Growing Small Acreage Potatoes for Profitability

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Growing potatoes for profit may seem like a lost cause. The world uses potatoes as a filler and cheap calorie in many different ways. We have decided not to try to compete with a product that we can not beat. Instead, our potatoes are seen as a local food with unique taste. We grow varieties that you can't find in the store. Someone looking at our Nicolas at market for $1.50 a pound may say "I can get them for .50 cents a pound at the supermarket." We like being able to say "no, you can't." We create something that you truly can't get anywhere else. At the same time we have watched many a grower willing to take a major hit in yields per acre to grow spuds at a small scale. This is not necessary. The real money in local potatoes can be made by taking all the great knowledge used by the big boys and scaling down to the size you are. Giving the crop what it needs when it needs it is like printing money. If the same field can give you five times what you planted or twenty times what you planted, which would you take? Of course money can be made by chitting potatoes for early production. We do this, but getting potatoes mid June for early sales is a topic unto itself. The following is a primer that has helped us at least to know when and why we were loosing yield in our main potato crop. After the establishment of a market for your spuds, getting the most per acre is the fastest way to increase profitability.

It is important to start off on the right foot. Good soil prep and the correct conditions will help avoid a lot of problems. Severity of common scab is significantly reduced in soils with pH levels of 5.2 and below, but losses can rapidly increase with small increases in pH above 5.2. Potatoes are commonly grown in soils with a pH of 5.0 to 5.2 for control of common scab. You will have to compensate for poor nutrient up take and the lack of effect of minor elements. Potatoes grow great in 6.5 soil, but it is hard to get around the scab. Legume cover crops should not be grown ahead of potatoes, since this can encourage scab, nor should sod crops, since they may increase wireworm populations. On the other hand, small grains—corn or sorghum-Sudangrass—may benefit a potato crop that follows. In Maine, some growers have used Japanese millet as a cover crop in the year prior to potatoes in an effort to reduce rhizoctonia. We use oats, wheat, or rye. Oats are great for the winter kill and allow the soil to be worked well early.

We chisel plow all our fields, Perfecta harrow. We have very rocky ground, so it takes many passes to get up as many rocks as we can. This leads to a second ground preparation most of the time. We apply our amendments before we go through to fix the ground we compacted. Potatoes love calcium and so putting down gypsum is a good idea when trying not to raise pH. If an organic fertilizer is to be used some of it will need to be put down pre-planting and then incorporated. Our goal is to have 140lbs of nitrogen per acre. Most planters will not be set up to put that much organic material down at planting. Since potatoes should be side dressed only as a last resort, pre-plant incorporation allows for the fertilizer to be below the tubers.

Picking out the best potato variety well ahead of time is key. A standard red, white and gold are important in any potato growing operation. Nevertheless, odd ball, off types, and fingerlings will help set you apart from the supermarket. We know we can't beat the market price so setting ourselves apart is key. We grow reba, chiefton, norland, superior, satina, nicola, Adirondack blue, Adirondack red, peter willcox, la ratt, french fingerling, and Russian banana. By November the year before we know where they are coming from. We get 90% of our potatoes from Bob Chapple, a grower in Vermont to whom we owe much. You need to trust your seed source. What is in their cellar will be in your cellar.

It would be tempting to get your seed, cut it up, and plant it all in the same day. We like to let the seed wake up first. The eyes swell a bit, but do not emerge. Potatoes will regrow their eyes three times, but each time they will be weaker. Best not to let them get to the point where they are damaged at planting. It takes a full day for us to cut our potatoes. We use a line cutter that does a good job of making the piece size. Anything under 1.5 oz is not good and each piece should have at least three eyes. "Blind seed" will cause gaps in the field that give weeds an opportunity and reduce per acre yield. For this reason we love to use "b's" as their size often lends them to being not cut at all. Another benefit of not cutting spuds is it reduces the opportunity for the seed to rot in the field. Seed that must be cut is given a day to heal over before planting out. There are many seed treatments on the market, but we have gotten away from using them as our cultural practice has reduced their need. Cleaning the cutter is important to keeping diseases in check.

We use a John Deer 216 two-row potato planter. You can buy one of these used for about $2,500 and it will transform the way you plant potatoes. This alone may be the biggest increase of yield for some. Each variety has its own needs for fertility, but we have settled on 140 lbs of nitrogen per acre as a base. Potatoes are poor nitrogen scavengers, so all of it should go down at or pre-planting. Side dressing will be less effective. Potatoes need a 1-2-2 N-P-K. Use a good soil text and your agricultural extension to get you where you need to be. We have found that our fertilizer suppliers have been very helpful as well. Fertilizer applied at the time of planting should not be in direct contact with seed pieces. The recommended placement on very low testing soils is in two bands, each band 2 inches to the side and 2 inches below the seed pieces. For our round potatoes we use a spacing of 8.5 inches between seed pieces. Fingerling requires 10-12 inches apart depending on variety. It is important when using a trench planter to maintain the skids below the furrow openers. These skids define the bottom of the trench. Without a good "v" shape seed pieces can roll at panting. This will bunch seed, create gaps, and reduce per acre yields.

We use trench application of pesticides and fungicides to aid in the growing of our spuds. The seed pieces are sprayed as they go down at planting. Admire, Quadis, and Ridomil Gold (see labels) are what we have used, but both organic and conventional growers will benefit from the use of Soil Serenade, designed to protect young plants against soil diseases like Pythium, Rhizoctonia, Fusarium, and Phytophthora. We may replace Ridomil Gold with Serenade because some growers have reported great root growth with the use of this product, in addition to its fungicide effects.

Ground crack occurs just before the leaves and stems push their way out of the soil. Timing is everything at this stage. All the forms of weed control at this point can cause some crop damage, if too much of the crop is up. We have found that you are better off sucking up the crop damage now than letting the weeds get to you. Sencor (see label) can give you a 30-day window and burn down the weeds present at time of application. It can, and will, burn potatoes and will damage colored verities more then whites. Flaming will give you a good week to get to your next cultivation, which may be all you need. Above-ground parts of your spuds will be damaged, but it's worth it. If you are good with the tool, your ground speed can help you get more weeds and less crop damage. Blind cultivation is a good compromise if you have waited too long. You will get less crop damage, but also control fewer weeds. The weeds controlled, or not controlled, at ground crack will tell you what kind of season you are going to have.

Cultivation and hilling should begin as soon as there is enough plant material above ground that you are not going to bury them. Cross flaming can help with the weeds, but you need to know what you are doing in order not to take down your crop. A benefit of cross flaming is that you will get some bug as

you go. You will, however, do nothing to get air down into the root zone of the tubers. We love for our cultivating and hilling season to last about a month. So, week one cultivate, bring soil in between plants, and set up a secondary ridge four to six inches away from plant. This is the beginning of the first hill. Week two, potatoes may be small enough to get in with a second cultivation which is mainly to loosen soil for the first hill. The first hill is done as soon as we are off the field from second cultivation. The first hill cups the plants, it doesn't bury them. After our first hill, our plants look like they are sitting in a trough. By week three, we can't bring in the cultivator without causing crop damage. The potatoes have leafed out and grown to the point that you can't see the cupped hills, but the second hilling takes that soil under the plants and pushes it on top of the lower stems. At the same time more soil is brought in around the plants. Sometimes, week four does not work out for us, mostly because of weather. This last hilling is right on the edge, flirting with damaging the vines. The potatoes are just about ready to close the canopy. This last hilling helps stop greening of spud, and acts as the last cultivation of weeds before the canopy is closed and weeds have a hard time getting started under the crop. A third hilling is so beneficial that we accept a 15% vine damage and still feel we have done the right thing. We use the front tines to lift the vines as we go if need be.

It is important to understand the life cycle of the potato to make the most of the crop that you have in the ground. Life cycle is broken down into three important parts for us: tuber initiation, bulking, and maturation. Irrigation needs are really the only thing left on the table to look at during each of these stages. Assuming, of course, that we are on top of our disease control, lack of water is the only stress that we need to look out for. Planting as early as we can has already helped us with the best photoperiods.

When the conditions are favorable for tuber initiation, the elongation of the stolon stops, and cells located in the pith and the cortex of the apical region of the stolon, first enlarge and, then, later divide longitudinally. The combination of these processes results in the swelling of the subapical part of the stolon. Induction of tuberization is favored by long nights (short photoperiods), cool temperatures, low rates of nitrogen fertilization, and more advanced "physiological age" of the seed tuber. Tuber initiation begins with the formation of 15-20 tubers. If the plant does not have enough water during this phase only a few tubers will form, decreasing the overall yield.

During tuber bulking, the potatoes increase in size and weight. Between 5 and 10 of the initial tubers actually grow. The rest are either used for nutrition by the plant or absorbed by other potatoes. Moisture stress during this phase results in small potatoes. Stress followed by adequate moisture leads to cracked, misshapen potatoes. A constant rate of increase in tuber size and weight occurs during this stage, unless a growth-limiting factor is present. This stage can last from 60 to over 90 days, depending on the length of the growing season and presence of pathogens. This is critically important: tuber size and quality is closely related to moisture supply in this period. Research has shown that the total yield of potatoes is most sensitive to water stress during mid-bulking. Mid-bulking occurs three to six weeks after tuber initiation. However, water stress any time during this period will have an effect on the total yield. Tuber growth is retarded by moisture stress and does not resume uniformly when moisture again becomes available. New growth and enlargement will take place at the top end while the other portions of the tuber remain stunted. Consequently, especially in some long tuber varieties, constricted areas develop that are directly related to the stage of tuber growth at the time the moisture stress occurred. Other deficiencies in quality such as growth cracks and knobbiness are also related to moisture stress followed by periods of adequate or surplus moisture.
During maturation, the canopy begins to die, water use decreases, and tuber growth slows. When the potatoes are nearly mature, producers typically spray the canopy to kill the plant in preparation for harvest. We have also simply mowed off, being careful of the top of the hills.

Lack of pest and fungal control in the field can take what was a great crop and make it nothing. Growing on long-time potato ground, we have a good population of all the pests you could imagine. Colorado potato beetle is a prime pest. We get 60 days of protection from the Admire, but then we have to be alert for potato beetle outbreaks. We want to use Entrust or Radiant to control late outbreaks. In order to do this, we must be on top of the life cycle of the pest. We get one shot with two sprays to get it. Our missing the correct life stage of the beetle to spray only helps them to become resistant to this powerful tool. As always, please be careful and read the label. No spinosad product controls potato leaf hopper. When you are spraying for CPB, you are not controlling hoppers.

Potato leaf hopper will cause burn down before you get the most out of your crop. Be careful of mowing next to your potato field as you will drive the hoppers into the potatoes. Also, beware of adjacent hay fields being mowed and protect yourself. A combination of pyganic and neem extract seems to do the best job on them. We have used Warrior or some pyrenthins for control as well.

Blight scares us all. Especially after the 2009 scares and crop loss we all had. Ag extension has done a great job of putting out alerts when the spores are present and when conditions are ripe for an outbreak. I highly recommend following their lead for spray timings. We use both copper and Brovo as protectants. If we are in the heat of an outbreak, or have some ourselves, we will start with tank mixes of copper or Brovo with Cruzate or Previcur Flex (see labels). These combinations are effective for both late and early blight, depending on target and rate of application. The Cruzate and copper tank mix can give you a two day reset on late blight and might save a crop.

Many factors effect the timing of your harvest. The ideal harvest temperature is between 50 and 59°F (10° and 15°C). To avoid shatter bruises, do not harvest when the tuber pulp temperature is less than 41°F (5°C). Tubers warmer than 64-68°F (18-20°C) and under drought stress are susceptible to black-spot bruising. Harvesting when tuber pulp temperature exceeds 68°F (20°C) increases the risk of leak and pink rot diseases, which can result in extensive storage decay. You also don't want to leave potatoes in the ground too long because you will start to pick up scerth and rizoctonia. We are trying to time our harvest so we don't import too much heat into our root cellar while at the same time giving the potatoes the correct temperature for curing. We also must give the color potatoes time for their skin to set. We have damaged many a red spud by digging too early or too warm. We try for a minimum two-week wait after mowing, but not to leave them in more then three weeks.

Post-harvest handling and storage can affect pack-out yield as much as anything you do during the growing season. The greatest amount of shrink occurs after harvest and before curing is complete. Harvested potatoes are skinned and there is no barrier to moisture loss until suberin is formed over the wounds. This initial storage period promotes wound healing (suberization) and skin set, and both are critical for long-term storage quality of potatoes. The temperature, relative humidity, and length of the curing period are determined by the condition of the harvested potatoes. High humidity (95%) during the curing period is necessary to prevent excessive shrinkage and to promote wound healing. Mature, healthy potatoes should be cured for about two weeks at 50-60°F (10-15°C) and 95% relative humidity. Good luck with this. We try our best, but come up short all the time. But, the closer you come to this, the better off you will be. We have found that every effort is rewarded at this stage, even if it is not perfect. Long-term storage should be 38 degrees for table stock. Colder temps lead to starch/sugar conversions. This will result in black spots in the cooked potatoes. Potatoes are stored dirty.