

Night of the Living Thrips: An Unusual Outbreak of Thysanoptera Dermatitis

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PRACTICE POINTS

- Thysanoptera dermatitis presents as a diffuse cutaneous eruption consisting of scattered pruritic papules to exposed skin surfaces.
- The importance of considering the environmental component of a cutaneous eruption via a thorough understanding of local flora and fauna cannot be underestimated.
- The role of a dermatologist in the rapid identification of a cutaneous eruption in the setting of an acute cluster outbreak is of utmost importance to assist with eliminating infectious and environmental public health threats from the differential diagnosis.

Identifying the etiology of a cutaneous eruption in the setting of an acute cluster outbreak is of utmost importance due to the inherent potential public health impact. The differential diagnosis ranges from innocuous arthropod bites to more concerning causes such as infection, medication reaction, and environmental exposure. We report the simultaneous presentation of 15 US Marines who presented with numerous discrete papular skin eruptions. Subsequent thorough patient evaluation and history, literature review,

immunization status reconciliation, entomological assessment, site survey, and skin biopsy were performed. This case series is one of the largest reported to date of a cluster outbreak of a papular dermatitis secondary to bites from thrips (ie, insects of the order Thysanoptera).

Cutis. 2016;97:E13-E16

Case Reports

A platoon of 24 US Marines participated in a 1-week outdoor training exercise (February 4–8) at the Marine Corps Training Area Bellows in Oahu, Hawaii. During the last 3 days of training, 15 (62.5%) marines presented to the same primary care provider with what appeared to be diffuse scattered lesions on the face, neck, and dorsal aspect of the hands. All 15 patients reported that they noticed the lesions upon waking up the morning after their second night at the training area. The patients were unable to recollect specific direct arthropod interactions, but they reported the presence of “bugs” in the training area and denied use of any insect repellents, insect nets, or sunscreen. Sleeping arrangements varied from covered vehicles and cots to sleeping bags on the ground, which were laundered independently by each marine and thereby were ruled out as a commonality. The patients denied working with any chemicals or cleansers while in the field. Further

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The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Navy, Department of Defense, or the US Government.

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questioning of all 15 patients revealed a history of extended contact with live foliage as branches were broken off to build camouflaged sites.

The following week, a second platoon of 20 marines occupied a separate undisturbed portion of the same training area for a similar 1-week training evolution. Manifestation of similar symptoms among members of the second group, who had no contact with the initial 15 patients, supported the likely environmental etiology of the eruptions.

Referral—Two patients from the first group were evaluated at the dermatology clinic at Tripler Army Medical Center (Honolulu, Hawaii) on day 10 of the initial outbreak. Cutaneous examination revealed numerous discrete, pink-red, well-circumscribed, 2- to 4-mm, dome-shaped papules exclusive to exposed areas on the face, neck, and dorsal aspect of the hands (Figures 1 and 2). Anemic halos surrounding the hand papules were noted (Figure 2). A punch biopsy in both patients revealed spongiotic dermatitis with superficial perivascular and interstitial lymphohistiocytic inflammation with eosinophils, suggestive of an arthropod bite (Figure 3). No retained arthropod parts were identified. Both patients were treated with triamcinolone ointment twice daily for 7 days with total resolution of the lesions.

Site Survey Results—Five days following the initial presentation of the first outbreak, a daytime site survey of the training area was conducted by a medical entomologist, an environmental health scientist, and a wildlife biologist. Records indicated that prior to the current utilization, the training area had not been used for 9 months. Approximately half of the training area was covered with mixed scrub vegetation and the remainder was clear pavement or sand (clear of vegetation). Feral hogs (*Sus scrofa*), cats (*Felis domesticus*), and mongooses (*Herpestes javanicus*) were observed at the site. Patient interviews and site survey ruled out a number of potential environmental irritants, including contact with fresh or salt water and chemical contaminants in the air or soil.

Because biting insects were suspected as the cause of the eruptions, an overnight entomological survey was conducted 3 weeks after the first outbreak under similar weather conditions and was centered in the area of an Australian pine (*Casuarina equisetifolia*) forest where most of the marines had slept during training. Mosquitoes (*Aedes albopictus* and *Culex quinquefasciatus*) were observed in the area, with an estimated biting rate of 1 to 2 bites per hour. Centipedes (*Scolopendra subspinipes*) were commonly observed after dark. There was no sign of heavy bird roosting or nesting, which would be a possible source of biting ectoparasites. Other than the

Australian pine, notable vegetation present included Christmasberry (*Schinus terebinthifolius*), koa haole (*Leucaena leucocephala*), and Chinese banyan (*Ficus microcarpa*). A survey of the vegetation uncovered no notable insects, and no damage to the leaves of the Chinese banyans, which is typical of thrip infestation, was noted.



Figure 1. Numerous well-circumscribed, discrete, pink-red papules diffusely scattered across the face.



Figure 2. Papules with classic anemic halos.

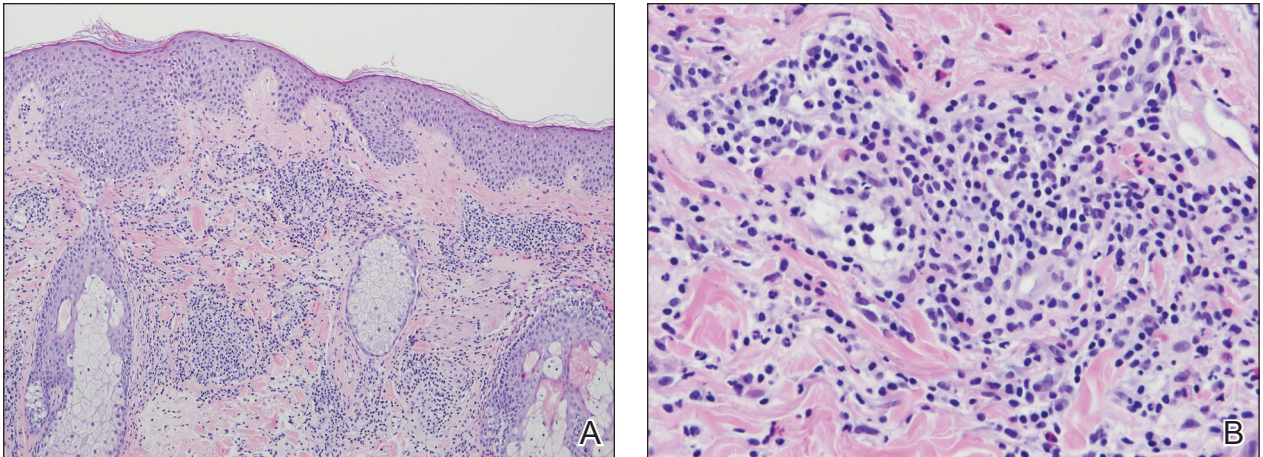


Figure 3. Superficial and deep perivascular and interstitial dermatitis (A)(H&E, original magnification $\times 10$) with lymphocytic predominance (B)(H&E, original magnification $\times 40$).

After completion of a resource-intensive investigation that included site survey, literature review, detailed patient history including thrips-associated skin manifestations, and thorough consultation with local dermatologists and entomologists, the findings seemingly pointed to thrips as the most likely etiology of the eruption seen in our patients and a diagnosis of Thysanoptera dermatitis was made.

Comment

Thrips are small winged insects in the order Thysanoptera, which comprises more than 5000 identified species ranging in size from 0.5 to 15 mm, though most are approximately 1 mm.¹ The insects typically are phytophagous (feeding on plants) and are attracted to humidity and seemingly the sweat of animals and humans.² Although largely a phytophagous organism, a few published cases of thrips exposure reported papular skin eruptions known as Thysanoptera dermatitis.³⁻⁸ Several species of thrips across the globe have been associated with incidental attacks on humans to include “*Heliothrips indicus* Bagnall, a cotton pest of the Sudan; *Thrips imagines* Bagnall, reported in Australia; *Limothrips cerealium* (Haliday), in Germany; *Gynaitkothrips uzeli* Zimmerman, in Algeria; and other species.”⁷ In Hawaii, *Gynaitkothrips ficorum* (Cuban laurel thrips) is a common pest of the Chinese banyan tree (*F microcarpa*) tree.⁹

A case series reported by Goldstein and Skipworth⁵ in the late 1960s of military personnel stationed in Oahu described exposure to similar environmental conditions with resultant lesions that were nearly identical to those seen in our patients.

The final conclusion of the investigation was that Cuban laurel thrips were the likely etiology, though mites also were considered.⁵ In a subsequent commentary in 1968, Waisman¹⁰ reported similar eruptions in hospitalized patients with further comment regarding the nocturnal occurrence of the bites. Additionally, the eruptions were reported to be short lasting and devoid of discomfort, similar to our patient population.¹⁰

Following suit, Aeling⁶ published a case series in 1974 depicting several service members who presented with symptoms that were nearly identical to the symptoms experienced by our patients as well as those of Goldstein and Skipworth.⁵ The investigator coined the term *hypoanesthetic halos in Hawaii* to describe the findings and further reported that Hawaiian dermatologists were familiar with the symptoms and clinical presentation of the disease. Patients in this outbreak had observed small flying insects, similar to the reports from our patients, and postulated that the symptoms occurred secondary to insect bites.⁶

Since the report by Goldstein and Skipworth⁵ in 1968, the majority of the literature regarding Thysanoptera dermatitis has largely been in case reports. In 1987, Fishman⁷ reported the case of a 43-year-old woman who presented with a palm-sized area of grouped red puncta on the lateral neck with the subsequent entrapment and identification of a flower thrips from the patient’s clothing. In 2005, Leigh et al² reported the case of a 30-year-old man with an erythematous papular cutaneous eruption on the anterior chest. In this case, the causative etiology was unequivocally confirmed upon

identification of the presence of thrips on biopsy.² In 2006, Guarneri et al¹ reported the case of a 59-year-old farmer who had tentatively been diagnosed with delusional parasitosis until persistent presentation to a dermatologist for evaluation enabled the capture and identification of grain thrips. More recently, another case of likely Thysanoptera dermatitis was published in 2012 after a man presented with a slide-mounted thrip from his skin for evaluation as to a potential cause of a recurrent rash he had been experiencing.¹¹ In all of these cases, it was fortunate that a specific organism could be identified for 2 reasons: (1) members of the order Thysanoptera have a biological cycle of only 11 to 36 days, and (2) thrips may go virtually unnoticed by humans, as they are often difficult to see due to their small size.^{2,12} Perhaps the most extensive report, however, comes from Childers et al⁸ in a descriptive case series published in 2005. In this report, the investigators provided a thorough detailing of multiple encounters dating back to 1883 through which patients were inadvertently exposed to various species of thrips and subsequently presented with arthropod bites.

Conclusion

The rapid and clustered manner of patient presentation in this case series makes it unique and highlights the need for further consideration of Thysanoptera dermatitis as a potential etiology for an outbreak of a papular eruption. Further reporting may help to better contextualize the true epidemiology of the condition and subsequently may trigger its greater inclusion in the differential diagnosis for a pruritic papular eruption.

Acknowledgments—We would like to extend our appreciation to Amy Spizuoco, DO (New York,

New York), for her assistance with the initial diagnosis; Steve Montgomery, PhD (Honolulu, Hawaii), for his assistance with further entomological discussion of potential etiologies; and John R. Gilstad, MD (Honolulu, Hawaii), for contributing his thoughts on the differential diagnosis of the presenting symptoms.

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