SEED AND SOIL TREATMENT FOR THE CONTROL
OF POTATO SCAB

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INTRODUCTION

Common scab of potatoes caused by the fungus Actinomyces scabies (Thaxter) (Güss.) has become more serious as a market factor since more emphasis has been placed on quality by an increasingly discriminating public. Scab causes an otherwise acceptable product to be placed in the unprofitable or marginal class of farm products.

No particular potato growing area of the United States produces scabby potatoes as a whole but certain fields or parts of fields consistently produce scabby tubers. In the Greeley, Colorado area, some fields that have produced scab-free tubers in the past, are now producing a high percentage of scabby tubers. In some instances a single hill of tubers will be found to be heavily scabbed, whereas those in the adjoining hills will be free from scab. Growers pay very little attention to such light or scattered infections but when such tubers are marketed the loss shows up in the reduced number of No. 1 or salable tubers.

Many attempts have been made to control common scab. Seed and soil treatments have been devised and to date none has been satisfac-

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tory. Many conflicting reports on the value of seed and soil treatments for scab control have been made in the literature. Cairns, et al (1) working in Ireland found that satisfactory control of scab was obtained by the disinfection of the affected seed tubers before planting, provided a sufficient interval had elapsed between the growing of successive potato crops in the same land. A great many factors are involved and man's ability to change the chemical and physical relationships encountered in soils, seems limited. A great deal has been published on the chemical and physical factors that affect scab development. Two variables, the organism and the environment, must be considered. It is generally accepted that when the soil reaction is lowered below pH 5.2, scab infection is greatly reduced (7). Some physiologic races of *A. scabies* are quite tolerant of acid soils (8) and there is little doubt that races of the organism exist that are capable of causing infection over a wide range of pH. It is extremely difficult to change the chemical and physical environment in a given soil and such a change may affect only a few races of *A. scabies* present.

The mercury salts have been found to be effective in killing the scab organism on the seed piece but they have been used with doubtful success for killing the fungus in the soil. Martin (5) reported a reduction in the amount of scab on tubers grown in soils treated with calomel, yellow oxide of mercury, or Semesan applied with fertilizer at planting time. In 1931 MacLeod and Hurst (3) found that seed treatment can be depended upon only as giving partial control of scab in Prince Edward Island, and in 1943 MacLeod and Howatt (4) reported that good control of scab was obtained by the use of mercuric chloride and calomel applied to the soil at the rate of 10 to 15 pounds per acre. Apparently these results were obtained in soils that were slightly acid. Taylor (9) found that the addition of mercury to the limestone soils of New York served to increase scab infection. When large quantities of mercury are added to the soil there may be danger of killing beneficial organisms and the cost of the treatment would be prohibitive.

Since the scab organism lives and increases in the soil independent of the potato, seed treatment could not be expected to prevent infection. It is possible that new physiologic races might be introduced into a given soil *via* the infected seed piece but the chances of survival and rapid increase of a new race is not likely. Many cases of scabby seed producing a clean crop and of clean seed, a scabby crop, have been observed. Attempts to inoculate normally scab-free soils by adding large quantities of scabby tubers were made by the writer and no increase