

SPUD NOTES

Horticulture  
Section  
Vol. I, No. 4

April, 1943  
Colorado State College  
Fort Collins, Colorado

#195

Misc. Series Paper No. 195, Colorado Agricultural Experiment Station

"IRRIGATING UP" POTATOES

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In some districts, owing to insufficient snowfall and spring rains and to desiccating winds or continued hot weather, it becomes necessary in some years to irrigate the land before planting potatoes or to "irrigate up" the newly planted crop to insure germination. The term "irrigating up" refers to the application of water after planting for the particular purpose of supplying moisture to facilitate germination.

If spring plowing is delayed, the land may be irrigated before plowing. When alfalfa ground has been crowned in the fall or plowed early in the spring it is not practicable to irrigate the soil by the flooding method. Plowed land is sometimes furrowed or ditched and irrigated before planting, but as a general rule if the soil lacks sufficient moisture to germinate the sets, water is not supplied until after planting.

When seed pieces or tubers of liberal size have been used and planting has been sufficiently deep, sturdy sprouts may develop and maintain their vigor for some time even though the soil is dry, but soil moisture must be available before roots can develop.

"Irrigating up" the crop after planting must be done very carefully or the seed may decay. This is especially true where cut seed has been used. The most successful method is to irrigate until the moisture reaches slightly above the seed piece or sprout but suspend irrigation before the soil above becomes wet. Applying an excess of water is often injurious, causing the soil to run together and form a crust which excludes the air and causes the seed pieces to rot. Although desired results may be obtained by running water in each furrow, in many instances the watering of alternate furrows would be sufficient. The depth of the ditch and the head of water to use will depend on the length of the row, the porosity of the soil, and the slope of the ground. On flat land the furrows must be fairly deep so that the water will not reach the top of the ridges. If the land is steep or of a type that will wash badly, a shallow furrow should be used. It is a good practice to cultivate and harrow the soil after "irrigating up" as soon as the condition of the soil will permit. Cultivators with narrow shovels and a light weight harrow are best suited for this work.

Irrigating in the fall or early spring is a good practice if water is available. Applying the water before planting is preferable to irrigating after planting, but good stands can be secured by "irrigating up" if the water is properly applied.

## DISINFECTING THE SEED CUTTING KNIFE

D. P. Glick

In the March 1943 issue of SPUD NOTES, Drs. Kreutzer and McLean described the spread of ring-rot infection resulting from use of an ordinary seed cutting knife that is not disinfected. It is known, too, that the virus of the spindle tuber disease may be spread in this way, as well as other seed-borne potato diseases.

When ring rot was first discovered in Colorado and the role of the cutting knife in spreading the disease was recognized, it was realized that this type of spread could be controlled by applying a disinfectant to the knife after each tuber was cut. At that time it was recommended that the knife be dipped in a 1-500 solution of mercuric chloride (corrosive sublimate). Some growers used several knives so that each could be immersed in the disinfectant for a longer period than if only one were used. From this, thanks to the ingenuity of growers and college workers, there developed the rotary cutting knife consisting of a circular blade that revolved through a small tank of disinfectant. The blade moved freely on its shaft or was motor-driven.

With the coming of war, the cost of mercuric chloride became almost prohibitive and other disinfectants were sought. In testing various disinfectants attention was paid both to the strength of the disinfectants, that is, their ability to kill the ring-rot bacteria quickly, and to the life of the solutions in actual use. It was soon found that the mercuric chloride solutions deteriorated so rapidly that the cost of operation was exorbitant. Other disinfectants became rapidly exhausted, also. Not more than six or eight sacks of seed could be cut per one gallon of solution before it became necessary to renew the disinfectant solution completely. A 2-percent cresol solution seemed to be the best, although it did not kill the bacteria quite as quickly as the mercuric chloride.

It had long been thought that heat might be used to disinfect the cutting knife, but this method had not seemed as convenient as using cold disinfectant solutions. Now that the chemical disinfectants had been proved too expensive or too easily exhausted, studies were made on the practicability of using boiling water as the disinfecting agent. The results were excellent. Not only did boiling water kill the ring-rot bacteria quickly but it continued to do so indefinitely as long as it was kept boiling and as long as evaporation losses were made up by adding a little water from time to time so that the rotating knife would always be completely treated as it revolved. Boiling water was found to control the spread of the spindle tuber virus, also.

Several methods of heating the disinfecting water are in use today. Electric heaters immersed in the water, gasoline burners, and bottled gas burners all work equally well. There are practically no differences in the costs of installation or operation, so the method of heating that is chosen depends upon the equipment available and the type of application that is to be made. Thus, the gasoline or gas-heated cutters are more portable, while the electrical heating may be preferred for stationary installations.

Deserving special attention is the practice of centralized or custom cutting as practiced in the San Luis Valley. Here the use of boiling water as a disinfectant was readily accepted and has proved very satisfactory. Instead of constructing several single-knife cutters, each with its own heating equipment, a few operators, consisting both of private growers and cooperative organizations,

built large cutting tables. Five or six cutting knives in each table were found to be suitable to their operations, although as many as 10 have been installed in a single table. In most instances these cutters have been constructed so that each rotary knife has its own tank of boiling water. Continuous drip systems are used to keep the level of the water in each tank to the desired height. Such equipment is somewhat more expensive than many individual growers would care to own, although a single knife or even a table having two knives may be built quite inexpensively. Neighbors or cooperative members are then urged to bring their seed to the large centers for cutting. In this way the cutting machines receive maximum use and only a few workers need to develop the skill (although very little is necessary) to do speedy cutting.

In one patented cutting machine the cutting table on which the seed rests consists of belts that rotate through the boiling water, thus providing continuous disinfection of those surfaces as well as of the knife. In other equipment this type of disinfection is accomplished by making the part of the table next to the knife of light sheet metal, in which case the table top is disinfected by steam rising from the tank of hot water beneath.

Recommendations: (1) Always disinfect the seed cutting knife after cutting each tuber, no matter what type of knife is used. (2) Continuously boiling water is probably the cheapest and is certainly the most efficient disinfectant that can be used. (3) If you live in a potato-growing community, encourage the purchase or construction of a seed-cutting machine large enough to serve the entire area and invite all growers to bring their seed to the machine for cutting. It will probably cost less and will insure proper treatment of the seed during the cutting operation.

#### BETTER POTATOES

The following suggestions were taken from the March issue of "Better Potatoes in Nebraska." The original was prepared by the Departments of Horticulture, Entomology, and Plant Pathology of the Nebraska Agricultural College.

I. A six-point Central Nebraska Program (early district). To increase yield and improve quality.

1. Plant only the best procurable seed--preferably certified. Guard especially against wet, rotting tubers.
2. Warm up seed so that sprouting is under way at planting time.
3. Plant after alfalfa or sweet clover on land that has not grown a potato crop for at least 3 years.
4. Be prepared to control psyllids or late blight if either appears.
5. At digging time handle potatoes more carefully to prevent mechanical injury, and protect potatoes from heat and wind from the time they leave the ground until they are in the car.
6. Load and ship in pre-iced cars or pre-cool or ice as soon as possible after cars are loaded.

II. Nine-point Western Nebraska Program (late district).

1. Obtain best seed procurable--preferably certified seed. Treat seed in March or April.

2. In dry-land production use only land that has at least 3 feet of moist soil at planting time. (Summer fallow a field for the 1944 crop.) With irrigation, plant after alfalfa or sweet clover. Do not plant on land that has grown potatoes within the last 3 years.
3. Cut seed potatoes during the early spring. Hold cut seed under proper conditions for developing a protective wound cork.
4. DISPOSE OF OR DESTROY ALL CULL PILES OF POTATOES TO DESTROY PSYLLIDS AND FLEA BEETLES WHICH LATER MIGRATE TO NEARBY FIELDS.
5. Do not plant potatoes before June 10, preferably June 17 to 24, to avoid principal source of flea-beetle damage and reduce early blight, Fusarium, scab, and Rhizoctonia.
6. Insure good stands by planting sound seed in moist soil.
7. Spray early and thoroughly.
8. Reduce amount of mechanical injury at harvest time. Plan now to rebuild or adjust equipment and to instruct workers.
9. Store properly. Maintain high temperature and high humidity for the first 2 weeks, then cool storage to 40°F. as quickly as possible.

### III. Other suggestions:

1. The best seed - freedom from seed-borne diseases.
  - a. Diseases that can be detected by looking at the seed are: Fusarium, black leg, spindle tuber, common scab, Rhizoctonia, and ring rot.
  - b. Diseases that cannot be detected are: Mosaic, leaf roll, late season spindle tuber infection, and mild ring-rot infection.
2. Proper care of seed potatoes before planting is very important.

To insure prompt and uniform emergence, seed potatoes should have short sprouts at planting time (not over  $\frac{1}{2}$  inch long, in the early district). If dormant, store in a warm place for 1 to 3 weeks. Delaying planting to prewarm seed may be more desirable than planting dormant seed in cold soil.

When seed is properly handled, a layer of wound cork develops at the cut surface. This prevents drying out and the entrance of rot producing organisms. The effective development of this protective layer is accomplished by holding cut seed in a warm place (65 - 70°F.) in a humid atmosphere. Avoid direct sunlight. Never place cut seed in a deep unventilated pile.

Properly healed seed pieces produce better stands than fresh cut seed during hot weather.

### 3. Choice and use of land

Good crops of potatoes can be produced every year if the soil is filled

with moisture to a depth of 3 feet or more, even though there is no effective rainfall during the summer. On dry land, summer fallowing is generally necessary to provide such moisture. Beans and corn remove less moisture than small grains.

Rotation of crops is necessary to increase length of time between potato crops to help control soil-borne diseases; scab; Rhizoctonia and Fusarium.

On irrigated land, rotations maintain soil structure and influence water absorption, and maintain proper fertility. Six-year rotation: Beets, alfalfa in small grain (3 years of alfalfa) potatoes--four year--potatoes after sweet clover.

4. Time of planting is important.

Planting in early districts to get early production. Ideal time is when soil temperature is 45° F. (Rhizoctonia is more severe in cold weather).

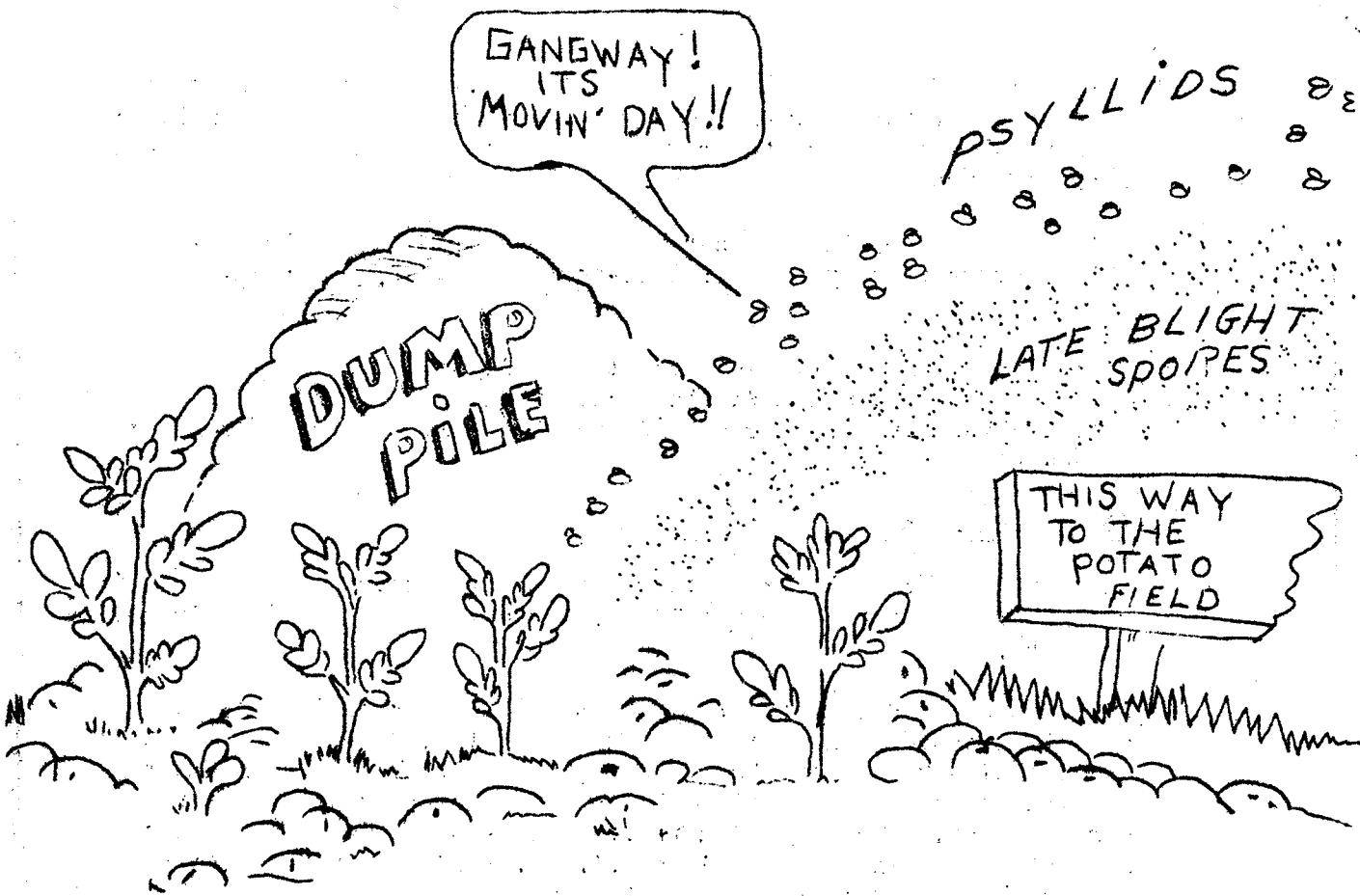
In western Nebraska late planting is a major factor in producing quality potatoes. No potatoes should be planted before June 10 because of the build up of flea beetle and psyllid populations. Planting Triumph potatoes between June 12 and 25 results in less common scab, early blight, Fusarium and Rhizoctonia. Potato tubers of best type and color and a maximum yield of U.S. No. 1 even though the total yield may not be as great as earlier plantings.

5. Seed and soil at planting time.

Protect seed potatoes at all times against hot sun or winds. Guard against spread of bacterial ring rot and spindle tuber. Do not cut any rotting tuber or any suspected of having spindle tuber.

6. Irrigation to increase yields and alter quality.

Irrigate whenever necessary to keep crop growing steadily. Early irrigation stimulates vegetative growth, increases set and the amount of medium size tubers. Necessitates a large amount of water later in the season -- with adequate irrigation gives maximum yields. Light or late irrigation results in late or light set, oversize tubers, yields below possibilities. If water is limited, irrigate to prevent any serious growth checking, but use most of the water at the time of tuber development. Avoid a water-logged soil because it induces enlargement of lenticels which allow the entrance of rot-producing organisms.



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