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SUGAR BEET POLLEN ALLERGY AS AN OCCUPATIONAL DISEASE

By

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The sugar beet is a variety of the domestic beet, *Beta vulgaris*, improved to produce a high content of saccharose. Botanically it belongs among the Chenopods. The plant is biennial, blooming the second year. It is mainly harvested the first year. In producing beet seed a cutting from the mother plant is grafted during the second year. The graft blooms with an enormous pollen production. The sugar beet is mainly wind pollinated. As far as the author knows there is no cultivation of sugar beet in Sweden for seed production. Only one laboratory, Hilleshög, deals with research work concerning the improvement of sugar beet. Thus exposure to sugar beet pollen only occurs at this laboratory.

Chenopodium album, Lambs Quarter, a common weed in Sweden, belongs to the same order as *Beta vulgaris*, Chenopodiaceae. It blooms from the middle of July to September. According to *Juhlin-Dannfelt* (1948) in Sweden and *Hyde* (1959) in Great Britain the quantities of pollen from *Chenopodium album* obtained in the atmosphere are fairly small compared with those of trees and grasses. The concentration was about 1 per cent of the grass pollen content. This is not only due to the mass of pollen produced by the plant but also to the size and the specific gravity of the pollen grain. Both types of pollen, *Beta vulgaris* and *Chenopodium album*, are known to be allergenic and fulfil the Thommen's criteria but judging from the literature *Chenopodium* allergy is a rare disease.

CASE REPORT

The patient was a female technician aged 23 working in the above-mentioned laboratory. In her family there are no known allergic diseases. Before the present instance the patient had never, as far as she knows, suffered from allergic symptoms. She started working in the greenhouses in January 1967 collecting pollen, but after a few months she developed a typical hay-fever with conjunctivitis and rhinitis but no asthma. She was allowed to leave the close contact with the pollen in the greenhouses and given work in the laboratories. Symptoms still annoyed her since there was some contact with pollen through the clothes and property of her colleagues. On vacation she was symptom free. When she returned to work the symptoms of pollinosis started again.

The results of intracutaneous test with dilutions of certain extracts are given in Table 1.

TABLE 1

Dilution	1:10000	1:100000	1:1 mil.	1:10 mil.
Beta vulgaris pollen		+	+	—
Chenopodium album pollen		+	±	—
Lolium perenne pollen	+	±		
Horse dander		++	+	±
Timothy pollen	—	—		

The skin reactions are evaluated according to the following principles (*Arner et al.* 1958):

Total of intersecting diameters	Indication
< 20 mm	—
≡ 20 mm	+
≡ 30 mm	++
≡ 40 mm	+++
≡ 50 mm	++++

Testing with extracts of house dust, mould spores, animal danders (except horse dander), tree pollen, Compositae pollen and different food allergens gave negative results.

Provocation tests were performed by dripping extracts of pollen and horse dander in the nose. Coca extracting fluid was used in the control tests with negative results. The provocation tests were positive with extracts of Beta vulgaris and Chenopodium album in dilution 1:100 and with Lolium perenne and horse dander in dilution 1:10. Specific hyposensitization with sugar beet pollen extract has been performed and the patient is now perennially treated with

monthly injections of 1.0 ml of the pollen extract in dilution 1:1000, which was the highest dose she could tolerate.

DISCUSSION

Hypersensitivity to sugar beet pollen seems to be the cause of pollinosis in this patient. The case history as well as the results of intracutaneous test and provocation test prove that. The sugar beet pollen seems to have a strong antigenicity, probably the strongest of all *Chenopods* (*Dutton* 1938). In a report *Phillips* (1939) showed that pollinosis developed in a group of people after only 2 seasons of exposure and in another (*Dutton* 1938) 4 cases were reported with known allergy, who had developed hypersensitivity to sugar beet pollen and symptoms during the first year of exposure. Since the plant is no longer allowed to bloom in open fields in Sweden but only in greenhouses attached to a research laboratory pollinosis due to sugar beet pollen is mainly an occupational disease. Most of the workers at Hilleshög more or less suffer from pollinosis (*Bosemark* 1968). Some people have for that reason been forced to leave their work. Concerning the result of hypo-sensitization, *Phillips* (1939) reported good results after specific treatment in 34 cases out of 37.

Not much has been published either about hypersensitivity to other *Chenopods*. Textbooks (*Feinburg* 1946, *Vaughan* 1948, *Jamar* 1959) make scant mention of it. In a paper *Homan* (1963) reported some patients sensitive to ragweed pollen with concomitant sensitivity to *Chenopodium album* pollen, who failed to respond satisfactorily until *Chenopodium album* pollen extract was included in the treatment. In the paper where *Juhlin-Dannfelt* (1948) showed that there is more than one pollen season in Sweden he mentioned the *Chenopods* as a possible cause of pollinosis. He pointed to the fact that in patients who have trouble with hay-fever during the late summer months, *Chenopodium album* pollen among other things may be possible causative factor. It seems that this fact has been ignored and it would be advisable to include *Chenopodium album* pollen extract in the list of extracts

used in testing patients with symptoms in the late summer months.

SUMMARY

A female technician, working in a research laboratory for improvement of sugar beet, developed a typical hay-fever after exposure to sugar beet pollen. This fact is discussed, as well as other forms of *Chenopodium* allergy especially *Chenopodium album*, a common weed in Sweden. The author suggests that *Chenopodium* pollen extract is incorporated in the list of extracts used in testing patients with symptoms of hay-fever in the late summer months.

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