory shift. Considering the added requirements for importing the product to the UK, the potential for injection-site reactions, and the off-licence use of the vaccine, there is little to justify the use of this product in the therapy of Culicoides hypersensitivity.

Anti-inflammatory drug therapy
Pharmacotherapy of skin allergies is applied in the majority of cases, at least in the initial stages of disease. Glucocorticoids tend to be the most appropriate and effective treatments. Dexamethasone (0.05 mg/kg every 24 to 48 hours) or prednisolone (1 mg/kg every 24 hours) are generally helpful, although the degree of resolution may depend on ongoing allergen exposure.

Several antihistamines, such as diphenhydramine (1 to 2 mg/kg every 12 hours) or hydroxyzine (1.0 mg/kg every 8 to 24 hours) may help in some cases, either alone or alongside glucocorticoids. Similarly, use of the tricyclic antidepressant doxepin (1 to 2 mg/kg every 12 to 24 hours) can at least enable a reduced glucocorticoid dose.

Summary
Pruritus in the equine patient is a condition that can be both simple and frustrating to treat. Both thorough history taking and even more thorough sampling is the mainstay of effective diagnosis and therapy. Treatment of parasitic diseases not only requires owners to be committed to ongoing care, but also vets to be responsible regarding their recommendation of topical products.

Allergic dermatoses are undoubtedly challenging conditions to treat, but it is important to address the disease as a whole, as opposed to reliance on anti-inflammatory drug therapy. Both licenced and unlicensed therapeutics exist when treating the pruritic horse. As such, it is important to follow the cascade when formulating a treatment protocol.

References


Further reading


SELF-ASSESSMENT: DIAGNOSIS AND MANAGEMENT OF THE ITCHY HORSE

In Practice partners with BMJ OnExamination to host self-assessment quizzes for each clinical article. These can be completed online at inpractice.bmj.com

1. At what maximal temperature are lice inhibited from reproducing?
   a) $30^\circ C$
   b) $39^\circ C$
   c) $46^\circ C$
   d) $28^\circ C$

2. What vaccine has been suggested to minimise hypersensitivity reactions associated with insect hypersensitivity?
   a) Tetanus toxoid
   b) Equine herpesvirus 1 + 4
   c) Equine influenza
   d) Trichophyton species

3. What feedstuffs can commonly be used in a dietary exclusion trial when trying to establish a food allergy in horses?
   a) Timothy hay
   b) Lucerne nuts
   c) Meadow hay
   d) Alfalfa

Answers:

1. (b) $39^\circ C$
2. (a) Tetanus toxoid
3. (c) Meadow hay

Make sure you’re complying with waste regulations

Download the BVA guide to handling veterinary waste from www.bva.co.uk/guides

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