

One-Cut Salad Heads



Extension
UNIVERSITY OF WISCONSIN-MADISON
DANE COUNTY



FAIRSHARE
CSA COALITION

Ray Tyler
Rosecreek Farms

Joe Schwen
Heartbeet Farm

Liz Graznak
Happy Hollow Farm

Location	Selmer, TN	Zumbro Falls, MN	Jamestown, MO
Acres in Vegetables	1	7	7
Acres in FIELD Salad	0.25	0.5	1
Acres in HOOPHOUSE Salad	0.25	0	5600

How these tasks are done for Salad Heads:

field prep/tillage	with a walking tractor	with a tractor	with a tractor
hoophouse prep/tillage	with a walking tractor	do not do this task for salad heads	with a walking tractor
transplanting	by hand	by hand	by hand
cultivating	by hand	by hand	by hand
spreading amendments	by hand	do not do this task for salad heads	by hand
mulch laying	by hand	do not do this task for salad heads	by hand
laying irrigation lines	by hand	by hand	by hand
laying row cover	by hand	do not do this task for salad heads	by hand
spraying for pests or diseases	by hand	by hand	by hand
hauling crop from the field	by hand	with a tractor	by hand
mowing residues	with a walking tractor	with a tractor	by hand
incorporating residues	with a walking tractor	with a tractor	with a tractor
farming style	organic practices, Certified Naturally Grown	certified organic	certified organic

Propagation

Varieties FIELD	Field: Muir, Cherokee, Panissi Hoophouse: Panissi	Red crisp, Red butter, and green crisp Salanova varieties as named by Johnny's seeds. The red butter prefers cooler temps but we still try and grow it through the hotter months as well. Otherwise, we harvest all three from June through October.	Field: Red & Green Incised, Red & Green Butter and Red & Green Oakleaf Hoophouse: Same
Seed Storage	in a sealed tote or bag in a fridge or freezer	The pelleted seed is all we've had available until this winter so we just keep it in a dry, cold place (empty, unplugged chest freezer in the barn). We don't expect great germination on held over pelleted seed. This year we're trying some unpelleted varieties from Harris Seeds.	In a five gallon bucket with a sealed lid in my 35 degree walk-in cooler
Soil Mix	Purple Cow seed starter 101	Cowsmo green label potting soil	Vermont Compost Soil Block Mix

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Seedling Trays	p-200 and 6" paperpots	So far, we've used the paper chain pot method. We're switching to a mechanical transplanter this year and will be seeding them into 128 trays.	Soil Blocks 1" size (35 blocks per punch)
Propagation Schedule	We start seeding January 1st and every two weeks until March 5th then we switch to every week until beginning of Sept where we switch to multiple planting a week so we can have a harvest all thru winter and early spring. Field: 3/4 seed 4/4 plant 5/4 harvest Hoophouse: Same	Field: Beginning March 1st, we seed them directly into the tray/cells. (We do not up-pot.) Every week we start another wave until about July 15th. Beginning approximately April 1st, we transplant them into the field when they're about a month old and do so every single week. We do this until about August 15th when we stop planting into the field. Those last few plantings hold better in the field and we harvest off of those through October.	Field: approximately 900 blocks seeded every other week for 2 months in the spring and for 3 months in the fall/early winter Hoophouse: approximately 900 blocks seeded every other week for 3 months in the spring and for 3 months in the fall/early winter
Germination	We seed year round and place in a germination chamber set to 71 degrees for exactly 48 hours. This works summer and winter.	No special treatment- They are thoroughly watered in and we try not to water them at all until they germinate unless they're totally dried out. This is because pelleted seed is prone to rotting with too much moisture. We leave them out in the open on the greenhouse tables aiming for a temperature in the mid-70s. However, nighttime temperatures in the earlier part of the season can get down to 50 degrees in the greenhouse.	Lettuce germinates very easily in cool temps. I don't heat my greenhouse so in the early spring I just watch the weather and find a 5-7 day stretch where there will be good sunny days and I'll seed them. I don't seem to have any trouble with germination. I am going to try a new germination chamber this winter to try some January/February seeding.
Greenhouse Irrigation	with a hand watering wand as needed	We hand water with a watering wand on a need-to-be watered schedule.	Mister nozzle before they germinate and with a higher spray nozzle after they've come up. Once in the morning (7 - 8am) and one more watering mid day (around noon)
Greenhouse Conditions	we like it 72 degrees in full sun with proper air circulation and exhaust fan.	We aim for mid 70s and try not to overwater the trays. Ideally they wouldn't be in direct sun while they are germinating because the dark potting soil gets hotter than the air temperature but they do have to be in direct sunlight as soon as they germinate.	I don't pay that close attention
Greenhouse Pests or Diseases	None	Damp off can be an issue. Provide lots of air movement for trays as soon as they germinate.	None

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Hardening-off	we place out doors at week 3 for 5 days	Set them outside about a week before transplant.	In the spring they get moved outside once the transplants are about 3 weeks old. In the fall I don't usually harden them off, they just get transplanted directly out of the greenhouse into a high tunnel
Other Notes on Propagation	Keep seeds at a consistent temp for 48 hours	With the chain pots, you need to make sure there is one and only one per cell.	I did a very small trial with High Mowing varieties this past winter but would like to expand those trials this spring with more High Mowing as well as Osborne seed varieties.

Bed Prep

Preceding Cash Crop	Field: Root crop or brassica Hoophouse: Same	Field: We don't have a specific rotation before growing the salad heads. Could be any vegetable family that precedes it.	Field: Cucurbits or Solonacea usually Hoophouse: really could be anything, just not lettuce
Preceding Cover Crop	Field: Compost Hoophouse: Same	Field: No system	Field: buckwheat and/or bare fallowing Hoophouse: no cover crops
Soil Amendments	Field: Yes this varies from year to year depending on soil test Hoophouse: Same	Field: We don't use anything specific for salad heads. We just follow a basic soil balancing protocol based on soil tests for each field.	Field: sprinkling of compost and a sprinkling of alfalfa meal Hoophouse: compost (3 full wheel barrows for 1 bed for 190'), a light dusting of alfalfa meal or cottonseed meal
Bed Prep	Field: broadfork a few times a year than power harrow Hoophouse: broadfork and power harrow	Field: We're looking for soil that is the consistency and texture so that you can squeeze it into a ball and have it hold but then be able to crumble it back into bits. For the chain pots, the soil has to be finely tilled. Immediately before planting, we use a 3 point hitch rototiller behind the tractor to prepare the bed.	Field: Discing, chisel plowing, discing, bed shaping with my bed shaper/plastic mulch layer Hoophouse: With any new tunnel significant amounts of peat moss & a small amount of lime are applied to each bed. These amendments are worked in with a BCS tiller. 1 time each year all of the beds are broadforked in each of the tunnels. A thick layer of compost & fertilizer are applied to each bed prior to tilling. Bed prep happens with a BCS tiller. Depending on the bed, time of year & what the preceding crop was, the soil is often loose enough that it can be worked with the Tilter from Johnny's.

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Pre-Planting Mulch	Field: We lay down landscape fabric and staple down every 4ft Hoophouse: Same		Field: no mulch Hoophouse: Same
Hoophouse Soil Needs	Hoophouse: lot of compost and minerals		Hoophouse: hefty amounts of compost (about 1" per bed applied at time of first planting each year), annual soil tests, diverse fertilizers (alfalfa meal, cotton seed meal, veggie plus fertilizer), the pathways are mulched with straw or leaves annually

Planting

Bed Width	Field: 30 inch Hoophouse: 30 inch-40 inch	Field: 45" from outer row to outer row	Field: 56" Hoophouse: 42-50"
Plant Spacing	Field: 4 rows per bed 6"-10" between plants 8" between rows Hoophouse: Same	Field: 4 rows/bed, 15" between rows, 6' in row spacing	Field: 5 rows/bed, 8" within the rows, 8-10" between rows Hoophouse: 4 or 5 rows/bed, 8" within the rows, 8" between rows
Transplanting Process	Lay down fabric. Plant transplants in each burned hole. Turn on over head irrigation.	Before heading to the field, we soak the trays of plants in a hydroponic 4'x8' tray of water for 5 minutes. We till the bed and mark it with a round barrel style row marker that is pulled behind the tractor. We place the tray of chain potted salad heads on the pull-boy transplanter. Pull the end of the chain out and plant the first one by hand keeping the chain intact. Pull the transplanter forward, following the marks on the bed, watching to make sure that as you go, the plants are being buried at the right depth. After all the trays are in the ground, go back and push each plant down to firm it into the soil.	Three or four lines of 4" drip tape are laid down in the bed, the 4" line easily marks the spacing for planting the soil blocks at every other drip. Soil blocks are planted on both sides of the drip line (depending on the number of rows we're putting in the bed). The drip lines keep our rows straight. Blocks are placed in a diagonal alternating pattern every other row.
Water at Planting	It varies per time of year.	Trays are soaked before planting. We only use drip tape right after planting if the ground is super dry or if it's really hot (90 or hotter).	The drip tape is turned on just as we start planting and left on for just long enough to mark the spacing for where to plant the soil blocks. Once we are finished planting the water is turned back on to water in the plants. Two days later another substantial watering is done and then we water once per week.

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Row Cover	Only use row cover in early spring and late fall. held down with sand bags		
Other Notes on Planting			Hoophouse: I've been experimenting with tighter row spacing based on some fellow farmer friends recommendations. This past winter I planted 4 rows per 3' wide bed, with 8" in row spacing between heads. I think I could get away with 5 rows in the spring or fall but in the winter I want them to be slightly farther apart spacing for better airflow.

Crop Maintenance

Irrigation	<p>Field: In fall -spring only when needed. In summer its 2-4 times a day unless it rains</p> <p>Hoophouse: We only water as needed in winter.</p>	<p>Field: We only irrigate when we first plant them IF the soil is super dry or if its above 90. Otherwise they're completely on their own.</p>	<p>Field: I shoot for 1.5" of rain per week with lettuce so, I usually try to split up the watering to twice per week. I try to not let the soil dry out too much between waterings.</p> <p>Hoophouse: Small mini wobblers and/or 4" drip tape. I water when the soil moisture looks like it's getting dry.</p>
Weeding	<p>Field: we use landscape fabric and cultivate twice a week if on bare soil.</p> <p>Hoophouse: we use landscape fabric</p>	<p>Field: We go through with the basket weeders on our cultivating tractor about a week to 10 days after transplanting. Then we cross hoe with a 3" stirrup hoe following the basket weeding (either immediately following or as soon as we can fit it in). Each crop just gets one pass through with the basket weeders and cross hoeing.</p>	<p>Field: Stirrup hoe or diamond hoe</p> <p>Hoophouse: Same</p>
Insects and Pests	<p>Field: We spray once a week for aphids. Mainly we use pyganic and safer soap</p> <p>Hoophouse: Same</p>	<p>Field: Occasionally we have cabbage looper and other cutworm type of problems. It's rarely bad enough to address.</p>	<p>Field: In the summer our biggest pest is Cucumber beetles and Blister beetles. Pyganic is the only thing that I've found that will control the Blister beetles. Insect netting does a decent job keeping the Cucumber beetles off.</p> <p>Hoophouse: Aphids in the deep winter months (January/February). I'm not that good about staying on top of them!</p>

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Diseases	<p>Hoophouse: We have lettuce drop in tunnels. We run winter salad production a lot dryer to prevent this problem.</p>	<p>Field: Mildew from underneath can be a problem when conditions are moist and hot. One thing we do to try to help avoid this problem is harvesting every other head on the first harvest pass through to get better airflow for the remaining heads that are left to grow.</p>	<p>Hoophouse: Sclerotinia is becoming a bigger & bigger problem! We are super diligent about not leaving any leaf matter/debris in the tunnels and I'm very conservative with watering during the winter. I use drip irrigation almost exclusively during the winter months. The end wall vents are left open continuously. As soon as the sun is up, the sides are dropped down even if it's below freezing out. I also installed circulation fans in the summer of 2018 and that seems to have helped quite a bit with condensation building up in the winter months.</p>
Hoophouse Environment	We use exhaust fans, circulation fans and automatic roll up sides. Also use heater to control humidity		YES!
Hoophouse Heat	We do if temps drop below 15 degrees		No
Hoophouse Shade Cloth	No		Only during July/August
Other Notes on Crop Maintenance		<p>Field: To extend our harvest window, when the weather gets hot we scan for the heads that look like they might be trying to bolt and we harvest them first.</p>	<p>Hoophouse: I may put low tunnels (10' lengths of 1/2" PVC hoops) over beds covered with 30% shade cloth in July/August. The hoops are spaced 10' apart so it doesn't take many per piece of shade cloth. The shade cloth is on the transplants from the time of planting for 2 to 3 weeks and then uncovered. Last year, I trialed laying the shade cloth over the top of the plants but wasn't super happy with the results so I'm going back to hoops even though it's more work.</p>

Harvest and Yields

Harvest Window	<p>Field: we harvest 52 weeks a year</p> <p>Hoophouse: from Dec-March</p>	<p>Field: First harvest around June 1st, continually with our waves through the end of October. The first couple waves and the last couple waves can be harvested from for about a month. The window of harvest on the waves in the middle of the season (July and August) is more like a week.</p>	<p>Field: April, May, June and Sept., October</p> <p>Hoophouse: November through end of March</p>
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Harvest Procedure	We harvest before sun hits leaves. We use black harvest totes aprox 24 heads per crate. For butter heads we stack first layer roots up, second layer roots down, third layer roots up, fourth layer roots down	We like to harvest a little before noon with a straight bladed sharp field knife. (This timing is because we don't want the plants to be at full turgor - we want them to be able to absorb any excess moisture after the washing and spinning dry because it improves shelf life.) We cut off the whole plant at the base and take the bad leaves off the bottom and then cut one inch off the stem, let the loose leaves fall into the crate, cut another inch off the stem and keep going until there is no more stem left and all the leaves are loose in the crate. Person harvesting moves the crate along down the row with them and when it's full we put it in a two trailer that we pull behind a tractor back to the washing and packing shed. The trailer is enclosed with plywood on 3 sides and has a roof. Our goal is keeping the salad greens out of the sun and wind.	I use a small harvest knife (Johnny's red handled serrated knife) to cut the entire head just above the growing point. I aim to get two good cuts per plant per planting. I harvest into Rubbermaid totes.
Mixing Procedure	we cut salanova above stem in the field	Mixed in the field by selecting different colors as we harvest.	When harvesting, we harvest 1 tote of each variety (usually 4 different ones). They are mixed during the washing process.
Additions	We occasionally add all star salad mix in the summer. We will add a 25% of mix to the wash tank.		
Washing	<p>Salad Mix: We dump 25# of cut salanova into a 100 gal wash tank. We change water as needed.</p> <p>Whole Heads: If lettuce is clean in the field we do not wash. If it is we dunk and gently spin for about 30 seconds</p>	<p>Salad Mix: The salad mix is triple washed in a series of three bathtubs, being lifted by hand or with a large metal fryer basket/colander. Wash water is changed if the third wash tank starts getting dirty. We work quickly and do not leave salad to soak in the tubs and absorb unneeded moisture.</p>	<p>Salad Mix: We use a large black stock tank to wash the mix and a jacuzzi bubbler to get the mix really thoroughly washed. Sanidate is added to the water.</p>
Drying	<p>Salad Mix: We bubble mix for 2 minutes, then spin in a spinner for 2.5 minutes. We use food grade, orange fish baskets.</p>	<p>Salad Mix: Out of the third wash tub the salad mix is transferred into orange plastic perforated harvest baskets which fit snugly inside of a revamped top loading washing machine where we spin the basket for 50 seconds.</p>	<p>Salad Mix: We use fish baskets and a washing machine to spin them dry.</p>

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Packaging	<p>Salad Mix: After wash and spinning we fill proper container for the proper lettuce outlet. We fill bags and containers by hand.</p> <p>Whole Heads: We pack in clamshells and bags. All work is done by hand.</p>	<p>Salad Mix: Clean, dry, salad mix goes into waxed produce boxes that are lined with perforated/vented bag with a piece of kraft paper on the bottom of the bag and on the top of the mix inside the bag.</p>	<p>Salad Mix: Compostable bags are used for bagging the mix if going to CSA members and a more professional clear bag with a HHF label is used if going to the farmers market. The weight per bag (no matter the bag) is always .3lbs.</p>
Storage	<p>We use clamshell, bags, totes in a walk in cooler set at around 36 degrees and around 95% humidity</p>	<p>Once it's packed into it's lined boxes, it goes into the walk in cooler at 38 degrees.</p>	<p>It is stored in the Rubbermaid totes it is harvested in, then in our 35 degree walk-in. It can be stored "dirty" or clean</p>
Maximum Storage Time	<p>Salad Mix: 2 weeks</p> <p>Whole Heads: 2-3 weeks</p>	<p>Salad Mix: The salanova has a total shelf life of about 2 weeks. Since we are wholesaling, we will only keep it for about half a week before sale at the most. 99% of the time, our salad mix is harvested 24 hours before delivery.</p>	<p>Salad Mix: 2 weeks</p>
Yields	<p>Field: 100 lb per bed</p> <p>Hoophouse: Same</p>	<p>Field: Green crisp is about 2# per row foot, red crisp is 1# per row foot, red bibb .5# per row foot.</p>	<p>Field: 10lbs. per 5-6' of the Butterhead varieties, the frillier/looser varieties it's more like 10lbs. per 8-10'</p> <p>Hoophouse: Same</p>

Equipment

General	<p>Salad spinner \$1,000 And washer/bubbler set up is approx. \$500 for all piping labor etc</p>	<p>Chain pot transplanter- \$1,000; tools for seeding with this system- Paper trays are \$3.50 each. Plastic greenhouse trays for chainpots are \$4 each. Salad spinner - we paid for a new, heavy duty motor at \$300 but the rest was just a junk washing machine that we rigged up ourselves.</p>	<p>BCS & Rototiller \$3,600, Bed shaper/Plastic Mulch layer \$1,800, Ford 4600 \$8,000, Cultivating hoes \$100, Washing machine \$150, Bubbler set up \$150, Fish Baskets x 3 \$90</p>
Biggest Impact	<p>both are curial to washing and drying fast and effectively.</p>	<p>The salad spinner and timing our harvest for optimum moisture management. Chain pots save a lot of labor but they cost a lot too!</p>	<p>Washing Machine & Bubbler</p>

Marketing

Markets	<p>CSA, farmers market, on-site farm stand, direct to grocery, direct to restaurant, wholesale through a distributor, on line retail</p>	<p>direct to grocery, direct to restaurant</p>	<p>CSA, farmers market, direct to restaurant</p>
CSA	<p>Salad Mix: 1 lb each share each week</p>		<p>Salad Mix: .4lbs. approximately 10 weeks out of 32 weeks</p>

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Farmers Market	<p>Salad Mix: we sell 4oz bags and clamshells for \$3 each</p> <p>Whole Heads: We sell whole head lettuce for \$3 a head</p>		<p>Salad Mix: .3lb. per bag @ \$3.50/bag</p>
Direct to Grocery	<p>Salad Mix: We sell a 4oz clam for \$2.85</p> <p>Whole Heads: We sell a head lettuce in a clamshell for \$3</p>	<p>Salad Mix: Bulk salad at \$6 per pound</p>	
Direct to Restaurant	<p>Salad Mix: bulk salad mix for \$5-\$8 per pound</p> <p>Whole Heads: \$.90 -\$2.75 per head</p>	<p>Salad Mix: bulk salad mix at \$6 per pound</p>	<p>Salad Mix: \$12/lb.</p>
Wholesale to Distributor	<p>Salad Mix: \$5-\$8 per pound</p> <p>Whole Heads: From \$1-\$2.50</p>		