

Atopy and
Insect Bite
Hypersensitivity



Equine allergies

Diagnosis and management

Introduction

Horses can be allergic to many different substances. Atopy and Insect Bite Hypersensitivity are potential causes for allergic symptoms in horses.



House dust and storage mites



Pollen from grasses, weeds and trees



Culicoides spp.

Insect Bite Hypersensitivity (IBH) or 'Sweet itch' is the most common allergic skin disease in horses¹. It is a seasonal recurrent allergic dermatitis caused by hypersensitivity to salivary antigens of biting insects, especially of Culicoides species.

Atopy or atopic dermatitis involves a skin allergy to environmental substances such as pollen, mites, epithelia, fungi and/or yeast. Depending on the allergens, it may be seasonal or nonseasonal.

Pathogenesis

Very little is known about these equine conditions. Immunological reactions (IBH or atopy) may develop when an allergen-specific IgE antibody on a mast cell binds with an antigen. Potent inflammatory mediators and cytokines are released, resulting in allergy symptoms.

IBH and atopy are IgE mediated allergies (immediate type I), but type IV hypersensitivity reaction (delayed type, T-cell mediated) may be involved^{1,2}.



Prevalence, age of onset and genetic predisposition

As *Culicoides* and other insects are not present in every region, the percentages of IBH affected horses range from 3-11% in UK³, 37% in regions of Germany⁴ and 0-71% in regions of the Netherlands⁵. The prevalence of atopy in horses is currently unknown.

The average age of onset for IBH and atopy varies from 1 to 6 years^{1,2,6,7}. It is believed that hereditary predisposition has an important role in both conditions.

IBH may occur in every breed, but Welsh, Shetland and Connemara ponies, Friesian, German Shire,

Arabian, Quarter and imported Icelandic horses seem to be affected more often.

Atopy pre-disposed breeds are Thoroughbreds, Quarter horses, Warmbloods, Arabians and Morgans. Males seem to be almost twice as likely to have atopy as mares.



Clinical Signs

The clinical signs of IBH and atopy can be overlapping, with pruritus as the primary symptom. Some horses can be affected with both conditions.



IBH starts with pruritus, broken hairs and crusts at the mane and tail region which then progresses to the rump, dorsal and ventral midline. The face, dorsal aspect of the pinna, neck and shoulders may also be involved.

The clinical signs occur distinctly in warmer months of the year (April-October?) and often worse near dusk and dawn due to the *Culicoides* feeding times.



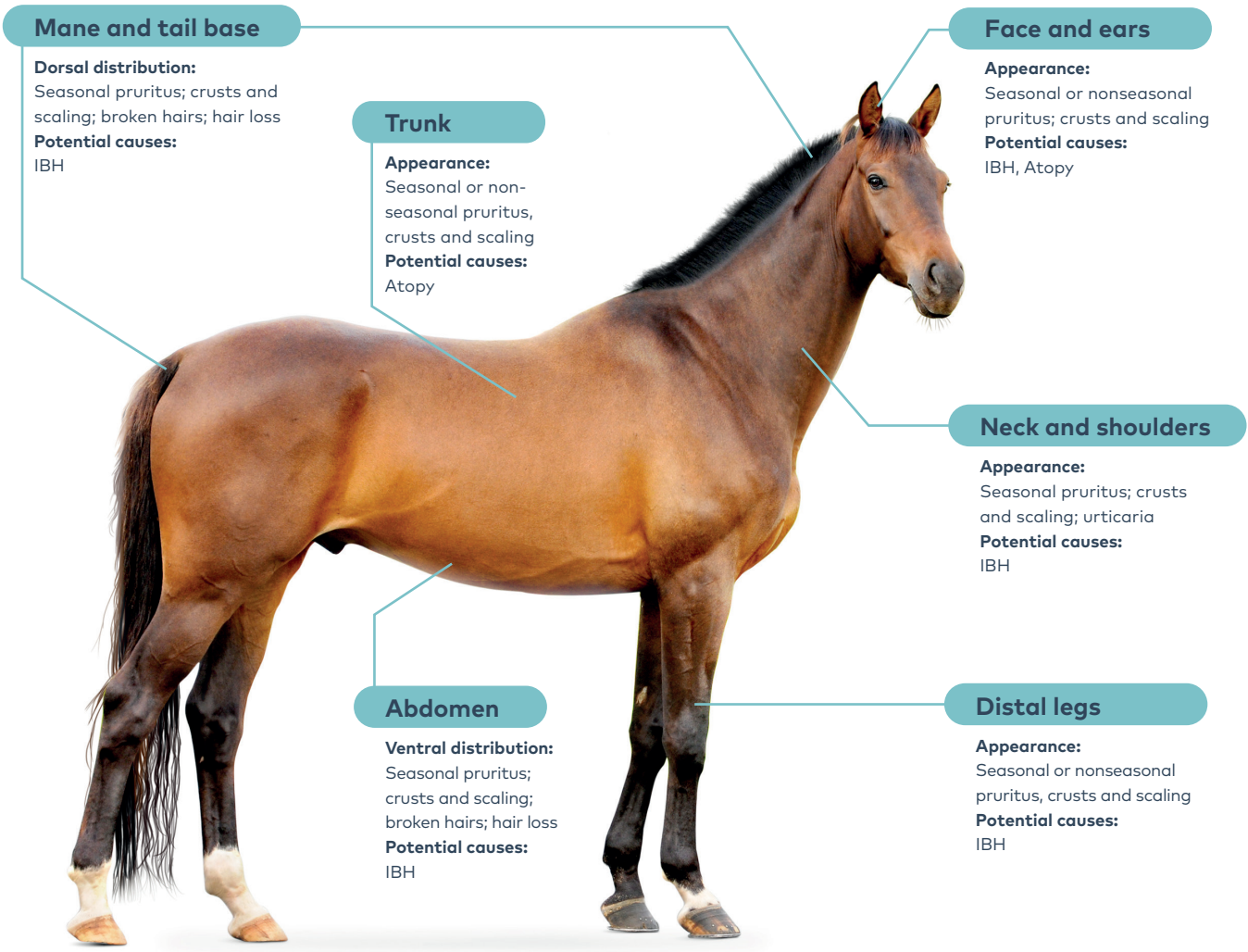
In atopy, pruritus is mainly present at the face, distal legs or trunk. Alopecia, erythema, urticaria and papules may all be present. Atopy symptoms can be seasonal or nonseasonal.



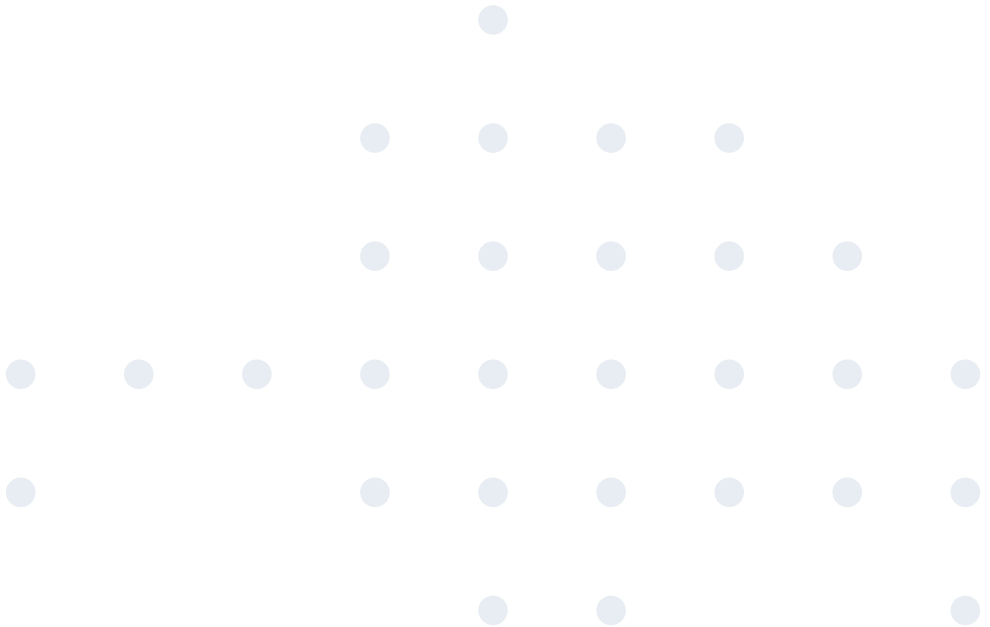
In both conditions self-trauma due to scratching, biting and rubbing may lead to erosions and ulcers, hair loss, excoriations, lichenification and pigmentary disturbances which contribute to the development of a secondary superficial bacterial infection. A pyoderma is typified by excess scaling, small epidermal collarettes or encrusted papules.

Sometimes Recurrent Airway Obstruction (RAO) can occur with or without pruritus. RAO is an allergic-based condition in stabled horses which is characterised by small airway inflammation, airway neutrophilia and obstruction after exposure to, for example moldy hay and straw (allergy to mould spores). It is unclear if IgE-mediated reactions play a role in RAO⁸.

Uncommon symptoms like laminitis and head tossing are also suspected to be associated with allergies⁶.



- +** Self-trauma and chronicity:
 Alopecia
 Excoriations
 Erythema
 Papules
 Erosions
 Ulcers
 Thickened skin



Diagnosis

At present, the definitive diagnosis of IBH and atopy is based on the history (seasonality, recurrence and response to insect control), physical examination and exclusion of other pruritic skin diseases such as ectoparasites, bacterial, yeast or fungal infections, food and contact allergy.

Once IBH or atopy has been established, Artuvetrin® Skin Test and/or NextEQ Serum Test can be done to support the diagnosis and identify the responsible allergens. Correlation of the test result to the clinical picture is essential.

nextEQ
Serum Test results

Owner name: Example
Animal Name: Example
Species: Horse
Veterinarian: J. Leite
Veterinary practice: Artuvetrin Animal Health
Practice address: Vrijweg 11, 8243 PM Lelystad, NL
Phone / Fax:
Email:
Test type: Environmental screen
Date tested: 28/09/2020
Test number: 23
Customer number: 123

Environmental screening

Allergens

Screening results: **POSITIVE**

A high level of antibodies (IgE) has been found for one or more allergens such as grasses, crops, weeds, trees, mites, insects, yeast or fungi.

Expand the screening

☐ Yes, I would like to expand the screening results.

Date: _____

Signature: _____

Please return this form by email to info@artuvetrin.com

100% reliable
Expanding the results from the screen has 100% correlation.

Need any technical help?
If you have any questions or if you need support in the diagnosis or treatment of a patient, please contact our medical department by phone +31 202 955 111 or by email info@artuvetrin.com

Your new support in DERMATOLOGY

House dust mite allergy?
Neutralises the allergen: ALLERGOE

Dust mechanism of action:
• Alters the chemical structure of allergen particles, reducing their allergenicity.
• Forms a porous film that traps allergens in larger particles allowing to be removed easily with conventional cleaning.

Long term protection & safety:
after single application on saddle covers and blankets.

Skin lesions?
Prevents scarring: Pet's Relief® DERM-10

Skin creams with Zinc Oxide + 9 Herbal Extracts
• relief and power to avoid healing
• helps to prevent the development of scar tissue
• allows to regain the normal skin structure and color

skin diseases, lesions, ulcers, burns, insect bites and stings

Go to artuvetrin.com for more information

NextEQ Serum Test

Highly specific and sensitive serological test specially for horses. It uses a monoclonal antibody generated and selected from recombinant horse IgE (rIgE).

The specific horse panel examines for the 32 most relevant indoor and outdoor allergens, including insects. You can choose between a screening and a complete panel. The screening indicates if any of the 32 tested allergens is positive or if all allergens are negative. If positive, a complete panel should be requested.

Grasses

Timothy grass, Perennial ryegrass and Bermuda grass

Crops

Oats and Rye

Mites

House dust mite, Farinae mite, Grain mite, Copra mite and Hay mite

Insects

Culex, Culicoides and Tabanus

Trees

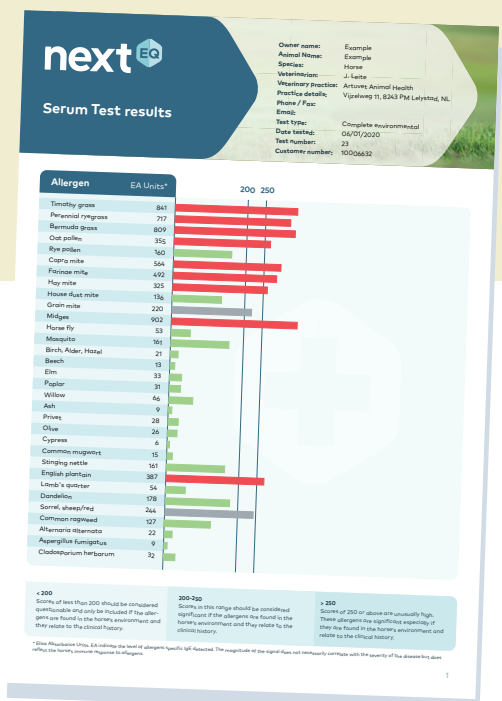
Birch, Alder and Hazel mix Beech, Elm, Poplar, Willow, Ash, Privet, Olive, Cypress

Weeds

Common mugwort, Stinging nettle, English plantain, Lamb's quarter, Dandelion, Red/sheep Sorrel and Common ragweed

Fungi

Alternaria alternata, Aspergillus fumigatus and Cladosporium herbarum



mAb derived from a recombinant horse IgE

Artuvetrin® Skin Test

With this test small amounts of different allergens are injected intradermal. Subsequently, it is possible to evaluate whether or not a local reaction develops at the site of the injection.

Allergens should be selected based on the clinical history of the horse. There are about 80 different individual allergens or allergen mixtures available.

Each vial contains 3 ml, about 60 tests can be performed. They have a shelf life of 6 months.



Treatment

To successfully treat IBH and/or atopy in horses, a multi-modal approach is often required. This includes environmental control, topical control, systemic treatment and allergen-specific immunotherapy.

The best treatment is environmental control to avoid or reduce allergen exposure. Although this is often impractical, there are specific recommendations depending on the responsible allergens (refer to the last page of this brochure - Environmental Control).

Ectoparasitic sprays, bath oils and lotions can be used for topical control. Regular grooming and bathing may remove allergens from the skin. Using cool bathing water rehydrates the skin, improves the epidermal barrier and vasoconstriction decreases delivery of mediators to the skin. Shampoos should be selected based on the skin condition.

Antihistamines, corticosteroids, tricyclic antidepressants or a combination can be effective in the control of pruritus or urticaria⁷. However, systemic treatment comes with undesirable adverse effects such as laminitis² and limitations on usage in competition sport.

Allergen-specific immunotherapy works by giving repeated doses of allergens, thereby stimulating an immune response in the body which leads to the build-up of immunological tolerance. It is the only treatment which alters the course of allergic disease while at the same time controlling the symptoms.

Allergen-specific immunotherapy is a safe and effective long-term treatment which has been used successfully for IBH, atopy, urticaria and allergen induced RAO^{7,9,10}. It may also be a consideration when treating allergy induced head shaking and laminitis⁹.

The success rate ranges from 60 - 84%^{7,9,10}. Improvement is seen as early as 2 months, but the treatment should be evaluated for efficacy over a minimum of a 12-month period⁷.

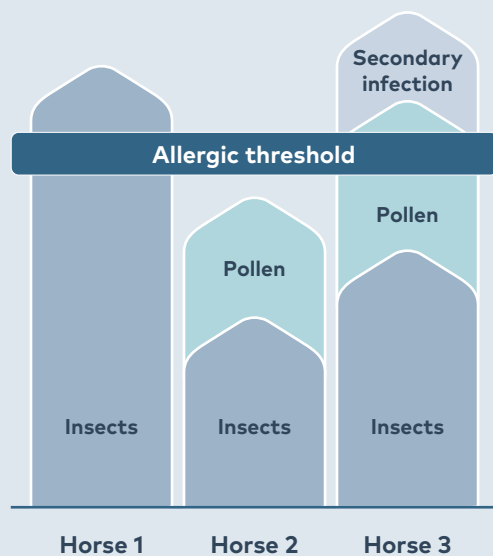
Allergen-specific immunotherapy is the preferred treatment choice¹⁰. It is available in subcutaneous injections or a sublingual spray.

The cumulative effect of allergens

Allergy symptoms start to develop when the horse rises above the allergic threshold, or also known as the itch threshold.

The allergic threshold is basically the border between showing and not showing symptoms.

The allergy threshold can be different for every horse depending on the allergens involved. If an allergic horse is treated successfully and symptoms have disappeared, they will return to below the allergic threshold. Horses can have one or multiple allergies. In cases of multiple allergies, combined exposure gives a cumulative effect.



Horse 1

This horse has risen above the allergic threshold and showing symptoms. Treating the IBH will bring the horse below the threshold again.

Horse 2

The cumulative effect of insects and pollen is not high enough to push the horse over the allergic threshold. This horse does not show any allergic symptoms.

Horse 3

The cumulative effect is high enough to push the horse over the allergic threshold, resulting in allergy symptoms during the pollen season only. A secondary infection pushes the horse further above the allergic threshold. Treating the horse for both insects and pollen will increase the chance of bringing the horse below the allergic threshold.

-  Pollen (seasonal)
-  Insects (seasonal)
-  Secondary Infection



Artuvetrin® Therapy

Administration of Artuvetrin® Therapy is by subcutaneous injections. The treatment starts with low dosages in the induction period and gradually increases to the maintenance period. A vial of 10 ml Artuvetrin® Therapy can last up to 10 months and can have up to 8 allergens per vial.

Artuvetrin® Therapy

Artuvetrin® is the product of choice under the European veterinary medicines regulations (directives 2004/28/EC).



Adviced schedule	Dosage
Week 1	0.2 ml
2 weeks later (week 3)	0.4 ml
2 weeks later (week 5)	0.6 ml
2 weeks later (week 7)	0.8 ml
3 weeks later (week 10)	1.0 ml
3 weeks later (week 13)	1.0 ml
4 weeks later (week 17)	1.0 ml
4 weeks later (week 21)	1.0 ml

Maintenance period: 1.0 ml every 4 weeks.

Sublingual immunotherapy

This treatment is an alternative to the subcutaneous injections. Administration is by spraying in the mouth daily, between the cheek and gum. No food and drink is allowed 10 minutes before and after administration. One vial of sublingual immunotherapy can last up to 6 months and contains a maximum of 12 allergens per vial.

When is sublingual immunotherapy a good alternative?

- Averse to needles (animal or owner)
- Animals that experience adverse events to injections
- Animals that did not show improvement to injections
- When a daily administration is preferred



Environmental control

Insects (IBH)

Reduce exposure to insects by moving horses away from standing water, manure piles, compost and cattle⁹.

Stable the horse before dusk and until after dawn⁹.

Use fly sheets or masks sprayed with permethrin repellent, using a $\pm 32 \times 32$ per 2.5-cm grid meshing⁹.

Place box fans within the stall⁹.

House dust and storage mites

Minimalise dust in the barn and consider purchasing rubber mats to replace stall bedding⁹.

Wash blankets, saddle pads and leg bandages regularly with 60°C hot water.

Consider keeping the horse outside or restrict stabling⁹.

Use airtight containers to keep food tightly closed and store in a cool, dark and dry environment.

Reduce food stockpiles by buying smaller amounts. Maximum storage time should be less than 30 days.

Wipe the face with a damp cloth after finishing a meal to remove food remains and keep food buckets, bins and tubs clean.

Keep the humidity and temperature in the barn lower than 45% and 21°C, consider using a dehumidifier.



Pollen

Restrict outdoor activity and only put the horse to pasture in the morning, evening or after rainfall when pollen numbers are low.

Move the horse to a different environment or a different barn?

Keep windows and doors of the barn closed on warm and windy days and open them when pollen numbers are low.

Dry blankets, saddle pads and leg bandages inside.

Molds

Remove molds from damp environments and surfaces with a fungi cleaner.

Lower the humidity and increase ventilation indoors.

Consider keeping the horse outside or restrict stabling?

Avoid forest walks in autumn or in humid weather.

Dry clothes and bedding indoors instead of outdoors.

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