

Skin lesions in Aubrac cows strongly associated with fly bites (*Haematobia irritans*)

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Background – The horn fly *Haematobia irritans* is known to cause problems in cattle including weight loss and decreased milk production; cutaneous lesions have not been widely reported and descriptions of the clinical manifestations are quite variable.

Hypothesis/objectives – This study describes the clinical and histopathological lesions of several Aubrac cows that presented with focal to confluent areas of alopecia, skin scaling and thickening, suspected to be induced by *H. irritans* bites.

Animals – Twenty seven, three- to six-year-old Aubrac cows, kept in mountain pastures in France, that presented with an apparently asymptomatic alopecic dermatosis.

Methods – Samples for skin cytological evaluation, skin scrapings and trichograms were examined; also, skin biopsy specimens from affected animals were used for histopathological examination.

Results – Clinical lesions consisted of focal to coalescing, symmetrical areas of hair loss and scaling, located on the back, flanks, and lateral and caudal aspects of the thighs. Histopathological examination revealed perivascular, oedematous, eosinophilic dermatitis with eosinophilic folliculitis and furunculosis. Species identification of several flies captured on the cows revealed *H. irritans*. The final clinicopathological diagnosis was eosinophilic dermatitis and folliculitis and furunculosis, suspected to be due to *H. irritans* fly-bite.

Conclusion and clinical importance – Fly-bite (*H. irritans*) dermatitis should be included in the differential diagnosis of alopecic dermatoses in cows.

Introduction

Fly bite dermatitis in cattle due to *Haematobia irritans* has not, to the best of the authors' knowledge, been described in France; it is of economic importance in other countries. The distribution of horn flies on cows and the negative economic impact on cattle production has been reported in Australia.¹ In Argentina, description of cattle hide damage ("black spots", "pits" and scars were described) due to *H. irritans* has been reported.^{2,3} Skin lesions are rarely reported in living cows and may consist of pigmentary changes, changes in hair coat texture and scaling, and bovine teat inflammation with fibrosing dermatitis.^{3,4}

Case report

Twenty seven of 60, three- to six year-old Aubrac cows, kept on summer mountain pastures at an altitude of 1,100 m, presented with alopecic skin lesions. There was no previous history of skin disease in the herd and none

of the animals had received any specific treatments. A detailed history revealed that severe fly infestation had occurred during stormy days one week before the onset of skin lesions.

Affected animals showed similar clinical signs of varying severity. Lesions were restricted to the skin and animals showed no visible signs that lesions were overtly painful or pruritic. Lesions included multifocal grouped circular, scaly and mild thickened areas of alopecia, 1–3 cm in diameter, with some areas of alopecia becoming confluent. The scale was nonadherent. Lesions were restricted to the dorsum, flanks, and lateral and caudal aspects of the thighs in a bilateral and symmetrical pattern (Figure 1).

Based on the history and clinical findings, the differential diagnoses considered included dermatophilosis, dermatophytosis, bacterial folliculitis, demodicosis, stephanofilariasis, *Pelodera* dermatitis and sterile eosinophilic folliculitis.

Skin scrapings and trichogram samples were taken from 10 cows and showed no external parasites, and samples for skin cytological evaluation (acetate tape strips on flank and thigh lesions, stained with RAL555®; RAL Diagnostics; Site Montesquieu-Martillac, France) revealed only rare bacteria. Fungal cultures were not performed. Histopathological examination of 8 mm skin biopsy specimens from the flank area of three cows

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Figure 1. Clinical lesions of an Aubrac cow at pasture with presumed insect bites. (a) Foci of alopecia and hyperpigmentation on the dorsum, flanks and lateral side of the thighs. (b) Lesions (1–3 cm diameter) consisted of annular and coalescing areas of hair loss, skin in these affected areas is scaly and thickened.

revealed diffuse, mild orthokeratotic hyperkeratosis, with some fine eosinophilic crusts above the follicular ostia. There was irregular mild acanthosis of the epidermis with severe superficial dermal, perivascular and perifollicular to diffuse inflammatory infiltrate composed of eosinophils, lymphocytes, histiocytes and neutrophils. Some dilated vessels and atrophic and distorted follicles were observed. The superficial dermis was severely oedematous. Mural and luminal, neutrophilic and eosinophilic folliculitis and furunculosis, affected most of the hair follicles (Figure 2). Half of the hair follicles were in telogen and many of these were devoid of hairs.

At the time of the outbreak, fly numbers were considered to be high. Fifteen flies were collected and their examination allowed species identification as *Haematobia irritans* (Figure 3). These flies had a small body, 4 mm long, with slightly overlapping wings that were held flat over the abdomen; the antenna had short setae and palps were long relative to the proboscis. They were the only flies observed on the cows during the previous period of

severe fly infestation that preceded the outbreak of skin lesions. The final clinicopathological diagnosis was perivascular eosinophilic dermatitis, folliculitis and furunculosis, strongly suspected to be induced by *H. irritans* bites. Lesions healed progressively and hair regrew within three weeks, without any specific therapy.

Discussion

Horn flies (*Haematobia* spp.) are parasitic, blood-feeding flies. They are small (adults are about 3–4 mm in length), brownish flies with palps nearly long enough to reach the tip of the proboscis.⁵ *Haematobia irritans* are found on cattle during the warmer seasons of the year. They are more commonly found on the back, but can take refuge on the ventral abdomen during rain or on particularly hot, sunny days.⁵ Adult flies generally remain on the host day and night, congregating on the back, withers, abdomen and around the head, and resting around the horn region when not feeding. *Haematobia irritans* males and females

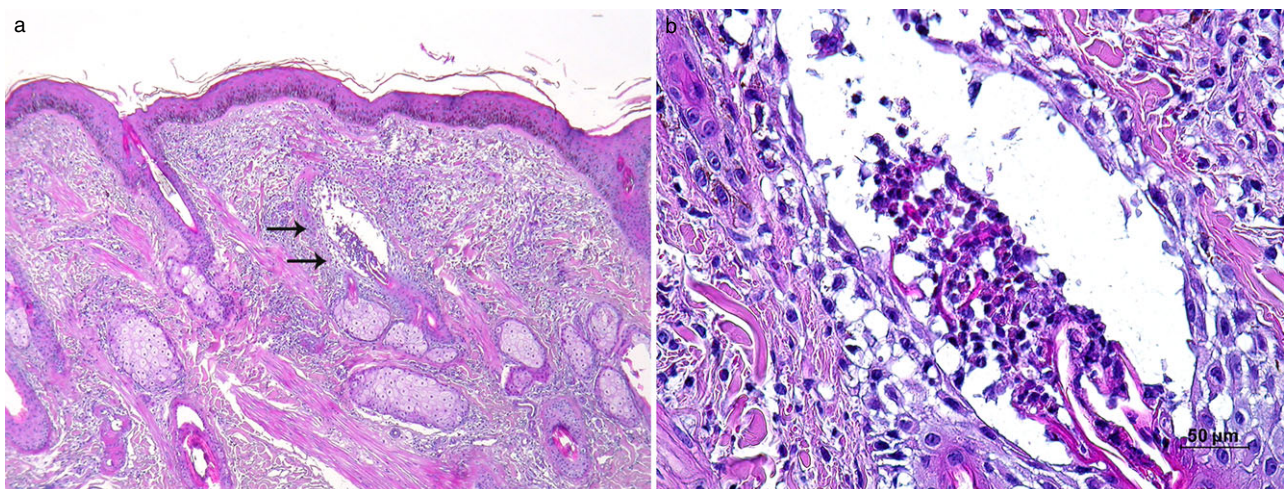


Figure 2. Photomicrograph of a skin biopsy from a cow with presumed insect bite lesions. Superficial, perivascular to diffuse hyperplastic dermatitis with oedema, severe furunculosis [Haematoxylin and eosin (H&E), ×100]. Insert: higher magnification of focal area of furunculosis (highlighted with arrows in part a) showing cell debris and necrotic eosinophils (H&E, ×400).



Figure 3. Examination of a fly captured on an Aubrac cow identified as *Haematobia irritans* ($\times 20$).

Small body, 4 mm long, with slightly overlapping wings that are held flat over the abdomen; antenna with short setae and palps, long relative to the proboscis, characterize this fly.

feed approximately 24 and 38 times per day.⁶ They take small blood meals, with each fly consuming an average 10 μL of blood per day.⁷

In dairy cows, horn flies have been associated with decreased milk production: they can cause teat atresia in first-calf heifers at the time of calving⁴ and they are potential vectors for the transmission of *Staphylococcus aureus* mastitis among dairy heifers.^{4,8} With 200 flies per animal, production losses in milk yield and live-weight gain were estimated to be 520 mL and 28 g daily, respectively.¹ As a consequence, they can have a significant economic impact on the cattle industry with some reports describing them as one of the most widespread and economically relevant pests of cattle.⁷

Horn flies are biological vectors of the nematode *Stephanofilaria stilesi* which is responsible for stephanofilariasis.⁹ This skin condition is uncommon, chronic and causes papules, crusts, ulcers, alopecia, hyperkeratosis and thickening of the skin. The ventral chest, abdomen, flank, udder and teats are most commonly affected, although lesions are occasionally seen on the face, neck and scrotum. Teat lesions may predispose the animals to mastitis. Typically, multiple animals in a herd are affected. Diagnosis of this disease is made by histopathological examination of adult nematodes in cyst-like structures at the base of hair follicles and microfilariae in the surrounding dermis.⁹

Horn flies have been described as causal agents of direct skin damage in cattle due to their feeding activity. Three major types of cutaneous lesions in processed hides from affected animals have been described: black spots, pits and scars.^{2,3} Black spots were small, flat, semicircular areas (0.5–5.5 mm in diameter), whereas pits (0.5–3.0 mm in diameter) had an ulcerated/eroded surface. Lesions were localized to the withers, back and ventral abdomen, although they could be generalized. The lesions were associated with the feeding activities of the flies and caused significant problems in leather quality.²

This report describes an alopecic dermatitis due to horn flies, characterized by focal circular to confluent areas of hair loss with scaling and thickening of the skin, located on the back, the flanks and lateral and caudal aspects of the thighs. The affected cows had a markedly different

clinical presentation and lesion location compared with previous reports.^{2,3}

In one study, histopathological examination revealed perivascular eosinophilic and mononuclear cell infiltration of the superficial dermis with oedema, hyperaemia and haemorrhage, which was similar to our observations of perivascular, oedematous, eosinophilic dermatitis. In addition to the eosinophilic infiltration in the dermis, we also noted eosinophilic folliculitis and furunculosis. The follicular lesions could explain the alopecic lesions observed in the Aubrac cows.

History, clinical examination and histopathological description were compatible with *H. irritans* bites. To prove the association between this dermatitis and *Haematobia* fly bites, it would be necessary to reproduce the dermatitis with subsequent re-exposure to these specific flies and/or document hypersensitivity by intradermal testing. Other differential diagnoses for this clinical presentation were ruled out using cytological and histopathological evaluation. Although dermatophyte culture was not performed, dermatophytosis was excluded because the lesions appeared suddenly and were symmetrically distributed, and signs of fungi were not found on histological examination.

Previous studies have shown that for cattle flies there can be considerable variation in fly load between breeds, as well as between individuals within a breed.¹⁰ Other factors that can influence the number of flies per cow are the coat colour and skin thickness, with dark-coloured animals and those with a thinner epidermis carrying more flies.¹¹ Hair density and quantity of sebum can also affect fly number per cow.¹² Horn flies seem to avoid skin sites with a high quantity of sebum and high hair density. Of the herd of 60 animals in this report, 27 presented with cutaneous lesions. Because the animals were all of the same breed, with similar coat colouring and hair density, then the variability in disease severity had to be a consequence of interindividual differences. Studies have shown that fly-resistant or fly-susceptible heifers keep their status regardless of group or location, so careful management of the 27 affected animals would likely be required in future to prevent further disease incidence.¹⁰ At the high altitude of the pastures in this outbreak, horn flies are uncommon and it is likely that their unusual presence was due to the hot temperatures and history of stormy weather. The animals that were affected required no treatment and lesions resolved spontaneously once the fly population decreased to the usual low numbers.

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Résumé

Contexte – La mouche *Haematobia irritans* est connue pour entraîner des problèmes tels que perte de poids et baisse de la production laitière dans les élevages ; les lésions cutanées n'ont pas été largement rapportées et les descriptions des manifestations cliniques sont assez variables.

Hypothèses/Objectifs – Cette étude décrit les lésions cliniques et histopathologiques de plusieurs vaches Aubrac qui présentaient des zones alopéciques focales à confluentes, une peau squameuse et épaissie, suspectées induites par les morsures de *H. irritans*.

Sujets – Vingt sept vaches Aubrac de trois à six ans vivant en alpage en France présentant une dermatose alopécique apparemment asymptomatique.

Méthodes – Les échantillons de peau pour évaluation cytologique, raclages cutanés et trichogrammes ont été examinés ; des biopsies cutanées des animaux atteints ont été utilisées pour examen histopathologique.

Résultats – Les lésions cliniques consistaient en des zones de perte de poils focales à coalescentes, symétriques, localisées sur le dos, les flancs, et les faces latérales et caudales des cuisses. L'examen histopathologique a révélé une dermatite éosinophilique périvasculaire, oedémateuse avec folliculite et furunculose éosinophilique. L'identification d'espèce de plusieurs mouches capturées sur les vaches a révélé *H. irritans*. Le diagnostic clinico-pathologique final était une dermatite éosinophilique et folliculite/furunculose, probablement due aux morsures de la mouche *H. irritans*.

Conclusion et importance clinique – La dermatite liée aux morsures de mouches (*H. irritans*) doit être incluse dans le diagnostic différentiel des dermatoses alopéciantes chez la vache.

Resumen

Introducción – se sabe que la mosca de los cuernos *Haematobia irritans* causa problemas en el ganado, incluidas pérdida de peso y la disminución de la producción de leche; las lesiones cutáneas no han sido frecuentemente publicadas y las descripciones de las manifestaciones clínicas son bastante variables.

Hipótesis/objetivos – este estudio describe las lesiones clínicas e histopatológicas de varias vacas Aubrac que presentaban áreas focales o confluentes de alopecia, descamación y engrosamiento de la piel, que se sospechaba eran inducidas por picaduras de *H. irritans*.

Animales – Veintisiete vacas Aubrac de tres a seis años de edad, mantenidas en pastos de montaña en Francia que presentaban una dermatosis alopécica aparentemente asintomática.

Métodos – se examinaron muestras para la evaluación citológica de la piel, raspados de la piel y tricogramas; también, se usaron muestras de biopsia de piel de animales afectados para el examen histopatológico.

Resultados – Las lesiones clínicas consistieron en áreas simétricas de pérdida de cabello y descamación, focal a coalescente, localizadas en la espalda, los flancos y las caras lateral y caudal de los muslos. El examen histopatológico reveló dermatitis perivascular, edematosa, eosinofílica con foliculitis eosinofílica y forunculosis. La identificación de especies de varias moscas capturadas en las vacas reveló *H. irritans*. El diagnóstico clinicopatológico final fue dermatitis eosinofílica con foliculitis y forunculosis, que se sospechaba era debida a picadura de la mosca *H. irritans*.

Conclusión e importancia clínica – la dermatitis por mordedura de mosca (*H. irritans*) debe incluirse en el diagnóstico diferencial de dermatosis alopécicas en vacas.

Zusammenfassung

Hintergrund – Die Hornfliege *Haematobia irritans* ist dafür bekannt, Probleme bei Rindern zu verursachen, wie Gewichtsverlust und eine verminderte Milchproduktion; Hautläsionen sind weitgehend nicht beschrieben und die Beschreibungen der klinischen Manifestationen sind sehr variabel.

Hypothese/Ziele – Diese Studie beschreibt klinische und histopathologische Hautveränderungen bei einigen Aubrac Kühen, die mit fokalen bis konfluierenden Hautveränderungen mit Alopezie, Hautschuppen und Verdickungen vorgestellt wurden. Es wurde vermutet, dass diese Veränderungen durch Stiche der *H. irritans* verursacht wurden.

Tiere – Siebenundzwanzig, drei bis sechs Jahre alte Aubrac Kühe, die auf Bergweiden in Frankreich gehalten wurden, wurden mit anscheinend asymptomatischer haarloser Dermatose vorgestellt.

Methoden – Es wurden Proben zur zytologischen Evaluierung der Haut genommen, Hautgeschabsel und Trichogramme wurden untersucht; es wurden ebenso Hautbiopsieproben von den betroffenen Tieren zur histologischen Untersuchung verwendet.

Ergebnisse – Die klinischen Veränderungen bestanden aus fokalen bis koaleszierenden, symmetrischen Stellen mit Haarverlust und Schuppenbildung, die am Rücken, an den Flanken und an den lateralen und kaudalen Stellen der Oberschenkel auftraten. Die histopathologische Untersuchung ergab eine perivaskuläre, ödematöse, eosinophile Dermatitis mit einer eosinophilen Follikulitis und Furunkulose. Die Identifizierung der Spezies einiger Fliegen, die auf den Kühen gefangen wurden ergab *H. irritans*. Die endgültige klinisch-pathologische Diagnose war eosinophile Dermatitis und Follikulitis und Furunkulose, vermutlich durch Stiche von *H. irritans*.

Schlussfolgerung und klinische Bedeutung – Eine Fliegenstich (*H. irritans*) Dermatitis sollte bei der Differentialdiagnose der haarlosen Dermatose von Kühen inkludiert werden.

要約

背景 – ノサシバエ *Haematobia irritans* は、牛の体重減少や牛乳生産減少などの問題を引き起こすことが知られているが、皮膚病変については広く報告されておらず、臨床症状に関する記述は一貫性に乏しい。

仮説/目的 – 本研究の目的は、*H. irritans* の刺咬に誘発されたと考えられる限局性の脱毛、皮膚落屑および肥厚が融合して認められたオーブラック牛の臨床病理学的病変について記述することである。

被験動物 – フランスの山地に放牧され、無症候性の脱毛症を呈した3~6歳のオーブラック牛27頭。

方法 – 皮膚細胞学的評価、皮膚搔爬およびトリコグラムのため採取したサンプルを解析し、罹患動物由来の皮膚生検標本を組織病理学的検査に供した。

結果 – 主な皮疹は、背部、側腹部、大腿部外側および後縁に発症する限局性から癒合性の左右対称性脱毛および落屑であった。組織病理学的検査では好酸球性毛包炎および蜂窩織炎に伴う、血管周囲性、浮腫性、好酸球性皮膚炎が認められた。牛から捕獲されたハエ数匹の種同定により *H. irritans* が検出された。最終的な臨床病理学的診断は、好酸球性皮膚炎、毛包炎および蜂窩織炎であり、*H. irritans* ノサシバエによる病変であることが示唆された。

結論と臨床的重要性 – 牛の脱毛症の鑑別診断にノサシバエ (*H. irritans*) 皮膚炎を含めるべきである。

摘要

背景 – 角蝇, 也称扰血蝇, 能引起牛体重减轻和产奶量降低等问题; 皮肤病变未被广泛报道, 对临床表现的描述也不确定. 假设/目的. 本研究叙述了几只奥布拉克牛的临床及组织病理学病变, 表现局灶至大片区域脱毛、皮屑和皮肤增厚, 怀疑是扰血蝇叮咬所致.

动物 – 27只3-6岁、法国山地放养、无症状但有明显脱毛的奥布拉克牛.

方法 – 采样用于皮肤细胞学评估、皮肤刮片和毛发检查; 同时, 发病动物的皮肤活检样本用于组织病理学检测.

结果 – 局灶至融合的临床病变, 表现为对称性脱毛和皮屑, 位于背侧、躯干、大腿外侧及后侧. 组织病理学检测显示血管外周水肿, 伴有嗜酸性毛囊炎和疖病的嗜酸性皮炎. 对牛身上捕获的飞蝇进行物种鉴定, 显示为扰血蝇. 最终的临床病理学诊断为毛囊炎和疖病性嗜酸性皮炎, 怀疑由于扰血蝇叮咬所致.

结论及临床意义 – 飞蝇叮咬(扰血蝇)性皮炎应纳入牛脱毛性皮肤病的鉴别诊断.

Resumo

Contexto – A mosca do chifre *Haematobia irritans* é conhecida por causar prejuízos ao gado, tais como perda de peso e redução na produção de leite. Entretanto, as lesões cutâneas ainda não foram amplamente caracterizadas e as descrições são muito variáveis.

Hipótese/objetivos – Este estudo descreve as lesões dermatológicas e os achados histopatológicos de diversas vacas Aubrac apresentando áreas alopecia focal a coalescentes, descamação e espessamento cutâneo, supostamente induzidas por picadas de *H. irritans*.

Animais – Vinte e sete vacas Aubrac entre três e seis anos de idade criadas em pastagens montanhosas na França que apresentaram um quadro de dermatopatia alopecica aparentemente assintomático.

Métodos – Foram coletadas e analisadas amostras de lesões cutâneas dos animais afetados para exame citológico, raspado cutâneo, tricograma e exame histopatológico.

Resultados – As lesões dermatológicas observadas foram áreas simétricas de hipotricose e descamação focal a coalescente, localizadas no dorso, flancos e faces lateral e caudal das coxas. Os achados histopatológicos consistiram de dermatite eosinofílica edematosa perivascular, com furunculose e foliculite eosinofílica. Diversas moscas capturadas nas vacas foram identificadas como *H. irritans*. O diagnóstico clinicopatológico final foi dermatite eosinofílica e foliculite e furunculose, provavelmente causadas por picada de *H. irritans*.

Conclusões e importância clínica – Dermatite por picada de moscas (*H. irritans*) deve ser incluída nos diagnósticos diferenciais de dermatopatias alopecicas me vacas.