

SANITATION AND FUNGICIDES FOR DISEASE CONTROL

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Potato growers need to be concerned with sanitation for a number of reasons. To begin with, ring rot and nematodes are spread more easily where no sanitation or hap-hazard sanitation is practiced. In addition to this, other things such as soft rots and various molds are able to survive and spread on premises and tools which are not properly cleaned up. Places where sanitation should be practiced are seed cutters, bins, crates, sacks, wooden truck beds, tools and store rooms where potatoes are held.

Seed cutters are more or less automatic in this day and age and a good many of them are not sterilized at all during the cutting process. Others are sterilized with the use of hot water through which the cutting knife runs continuously. Where a single cutting knife is used and is of a rotary type, hot water is the very best way of sterilizing the knife. Other knives can be sterilized by bichloride of mercury, used at the rate of 1 part to 1000 parts of water. There are several substances such as Lysol and Chlorox which, if properly used, can keep the blade of the cutting knife clean. The big problem with the cutting knife is the spread of ring rot in lots of potatoes where this disease is present. In many cases, ring rot spread would be very greatly reduced if the seed cutting implements were properly sterilized.

Bins should be sterilized after each season of use. The first requirement in the sterilizing of a bin is to have it thoroughly scrubbed so as to get rid of all the soil, dirt and rotted portions of potatoes which may be sticking to the sides and bottom of the bin. Once it has been thoroughly cleaned up, sterilizing is much simpler. In fact, unless it is thoroughly cleaned up, sterilizing will seldom be successful because many organisms can remain viable under a film of dirt where, if they were exposed directly to some sort of sterilizing chemical, they would be easily killed. There are a number of things that can be used to sterilize a bin. One old favorite is copper sulfate, 1 pound of it dissolved in 10 gallons of water and sprayed onto the sides and bottom of the bin or used as a wash on the various surfaces. It is non-poisonous and will do an excellent job of cleaning up a bin. Another substance which is used sometimes, but which is much more unpleasant to apply is formaldehyde. This is put on as a 1% solution of the commercial type formaldehyde. It is sprayed on in water solution. The gas is released and allowed to penetrate around through the bin. This material will do a reasonably good job of cleaning up, but the bin has to be aired out for sometime after the treating is done. It may take as much as two weeks or even longer to get all of the formaldehyde gas out of the bin.

In recent years, a group of quarternary compounds have been used as sterilizers. One of these is known as Roccal or Zephriol or Zephiran. Chemically, it is a compound known as Alky-dimethyl-benzyl-ammonium chloride. This is usually used as a 1 per cent solution. Where the organisms to be killed are fully exposed, this material will do a very good job. But altogether too often,

if there is a slight film covering over the organisms, such as a film of the sticky material frequently associated with bacteria, this quarternary compound will not penetrate the dried surface and will not do a satisfactory job of sterilizing.

Finally, there is a material which is used mostly for wood preservation, which is known as creosote. This is a rather acrid smelling substance. If smeared onto food products, it would be undesirable to say the least. However, in new bins where it is necessary to preserve the wood, creosote can be used if it is allowed to dry out thoroughly. It should be thoroughly absorbed by the wood before the bin is used for the storage of potatoes and vegetables. So, while creosote is not really a sterilizing material, it is excellent for wood preservation and should be used on any wood which remains permanently damp or is in contact with the ground.

There is another material used to preserve wood. It is pentachlorophenol which is usually recommended in place of creosote for preservation of wood which is going to be used in building. Where sterilizing and preservation of timber in the ground is needed, creosote is perhaps the best material. However, for above ground preservation and in places where the wood will not be rained on or made wet repeatedly, pentachlorophenol is an excellent material to use. It is quite poisonous so should be kept from coming into contact with potatoes. Where it has been used on wood and has soaked into the wood, it is safe. Wood can also be sterilized and preserved to some extent by using a Bordeaux paint on the wood. This, of course, is a copper compound. Where the wood is not exposed to rain or weather, a copper compound painted on is an excellent preservative.

One of the most important disinfecting processes is that employed on tools. A tool which has been in the soil or in contact with diseased tubers needs to be sterilized. A good method of sterilizing tools is to wash them thoroughly and then heat them with steam. This is possible only in a special building where a tool could be pushed into it and then steam blown around it. Where a small container is used to sterilize tools--such as an autoclave--steam is a good sterilizer. There has been some discussion of using steam at a service station to sterilize tools after they have been on nematode infested soil. This could be a satisfactory way of treating tools, but it is necessary, first of all that tools be washed absolutely clean of soil. No particle of soil should adhere to the tools in any place. Following this, if steam cleaned such as is done on an automobile engine, a satisfactory job of sterilizing the tools would likely result.

Where some fungus or bacterial contamination is found on a tool, it can be sterilized by the use of copper sulfate wash. Dissolve 1 pound of copper sulfate in 10 gallons of water and wash the tool in the solution, after it has been thoroughly cleaned. Remove all soil and plant debris. Another material which has been previously described, Roccal, or some other quaternary compound, is usually satisfactory for tool sterilization. Again, the tool must be absolutely clean when the material is applied.

Not infrequently, it is necessary to sterilize sacks and other cloth material such as coveralls, gloves and things which come into contact with diseased tubers, particularly those infected with ring rot. The best way of sterilizing these things is to place them in a closed container and heat them with live

steam. The clothing and sacks should be moist and the material should be so handled so that all air is driven out of the container before the steam is turned on and allowed to remain. Steam sterilizes sacks by means of heat and that heat has to penetrate all through them before the sterilization is complete. This is a very satisfactory method if done properly.

Sacks and other materials such as gloves which are infected with things like ring rot can be sterilized by putting them in a copper sulfate solution. While this is not desirable where a staining of the blue sulfur would harm the materials, with burlap sacks and things of that nature, copper sulfate could do a satisfactory job. Last, but not least, using formaldehyde is a very successful way of getting rid of disease organisms. Wet sacks or other materials should be placed in a closed container and should not be packed too tightly. The formaldehyde gas should be allowed to permeate the sacks thoroughly and then be thoroughly aired out before there is any use made of the sacks. This may take some little time, It will do the job successfully if time enough is allowed for the formaldehyde to penetrate all through the wet material.

These are two fungous diseases of potatoes in the Columbia Basin that sometimes require sprays as control measures. These diseases are caused by the early blight fungus and the powdery mildew fungus. Both diseases can be quite serious and destructive. At such times chemical control is the only thing that can be used to save the crop.

Early blight is caused by the fungus that attacks the leaves, stems and above ground parts. Spots appear on the leaves which are made up of a series of slightly raised target-like rings. Spots may be few and on the lower, older leaves, or may be so numerous as to severely blight all of the leaves, causing extensive defoliation. The stems may be covered with brown streaks.

Control of early blight is difficult if the fungus has a good start before the plants are sprayed or dusted. The disease is more severe under wet, humid conditions following natural rainfall or sprinkler irrigation. Sprays are usually more effective than dusts. Use 2 pounds actual of Maneb or Zineb per acre in 100 gallons of water or 40 pounds of Maneb or Zineb dust per acre. Some growers prefer fixed copper at the rate of three pounds in 100 gallons of water per acre.

Powdery mildew is also caused by a fungus that attacks above-ground parts. The first sign of the disease is a series of brown to dark brown streaks or stippled patches on the stems just above ground-line. These patches increase until they cover the stems and the leaf petioles. White mealy spots appear on the leaves and increase in size until the entire leaf is covered. Later the stems also become a mealy white. Late in the season, tiny black specks may be scattered through the moldy growth.

Control should be started at the very first appearance of the disease. Dust with sulfur at 30 pounds per acre. Additional applications may be necessary at a later date. Do not apply sulfur when the temperature is above 90°F. If control is delayed until mildew is well established, it will not control the disease.