

# Salad Mix



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Shooting Star Farm

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Vitruvian Farms

Location	Mineral Point	Spring Green	McFarland
Acres in vegetables	2 - 2 1/2	10	
Acres in Salad Mix FIELD	3/4	0.75	3
Acres in Salad Mix HOOPHOUSE	1200 square feet - very little		10,000 sq ft
How these tasks are done for Salad Mix			
field prep/tillage	with a tractor	with a tractor	with a tractor
hoophouse prep/tillage	with a walking tractor (BCS, Troy-bilt, etc.)	do not do this task for salad mix	with a tractor
creating stale beds	with a tractor	with a tractor	with a tractor
direct seeding	by hand	with a tractor	by hand
cultivating	by hand	by hand	with a tractor
spreading amendments	with a tractor	with a tractor	by hand
laying irrigation lines	by hand	with a tractor	by hand
laying row cover	by hand	by hand	by hand
spraying for pests or diseases	by hand	do not do this task for salad mix	by hand
harvesting	by hand	by hand	by hand
spinning	by hand	by hand	by hand
bagging	by hand	by hand	by hand
incorporating residues	with a tractor	with a tractor	with a tractor
farming style	certified organic	certified organic	certified organic

## Varieties & Schedule

Specialty Varieties	<p>Red Leaf Amaranth - nice in summer but must manage separately due to growth rate, picky to harvest; Golden Frisee - great yellow color, stays narrow, bitter in summer; Wrinkled cress - fall only, nice loft.</p>	<p>Astro Arugula - Great first cut but second cut get a lot spicier and subsequent cuts gets too large for our harvest standard. Leaves tend to break a bit easier than our other greens and require a bit more ginger touch specifically in the pack shed.</p> <p>Emperor Spinach - Very solid spring and fall variety that's great for baby cut and large leaves for multiple cuts. Very little heat tolerance and is prone to yellowing if fertility is an issue after the first cut.</p>	<p>FIELD: Bull's Blood beet leaves (amazing flavor, texture, color; difficult to germinate for us in the field)</p> <p>Minutina (very cold hardy, interesting flavor; re-cutting is not an option)</p> <p>Frisee (adds wonderful color, and body to salad; can get quite bitter mid summer)</p> <p>HOOPHOUSE: Johnny's Claytonia (cold hardy, excellent flavor and look; small seeds are difficult to work with outside)</p>
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<p>Lettuce Varieties</p>	<p>Red Oak Leaf - dark, stays smallish, cold hard;                  Red Salad Bowl - decent, cheap oak leaf, grows quickly in spring, can get too big, not cold hardy;                  Rouge d'Hiver - cheap red romaine, fast in spring and early fall, too big in summer;                  Malawi - nice, dark red leaf, not too wide;                  Blade - gorgeous upright red oak leaf, easy to harvest and re-grow, expensive, cold hardy;                  Spock - narrow, upright, dark red romaine, expensive;                  Green salad bowl - fast, good light color, can get big too fast, bolts in summer;                  Tango, cheap, frilly green oak with loft, good in spring and early fall, bolts in summer;                  Jericho - good green romaine for spring and summer;                  Defender - better green romaine for all seasons, downy mildew resistance;                  Sulu - nice, upright green oak, good loft, can get coarse in summer.</p>	<p>Allstar - Generally consistent for multiple cuts and mixed varieties develop at the same rate. A generally good whole season option as it performs really well on the bookends but can handle the heat of the summer as well.</p>	<p>Same for FIELD &amp; HOOPHOUSE                  Johnny's Red Saladbowl (less cold hardy; faster to grow, more heat tolerant)                  Fedco Red Saladbowl (slower to grow, more cold hardy; better resistance to downy mildew)</p>
<p>Mustard Varieties</p>	<p>Arugula - Astro from High Mowing Seeds, cold hardy strap-leaf type;                  Mizuna, Garnet Giant red mustard - a bit fast growing, darker than most in the summer and great in the fall;                  Tatsoi - bolts quickly with first planting, but a must;                  Red Russian Kale - use in the spring and fall, too coarse and fast growing in summer;                  Pepperpress - nice loft in spring and fall, bolts quickly in heat;                  Purple Mizuna - spindly in summer but nice color in fall.</p>	<p>Ovation - A pretty good mix but there is some inconsistency in the development of different varieties in the mix. Can get relatively large without getting tough but is best at baby size.</p>	<p>FIELD: Johnny's Arugula (very high yield; doesn't look as fancy)                  Johnny's Surrey Arugula (lower yield, worse quality recut; looks great)                  Johnny's Sylvetta Arugula (preferred flavor; small seed is difficult to plant/ bolts easily)                  Johnny's Mizuna (very high yield, fast growing; re-cuttings come back uneven sometimes)                  Johnny's Purple Mizuna (low yielding, slower growing; color looks great)                  Johnny's Red Russian Kale ( yield can be low, yellows mid summer on recuttings, machine cut regrowth can be unsightly; very cold hardy, many re-cuttings in winter)                  HOOPHOUSE: Same except we do not plant Sylvetta arugula or Purple mizuna indoors because over slower growth times.</p>

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FIELD Planting Schedule	We plant in the spring as soon as the ground can be worked - about April 8th in 2016. Lettuce and mustards are seeded every week all season long, weather permitting. Last lettuce of the year is planted outdoors about September 1st. Last mustards are planted about September 18th. T	For all greens we start seeding as early as possible which will vary from early April to early May. On the bookends we seed weekly (2-3 weeks each end of season) but for the main part of the season we seed every other week up through late September. We take an 8 week break from seeding spinach in the heat of the summer from late June through early August.	We start planting as early in the year as we can work the soil, usually around late April/early May. We plant single cutting greens every Tuesday and Friday until about mid September. We plant greens that are re cut one time twice in a week for two weeks, then break for 2 weeks. There is usually a week in spring where I hold off planting for a week (because crop growth is increasing in speed), and usually a week or 2 in fall where I will not break for recutting crops or double up on single cut crops at the end in order to prepare for fall growth slowdown.
HOOPHOUSE Planting Schedule			We start planting around Late February for the longest crops ( like claytonia, and frisee) and early March for shorter crops like lettuce, and mustards) We only have 4 plantings for each variety, so the first planting starts way early, then the distance between each consecutive planting get shorter as we move towards mid March, the greenhouses are completely planted by then so everything is ready to harvest the first week of April.
Salanova	Only in a pinch. Seed is expensive, pelleted, and best transplanted. Spacing and harvest are different than other salad lettuces. Leaves get too wide too quickly to justify price in mix. Best as a head lettuce.	No specific reason for not growing it other than not having a lot of room to trial it yet with over 150 varieties already being grown on the farm as we are generally happy with our mix and head lettuce production independently.	We plan to trial Salanova next summer in order to see if we can close the gap on no lettuce mid summer. Since we can germinate Salanova in a cooler environment and transplant outside, we may be able to offer salad mid summer.

**Field Prep**

Preceding Cash Crop	Tomatoes or root crops in year 1; cover crop/fallow in year 2; salad mix year 3	Based on the 3 years on our current location: 2013 - Hay, 2014 - Plasticulture or Corn, 2015 Corn or Brassicas, 2016 Greens/Mixed direct seed crops. We will double crop direct seed greens fields in a single growing season.	FIELD: We alternate between salad crops. So we may grow spinach, then lettuce, then arugula or vice versa. HOOPHOUSE: Summer tomatoes or basil
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<p>Preceding Cover Crop</p>	<p>If tomatoes in year 1, year 2 is oats/peas followed with periods of fallow and buckwheat. Wheat or oats are planted in part of the field the fall prior to salad. If roots in year 1, then wheat/vetch in fall. Year 2 is buckwheat and fallow with oats or wheat over winter. Spring seeded salad is not preceded with a fall cover crop.</p>	<p>There is great variability, but as a general rule we are trying to reduce the amount of residue that is left ahead of planting. So sometimes there is no cover ahead of direct seed, or we will plow down something highly digestible such as buckwheat, a winter kill crop that is well dried down or an immature crop of something such as oats, barely or rye that is also highly digestible and breaks down quickly once turned in.</p>	<p>FIELD: I plant cover crops when I can, which will usually be winter rye in late fall. If I don't need a field I will plant mammoth red clover with oats, but as of now we are not able to cover crop as much as I would prefer because the lack of space/irrigation. HOOPHOUSE: None</p>
<p>Soil Amendments</p>	<p>Prior to creating a finished seed bed we fertilize with a pelleted fertilizer using a drop spreader. We've used products from Midwestern Bio Ag. And also Ohio Earth Food. Approximately 5 lbs fertilizer per 100 foot bed (about 400lbs per acre). Finished compost is sometime spread by hand on beds. All beds are fertilized a second time if they are double-cropped.</p>	<p>We don't specifically fertilize for greens but those fields receive the whole farm application of chicken crumbles (2-4-3 -8Ca) @ 1ton/acre in the spring. We have found this to a good combination fertilizer for nutrient replacement/compost substitute that works well with our green manure and crop specific sidedress program.</p>	<p>FIELD &amp; HOOPHOUSE: We use about 27 tons per acre per year of Purple Cow Compost. We like it for potassium and phosphorus, micronutrients and adding organic matter to our heavy soil. We keep the compost on the very top of the soil to help prevent crusting. We have been using Organic Alfalfa pellets from Nature's Grown Organic as our main source of Nitrogen (NPK of roughly 3-1-2), but have recently switched to Sustane's 4-2-2 Fertilizer. Depending on the crop we aim to have between 100-135 lbs/acre of Nitrogen. This means we usually apply at the rate of 3 pounds of fertilizer per 11 feet of our raised bed (beds are about 42").</p>
<p>FIELD Bed Prep</p>	<p>Salad fields are planned to have very little trash/cover crop prior to seeding. We use a Howard rotovator on our Kubota tractor to create a finished seed bed. A roller/dibble is attached to the tiller and tamps and marks beds in one pass.</p>	<p>Once cover crop is incorporated and the field is ready, we do the following beginning 14-21 days in advance of planting: Final prep pass with field cultivator as deep as possible. Raised bed formation with bed shaper, 2-3 passes with basket weeder at ~1" deep with 1 pass at 14-21 days before seeding, 1 pass at 7-14 days before seeding and one pass immediately prior to planting. If conditions don't allow for basket weeding, we will do a pass at ~2" with the rotovator over raised beds to kill larger weeds prior to seeding.</p>	<p>Week 1: chisel plow, rototill, shape raised beds with bedshaper on the tractor (all within a few days or same day if rain is expected) Week 2: irrigate if no rain Week 3: irrigate if no rain Week 4: Spread fertilizer by hand then on same day shallowly cultivate weeds with rotiller on tractor(aim to go no more than 2" down). Same day, spread compost over beds with manure spreader and tractor. Rake beds clean by hand, then roll beds with Johnny's 6 row seeder.</p>

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HOOPHOUSE Bed Prep			<p>Week 1: chisel plow, rototill with tractor. Then rototill the close to the sides with push rototiller because tractor can't get close. Shape raised beds with string lines and rakes                  Week 2: irrigate                  Week 3: Spread fertilizer by hand then on same day shallowly cultivate weeds with Johnny's tilter(aim to go no more than 2" down). Then spread compost over beds by hand with shovel and wheel barrow. Rake beds clean by hand, then roll beds with Johnny's 6 row seeder.</p>
Stale Beds	<p>Till beds 2 - 3 weeks prior to seeding. Overhead water (or rain if prompt). Wait for "thread stage" of weeds. Us a tractor mounted tine weeder or skim till the surface to kill weeds. Repeat the germinating/skim tilling a second time if possible. A hand-held flame weeder is sometimes used when weeds get bigger than thread stage. Seeds are then planted without disturbing the soil.</p>	<p>A variation on stale seed bedding in the previous fall. For our earliest direct seed fields we do tillage and make raised beds in the fall that dry our faster in the spring and allow minimal field operations to get early beds ready for direct seeding. We will also at some times stale seed bed later season beds by incorporating cover crops and cultivating open fields every 7-14 days for up to 3 months ahead of bed formation and seeding if that field has particularly strong weed pressure.</p>	<p>Described above.</p>
Notes on Field Prep	<p>Buckwheat is sometimes planted after plowing down a spring salad patch, and double-cropped in the fall. Too much trash in the field interferes with the pinpoint seeder and harvest.</p>		

**Seeding**

Bed Width	<p>Salad mix beds are about 60" on center. 45" bed top with 15" pathways. They vary a bit.</p>	<p>6 foot on center beds with a bed top of ~50 inches</p>	<p>FIELD: 42" beds with 1 - 1.5' beds                  HOOPHOUSE: Salad is planted in 45" beds, 1 foot walk paths, except for middle bed which is 30" wide</p>
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Spacing	<p>Rows are about 6" apart for mustards. The stand is fairly thick, but more space between rows. Seeds are planted about 1/4" deep. For lettuces, rows are 2 1/2 inches part (pinpoint seeder spacing); 16 rows per bed. Seeds are sometimes left on soil surface, but immediate watering sets them in.</p>	<p>Currently 15 row at 3 inches but we will be adding 5 rows to the seeder in 2017 for 20 row at 2.5 inches</p>	<p>FIELD: 18 rows for lettuce (hole size B), frisee, and mustards, minutina, and spinach using Johnny's Six Row seeder            9 rows for beet leaves, chard using Earthway seeder beet plate            9 rows for Claytonia with Six Row Seeder            HOOPHOUSE: Same, except the 30" bed is 12 rows for lettuce, mustards, spinach and 6 rows for beets/chard</p>
Seeding Process	<p>Once beds are tilled and rolled, the Earthway seeder is used to plant mustards. Arugula is planted 6 rows per bed, beds are 100-feet long. Other mustards are seeded at the same spacing, but in blocks - i.e. 35-feet of mizuna, 35-feet of tatsoi, 20-feet of red mustard, 10-feet of kale or cress. Lettuces are also planted in blocks by variety.</p>	<p>Assuming the bed is ready as described previously we will use a tape or measuring wheel to measure our the required distance and mark that point with a stake. Then we drop the seeder and drive until we reach the stake then swap out seed and drive to the next stake.</p>	<p>FIELD &amp; HOOPHOUSE: After stale seeding our raised beds we apply compost to the top of the beds and rake smooth, getting out clumps and making the bed level. Then we roll the bed to tamp down with Johnny's 6 row seeder. Then I plant most crops with different size holes on the 6 row seeder, beets and chard are planted with the Earthway seeder.</p>
Fertility at Seeding	<p>See above for fertility info.</p>	<p>We do not fertilize at planting or sidedress greens crops. The occasional exception is spinach; we will hand spread a fertilizer such as feather meal if it needs a boost.</p>	<p>Compost is spread by hand in the hoophouse and with a compost spreader in the field.</p>
Water at Seeding		<p>If it will be dry we will irrigate newly seeded beds with overhead irrigation from the traveling reel. Often we are trying to beat the rain at seeding so nature takes care of it.</p>	<p>FIELD: We water overhead with sprinklers immediately after planting if rain is not expected.            HOOPHOUSE: overhead irrigation is used immediately after planting</p>
Row Cover	<p>Row cover is rolled out over mustards beds immediately after seeding. It's weighed down using 10' pieces of 3/8" rebar laid end to end. Lettuce is only covered in the early spring to speed growth, and in the fall to protect from frost. No hoops are used on either crop.</p>	<p>Salad mix, mustard mix and arugula are covered after planting. Spinach is not, as it does not germ well under cover. We do not use hoops and tack it down with Re-Pins which are a cheap and low labor option. The downside of the pins is that they do not completely seal the bed, so there is a chance that flea beetles can get in. Wind can also be an issue if pins are placed too far apart. We find 5-7 paces between pins is sufficient. We use row cover for moisture and heat retention, frost protection and pest exclusion.</p>	<p>Floating row cover usually doesn't work well for us. Because we have a heavier soil we tend to lose a lot of crop to damping off under the row cover.</p>

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Ensuring Germination	If rain isn't forecasted for the next 24hours, we use sprinklers to irrigate the beds.	Keeping that top inch of soil moist is the most important factor for getting good germination	We keep compost on top of the bed, and keep bed tops moist (but not overly saturated) to ensure no crusting, and to keep beds cool during warmer periods.
Notes on Seeding		With mechanical seeding it is important to periodically check the planting shoes to make sure that they aren't plugged or dragging and residue in the field.	Leveling beds and rolling them to tamp them down before planting does wonders to make the 6 row seeder work well. This seeder is very difficult to use in most field conditions.

**Crop Maintenance**

Irrigation	Beds are irrigated with overhead sprinklers attached to hoses. We water soon after planting, and as the ground dries out. We don't monitor inches of water.	We irrigate as needed, based on time since last rain, overall soil moisture, weather forecast and need to push for growth. A field is rarely dedicated to greens alone, it will usually be planted with other direct seed crops such as beets, radishes etc. whose water needs my dictate watering the whole field whether or not the greens need it.	FIELD: Without rain we aim to overhead irrigate 1/2 inch twice in one week separated by a few days for younger crops, and 1 inch once in one week for more established crops. HOOPHOUSE: Same management as field, except for early spring and late fall/winter we will only water as needed, might go 2-3 weeks between waterings.
Irrigation Modifications	When the crop gets close to harvest, we cut off water to keep greens from growing too fast. Humidity is a problem on mustards in the summer. They are sometimes uncovered at night to let them "breathe".	Prior to establishing a solid stand the moisture in the top inch is very important to keep the plant alive. As the plants develop that zone of concern deepens to several inches (especially for a second or third cut).	listed above
Supplemental Fertility		We may occasionally apply a chicken based fertilizer by hand to spinach. This is only required on a few plantings a year and other than that we do not fertilize greens plantings.	
Weeding	Mustard greens can be uncovered and hoed between rows if necessary. Usually mustards grow fast enough to outcompete weeds in the row. Lettuces are hand weeded before the weeds reach the height of the lettuce. The pinpoint seeder is too tight for a typical hoe. The tip of a Japanese hand-weeder can be dragged between rows. We sometimes lose beds to weeds and have to till the whole thing under.	After seeding, all weed control is done by hand with hand hoes. We also pull weeds as we harvest the first cut to help leave a cleaner bed for the second cut.	We stale bed before planting, we have to hand weed all salad between 1-3 weeks of age, and then we usually "pre-weed" all salad immediately before harvest.

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<p>Insects</p>	<p>Flea beetles are excluded with row cover immediately after seeding mustards. On rare occasions we've sprayed Pyganic on germinated greens if attacked before the cover goes on. Then we immediately cover. Lettuces are fine until fall when cabbage worms come in. Bt is sprayed if they are a problem. Sprays are mixed in a battery powered sprayer on wheels.</p>	<p>Row cover is our main defense and in general we have very few pest issues on greens crops. The one exception is mustard and arugula which can have flea beetle issues, especially in those particularly bad times for flea beetle like late spring/early summer and late summer. If the infestation is too severe we will kill the crop otherwise we will accept some minor damage or spray a pesticide with the backpack sprayer.</p>	<p>FIELD: Slugs during wet weather, we extract them in the washing process. Caterpillars and most other insects are eliminated during the wash process. Our main pest is the flea beetle, which attacks all brassicas excessively from late spring to early fall. We spray crops with Spinosad brand name Entrust. Each brassica will be sprayed once or twice by hand. HOOPHOUSE: Same as field, except we do not need to use Entrust since early spring, late fall/winter do no pose problems for us with flea beetles.</p>
<p>Diseases</p>	<p>Diseases aren't a big problem. Lettuce downy mildew in the fall. Monitor moisture and plant disease resistant varieties. Black rot is becoming a problem on our farm. Not much of an issue in quick growing mustards, but I can foresee it being a bigger issue as more ground is contaminated.</p>	<p>Mildews can be an issue with spinach under poor weather conditions in which case we usually just kill the planting rather than try to remediate it. Other than that we rarely if ever see disease problems on our greens. We have seen black rot develop on our main cole crops (cauliflower in particular) and we are on a strict sterilization protocol until we get it taken care of. We haven't seen it affect our direct seed brassicas yet but we are on high alert moving into 2017.</p>	<p>FIELD: We see some damping off, for this we mainly try to manage irrigation properly, and make sure we have proper field drainage. Our main disease problem is downy mildew on lettuce, especially during fall. We are starting to play with disease resistant varieties, we know Fedco Red Saladbowl is more resistant on our property. We decrease density of planting during wetter months. We sometimes use Actinovate after periods of extended rain in fall. HOOPHOUSE: Same as field, additionally in the hoopouses we make sure to vent the houses for at least 1 hour during early spring and late fall/winter even if it is not warm in the house to get trapped moist air out to prevent downy mildew. We have also added circulation fans in the houses to prevent downy mildew.</p>

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Notes on Crop Maintenance		It's important to keep an eye on the row cover. If it become too tight or too loose (particularly when windy) the row cover can damage the leaves by squashing it, or rubbing on it. It can also become too hot under the row cover which can contribute to tip burn. Letting the crops out can expose it to potential pests but is generally not problematic outside of the main flea beetle season.	HOOPHOUSE: Humidity is kept as low as possible by venting, and watering as little as needed during early spring and late fall/winter (the only times we grow salad in the houses). We use floating row cover suspended on wire wickets to keep all crops (except lettuce). We plan to try 30% shade cloth this summer.
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**Harvest and Yields**

Harvest Window	First mustards are harvested about May 10th from the field. Lettuces around May 20th. Mustards can be harvested over the course of 7-10 days. Generally they are cut once. Lettuces are harvested over about 2 weeks. These may be harvested twice if cut cleanly and young. Days to maturity are 21 for mustards in mid-summer; up to 42 days in the fall.	Lettuce - 27+/- Days, 2-3 cuttings 7-10 days apart Arugula/Mustard - 23+/- Days, 1-2 cuttings 7-10 days apart Spinach - 35+/- Days 2-4 cuttings, 10+/- days apart	FIELD: We harvest every Monday and Thursday from about Mid May through the end of October and sometimes as late as mid November outside. Because we have tight sizing preferences for leaves the harvest window for crops is usually very small, however in early spring and early to late fall we are able to hold off harvesting a "ready" size crop for up to a week or more depending on how cold the weather is. Lettuce, frisee, and mustards are usually harvested twice, with a 2 week regrowth, but they can be harvested 4 times if conditions are perfect (though these leaves are less ideal). Spinach, beets, and chard are harvested once, our customers do not like half cut regrowth leaves from these crops). Our baby leaf lettuce grows an average of 26-28 days from planting to harvest, however this can be up to 40 days in early spring/ fall plantings, and down to 24 days or less in midsummer. We see similar percent growth changes with mustards (average harvest of 21 days) and spinach (21-25 days). HOOPHOUSE: Same, except we usually get at least three cuttings of lettuce, mustards and frisee in early spring salad.
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<p>Harvest Procedure</p>	<p>Salad greens are always harvested first thing in the morning, preferably with dew still on.. Mustards are best uncovered the night before (once flea beetles stop moving) to help them stand up. Harvest crates are lined with fishing nets. We used serrated knives to cut greens and lettuce into separate crates - about 3-4lbs per crate. We have used the greens harvester from Farmer's Friend. Beds must be clean and flat for it to work well. It is fast and efficient under the right conditions. Greens should be small enough to fit on a fork without cutting. About 4" for lettuces. Mustard leaves should be about 4" or less with little stem.</p>	<p>Greens must be out of the field before 8am as a general rule with obvious exceptions for frost delayed harvests or particularly cool or wet days which extends that window. But in general we are trying to get them to the packshed while they are still as cool as possible and moist from the dew.</p> <p>We have a harvest machine that we are yet to use but will hopefully figure out this year. Until then it is hand harvest with a harvest knife. Two people work together across the bed from one another in order cover the full width of the bed and fill a single tote that is dragged down the bed over the crop that was just cut. For baby green a full tote is about 8# and up to 10# for larger leaves.</p> <p>Depending on the size and quality of the greens we will adjust how high or low we cut the crop.</p> <p>There are only two acceptable body positions for cutting greens: on both knees or on one knee with the other knee raised in a squat position.</p>	<p>FIELD: We harvest starting around 8 am every Monday and Thursday until about noon or 1 pm. Most of the harvest is done with a hand pushed HarveStar from Sutton Ag. Some greens are harvested with the Quick Cut Greens Harvesters from Farmers Friend.</p> <p>HOOPHOUSE: Same time of day, all harvesting is done with Quick cut greens harvesters, we hand cut the sides of the crops which are missed by the harvester.</p>
<p>Cleaning</p>	<p>Greens kept in the net bags (about 3lbs max) and are cooled in small tanks with fresh water. No sanitizer is used in the water. We agitate the water by hand. They get one rinse in the first tank, and a second rinse in the second tank. Water in changed often, as tanks only hold about 25 gallons.</p>	<ol style="list-style-type: none"> <li>1. Wet down greens in harvest totes while they wait to be washed</li> <li>2. Dump 2 totes as a time into the first wash tank (with 6oz/100gal Tsunami) and carefully mix by hand. Transfer greens to second wash tank (also Tsunami treated) with a pool skimmer and repeat.</li> <li>3. Use the pool skimmer to transfer greens to the spinner.</li> </ol>	<p>We have a double wash system. The first tank is about 400 gallons. We add Sanidate to recommended levels. We mix all the separate ingredients in this tank, then transfer to the second tank.</p>

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Drying	Still in the net bags, we place the greens an old washing machine (two bags per load), and use the "spin" cycle for 10-30 seconds depending on the power of the machine.	We use a stainless steel drummed washing machine to dry the greens. We put 3-4# in per spin cycle and run it for 30-60 seconds (our current washer spins kind of slow so it takes longer). We do not use bags for the spin cycle but we are considering getting some and trying them out.	From tank 2, salad is moved to spin dryers, then to an air dryer.
Packing	When making salad mix, we dump pre-measured amount of the mustards and lettuces on a large stainless steel table. We gently mix the washed and spun greens together on the table. They are bagged into 4 and 8 ounce bags by hand for farmers' markets and CSA. Wholesale quantities go into 5/9th boxes with a food-grade perforated liner. 4 lbs per box.	All greens are weighed and packed into vented plastic bags directly out of the spinner	Salad is then packaged in food grade, resalable bags, then boxed to order.
Storage	Bulk salad mix in stored in food-grade perforated liners inside waxed boxes - 4 lbs per 5/9 box. The cooler temperature is kept at 38 degrees. Humidity is maintained inside the bag and box without additional misting. 4 and 8 ounce bagged salad is stored in black bulb crates for market and CSA. No perforations in bags.	For longer term or market storage, greens are packed in a larger vented bag in a clean harvest tote. For out going orders they will be bagged and packed in a wax box and labeled for delivery. We keep the cooler at about 34 and we don't have any humidity control so that is what it is for the most part but through most of the season stays high.	Salad is stored in bags on shelving in a walk in cooler kept at 35 degrees F, until boxed.
Length of Storage	Salad is usually 1-2 days of harvest, but occasionally up to within 5 days of harvest.	With some variability we will keep greens for up to 2 weeks for sale and longer for home use if we are stuck in a gap. We will generally only sell these older greens to customers like a chef that we know will use them in a couple of days as opposed to someone who may be hoping to keep them for a while. Summer greens that have seen more heat stress tend to keep for more like 7-10 days reliably and we have eaten month old greens from later plantings. Most greens however are cut to order and are rarely in our possession for more than a few days.	1 week max, usually we don't store salad more than 4 days, but the bulk of everything is sold within 24 hours.

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<p>Yields</p>	<p>Mustards vary by variety and season - as little as 1/3 pound per foot for small arugula; up to 3/4 pound per foot for larger, fall-sown arugula. Lettuce are higher - closer to 3/4 or 1 lb or more per bed foot.</p>	<p>Lettuce: .6# per bed foot/cut (4300#/acre) Arugula/Mustard: .6# per bed foot/cut (4300#/acre) Spinach: .3# per bed foot/cut (2200#/acre)</p>	<p>FIELD &amp; HOOPHOUSE: 0.6 lbs/bed foot/harvest We will harvest each bed between 2 - 9 times per season ( which is a minimum of 1 planting, and a maximum of 3 plantings).</p>
<p>Notes on Harvest &amp; Yield</p>		<p>Our yields are lower than what is possible for a few reasons. For one we harvest what we like to eat which is small, tender and flavorful. We know we could get a third or fourth cut out of arugula but we won't eat stemmy over spicy arugula so we won't try and sell it. When times are lean we will adjust the standard a bit but in general there is always a better planting coming in which allows us to market a very consistent and reliable product. When we aren't proud of a harvest we make sure to communicate it to our customers that is larger or holey or whatever it is that we don't like about it.</p>	

**Equipment**

<p>Equipment</p>	<p>Earthway seeder - \$125, Pinpoint seeder - \$250, Greens Harvester \$550 plus cordless drill, Serrated knives - \$9.00 each, 60" Howard rotovator - ?, Home made roller/dibble - \$150</p>	<p>Basket Weeder: \$1-3k Sutton Seeder: \$3-7k Row Cover (single bed .55oz): \$.10/foot Repins: \$.17ea Hand Hoes: \$30ea Knives: \$15-30ea Harvest Totes: \$15/ea Spinner (washing machine): \$0-50 Vented Bags Large: \$.12ea Small: \$.02ea Tsumani 100: \$1.50/tank</p>	<p>Salad spinner New: \$2,200 , used: \$800 Harvestar Harvester New: \$14,000, used: \$7,000 Salad Dryer New: \$20,000 Salad wash bulk tank used: \$800 quick Cut Harvester new: \$600 (without drill) Manure Spreader new \$5,000 Skid Loader used: \$22,000 Tractor used: \$16,000</p>
<p>Equipment Priorities</p>	<p>When it works, the Greens Harvester is a huge time saver. Time hand-weeding is paid off in quick harvest.</p>	<p>The seeder has saved us time and increased yields by improving stand consistency and density as a long term investment that is used on many crops it's hard to say exactly how it has increased profitability but it feels a lot better.</p>	<p>Necessary to our system are the Tractor, Skid loader, manure spreader, all harvesters, and salad dryer. These pieces of equipment allow us to work much more efficiently.</p>

**Shooting Star Farm**

**Fazenda Boa Terra**

**Vitruvian Farms**

**Marketing**

Markets	CSA, farmers market, direct to restaurants	CSA, farmers market, direct to restaurant	CSA, farmers market, on-site farm stand, direct to grocery, direct to restaurant
CSA	Our CSA is choice style.	1-2 bags per share at 1/3#/bag	1/3 pound every week for 20 weeks.
Farmers Market Prices	\$9.00 per pound	1/3# bag at \$3/bag (\$10/#)	5 oz bag for \$3
Direct to Grocery Prices			\$6.00/lb
Direct to Restaurant Prices	\$7.00 per pound	5# bulk case at \$30/case (\$6/#)	\$6.00/lb
Wholesale Prices to Distributor			