Sweet Potatoes

	Laura Mortimore Orange Cat Community Farm	James Nisly Organic Greens
Location	Reedsburg, WI	Kalona, Iowa
Acres in vegetables	3.5	6
Total acres in broccoli	.14 acres, 12 100' beds	3
How these tasks are done for Sweet Potatoes:		
field prep/tillage	with a tractor	with a tractor
transplanting	by hand	with a tractor
cultivating	by hand	with a tractor
mulching	with a tractor	do not do this task for sweet potatoes
laying irrigation lines	with a tractor	do not do this task for sweet potatoes
laying row cover	do not do this task for sweet potatoes	do not do this task for sweet potatoes
spraying for pests, diseases, weeds	do not do this task for sweet potatoes	do not do this task for sweet potatoes
harvesting	with a tractor	with a tractor
farming style	certified organic	certified organic

Propagation

Varieties	Beauregard- always had nice potatoes but the yield consistency from plant to plant was very poor. Great storage Orleans- similar potato quality to Beauregard but in my experience it finally gave me more consistency from plant to plant and hence increased yields without changing production. Also excellent storage Covington- tried this variety because my supplier could not ship the Orleans. I believe they told me it was supposed to have more uniform, smaller size potatoes within the hill. Performed well in the field that year despite being planted very late, and indeed, I thought the potato size was more consistent. This was the first year my potatoes did not store well post harvest. Possibly the variety. Planted Covington for a second year from a different supplier and was very disappointed in the quality of the potatoes- shapes and sizes weird and inconsistent.	2021 - Covington 95%, Orleans 5%; 2022 - Covington 95%, Considering a white skin/white flesh variety. Maybe Bonita 5% Covington has produced good quantities of high quality, nice shaped, high percentage of grocery store marketable potatoes. Covington produces a greater number of medium sized potatoes than other varieties that I have grown in the past (Beauregard, Burgundy, Orleans, Murasaki).
Purchased Slips - Suppliers	12 year ago- Johnny's Selected Seeds. I had terrible scurf that year, but might be different now Kansas State- fantastic, lovely slips!!!! Sometimes very late delivery Jones Family Farm- North Carolina- Tried for the first time this year. Very friendly to deal with, but slips were in poor shape when they arrived, which I sort of expected coming from NC to WI	Kansas State University, New Sprout Organic Farms. KSU has delayed availability two years in a row. I don't like receiving shipped slips UPS, FedEx etc. because of cost, and the slips are already slimy upon arrival. I don't have a good recommendation for where to purchase slips. That's why I plan to grow most/all of my own slips in the future.

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Purchased Slips - Keeping Fresh	I open the boxes and separate out some of the slips into other tubs- an attempt to unpack them and let some of the heat out from shipping. I just keep the boxes and tubs in the shady pack shed with intentions of planting asap. Often I can plant the next day.	Remove lower leaves. Pack 50 slips to a bundle (rubber band), "plant" in a mixture of 70% Peat Moss, 30% Sand with additives (Micro Spark O, MycoApply Ultrafine Endo (Endomycorrhizal fungi).
Growing Slips - Schedule		3/1: Remove from cool storage to room temperature 3/5: Sort potatoes for quality 3/6: Soak potatoes in water with additives (Micro Spark O, Ultrafine Endo (Endomycorrhizal fungi), 3/6: Plant in shallow trays in a mixture of 70% Peat Moss, 30% Sand with additives (Blood meal, Micronized Soluble Fish Powder with Crab 10-2-0, Micro Spark O, MycoApply Ultrafine Endo (Endomycorrhizal fungi). Put under strong LED lights at 72 degrees F. Late April thru early June: Harvest slips that are at least 10". Cut slip near the potato. Remove lower leaves. Bundles of 50. Pack in mixture described above. DO NOT ALLOW SOIL TO DRY OUT. 5/25: Start planting in the field as conditions allow.
Growing Slips - Yield		3000 slips from 450 potatoes
Growing Slips - Sprouting		1. Remove from cool storage (55 F) to 72 F 2. Sort potatoes and only use perfect quality potatoes for growing slips 3. Soak potatoes in 1 bushel plastic totes over night 4. Use shallow (2.5") nursery trays. Layer of potting mix, lay out the potatoes flat, more potting mix to the top of the potatoes. Potting mix is 70% Peat Moss, 30% Sand with additives (Blood meal, Micronized Soluble Fish Powder with Crab 10-2-0, Micro Spark O, MycoApply Ultrafine Endo (Endomycorrhizal fungi). 5. Set trays on growing rack under LED grow lights. 6. Water 3-4 times / week. 7. Move trays to a more greenhouse / high tunnel when temperatures will stay about 50 F.
Growing Slips - Irrigation		Hand water about 3-4 times/week
Growing Slips - Conditions		My indoor growing environment is 72 F, with 50 - 70% RH. I use LED lights until they are moved to a high tunnel environment when night time temperatures will stay about 50 F.
Growing Slips - Insect Pests		Aphids: Neem oil spray

Bed Prep

Preceding Cash Crop	My general rotation is a year in summer/fall crops, a year in spring crops, a year in fallow/cover crop	Cabbage. I hope to extend crop rotations to at least four years in the future. Sweet potatoes, pasture, edible beans, butternut squash, cabbage

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Preceding Cover Crop	Hairy vetch and oats	Winter rye, spring seeded oats, mammoth red clover
Soil Amendments	Midwest Bioag Veggies Plus @ 300lbs/A, Midwest Bioag Veggies NKO @ 400lbs/A	Ohio Earth Food Re-Vita Hi-K 2-3-16: 300 lbs/acre Redmond SR-65: 75 lbs/acre Planters II: 75 lbs/acre Re-Vita Hi-K is because sweet potatoes are heavy feeders of potassium and do not need a lot of nitrogen. I am applying Redmond SR-65 at the advice of my soil fertility advisor. Planters II is mineral rich volcanic rock supplement.
Soil Prep	I use a Kubota B3200 on the farm for most of the work. The vetch cover crop is mowed with a brush mower and incorporated with the rototiller in Mid-May. Two weeks later I spread the fertilizer with a cone spreader and do another pass with the rototiller to create a nice even field for the plastic mulch layer.	1. I chisel plow the field with the green manure cover crop 14-17 days prior to planting. 2. I rototill the green manure cover crop soon after chisel plowing. 3. I do a second, shallow rototilling pass within 3 days of planting.
Bed Shaping	I plant the sweet potatoes into raised beds of plastic mulch. I use the mini layer from Rain-flo.	I have two discs mounted on cultivator shanks that mount on the rear of the Farmall 140 which creates a wide and shallow "M" shaped ridge.
Mulching	I lay 3' wide pieces of black landscape fabric between the raised beds of plastic mulch and secure it with metal staples. This keeps the weeds down in the path and makes for a very low maintenance crop.	I do not use mulch
Field Prep Notes		I mount a drop spreader under the belly of my Farmall 140 to apply the fertilizer mix. With one pass, I can drop the fertilizer and make the ridge.

Planting

Bed Width	5' (used to be 6')	46"
Plant Spacing	1 row per bed; 10" between plants (used to be 2 rows, 12", 6' bed spacing)	15" between plants
Transplanting Process	A few days before planting, I leave the drip irrigation on for an extended time, at least overnight, to make sure I have moist soil. When ready to plant we use a rolling dibble to mark holes in the plastic at the appropriate spacing. We use a pokey stick to make a deeper hole and insert the slips, leaving the meristem sticking out of the hole.	Tractor pulls a 275 gallon water trailer with a punch wheel/water wheel fabricated attachment that punches wholes and fills holes with water. I lay on a home made sled, pulled behind the tractor/water trailer and plant slips into the water filled holes. I plant the slips as deep as possible, but prefer for at least 5 inches of the slip to stick up out of the ground.
Amendments at Transplanting		Micro Spark O: 1 cup/275 gals Micronized Soluble Fish Powder with Crab 10-2-0: 2 cups/275 gals Liquid Humic Acid: 2 cups/275 gals MycoApply: 1/2 cup/275 gals Mix these ingredients in a 5 gallon bucket first, then add to the water tank and mix with drill/paint mixer.
Water at Transplanting	The crop is irrigated with drip tape immediately following the transplant.	Water wheel planter: Averages about 16 oz. water mixture per plant
Row Cover	none	I do not use row cover

Crop Maintenance

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Irrigation	I make sure to irrigate the young slips once a week. The drip remains on for 6 hours in my rotation.	I hand water the slips again, only if necessary. Unless conditions are extremely hot and dry, like early June, 2021, it generally is not necessary.
Changes to Irrigation	I back off on weekly irrigating at some point- probably around canopy closure- and am happy if they get drip irrigated under the plastic mulch every-other-week. I make sure to not irrigate a week or two before harvest so I don't have muddy conditions.	I do not add additional water once the plants are established.
Supplemental Fertility		I apply Plantskydd primarily for the purpose to deter deer and rabbit browsing, 2-3 times during the first 6-8 weeks. This has a secondary effect of giving the plants a nitrogen boost.
Weed Control	Because they are totally mulched, the only weeding we do is hand weeding the holes once or twice.	I cultivate in between the rows with belly mount and rear mount cultivator shovels on Farmall 140. I also fabricated hand controlled tools (hoe and garden rake heads) mounted onto my home made sled pulled behind Farmall 140 which enables fine control to either take out weeds in the hair stage or cover them up without covering up the slips/plants.
Insect Pests	None! That's why I love them!	1. Wire worms: Usually only a problem with newly cultivated soil. Not much you can do about it that I know of. 2. Japanese Beetles: They haven't posed enough of a problem that I have needed to exercise control measures. 3. Deer and rabbit browsing: Plantskydd
Rodent Damage	Tough one. I don't do anything. It's just part of the deal. 10% damaged potatoes at least. I will sometimes trim them and deliver in the CSA.	The two rows closest to the road ditch had an estimated 60-70% of the sweet potatoes that had rodent damage. That percentage reduced down to less than 5% rodent damaged sweet potatoes after the fifth row in from the road ditch. I did not have a bare ground perimeter along the road ditch, which I believe would have helped somewhat. I am contemplating to snake habitat (old tires) every 75-100 ft. along the road ditch.
Diseases	None. Very low maintenance for me.	I have some disease problems, but I haven't identified what the disease is.
Scurf	I had scurf my first two years. Switched slip supplier and have not had any problem since.	I have not identified scurf as a problem. I go with the theory of putting effort into increasing populations of beneficial soil microbes in order to reduce the percentage of plant pathogens.
Notes on Crop Maintenance		My game plan is to push more soil around the plants as I cultivate to create a higher ridge with each cultivation pass which helps to reduce potatoes sticking out of the ground and getting sunburned near harvest time.

Harvest and Yields

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Harvest Window	Begin harvest mid-September so potatoes can cure for two weeks and I can start selling them in October. Then I try to wrap up the harvest by first frost in very early October.	I use to delay harvesting as long as I thought I could get away with and finish the harvest just before frost. I decided to start harvesting my mid September for the following reasons. 1. Soil conditions are more likely to be drier in September than in October. 2. Rodent damage really starts to pick up after late September. My rough estimate is that whatever advantage may be gained leaving the potatoes in the ground 2-3 weeks longer is more than lost in increased rodent damage and risk of having to harvest in wet soil conditions.
Harvest Procedure	Clip vines by hand and pull them out of the way, pull out the landscape fabric and plastic mulch. I drive down the row with a furrower and flip over the hills of potatoes. We then pick them up into black crates, sorted by smalls, larges and #2. We handle them VERY gently at this point to avoid ANY scratching.	I fabricated a method of cutting the vines using two 1/2 HP electric motors with brush cutter blades mounted on an angled frame that roughly matches the ridge. This "vine mower" mounts under the belly of the Farmall 140 and is powered by a generator carried on the back of the tractor. I also position two discs (the ones that are mounted onto cultivator shanks) to cut the vines on both sides of the ridge, which effectively removes 80-90% of the vines covering the ridge. I use a US Small Farms Model D-10M on a Branson 3520H (hydrostat) tractor to dig the potatoes. The digger has a shaker chain to help separate potatoes from dirt. The digger drops the potatoes onto a (locally fabricated) conveyor belt trailer which is attached to/pulled by the tractor/digger. Three to four workers further clean, remove small roots and sort the potatoes into eight size and quality category totes (approximately 1 bushel plastic) which sit on a shelf, one on each side of the convey trailer.
Cleaning Procedure	damaged potatoes are trimmed with a knife in the field.	Potatoes are sorted into the following categories #1 sellable quality, #2 sellable quality (typically for food service) and #3 quality (typically considered processor or giveaway). #1 sellable quality potatoes are further sorted into the following sizes: 1-3 oz., 3-6 oz., 6-9 oz., 9-12 oz., 12-18 oz. and 18+ oz.
Curing Procedure	Stacks of black crates full of dirty sweet potatoes are stored for curing for two weeks in the pack shed at room temp. I don't use any extra heat to cure them. My pack shed is insulated and I close up at night once the sweet potatoes are harvested so this helps significantly in maintaining a more consistent environment. Been doing it this way for 12 years and they do great!	Filled totes of potatoes are placed in "root cellar". Totes are the type that will nest and stack. We stack the totes 5 high, which makes the stack nearly 6 ft. high. Currently, I use a propane heater to heat the storage space for the curing process. I wait to heat the storage space until all of the potatoes are harvested and stored. I heat the space to 85-90 F for 9-10 days. Once I see any potatoes beginning to sprout, I turn off the heater and allow the space to cool down. Usually, at that time, (late September or early October) the root cellar temperature will naturally be 60-65 F.

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Packing Procedure	Sweet potatoes are washed by hand to avoid scratching the skins. We use a hose on a grated table. They are packed into black crates. All those little small ones are sorted out and delivered to the CSA. They do not store well into the winter because they dry out.	
Storage	Clean sweet potatoes are stored in stacks in the pack shed into the fall. The shed is insulated. By the time the temps in the pack shed start dropping below 50- usually mid-November- one of my coolers is empty and available to store sweet potatoes with a small heater to keep it around 55. They are in there until sold out. I don't do any humidity control. I wash all the sweet potatoes on a nice warm day before the end of October and store them clean.	Sweet potatoes are stored in a root cellar. I don't currently do anything to modify the humidity, however, the humidity is relatively high, 85-90% RH. I don't modify the temperature until colder weather when I must turn the heater on again to keep the room temperature around 55 F.
Maximum Storage Time	I have stored them until the following June, but try to sell out sooner:) They store for me just fine into March	I have stored sweet potatoes for a full year without any appreciable loss of quality, however, they are normally sold out by February or March, except for the potatoes that I save for growing the next years slips.
Yield	1.75-2lbs/row foot	2.4lbs/row foot just #1; 2.8 lbs/row foot #1 & #2
Notes on Harvest	It's the absolute best job of the season!!!!	

Equipment

General	Tractor $20,000 rototiller $2000 mulch layer $2500 furrower $200	Estimated New & Fabrication Prices: Vegetable washer, sponge roller drier and sorting round table $4,000 Farmall 140 tractor: $2,500 Branson 3520H tractor: $16,000 Potato Digger: $4,000 Fabricated vine cutter: $500 Fabricated conveyor belt trailer: $5,000 Fabricated sled with hand controlled cultivator attachments: $450 Fabricated water tank trailer: $800 Fabricated punch wheel/water wheel combo: $600
Biggest Impact	mulch layer- no weeding! furrower- no forking!!	1) Fabricated conveyor belt trailer: Don't have to pick potatoes up off the ground. Makes a huge difference in gathering and sorting the sweet potatoes once they are dug. 2) Fabricated sled with hand controlled cultivator attachments: Has the potential to reduce hand weeding by 99+%, especially if slips are 10+ inches and other factors allow for timely cultivation.

Marketing

Markets	CSA, farmers market, online winter sales	direct to grocery, direct to restaurant, Other CSA and direct to consumer marketers. Institutions. Direct to consumer.
CSA	2 pounds per week for 4 weeks in October	
Farmers Market	$2/lb	

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Direct to Grocery		$1.40/lb.
Direct to Restaurant		$ 0.85/lb.
Wholesale to Distributor		
Other Outlet	$2/lb	
Seconds	The smalls go out to CSA. I will sometimes market the seconds to customers. Depends on the quantity.	Restaurant. $ 0.85/lb.