

LYCOPODIUM ALLERGY¹

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Lycopodium, as we know, is the name of the spores of the moss *Lycopodium clavatum*, a small plant with runners several yards long at the top, belonging to the fern species. It is above all found in damp woodlands; it is green all the year round and therefore is often used as Christmas decoration here in Sweden. The spores turn yellow and "bloom" in July-August in this country. It is found especially frequently within certain districts, for instance around Stockholm. The plant is classified as a medicinal plant. The total demand for Lycopodium can as a rule be supplied from the stock of wild plants. As far as could be found out, not other species of the family Lycopodiaceae are used, except possibly *Lycopodium complanatum*.

In spite of the fact that lycopodium extract does not contain nitrogen in a quantity that can always be positively demonstrated, the spores obviously have a strong allergic effect in certain cases. In one case previously subject to specific desensitization and then to yearly treatment, a severe shock appeared in connection with a 4-weeks' injection—a dose which had previously been tolerated well. The shock could be relieved only by treatment with anti-allergic measures and cardiotonica for more than an hour. The 4-weeks interval had this time been exceeded with about two weeks and in the mean-time the patient had had an infectious cold with fever.

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To judge from the foreign literature, lycopodium allergy should be very rare. It is not mentioned in *Vaughan and Black's Practice of Allergy*, nor in *Hansels' and Cooke's* handbooks and *Rost's* recently published handbook. *Tuft* in his *Clinical Allergy* (1949 p. 264) mentions lycopodium among a series of potential inhalation allergens "as occasionally causing respiratory allergy though not frequently enough to warrant detailed consideration". Evidence of the same point of view is the fact that lycopodium extract is not included in e.g. *Wyeth's* otherwise fairly complete extract collection. Lycopodium allergy is not mentioned in *Urbach's Das Heufieber und seine Behandlung*. The same author, however, calls attention to some cases reported in the literature in his *Allergy* (1943).

The first to observe lycopodium allergy seems, according to *Feinberg* and *Urbach*, to have been *Peshkin*, who reports two such cases in 1924. One of these was a pharmacist who got a severe attack of asthma already at relatively slight exposure. The other case was a woman who got attacks of vasomotoric rhinitis when using a lycopodium preparation for an oily scalp. Similar cases have been described by *Sticker*, *Lambright* and *Albaugh*. *Feinberg* says that he has only seen two or three cases of Lycopodium allergy altogether. There seem to be about ten cases reported in the foreign literature. None of these cases seem to have been subject to the Prausnitz-Küstner reaction, nor have specific desensitization been carried out.

The examples mentioned here thus illustrate *two* different modi of exposure: as occupational allergy in pharmacutists; through dry shampoo with preparations containing lycopodium.

A *third* possible modus of the sensitization seems to have been first observed by *E. Hanhart* (1934): a typical lycopodium allergy in a worker in metals. In casting, the metal is poured into wooden moulds which have been treated with lycopodium powder to prevent the metal from sticking to the wood. This procedure has the effect that a cloud of

powder is spread in the air. I have previously had an opportunity of reporting such a case of *Lycopodium* allergy¹. With this type of occupational allergy the problem could best be solved by changing the lycopodium powder to another suitable preparation (trituated carbon).

We have reported a case in this society in 1931 that illustrates the presence of *Lycopodium* allergy in another occupational group, i.e. among theatre personnel. As we know they often prefer lycopodium powder to other kinds of powder, because it so to say binds the sweat better than other kinds. The case in question was, briefly, as follows²:

A middle-aged woman had been employed at the Opera as a chorus-singer for about 25 years. 12-13 years ago she discovered for the first time that she sometimes started to sneeze and got rhinitis when on duty. The symptoms became more and more accentuated both as to frequency and intensity during the following years. Later she also had coughing attacks and still later also difficulty in breathing and wheezing. These symptoms appeared more and more as attacks of typical asthma that sometimes forced her to leave the stage during the performance. She had about an hour's walk to her home. In the beginning the asthma troubles left her during this walk; later she still had them when she went to bed and she also had difficulties at night which deprived her of sleep.

The woman in question was very observant. Gradually she discovered certain peculiarities regarding the occurrence and intensity of the trouble. She thus noticed that she could appear in certain operas without any trouble, in certain others the manifestations did not set in until the end of the opera, in others, finally, the difficulties appeared already in the second act, etc. She made a list stating which operas she could and could not endure and with this list in her hand she went to see the manager and asked to be relieved of appearing in the ones she could not endure. It is not at all surprising that the whole matter was considered a proof of gross feminine hysteria at that time.

An examination of the case, however, gave an explanation that freed her completely from this accusation. It was proved that the different kinds of powder used in different operas contained a very varied amount of lycopodium. The brown used for instance in *Carmen* held very little lycopodium; the white in the *Tales of Hoffmann* was nearly entirely composed of lycopodium. A compa-

¹ Salén: Acta Allergologica I:2, 1948.

² For a complete description see Salén: Allergistudien II, 1932; also Acta Allergologica I:2, p. 144.

rison between the patient's list of operas she could not endure and the list stating the percentage of lycopodium used in the different powders, showed a remarkable correspondence.

A skin test with lycopodium gave strongly positive reaction and produced a regular asthma paroxysm within few minutes. The woman did not have any such manifestations before the test. Passive homologous transfer according to the Prausnitz-Küstner test gave the result¹; negative reaction with the brown powder containing little lycopodium; a fairly weak reaction with the red powder, but a maximum positive reaction with the yellow powder, nearly as strong as that which was obtained with pure lycopodium extract. The woman was later pensioned before retirement age due to Lycopodium allergy contracted because of her employment. The case was at that time complicated with a purulent frontal sinusitis.

The case reported above made us include Lycopodium extract in the routine skin test, applied so far to about 15,000-20,000 allergic patients during about 18 years. Privately, nine cases of "theatre" allergy have been discovered. Some of these have previously been reported in the chapter on therapeutics in K. Hansen's handbook (1942 p. 312). Seven of these cases had only rhinitis manifestations and two had also asthma. Six of the cases had purely monovalent lycopodium allergy. Specific desensitization was carried out on five of these cases with so good a result that all five could later on continue their work at the theatre. It should be added that all of them were recommended not to use powder containing lycopodium.

These experiences of lycopodium allergy induced us (9) to add a group of people with theatrical occupation to the material to be subjected to an examination for latent allergy, which was performed in 1935-1936. Table 1 gives the result of this examination.

¹ See Fig. 1, *Acta Allergologica* 1:2, p. 144.

TABLE I

Persons with theatrical occupation (21).

		Allergic heredity		Clinical allergic symptoms (probably due to lycopodium)
		+	—	
Positive skin reaction from lycopodium extract...	9	1+1 ?	7 (8)	4 ¹
Negative	12	1+1 ?	10 (11)	0

To judge from this result, it is probable that skin sensitization to *Lycopodium* is relatively frequent in people with a theatrical occupation and that to about 50 per cent it is combined with slight allergic symptoms (sneezing, rhinitis, closed-up nose). Every probability favours the belief that lycopodium allergy in a great number of such cases is never diagnosed, that the symptoms are characterized as "catarrhal" and non-allergic, and that the treatment often is only a "palliative" local treatment.

As mentioned above, the other important group of occupational allergy to lycopodium is pharmacists and persons with similar working conditions (drug stores, etc.). Altogether, we have privately had eight such cases for examination and treatment, four of which with both rhinitis and asthma manifestations. Some of these have previously been reported². While the theatrical allergy is often monovalent, the pharmaceutical allergy is often polyvalent. The commonest in our material is sensitization to condurango, liquorice, myrrh, senna, lycopodium and less common to digitalis. It is worth mentioning that we have never seen a case of ipecacuanha allergy. Specific desensitization has been carried out on six of these cases. All have been able to continue their work.

A few odd cases have to be added to this. As some of them are of special interest, I shall take the liberty of stating the relevant data about them.

¹ In all cases only slight rhinitis symptoms.

² Salén in K. Hansen's handbook, p. 310-312.

A 40 years old woman consulted us for severe allergic rhinitis. *She had never had any asthmatic symptoms.* Strongly positive reaction at antigen analysis with dust allergen extracts and a nearly as strongly positive reaction with lycopodium extract. She had never had anything to do with theatrical or pharmaceutical work. She had never herself observed anything that could be manifestations of lycopodium allergy. She was treated for her dust allergy and was practically free of symptoms and trouble during the time immediately after this treatment. About six months later, I was called to her and found her in a fairly severe Status asthmaticus. This had set in during a dry shampoo. The preparation used contained about 90 % lycopodium.

A case which illustrates another modus of exposure is the following:

A 52 years old woman consulted me in 1934. She belonged to a family with strong allergic heredity. She had since childhood experienced a varied mixture of allergic manifestations; rhinitis, asthma, migraine, gastric and abdominal symptoms (allergic?), etc. When the anamnesia was taken down she mentioned that she did not tolerate lycopodium. She said that she would get asthma manifestations and start sneezing when at the opera. She had a severe asthma paroxysm in 1932 in connection with a dry shampoo. A polyvalent spectrum (with dust, bacterial and animal extract strongly positive reaction) was obtained by antigen analysis and besides a +++-reaction with lycopodium extract.

When I prescribed medicine she was also given some pills and I forgot to prescribe that they were not to be lycopodium-treated. When opening the bottle of pills, she got Quincke's edema on her eyelids.

In these and similar cases the modus of sensitization is not elucidated. Lycopodium powder was previously used a good deal to keep the skin dry (especially on children); further, a lot of cosmetics must have contained lycopodium¹. As I have been informed, Lycopodium is never or very rarely used for such purposes nowadays. It is impossible to tell now whether occasional visits to the theatre, repeated dry shampoos with Lycopodium preparation, continuous use of Lycopodium-treated pills could be cause of the sensitization. A group examination of personnel at hairdressers', etc., would be of interest and might to a certain extent elucidate these questions.

¹ In closing I should like to point out that lycopodium preparations are prescribed for peroral use in homoeopathy, i.e. for stones in the kidney.

An examination of the allergic material of the Södersjukhuset in 1946—November 1950 shows that positive reactions with *Lycopodium* extracts have been obtained in 21 cases. In 15 of these cases the reactions, however, were relatively weak, one plus to one and a half plus. In the other 6 cases 2 plus to 5 plus. Only two cases of monovalent *Lycopodium* allergy were discovered, the others were more or less polyvalent. Positive skin reactions were also obtained with grass, compositae, or tree pollen extracts in 10 of the 21 *Lycopodium* positive cases; positive reactions with one or several animal extracts in 5 cases; also in 7 cases with auto-dust extracts.

Among these 21 cases there were two who were working at a chemist's. In both cases positive exposure tests. In a third case asthma and rhinitis symptoms occurred in connection with dry shampoo with a preparation containing *lycopodium*; in a fourth case when taking *lycopodium*-treated pills (Quincke's edema). Exposure test had not been carried out in any of the cases with only weakly positive skin reaction.

One of the main reasons for the writing of this report on different modi of sensitization in *lycopodium* allergy is a case that we have lately (1950) had an opportunity to observe and which is peculiar from this point of view.

Boy born in 1943. Allergic heredity positive. He is reported to have had eczema, probably of the Besnier type, during his first year. The reason why he is now consulting us is a cough which he has had for years and which is particularly troublesome at night. It occurs for fairly long and frequent periods and has been considered due frequent "colds". As a rule, though, without a temperature. Rhinitis and itching in the eyes are said to have set in with these colds. No wheezing or rattling nor dyspnea. Somatic examination revealed no sign of asthma or bronchitis, no other abnormal or morbid symptoms except signs of a chronic tonsillitis + swollen lymphatic glands submandibularly. Sedimentation rate 4 mm. Eosinophilia 2.5 %.

Further investigations revealed that he usually had his worst period when at the summer residence of his family in the archipelago of Stockholm and that

he had been remarkably much better when staying at other places during the summer. It was not possible to obtain definite information as to which part of the summer was especially difficult, but later on it was considered that the latter part (July-August) was the worst.

Skin test produced a $\pm$ to weak $+$ -reaction with the dust extracts used and a 4 $+$ -reaction with lycopodium extract; for the rest a totally negative allergen spectrum. The *Prausnitz-Küstner* reaction with *Lycopodium* extract strongly positive. Due to the information that the troubles were accentuated in summer, a specially detailed test with grass, tree, and compositae pollens were carried out. *All these tests, however, were negative.* The colleague who normally took care of the boy and who had submitted him to the allergy test had gradually reached the conclusion that the condition might be due to allergy or asthma. The atypical or rudimentary clinical course, the negative result of the lung examination, the absence of blood eosinophilia and the otherwise negative skin test could not by itself constitute a proof of allergy or asthma. At least not as an exogenous condition; possible, though, the hypothesis of a direct or indirect bacterically or toxically caused allergy with the tonsillitis as major cause.

In the beginning, it was uncertain whether the strong *Lycopodium* reaction could be given any clinical significance. None of the known modi of exposure to *Lycopodium* seemed probable.

It was out of question that the *Lycopodium* extract used should react non-specifically. Both before and after the examination of the patient this extract had been included in the series of extracts used as a matter of routine on about 50 allergic cases with totally negative result. The strongly positive result of the P.-K. reaction eliminated the possibility of the reaction being non-specific. The test (intracutaneous) was, however, just for safety repeated at the Södersjukhuset with two other *Lycopodium* extracts. The patient was completely free of manifestations before the test. The local reactions were now as before strongly positive. The patient started to sneeze violently, got itching in the eyes and running eyes a few minutes after the tests. Shortly afterwards a regular Status asthmaticus set in. The patient got antisthine and epinephrin subcutaneously.

It was thus proved that lycopodium in this case gave rise to clinical allergic symptoms. Titration gave a titre of 1:40.000.

The question how the sensitization was established was still unanswered.

The absence of the usual, known possibilities of exposure; the accentuation of the manifestations in the latter part of the summer when the family stayed at the summer residence—which was the time when *Lycopodium* “blooms”; the absence of this status when the boy stayed at other places; all these facts aroused suspicion of the possibility of a

"natural" exposure, analogous to the usual pollen exposure. Further, the fact emerged that the district where the family had their summer residence is since long known as having a particularly good supply of *Lycopodium clavatum*¹.

The above is illustrated in an interesting way by fig. 1 and 2 which are taken from Eric Hultén's newly published *Atlas över Växternas Utbredning i Norden* (Atlas of the Distribution of Vascular Plants in N. W. Europe)². From fig. 1 you can see that *Lycopodium clavatum* is fairly frequent in the whole of Sweden (the thin diagonally marked lines) except in the north; more frequent, however (the closer and heavier marked lines), at the coast near Stockholm (S), especially east and north-east of the town and on the cape of Finland. Fig. 2 shows that also *Lycopodium complanatum* is frequent in about the same districts (the dots mark these places).

When a picture of the plant was shown to the family, they knew it very well as occurring near their house. It had been used as a Christmas decoration. Further information of interest could be reported: in connection with fireworks the children had played with some unused rockets. In connection with this the patient had an especially severe attack of asthma. As we know lycopode is often used for fireworks.

All these circumstances seem to prove with a fair amount of probability that the patient in question was sensitized in a so to say natural way. Whether this had been done by air-borne spores cannot of course be proved for certain. The lycopodium spores are smaller than those of timothy-grass pollen, about the size of those of birch pollen. The possibility of spreading the spores by air are of course less, due to the fact that the plant is growing in damp woodlands. If, however, we presume that the plant is frequent in places where the

¹ I want to express my sincere gratitude to Mr. H. Camsjö of the Swedish Society of Medicinal Plants for valuable advice and information.

² I beg to express my thanks to professor Hultén for giving me the permission to publish these figs.

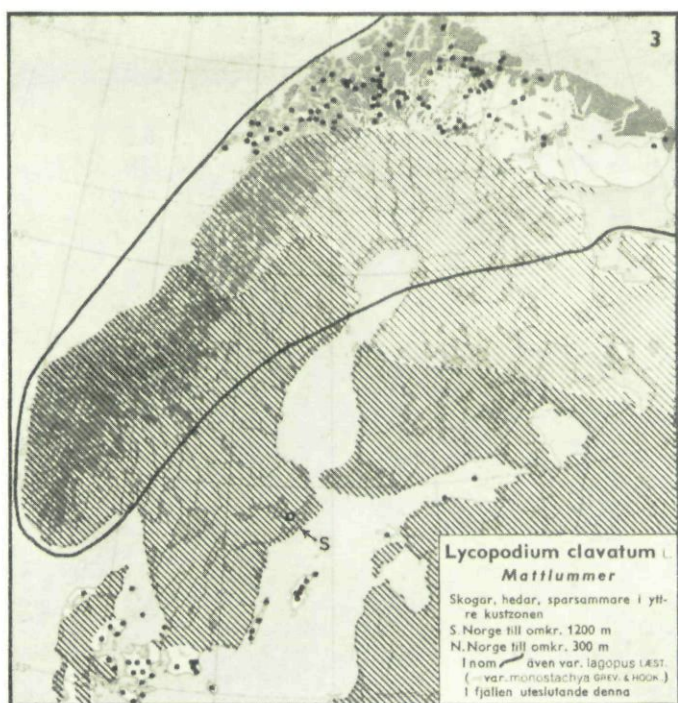


Fig. 1.

children play, the conditions of exposure are of course more favourable. The fact that the patient's trouble appeared most strongly in July-August when staying in the country, i.e. at the time of the "blooming", argues in favour of the modus of exposure suggested above. The plant seems to have been found indoors in the winter only when the dissemination of spores will already have taken place.

SUMMARY

1. Different kinds of lycopode allergy are reported: (a) in theatre personnel, (b) in pharmacists and other personnel with similar occupational conditions, (c) in workers in metal, (d) in the fireworks industry, (e) in connection

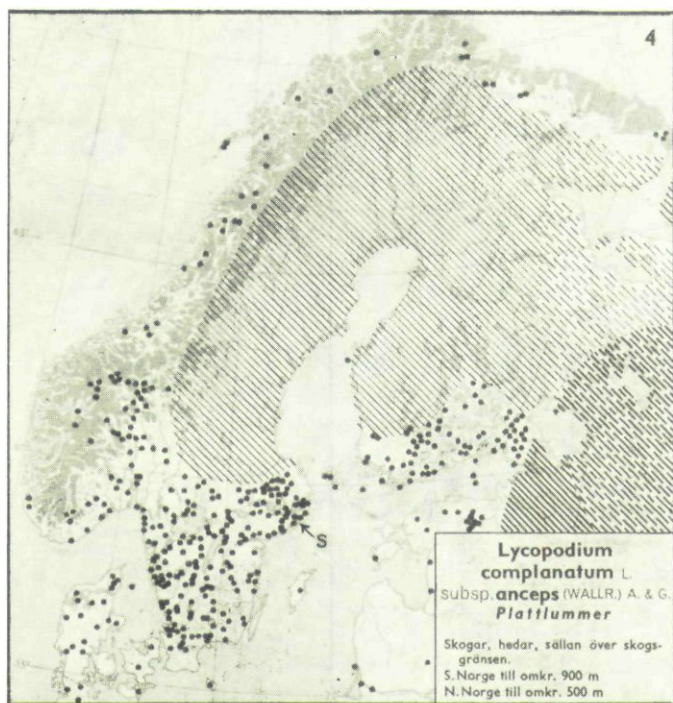


Fig. 2.

with dry shampoo; (personnel at hairdressers'?), (f) lycopode treated pills.

2. A case is reported in which the sensitization with every probability is caused by staying at a place where *Lycopodium clavatum* is abundant. Modus of sensitization probably analogous to that of pollen allergy.

3. In altogether 61 cases of rhinitis of which some with symptoms of asthma, positive skin reaction (endermal) was obtained with lycopodium extract. In 34 of these cases the reactions, however, were weakly positive ($\pm$ bis + (+)) and probably without clinical significance. A completely negative reaction was obtained with the same extract on a small number of non-allergic persons and on a great number of allergic persons. It could be proved in 27 cases by exposure

respectively provocation tests and by anamnestic data that lycopodium was the cause of the clinical manifestations. The serological specificity has been verified in a great number of cases by test of passive transfer. About half of the 27 cases were theatre personnel, the other half personnel at chemist's. Specific desensitization has been carried out in 11 cases with satisfactory result (the persons in question have been able to continue their profession without any difficulty).

4. The not unusual frequency of *latent* Lycopodium allergy, i.e. in theatre personnel is pointed out.

5. Particularly the case reported in (2) elucidates how easily certain allergy cases can wrongly be characterized as non-allergic, "intrinsic", "psychogenous", due to oversight when extracts are selected.

6. It is pointed out as probable that Lycopodium allergy is more frequent than supposed.

LITERATURE

- 1) *Cooke, Robert A.*: Allergy in Theory and Practice, W. B. Saunders Comp. Philadelphia and London 1947.
- 2) *Feinberg, Samuel M.*: Allergy in Practice, The Year Book Publishers Inc. Chicago 1946 (p. 300).
- 3) *Hanhart, E.*: Deutsche med. Wochnschr. 60, 1110. 1934.
- 4) *Hansel, F. K.*: Allergy of the Nose and Paranasal Sinuses. St. Louis, Mosby 1936.
- 5) *Lambright, G. L.* and *R. P. Albaugh*: J. Allergy 5, 590 (1934).
- 6) *Peshkin, M. M.*: J.A.M.A. 82, 1854 (1924).
- 7) *Rost, G. A.*: Allergie und Praxis, Springer Verl. 1950.
- 8) *Salén, E. B.*: a) in K. Hansen: Allergie. Thieme, Leipzig 1942; b) Acta Allergologica I:2, 1948; c) Ibidem, Suppl. I, 1950; d) Allergiestudien II, Acta Med. Scand. Suppl. 59, 1933.
- 9) *Salén, E. B.* and *C. Juhlin-Dannfelt*: Acta Med. Scand. 86 (1935).
- 10) *Sticker, G.*: Das Heufieber und verwandte Störungen, Vienna, Holder, 1912.
- 11) *Tuft, Louis*: Clinical Allergy, Leo and Febiger, Phil. 1949.
- 12) *Unger, Leo*: Bronchial Asthma, Charl. C. Thomas, Springfield 1945.
- 13) *Urbach, Erich*: Allergy, Grune and Stratton, New York 1943 (p. 342, 669, 672).
- 14) *Vaughan, Warren T.* and *H. J. Black*: Practice of Allergy, The C. V. Mosby Co., Saint Louis, 1948.

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