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COMMON AND POWDERY SCAB OF POTATO

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COMMON AND POWDERY SCAB OF POTATO

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common scab

Common scab of potatoes causes economic losses in almost every potato-growing area in Canada. A severe infection reduces the yield. The consumer does not like to buy scabby potatoes; they are unsightly and are also wasteful because the scabs must be cut out.

The scabs vary from slight russeting of the skin to very rough, corky areas that may be raised, pitted, or superficial. They first appear as minute reddish or brownish surface lesions on the young tubers, usually around the breathing pores. As the lesions increase in size they become dark and develop into the typical, somewhat circular scablike areas. The scabs may be single, or several or many may join together to form a large corky mass.

Other root crops such as turnips, sugar beets, garden beets, and radishes are also affected by common scab.

what causes common scab

Common scab is caused by a soil-borne bacterium.¹ The scabs occur on the tubers, stems, stolons, and roots. They develop on growing tubers, not on those in storage. The organism can live for a long time in the soil. Potatoes grown in soil that has never been cropped before are sometimes severely scabbed.

The amount of scab that develops is influenced by the kind and amount of organic matter in the soil, and the acidity, moisture, aeration, and temperature of the soil.

Barnyard manure applied to the soil usually favors scab. The

¹*Streptomyces scabies* (Thaxt.) Waks. & Henrici.

organism may persist for many years in fields that have been heavily manured or in sites of old barnyards.

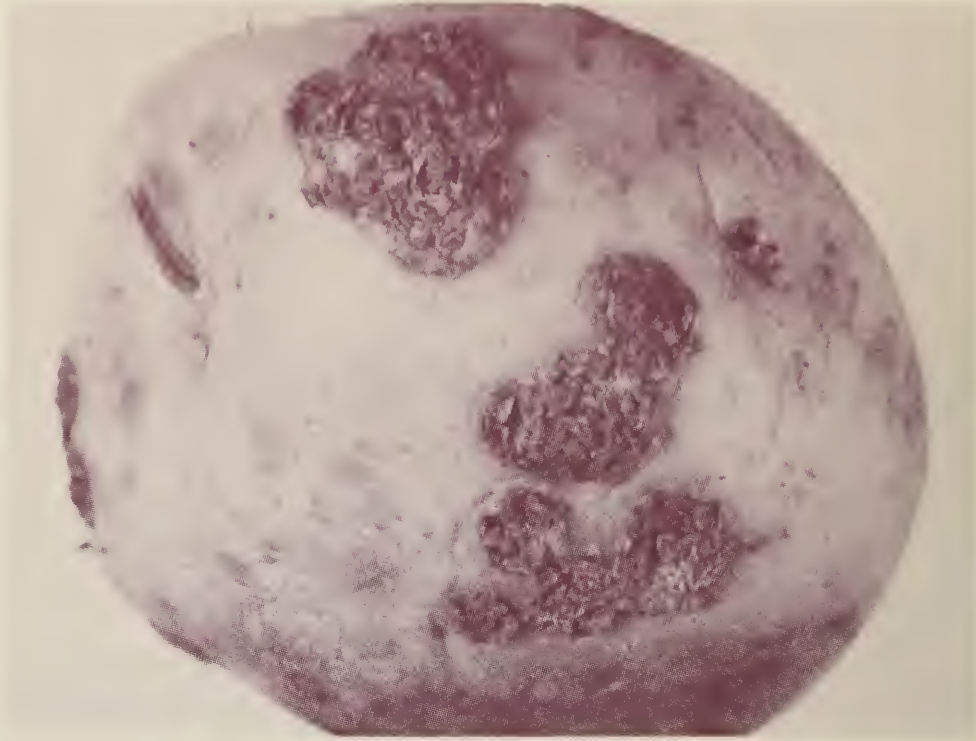


Fig. 1. Common scab.

The disease does not usually occur on potatoes grown in an acid soil with a pH of 5.2 or less; it is likely to be rather severe in soils that are slightly acid, neutral, or slightly alkaline.

Scab is usually worse in dry than in moist soils.

The disease develops on potato tubers grown in soil with a temperature of 50 to 85°F (10 to 29°C), the most favorable temperature being about 70°F (21°C).

control

Several preventive measures and other practices help to reduce scab. The main ones are: growing resistant varieties, proper soil management, crop rotations, and soil treatments.

Resistant Varieties

The most effective way to control the disease is by growing scab-resistant varieties. Although no variety is immune, a number of

varieties licensed as seed potatoes are resistant to scab. These are as follows.

Avon is moderately resistant to scab, is of medium maturity, is excellent for cooking, and makes a good chip when processed directly from the field, and when reconditioned at 70°F (21°C) after storage.

Cariboo has slight resistance and should be grown in soils where scabbing is not severe. It is high yielding and late maturing.

Cherokee has high resistance, appears to be field immune to mild mosaic, and has some resistance to net necrosis. It matures early.

Chieftain is a red variety with medium to high resistance and medium maturity. It is resistant to the common races of late blight, and to mild mosaic, stem-end browning, and net necrosis.

Chinook has high resistance and is late maturing.

Huron has high resistance and is late maturing.

Netted Gem (Russet Burbank), which is moderately resistant and late maturing, is good for baking and French frying.

Norchip has moderate resistance, is early maturing, makes good chips directly from the field and when reconditioned at 70°F (21°C), and is resistant to the potato flea beetle.

Norgold Russet has moderate resistance, and is early maturing with russet skin.

Norland is an early maturing red variety with moderate resistance.

Sable is an early sizing variety for the early market. It has low specific gravity and moderate resistance.

Sebago has slight to moderate resistance, and is late maturing with some field resistance to late blight.

Superior has moderate resistance, medium maturity, and moderately high dry matter; it makes good chips.

Viking is a medium maturing red variety, which is drought resistant and has moderate resistance.

Wauseon has moderate resistance and is medium to late maturing. It is resistant to common races of late blight, and to mild mosaic, net necrosis, and the golden nematode.

Because of the variation in climatic conditions in Canada, many of the above varieties do not grow well in some regions. Consult your Department of Agriculture for varieties that produce well in your area.

Preventive Measures

Because scab is generally less severe in highly acid soils than it is in slightly acid to slightly alkaline ones, it is important not to apply too much lime to potato fields. Where you need to lime potato land for growing legumes, apply the lime in the fall after harvesting the potato crop. Do not lime this soil again until after another crop of potatoes is grown. The amount of lime to add should be determined by a soil analysis.

Fertilizers and soil treatments that tend to keep the soil acid are beneficial in controlling scab. It is best to use ammonium sulfate to

supply nitrogen for the potato crop in soils infested with the scab organism. Sulfur is also used to increase the soil acidity; however, high cost and the need to pay attention to details of application limit its use. Be careful not to make the soil too acid when using either of these chemicals.

Timely irrigation of the potato crop can also help to control scab. It is now generally considered that the formation of scab is promoted by dry conditions, whereas the amount of disease is usually less in moist soils. If irrigation is used for scab control, the most important time to add water is just when tubers start to form and for about three to four weeks thereafter.

Rotations with nonsusceptible crops such as rye, alfalfa, and soybeans may reduce the incidence of scab. However, the length of time between potato crops is just as important as the particular crop grown in the rotation. Three to five years between potatoes are recommended for the prevention of scab.

Avoid adding large amounts of fresh manure to potato soil. It is best not to pile and burn dead potato tops or other refuse in the field as the alkaline areas that may be formed usually favor scab.

Treating the seed does not usually help to reduce scab. Therefore, it is recommended that scab-free seed be used in all plantings.

powdery scab

Powdery scab of potatoes is sometimes difficult to distinguish from common scab. It is less important than common scab but can occur in many of our potato-growing areas.

The disease occurs on roots, stolons, and tubers. On the roots and stolons, small light-colored warty growths appear, which gradually turn dark and break down releasing spores into the soil. On young tubers, small warty growths develop on the surface. As the tuber matures these growths turn brownish, become dry, and break down, leaving a roundish flat pustule surrounded by a ragged margin of torn skin. Within the pustule is a dark brown powder consisting of clumps of spores. The ease with which the powder can be shaken or scraped from the dry scab onto a sheet of paper is a useful means of distinguishing powdery scab from common scab. Single scabs, when mature, are less than one-quarter inch (0.6 cm) in diameter.

In very wet soils, a canker form of the disease may occur. The affected areas become malformed, split, and give the appearance of being eroded away.

In storage, a dry sunken rot may develop around the diseased areas.

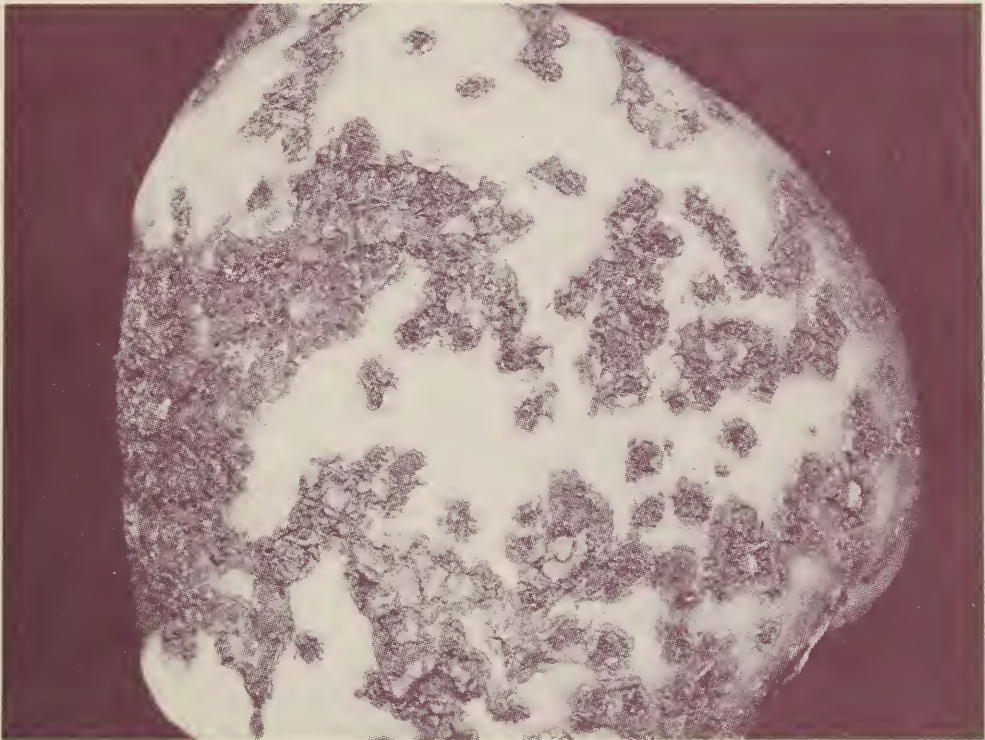


Fig. 2. Powdery scab.

what causes powdery scab

Powdery scab is caused by a fungus.² It is both seed- and soil-borne and can live for a long time in the soil. The fungus favors alkaline soils but can cause disease in acid soils as well. Powdery scab is worse in wet, cool soils. Infection is favored by temperatures below 68°F (20°C).

control

No adequate control measures have been developed for powdery scab; however, some preventative measures help to reduce it. Long rotations of five years and good drainage help. Avoid planting in low, wet areas of a field. As with common scab, intensive liming increases the amount of infection. Varieties of potatoes vary in susceptibility, but none are known to be completely resistant to powdery scab. Do not plant infested tubers.

²*Spongospora subterranea* (Wallr.) Lagerh.

more information

For more information, consult your agricultural representative or provincial specialist, or write to the nearest plant pathology laboratory of the Canada Department of Agriculture.

METRIC EQUIVALENTS

LENGTH

inch	= 2.54 cm	millimetre	= 0.039 in.
foot	= 0.3048 m	centimetre	= 0.394 in.
yard	= 0.914 m	decimetre	= 3.937 in.
mile	= 1.609 km	metre	= 3.28 ft
		kilometre	= 0.621 mile

AREA

square inch	= 6.452 cm ²	cm ²	= 0.155 sq in.
square foot	= 0.093 m ²	m ²	= 1.196 sq yd
square yard	= 0.836 m ²	km ²	= 0.386 sq mile
square mile	= 2.59 km ²	ha	= 2.471 ac
acre	= 0.405 ha		

VOLUME (DRY)

cubic inch	= 16.387 cm ³	cm ³	= 0.061 cu in.
cubic foot	= 0.028 m ³	m ³	= 31.338 cu ft
cubic yard	= 0.765 m ³	hectolitre	= 2.8 bu
bushel	= 36.368 litres	m ³	= 1.308 cu yd
board foot	= 0.0024 m ³		

VOLUME (LIQUID)

fluid ounce (Imp)	= 28.412 ml	litre	= 35.2 fluid oz
pint	= 0.568 litre	hectolitre	= 22 gal
gallon	= 4.546 litres		

WEIGHT

ounce	= 28.349 g	gram	= 0.035 oz avdp
pound	= 453.592 g	kilogram	= 2.205 lb avdp
hundredweight (Imp)	= 45.359 kg	tonne	= 1.102 short ton
ton	= 0.907 tonne		

PROPORTION

1 gal/acre	= 11.232 litres/ha	1 litre/ha	= 14.24 fluid oz/acre
1 lb/acre	= 1.120 kg/ha	1 kg/ha	= 14.5 oz avdp/acre
1 lb/sq in.	= 0.0702 kg/cm ²	1 kg/cm ²	= 14.227 lb/sq in.
1 bu/acre	= 0.898 hl/ha	1 hl/ha	= 1.112 bu/acre

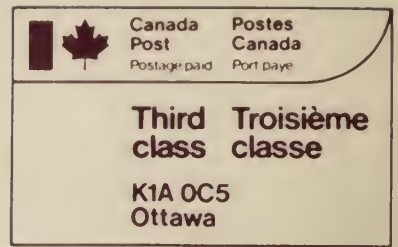
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