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# Common Scab of Potato

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Common scab of potato occurs in many areas of Idaho and can be a serious problem. This disease has no influence on total yield. However, by severely blemishing tuber appearance (Fig. 1A), scab can drastically reduce visual attractiveness and value. *Streptomyces scabies*, a soilborne, filamentous bacterium, is regarded as the main causal organism of this disease. Additional species of the organism may also be involved. In some instances, scab may predispose tubers to chewing insects that may in turn accentuate its importance.

In addition to potato, the scab pathogen may infect sugar beet, red beet, radish, turnip, rutabaga and carrot. Therefore, selection of planting sites in the home garden is important.

Most infection on potato occurs early in the growing season following tuber initiation. The bacteria invade recently formed pores but do not invade directly through intact skin. With first appearance of this disease (generally about mid-July), small spots may become visible on the tubers. With infection, a wound barrier may form a few cells below the surface. If bacterial penetration continues, a second or third barrier may be formed. Fig. 1B shows a cross section of a typical scab lesion with a breach of the wound barrier. When the tuber stops growing, lesions do not increase in size. Scab development does not occur in storage — only during plant growth.

Common scab is favored by dry soil, particularly during the early part of the growing season. Soils with a high calcium level and soils rich in non-decomposed organic matter (e.g. barnyard manure) favor the disease. Growth of the pathogen is optimum at approximately pH 7.0 while pH below 5.5 generally inhibits activity.

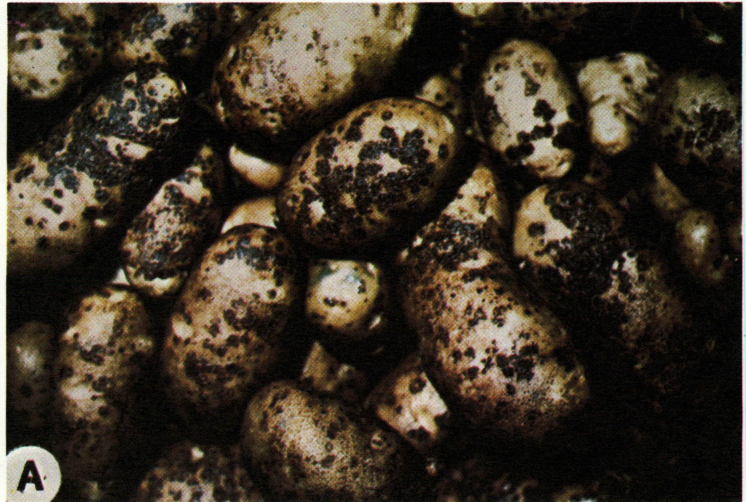


Fig. 1. Tuber blemished by potato scab disease (top), and cross section of a scab lesion (bottom).

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Trade names are used in this publication for educational purposes only.  
When using any chemicals, read and follow label directions exactly.

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## Control

### Soil Moisture

High soil moisture suppresses common scab. The most critical time for irrigation management is a period of 5 weeks following tuber initiation (when stolon tips swell to double their size). Tuber initiation generally occurs about 2 weeks after emergence. Therefore, the period when the potato is most susceptible to infection is about 2 to 7 weeks from emergence.

High moisture should be maintained in the upper 9 inches of the soil profile. The minimum moisture required for scab suppression approximates -0.65 bars (determined by pressure plate extraction method). On a silt loam soil this would approximate 75% available soil moisture. With sprinkler irrigation on a silt loam soil, this moisture level may often be accomplished by irrigation at 4 or 5 day intervals with sets of 5 to 7 hours, depending on consumptive use.

On a field where common scab is not a severe problem, high moisture alone may be a sufficient control. In a severe disease situation, treatment with pentachloronitrobenzene (PCNB) may also be necessary.

### PCNB Treatment

PCNB, sold under the trade name Terraclor, controls scab and has the added advantage of controlling rhizoctonia disease of potato (*Rhizoctonia solani*). Preplant broadcast application of PCNB has been highly effective for common scab control using rates ranging from 15 to 25 pounds per acre. The rate of application depends upon the irrigation regime that is followed. At high moisture levels, the 15-pound rate may be used; at lower moisture levels (above -0.65 bars), 20 to 25 lb./acre of PCNB are recommended.

The cost of PCNB may be considerably reduced by precise application techniques in place of broadcast application. PCNB can be successfully applied in an 18-inch band over the seedbed area. This takes half the dosage (for example, 12.5 lb./acre instead of 25). A disadvantage is that this technique does require special equipment. Band application requires proper spray equipment attached to the front of a rototiller. The spray nozzles should be adjusted to provide treatment application in 18-inch bands over seedbed areas. The rototiller can then incorporate PCNB 5 to 6 inches deep while bed shapers behind the rototiller shape the seedbed and simultaneously mark the rows. Potatoes are then planted in the beds. When applying band applications, bed shapers must be used.

**Problems with PCNB application** — This material must be applied according to label. Excessive rates of PCNB (above 25 lb./acre) may result in illegal residues. The lack of control with PCNB soil treatment can usually be traced to inadequate incorporation as follows:

(1) **Wrong implements.** PCNB must be thoroughly incorporated into soil. Planter hilling discs, harrows, rippers or other such devices will not do an adequate job. Incorporation must be either with a rototiller or by cross-discing to a depth of 8 to 10 inches.

(2) **Wrong soil preparation.** PCNB is most uniformly incorporated when treated on a flat soil surface. Application over furrowed land is not acceptable.

**Fall application vs. spring application** — All University of Idaho tests with PCNB to date have involved spring application. Although scab control may be possible with fall application, the risk of losing PCNB effectiveness seems to be greater. PCNB is broken down in the soil by microbial action and at moderate soil temperature the half-life (time required for half the chemical to decompose) approximates 6 weeks.

### Sulfur

Treatment with flowers of sulfur also provides effective scab control. However, because of application problems and the extreme fire hazard of this product, it currently does not lend itself to commercial use. Flake sulfur has not been consistently effective for scab control.

### Phosphate

On a calcareous soil where scab problem was severe, postplant side-dress applications of triple-superphosphate significantly suppressed common scab. Applications between 75 and 300 pounds of  $P_2O_5$  per acre increased total yield by 9 to 17% and yield of U.S. No. 1 potatoes by 83 to 104%. This was accomplished even though the residual phosphorus levels in soil were high (greater than 20 ppm in the upper 9 inches of soil).

### Resistance

Several potato varieties — Norgold, Targhee and Early Gem — are highly resistant to scab. In scab-infested areas these may be preferable to susceptible varieties such as Russet Burbank, Kennebec, Pontiac, Norchip and Bliss Triumph.

### Crop Rotation

Rotations involving rye and soybeans have reduced scab severity in other states, but rye and soybeans are not advised for Idaho.

### Biological Control

Newly developed land areas are generally most prone for scab invasion. In contrast, the likelihood of developing a scab problem in old potato ground (with no recent history for scab) is considerably less. This is believed due to the presence of soilborne organisms in old soils that are capable of providing biological control and thus prevent or reduce the incidence of scab.

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