

A STUDY OF THE AIR-BORNE ALLERGENS OF THE VIRGIN ISLANDS NATIONAL PARK AND ADJACENT PARTS OF ST. JOHN ISLAND

Oren C. Durham,**Angwin, Calif.*, and Henry Fafalla,** *St. John, Virgin Islands*

WITH the cooperation of Mr. Harold A. Hubler, then Superintendent of the Virgin Islands National Park, and the cooperation of Mr. Leslie H. Moore, Jr., and his technical staff of Caneel Bay Plantation, a pollen survey of this, the newest national park, and the privately owned areas of St. John Island was set up in the fall of 1958. As in the case of most of the other national parks, this study was to consist of both a careful examination of the flora of the Island and continuous sampling of the air for allergenic pollens and spores over a period of one year. The survey was inaugurated on October 23.

The Virgin Islands National Park encompasses two thirds of St. John, smallest of the three main U. S. Virgin Islands. The Park was established in 1956 as the result of the gift of land by Mr. Laurance S. Rockefeller and Jackson Hole Preserve, Incorporated. St. John is 75 miles east of Puerto Rico, three miles from St. Thomas, and is noted for its natural beauty, climate, and beaches. It is some nine miles long and five miles wide, has a population of about 800 persons, and is mountainous and heavily forested.

Our field studies were directed specially toward learning whether any species of ragweed (*Ambrosiaceae*) was to be found growing anywhere on the island. While carrying on this search, ample opportunity was afforded for detecting any other source of pollens which might later prove to be allergenic, particularly wind-borne pollens. As a part of the field work done during late October, Mr. Fafalla made a list of more than eighty native and exotic plants found on the Plantation and on adjacent Park areas and which were in flower at that time. Samples of pollen were collected from each of these for use in identification of pollens that might be caught subsequently in the course of the continuous air sampling.

Nearly two weeks were spent in an intensive search of the shore areas of St. John, particularly that along the numerous bays and the small neglected spots and gardens in the village of Cruz Bay, as well as the privately-owned farms outside of the Park area. Careful attention was also given to the lush tropical vegetation of the mountainous central part of the island and to the well-groomed open acreage of Caneel Bay Plantation.

Received for publication July 25, 1960.

*Chairman of Pollen and Mold Committee, American Academy of Allergy.

**Landscape Supervisor, Caneel Bay Plantation, Inc.

Our air sampler at the Plantation was placed on the flat roof of the open dining terrace at a distance of about 10 feet above ground and 30 feet from the bay shore. Here oil-coated slides were to be exposed throughout the ensuing year, changes of slides being made every two or three days. Mr. Fafalla assumed the task of identification and counting of pollen grain and mold spores found on the unbroken series of samples through the year. This location seemed to be ideal because of the prevailing winds that sweep down from the high central part of the island.

Not one ragweed plant of any species was found anywhere on the island. In view of the fact that two ragweed species in very small quantities had been noted on St. Thomas and a sizeable ragweed-contaminated area had been discovered by the senior author on Puerto Rico some seven years previously, it was thought possible that stray specimens of ragweed might be present on St. John. Two species of garden and wasteland weeds, *Ambrosia dubious* and *Parthenium hysterophorus*, common in parts of continental U. S. A. but of slight significance even there, were found in Cruz Bay village. There were not enough of these plants present to excite allergic symptoms, even though a person sensitized to them should reside continuously in the immediate area of the plants, much less for the few specimens to distribute effective quantities of pollen over the island. No pollen grains from any of the above species were found on the slides at Caneel Bay.

Of the trees and shrubs on St. John, none was found to be wind pollinated and none represented species that are known to cause even occasional allergy symptoms in the continental U. S. A. However, several insect-pollinated St. John species have been reported by allergists practicing elsewhere in the West Indies to be occasional causes of sensitization among residents of the islands. The mango tree, which is present on St. John, is an example of these. Of the tree and shrub pollen grains caught in the air sampling throughout the year, 60 per cent were from the half dozen coconut trees standing within 10 to 30 feet of the sampler and whose flowering spikes hung considerably above the slides. Coconut pollen has never been proved to be allergenic. The total catch of pollen from the nine other species of woody plants averaged considerably less than one pollen grain per unit slide area per day, which is certainly a negligible amount even if these pollen were known to be actually allergenic. In any case the tropical plants whose few pollen grains were caught need not cause any concern to visitors or guests on the island, who stay only a few hours or at most a few weeks and who seldom or never have encountered these pollens before. It is the experience of allergists that it usually requires several seasons of continuous, heavy exposure to unfamiliar types of pollen in order to induce sensitivity to them.

It will be seen from Table I that the common wind-borne mold spores, which are a frequent cause of allergy in the middle and eastern states, are almost absent from the air of St. John, at least at Caneel Bay.

Thus the native and imported grasses seem to be the only possible sources of air-borne allergens on St. John. In the wooded areas which constitute a

TABLE I. TOTAL POLLEN AND MOLD SPORE RECORD FOR ONE YEAR (NOV. 1, 1958, TO NOV. 1, 1959) IN GRAINS CAUGHT ON 1 SQ. CM. OF HORIZONTALLY-EXPOSED, OIL-COATED SLIDE

<i>Pollens</i>	
Grass (all species)	194
Coconut palm	229
Calabash, <i>Crescentia cujete</i>	1
Buttonwood, <i>Conocarpus erecta</i>	7
Genip, <i>Melicocca bijuga</i>	27
Turpentine tree, <i>Bursera simaruba</i>	18
Hog plum, <i>Spondias lutea</i>	1
Sea grape, <i>Coccolobis uvifera</i>	25
Gre-gre, <i>Bucida buceras</i>	14
<i>Zanthoxylum</i>	2
Scotch pine, <i>Pinus sylvestris</i>	1
Composite	3
Ragweed	0
Unidentified pollen	13
<i>Spores</i>	
<i>Alternaria</i>	2
<i>Helminthosporium</i>	9
<i>Brachysporium</i>	7
Rust	2
Unidentified spores	2

large portion of the island, grasses are crowded out by stronger types of vegetation. On the Plantation and in other cleared areas, various species of grass flourish. Bermuda grass is a favorite lawn grass on the Plantation. Elephant grass (*Pennisetum purpureum*) and various species of *Chloris* are common on other open areas.

Only during the month of May did the slides catch an average of as much as one pollen grain per day per square centimeter. Compared with the average catch per day during the grass season in many places in the central and eastern states, this represents a very low atmospheric concentration. One of the possible reasons for the low figure on St. John is that there is very little grass growing in the wooded parts of the island. The frequent rains and continuous high humidity are doubtless effective in curtailing grass pollen dispersal. But on the Plantation where there are several acres of grassy area it would seem that frequent cutting must be partly responsible for low pollen production.

From the evidence we have gathered, the exposure to any kind of allergenic pollen and mold spores of visitors touring the Virgin Islands National Park at any time of the year is very small or negligible, and the exposure to ragweed pollen, zero.