

Case report

Occupational allergic contact urticaria to yucca (*Yucca aloifolia*), weeping fig (*Ficus benjamina*), and spathe flower (*Spathiphyllum wallisii*)

Background: Occupational contact urticaria (CU) from plants is often reported, but it is less often attributed to decorative houseplants. We present an atopic gardener and caretaker of plants who developed CU when occupationally exposed to weeping fig, spathe flower, and yucca.

Methods: Sensitization was evaluated by skin prick tests (SPT) and analyses for IgE antibodies.

Results: SPT were positive to all three plants, and IgE antibodies were found to weeping fig and spathe flower. SPT were also performed with several decorative houseplants in more than 600 patients. Positive SPT was found to weeping fig (12%), African milk tree (8.3%), yucca (5.8%), Chinese rose (4.7%), massangana (4.6%), bird's nest fern (3.2%), and spathe flower (3.2%).

Conclusions: Our study indicates that SPT and tests for IgE antibody are useful in detecting occupational CU caused by houseplants.

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Hundreds of plants have caused type I allergy (1). Occupational contact urticaria (CU) from plants is also often reported (1), but it is less often attributed to decorative houseplants (1–19). We present a patient with occupational CU from weeping fig (2, 4, 5, 10), spathe flower (7, 10, 11), and yucca. We have not found earlier reports on allergy to yucca.

Case report and Methods

A 22-year-old male gardener and caretaker of plants developed CU and rhinoconjunctivitis when exposed to decorative houseplants. He had worked in his present job for 15 months before skin symptoms developed on the eyelids and lower arms, and later spread to the hands and the entire skin. Contact with especially weeping fig, yucca, and spathe flower caused immediate skin symptoms. He underwent allergologic investigation half a year later. Occasionally, he had had work-related hand dermatitis, developing as a consequence of CU, and conforming to protein contact dermatitis. Prick tests were performed with standard environmental allergens, including natural rubber latex (NRL), and with decorative flowers (10, 11) and vegetables. The following prick test reactions were recorded (diameter

of wheal in parentheses): histamine hydrochloride 10 mg/ml (5 mm = 3+), birch (6 mm plus pseudopodia; [ps]), alder (3 mm), willow (*Salix*) (4 mm), meadow fescue (*Festuca pratensis*) (7 mm plus ps), and timothy (4 mm). Histamine-size reactions in a series of vegetables were provoked by potato, carrot, and onion. NRL was negative.

Prick tests with decorative flowers, including spathe flower, weeping fig, and yucca, were conducted as previously described (10, 11). A piece of leaf was slightly crushed and broken with a knife, and a broken piece of the plant was then applied on the skin in a drop of water. Prick testing was then performed through the leaf. Pollen was tested as is in a drop of water. The prick test substances were prepared and used on the same day as the prick testing was performed.

Yucca (leaves), spathe flower (*Spathiphyllum wallisii*; leaves and pollen) (10, 11), and weeping fig (*Ficus benjamina*; leaves) (2, 4, 5, 10) caused strong allergic prick test reactions (diameter the size of histamine or larger plus pseudopodia), indicating occupational immediate allergy. Commercial (Pharmacia, Sweden) and "homemade" (10, 11) radioallergosorbent tests (RAST) were performed, as previously described, with spathe flower, weeping fig, and yucca. Elevated levels

Table 1. Frequency of allergic skin prick test reactions in 1997–99 to series of decorative houseplants

Plant	Latin name	Positive/tested	% positive
Weeping fig	<i>Ficus benjamina</i>	77/640	12%
African milk tree	<i>Euphorbia trigona</i> (<i>E. abyssinica</i>)	51/616	8.3%
Yucca (syn. Spanish bayonet, dagger plant)	<i>Yucca aloifolia</i>	37/634	5.8%
Chinese rose (butterfly)	<i>Hibiscus rosa sinensis</i>	29/618	4.7%
Massangana/corn plant	<i>Dracaena fragrans</i>	26/621	4.6%
Bird's nest fern	<i>Asplenium nidus</i>	20/616	3.2%
Spathe flower	<i>Spathiphyllum wallisii</i>	20/622	3.2%

(class 2) of specific IgE antibodies of birch, spathe flower, and weeping fig were detected by RAST. Total IgE was slightly elevated at 169 kU/l (normal <110). A challenge test with leaves of yucca, spathe flower, and weeping fig on the eczematous skin of the patient resulted in itching and whealing. Prick tests with yucca, spathe flower, and weeping fig were performed as above on 20 unexposed controls, with negative results.

Two patch test sessions were then performed according to the recommendations of the ICDRG. In the first patch test session, methylchloroisothiazolinone/methylisothiazolinone (Kathon CG, 100 ppm; Chemotechnique Diagnostics, Malmö, Sweden) provoked a 2+ allergic patch test reaction in a modified European standard series, whereas the others were negative. A series of plant allergens and chemicals containing mainly allergens from Hausen (20, 21), as well as a series of pesticides (Trolab[®] Hermal, Reinbek, Germany), was negative. The patient later developed iatrogenic patch test sensitization to 2-monomethylphenol and mansonnone A (22).

The patient was symptomless during our investigations, but a work trial showed that he could not continue in his job as gardener, and retraining was thus recommended. Our final diagnosis was occupational CU caused by weeping fig, yucca, and spathe flower.

We also analyzed the prick test results of a decorative flowers series at the Skin and Allergy Hospital, Helsinki University Central Hospital (Table 1). Patients with exposure to decorative flowers were prick tested (prick-prick test method) (11). Reactions were classified as positive if the diameter of the wheal was ≥ 3 mm. The study showed that weeping fig (12%) caused the greatest number of positive prick test reactions, followed by African milk tree (8.3%) and yucca (5.8%). The clinical relevance of the individual prick test reactions was not determined.

Discussion

Our patient was highly atopic and showed allergic prick test reactions to common environmental allergens, food allergens, and plant allergens. However, it was evident that specific sensitization to plant allergens had occurred, as he had been working for 15 months with the same plants before the symptoms, and apparently

the sensitization, occurred. We did not perform studies to investigate cross-reactivity, but part of the prick test reactions apparently represented cross-allergy. In any case, the patient had a history of exposure; positive prick test reactions to spathe flower, weeping fig, and yucca, and clinical evidence of CU to these plants. He also had elevated IgE to spathe flower and weeping fig. The RAST to yucca leaves was negative. The most likely explanation is that prick tests are more sensitive than the RAST. Other reasons may be that the prick test reaction mechanism to yucca is different from the reaction provoked by spathe flower and weeping fig; for example, the IgE could be locally distributed in the skin only, and not in the blood, as has been suggested for protein contact dermatitis (23). Another explanation is that the



Figure 1. Yucca (*Yucca aloifolia*).

allergen would not stick to the RAST disks. This is less likely, as IgE was demonstrated with the immunospot method in six out of 10 sera from yucca patients skin test positive (Mäkinen-Kiljunen, unpublished data).

Weeping fig (*F. benjamina*) is a well-known cause of immediate allergy to decorative houseplants, including occupational allergy and occupational CU (2, 4, 5, 10). Weeping fig often cross-reacts with NRL (1). Prick tests are more sensitive than *in vitro* methods (RAST, CAP-RAST), but our patient was positive in both. Weeping fig should not be kept in the homes of atopic or NRL-allergic persons.

Three earlier reports have described allergy to spathe flower (7, 10, 11). In IgE immunoblotting, one heavy band was detected at about 14 kDa (11). An IgE-binding protein with a molecular mass of 14 kDa has been identified as profilin in several plant species (trees, grasses, and weeds), and it has been suggested that it is a plant panallergen (24). It is likely that at least some of the prick test reactions of our patient represented cross-allergy. Interestingly, our previously reported patient with allergy to spathe flower also related his symptoms to exposure to spathe flower, yucca, and weeping fig (10). The yucca plant belongs to the Agavaceae family, and comprises about 40 different species native to Central America and Mexico, the Caribbean, and the

southern USA. They are related to plants of the *Dracaena* genus, which are also popular decorative flowers in Finland, and which frequently provoke positive prick test reactions (Table 1). In Finland, four yucca species, *Yucca aloifolia* (Fig. 1), *Y. gloriosa*, *Y. elephantipes* (25), and *Y. filamentosa*, are commonly cultivated. Yucca and some other Agavaceae plants, such as *Agave americana*, may contain saponin and minute, sharp, irritating crystals of calcium oxalate (26, 27). Plant thorns and splinters from yucca plants may induce deep granulomata (26), but we have not found reports of yucca allergy. As yucca is a popular houseplant, it is worth including yucca in the prick test series of decorative houseplants. Table 1 shows other decorative plants that commonly cause immediate allergy in Finland. The relevance of the positive prick tests in Table 1 was not evaluated, but these tests give information about the exposed patient's prick test reactions. Most of these patients are allergic to at least one decorative flower, although we do not have data on cross-reactivity.

Yucca and many other houseplants that do not produce pollen when cultivated indoors have been considered safe for atopics. Unfortunately, also other parts of houseplants may cause immediate allergy.

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