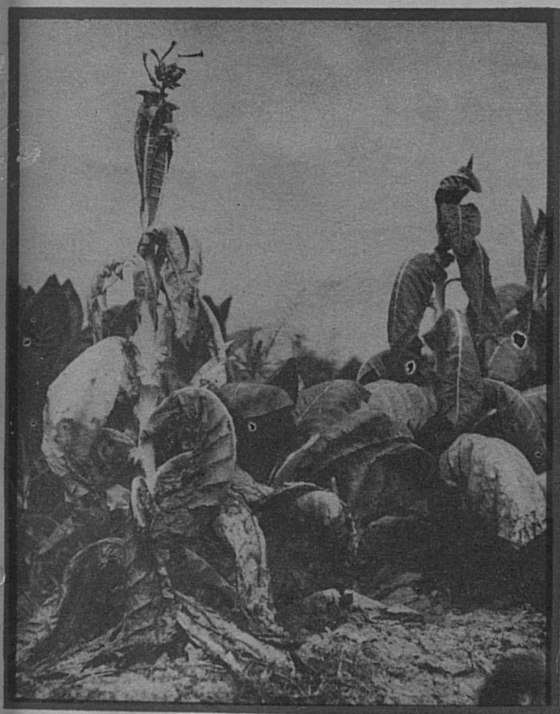


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PREVENT
Black Shank Losses in 1953

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SUMMARY

Prevent losses from black shank in 1953 by -

1. Placing the plant bed on clean land that is not likely to be contaminated by road water, wash from infested land, or wash from the tobacco barn.
2. Grow tobacco on land in 1953 that has never had black shank on it, and land that is not likely to become infested by running water from roads, infested fields, or any other source.
3. Prepare the bed and the tobacco field with tools that have been thoroughly cleaned, so that the black shank fungus will not be introduced on clods of dirt.
4. If you trade labor or tools with your neighbors, be sure that all tools are thoroughly clean before moving from one farm to another, and be sure no dirt is carried from one farm to another on men's shoes or on the hoofs of animals or in any other way.
5. Use water for watering beds and setting tobacco that has no chance of contamination with the black shank fungus. Water from creeks and rivers is not safe.
6. If any black shank plants do develop, remove them with all of the roots possible and drench the spot thoroughly with 1-400 nabam solution.
7. Do not allow a field to become heavily infested with the black shank fungus by growing tobacco in infested ground or by leaving infected plants and roots in the field. Remove them as completely as possible.

Recommendations For Farms With Only One
Field Fit for Tobacco

- 1951 - Black shank
- 1952 - No tobacco grown
- 1953 - Grow no tobacco

Note: If tobacco was grown on the infested field in 1952 and if all diseased plants were removed from the field as soon as symptoms could be observed, and the spots drenched with nabam, there is a possibility that carry-over of the fungus has been reduced and that there may be less loss in 1953 than in 1952; but there is at present no proof of this, and the grower might be taking considerable risk in using the land in 1953.

Recommendations For Farms With Two Fields Fit For
Tobacco, One of Which Was Infested in 1951

<u>Field 1</u>	<u>Field 2</u>
1951 - Black shank	1951 - Grass
1952 - No tobacco	1952 - Tobacco
1953 - No tobacco	1953 - Tobacco, if 1952 crop was free from black shank

Recommendations For Farms With Three Or More
Fields Fit For Tobacco

Fields infested with black shank should be in grass or other crops until experiments show it is safe to plant them to tobacco. In 1953 grow tobacco only on cleanland. If there was no black shank whatever in the 1952 field, it should be safe for another crop in 1953, provided precautions are taken not to contaminate the soil.

PREVENT BLACK SHANK LOSSES IN 1953

By J. W. Irvine and W. D. Valleau

One season has passed since Kentucky tobacco growers made a state-wide attempt to stop losses from black shank. The results have been spectacular and have demonstrated that a careful farmer who has enough land so that he can change the location of his tobacco from year to year if black shank develops, has little to fear from the disease. No satisfactory way has yet been found to prevent losses on farms where there is only one plot of ground satisfactory for tobacco, and this infested with the black shank fungus. It is too early to know the effect of removal of diseased plants and spot-drenching with nabam on carry-over of the black shank fungus in fields used for tobacco each year.

Clean Land and Clean Tools the Solution

Reports have been gathered on 1,183 farms ^{1/} that had black shank losses in 1951 but where tobacco was planted on clean land in 1952 ^{2/}. On 932 of these farms, or 79 of each 100, there was no loss whatever from black shank in 1952. Where black shank did occur on clean land, usually only a few plants were affected. Where tobacco was grown in 1952 on land where losses occurred in 1951, losses were sometimes heavy in spite of the drouth that occurred over most of the state.

^{1/} These figures are based on answers to a questionnaire sent to county agents and filled out by them. In some cases their answers were based on actual records; in others, on estimates. Enough accurate records were obtained to indicate that the estimates are conservative.

^{2/} By clean land is meant land that has never had a black-shank-infected crop of tobacco on it. Reports from counties with a long history of black shank suggest that some of the growers moved from a recently infested field to one where there was a carry-over from an infected crop some years previously, and so failed to get control.

A total of 393 farmers reported black shank on their farms for the first time in 1952, but it is probable that on most of these farms there was some black shank in 1951 which was either not reported or not recognized. If these farmers, in addition to those who successfully controlled the disease in 1952, will go to clean land and take necessary precautions not to contaminate the new field, losses from black shank need be very little in 1953.

How Long Does the Black Shank Fungus Live?

A year ago there was no definite information as to how long the black shank fungus would remain in the soil after a diseased crop. In 1952, studies were made on 27 fields out of tobacco 1, 2, and 3, years following a severe outbreak of black shank.

One year without tobacco was not long enough to get rid of the disease on any one of 12 fields studied, although on several farms losses were much less in 1952 than in 1950. On 4 of these fields losses in 1950 ranged from 30 to 90 percent, with an average of 55 percent, while in 1952 the range was from 2 to 40 percent, with an average of 21.1 percent.

Two years without tobacco gave variable results. Losses were recorded on 11 fields where the loss in 1949 ranged from 7 to 66 percent. In 4 of the fields there were 0, 1, 4, and 54 plants, respectively, that developed black shank in 1952. In another field the loss dropped from 50 to 1.6 percent; while losses in the other 4 fields ranged from 17.6 percent to 80 percent. In half of the fields a commercially satisfactory crop could have been grown, at least in a dry season, but the loss in the others was too great to warrant taking a chance on land only 2 years without tobacco.

Three years without tobacco was studied on only four farms. On two fields a single black shank plant was found on each, one field dropped from a loss of 90 percent in 1948 to 1.3 percent in 1952, and the fourth field

dropped from 25 percent to 4 percent. In any of these fields a satisfactory commercial crop could have been grown, provided that immediate removal of affected plants will prevent current-season spread to neighboring plants in a wet season.

It is obvious that even with 1 year out of tobacco there is a great falling off in inoculum, but the time required to completely rid a field of the fungus is not yet known.

As a result of these studies, recommendations can be made for 1953, based on the length of time the field has been without tobacco. See page 4.

Don't Allow Land to Become Heavily Infested

The more crops of tobacco grown on a piece of land infested with black shank, the more heavily the soil will become loaded with spores of the fungus and the longer it will take to get rid of them. Therefore, on the very first appearance of the disease, remove the diseased plants as soon as they can be recognized, taking up all roots possible, and then drench each spot thoroughly with 1-400 nabam solution (3 tablespoons of nabam to 10 quarts of water). If a field has many diseased plants the nabam treatment may be too tedious and expensive, but it would still pay to remove every tobacco plant, with as many roots as possible, as soon as it is recognized that it has black shank. If this is done carefully, taking out all roots possible, it is certain to reduce the amount of fungus spores that can be carried over. The field should then be sown to grass and not used for tobacco until experiments show it is safe. If any other ground is available, don't risk planting a field to tobacco the year after black shank is found in it, even though there were only a few plants and these were removed and the ground drenched with nabam solution.

Tobacco on Flooded Land

Several fields were found in 1952 that had had black shank in the past but had been flooded in winter or spring by high waters of a creek or river. These flooded

fields, when put back to tobacco, usually had few or no black shank plants below the high-water line, but in several instances had black shank above the high-water mark. While there is no absolute proof that flooding will always get rid of the fungus, it now appears that flooded land will be safer to use after a couple of years without tobacco than land that has not been flooded. Flooding, if it introduces the fungus, does not contaminate a whole field with black shank; it may leave a few contaminated roots or stalks in the debris at the high-water mark, and these may result in a few affected plants in the next crop.

Limestone and Carryover of Black Shank in the Soil

Studies on the reaction of the soil, whether acid or alkaline, as determined by pH, suggest that fields on which the pH concentration is high (that is, 6.5 or above) are more likely to carry the fungus from year to year than soil more distinctly acid (pH 5.6 or below). The most serious losses from black shank appear to be on parts of fields where much limestone rock, as small particles or large pieces are scattered through the soil.

Until more is known about the reaction between limestone particles and carry-over of black shank, it may be well to put spots in fields that are known to contain lime, such as drainageways from old limestone roads that pass across a field, in grass permanently, even though the remainder of the field is plowed for tobacco. Fields that have been heavily limed for alfalfa may be found to carry the black shank fungus for longer periods than more acid soils. There is no absolute proof of such a relation between limestone and black shank, but several observations make it seem probable, and it may be safer to use the more acid soils for tobacco. These observations also suggest that limed soils should be left out of tobacco longer than acid soils in getting rid of the fungus.

Selection of a New Field for Tobacco

Any farmer who had black shank in 1952 should select a clean field (that is, one that has not had a black shank

affected crop on it in the past) that does not receive any drainage water from a black shank field or, if it does, the waterway across the field should be left in grass above the high-water mark. The new field should not be along a road if the field is lower than the road and receives drainage water from it, unless all of the road water can be carried across the field on a sod waterway. If the field is about level with the road, a strip of sod about 20 feet wide should be left between the road ditch and the tobacco. This will tend to filter out the fungus that may be in the ditch water when it overflows the sod. The field should not receive drainage water from a barnyard or the yard around a tobacco barn; and it should be so located that no one has to cross a contaminated field to reach it. It has been observed that when an old tobacco bed site is plowed, along with a clean piece of ground, black shank sometimes starts at the old bed site. It may, therefore, be safer not to plow old bed sites for cropping tobacco.

Precautions Against Contamination of the New Field

The black shank fungus is carried in running water but also in clods of dirt on shoes or horses' hoofs, and in dirt clinging to all kinds of machinery. To prevent contamination of a new field, it is necessary that all tools that have been used in a black shank field be cleaned of dirt as thoroughly as possible before preparing the new plant bed and the new field. Thorough soaking of tools with 1-400 nabam solution should be helpful, provided all soil masses on the tools are thoroughly wetted.

It is so important that the machinery be clean that a farmer can afford to give careful thought to the best methods to be used under his conditions. It is better to do the cleaning on a grass plot rather than in a tobacco barn or in a barnyard where the tools may be contaminated again by the dirt left on the ground, and it is also better to do the cleaning as near the old infested field as possible so as not to distribute dirt from the black shank field over the farm. It would be highly desirable for each farmer to make a practice of cleaning all of his

machinery in the fall before storage for winter, so that this work need not be done when the weather is satisfactory for plowing and fixing the ground.

Selection of a Site for the Tobacco Bed

There is danger, on a farm where black shank occurs that infested soil may be carried to the plant bed site during the pulling season. It may, therefore, be safer to choose a new site each year. The tobacco bed should be placed where it will receive no drainage from a black shank field and where dirt from the barnyard or tobacco barn is not likely to be carried to it on the feet of animals or men. It should be located where it can be reached without walking across a black shank field. The bed should be prepared with clean tools. If watering is necessary, the water should be from a cistern, well, spring, a pond that does not receive drainage from a black shank field, or a city water supply; not stream or river water.

Grow Your Own Tobacco Plants

Make your plant bed large enough and care for it well, so that you will not need to get plants from another farm. In case of a plant bed failure in a black shank area in Kentucky, a grower would be much safer to go to a black-shank-free area for plants, but should take every precaution not to carry black shank to the farm from which he gets the plants.

Setting the Crop

Make every effort to see that all tools used in setting are as clean as possible before beginning work, particularly if they are borrowed tools that have been used on a black shank farm. The grower should see that the shoes of the setters are free from clods of dirt before entering the field, particularly if the setters are hired labor from a farm where black shank was present the year before. Black shank can be introduced in setting

water if it is taken from an infested creek or river. Pond water, if the pond receives no drainage from a black shank field, cistern water, spring water, and water from town or city water supplies should be safe to use.

Tobacco Stalks and Barn Sweepings

Tobacco stalks and barn sweepings from a black shank crop should not be used as bedding and should not be put on the manure pile. They may be burned or put on grassland that does not drain onto land that is to be used for tobacco or into a creek or river, if such land is available; or they may be put back, during a dry period, on the field from which they came if it has been sown to permanent grass.

Black Shank and Irrigation

Tobacco beds should not be watered from creeks or rivers, as at that time of the year the water is likely to be contaminated. It is also probably dangerous to irrigate tobacco fields soon after setting the crop, particularly if the water is high. However, at the low stage of rivers during a drouth, when irrigation is particularly valuable, it is probable that the water is free from contamination and safe to use for irrigation.

Visiting, Trading Labor and Tools, and Measuring Tobacco Acreage

Black shank can be carried from one farm to another on shoes, automobile tires and fenders, on the floor of a car, and on all kinds of machinery. Visitors from black shank farms, when visiting other farms, should first be sure that their shoes are free from dirt and that clods of dirt are not on the floorboard ready to be kicked out when they get out of the car. As an added precaution, visitors should stay entirely away from the tobacco field.

In areas where labor and tools are traded, the greatest of care should be taken to see that all tools are clean before they leave a farm; and the farmer on whose farm

the tools are to be used should assure himself that they are clean before he allows them to enter his farm.

Black shank could be carried from farm to farm by those who measure tobacco acreage for P. M. A. The P. M. A. has recognized this danger and has instructed that measurements of fields infested with black shank be made outside the field, and that infested farms be left last and then be measured only when the ground is dry. Another suggestion is that the measurers wear overshoes or boots which may be removed and washed before leaving the farm. (Letter 2241, August 9, 1951, State P. M. A. Committee to chairmen of county P. M. A. committees).

How to Recognize Black Shank

Black shank causes tobacco plants to look as though they had been drowned; and many growers, in the wet season of 1950, mistook a few plants that were dying from black shank for drowned plants, only to put the field back in tobacco in 1951, with heavy loss. The fungus that causes black shank lives through the winter in the soil and attacks tobacco any time during the summer.

The first signs of the disease are a slight wilting, followed by the lower leaves turning bright yellow and hanging down the stalk. At the early wilting stage it may be necessary to cut into the underground base of the stalk to find the blackened, diseased area; while later the roots usually will be found to be dead and a black rot may have spread up the stalk for several inches. If the stalk is split, the rot will usually be found to have entered the pith, which is dark and separated into disks.