

Immunochemical Behavior of Tomato Bushy Stunt Virus.* (20610)

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Relatively little data exists on the immunochemical behavior of the plant viruses except for tobacco mosaic virus(1). Although unrelated to the latter in biological as well as in gross physical characteristics, tomato bushy stunt virus is comparable with respect to its high molecular weight (8×10^6). The availability of this spherical virus (26 m μ in diameter) in a purified crystalline state prompted the following study.

Methods and results. Bushy stunt virus was isolated from diseased tomato plants and crystallized according to the technic described by Stanley(2). Antiserum was prepared by immunizing rabbits with the virus according to the usual procedures. The quantitative precipitin titration technic of Heidelberger and Kendall, as carried out for study of tobacco mosaic virus(1), was followed. The results, shown in Table I, are similar to those

observed for tobacco mosaic virus as well as for proteins of lower molecular weight. As antigen nitrogen is added in increasing amounts to a constant volume of antiserum, increasing amounts of total nitrogen are precipitated. Maximal total nitrogen precipitation, although not reached in this study, would undoubtedly occur in the region of antigen excess. Maximal precipitation of antibody nitrogen was found to occur within the equivalence zone. The antibody N/antigen N ratio is seen to be curvilinear with respect to added antigen N as also has been observed for tobacco mosaic virus. This relationship is apparently a function of high molecular weight.

Summary. Crystalline bushy stunt virus behaves as a typical protein in its immunochemical reactions.

TABLE I. Reaction of Bushy Stunt Virus with Homologous Rabbit Antiserum.

mg virus-N added/ml antiserum	Total mg N pptd/ml antiserum	Antibody N pptd/ml (by difference)	R*	Supernates tested for	
				Antibody	Antigen
.019	.053	.032	1.68	++	—
.038	.103	.065	1.71	++	—
.057	.152	.095	1.67	++	—
.077	.205	.128	1.66	++	—
.097	.260	.163	1.68	++	—
.100	.238	.138	1.38	++	—
.142	.351	.209	1.47	++	—
.190	.446	.256	1.35	+	—
.379	.854	.475	1.25	+	—
.386	.824	.438	1.13	+	—
.758	1.540	.782	1.03	±	—
1.138	2.128	.990	.87	—	—
1.517	2.568	1.051	.69	—	—
1.896	2.952	1.056	.57	—	—
2.275	3.256	.981	.43	—	—
2.548	3.384	.836	.33	—	—
2.749	3.696	.947	.34	—	—
3.839	4.440	.601	.16	—	±
4.169	4.624	.455	.11	—	±

* R = antibody N/antigen N.

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1. Malkiel, S., and Stanley, W. M., *J. Immunol.*, 1947, v57, 31.
2. Stanley, W. M., *J. Biol. Chem.*, 1940, v135, 437.

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