

THE PROSOPIS TREE AS A CAUSE OF SEASONAL HAY FEVER AND ASTHMA IN SOUTH WEST AFRICA AND SOUTH AFRICA

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During the last 15 years our attention has periodically been drawn to the occurrence in South West Africa, and occasionally also in South Africa, of cases of seasonal hay fever and bronchial asthma in the spring and early summer (October—December). Reports of such cases have led us to enquire into the condition.

South West Africa is some 700 miles from our laboratories in Johannesburg and, at this distance, the full scientific investigation could not readily be carried out as desired. Considerable correspondence was entered into about these patients with the various physicians in the Territory, some of whom had suspected Prosopis-tree pollen as the cause. In this way and with their aid a coherent and co-ordinated picture of prosopis pollinosis has emerged.

It is difficult to estimate even approximately the number of persons affected by prosopis pollen in Southern Africa. The understanding of this condition as an entity has developed gradually and there is little doubt that even now such cases escape recognition because the existence of this form of pollinosis is not generally known. It has however been described in Texas by Bieberdorf and Swinny.¹

Flowers of the Prosopis tree have, at various times during the pollinating season, been sent at our request with the object of maintaining stocks of the pollen. Extracts of this pollen have been prepared in our laboratories and distributed as required to physicians in South West Africa and in parts of South Africa for skin-testing purposes and for subsequent desensitization if prosopis pollen sensitivity was confirmed.

The Prosopis tree belongs to the *Leguminosae* of the sub-family *Mimosoideae*, among which are the Acacia, Mimosa and Prosopis. The Prosopis in desert regions can occur as thorny shrubs a few feet high, but under favourable conditions may develop into trees more than 50 feet high and 3 feet in diameter. The leaves, bipinnately compound, each bearing 8—24 pairs of smooth $\frac{1}{2}$ -inch-long leaflets, are deciduous in the winter. The fragrant yellowish-white flowers, borne on cylindrical catkin-like spikes 2—4 inches long, are laden with pollen which is insect-borne but also carried by the wind. The pods, 4—9 inches long and $\frac{1}{3}$ inch wide when mature, are yellow, often tinged with red, and contain 6—20 small, hard, pale brown $\frac{1}{4}$ -inch-long seeds embedded in the pulp. The ripened pods with a nutritious pulp between and around the seeds have a high food value for cattle, sheep, horses and pigs and provide an important fodder stand-by in times of drought. The tree develops remarkably long tap-roots which enable it to derive moisture from depths up to 50 feet and so to become independent of the surface water supplies.

The genus *Prosopis* contains some 20 species—the commoner being *P. juliflora*, *P. pubescens*, *P. glandulosa*—distributed in North and South America, South West Asia and parts of Africa. It occurs mainly in low-rainfall areas with calcareous soil. *P. juliflora* is indigenous to the North and South West of America from Kansas to California and southwards into Mexico, where it is found in the hotter, drier parts of the country. In Texas¹ the Prosopis flowers after each rainfall, mainly from April to June in the dry

season, and is regarded as a noxious plant interfering with ranching. *Prosopis pollinosis* is there becoming more common with the disappearance of the grasslands. This species is also found in Jamaica and in Hawaii, the drier parts of India, the Philippine Islands and Australia. Some species occur in tropical Africa and the south-western parts of tropical Asia as well as in the Argentine and Uruguay.

P. pubescens, a tall shrub or small tree not exceeding 20 feet high, is also known as the 'screw-bean' or the 'screw-pod Mesquite' because the pods are twisted with 12—20 turns into a spiral 1—3 inches long.

PROSOPIS TREE AND PROSOPIS POLLINOSIS IN SOUTH WEST AFRICA

Prosopis trees, known there as Mexican Mesquite or Suidwes Doringboom, grow prolifically nearly all over South West Africa, where they have been cultivated for more than half a century. Several species were brought from Texas, Mexico, Argentine and Chile. The trees have become acclimatized and self-spreading and now occur in the wild state. Scattered trees found in the veld have been disseminated there by stock as the seeds are not crushed in the digestive tract. The trees are found abundantly in Windhoek, Omaruru, Gobabis, Okahandja and Rehoboth. There are hardly any *Prosopis* trees in the wetter north-eastern parts of the territory including Swakopmund, Tsumeb, Grootfontein and Otavi. The trees develop into tall hardy growths or may appear in shrub form under unfavourable conditions. Although most of the trees are recognized as *P. juliflora*, it is believed by some that they are so much hybridized that the species name can no longer correctly apply.

The incidence of hay fever in Windhoek due to the pollen of the *Prosopis* is said to be high; so much so, indeed, that appeals have periodically been made to the authorities for the removal of the trees. In some seasons the condition is worse than in others and often worse than the summer hay fever caused by grass pollens. In Omaruru hay fever and asthma are rife and ascribed to *Prosopis* pollen because of the seasonal incidence of the condition. Skin tests carried out on patients in Gobabis have confirmed *Prosopis* pollen sensitivity. The *Prosopis* has also been suspected of causing hay fever and asthma in Okahandja and the trees are similarly regarded as important causes of hay fever in Usakos and in Rehoboth.

The following case is typical of *Prosopis* pollinosis in South West Africa:

Housewife in Gobabis, 33 years old, has suffered from vasomotor rhinitis and bronchial asthma in September and October only. There are large numbers of *Prosopis* trees on the patient's farm. Skin tests showed ++++ reaction to *Prosopis* pollen and +++ reaction to *Acacia* pollen extract. Desensitization with *Prosopis* pollen extract was commenced in August 1955 and in the ensuing season the patient had only one or two mild attacks. She subsequently received a further series of desensitization injections with almost complete freedom from symptoms in the season following.

PROSOPIS TREES IN THE UNION OF SOUTH AFRICA

In the Union of South Africa *Prosopis* is found mostly in the western and drier areas of the country as street trees in towns and ornamental shade trees in parks and gardens. They are also planted for shade around homesteads in rural areas and on some farms they occur in plantations for use as fodder. The trees are mainly *P. juliflora* with occasional *P. pubescens*. Seeds were imported by the forestry depart-

ment from the beginning of the century. At present the cultivation of *Prosopis* is not encouraged lest it become a troublesome weed as in parts of the United States of America. The trees are found principally in the northern and western parts of the Cape Province (Namaqualand, Upington, Mafeking, Kuruman and Carnarvon), as well as in Kimberley and De Aar and a few also in Graaff-Reinet, Steytlerville, Middelburg and the Robertson district; and in parts of the Orange Free State (Bloemfontein, Brandfort and Welkom). Some *Prosopis* is also found in the Transvaal at Potchefstroom and in the Machavie and Lichtenberg districts.

A housewife in Kuruman in the Cape Province suffered from seasonal hay fever not improved by 3 courses of desensitizing injections of grass and *Acacia* pollens, dog and horse hair, feathers, house dust and orris root. The patient herself thought her symptoms were due to the doringboom. Skin tests showed a +++ reaction to *Prosopis* pollen extract and a ++ reaction to *Acacia* pollen extract.

A case of *Prosopis* pollinosis was also reported from the adjoining Bechuanaland Protectorate in Tsabong, where *Prosopis* was originally planted in 1939.

The *Prosopis* is in full pollination in October and November, but in some years the flowering season extends from September to December. Grass pollinates in South Africa and in South West Africa during the summer from October to March with a peak period in December and January. If the symptoms of seasonal hay fever or asthma commence in September and October and extend through to the end of March, then it is most likely that grass pollinosis is the explanation of the symptoms during that period. If, however, the symptoms in the patient do not extend beyond December in areas of growth of the *Prosopis* tree, then the suspicion of *Prosopis* pollinosis is justified. Nevertheless, it could very well be that in early summer a patient suffers simultaneously from *Prosopis* and grass pollinosis. It is therefore advisable in *Prosopis*-tree regions for physicians to test their spring-summer respiratory allergy patients as a routine measure with both *Prosopis* and grass pollen extracts.

Skin testing with *Prosopis* pollen extract invariably gives a definitely positive reaction in the clinically sensitive person. The botanical relationship of the *Prosopis* tree to the *Acacia* tree suggests that there may be a similarity in the allergenicity of the pollen. In the Union of South Africa, where *Acacia* grow in abundance, patients are tested with *Acacia* pollen by routine and many give a positive skin reaction thereto. These reactions are probably of little clinical significance since there is very little evidence, despite popular opinion to the contrary, that *Acacia* pollen is specifically responsible for symptoms of respiratory allergy. In a few cases where suspected *Prosopis* pollen sensitivity occurred in South West Africa, the physicians were invited to carry out skin tests on their patients with *Acacia* pollen as well as with *Prosopis* pollen extracts. Positive reactions were frequently obtained with both extracts, but reactions were generally more pronounced with *Prosopis* pollen extract. In some of the cases positive reactions were given by *Prosopis* pollen only. Investigations are under consideration to determine the nature of common allergens, if any, between the two pollens.

Bieberdorf and Swinny¹ in San Antonio, Texas, carried out routine skin tests in that region where the *Prosopis* trees are abundant and found that 55% of the patients suffering from respiratory allergy gave positive reactions to

the pollen. Most of these, however, were 'false positives' for in only 37 out of 385 cases was there a corresponding clinical sensitivity.

Desensitization with prosopis pollen extracts have given gratifying results. In cases of true seasonal prosopis hay fever or asthma pre-seasonal desensitization should commence in May or June, that is a few months before the flowering period of the tree, and should be carried out with gradually increasing doses of the extract. After the end of the season it is advisable that 'maintenance doses' of the extract should be administered to the patient at longer intervals until he is receiving a 'maintenance dose' every 4-6 weeks, which will serve to maintain the state of hyposensitization acquired and thus the necessity for recommencing desensitization each May or June will be obviated.

SUMMARY

The Prosopis tree and its occurrence in South West Africa and in South Africa are described.

An account is given of seasonal hay fever and bronchial asthma due to the inhalation of the pollen of the Prosopis tree (Mexican Mesquite, Suidwes Doringboom) in Southern Africa, mainly South West Africa, which flowers in September to December but shows a peak in October and November.

Indebtedness is expressed to the many physicians in South West Africa who kindly supplied clinical and other details of their patients and provided information about the occurrence of the Prosopis tree in their area. It is by their courtesy also in responding to our requests for pollinating flowers of these trees, that pollen extracts are now available for general use.

Acknowledgement is also made for information about the botanical and agricultural aspects of the Prosopis tree to the Directors of the Department of Forestry, Pretoria; the National Herbarium of the Department of Botany, Pretoria; the Grootfontein College of Agriculture Experimental Station, Middelburg, Cape Province; the Director of Agriculture in South West Africa; and an article by C. C. Robertson.²

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