experimental work which is now under way.[10] A detailed discussion will therefore be postponed.

Robert S. Mulliken,
National Research Fellow
Jefferson Physical Laboratory,
Harvard University

HYDROGEN ION CONCENTRATION AND THE DEVELOPMENT OF SCLEROTINIA APOTHECIA

Recent experiments, performed under the general direction of Dr. J. B. S. Norton, have demonstrated a marked relation between the growth of the apothecial stage of the sclerotinia causing brown-rot of stone fruits and the hydrogen ion concentration of the substrate. The special significance of this relation is due to the following facts: As is now well known, the perfect or apothecial stage of the fungus arises in spring from old mummied fruits on the ground. Mature Sclerotinia apothecia are usually first noted as they discharge ascospores at the time peach trees are blooming, but previous to this time these apothecia have been developing slowly on the ground for a number of weeks. Hence there is a period of weeks, prior to the time when any infection can be caused by the ascospores, during which the apothecia are exposed to possible injury. With this idea in mind a number of experiments, of which a few will be summarized here, have been performed on the effect of different environmental conditions on the developing apothecia.

A preliminary experiment was made in the spring of 1922, using peach mummies with the sporophores developed just sufficiently to protrude from the sclerotia as light brown, rod-like stipes. The mummies were suspended in glass tumblers containing unbuffered HCl and NaOH solutions, to which final pH determinations gave a range of only pH 4.5 to 7. Apothecia developed rapidly to maturity in all. Meanwhile similar peach mummies had been placed partly buried in sand in some pots, and powdered sulphur dusted on in quantities equivalent to 100, 500 and 1,000 lbs. per acre. The apothecia were coated with sulphur, but after temporary inhibition for six days the treated apothecia grew even more rapidly than the checks. In the three treated pots the soil solution reached a pH of 3.5 (colorimetric).

The experiments above had revealed remarkable acid tolerance in developing apothecia, and this phase was followed up in the spring of 1923. Well-buffered solutions were used in a series from pH 1.4 to 11.9, at intervals of about one pH unit. When young apothecia were grown in these, the optimum seemed to be near pH 2.5 with good growth from 1.4 to 5.8. At pH 6.8 growth occurred, but the apothecia did not mature; at 7.7 and higher no growth was observed. Using more nearly mature apothecia, growth was seen in one case near pH 9.5; otherwise, the results were as in the other series.

It seemed probable from this that slight alkalinity in the soil should be sufficient to inhibit the growth of Sclerotinia apothecia. Some peach mummies with developing apothecia were placed in pots of sandy soil, and hydrated lime applied in quantity and with the results indicated in Table I. Note especially the initial inhibition and final development of apothecia in pot 1 in connection with the falling pH in this pot.

TABLE I

Effect of hydrated lime on growth of apothecia

Pot No.	$Ca(OH)_2$ in lb. per acre	pH after 1 day	pH after 14 days
1	125	6.81	6.55
2	625	6.65	6.65
3	5000	7.30	10.70
4	0 (check)	5.99	6.40

Pot No.	Development of apothecia after 1	6	10	14	20 days
1	—	—	trace	++	+++
2	—	—	—	—	—
3	—	—	—	—	—
4	++	+++	+++++	++	–

Walter N. Ezekiel
University of Maryland Agricultural Experiment Station

[10] Preliminary measurements on the visible part of the boron nitride spectrum now indicate equally good agreement with theory for the α as for the β system, and a quantitative analogy between the two systems in respect to the relative positions of the $B_{10}N$ and $B_{11}N$ bands. The fact that each $B_{11}N$ α band has two pairs of heads, whose structure lines overlie and often resemble the corresponding $B_{10}N$ band heads, tends to obscure the latter, except far from the (0, 0) band, and accounts for Jevons's failure to note $B_{10}N$ heads. A number of the $B_{10}N$ heads are, nevertheless, plainly visible, with the present set-up, even in visual examination of the spectrum. The isotope heads are unmistakable in the two red bands, (0, 4) and (1, 5). For the latter, the stronger pair of $B_{10}N$ heads (middle of pair at λ 6462) lies 94 Å.U. farther to the red than the corresponding $B_{11}N$ pair (middle of pair at λ 6368). Some new α bands in the extreme red show an even greater isotope effect. In the ultraviolet, Jevons's data include three unidentified heads which agree closely with calculated positions for $B_{10}N$ head pairs of the α system. One is evidently the weaker head pair of the (4.0) band (the expected stronger pair for this band should, according to calculation, coincide with the weaker $B_{11}N$ pair). The other two heads ($\lambda\lambda$ 3353.3 and 3369.3) evidently are those of the (5.0) band of $B_{10}N$; these lie 18 Å.U. farther into the ultraviolet than the corresponding $B_{11}N$ pairs ($\lambda\lambda$ 3373.5 and 3386.8).