

SENSITIVITY TO AILANTHUS POLLEN

WITH REPORT OF TWO CLINICALLY SENSITIVE PATIENTS

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IN A previous communication¹ it was reported that the unusual tree pollens not routinely used in skin testing were of no etiologic significance in precipitating hay fever in or around the Philadelphia district. Since that time, Rowe² has reported a case of pine pollen allergy, Swineford³ has published a case of hay fever due to the catalpa pollen, and Derbes⁴ has cited four patients who were clinically sensitive to the pollen of the linden tree. Clinical sensitivity of two patients to Ailanthus pollen prompted this publication. It also permits a modification of the original conclusion so as to include this and other tree pollens that might, from time to time, prove to be of etiologic significance in precipitating allergic symptoms.

The tree of heaven⁵ (*Ailanthus glandulosa*), also known as the Paradise Tree, Ailanthus, Haven-wood and Chinese Sumach, is native to China but has been widely planted in Ontario, Canada, and northeastern United States. A Jesuit missionary brought it into Europe in 1751,⁶ hoping that it might establish the silk industry on the continent. A Long Island nurseryman introduced this tree to the United States in 1820.⁷ The tree grows rapidly, is not attacked by insects, and tolerates almost any kind of soil and dense shade. The rapid and free growth of the root sprouts makes it almost impossible to eradicate when once established. Only the fertile plant should be used for street planting, as the males exhale a disagreeable odor when flowering and the pollen is said to cause catarrhal trouble.⁸ It is naturalized extensively in the eastern, southern, central, and western parts of Pennsylvania, being rare or entirely absent in the northern part.

The tree of heaven can be distinguished in the winter by its stout twigs which are covered with fine down and conspicuous scattered lenticels, and contain a large, light brown pith. The twigs are roughened by large heart-shaped leaf scars, containing a curved line of bundle scars. In the summer the large alternate leaves, with eleven to fourteen leaflets, which often have glands on the lower surface, are distinctive. The bark cannot be confused with that of any native tree. Flowers appear about June when the leaves are fully developed. Pollination begins in early June and lasts a little over three weeks.

Commercially the tree is relatively unproductive. The wood takes a high polish and may also be used for woodenware and for making charcoal.⁹ The leaves are frequently mixed with sumac leaves, the latter con-

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taining 20 to 35 per cent tannin, and may be utilized in the tanning industry, more especially for the pale colors and soft tanning as for moroccos, roans, and skivers.¹⁰ Two species, *A. sutchuensis* and *A. vilmoriniana* are sometimes planted as the host of a silkworm (*Attacus cynthia*) producing a coarse silk, inferior to that of the common silkworm.⁸

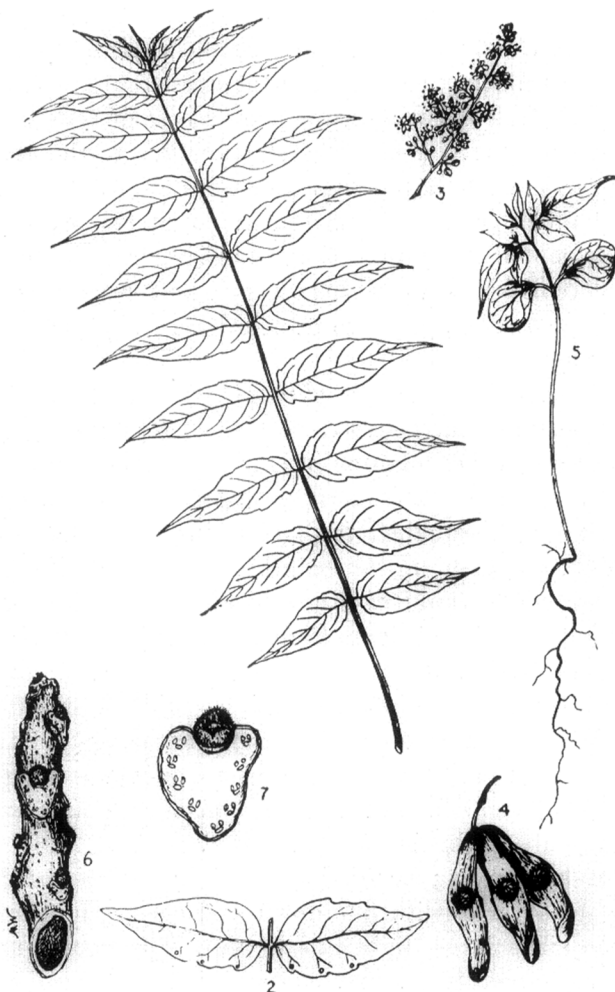


Fig. 1.—Tree of heaven. 1, A mature leaf ($\times \frac{1}{4}$); 2, lower side of two leaflets showing glands ($\times \frac{1}{4}$); 3, a panicle of flowers ($\times \frac{1}{2}$); 4, a small cluster of winged seeds ($\times \frac{1}{2}$); 5, a seedling ($\times \frac{1}{4}$); 6, a winter twig ($\times \frac{1}{2}$); 7, a bud and a leaf scar with bundle scars (natural size).

CASE REPORTS

CASE 1.—S. S., male, aged 51, fruit merchant by occupation, was first seen on May 13, 1936, because of spring and fall hay fever and asthma of seven years' duration. The spring symptoms began in early June and invariably subsided before July 4, while the fall symptoms began in mid-August and continued until late September or until the first frost.

One of the outstanding objective signs of his spring hay fever was the marked conjunctival reaction. The conjunctivitis was one of the earliest signs of hay fever and persisted throughout the period of symptomatology. Bronchial asthma appeared at the height of pollination and persisted for several weeks. He had obtained relief from his fall symptoms by visits to Bethlehem, N. H., Phoenix, Arizona, and San Francisco. A polypectomy was performed in 1933. One brother and one sister were afflicted with ragweed hay fever and asthma.

Skin tests revealed marked reaction to ragweed pollen, slight reactions to timothy and plantain pollen, and negative skin reactions to the usual hay fever causing tree pollens in this locality. Ophthalmic and nasal tests were done with all the grass and tree pollens known to cause clinical hay fever in this area, but negative reactions resulted. This eliminated these pollens¹¹ as etiologic factors and suggested either an unusual pollen or mold as the probable offending agent. Skin and nasal tests with all the mold extracts available proved negative, thus suggesting that his symptoms were due to an unusual pollen.

Phylactic treatment with extracts of timothy and plantain pollen during the 1936 season failed to afford any relief whatsoever. Symptoms began on May 29 and subsided on June 24. During the following season he was treated with oak and sycamore pollen extracts in addition to timothy and plantain, since these trees pollinated at or about the time that clinical symptoms appeared. Symptoms of similar severity and duration made their appearance on May 26, 1937, and subsided on June 23, 1937. In 1938 treatment with timothy and plantain pollen extracts again failed to afford relief, symptoms appearing on June 4 and lasting until July 2. In 1939 symptoms began on May 31 and lasted until June 25. It was at that time that I realized that a distinct correlation existed between the patient's symptoms and the blooming of an *Ailanthus* tree in the rear yard of his home. Careful questioning verified this suspicion, and an extract of *Ailanthus* containing 0.1 mg. of nitrogen per cubic centimeter was prepared. Intradermal testing with this latter extract evoked a markedly positive skin reaction. Eye and nasal tests with the dry pollen were also positive. A change of residence during the fall of 1939 raised hopes that the new location might be free from this tree, but a complete survey of the tree flora revealed many *Ailanthus* trees within a short distance of his home. Treatment with an extract of *Ailanthus* pollen was considered satisfactory during the 1940 season, since the patient had only mild hay fever symptoms from June 19 to June 23 and no annoying asthmatic seizures. During this entire time results of treatment of his fall hay fever with a ragweed pollen extract were considered satisfactory. The patient moved to Los Angeles in the winter of 1940 and has been free from spring symptoms since. A superficial survey by the patient failed to reveal the existence of the *Ailanthus* tree in his locality.

CASE 2.—E. B., female, stenographer, aged 27, consulted me on Feb. 15, 1940, because of "rose fever" that had occurred each year from late May until mid-July for the past six years. The symptoms were always worse during the first three weeks of June. There was very little sneezing and only a mild rhinorrhea, but the ocular symptoms were severe and annoying, consisting of itching, tearing, photophobia, and conjunctival injection. She was symptom free while on an ocean voyage during the 1939 season. Her sister suffered from ragweed hay fever.

Skin tests to all the pollens found in the air at or about that time of the year were negative. Ragweed pollen, however, gave a markedly positive reaction. All the ophthalmic and nasal tests, including ragweed, were negative. An accurate etiologic diagnosis could not be made, and the patient was asked to return during the period of active symptomatology. She reported on June 15, 1940, when symptoms first appeared. It was at that time that careful questioning revealed the existence of an *Ailanthus* tree in her immediate environment. It also recalled to her mind the fact that her symptoms were always associated with the blooming period of this tree. By June 30 all the symptoms of hay fever had subsided. Skin, eye and nasal tests were positive to *Ailanthus* pollen, and the patient was treated with an *Ailanthus* pollen extract during 1941. Mild but unannoying symptoms of hay fever were present from May 31 to June 15. The patient manifested a dry, nocturnal cough during the height of pollination. On March 28, 1942, a dose of 0.1 c.c. of the concentrated 3 per cent *Ailanthus* pollen extract resulted in a constitutional reaction manifested as severe, lower abdominal cramps that prevented her from straightening up. The administration of 0.5 c.c. of 1:1000 epinephrine solution afforded her relief within fifteen minutes. Distinct bronchial asthma occurred during the height of pollination in 1942, but the oculonasal symptoms of hay fever were mild as compared with previous years when the patient had not received treatment.

The constitutional reaction occurred with a change from an old to a new pollen extract. The pollen used in the preparation of this latter extract was obtained from a new source. In the interim another extract of *Ailanthus* pollen had been found incapable of evoking either positive skin or mucous membrane reactions. Skin tests and passive transfers showed that the three pollen extracts used varied widely in their antigenic activity. All three extracts (3 per cent) were prepared in the same manner but no nitrogen determinations were performed.

DISCUSSION

The nonmedical literature as far back as 1900¹² contains a statement that the *Ailanthus* pollen is said to cause catarrhal trouble, yet no medical reference alludes to or corroborates this statement. Alfred Rehder,¹³ in a personal communication regarding the origin of it, said

that there must be some published reference before 1900 regarding the effect of the pollen. Careful search for such an article, however, has been fruitless. Nonetheless one must assume that the author responsible for the statement must have known of a patient who suffered during the time that the Ailanthus tree was pollinating.

This report of two patients exhibiting clinical sensitivity to Ailanthus pollen together with the reports of Rowe, Swineford, and Derbes regarding pine, catalpa, and linden sensitivity should emphasize the potentialities that these and other pollens possess and the role that they might play in precipitating clinical allergy. Because of the rarity of such cases, routine testing with the uncommon tree pollens is inadvisable. They should, however, be thought of and tested for in the obscure cases. The local flora of unusual trees and plants, plus the knowledge of their approximate period of pollination, should be the determining factors in deciding which pollens to use in skin testing.

Clinically, there is nothing characteristic about sensitivity to the pollen of the Ailanthus tree. There was, however, one outstanding feature in the cases cited that might aid in the clinical diagnosis. This was the marked conjunctivitis that persisted throughout the pollinating season and subjectively was the most annoying symptom.

Pollen obtained from different sources varied widely in antigenic activity. This should serve to stress the necessity for testing the activity of each new extract. Had this been done, the constitutional reaction encountered could have been avoided.

The experience in these cases emphasizes the fact that positive skin reactions, per se, are not indicative of clinical sensitivity, as indicated by the positive reactions to timothy and plantain in Case 1. They must be correlated with the clinical history, period of pollination, and observation during the season before they assume significance. The nasal test with the powdered material is a simple office procedure that enables the examining physician to evaluate the significance of a positive skin reaction in cases of pollen allergy, as exemplified in these two case reports.

SUMMARY

1. Cases of two patients clinically sensitive to Ailanthus tree pollen are presented. The marked conjunctivitis was a noteworthy clinical feature in the cases cited.
2. The variability of antigenic activity of pollen obtained from different sources is discussed.
3. The value of the nasal test in cases of pollen allergy is again stressed.

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