

Onions



Extension
UNIVERSITY OF WISCONSIN-MADISON
DANE COUNTY



FAIRSHARE
CSA COALITION

Jimmy Bauman

Farm Farm

Liz Graznak

Happy Hollow Farm

Nate Parks

Silverthorn Farm Inc.

Location	Delano, MN	Jamestown, MO	Rossville, IN
Acres in Vegetables	2	7	20
Acres in MAIN SEASON Onions	0.08	0.25	0.75
Acres in OVERWINTER Onions	0.03	0.25	None

How these tasks are done for Onions:

field prep/tillage	with a walking tractor	with a riding tractor	with a riding tractor
transplanting	by hand	with a riding tractor	with a riding tractor
cultivating	by hand	by hand	with a riding tractor
spreading amendments	by hand	by hand	with a riding tractor
mulch laying	by hand	with a riding tractor	with a riding tractor
laying irrigation lines	by hand	by hand	with a riding tractor
laying row cover	by hand	by hand	by hand
spraying for pests or diseases	by hand	by hand	with a riding tractor
harvesting	by hand	by hand	by hand
hauling harvested crop from the field	with a riding tractor	by hand	with a riding tractor
mowing residues	with a walking tractor	with a walking tractor	with a riding tractor
incorporating residues	with a walking tractor	with a riding tractor	with a riding tractor
farming style	organic practices, not certified	certified organic	organic practices, not certified

Propagation

Varieties MAIN SEASON	Cortland (yellow), Calibra (yellow), Red Wing (red), Cabernet (red), Blush (red), Long Red Florence/ Tropea (torpedo), Conservor (shallot), Camelot (shallot), Borettana (cipollini)	Red Wing, Ailsa Craig, Bridger	Valencia (sweet) Great look, flavor, storage for a sweet. Replaced our Walla Walla and Candy Zoey (sweet) also performs better for us Cortland (storage) Excellent flavor and storage. 50% of our storage crop is Cortland Yankee (storage) Beautiful color, medium size, seem to last forever (downy mildew tolerance) Talon (storage) healthy tops, great color, long storage Cabernet (early red bunching/storage) Medium/small bulbs for bunching and storage Monastrell (red medium storage) Our main summer red, nice size, lacks a bit for storage Red Carpet (storage) Our go to over red wing
------------------------------	--	--------------------------------	--

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Varieties <u>OVERWINTER</u>	Walla Walla (sweet) Conservor (shallot) Camelot (shallot)	Desert sunrise (red/purple)	
Propagation Schedule <u>MAIN SEASON</u>	Started in greenhouse last week of February or first week of March and we transplant as soon as we are able to in the spring, but after the first plantings of other cold season crops, since onions take their time to grow anyways, and it is a relatively large amount of space for one crop to be planted all at the same time. This also will give weeds more of a chance to germinate ahead of planting so we can create a stale seed-bed.	Seed first week of February, transplant as early as possible (usually late March/early April)	Seeding date is February 15th, trim twice then transplant around April 15th
Propagation Schedule <u>OVERWINTER</u>	Seeds started no later than the end of August and transplanted no later than the end of September. They are immediately covered with low tunnels row cover and then greenhouse poly before it snows.	Seed 3 seeds per 1.5" soil block first week of August. Transplant out late September.	
Soil Mix	Cowsmo Green Mix (with a little blood-meal added)	Vermont compost soil block mix	Dairy Doo 101 potting mix from Morgan County Composting in Sears, Michigan
Seedling Trays	#72 cell flats, 4 seeds per cell, thinned to 3 plants	1.5" soil blocks	We plant 3-4/ cell in 128's never potted up, trimmed twice and planted as plugs
Seeding	By hand, 4 seeds per cell, with a small spoon	3 seeds per soil block	We use a Vacuum seeder to seed 3-4 seeds per cell.
Germination	Cover the seeds with potting soil, water well, place in germination chamber set at 75 degrees. We leave them in the germ chamber for a bit longer than other crops since there is more than 1 seed per cell, getting a little 'leggy' isn't a big deal for onions, and the greenhouse heat won't be turned on until we take them out since they are one of the first things that we seed.	cover the flats with black trash bags, keep greenhouse at 50 degrees	Onions are placed in germination chamber with the temp set to 80 degrees, once we have 80% germination they are pulled out to open tables to be grown out.
Greenhouse Irrigation	We water with a combination of over-head misters and by hand with a watering wand. We also fertilize trays as needed with fish emulsion, or 4-3-2 CPM sprinkled on top, or blood-meal	Mister nozzle ever couple of days and once germinated switch to a heavier flow water nozzle	Onions should be kept moist but not wet. Hand watering is our preferred method on this crop to make sure we are checking onions regularly and supplying the correct moisture. Small onion seedlings can dry and die very quickly in the spring sun if not watered correctly.

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Greenhouse Conditions	50 degree night time temp until heat loving crops are taken off their heat mats, then 60 degree night time temps. They get moved to the coldest/ most out of the way part of the greenhouse since there are so many of them, and they are in there for a long time.	50 degrees, keeping flats in the dark helps them germinate more quickly	We grow onion with our early tomato starts in February which keeps them at 65 degree night time temps for the first 4-6 weeks of their life. By mid-March we are running tight on space and will move the onions to benches in a minimally heated section of the greenhouse to finish out their growing cycle.
Pests or Diseases in the Greenhouse	Not really	nope	No major pest or disease issues in the propagation house
Hardening-off	We shoot for at least a few days outside uncovered before transplanting, but ideally a week.	Move the flats outside just a couple 2-3 weeks before transplanting, may cover with row cover if hard frosts or snow are expected.	Moving onions to minimal heat for the last 4 weeks of growth has proved to be enough for us.
Other Notes on Propagation	MAIN SEASON: We try keep the tops trimmed to about 5", we will always trim them before transplanting. OVERWINTER: The transplants are only 4 weeks old, just old enough to pull out from the cells. In 2018 we were behind on seeding, so we used 128 sized cells so the roots would fill the space faster. No top dressing or trimming needed since they are younger than spring planted onions.		MAIN SEASON: Pretty straight forward seedling production, supplemental fish fertilizer is usually used at both trim events
OVERWINTER Benefits	Early harvest of sweet onions (beginning to mid June depending on the spring) Getting your onions planted in the fall when you may have more time than the spring. A great item to have early at farmers markets and for more variety in the CSA. Not sure if it makes sense for below retail prices. We are not over wintering shallots this year since they don't sell super well at market due to their higher price point.	An extra early crop when no-one else has onions and lots less weed pressure!	

Bed Prep

Growing Location	MAIN SEASON: Field OVERWINTER: Field. Hoop houses are too valuable to be taken up by onions unless it is a movable house	MAIN SEASON: Field OVERWINTER: Field	MAIN SEASON: Field
------------------	---	---	---------------------------

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Preceding Cash Crop	Anything but onions. We choose locations that have the least amount of weed pressure and that are the most ready (least amount of crop residue) and that has high organic matter.	Could be just about anything as long as it was an early in & out spring crop (lettuce, radishes, turnips, kale, chard, etc.), giving the field time to sit fallow for a couple of months late summer before the winter onion crop goes in.	Previous year would be fallow or brassica, preceded by carrot/beet, preceded by fallow. We have at least one year off production every three years. Ideally we get to every other year but not quite there yet
Preceding Cover Crop	N/A	Usually no time for a cover crop because the field was in an early spring crop.	Peas/Oats have worked well for us when following a brassica crop. Otherwise we would be going into clover following an off year.
Soil Amendments	1" of vegetative compost per bed and 4-3-2 CPM at about 75-85#N/Acre. We would like to try some feathermeal mixed in too since it takes longer to become available. Trace elements given based on soil tests. Work in amendments with power harrow before installing the landscape fabric.	A thin layer of compost is spread on the beds as well as the recommended amount of Veggie Plus fertilizer based on the soil test results from MidWestern BioAg	Based on soil tests we will add minerals needed along with a pre-plant application of 2000#/ acre of 3-4-3 poultry pellets.
Bed Prep	We use a power harrow behind a walk-behind tractor as soon as we can in the spring. After the first plantings of cold-season crops are in, we will amend the beds, harrow, then plant.	The field is usually bare-fallowed for a month or two before hand, may run a disc over the ground once every couple of weeks. Just before planting, I use a spring toothed harrow to cut deeply thru the field. Then I work the ground another time or two with a disc and use a bed shaper/plastic mulch layer to create the beds. I go over the field with the bed shaper one time to create the beds. Then compost & fertilizer are spread over the bed tops. If necessary I'll make a second pass over the bed to smooth out the bed top but usually the beds are good enough that the second pass is done to lay the plastic mulch on the beds. I follow the same bed prep for spring planted as well as for overwintering onions. However, the spring tooth harrow work is done the fall before in the field where the early season onions are going to be planted.	Following oat/pea mix we will Disc chisel mid-March followed by a disc then disc bedder to pre-shape beds, followed by bed shaper and plastic layer.

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Pre-Planting Mulch	<p>MAIN SEASON: We use 12ft wide sheets of landscape fabric that cover 3 of our beds. Holes are burned into it, 3 rows per beds 12" apart and 12" apart in the row. Onions can not deal with weed pressure, and landscape fabric will last many years and the wide sheets cover the walk ways too. We use heavy duty 8 ga 8" long sod staples about every 6-8' to hold down the edges, and then in the walk ways about twice to distance if need be.</p> <p>OVERWINTER: Same</p>	<p>MAIN SEASON: I use Biotello plastic mulch and I use a bed shaper/plastic mulch layer to lay the plastic.</p> <p>OVERWINTER: Same</p>	<p>MAIN SEASON: We use 5' plastic mulch with double drip lines, for a 42" bed top and 72" center beds. plastic middles are mulched with large round bales of hay, applied with a pto driven bale grinder.</p>
Other Notes on Bed Prep	<p>MAIN SEASON: Choose a location with low weed pressure.</p> <p>OVERWINTER: Stale seed beds can be more effective since you have a long window to implement this technique, and the soil is warm enough to germinate weed seeds ahead of time.</p>		

Planting

Bed Width	All our beds are 48" with a 30" growing space.	The bed top is 48" wide	72" centers with a 42" bed top
Plant Spacing	3 rows per bed, 12" apart with 3 onions planted in a group every 12"	3 rows per bed about 1 foot apart, 12" between soil blocks in the rows	Three 15" rows, 12" between plugs
Mulch at Planting			Mulch is usually in place prior to planting. Onions can be pretty fragile and later mulching has resulted in more damage than we are comfortable with. We use a mechanical process to add mulch and this could add to the damage over hand applied.
Amendments at Planting			We typically will put 2000#/ acre of 3-4-3 before plastic mulch is laid. A starter mix of fish and kelp are mixed with planting water in transplanter.

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Transplanting Process	We plant one multi-plant plug per hole. If the plug has fewer than 3 plants, we try to quickly find another thin one to plant with it. Some holes may only get two plants. If spring is favorable we might wait a week after the landscape fabric install to have another opportunity for a stale seed bed since the transplanting process should be enough soil disturbance to kill thread stage weeds. We use overhead irrigation to water the plants in and to water through-out the season since we try to plant our onions on our heavier loam soils. If we plant them in the loamy sand soils we will put two lines of drip tape underneath the fabric per bed, but still use overhead to water them in.	I use a water wheel transplanter. The soil blocks are pushed into the pre-dibbled and watered holes by the two people riding on the transplanter. One or two people follow behind to make sure that the soil blocks go planted deeply enough and fully covered with soil. The middle row is planted by hand as my transplanter only has two wheels. I'm hoping to change that this season!	Onions are planted with a water wheel transplanter with rows pre-set distance apart and spades set to 12" O.C. spacing
Water at Planting	Overhead is used to water in the plants and then we shoot for about 1" of irrigation per week, especially when they are bulbing.		Drip tape is turned on prior to transplanting, this insures plants are well watered and helps to find any leaks in the system as we are planting.
Row Cover	<p><u>MAIN SEASON:</u> We do not use row cover for onions, they are hardy enough.</p> <p><u>OVERWINTER:</u> After transplanting and watering in the fall onions, we install EMT conduit hoops every 6' across two beds, and cover with 10' wide row cover. The hoops have 'J' hooks drilled in 10" from each end so we can use parachute cord laced over the row cover, the end result looks like a mini caterpillar tunnel. It takes more time to install this way compared to sand bags, but fall can be windy and the cord keeps the cover in place without much maintenance. We have always used AG-19 row covers, but will likely be getting thicker cover so it doesn't tear as easily. Before the snow flies or the ground freezes, we add a layer of greenhouse poly and use an additional length of rope to hold it down.</p>	<p><u>OVERWINTER:</u> Hoops & row cover (pro 30) is put over the beds once the first 10 degree night is predicted in the early winter.</p>	<p><u>MAIN SEASON:</u> no row cover or protection used.</p>

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Other Notes on Planting	<p>OVERWINTER: Planting too early in the fall risks more bolting plants in the spring, and planting too late the onions won't be a good size. A great research paper is published by the University of New Hampshire and the link is: https://extension.unh.edu/resources/files/Resource005477_Rep7652.pdf</p>	<p>MAIN SEASON: I have a lot of weeds (don't we all) and I don't do a good job of staying on top of weeding my spring onions b/c I'm so busy with other things! I may move to planting only overwintering onions because they do so well for me!!!</p>	<p>MAIN SEASON: We have found planting 3-4 seeds per cell and 12" apart on plastic speeds our planting tremendously reduces the amount of hand weeding by 1/3 all while maintaining adequate size and yield.</p>

Crop Maintenance

Irrigation	<p>MAIN SEASON: If our onions are on our heavier soil we will only use overhead Wobbler sprinklers to provide about 1" of rain per week. If they are planted on our lighter ground we use 2 lines of drip tape per bed and provide about 1" of rain per week.</p> <p>OVERWINTER: After watering with overhead, the fall planted onions won't be watered again until the spring. If the beds are really dry in the early spring before the covers are removed you can water them if you have drip tape installed. Do not use the drip tape to water them in in the fall, it will get ruined when the water freezes.</p>	<p>MAIN SEASON: overhead wobbler sprinklers, a good 1 - 1.5" per week</p> <p>OVERWINTER: almost never have to irrigate them!</p>	<p>MAIN SEASON: We have found onions to respond very well to lots of moisture early in their growing cycle. We try to maintain at least 1" per week through drip tape right up through harvest.</p>
Irrigation Modifications	<p>When the onions start to bulb, we make sure to pay extra attention to providing them with water, and once the tops start to fall over, we won't water anymore.</p>	<p>If anything as the onions start to head up, I increase the watering by a little bit.</p>	<p>Onions can size up quickly at the end of June through the first of July and we try to make sure that 1" per week is maintained through those last critical weeks.</p>
Weeding	<p>Since we use landscape fabric we can only hand weed them. Usually just once is enough, but make sure to do it on time. If there are weeds after one hand weeding (and there will be) we like to clip them before they set seed. This way we can count on the beds under the fabrics to have low weed pressure for the following crop. If your weeds get too big you must clip them--onions have very shallow and fragile roots that would get wrecked if you pull the weeds.</p>	<p>BY HAND!!!</p>	<p>We do one main hand weeding of the entire field by the end of May, after this weeding is usually not necessary unless we have growth between the plastic. IF no mulch has been used on wheel tracks we will cultivate with sweeps and discs on a belly mounted cultivator. If hay mulch has been used often we don't weed the wheel tracks as most weeds that finally do break through the mulch are not going to go to seed by mid-July when we are ready to clear the beds.</p>

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Insects & Pests			Thrips have become a problem for us for the first time this past season. Was caught off guard with this pest and am interested to know others best practices for control.
Diseases			Powdery mildew has been becoming a problem as our summers over the past 3-4 years have been very wet from late June on. Both Valencia and Yankee have performed well for us under these conditions.
OVERWINTER Protection	<p>After transplanting and watering in the fall planted onions, we install EMT conduit hoops every 6' that covers two beds, and cover those with 10' wide row cover. The hoops have 'J' hooks drilled into the hoops 10" from each end so we can use parachute cord laced over the row cover, the end result looks like a mini caterpillar tunnel. It definitely takes more time to install the cover this way compared to sand bags, but fall can be very windy and the cord keeps the cover in place without too much maintenance. We have always used AG-19 row covers because that is what we have, but will likely be getting thicker cover so it doesn't tear as easily. Before the snow flies or the ground freezes, we add a layer of greenhouse poly on top of the row cover and use an additional length of rope to hold it down.</p>	Pro30 row cover & low metal hoops	

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
OVERWINTER Spring Uncovering	Good timing is key, but often hard to achieve as the spring of 2018 proved. The goal is to remove the greenhouse poly after the danger of heavy snow has passed before the daytime temperature get too warm. The low tunnels can get quite warm on a sunny day even in the early spring which will dry the soil out. In 2018 we removed the poly and then we had a blizzard in mid April which damaged the row cover. The onion plants themselves look like garbage, especially the rows closest to the edges of the low tunnels, but they are quite tough and we have not noticed a size difference in the mature bulbs of edge rows vs center rows. We had a chunk of scallions in a bed that were not harvested the fall before and they were marketable the next spring without any covering at all (they were bolting however)	As soon as the days start to get longer and the night time temps are staying above 30, I uncover them.	
Other Notes on Crop Maintenance			Spreading our transplant spacing out to 12" in row with 3/4 onions per whole cuts our hand weeding by a third with the same amount of onions as if we were doing 4" o.c. plants. In our environment wind is a non-stop challenge, if we put holes in plastic every 4" we would have shredded plastic. I would like to trial some bare ground onions with the same spacing as we move forward. With better cultivating equipment now and a way to mulch easily it may be worthwhile.

Harvest and Yields

Harvest Window	MAIN SEASON: End of July/ early August OVERWINTER: Early to mid June	MAIN SEASON: mid June OVERWINTER: late April	MAIN SEASON: We begin bunching small bulbs by the second week of June. The bulk harvest is planned to happen after our July 4th break. The Sweets will be ready by this time and a week later the reds then our storage onions. By the last week of July harvest is complete.
----------------	---	---	--

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Harvest Procedure MAIN SEASON	Not all varieties mature at the same time. Once half the tops start to fall over for a given variety, it is time to harvest. We harvest any time of the day and try to wait for a time of the week that isn't raining. We harvest our onions into harvest totes to carry them to our wagon at the end of the row. Cut the tops off leaving about 2" above the top of the bulb and place into bread trays in 1 layer deep (or just slightly overlapping).	I like to have fresh bulb onions to sell at market so usually some get pulled and bunched and sold early as well as put into CSA shares. Once the tips begin to brown I use a soil rake to knock the tops over and let them sit in the field for hopefully a week. The challenge for us in MO is that the time to do this happens to be a time when we usually are getting quite a bit of rain. Which leads to lots of problems with curing later on!	We usually let tops fall on their own and harvest a variety when the bed is close to 80% down. Typically we will harvest onions and lay them out in shallow macro bins no more than three onion plants deep. These are 18" deep macro bins that we move with the tractor to our Tool shed and stack 4 bins high to cure. This year we had to harvest into black crates and lay onions out on greenhouse benches. The weather was extremely wet and the onions had to come in from the field. With all the mud and moisture on the bulbs laying them out made sense. It also added lots of labor to lay everything out and then pick it all up by hand.
Harvest Procedure OVERWINTER	We begin selling sweet onions as soon as we feel that they are 'big enough' in the spring by leaving the tops on and bunching them. Once about half the tops start to fall over we harvest using the same method as spring planted onions. If we have any unsold sweet onions by the time the spring planted crop is ready, we will transfer the onions to other crates so we can use the bread trays.	These are all harvested for fresh eating so I just start pulling them when I think they've gotten big enough. They will start to bolt so you don't want to wait too long.	
Curing	MAIN SEASON: The bread trays are placed into the greenhouse on the propagation benches and a 50% shade cloth is hung over the trusses. After a few weeks or when the skins are dry and the remaining part of the top has dried closed, we stack the bread trays in the shed out of the sun. We clean the onions only as we sell them. OVERWINTER: Same	MAIN SEASON: I built an onion drier which I use to cure my onions. OVERWINTER: Only sell fresh	MAIN SEASON: Ideally we harvest into shallow macro bins and stack 4 high in two rows in our tool shed. A 36" fan is used to keep air flowing in and around bins. In extreme wet conditions we will dry on bench tops in the greenhouse. We will allow the onions to cure in these environments for 4-5 weeks before we start the cleaning process. I like to have them trimmed packed in large Macro's and into storage by September 1st.

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Cleaning	We just brush the dirt and loose skins off by hand when they are needed for a sale. I make sure to remind everyone that we are not peeling them, just brushing off the dirt.	Dried tops are removed with scissors and they are rubbed clean by hand.	Latex gloves and pruners make quick work of snipping tops 1" above the bulb and cutting the roots at the bulb. We will put the trimmed onion onto our wash line with top brushes and run through dry. It is important the machine is dry and not following a water cycle. At the end of the wash line we have a rotating sorting table and onions are packed into 50 pound bags according to size. Baseball and larger in one bag and everything else in the other. These bags are stacked into bins and moved into long term storage. Putting in bags first greatly improves life later when its time to pack out.
Packing	We weigh our portions for farmers markets and CSA. We use a roll of 'netting bags' for the farmers market and sell 1.5# bags. Any unsold bags are ready to go for the following week. CSA portions are not bagged, just dumped into the box.		Upon pack out bulbs are mostly ready to go, a few loose papers may need to be cleaned off as we go. Having the onions pre-bagged makes pulling product out of the cooler much faster as the season progresses. For wholesale accounts these bags will not need to be sorted again until signs of deterioration begin to show.
Storage MAIN SEASON	After curing the onions are placed into the shed out of the sun. They remain there until the danger of them freezing arrives. At that point they are moved into a heated part of the shed that stays around 55 degrees. We know that they store best closer to 32, but we don't have that much cooler space, and we don't typically have too many go bad on us before we sell out around the new year.	I keep my onions in my 35 degree walk-in cooler loose in black crates, covered with plastic bags. The ends of the bags are left open for air flow.	Our onions are stored in mesh bags stacked inside of wooden bins. These bins are stacked two high and placed into a 53' semi reefer trailer that is attached to our pack shed. This cooler is kept at 36 degrees with multiple different crops inside. Storage onions have kept well through March in most years.
Storage OVERWINTER	After curing the onions are placed into the shed out of the sun. We try to use up the over-wintered sweet onions as soon as we can since they won't store as long as other varieties.	Don't store them	

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Yields MAIN SEASON	This varies greatly year to year depending on many factors, especially weed pressure. Since we started to use landscape fabric and pay better attention to hand weeding on time, our yields continue to improve.	???	Valencia has been our best yielding variety at 1.25 pounds per bed foot. Storage onions come in at an average of 1 pound per bed foot and the reds follow with just under a pound per foot.
Yields OVERWINTER	We will typically get good sized sweet onions, usually bigger than spring planted ones. When we first started to over winter onions, we were not using landscape fabric and were not the best at keeping them weeded, but they would usually do ok, even in a sea of annual weeds (depending on the weed) I feel that the onion is getting a really good head start on annual weeds by being planted in the fall.	???	
Other Notes on Harvest & Yield			Harvest and yield have been very weather dependent over the last couple of years. Heavy consistent rains in early July have really challenged harvest and marketable yield. Having high raised beds, plastic and mulch seem to help mitigate this issue somewhat.

Equipment

General	All of the equipment is standard propagation equipment and landscape fabric since we do everything by hand. I do like topping them right away in the field and curing them on bread trays. After they are topped, we don't have to touch an onion until it is time to clean it before selling. The bread trays we purchased were about \$15 each.	Ford 4600 (\$8K) for pulling the bed shaper (\$2,400) & transplanter (\$1,200) & field prep work. Ford 801 (\$800) for discing (\$700) & spreading compost.	Our equipment used is typical with the rest of our production acreage and nothing specific to only onions. Disc chisel disc disc bedder shaper/layer 105hp tractor water wheel transplanter cultivating tractor bale grinder harvest bins \$70,000 approximate value
---------	---	---	--

	Farm Farm	Happy Hollow Farm	Silverthorn Farm Inc.
Biggest Impact	Landscape fabric. It makes transplanting a little more time consuming, but our yields have vastly improved since we started to use it.	Bed shaper/plastic mulch layer for weed control!!!	I would say the plastic layer. Prior to the current system we use now, we struggled with bare ground production

Marketing

Markets	CSA, farmers market, direct to grocery, direct to restaurant	CSA, farmers market	CSA, farmers market, on-site farm stand, direct to restaurant
CSA	For 25 weeks of CSA: sweet- 6#/yr, yellow- 8#/yr, red- 8#/yr, Cipollini- 4#/yr, shallot- 3#/yr	3-5 onions per share for about 8-10 weeks of the season	Our CSA has always been free choice. Onions are sold in 3 pound small mesh bags with the sweets and reds going out first followed by storage onions for winter csa delivery.
Farmers Market Prices	MAIN SEASON: Sweet, yellow, and red \$2.25/#, Cipollini \$5/#, shallots \$6/# OVERWINTER: Sweet, yellow, and red \$2.25/#, Cipollini \$5/#, shallots \$6/#	MAIN SEASON: \$3.50/bunch (3-5 onions per bunch) for fresh onions, \$2.50/lb. for storage onions OVERWINTER: \$3.50/bunch (3-5 per bunch) for fresh onions	MAIN SEASON: Early top on bulb harvest are sold at \$1.25 each then main summer season onions are \$1.50 per pound, winter market prices are \$2.00 per pound
Direct to Grocery Prices	Cipollini \$4/#, Shallot \$4.50/#		
Direct to Restaurant Prices	Cipollini \$4/#, Shallot \$4.50/#		MAIN SEASON: Onions are sold at \$1.50 per pound throughout the season
Wholesale Prices			
Other Markets			