

NUMBERS AND KINDS OF AIR-BORNE, CULTURABLE FUNGUS SPORES IN HAVANA, CUBA

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INTRODUCTION

IN A previous article¹ we summarized data on the number of culturable fungus spores caught from the air at hourly intervals in Havana. We herewith summarize data on the spore load of culturable fungi in the air at Havana at different seasons throughout the year.

The climate in Cuba is divided into two fairly definite and distinct seasons: (1) the rainy season, from May to November, when torrential down-pours are common; and (2) a winter season, from November to May, in the beginning of which gentle rains prevail for a few weeks, followed by dry, relatively cool weather with low relative humidity, which persists until the following rainy season. Seasonal respiratory allergic syndromes reach their greatest vehemence in November; only a few of these patients are sensitive to pollen, and their seasonal allergic disorders are due mostly to molds. It is therefore of considerable importance to accumulate data on the number and kinds of fungus spores in the air at different seasons of the year.

MATERIALS AND METHODS

The collecting apparatus previously described¹ was used in the present studies in order to avoid the influence of the wind, which has a definitive influence upon the apparent quantity of fungus-cultured colonies.

The culture medium used was Sabouraud's agar, acidified to a pH of 5.6 to avoid excessive growth of bacteria. The evidence presented by Swaebly, Christensen, and Grahek² indicates that other media may be preferable to Sabouraud's agar in determining the number and kinds of culturable fungus spores in the air. However, any agar medium is likely to be somewhat selective, and Sabouraud's has the merit of having been widely used, so that the results of the present tests should be, in general, comparable with other and similar tests in other places and at other times. Also, since the studies were begun with the use of this medium, it was thought best to continue its use throughout the tests.

Petri dishes were exposed daily, at 10 A.M., and colonies were counted and identified seventy-two hours later.

RESULTS

A total of 5,535 colonies developed on the exposed plates, of which 4,285, or approximately 80 per cent, were identified. The number of colonies of each

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TABLE I. MOLDS ISOLATED IN THE AIR OF HAVANA

IDENTIFIED MOLDS	ANNUAL TOTAL NUMBER OF COLONIES	AVERAGE PERCENTAGE
Hormodendrum	1,677	30.2
Aspergilli	1,063	19.2
Yeasts	897	16.2
Penicillium	163	2.7
Acrothecium	141	2.5
Mucoraceae	94	1.7
Red mold	62	1.1
Alternaria	49	0.8
Monilia sitophila	24	0.4
Cephalosporium	22	0.3
Orange mold	21	0.3
Chaetomium	20	0.3
Fusarium	15	0.2
Streptomyces	14	0.2
Trichoderma	13	0.2
Helminthosporium	9	0.1
Botrytis	4	0.07
Pullularia	4	0.07
Cephalothecium	4	0.07
Yellow mold	3	0.05
Pink mold	2	0.03
Ambliospodium	1	0.01
Spondylocadium	1	0.01
Botriosporium	1	0.01
Cylindrocephalum	1	0.01
Unidentified molds	1,230	
Total	5,535	

of those identified and the percentage of the total which each comprised are given in Table I.

Hormodendrum (*Cladosporium*) made up approximately 30 per cent of the total, followed by the *Aspergilli* with nearly 20 per cent, and yeasts with

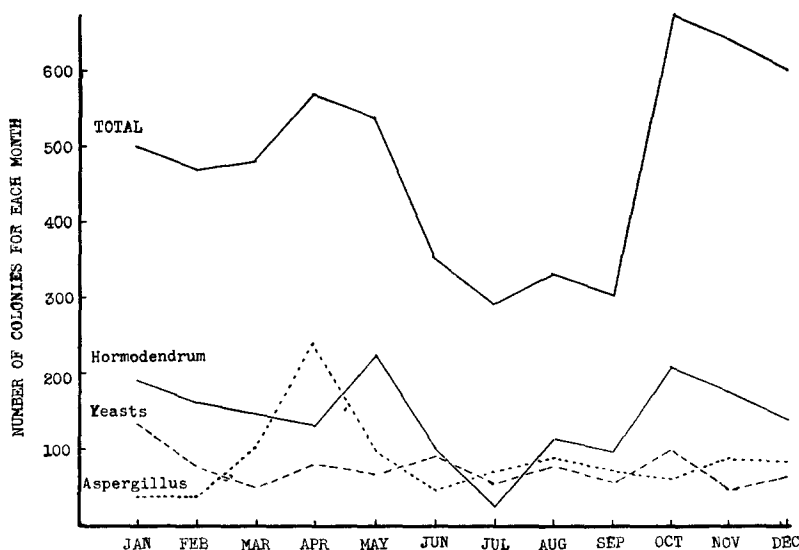


Fig. 1.—Occurrence of atmospheric molds through the year in Havana. Curves based on average total counts for each month, daily Petri dish exposure.

slightly over 16 per cent. Had a medium, such as malt-salt agar, known to be favorable to the growth of *Aspergillus* species, been used, it is probable that many more colonies of this group would have been detected. Granting the limitations of the techniques used, it is obvious that *Hormodendrum* (*Cladosporium*), the *Aspergilli*, and various yeasts comprised by far the greatest proportion of the microflora detected, with the other twenty-odd genera making up only a small proportion of the total.

As shown in Fig. 1, there were two general peaks of prevalence of mold spores in the air, the first in April and May, at the beginning of summer, and the second in October and November, at the beginning of winter. A study of the seasonal prevalence in 1,200 cases of rhinitis and asthma showed 69 per cent in winter, 7 per cent in summer, and 24 per cent nonseasonal. The data suggest strongly that the periods of high contamination of the air with spores of common molds coincides with times when allergenic symptoms are most severe.

SUMMARY

1. Spores of molds detectable on Sabouraud's agar, exposed at Havana, Cuba, were very abundant from October to February, and in a short period in late May and early April.

2. The principal air-borne molds detected in the present study were *Hormodendrum*, *Aspergillus*, and yeasts, with many other genera being encountered occasionally.

3. Of the asthma and rhinitis cases under our observation with sensitivity to fungi, 69 per cent became worse in winter, when the air-borne mold spores were, in our tests, most numerous; only 7 per cent were more pronounced in summer; 24 per cent were severe throughout the year. Thus, the time when the majority of these allergies were most severe coincided with the time when the spores of various fungi known to cause allergenic symptoms were most prevalent in the air of Havana.

REFERENCES

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2. Swaebly, M. A., Christensen, C. M., and Grahek, T. A.: Tests of Different Media for the Collection and Identification of Air-Borne Saprophytic Fungi, *J. ALLERGY* 21: 404, 1950.