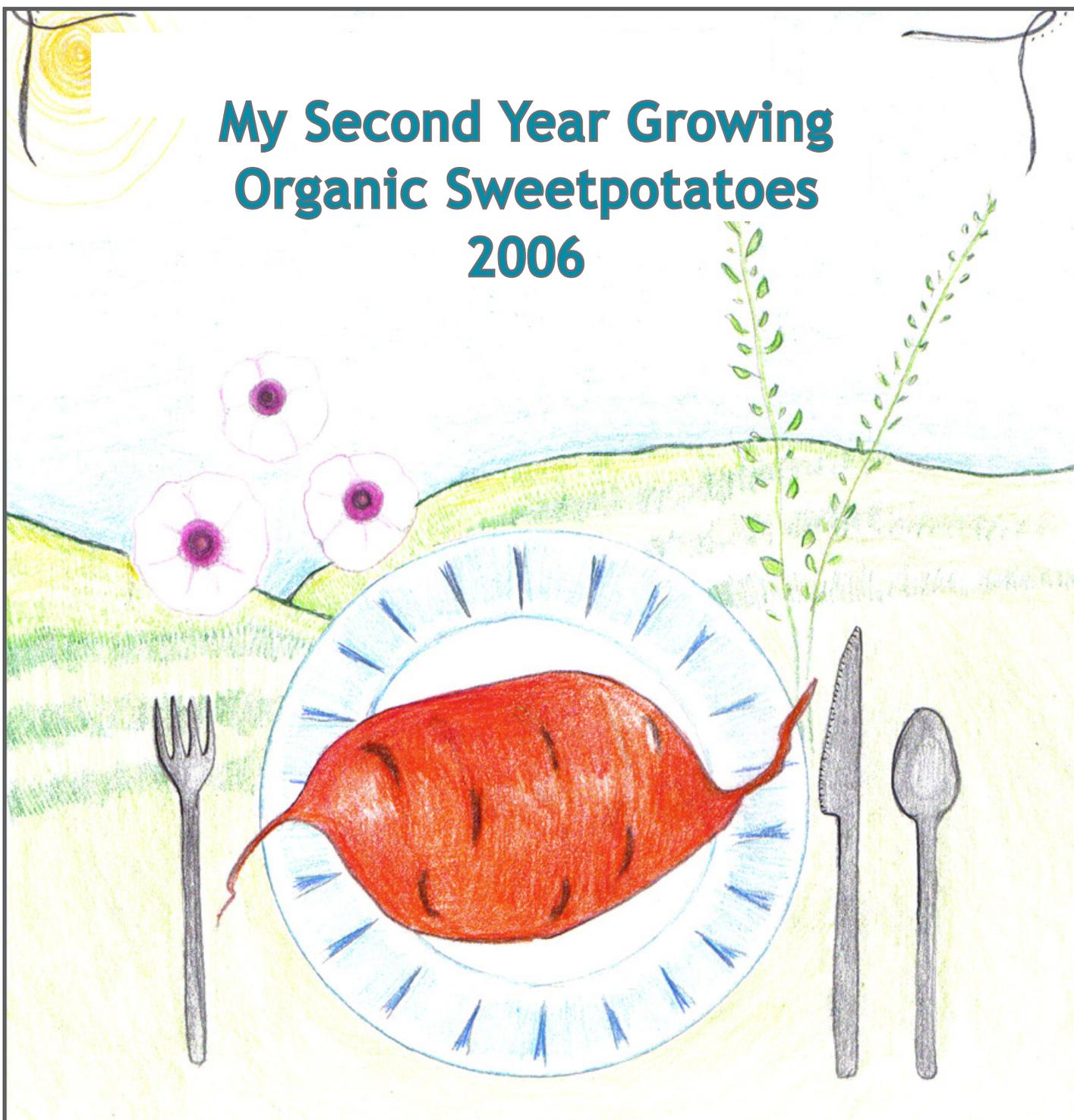


My Second Year Growing Organic Sweetpotatoes 2006



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Ian reading a draft copy of *My Experience Growing Sweetpotatoes*, summer of 2005

Table of Contents

Introduction.....1
Getting Started-Preparation.....2
Preparing Beds.....3
Care of Maturing Crop.....4
Harvesting.....5
Curing and Storing.....5
Summary.....6
Selected Bibliography.....7
Credits.....7

Introduction

Ottawa, Ontario Latitude: 45° 21" North: Longitude: 75° 43" West. Elevation: Approx. 370 feet (112 m).

I first grew sweetpotatoes (*Ipomoea batatas*) in the summer of 2005. The crop was successful and I wrote a report entitled *My Experience Growing Sweet Potatoes—summer 2005*. The report is available by email by contacting me at: ianreid@sympatico.ca

The sweetpotato is a member of the morning glory family (*Convolvulaceae*). It is not related to the common table potato, a member of the *Solanaceae* family or the yam, a member of the *Dioscoreaceae* family. Sweetpotato is written also as sweet potato. I prefer to refer to it as one word: sweetpotato.

There is quite a bit of interest in growing sweetpotatoes on a small scale in these northern latitudes. Since growing sweetpotatoes for the first time in 2005 I have learned a lot and I am sharing this experience so that first time growers, and maybe others, can profit from my experience.



Flower of sweetpotato



Common table potato: *Solanum tuberosum*



Yam: *Dioscorea species*.
Note: there are many species of yam.

To begin with, I ordered the book entitled *Sweet Potatoes for the Home Garden - With Special Techniques for Northern Gardens* by Ken Allan. I'll give ordering details in the Bibliography.

Much of what I am going to write about and much more are covered in Ken Allan's book. If you are serious about growing sweetpotatoes, Ken's book is a must buy. According to Ken Allan, "As far as I have been able to discover, there is no other book on sweet potatoes for the home gardener". Since Ken's book costs money and this article doesn't, you might find enough material here to get you started. At least, if you are already thinking of growing sweetpotatoes, this article may shed enough light on the subject to help you decide if it worth the effort to grow sweetpotatoes. Sweetpotatoes being a tropical plant thrive on tropical conditions. As growers here in the temperate zone, we have to use techniques and practices to create tropical like conditions here.



Sweetpotato: Ipomoea batatas
In some stores incorrectly labeled as Yam.



Pail with sweetpotato

Getting Started- Preparation

In February 26, 2006 I filled a 20 litre pail with soil purchased locally and punched a small hole in the bottom of the pail for drainage. This pail with the soil moistened with water was placed near an east facing large picture window in my condominium.

Then, I placed a sprouting sweetpotato from last year's crop at about a 5 cm (2 inches) depth in the soil.

The sweetpotato placed in the 20 litre pail on February, 26, 2006. Note the large number of sprouts. After the sprouting sweetpotato was placed in the soil, I watered it and let it grow.



My condo with sweetpotato vine growing

On March, 18, the vine is climbing up the string strung for the purpose. By May, 13 the vine was some 3 m (10 feet) long.



On May 13, I am planting slips from the sweetpotato planted Feb. 26th into another 20 litre pail filled with damp store bought soil.

With a clean sharp blade, I made a clean cut about 1 cm (1/2 inch) below a node and removed the leaves again with clean cuts. A node is the place on the stem where a leaf is attached.

About 2 cm (1 inch) above the next node I made another clean cut leaving the leaves on. Then with a pointed tool, I made a hole in the soil and inserted the slip to a depth of approx 5 cm (2 inches). I inserted as many slips as possible (about 40) in this pail of soil. These slips will form about 5cm (2inches) of roots ready for planting around May 24th in the prepared bed. I planted approximately 80 slips into 2 pails and set them outside in a sheltered area 2 weeks for hardening-off prior to planting them into the prepared beds.

Preparing Beds

Around the first of May, I covered the 1.5m x 6m (5 foot x 20 foot) area where the slips are to be planted with clear plastic to warm the soil to the planting depth 2.2 cm (6 inches or though). In doing this, I am changing the albedo in this small area of land. This plastic was sealed all round to trap the heat produced by the sun. After a cold winter, it takes the sun some time to warm the soil to a depth of some 25cm (10 inches) or so naturally. The soil is not warm enough at planting time for the sweet potatoes to thrive—the soil needs warming artificially.

Why clear plastic and not black plastic?

The clear plastic mulch allows the short rays of the sun to penetrate the soil to a considerable depth heating the soil by 10 to 15° C (50 to 59°F) and to trap the heat after the sun sets. The sun's rays penetrate glass the same way it penetrates plastic. To check the effect of the sun, stand or sit close to a big glass window and feel the heat from the sun. Black plastic, on the other hand, absorb the sun's heat and the top layers of the soil only are heated by as much as 6° C (43°F). The amount of heat passing through clear plastic is in relation to the amount and direction of the sun's rays hitting the plastic. As foliage covers the plastic as the growing season progresses the effect of the sun diminishes in relation to the foliage cover. It follows that when the foliage totally covers the plastic, the effect of the plastic is nil.

What about weeds?

In the heat of the summer, the temperature under clear plastic is so high that most shallow rooted weeds do not survive especially if there are no holes in the plastic cover.

When the foliage covers the plastic, weeds don't grow because weeds need sunlight to grow.

Black plastic prevents the penetration of the sun's rays and plants don't grow without sunlight so weeds don't grow at all under opaque plastic.

Just prior to planting, I removed the clear plastic and gave the bed a good watering with warm sun-heated water. It doesn't make much sense to heat the soil and then cool it with cold city tap water.

A couple of items to consider when preparing the bed.

If the bed is raised, the rays of the sun heat the side of the bed as well as the top. The top of the bed should be flat or slightly concave, not rounded (convex). We want the rain water to run into, not away from, the holes in the plastic where the sweetpotatoes are growing. It's a good idea also to make another concave, dish shape, area just around the plant itself. This can be done by hand at the time of planting.

The sides and ends of the plastic should be slightly higher than the middle. If this can't be accomplished by rounding up the soil then boards or other objects can be used. Care must be exercised to not ruin the effect of the plastic by making holes in it.



Care of Maturing Crop

May 4, 2006. In the centre is my bed of sweetpotatoes under clear plastic. To the right are my tomato plants and to the left are squash and corn plants. The string over the corn prevents the crows from landing and pulling up the corn plants for the kernels. The tomato plants are too close to the sweetpotatoes as the vines won't have enough room to grow. I should have planted a faster maturing crop that would have matured and have been removed to give the sweetpotato vines more room to run. The pails are full of water warmed by the sun. I found that these 3 pails were not enough and later on I added more. In total, I had about 80 plants planted in a grid fashion one foot apart.

You can notice that I didn't do a very good job of making the top concave, nor did I shore up the sides and ends sufficiently so the water would run into the holes in the plastic. I built the sides and ends a little higher with soil that gradually eroded away. This made it a little more difficult to make sure that each plant had the proper amount of water. I tried to give each plant 5 cm (2 inches) of water per week. If it wasn't supplied by rain, I supplied the rest by sun warmed water from the pails. To be more effective, the pails could be covered with clear plastic or glass. The clear plastic helps prevent the trapped heat from escaping.

Rather than using slits in the plastic to plant, I used holes made by a bulb planter. I believe a slit may be preferable as it can be sealed more easily. Once the plant is planted the hole should be sealed, preferably by sand to trap the warm air heated by the sun. Water passes through sand more readily than soil. If the plastic is not sealed, hot air trapped during the day will escape through the holes in the plastic as the temperatures drops at night, the stove pipe effect.



Bulb Planter with slips ready to plant

If the extracted soil is mostly clay, it might be a good idea to fill the holes with enriched store bought top soil; it will pack into the hole better and without air pockets.



My sweetpotatoes on June 30th

Notice that I planted corn to the left of the sweetpotatoes. When the sweetpotato vines start to run up to 3 m (10 feet) or so the corn will have then been removed giving the sweetpotatoes lots of room to run in bright sun.



My sweetpotatoes on Aug. 1st

The corn stalks will soon be removed to let the vines have more sun and room to run. By the way, the bed runs in an east-west direction which is not an issue, so far as I know.



The sweetpotatoes on Sept. 1st

Harvesting

The leaves are nearing maturity. Notice that the corn is gone and sticks are placed at the ends of the patch so that the sweetpotatoes can climb up them rather than running out onto the grass which is cut periodically.

By now the plastic is completely covered by foliage.

Some people eat the tender part of the vines.

If parts of the vines aren't available for the production of energy for the plant, the plant will suffer and produce smaller tubers. I don't want this to happen so I don't cut, or let anyone else cut, the vines until digging time. At digging time even though the vines are old and tough they are in high demand, nothing is wasted.



Digging the sweetpotatoes on Sept. 16th

I use the smaller shovel with the ploughshare-like steel and the larger one to scoop away the earth. The only reason I use the smaller shovel to dig is because it was available and the earth doesn't stick to the steel like other non-steel shovels.



Sept 24, 2006. What is left of the sweetpotatoes after I gave away about an equal amount

Curing and Storing

I cured the sweetpotatoes at a temperature of 30° C (86° F) and high humidity for 7 days in a bathtub. To keep the temperature at 30°C, I used a portable electric heater. I covered the sweetpotatoes with plastic to retain moisture. When the humidity got low according to my temperature-humidity instrument, I opened the tap and showered them with tap water.

We were deprived from taking a shower for 7 days but this wasn't a great inconvenience as we have common bath areas in our condominium.

Sweetpotatoes should be stored at 13°C (55°F) or slightly above. That means don't store sweetpotatoes in the refrigerator. In my case, I don't have a cold room so they are stored in a cool area in the condominium.

What kind and where to purchase sweetpotatoes and sweetpotato slips.

Ken Allan in his book dated 1998 lists the following Canadian sources. Mr. Allan states, "For all practical purposes, Canadians must order from Canadian sources" I tried to order from suppliers in the States, but couldn't because of border laws.

Canadian Sources

Ken Allan, 61 South Bartlett St. Kingston, Ont. K7K 1X3
Seed roots only. Send SASE for list. Website: http://home.cogeco.ca/~allan/sweet_potatoes.html

Dominion Seed House, Box 2500, Georgetown, Ont. L7G 5L6. Catalogue free.

Maple Farm, Hillsborough, NB. E0A 1X0 Send SASE for list.

Seeds of Diversity Canada (formerly Heritage seed Programme), Box 36, Station Q, Toronto, Ont. M4T 2L7. Web Site: <http://www.cog.ca/documents/Howsweetitis.pdf#search=%22greg%20wingate%22>

I haven't checked out any of the above. In my case, I got untreated sweetpotato, incorrectly labeled as yam, from a local store. This is not a dependable source as most sweetpotatoes are chemically treated and won't sprout easily. I believe the sweetpotatoes I grew are called Beauregard.

A note about cooking Sweetpotatoes from Ken Allan's book:

"Sweet Potatoes must be cured and then stored for a few weeks before the flavour develops and they do not reach maximum flavour and sweetness until they have been in storage for several months.

The reason for this has to do with the chemistry of the sweet potato and the changes that take place at the molecular level during curing, storage and cooking. Curing, which causes the skin of the fleshy root (tuber) to thicken and seal itself, also initiates enzymatic changes in the starch- sugar balance. The later is directly related to the flavour and texture of the baked sweet potatoes.

While the fleshy root is growing, most of the carbohydrate of the root is stored in the form of long chain starch molecules. Also present are the enzymes alpha and beta amylase. When these enzymes are activated, they chop the starch into simpler component parts---Alpha amylase breaks long chain starch chains into shorter starch chains called dextrin and beta amylase reduces dextrin into malt sugar.

During the curing process these enzymes are activated and they continue to work during storage. They speed up considerably during the cooking process until the temperature reaches 95°C (203°F) and then the heat gets to them. Maximum alpha amylase activity occurs at 77° C (171° F). When sweet potatoes are baked in 350° F oven, the heat gradually penetrates from the surface to the centre of the tuber and maximum amylase activity for each layer lasts from five to ten minutes as that part of the tuber reaches and then exceeds the ideal temperature. With other means of cooking, sweet potatoes go through this phase of maximum activity much faster so less starch is broken down into sugar.

Baking is the best cooking method for sweet potatoes. Baked sweet potatoes are sweeter, and both flavour and texture are different than when they are steamed, boiled, fried, or cooked in a microwave. Something else happens during baking is that in the last stages, as the flesh is getting soft, some of the malt sugar caramelize. Sweet potato is one of the few vegetables that are better overcooked than undercooked"



Caramelized sweetpotato after cooking in oven at 177°C (350° F) for an hour and a half. A smaller sweetpotato may take less time and a larger one more.



I also grew a few sweetpotatoes in a clear plastic container. A container is suitable for gardeners with limited space. I inserted 4 slips in the 1m (3 foot) diameter, 1 m (3 foot) high container.

You can see the vines climbing the poles. Some of the vines that were on the ground sent out roots at the nodal points adding more nourishment to the plant.

I found that the container needed more water because I filled it with soil made up mostly of porous compost. The container should be in the open to receive lots of sun.

Summary

In summary, I had a very successful year growing sweetpotatoes. Next year I expect to add one or two different varieties to make things more interesting. In my case, we now have sweetpotatoes in storage for the year and then some. It was well worth the time and effort.

The literature contains many articles and research papers on the health benefits and nutritional values of sweetpotatoes. Deep orange flesh-coloured sweetpotatoes contain excellent amounts of Vitamin A; very good amounts of vitamin C ; and good amounts of

manganese, copper, dietary fibre, vitamin B6, potassium and iron. They also contain a small amount of protein. Sweetpotatoes, being especially rich in Vitamin A (beta carotene) could reduce the risk of cancer according to some studies.

Sweetpotato greens have many of the same nutritional value as the tubers but twice the amount of protein (From Ken Allan's Book).

Ken Allan, in his 1998 book, states that there are hundreds of papers published by sweetpotato researchers in academic journals every year. He lists some 53 papers as references.



Tractor Rototilling Garden - May 2006



Sweetpotato Vines

Selected Bibliography

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Sweet Potatoes for the Home Gardener, with Special Techniques for Northern Growers by Ken Allan Published by Green Spade Books, 61 South Bartlett St. Kingston, Ont. K7K 1X3.

Weather-Wise Gardening Written edited and designed by the editorial staff of ORTHO Books Chevron Chemical Company, ORTHO Division, 200 Bush Street, San Francisco, Calif. 94104.

Propagation of Plants by Kains and Mcquesten, Published by Orange Judd Publishing Company, Inc. 1954, New York.

Internet:

Searches by the words sweetpotato and sweet potato.

One web site in particular: <http://www.ces.ncsu.edu/depts/hort/hil/hil-23-a.html>

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