A PARTIALLY MASKED MOSAIC OF POTATOES

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The Smooth and Russet Rural varieties of potato show mosaic so rarely under field conditions in New York State that inspectors and seed growers often assume that it is not necessary to make any attempt to record or control it in these varieties. Johnson (10) (p. 3) says: "The Rural appears to be comparatively free from marked symptoms of virus diseases." Nevertheless in some years high percentages of mosaic have been recorded, causing the rejection of fields of Rurals entered for seed certification, while other fields planted with the same stock showed no mosaic. Such circumstances led to a suspicion that mosaic might be much more abundant in these varieties than field inspections indicated. This suspicion was confirmed by the indexing of a quantity of Rurals during the winter of 1927-1928 when a considerable percentage of the indexed plants showed marked symptoms of mosaic.

Investigations reported in this paper have demonstrated that potato plants of the Smooth Rural and Russet Rural varieties frequently contain a virus which is more or less masked according to environmental conditions, but capable of causing a clearly recognizable disease on potato plants of the Green Mountain type.

The presence of a virus in plants which fail to show readily detectable symptoms has often been noted in scientific literature. Nishimura (11) reported that Physalis alkekengi was a symptomless carrier of tobacco mosaic. Holmes (6) has since shown that this plant is not always symptomless and that even when infected plants fail to show symptoms they still contain the virus. Holmes has also described the failure of certain other species to show symptoms when infected with tobacco mosaic.

Masking of mosaic in potatoes has been mentioned by many observers and its occurrence in warm seasons is commonly expected by inspectors, growers, and others. Johnson (8) showed that such masking of crinkle mosaic\(^1\) on Bliss Triumph potatoes could be caused by

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\(^1\) This disease is called rugose mosaic in an early publication (15) but in a later paper (10) the statement is made that the disease was incorrectly designated and should be known as crinkle mosaic.
temperatures above 20° C. Tompkins (15) further showed that temperatures of 28° C. for only 2 hours a day would cause this disease to be masked in the new growth.

Johnson (9) working in Wisconsin, reported a virus disease produced on tobacco by juice from apparently healthy Bliss Triumph potatoes. Fernow (3) working in New York with Green Mountain potatoes found that what is probably the same virus was capable of causing a mosaic on *Nicandra physallodes*, *Datura Stramonium*, *Lycopersicum esculentum* and *Nicotiana glutinosa* while showing no symptoms on potato. This virus has since been shown to be present in practically all individuals of most of the American potato varieties, although some European varieties seem to be free from it. Seedling potatoes do not contain the virus until they have been inoculated (3). On some European varieties it produces marked symptoms, usually of a necrotic type. Schultz (12) also reports a necrotic disease of certain seedlings caused by this virus.

This virus has been called by some the "healthy" potato virus and by others the "latent" virus. Neither name seems particularly appropriate but the second name is probably the less objectionable. The latent virus was no doubt present in most if not all of the plants used in these studies both in those called diseased and in those for convenience called healthy.

Atanasoff (1) showed that the varieties Ashleaf and Koksiaan exhibit no readily detectable symptoms of stipple-streak but may nevertheless serve as sources of inoculum.

Folsom (5) states that Irish Cobblers may carry leaf-rolling mosaic and that Rurals may carry either leaf rolling or mild mosaic without showing symptoms. Schultz and Folsom (13) (14) report transmission experiments to Green Mountain from "curly dwarf," "mosaic," "ruffle dwarf," and "dwarf" Smooth Rurals and Russet Rurals. These experiments were complicated by natural transmission in the open field from the inoculated plants to the adjoining controls, but seem to indicate that Rurals showing a diseased appearance may harbor leaf rolling and rugose mosaic. These authors note that Rurals which showed symptoms of mosaic in 1920 appeared healthy in 1921.

**Prevalence of the Disease**

An attempt was made to determine the prevalence of the mosaic disease noted in the greenhouse indexing of 1927–1928, by further indexing in the greenhouse. In table I, data are given as to the number of sources indexed and the percentages found in each year.

In all cases the lots indexed were either certified seed or the progeny of certified seed. In analyzing the data only those plants were counted as mosaic in which the symptoms were clear enough to make diagnosis relatively certain. Since doubtful cases were disregarded,