

CONTROL OF *Russet Scab* IN POTATOES . . .

Some Preliminary Observations And Results

By Nicholas Sandar¹

RUSSET scab is often called "sand scurf" by potato growers. At present it is one of the most serious single factors that affects the market quality of potatoes produced in the Red River Valley. The condition is characterized by a severe russeting or superficial cracking of the tuber skin (fig. 1) and is caused by the organism *Streptomyces scabies*.

No effective methods for scab control are available. The standard recommended methods include the use of resistant varieties, crop rotation, control of soil pH, seed and soil treatment. Of the main varieties now grown in the Red River Valley, only Early Gem has a relatively high degree of resistance to russet scab, but it is very subject to growth cracks and is lacking in cooking quality.

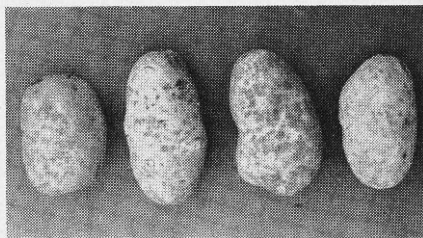
Progress is being made on the development of new resistant varieties, both at the North Dakota Ex-

periment Station and in other parts of the country. Recently, a soil treatment chemical has shown promise for controlling scab but its use is limited by excessive cost. With this lack of control measures, scab remains a major problem for potato growers in the Red River Valley.

The department of horticulture has placed emphasis on the problem of russet scab in its research on market and table quality factors as affected by various production practices. Since 1955 studies² have been conducted on the effects of various crop residues, legumes as green manure crops and fertility levels of the soil. The crop residues under study at present are wheat straw, green rye, green alfalfa, soybeans and vetch.

The critical need for information on control measures for russet scab has prompted this report which briefly summarizes some of the re-

Figure 1.—Russet scab symptoms on four potato varieties. Left to right—Red Pontiac, Early Ohio, Kennebec and Early Gem.



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sults obtained to date. The following statements are thus preliminary in nature and further work may result in their modification.

1. Russet scab is generally more severe on coarser textured or sandy soils as compared with fine textured soils.
2. Green rye plowed under just before planting potatoes showed little or no control of russet scab.
3. Stubble field conditions generally result in a higher degree of russet scab infection as compared with summerfallow conditions.
4. Under uniform summerfallow conditions, russet scab was increased in plots where wheat straw was incorporated but was reduced in plots where green alfalfa was incorporated. This was only true in the year of incorporation; when potatoes were replanted a second year in these plots, the level of russet scab was about the same in both the straw and alfalfa plots.
5. Highly significant negative correlations were found between the amount of russet scab and the level of soil nitrates.³ The critical period appears to be July and early

August. Any treatment that maintained a high level of soil nitrates during this period resulted in a much lower level of russet scab.

6. Sideband or broadcast applications of nitrogen (ammonium nitrate) at planting time generally reduced russet scab but did not eliminate it. Phosphate alone appeared to increase scab, but at higher levels of nitrogen in relation to phosphate this increase did not occur. Under spring plowed stubble conditions, the lowest level of russet scab and maximum marketable yields were obtained when rates of between 60 and 90 pounds of nitrogen per acre were used.

The preceding statements should provide the growers with some additional information to help them cope with the scab problem on potatoes. No specific recommendations can be made until some of the present experiments are completed. Studies on the effects of crop residues are being continued. The role of nitrogen and soil nitrates on the development of russet scab appears to be a major one but information on sources, rates, methods and the best time of nitrogen application is not yet available.



³Analysis of soil nitrates was made possible through the cooperation of Dr. A. P. Adams of the Department of Bacteriology.