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Potato Growing in Iowa

E. S. Haber

Potatoes rank high in importance among the vegetables commonly grown in Iowa gardens. The potato, which contains about 80 percent water, 15 to 18 percent starch and about 2 percent protein, in the raw state, is a cheap and available source of highly nutritious food. Iowa, which produces about 75,000 acres of potatoes, most of which are used on farms or sold on the local markets, does not grow enough to supply its own needs.

The average yield for Iowa is probably less than 100 bushels per acre. Because of high summer temperatures and poor distribution of rainfall during the growing season, the climate is not ideal for the production of potatoes. However, satisfactory and profitable yields can be secured if the grower will adhere to the practices as outlined in the following paragraphs.

SOILS

An ideal potato soil should be high in fertility, friable, deep and with an acid to slightly acid reaction. Soil type definitely influences the shape of the tuber, light well-aerated soils producing better shaped tubers than heavy soils. Sandy soils are excellent for early potatoes, but in dry seasons the crop may suffer from lack of moisture. Heavy clays fail to produce tubers of good quality or shape. Sandy loams and medium loams are the most satisfactory upland soils. Much of the commercial acreage in Iowa is on peat and muck. They are excellent potato soils when they have adequate surface and subsoil drainage. Because of their high percentage of organic matter and lower temperature, they yield more heavily than mineral or upland soils, when properly managed.

Clover, alfalfa and sweet clover sods plowed under are excellent for increasing organic matter and nitrogen. Alsike, rye, soybeans and similar acid-tolerant crops are often preferable as they can be grown without liming. Potatoes should follow a cultivated crop; therefore it is advisable to have a rotation such as legumes or bluegrass, then corn, and then potatoes.

Scab, which is one of the most serious diseases of potatoes, is less prevalent on acid or slightly acid soils than on neutral or alkaline soils.
SOIL PREPARATION

Deep fall plowing is advised, followed by thorough discing and harrowing before planting.

FERTILIZER

Potatoes are heavy users of soil nutrients. Compared with most farm crops they use especially large amounts of potash. A crop of 150 bushels of potatoes will remove about as much nitrogen and phosphoric acid as 25 bushels of wheat or 50 bushels of oats and five or six times as much potash as wheat or oats.

There is a long-standing belief that farm manures, especially fresh, when used as potato fertilizers, encourage the development of scab. Omission of stable manure, however, is no insurance against scab infection. If the soil or the seed are infected, scab will attack the tubers whenever moisture, temperature, aeration or acidity conditions in the soil are favorable for growth of the scab organism. In spite, therefore, of the possible danger of encouraging scab infection, stable manure is a good potato fertilizer. It supplies organic matter and, with the addition of 40 to 50 pounds of superphosphate to each ton of manure, is excellent. It is advised that manure be applied just ahead of plowing the fall before the potatoes are planted and that the superphosphate be applied either just before seedbed preparation or else sown with a fertilizer attachment on the planter as the seed is planted.

Usually potatoes will respond to superphosphate on any Iowa soil. Peats and mucks are uniformly deficient in potash. Sand needs a complete fertilizer. Loam or clay loam should have 500 pounds of 0-20-0 (superphosphate) per acre. Peats and mucks should receive 500 to 700 pounds of 0-9-27, sand, 500 to 700 pounds of 3-9-18 and sandy loam, 500 pounds of 4-8-6.

Up-to-date potato planters have fertilizer attachments which place the fertilizer in bands near the seed-piece zone. Farmers who do not have special tools for planting and fertilizing should broadcast the fertilizer before spring plowing or, if the field is fall plowed, before cultivating in preparation for planting. In the home garden the fertilizer may be applied in the open furrow between the seed pieces, but it should not touch them as it may injure the starting sprouts.

VARIETIES AND SEED

The Irish Cobbler is the most reliable all-round variety for Iowa. It has deep eyes and is susceptible to scab and spindle tuber, but it yields well, grows vigorously, is early, is a good
storage variety and has fairly good quality. The Early Ohio is well liked but is likely to have knobby tubers and growth cracks, and it will not yield as well under adverse conditions as the Cobbler. Rurals may be grown with fair success but they are rather late and do not produce large yields. Chippewa is the best new variety. It will yield as well as the Cobbler under favorable conditions. Warba and Red Warba are earlier than Cobbler but when soil moisture is low the tubers are small. On account of its earliness, Warba is a good home garden variety for immediate table use. It is not recommended for storage. The Pontiac, a very recent Michigan introduction, is an attractive, high quality, red-skinned variety which in test the past 2 years has shown considerable promise.

Only healthy, disease-free seed potatoes should be planted. Good appearance of potatoes in the bin does not insure good planting stock, as they may be from infected plants and produce diseased progeny the following season. Even the selection of apparently healthy hills in a field containing some diseased stock may result in diseased progeny the following season. The surest way to get healthy planting stock is to use certified seed each year. In Iowa, all certified seed comes in bags, sealed and tagged with a blue label, on which is stated the name of the variety, its source, and the name of the certifying agency.

SPROUTING

Seed pieces should start to grow as soon as possible after planting. Sun sprouting or “greening” of seed potatoes is beneficial. The tubers should be exposed to moderate or subdued light for about 2 weeks before planting. The sprouts developed under these conditions will be short, green, vigorous and more disease resistant. The sprouts from this seed will emerge earlier from the soil and the tubers will mature slightly earlier than sprouts from dormant tubers. Long spindly sprouts are not desirable as they are easily broken off in handling and planting.

SEED TREATMENT

The scab and scurf or Rhizoctonia organisms on the seed potatoes should be killed by treating the seed with suitable chemicals. Scab appears on the tubers as corky areas and Rhizoctonia as black specks. The latter disease may also infect the stems and appear as brown lesions below ground. Sometimes plants infected with Rhizoctonia will produce aerial tubers. Even though seed is treated the new tubers may be infected because of the presence of these organisms in the soil. The following treatments are satisfactory:
Cold formaldehyde: To 30 gallons of water, add 1 quart of 40-percent formaldehyde. Soak the potatoes 2 hours.

Hot formaldehyde: Add 1 pint of formaldehyde to 30 gallons of water. Heat the solution to 126°F. Soak the potatoes in crates or in sacks for 3 minutes in the solution, remove them from the solution and cover them for 1 hour. It is essential that the solution temperature be held from 123 to 126°F., as the treatment is ineffective at a lower temperature.1

Acid-Mercury Dip: To 25 gallons of water, add 6 ounces of corrosive sublimate and 1 quart of hydrochloric acid. Soak the potatoes 10 to 15 minutes, then dry before cutting. This will treat 40 to 50 bushels of potatoes. Use wood or earthenware containers for this solution.

Semesan Bel is particularly adapted to the needs of the small home garden. It should be used according to the manufacturer’s directions.

Potatoes treated with formaldehyde may be used for food if all are not planted. Do not use potatoes treated with acid-mercury dip solution as they are poisonous.

SIZE OF SEED PIECE

Highest yields are secured when seed pieces weighing from 1 to 2 ounces are planted. Chunky seed pieces containing one or more eyes are desirable. Tubers weighing 6 to 8 ounces are ideal for cutting into four pieces, each weighing from $1\frac{1}{2}$ to 2 ounces, or about 10 pieces to the pound. Using this size seed piece, at least 20 bushels of seed are required per acre.

TIME OF PLANTING

Experiments conducted by the Vegetable Crops Subsection of the Iowa Agricultural Experiment Station on time of planting show definitely that the largest yields are secured when planting is early. Potatoes should be planted in our upland soils before it is safe to plant corn. Peat and muck soils as a rule cannot be worked as early as the upland soils and planting may have to be delayed until a proper seedbed can be prepared. The best planting dates in Iowa will vary from early April in the south to the latter part of April in the northern part of the state.

SPACING

On upland soils, the rows should be spaced 36 inches apart and the seed pieces in the row 12 inches apart. On peat and

1For more detailed information on this treatment, write the Extension Service of Iowa State College.
muck, closer spacing, with rows as close as 32 inches and seed pieces 10 inches in the row, has the advantage of producing a larger yield of more evenly sized tubers. With closer spacing, the leaves will interlace and provide a canopy over the soil which will keep the soil temperature lower and may be of some protection against unseasonal frosts, common on peat. Somewhat more seed is required for closer spacing.

DEPTH OF PLANTING

The usual planting depth is 4 inches. In sandy soils 1 or 2 inches deeper is desirable. Cover the seed shallow with only 1 or 2 inches of soil, so that the soil will warm up sooner around the seed piece and hasten growth of the sprouts. In cultivation, fill in the planting trench after the sprouts are 6 inches or more high. With shallow covering, less Rhizoctonia damage to stems will occur. Modern potato planters are so constructed that they plant deep (4 inches or more) and cover shallow. The soil should be pressed firmly around the seed piece.

CULTIVATION

Cultivation should be shallow since deep cultivation destroys the roots near the surface and does not increase the depth of penetration of the undamaged roots. When roots are cut off by the cultivator, the potato plant fails to utilize all the moisture and plant food in the upper and often richer soil. Timely cultivation is more important than frequency, since weed control is the primary purpose of cultivation. The grower should strive to destroy all weeds when they are very small. Hilling is not desirable unless the tubers are exposed to greening at the surface, because soil moisture is lower and soil temperatures are higher at the level of the tubers in ridged soil.

SPRAYING OR DUSTING

Maximum yields cannot be secured without adequate insect or disease control. It always pays to spray or dust any potato patch. As much as 50 to 150 bushel increase in yields per acre are often secured by adequate spraying. Bordeaux mixture, consisting of 10 pounds of crystalline copper sulphate, 5 pounds of hydrated lime and 4 pounds of calcium arsenate in 100 gallons of water is the standard spray. The first spray should be applied at the rate of 100 gallons per acre as soon as the Colorado potato beetles or leafhoppers appear and spraying should be repeated every 10-12 days until the leaves begin to die. Usually 4 or 5 sprays are sufficient.
To make the bordeaux mixture, dissolve the powdered copper sulphate in a half tank of water in the sprayer, start the agitator and add the lime. The lime should be prepared in a container by adding water and stirring until a thick milk of lime is secured; then pour this into the sprayer through the stainer. About 100 gallons per acre should be sprayed on the foliage at each spraying.

Very large sprayers with pressure pumps capable of delivering 15 to 20 gallons per minute at 400 pounds or more pressure per square inch and tanks holding 200 to 400 gallons of liquid, spraying 8 to 12 rows at one time, are most satisfactory for commercial growers. Such sprayers cause less wheel damage to the plants because they cover so many rows at once, thus reducing the number of trips necessary to cover the area.

Dusting may be substituted for spraying especially in the home garden. The dust will not adhere to the leaves as well as spray. As dew on the foliage is necessary to make the dust adhere, early morning, late evening or night dusting is more effective than day dusting and, in midsummer, there may be little or no dew on many successive nights when dusting would be most beneficial. The standard potato dust formula is finely ground monohydrated copper sulphate, 1 pound; hydrated lime, 4 pounds; calcium arsenate, \( \frac{1}{4} \) to \( \frac{1}{2} \) pound. Another dust of value for potatoes is one composed of 8 pounds calcium arsenate plus 100 pounds of 325 mesh dusting sulphur applied at the rate of 40 pounds per acre per application. In a small garden use 1 pound calcium arsenate to 10 pounds dusting sulphur. Prepared dusts for potatoes can be purchased but are not economical if large quantities are used.

**HARVESTING**

Potatoes can be dug and used when vines are still green, but maximum size of tubers is secured only if the vines are allowed to grow until the tops are dead. Potatoes should be picked up within a few minutes after digging and placed in the shade when they are dug during hot weather. Potatoes exposed to bright sunshine will rot quickly in storage.

Potatoes should be handled carefully to avoid bruising in harvesting. The appearance as well as the keeping quality thus will be improved, as bruised potatoes are quite subject to rot in storage.

**STORING**

Potatoes should be stored clean and dry. Do not expose them to the sun to dry as sunscald will develop. Potatoes should not be moved from the field to a cold storage. Store
the potatoes a week or two at 65 to 70°F. and a relative humidity of 85 percent until cuts and bruises are healed. Then store at about 40°F. Little or no sprouting will occur at 50 or 60°F, for the first 2 months or more, but for long keeping a lower temperature is essential. Do not store potatoes in large piles, as physiological injury known as black heart may develop. Slatted bins should be used no more than 6 feet wide and 6 feet deep so that no potato is more than 3 feet from air. The storage should be well-ventilated.

Potatoes should not be allowed to freeze. Potatoes stored near the freezing point for any length of time become sweet to the taste and unpalatable.

Often it is better to sell early harvested potatoes rather than store them in the home storage cave which may be too warm during midsummer. It may pay to sell and buy later for winter use. Do not try to hold potatoes in the soil after the tops are dead.