

Asteraceae Dermatitis: Everyday Plants With Allergenic Potential

Carly E. Wallace, DO; Dirk M. Elston, MD

PRACTICE POINTS

- Asteraceae dermatitis can occur from direct contact with plants of the Asteraceae family; through airborne pollen; or from exposure to topical medications, cooking products, and cosmetics.
- Patient education on primary prevention, especially protective clothing, is crucial, as these plants are ubiquitous outdoors and have diverse phenotypes.
- Management of mild Asteraceae dermatitis consists primarily of topical corticosteroids and calcineurin inhibitors, while systemic corticosteroids and other immunosuppressive agents are utilized for severe or recalcitrant cases.

The Asteraceae (formerly Compositae) family of plants is the second largest family of flowering plants, accounting for 10% of all flowers as well as numerous herbs, weeds, and vegetables. In North America, Asteraceae dermatitis classically manifests as seasonal allergic contact dermatitis, often localized to the upper extremities. This review explores the etiology, cutaneous manifestations, and management of Asteraceae dermatitis.

The Asteraceae (formerly Compositae) family of plants is derived from the ancient Greek word *aster*, meaning “star,” referring to the starlike arrangement of flower petals around a central disc known as a capitulum. What initially appears as a single flower is actually a composite of several smaller flowers, hence

the former name Compositae.¹ Well-known members of the Asteraceae family include ornamental annuals (eg, sunflowers, marigolds, cosmos), herbaceous perennials (eg, chrysanthemums, dandelions), vegetables (eg, lettuce, chicory, artichokes), herbs (eg, chamomile, tarragon), and weeds (eg, ragweed, horseweed, capeweed)(Figure 1).²

There are more than 25,000 species of Asteraceae plants that thrive in a wide range of climates worldwide. Cases of Asteraceae-induced skin reactions have been reported in North America, Europe, Asia, and Australia.³ Members of the Asteraceae family are ubiquitous in gardens, along roadsides, and in the wilderness. Occupational exposure commonly affects gardeners, florists, farmers, and forestry workers through either direct contact with plants or via airborne pollen. Furthermore, plants of the Asteraceae family are used in various products, including pediculicides (eg, insect repellents), cosmetics (eg, eye creams, body washes), and food products (eg, cooking oils, sweetening agents, coffee substitutes, herbal teas).⁴⁻⁶ These plants have substantial allergic potential, resulting in numerous cutaneous reactions.

Allergic Potential

Asteraceae plants can elicit both immediate and delayed hypersensitivity reactions (HSRs); for instance, exposure to ragweed pollen may cause an IgE-mediated type 1 HSR manifesting as allergic rhinitis or a type IV HSR manifesting as airborne allergic contact dermatitis.^{7,8} The main contact allergens present in Asteraceae plants are sesquiterpene lactones, which are found in the leaves, stems, flowers, and pollen.⁹⁻¹¹ Sesquiterpene lactones

Dr. Wallace is from the Medical College of Georgia, Augusta. Dr. Elston is from the Department of Dermatology & Dermatologic Surgery, Medical University of South Carolina, Charleston.

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Correspondence: Carly E. Wallace, DO, Medical College of Georgia, 1120 15th St, BI 5070, Augusta, GA 30912 (cwallace55295@med.lem.edu).

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FIGURE 1. Members of the Asteraceae family. A, Black-eyed Susan (*Rudbeckia hirta*). B, Purple coneflower (*Echinacea purpurea*). C, Indian blanket (*Gaillardia pulchella*). D, Oxeye daisy (*Leucanthemum vulgare*).

consist of an α -methyl group attached to a lactone ring combined with a sesquiterpene.¹² Patch testing can be used to diagnose Asteraceae allergy; however, the results are not consistently reliable because there is no perfect screening allergen. Patch test preparations commonly used to detect Asteraceae allergy include Compositae mix (consisting of *Anthemis nobilis* extract, *Chamomilla recutita* extract, *Achillea millefolium* extract, *Tanacetum vulgare* extract, *Arnica montana* extract, and parthenolide) and sesquiterpene lactone mix (consisting of alantolactone, dehydrocostus lactone, and costunolide).

In North America, the prevalence of positive patch tests to Compositae mix and sesquiterpene lactone mix is approximately 2% and 0.5%, respectively.¹³ When patch testing is performed, both Compositae mix and sesquiterpene lactone mix should be utilized to minimize the risk of missing Asteraceae allergy, as sesquiterpene lactone mix alone does not detect all Compositae-sensitized patients. Additionally, it may be necessary to test supplemental Asteraceae allergens, including preparations from specific plants to which the patient has been exposed. Exposure to Asteraceae-containing cosmetic products

may lead to dermatitis, though this is highly dependent on the particular plant species involved. For instance, the prevalence of sensitization is high in arnica (tincture) and elecampane but low with more commonly used species such as German chamomile.¹⁴

Cutaneous Manifestations

Asteraceae dermatitis, which also is known as Australian bush dermatitis, weed dermatitis, and chrysanthemum dermatitis,² can manifest on any area of the body that directly contacts the plant or is exposed to the pollen. Asteraceae dermatitis historically was reported in older adults with a recent history of plant exposure.^{6,15} However, recent data have shown a female preponderance and a younger mean age of onset (46–49 years).¹⁶

There are multiple distinct clinical manifestations of Asteraceae dermatitis. The most common cutaneous finding is localized vesicular or eczematous patches on the hands or wrists. Other variations include eczematous rashes on the exposed skin of the hands, arms, face, and neck; generalized eczema; and isolated facial eczema.^{16,17} These variations can be attributed to contact dermatitis caused by airborne pollen, which may mimic photodermatitis. However, airborne Asteraceae dermatitis can be distinguished clinically from photodermatitis by the involvement of sun-protected areas such as the skinfolds of the eyelids, retroauricular sulci, and nasolabial folds (Figure 2).^{2,9} In rare cases, systemic allergic contact dermatitis can occur if the Asteraceae allergen is ingested.^{2,18}

Other diagnostic clues include dermatitis that flares during the summer, at the peak of the growing season, with remission in the cooler months. Potential risk factors include a childhood history of atopic dermatitis and allergic rhinitis.¹⁶ With prolonged exposure, patients may develop chronic actinic dermatitis, an immunologically mediated photodermatosis characterized by lichenified and pruritic eczematous plaques located predominantly on sun-exposed areas with notable sparing of the skin folds.¹⁹ The association between Asteraceae dermatitis and chronic actinic dermatitis is highly variable, with some studies reporting a 25% correlation and others finding a stronger association of up to 80%.^{2,15,20} Asteraceae allergy appears to be a relatively uncommon cause of photoallergy in North America. In one recent study, 16% (3/19) of patients with chronic actinic dermatitis had positive patch or photopatch tests to sesquiterpene lactone mix, but in another large study of photopatch testing it was reported to be a rare photoallergen.^{21,22}

Parthenium dermatitis is an allergic contact dermatitis caused by exposure to *Parthenium hysterophorus*, a weed of the Asteraceae family that is responsible for 30% of cases of contact dermatitis in India.^{23,24} Unlike the more classic manifestation of Asteraceae dermatitis, which primarily affects the upper extremities in cases from North America and Europe, Parthenium dermatitis typically occurs in an airborne pattern distribution.²⁴



FIGURE 2. Characteristic sparing of the shaded areas of the face in airborne Asteraceae dermatitis.

Management

While complete avoidance of Asteraceae plants is ideal, it often is unrealistic due to their abundance in nature. Therefore, minimizing exposure to the causative plants is recommended. Primary preventive measures such as wearing protective gloves and clothing and applying bentonite clay prior to exposure should be taken when working outdoors. Promptly showering after contact with plants also can reduce the risk for Asteraceae dermatitis.

Symptomatic treatment is appropriate for mild cases and includes topical corticosteroids and calcineurin inhibitors. For severe cases, systemic corticosteroids may be needed for acute flares, with azathioprine, mycophenolate, cyclosporine, or methotrexate available for recalcitrant disease. Verma et al²⁵ found that treatment with azathioprine for 6 months resulted in greater than 60% clearance in all 12 patients, with a majority achieving 80% to 100% clearance. Methotrexate has been used at doses of 15 mg once weekly.²⁶ Narrowband UVB and psoralen plus UVA have been effective in extensive cases; however, care should be exercised in patients with photosensitive dermatitis, who instead should practice strict photoprotection.^{27–29} Lakshmi et al³⁰ reported the use of cyclosporine during the acute phase of Asteraceae dermatitis at a dose of 2.5 mg/kg daily for 4 to 8 weeks. There have been several case reports of dupilumab treating allergic contact dermatitis; however, there have been 3 cases of patients with atopic dermatitis developing Asteraceae dermatitis while taking dupilumab.^{31,32} Recently, oral Janus kinase inhibitors have shown success in treating refractory cases of airborne Asteraceae dermatitis.^{33,34} Further research is needed to determine the safety and efficacy of dupilumab and Janus kinase inhibitors for treatment of Asteraceae dermatitis.

Final Thoughts

The Asteraceae plant family is vast and diverse, with more than 200 species reported to cause allergic contact dermatitis.¹² Common modes of contact include gardening, occupational exposure, airborne pollen, and use of pediculicides and cosmetics that contain components of Asteraceae plants. Educating patients on how to minimize

contact with Asteraceae plants is the most effective management strategy; topical agents and oral immunosuppressives can be used for symptomatic treatment.

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