

# Occupational Contact Urticaria and Late-Phase Bronchial Asthma Caused by Compositae Pollen in a Florist

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**Insect-pollinated members of the plant family Compositae (Asteraceae) rarely cause immediate-type hypersensitivity disease; however, this may have quite disabling consequences, which is shown by the case of a 42-year-old female florist. She developed contact urticaria later accompanied by rhinoconjunctivitis and bronchial asthma with maximum obstruction occurring some hours after the end of occupational exposure to the causative Compositae pollens of, for example, dandelions, blazing star, golden rod, yarrow, *Aster* spp, chrysanthemums, and marguerite. Skin testing revealed immediate-type hypersensitivity to several members of the above-mentioned plant family confirmed by demonstration of specific IgE antibodies. Bronchial provocation testing yielded a positive response with all 4 pollen extracts tested. The patient had to give up work in a flower shop, because sufficient avoidance of airborne inhalant exposure was not considered practical.**

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Although allergic rhinitis and bronchial asthma caused by pollens of wind pollinated Compositae (Asteraceae), especially to mugwort pollen (*Artemisia vulgaris* L.), are common, symptomatic immediate-type hypersensitivity to pollens of insect pollinated members of this plant family is relatively rare.<sup>1-3</sup>

## Case History

A 42-year-old woman florist presented, after 8 medically uneventful years in her occupation, with a history of itching, burning and redness of the skin within minutes after

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Some people talk *to* plants. Fewer people think plants talk *to them*. We want to talk *about* plants, and we hope that you will not only want to listen, but also, perhaps, you will even occasionally talk to us about plants.

Plants can cause an array of reactions in members of *Homo sapiens*, and in the course of this quarterly feature, we will provide reviews and/or commentary on common reactions to common plants, uncommon reactions to uncommon plants, and many reactions in-between. Plants and their derivatives have the potential not only to harm the skin, but also to ameliorate skin disease, and we welcome papers that concern either of these aspects of plants. If an occasional column is not necessarily practical, we hope it will be enjoyable.

contact to freshly picked dandelions (*Taraxacum officinale* L.), lasting a few hours. Previous atopic diseases (symptoms of allergic rhinoconjunctivitis, bronchial asthma, or atopic eczema) were denied both concerning her personal and the family history. Several weeks later, whealing not confined to the site of contact alone was induced by pollen of several other Compositae species (e.g., blazing star [*Liatis spicata* L.], golden rod [*Solidago virgaurea* L.], yarrow [milfoil; *Achillea millefolium* spp.], *Aster* spp., chrysanthemums [*Dentranthema x hortorum*], and ox-eye daisy [marguerite; *Leucanthemum vulgare* Lam.]). Additionally, conjunctival itching and sneezing was noted. Symptoms slowly progressed to attacks of mild bronchial asthma, mainly in the evenings and early at night, approximately 8 to 14 hours after cessation of allergen exposure. Eczematous lesions never developed at the sites of skin contact.

Physical examination of skin and chest was unremarkable, including normal red dermographism. Skin prick tests with extracts of 30 common inhalant allergens (Bencard, SmithKline Beecham, Munich, Germany) revealed strong positive reactions to pollen of chrysanthemum, aster, golden rod, and marguerite. Other positive reactions were noted to several grass, herb, and tree pollens, including mugwort, without current clinical relevance. Total IgE was 70 kU/L, specific antibodies were found against several

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**Table 1.** Skin Test and Laboratory Results in a Female Florist

| <i>Plant Species/Part</i> | <i>Skin Prick Test</i> | <i>Skin Provocation</i> | <i>Bronchial Provocation</i> | <i>Specific IgE: kU/L (CAP class)</i> |
|---------------------------|------------------------|-------------------------|------------------------------|---------------------------------------|
| Golden rod pollen         | ++                     | Positive                | Positive                     | 3,79 (3)*                             |
| Golden rod                | NT                     | NT                      | NT                           | 0 (0)                                 |
| Blossom and leaf          |                        |                         |                              |                                       |
| Chrysanthemum             | +++                    | (Negative)†             | Positive                     | 3,53 (3)                              |
| Pollen                    |                        |                         |                              |                                       |
| Chrysanthemum             | NT                     | NT                      | NT                           | 0 (0)                                 |
| Blossom and leaf          |                        |                         |                              |                                       |
| Aster pollen              | +++                    | NT                      | Positive                     | 3,53 (2)                              |
| Marguerite pollen         | ++                     | NT                      | Positive                     | 6,69 (3)                              |
| Dandelion pollen          | ++                     | NT                      | NT                           | 3,59 (3)                              |

\*Class 3 and more generally considered clinically important

†Not yet blossoming at the time of skin testing

Abbreviations: NT, not tested; ++, wheal and flare as in positive control (histamine); +++, markedly stronger reaction than positive control, pseudopodia.

Compositae pollens, but not to other parts of the plant (Table 1) (CAP System IgE-FEIA,<sup>4</sup> Pharmacia AB Diagnostics, Uppsala, Sweden). As an epidermal provocation test, 10 gentle strokes with a blossom of golden rod on the volar forearm produced a positive reaction with wheal, erythema, and itching within 15 minutes; control tests in 5 healthy volunteers had negative results.

Baseline pulmonary function revealed normal resistance and diffusion capacity, which remained unremarkable also at ergospirometric examination (maximum: 100 W). Bronchopulmonary provocation was performed with allergen extracts of pollen as used for skin testing (diluted 1:10); for results see Table 1. Nonspecific reactivity to the test solution was excluded by bronchopulmonary provocation with the vehicle alone. Because the results of spirometric examination are highly dependent on the patient's ability (and willingness) to cooperate, whole-body pletysmography yields reliable results and is a preferred method, especially in a medicolegal context. With the allergen extracts only, a significant increase of specific resistance accompanied by rhinoconjunctival symptoms and transient urticaria was noted: from 0.83 to 2.15 kPa/s with aster, from 0.91 to 2.4 kPa/s with chrysanthemum, from 0.94 to 3.7 kPa/s with golden rod, and from 0.89 to 3.84 kPa/s with marguerite pollen, after 7 to 16 respirations. To avoid severe iatrogenic late-phase reactions as noted in the patient's history, a bronchodilator (ipratropium bromide and fenoterol-HBr aerosol) was applied immediately after each positive provocation, with sufficient washout time allowed before the next provocation. Thus, no attempt was made to reproduce late-phase reactions, which were indeed abolished by bronchodilator treatment.

## Discussion

Pollen of chrysanthemums and related species of the Compositae family are known to produce immunologic<sup>1-3</sup> immediate-type hypersensitivity. Surprisingly, this is not un-

common even on a population level: In a sample of university students, 23% had positive skin prick test responses to pollen of Compositae or other ornamental plants that were, however, clinically irrelevant in all persons. Not surprisingly, florists and gardeners, who are much more heavily exposed, can develop not only latent immediate-type hypersensitivity, but also respiratory and/or urticarial skin symptoms.<sup>1-3,5,6</sup> As an example, Paulsen et al<sup>3</sup> reported contact urticaria only in 4, respiratory symptoms only in 3, and both contact urticaria and respiratory symptoms (which were not verified by provocation testing) in 3 of 16 subjects with positive prick test results from a sample of 82 gardeners and greenhouse workers. Piirilä et al<sup>2</sup> presented 4 florists and gardeners, including one with combined allergic asthma and contact urticaria caused by chrysanthemum pollen.

Immediate-type hypersensitivity to several members of the Compositae family, including mugwort as a common weed (as found in our patient), has been reported before.<sup>5</sup> Patients should be counseled about potential cross-sensitivity, namely to food allergens like celery and some spices, in this case.

In our patient (and also in the majority of those with systemic reactions reported by de Jong et al<sup>5</sup>), this rare manifestation of Compositae pollen sensitization had disabling consequences; she had to give up the job she had been trained in and working in for many years. If she had been a gardener and greenhouse worker, the use of special protective equipment, including filter-masks, could have been considered,<sup>1</sup> but such equipment was not thought to be acceptable in a shop environment.

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