



Contents lists available at ScienceDirect

Allergology International

journal homepage: <http://www.elsevier.com/locate/alit>

Letter to the Editor

Simuliosis – A dermatosis caused by black flies

Dear Editor,

The Simuliidae family consists of more than 2141 species that were listed as valid by Adler and Crosskey in 2011, of which over 1200 belong to the genus *Simulium*, with 43 subspecies, prevailing in the Holarctic regions. A study of Romanian Simuliids fauna was undertaken by Dinulescu (1966).¹ Adult black flies are quite small, about 1.5–4 mm long, they are frequently black, as their vernacular name indicates, are relatively stout-bodied and are notorious for biting. In most species, females require a blood meal from mammals, including humans, to obtain proteins needed for egg maturation. Males are mainly nectarivorous, so only females bite. They are particularly active during the morning and evening. The saliva secreted by black flies when they feed may cause allergic responses in the host. *Simulium dermatitis* is frequently reported in areas where *Simulium* species occur; it can affect humans and animals, especially in rural land and suburbs. Clinically, it is characterized by repetitive eruptions of papules and vesicles on an erythematous base, with intense pruritus, sometimes wheals. This condition is the result of a hypersensitivity reaction to the bite of simuliids.

In this paper, we report a case of *Simulium dermatitis* from the North-Eastern region of Romania, in a young man living in the suburbs who reported being bitten by insects every spring in April, during grass cutting. No other similar cases have been reported so far in English literature, as far as we know.

A healthy man, 45, was seen in the Emergency Unit, in June 2014, for a severe allergic reaction induced by a tick bite. The patient presented, at the moment of clinical examination, fever, malaise, and headache; dermatological examination revealed a severe local reaction: small crusted ulceration, edema, erythema and swelling of the foot (Fig. 1a). The patient complained of extreme pruritus and local pain. No other systemic problems were reported. He reported being bitten by a tick a few hours before admission to the hospital; he had caught the insect and put it in a plastic bag for identification. The tick bite was noticed in the afternoon, on a sunny April day, while cutting grass.

The patient's history was notable for recurrent and severe seasonal episodes of presumed cellulitis after fly bites, which responded poorly to intravenously administered antibiotics, antihistamines and high doses of intravenous steroids (Fig. 1b, c).

Laboratory investigations were within normal ranges, including IgE levels; clinical evolution improved slowly in the following days, while the patient was treated with systemic steroids and antihistamines. The insect was identified at the Veterinary University as a black fly.

A final diagnosis of *Simulium* bite-induced hypersensitivity reaction was accepted and the problem of prevention was raised by the patient, having in mind the repetitive episodes of the disease.

Simulium, commonly known as black fly or buffalo gnat or Turkey gnat, is a member of the family Simuliidae of the Culicomorpha infraorder.² The genus *Simulium*, black fly (Diptera), comprises nowadays more than 1800 species worldwide³ comparing with only 600 reported in 1954.⁴ They are usually found in huge numbers worldwide, from the Tropics to the Arctic Circle, especially in humid places with running water and/or freshwater necessary for larval growth.⁵

Both male and female black flies feed on plant juices and naturally occurring sugary substances but only females take blood-meals, from mammals and humans, with some species of black flies feeding almost exclusively on birds (ornithophilic); each species attacks one type of host preferentially. Females of some species may fly 2–15 km from their emergence to obtain blood meals, helped also by winds. These long distances can burden control programs. Biting occurs outdoors during the day.

The female flies crawl on exposed skin areas, mainly head and limbs. The female black flies cut a small hole in the skin, from where they feed themselves. The biting place becomes very painful and itchy. Medically, black flies are most important as disease vectors.

Black fly salivary extract contains anti-thrombotic, anti-coagulant and immunomodulating effects (suppression of serum IL-6, IL-10, Tumor Necrosis Factor) and induces anaphylaxis and acute cardiotoxicity.⁶ Active substances are released at the site of biting: histamine, leukotrienes, prostaglandins, platelet-activating factors and eosinophilic chemotactic factor.²

The first description of an invasion of black flies (*Simulium columbaccense*) in Romania dates from 1688, when the Prince of Wallachia, Constantin Brâncoveanu marched with his army to the Danube area to defend against his enemy (History of Wallachia from October 1688 to March 1717).^{1,7} The black fly *Simulium colombaccense* was recognized in the Djerdap area around the Iron Gate Gorge (Serbia and Romania).⁸

Simulium dermatitis is characterized mainly by eruptions of pruritic papules, vesicles, and erythematous wheals resulting from a hypersensitivity reaction to black fly bites,² although variable clinical forms have been described (edematous, erythematous-edematous, erysipeloid, inflammatory-indurative, phlegmonoid and hemorrhagic).⁹

Insect bite hypersensitivity represents an immunoglobulin E (IgE)-mediated hypersensitivity to salivary antigens and severe reactions are quite rare. The severity of *Simulium dermatitis* in hypersensitive persons is an important concern for daily practice as the risk of anaphylaxis and acute cardiotoxicity exist, although it is unusual.⁶

Peer review under responsibility of Japanese Society of Allergology.

<http://dx.doi.org/10.1016/j.alit.2015.11.005>1323–8930/Copyright © 2015, Japanese Society of Allergology. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

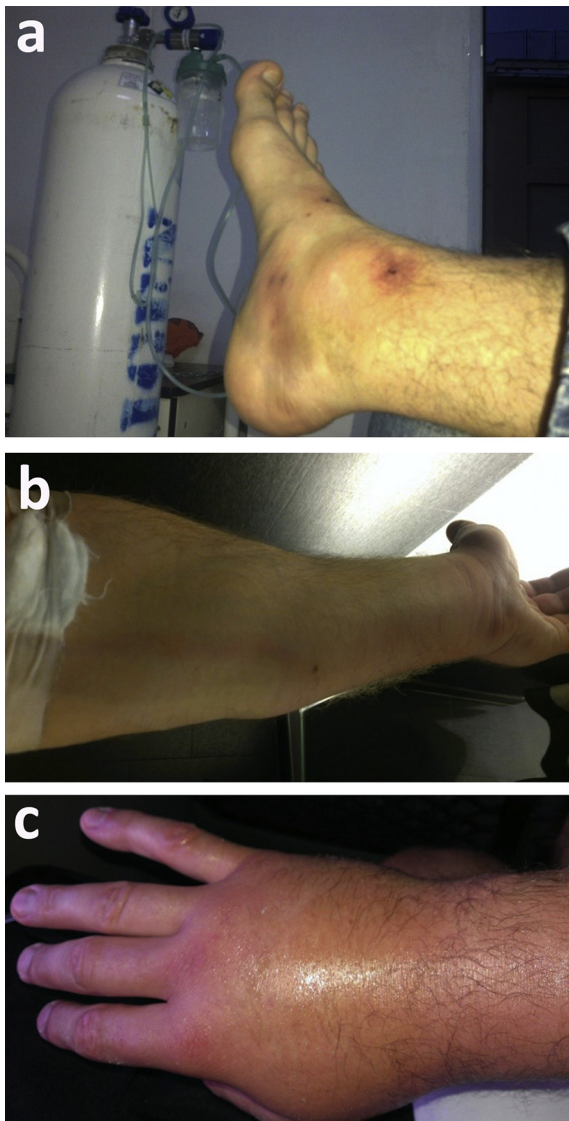


Fig. 1. **a:** Insect bite and allergic reaction in spring 2014 (patient under surveillance at the Emergency Hospital): swelling of the limb, inoculation eschar surrounded by erythema; **b:** Insect bite in spring 2013: inoculation eschar, lymphadenitis, cutaneous rash; **c:** Clinical picture at 5 h after the insect bite: important edema, bullae, intense erythema distributed to the entire limb.

No specific therapeutic options for black fly hypersensitivities are available. Antihistamines covering the whole late spring-early summer period could be an option, along with keeping the risk of re-sting as low as possible. Desensitization is not available as a standard decision. The regular use of repellents should be recommended to the patient. Since this case is unique due to

appearing in a patient from the North-Eastern region of Romania and no other similar cases have been reported so far in English literature, as far as we know, we believe that general medicine doctors, dermatologists and medical doctors working in the Emergency Units should to be aware of the disease.

Conflict of interest

The authors have no conflict of interest to declare.

Anca Chiriac^{a,b,c}, Piotr Brzezinski^d, Liviu Miron^e,
Cosmin Moldovan^{f,*}, Cristian Podoleanu^g, Simona Stolnicu^h

^a Department of Dermato-Physiology, Apollonia University, Iasi, Romania

^b Department of Dermatology, Nicolina Medical Center, Iasi, Romania

^c "P. Poni" Institute of Macromolecular Chemistry, Iasi, Romania

^d Department of Dermatology, 6th Military Support Unit, Ustka, Poland

^e Faculty of Veterinary Medicine, "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine, Iasi, Romania

^f Department of Histology, University of Medicine and Pharmacy of Tirgu Mures, Tirgu Mures, Romania

^g Department of Cardiology, University of Medicine and Pharmacy of Tirgu Mures, Tirgu Mures, Romania

^h Department of Pathology, University of Medicine and Pharmacy of Tirgu Mures, Tirgu Mures, Romania

* Corresponding author. Department of Histology, University of Medicine and Pharmacy of Tirgu Mures, 38 Gheorghe Marinescu Street, Tirgu Mures 540139, Romania.

E-mail address: cosmin.moldovan@outlook.com (C. Moldovan).

References

- Dinulescu G. [Fauna Republicii Socialiste Romania. Diptera: Simuliidae (mustele columbase), XI, 8]. Bucharest: Editura Academiei Republicii Socialiste Romania; 1966 (in Romanian).
- Borah S, Goswami S, Agarwal M, Rahman I, Deka M, Chattopadhyay P, et al. Clinical and histopathological study of Simulium (blackfly) dermatitis from North-Eastern India—a report. *Int J Dermatol* 2012;**51**:63–6.
- Orange JS, Song LA, Twarog FJ, Schneider LC. A patient with severe black fly (Simuliidae) hypersensitivity referred for evaluation of suspected immunodeficiency. *Ann Allergy Asthma Immunol* 2004;**92**:276–80.
- Gudgel EF, Grauer FH. Acute and chronic reactions to black fly bites; Simulium fly. *AMA Arch Derm Syphilol* 1954;**70**:609–15.
- Werner D, Pont AC. Dipteran predators of simuliid black flies. A worldwide review. *Med Vet Entomol* 2003;**7**:115–32.
- Chattopadhyay P, Goyary D, Dhiman S, Rabha B, Hazarika S, Veer V. Immunomodulating effects and hypersensitivity reactions caused by Northeast Indian black fly salivary gland extract. *J Immunotoxicol* 2014;**11**:126–32.
- Dăncescu P. An invasion of insect *Simulium columbase* (Diptera, Simuliidae) described in an old Romanian chronicle. *Rev Med Chir Soc Med Nat Iasi* 2002;**107**:424–6.
- Brúderová T, Kúdela M. *Simulium colombase* and *S. voilense* (Diptera, Simuliidae) in Slovakia and Austria. *Folia Faunistica Slovaca* 2012;**17**:133–8.
- Farkas J. Simuliosis. Analysis of dermatological manifestations following blackfly (Simuliidae) bites as observed in the years 1981–1983 in Bratislava (Czechoslovakia). *Derm Beruf Umwelt* 1984;**32**:171–3.

Received 26 October 2015

Received in revised form 23 November 2015

Accepted 25 November 2015

Available online xxx