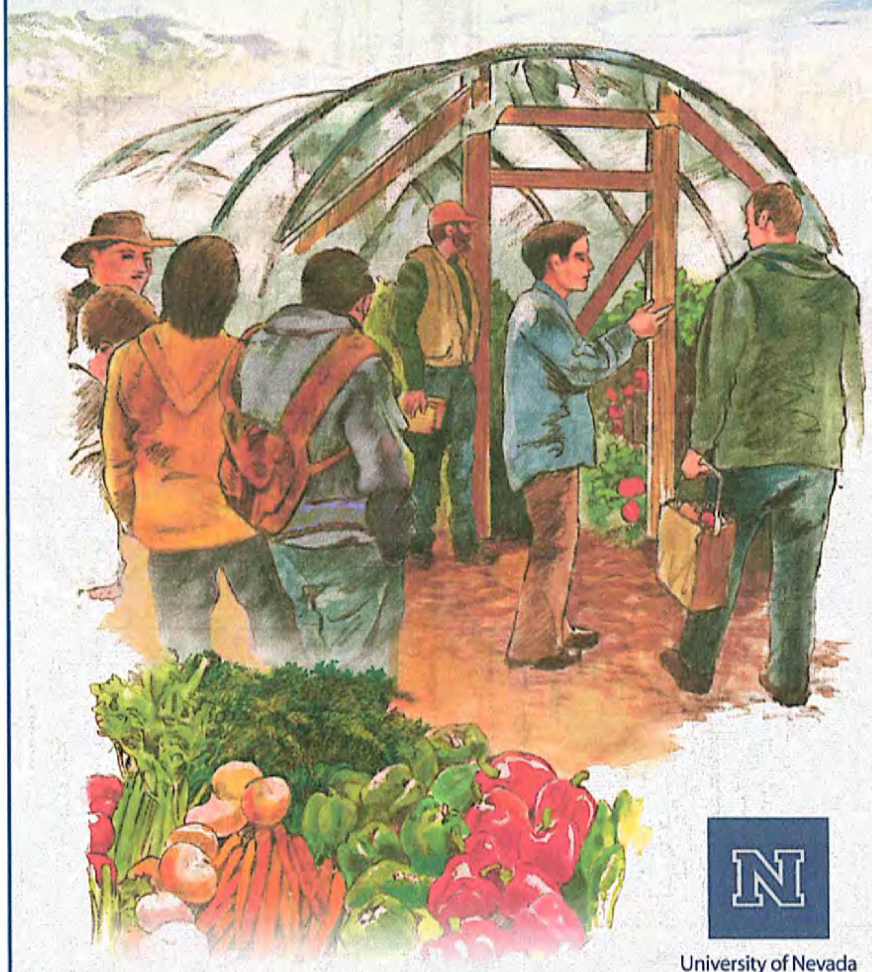
Farming Principles for Growing Vegetables in Hoop Houses



University of Nevada
Cooperative Extension

Elko, NV - 11.19.16

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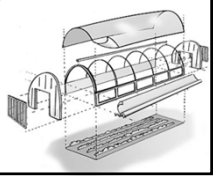
Basic Farming for Growing Vegetables in Hoop Houses

The Nuts & Bolts of Season Extension Farming

Presented by:
Rick Lattin,
Managing Partner, Lattin Farms LLC
November 19, 2016
Elko, Nevada

What is Season Extension?

- Season extension is a process of changing the growing environment of plants to enhance and prolong normal growing season.
- Season extension techniques include mulches to warm spring soil, row covers to protect crops from wind and frost and high tunnels to provide more long-term semi-permanent protection for selected crops.
- Season extension is normally growing in existing soil – not on benches or other artificial plant mediums.



What Season Extension is Not

- Season Extension is not greenhouse growing for year around production of a crop by applying supplemental heat to the structure.
- Season extension is not normally associated with hydroponic systems which require heavy capital investment and year long growing.

Why Season Extension in NV?

- Short growing seasons
- Unpredictable weather
- Huge variations in day and night temperatures
- Low humidity
- Dry persistent spring winds

History of Season Extension in NV

- Small farmers in Nevada have been involved in season extension for decades – using hotkaps and other field applied protections from frost due to our short growing seasons.
- Season extension has taken off the last 20 years with the advent of commercial plastic mulches, row covers and high tunnels.
- Specialty Crop Institute & Cooperative Extension encouragement, grant writing and training and building of high tunnels

History of Season Extension in NV

- NRCS funding of high tunnel construction
- Specialty Crop Block grants for high tunnel production experiments
- Improving up-scale local markets i.e., food co-ops, Whole Foods, Farmer's Markets, CSA's, restaurant interest in local production

Key Elements to Hoop House Production

1. Crop Selection
2. Pollination
3. Water management
4. Temperature management
5. Pruning and staking
6. Variety selection

Crop Selection – The Basics

- Any crop for which there exists a market can benefit from high tunnel production.
- There is a higher cost for high tunnel production – must pick crops with high yield potential and high value per unit.
- Value of high tunnel crops is computed by dollar value per square foot and number of days in the structure (multiple crops per year).
- Historically, prices are higher for products early in the season and late in the season that do not compete with field grown products

What do people typically grow in high tunnels?

- Nationwide, tomatoes are the top crop grown in high tunnels
- Other popular crops include peppers, cucumbers, salad greens and cut flowers

How much does a high tunnel accelerate harvest?

- Most crops grown within a high tunnel are harvested at least a month earlier (and/or later) than field-grown crops.

*****SPECIAL NEVADA NOTE*****

In Northern Nevada, our weather is so unpredictable and our season so short that field-grown crops are not profitable at all. With the high tunnel, we not only get season extension, we can grow some crops that would not make it outside.

How many crops can be produced in a high tunnel per year?

- In the Nevada climate you can expect 2-3 crops per year. A cool season crop, followed by a warm season crop and then back to a cool season crop.
- Quick growing crops such as greens may get an additional crop. If you use cover crops as a soil-building process you may substitute one wintered over crop for that purpose.

Temperature Management

- High tunnels must be managed for both heat and cold. Typically, they are managed passively thru venting systems (vents, fans, roll up or down sides, shade cloth, doors, etc.).
- A must in most vegetable operations is the use of thermal blankets and row covers to trap daytime heat to prevent damage due to night time cooling.

Water Management

- The high tunnel environment means less water usage
- Most high tunnels use drip systems with some use of low volume sprinklers for sprouting.

Pollination

- High temperatures can be as damaging to crops as low temperatures.
- Excessively high temperatures can cause flowers to fall off tomatoes and peppers and reduce pollination.
- Shade cloth and roof vents are effective products used to manage high temperatures.
- Melons, squash and some cucumbers require pollination. Need to open high tunnels to pollinators, use parthenocarpic (self-fruiting) varieties, place bees close by and plant cover crops such as hairy vetch, dill and alyssum around a high tunnel to attract pollinators.

Pruning & Staking

- Space is at a premium in tunnels – staking and pruning improves yield and earliness in cucumbers and tomatoes.

Variety Selection

- Trial and error
- Interdeminate vs. determinate
- Parthenocarpic
- Varieties proven in high tunnels (tomatoes, cukes – very expensive seed)
- Elliot Coleman's books
- Seed catalogs

Nevada/Utah High Tunnel Info.

Learn From Others Who Have Gone Before

From University of Nevada Cooperative Extension

- Small Farm Hoophouse Production of Vegetables in Desert Climate Costs & Returns 2010 – Holly Gatzke
- Selecting Vegetable Crops for Small-scale Desert Production – Holly Gatzke
- Hoophouse Production in the Desert: Colanaceae an Cucurbitaceae Crops – Holly Gatzke
- Plant Season Extension in the Desert – Holly Gatzke

http://www.unce.unr.edu/publications/

From Utah State University Cooperative Extension

- High Tunnel Tomato Production – Dan Drost
- High Tunnel Lettuce in Utah – Dan Drost
- High Tunnel Spinach, High Tunnel Peppers, Fall Bearing Raspberries – Dan Drost & Brent Black

http://extension.usu.edu/htm/publications

DVD
Jumping Through Hoops – New Cash Crops of Lincoln County Nevada – Holly Gatzke

*10 Reasons **Not** to Grow in High Tunnels*

#1 Return on investment

Simply put, input costs are substantially higher in a tunnel versus the field. After amortizing the costs of the structure, the plastic film and other specialized equipment that are required to effectively produce in a tunnel, the field planting has much lower input costs. Yes, increased yield, quality or market window can justify the increased costs of tunnels. However, we have observed in some situations poorly managed tunnels yield equal or less than field plantings. Consider carefully what every square foot of production space is worth and manage with the goal of justifying the increased input costs.

#2 Increased risk

Greenhouses and High Tunnels are typically engineered carefully to balance the environment versus the need to keep material costs low. Metal tube structures do fail as do crops. Between your investment in the tunnel itself, the costs incurred in producing a crop and your anticipated return on investment, growing in protected culture requires a greater attention to details and pest management in order to realize economic goals.

#3 Increased pressure from insects and arthropods

While tunnel culture brings with it the opportunity for higher crop quality, Aphids, Whiteflies, Western Flower Thrips, Spider mites and Broad mites all thrive under tunnel conditions. The dry foliage, stems and fruit grown under intense irrigation and fertigation are ideal environments for these pests to flourish. Scout regularly for pests and consider a proactive pest management that includes banker plants such as Black Pearl and Purple Flash peppers hosting Minute pirate bugs (Orius). Every crop reacts differently under tunnel conditions versus field grown. With no rainfall, Spider mites can increase populations incredibly rapidly unless carefully managed.

Cooperative Extension

*10 Reasons **Not** to Grow in High Tunnels*

#4 Irrigation management requires greater care vs. field grown

This is especially so on the margins of the season when there are often days with little sunshine. Learning to grow dry(er) during the early and late season will reduce root-borne diseases. Growers must adapt to rapidly changing conditions and know when to increase irrigation flow in order to maximize plant growth, reduce cracks, and Blossom end rot. Consider investing in tensiometers or irrometers in order to monitor root zone moisture levels. Tunnels will require more irrigation than field plantings. Farms with less than adequate water supply should look at tunnels with caution.

#5 Increased disease pressure

While tunnels do reduce diseases such as Early Blight and Septoria Leaf Spot, other diseases are accentuated. Brown leaf mold, Powdery mildew, and Botrytis are occasionally seen in field-grown vegetables, but are standard fare under high tunnel conditions. Increasing air flow, reducing humidity, and using disease resistant varieties will all help to manage these diseases. Brown Leaf Mold in tomatoes is almost exclusive to tunnel-grown tomatoes. We are finally seeing the release of the first tomato varieties with strong resistance to leaf molds. Check with your Extension Specialist / Horticulture Educator for the latest on recommended tunnel varieties.

#6 Tunnels perpetuate viruses

Tunnel tomatoes are a very 'hands-on' crop as many growers have come to appreciate the benefits of greenhouse methods of pruning to improve yields. However, viruses such as Tobacco Mosaic (TMV) are spread mechanically. Workers move the virus down the row with weekly suckering or pruning. Field tomatoes see . . .

*10 Reasons **Not** to Grow in High Tunnels*

#6 Tunnels perpetuate viruses (cont.)

much less handling and thus are generally at lower risk. High technology greenhouses on the other hand have disinfection protocols in place to reduce the spread. The soil-based system is also more difficult to disinfect than a concrete floor. The in-between greenhouse field nature of a high tunnel perpetuates TMV. So what can we do to prevent TMV in tunnels? Buy only from reputable seed sources and consider seed treatment. The use of disposable gloves, regular hand washing and tool disinfection will reduce the spread of viruses and other systemic diseases. There are now commercial pruning tools with reservoirs to disinfect the blade continually during usage. Remove suspect plants immediately.

#7 Soil health and nutrition

Tomatoes are the single most popular high tunnel crop due to their high return on investment and high market demand. There is considerable pressure not to rotate tunnel crops as you would fields. This can result in steadily increasing soil-borne diseases such as Fusariums and Verticilliums. Using only the best quality plants from known and trusted sources along with inoculating plant roots with Actinovate AG, RootShield Plus, Companion, Cease....(there are an increasing number of biological root inoculants available). These practices reduce the potential need to fumigate.

In addition, tomatoes are heavy feeders making strict attention to soil tests and tissue analysis especially important in the usually higher (than field) densities used in high tunnels. Maintaining recommended levels of Ca, Mg and K are often challenging in tunnels. Since it never rains in a tunnel, all nutrients that the roots utilize are within the drip irrigation zone. This root area can quickly be exhausted of nutrients. Both injected and foliarly-applied nutrients are necessary to maintain nutrient levels are their optimum levels during ideal growing periods.

*10 Reasons **Not** to Grow in High Tunnels*

#8 Negative R values

Under early and late season short and cloudy days and clear, cold nights, it is possible to have the low temperature in a high tunnel be lower longer than outdoors. Cold nights, particularly in spring, can see temperatures lower inside the tunnel than out (hard to believe but true). Using a set of heavy floating row covers under these conditions can help to keep a crop alive. Many growers will opt to use a low output heater during these conditions to keep temperatures above 45-50F. In general, an unheated high tunnel can be reliably planted with tomatoes about 4 weeks prior to the normal outdoor planting season. Adding heat can speed up successful planting by 8 weeks or more.

#9 Increased management and labor

It is more challenging to manage tomatoes, peppers, cucumbers, strawberries and raspberries indoors. Pest populations and infestations tend to come on quickly requiring a very proactive management program. The narrow aisles require careful attention to crop canopy management, so pruning and trellising are constant chores. Is there room within your schedule as manager to accommodate the increased demands of a tunnel? We have seen many cases where the answer is No.

#10 Playing field irregularities due to subsidized tunnel purchases

Recent grant programs have created two levels of tunnel purchases, those that are subsidized and those were not. Growers that purchase their tunnels without the grant subsidy may have paid 40-60% more for their first high tunnel. If you are not a grant recipient, your input costs will be higher, and your margin lower, than others.

Summarized from an article written by:
Steve Bogash - Commercial Horticulture Educator, Penn State University Cooperative Extension
Judson Reid - Extension Vegetable Specialist, Penn State University Cooperative Extension

Lattin Farms Hoophouse Growing Experiences

Rick Lattin, Managing Partner
Lattin Farms, LLC
Elko, Nevada
November 19, 2016

University of Nevada
Cooperative Extension

Hoophouses on the Farm

- 19 Functional Hoophouses



Hoophouses on the Farm

- 4 – Oregon Valley Modified Gothic Style
  - 30 x 96




Hoophouses on the Farm

- 8 – Utah State University PVC Hoophouses
  - 6 – 14 x 145
  - 2 – 14 x 70

Hoophouses on the Farm

- 7 – FarmTek Style Quonset Hoophouses
  - 6 – 26 x 72
  - 1 – 26 x 48

Hoophouse Construction

- Rip, Disc and Laser
- Add Fertilizer
- Precision Placement of Posts
- Cement in Posts
- Purlin Placement
- Structure Support
- Greenhouse Plastic
- Add Shade Cloth

Crops Grown in Hoophouses

- Tomatoes
- Greens
- Root Crops
- Cucumbers
- Melons
  - Experimental with poor results
- Raspberries & Blackberries
  - Experimental with promising results

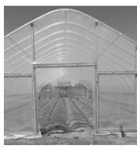



Reasons for Hoophouse Growing

- Extend the season in Spring and Fall
- Increased Yield
  - Climate and Virus Protection
- Decreased Farm Footprint
- Allows a more consistent product availability for customers

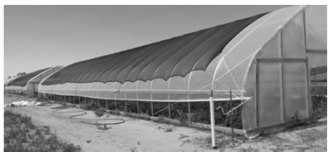
Operation of Hoophouses

- Opening and Closing
  - Roll Up
  - Large Door Venting
  - Pull Up Sides




Operation of Hoophouses

- Shade Cloth Utilization

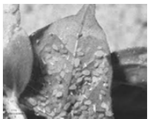



Operation of Hoophouses


Watering

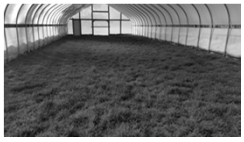


Weeding


Pest Control

Soil Tending

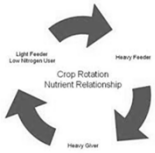
- Cover Cropping



Soil Tending

- Gypsum
- Sulfur
- Other Fertilizer

- Rotation



Crop Care and Management

- Staking and Pruning
- Picking Schedules
- Scouting for critters and their control

Crop Care and Management

- Knowing when to hold and when to fold

Pick Your Own in Hoophouses

- The Good
- The Bad
- The Ugly

Placement of Hoophouses

- East – West
- North – South

Placement of Hoophouses

- Good Ground, Bad Ground
- Water Sources
- Ease of Care and Maintenance
- Windbreaks versus Full Sun
- Ground Preparation

			Hoop House Yield Summary for 2015			
Hoouse #	Size	Square feet	Crop/variety	Lbs total	Value	Per Square Ft
HH1	26x48	1248	Tomato Juliet/Sungold	913	$1825	$2.75*
HH2	26x72	1872	Peppers	809 @ $3.00	$2427	$1.30**
HH3	26x72	1872	Raspberries	518 @ $3.00	$1554	$0.83***
HH4	26x72	1872	Raspberry & Blackberry	342 @ $3.00	$1026	$0.54
HH5	26x72	1872	Spring Veggies	1010 @ $5.00	$5050	$2.70****
HH6	26x72	1872	Spring Veggies	1370 @ $5.00	$6895	$3.68
HH7	26x72	1872	Tomato Pozzano &New Girl	2438 @ $2.00	$4876	$2.60
HH8 Utah	14x140	1890	Tomato Shady Lady	3400 @ $2.00	$6800	$3.60
HH9 Utah	14x140	1890	Tomato Shady Lady	2940 @ $2.00	$5880	$3.11
HH10Utah	14x140	1890	Tomato Early Girl/Juliet/Shady Lady	2228 @ $2.00	$4456	$2.35
HH11Utah	14x140	1890	Juliet, Shady Lady	1998 @ $2.00	$3996	$2.11
HH12/Utah	14x140	1890	Shady Lady, Lemon Boy	2875 @ $2.00	$5750	$3.00
HH 13/Utah	14x140	1890	Gold Nugget Cherry tomato	273 flats @ $10	$8190	$4.33
HH 14/Utah	14x70	900	Shady Lady	1420 @ $2.00	$2840	$3.15
HH 15/Utah	14x70	900	Shady Lady	1110 @ $2.00	$2220	$2.46
HH 16/ Oregon Valley	30x96	2700	Little Leaf Pickling Cukes	2978 @ $2.00	$5956	$2.20
HH 17/Oregon	30x96	2700	Spring Veggies	1686 @ $5.00	$8430	$3.10
HH 18/Oregon	30x96	2700	Tomatoes, Cherokee purple, BHN 589, Sakura	3380 @ $2.00	$6760	$2.50
HH19/Oregon	30x96	2700	Tomatoes, Arbason, Sakura	5625 @ $2.00	$11,250	$4.16

*HH 1 was all cherry tomatoes priced at $35 per 12 pint flat
** HH2 35 feet of 1 row unplanted – early bug problems – based on $3.00 pound – specialty green, red, purple and yellow peppers
***Research and trial house – only 65% planted
****Hoophouse 5 and 6 were planted to Russian kale, beets and greens for our CSA premium priced
HH7 new girl productive throughout season – Pozzano is an organic San Marzano that for us had serious blossom end rot but still ended up fairly productive
Hoophouse 18 had troubles with establishment and had to be replanted – huge problem with blossom end rot on BHN and some of the Cherokee – many of the Sakuras not harvested

DIRECT MARKETING FOR SMALL FARMS

Where is Success Found: Market or Production?

Presented by:
Rick Lattin, Managing Partner
Lattin Farms, LLC

University of Nevada
Cooperative Extension

The Role of Production

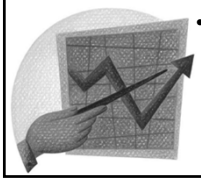
Ante up!

Without successful production, there is no marketing.

Finding Success Through Production & Marketing

Sell Before You Sow

- Don't plant one seed until you know who your customers will be.
- Match your planning to your market – anticipate the market.
- There's nothing worse than producing a crop, only to find out that you can't sell it.



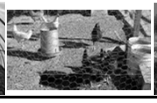
- Market analysis not only helps determine if your prospective enterprise can be profitable, but also determines how you will promote and market your product.

Start Small

- Test your ability to grow and market new products before you scale up.
- Starting small also helps assure you'll produce a quality product.
- Concentrate initially on producing a few specialties, and establish a reputation for quality.

Diversify

- Check with current or potential buyers such as specialty distributors, restaurant chefs, customers at your own farm market.
- Play around in the kitchen experimenting with different ways to use your products .
- Don't get swept away by every new possibility that comes along.
- Evaluate how each crop matches your skills, preferences and resources.
- Don't put all your eggs in one basket. If weather, pests, or a collapsed market wipe out one crop, you've got others to rely on.
- Diversifying markets can be simpler and more lucrative than diversifying production.



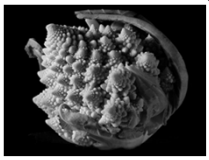
Think Specialty Crops

- Raise high-value crops.
- It just has to taste special!
- You are not Wal-Mart.
- Specialty can be variety, quality, freshness, taste, appearance, variety.

Discover New & Exciting Flavors

Prepare for Change

- The secret of high-value, specialty marketing is to know ahead of time what your market is, and where it's going.
- Be prepared to change with the seasons.
- Too many growers just go by what sold well last year - but most specialty buyers, such as chefs, are constantly looking for something new.



- In case your high-end markets don't take all your premium produce, develop secondary outlets for your specialty crops such as canning, processing or selling at lower-end markets.

Seek Profitable Trends & Charge for Them

- Look for niche markets through such trends as:
  - health and nutrition
  - smaller packages
  - more diverse & higher quality foods
  - quality and convenience
  - ethnic foods
  - foods for weight-conscious
  - foods for food safety-conscious
- Some other trends
  - demand for fresh, in-season, local produce
  - organic produce
  - cut flowers

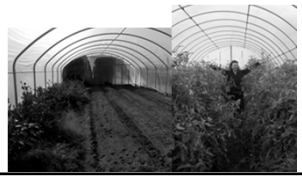
Locavore: Someone who eats within a certain distance of his home (Oxford 2007 word of the year)

Grow and Market for Quality

- Some customers will pay the price you name for **quality** they can't get elsewhere.
- **Freshness**: keep your products on the vine or tree as long as possible, then get them to the consumer as soon as possible after harvest.
- **Variety**: comb through specialty.
- Seed catalogs: search for varieties that boast of excellence in flavor, and fit your season and growing conditions .
- Plant 10% more than you plan to market.

Extend Your Season

- Extend your harvest by successively planting different varieties with different harvest dates.
- Steady production stretched over a long growing season provides numerous benefits
- Farming in Nevada requires season extension
  - varieties
  - high tunnels
  - row covers
  - mulches, etc.



Know Your Customers

- Find out first what will sell!
- Get to know your customers or buyers, why they purchase what they do, and what else they might like to purchase.
- Make it a habit to informally survey your customers.

Test Market Your Product

- Offer your product or service on a limited basis in order to evaluate potential sales.
- Ask your family and friends to give you both positive and negative feedback on any new product or idea you try.
- Send retail or wholesale buyers new product samples and ask for their feedback.
- Use small focus groups to gain insights on your new product.
- Use advertisements as a type of low-cost test promotion.

Don't Compete with Everyone Else

- The name of the game is niche marketing.
- Differentiate your product -- what you grow and how you grow it (i.e., organic)
- Some other ways to differentiate your product might include:
  - service such as washing your lettuce
  - home delivery of products
  - giving information such as recipes or workshops

Look for High-return Marketing Outlets

- High-end restaurants
- Specialty produce businesses
- Farmer's markets
- On-farm market
- Gourmet stores, etc.

Educate the Customer

- The more people know about your product and what went into growing it and how to use it, the more they are willing to pay premium price.
- Ways to inform customers about your products or services include:
  - point-of-purchase educational brochures and flyers
  - on-farm demonstrations and workshops
  - free recipe sheets
  - product information on labels
  - educational articles or columns in the media
  - regularly published newsletter

Price for Quality

- Offer a unique, high-quality product that customers can't get elsewhere.
- Stress quality, freshness and uniqueness rather than "cheap food".
- Package expensive specialty items in smaller units.

Sell Yourself & Your Farm

- Farmers are an endangered species – there aren't many of us around.
- Capitalize on your uniqueness.
- Personal sales is the oldest and most effective form of marketing - USE IT!!
- You grew and intimately knows the product you're selling, you can sell twice as much on any given day as a hired salesman!
- Repeat it!

The Lattin Farms Experience

Lattin Farms

DIRECT MARKET VENUES

Food

Education

Farm Fun

Food

- FRESH CERTIFIED ORGANIC PRODUCE
- ON-FARM PROCESSED JAMS, PICKLES
- ON-FARM BAKERY
- CATERED ON-FARM EVENTS/ACTIVITIES
- CO-PACK PROCESSED ITEMS
- LOCAL FARMER ITEMS

- CORN MAZE
- PUMPKIN PATCH
- COW TRAIN, BOUNCE HOUSE, COW TRAIN
- FALL FESTIVAL, CRAFT FAIR, GOAT DAYS
- FARM OPEN HOUSES, SPECIAL EVENTS
- PICK YOUR OWN
- WEDDINGS, WAKES, REUNIONS, PICNICS, ETC

- SCHOOL EDUCATIONAL TOURS
- HEALTHY EATING CLASSES
- SPECIALIZED GROUP TOURS
- OPEN HOUSES
- FOOD PRESERVATION CLASSES
- CSA EVENTS

WHERE IS THE MONEY?

- FOOD - - - - - - 89%
- FUN - - - - - - - 9%
- EDUCATION - - 2%

FOOD BREAKDOWN
65% PRODUCE
20% KITCHEN
15% FIELD CROPS(ALFALFA, SMALL GRAINS)

PRODUCE INCOME BREAKDOWN CUSTOMERS

- GROWERS MARKET - - - - - 54%
- CSA - - - - - - - - - - - - - - - - - 25%
- WHOLESALE ACCOUNTS - - 11%
- FARMER'S MARKETS - - - - 9%

PRODUCE INCOME BREAKDOWN CROPS

- CANTALOUPE - - - - - 21%
- TOMATOES - - - - - - 15%
- SQUASH- - - - - - - - - 10%(SUMMER, WINTER)
- PUMPKINS -- - - - - - 7%*
- CUCUMBERS - - - - - - - 5%
- GREENS- - - - - - - - - -- 4%**
- PEPPERS - - - - - - - - - - 4%
- GARLIC/ONIONS - - - - -4%
- WATERMELON - - - - - 4%
- RASPBERRIES - - - - - - - 3%
- CORN - - - - - - - - - - - - - 3%

*MANY PUMPKINS GET RECORDED IN FUN(HAYRIDES)

**IN 2011 MOSTS OF GREENS SOLD WERE PURCHASED FROM LOCAL FARM FOR BASKET SALES – 2012 ANTICIPATE 6-8% OF SALES

GROWERS MARKET AT LATTIN FARMS

Questions?

This presentation is based on ideas presented in:

Tips to Successful Farm Produce Marketing
Duncan M. Chembezi, Ph.D
Professor and Director
Small Farms Research Center
Alabama A&M University

WELCOME

To Lattin Farms

Great Basin Basket CSA

Community Supported Agriculture

Presented by:
Lattin Farms LLC
2016

Some information comes from an article at www.fix.com/blog/farm-to-table/

Community Supported Agriculture

- What are CSAs?
  - One of the fastest growing niche markets in agriculture
  - Directly serves Communities and Customers/ Families
  - Participants purchase "shares" in weekly harvests
  - Arrangement beneficial to farmers & the communities they serve

CSAs cut out the middlemen (transportation and storage) and bring us back to nutrient rich, farm-fresh food that changes with the seasons.

- We offer a farmer cooperative CSA, meaning the farmer shoulders the bulk of the management responsibilities and the shareholder is treated more as an investor.

Benefits for the Shareholder

- You get the freshest produce available.
- If a bad product manages to slip by, we will work with you to replace the item.
- You will get a diverse supply of produce not often found in agri-business.
- Encourages sustainable agriculture and environmental health.
- Involvement in CSA decreases the distance between their food and the person who grows it.

Benefits for the Farmers

- Up front operating funds
- Better opportunity for planning and planting production
- Develop a personal relationships with shareholders
- Allow farming families to continue doing what they do best-FARM!

Great Basin Basket CSA

- The Great Basin Food Basket is a collaboration between you, your fellow citizens within the northern Nevada area and dedicated farmers from around the area that wish to support the market for healthy, fresh and wholesome food. Local farmers include Lattin Farms, Pioneer Farms, Mewaldt Organics, River Bend Farms, Coblentz Family Gardens, and Holley Farms.

- Lattin Farms is the main producer for the CSA Baskets located in Fallon, NV.
- We are a certified organic farm. We also use food safety practices.
- We believe in the quality of our produce and stand behind what we provide.
- We work with smaller farms in our area that may not be certified organic, but use organic principals when growing their food.

What's in your basket?

- A typical basket is designed to supplement your grocery list for about 3 to 4 people for the week

Early Season

Lettuce, spinach, baby greens, kale, chard, braising mix, green onion, green garlic, beets, carrots, radishes, turnips, herbs, cherry tomatoes, early squash, etc.

Late Season

Tomatoes, melons, zucchini, summer squash, cucumbers, onions, garlic, beets, carrots, potatoes, eggplant, green beans, peppers, cabbage, Nevada berries, winter squash, etc.

CSA Tips

- Plan Ahead–the farmer usually knows what is going to be available for that week to help with your grocery list
- If your vegetables need washing, peeling, and chopping, aim to do it right away. Most produce can be frozen for another day.
- If you don't know what the item it is, look it up. We usually offer explanations for the unfamiliar produce in our newsletters, but the internet can be a great source as well.

www.greatbasinbasketcsa.com

- Choose the season(s) you would like to enroll in
- Choose if you would like weekly or bi-weekly
- Choose your pickup location
- We have a variety of payment options: online, credit card, check, bi-weekly payments, and SNAP payments.

Basket Pricing

- Early Season May 17th – July 21st
  - Weekly (10 weeks) – $270
  - Bi-Weekly (5 weeks) – $150
- Late Season July 26th – Sept 29th
  - Weekly (10 weeks) – $290
  - Bi-Weekly (5 weeks) – $160
- Both Seasons May 19th – Sept 29th
  - Weekly (20 weeks) – $560
  - Bi-Weekly (10 weeks) – $310

Pick-up Locations

Day	Location	City
Tuesday	St. Mary's Regional Medical Center	Reno
Tuesday	Rail City Garden Center	Sparks
Tuesday	1012 S Minnesota St	Carson City
Tuesday	Century 21 Building	Minden
Tuesday	Lattin Farms	Fallon
Wednesday	Renown Medical Group	Fernley
Thursday	Great Basin Food Coop	Reno
Thursday	Whole Foods Market	Reno
Thursday	Renown Regional Campus (employees)	Reno
Thursday	NV Energy (employees)	Reno

Get in Touch with the Seasons


Questions?
GREAT BASIN BASKET CSA
COMMUNITY SUPPORTED AGRICULTURE
Lattin Farms

Fall Planting

"What's in your Hoop-House?"

Decisions; growing people food and/or soil food.

Prepared for UNR Cooperative Extension November 19, 2016
By
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The main season is over …why plant again?

Cons:

- Summer crops are still producing.
- I'm tired.
- The soil is tired.
- The help is on strike.
- The equipment needs repair.
- It's Hunting Season.

Pros:

- I love producing.
- I love to eat.
- Other people are hungry too.
- Hobby, cash-flow, or a living.
- I like dealing with people.
- They say it can't be done! (stubborn factor)

Hoop Houses = Year-round Possibilities

- Most people think that growing seasons are defined by temperature, but it's also the amount of daylight that really allows crops to thrive. By February 15th, in most of Nevada, there will be 10 or more hours of daylight, which is the minimum amount plants need for great active growth.
- A hoop house traps in heat and allows you to plant crops much sooner and later than you could without the added protection. It also protects from wind and storms that could otherwise devastate a field crop.
- You will have to make hard decisions about cleaning out the August bounty, renewing your growing beds and starting cool season crops. You will want seed that can germinate in cooler soil --- radishes, salad and stir-fry or cooking greens, spinach and hardy cabbage family or Asian greens, beets, carrots, turnips, parsley and cilantro. Alliums; onions, leeks, and scallions love the cooler soil and temps.

Possibilities, Continued……

- In late Spring, as outside temperatures climb, (with all- important ventilation) you can again plant your hoop house with summer tomatoes, melons, cucumbers, eggplant and peppers, for example.
- Keep your hoop ventilated; even in winter months, This is crucial as temps can climb unbelievably high. It's usually enough to have window vents on the ends and at least one end door that you can open to let heat escape. Some hoops have roll up sides. With good ventilation hoop-houses can be used year-round. You may have to shade your hoop house! You may need a fan or two to keep air moving on both temperature extremes.



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Making the hard choices..


Summer Crops – still producing -- but they need to go if you want fall crops through – say, Thanksgiving. Preserve , dry, freeze or can. Send them to the local food bank, have a farm party, have a big sale.
You need to get tough about creating space for your fall crops.
Clean Up – Re-do your Beds with compost (go easy) and keep those luscious fall veggies the top priority space in your brain. Later -- we'll look at an alternative to producing food plants -- soil re-building for organic matter and nutrients.

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Fall crops = planted in Summer

- **Late July to early August**, **Purge, and clean;** by removing some or all of your summer crops that are spent, or no longer needed -- to make way for cool season veggies. Start seeds in flats, or direct seed, after light compost addition.
- **Labor Day** marks the potential for freezing weather. Fall and winter crops may benefit from the use of row cover, sometimes called frost cover, that allows light and water through, but insulates the plants from extreme cold temperature and protects them from frost.
- **Fall and Winter Crops**; such as arugula, Asian veggies, garlic, Mache, turnips, mustard and spinach, carrots (and other root crops) salad and braising greens will survive the winter even if the greenhouse is not heated. Choose quick or short season crops to produce by Thanksgiving. If you plan to nurse roots and longer term veggies through the winter, get your extra warmth covers ready. If not, you can clean out around Thanksgiving time, and either plant a quick growing cover or green manure crop, or nurse your plants through the next several weeks.
- **Cold weather crops will slow or stop growth during the short days of winter** and resume as days start getting longer (Feb 15) **Unhealthy Nitrates can build up** in winter crops. **See the hand-out** and remember to do your picking later in the day to lessen nitrates during freezing winter weather. **(see pass-out sheet for suggested ways to lessen nitrates).**

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- **Soil Temperature Germination Ranges for Select Vegetables**

TEMP (° F) Direct seed:

- **45–* 85 cabbage, kale, broccoli, collards seedlings / prefer 45 –*65**
- **35–* 80 lettuce, Asians, and most salad greens (* at more than 80 degrees germination rate drops 50%)**
- **35–75 spinach (optimum 68)**
- **50–85 onions (optimum 75)**
- **45–95 radishes (optimum 85)**
- **50–85 beets, Swiss chard (optimum 85)**
- **40–75 peas (optimum 75)**

Below (* using transplants) -- late spring or summer to fall hoop

- **60–85 * beans, snap (optimum 80)**
- **65–82 * tomatoes (optimum 80)**
- **60–95 * peppers (optimum 85)**
- **65–100 * cucumbers, Note: melons, squash (optimum 80–90)**

See pass-out for additional information on soil temperatures and germination.

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LAY-OUT GRO-BEDS & WARM THEM IF NEEDED

Soil too cool – and you are anxious to start planting? Use porous covers, like Agribon (Remay) fabric or alternately, black plastic to cover beds(with or without hoops). Create additional warmth as needed. Some folks even hang "curtains" around edges of hoop, to lessen cold infiltration / heat loss. Raised beds are nice for drainage. Easy to work in. Keep after early sprouting weeds.

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DON'T GUESS

Determine fertility needs with a good soil test, from an agricultural lab that will give you organic results TO SHOW POTENTIAL PROBLEMS and explain any needs. Such a lab may be A&L Western Labs in Modesto. Or you can go through a company a like Peaceful Valley Farm Supply

Remember, crop residue is good organic matter and may be tilled in, allowing for time and moisture to break down the materials.

We do not recommend tilling in solanum crop (tomato, potato, eggplant, peppers, ETC) residue.

Compost beds, between food crops and green manure cycle.

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Our "cool" crops off-season in Hoop-Houses

Arugula and Asian Greens
Beets
Bok-Choy
Broccoli (sprouting variety)
Cabbage
Carrots
Garlic and other Alliums
Herbs: cilantro, parsley, oregano, thyme
Kale
Lettuces and other cold hardy greens.
Leeks, scallions
Mache, claytonia,
Mustards (including Broccoli Raab
Radishes & Hong-Vit
Spinach
Turnips (white oriental and scarlet)

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Target your harvest dates to determine when to plant.

- **Early Spring Crops** are ideal for an unheated greenhouse. The sun will warm the inside of the greenhouse, making it possible to grow carrots, lettuce, onions, spinach, radish, peas and a host of other cold weather crops. Watering needs are less. Note: Some of the same crops can be planted for fall, or for wintering over.
- **Lower light levels** and once well established, the occasional freeze will not harm these types of plants, especially if you have frost fabric ready to cover during the nights, or on really cold or freezing days. Harvest later in the day on frosty mornings. **(See hand-out about Nitrates.)**
- **Once the air temperature warms up** inside the house, the crops will perk up, and the quality of the produce will be the same as before.
- **Day-length is increasing starting in February**, (+ or – 15th) so these crops in a hoop-house will take off and grow! Remember, it may take a bit longer to reach maturity. Seed packet maturity is just a guide. Use a chart, (provided) and possibly add or subtract some extra days or weeks to your actual harvest. Also remember IF you have wintered veggies over, they are inclined to bolt (trying to go to seed) once active growth takes place.

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Grow great cash crops for market. Here is a hoop house in full winter operation, and another in winter to mid-spring mode. Note differences in layouts.

Winter growing is possible with extra covers and hoops. Remember there may be a period of weeks, where the crops don't actively grow, but they hold up well and take off again after mid February, IF you haven't used or sold them.

Planted in the fall, this is a early spring hoop house is full of salad plants, root crops and other cooking or stir-fry greens. Very soon, it will be time to clean out or till in bolting plants.
It will be time to seed and/or put in heat-loving transplants

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It all starts with the soil….

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Green manures enrich the soil where your future produce will grow!

1: A typical soil builder seed mix 2: Growing a healthy soil.

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Cutting a good stand of overwintered soil builder green-manure crop.

Remember allow 2-3 weeks for good breakdown. before planting seed.

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Tilling is the fun part!

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Check out all of the soil organic matter & nutrition

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Almost done tilling in the green manure!

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Enjoy what Nature and Winter brings

Seed Catalogs to help plan for another year

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Internet Help / Resources

- Note: Almanac help is from two different companies – choose the one you like best
- http://farmersalmanac.com/calendar/gardening/
- http://www.almanac.com/gardening/frostdates/NV/Elko
  (Enter a city_____& zip code)
- http://www.Johnnyseed.com Growers Library (many topics)
- www.groworganic.com Peaceful Valley Farm Supply (lots of information and organics)
- https://attra.ncat.org/ (many subjects, search database).
- http://extension.usu.edu/ **(UTAH)** Programs; agriculture & gardening.
- **National Organic Program** https://www.ams.usda.gov/about-ams/programs-offices/national-organic-program
- **More Hoop-House Information on Internet: Here is just one with seeds and good growing information:** http://www.highmowingseeds.com/
- http://planthardiness.ars.usda.gov/PHZMWeb/InteractiveMap.aspx **ZONES MAP**
- **Germination, Soil Temps charts:** http://extension.oregonstate.edu/deschutes/sites/default/files/Horticulture/documents/soiltemps.pdf

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Growing Greens and The Hazards Of Nitrate Accumulation; **During periods of short daylight length, there is a health risk associated with nitrate accumulation in leafy greens.** Nitrates are converted in the body into toxic nitrites, which reduce the blood's capacity to carry oxygen. Also, nitrites can form carcinogenic nitrosamines. Plants make nitrates during the night, and convert them into leaf material during the day. It takes about six hours of sunlight to use up a night's worth of nitrates. In winter, a small handful of leafy vegetables can exceed the acceptable daily intake level of nitrate for an adult, **unless special efforts have been made to reduce the levels.** Spinach, mustard greens and collards contain about twice as much as lettuce; radishes, kale and beets often have two and a half times as much. Turnip greens are especially high, at 3 times lettuce levels.

How To Keep Nitrate Levels As Low As Possible:

• Grow varieties best suited for winter.
• Avoid fertilizing with animal-based fertilizers; use organic compost.
• Ensure soil has enough Phosphorous, Potassium, Magnesium and Molybdenum.
• Water enough but not excessively.
• Provide fresh air as soon as temperatures reach 68 degrees Fahrenheit (20 degrees Celsius), so that carbon dioxide levels are high enough.
• Harvest after **at least four (preferably six) hours of bright sunlight in winter**.
• Avoid harvesting on very overcast days.
• Avoid over-mature crops and discard the outer leaves. Harvest crops a little under-mature.
• Refrigerate immediately after harvest, store harvested greens at temperatures close to freezing; use crops soon after harvest.
• Mix your salads; don't just eat turnip greens.

How to Harvest Winter Vegetables

Don't harvest frozen crops **- wait till they thaw.** With fall-sown crops the aim is often to keep the same plants alive through the winter. November-January is not a good time to sow replacements.

With leafy vegetables, highest productivity is from "Cut and Come Again" crops: cut the tops of the plants above the growing point with scissors or shears every 10 to 35 days. Leaf-by-leaf is the method we use for kale, collards, chard and spinach. Never remove more than 40 percent of the total leaf area: less than half of the leaves, with a safety margin (4 to 6 center leaves)

Once spinach plants start to look a bit past their peak, we "crew-cut" or buzz-cut them. Initially we harvest lettuce by the leaf, leaving the center to keep growing, and switch to harvesting the heads in late January, when growth begins to pick up. Whole plant harvesting works well for small plants like tatsoi and corn salad. A direct-seeded row can be thinned over time by harvesting out the biggest plants on each visit.....

Copy provided by Ray Johnson of Custom Gardens Organic Farm, Silver Springs, NV. Excerpts from an article in Mother Earth News. Author Pam Dawling; Winter vegetables in your hoop house.

Soil Temperature Conditions for Vegetable Seed Germination (in degrees F)

Crop	Minimum	Optimum Range	Optimum	Maximum
Asparagus	50	60-85	75	95
Bean	60	60-85	80	95
Beet	40	50-85	85	95
Cabbage	40	45-95	85	100
Carrot	40	45-85	80	95
Cauliflower	40	45-85	80	100
Chard, Swiss	40	50-85	85	95
Corn	50	60-95	95	105
Cucumber	60	60-95	95	105
Eggplant	60	75-90	85	95
Lettuce	35	40-80	75	95
Muskmelon	60	75-95	90	100
Onion	35	50-95	75	95
Parsley	40	50-85	75	90
Parsnip	35	50-70	65	85
Pea	40	40-75	75	85
Pepper	60	65-95	85	95
Pumpkin	60	70-90	95	100
Radish	40	45-90	85	95
Spinach	35	45-75	70	85
Squash	60	70-95	95	100
Tomato	50	60-85	85	95
Turnip	40	60-105	85	105
Watermelon	60	70-95	95	105

*Daily fluctuation to 60° F or lower at night is essential
Data Compiled by J. F. Harrington, Dept of Vegetable Crops, University of CA at Davis

Days to Appearance of Seedlings at Various Soil Temperatures from Seed Planted at ½" Depth

	Soil temperature in degrees F								
Crop	**32**	**41**	**50**	**59**	**68**	**77**	**86**	**95**	**104**
Asparagus	x	x	53	24	15	10	11	19	28
Bean	x	x	x	16	11	8	6	6	x
Beet	...	42	17	10	6	5	4	4	...
Cabbage	...	...	15	9	6	4	3	...	...
Carrot	x	51	17	10	7	6	6	8	x
Cauliflower	...	...	19	10	6	5	4	...	...
Corn	x	x	22	12	7	4	4	3	x
Cucumber	x	x	x	13	6	4	3	3	...
Eggplant	...	...	...	13	8	5	...	...	...
Lettuce	49	15	7	4	3	2	2	x	x
Muskmelon	...	...	...	...	8	4	3	...	...
Onion	135	31	13	7	5	4	4	12	x
Parsley	...	...	29	17	14	13	12	...	...
Parsnip	171	57	27	19	14	15	32	x	x
Pea	...	36	13	9	7	6	6	...	...
Pepper	x	x	x	25	12	8	8	9	x
Radish	...	29	11	6	4	3	3	....	...
Spinach	62	22	12	7	6	5	6	x	x
Tomato	x	x	43	14	8	6	6	9	x
Turnip	x	x	5	3	2	1	1	1	2
Watermelon	...	x	...	...	12	5	4	3	...

X little or no germination
... not tested

Data Compiled by J. F. Harrington, Dept of Vegetable Crops, University of CA at Davis

GREAT BASIN BASKET CSA

GROWER PROCEDURES MANUAL

Congratulations on becoming a member of the Great Basin CSA grower's team. Our CSA has very loyal customers who expect and appreciate high quality locally grown products. They pay a premium to have seasonal fresh produce delivered to them each week throughout the growing season. This manual is intended to provide guidelines for the harvest, packaging and delivery of products to the Basket assembly point at Lattin Farms. Following these guidelines will help us deliver a quality product to each customer every week.

GENERAL INSTRUCTIONS

The most critical basket issues are protecting our products from the heat and delivering top quality product to the subscribers. Please deliver only clean, presentable, edible product. Trim or discard anything that is not top quality. PLEASE NOTE: If we receive wilted product from you, you will have to take it back home and the customers will do without. We CANNOT have this happening. Wilt is a critical issue we face as it gets much worse by the time it is boxed, delivered and picked up by the subscribers. Please – it is very important – KEEP THINGS MOIST AND CHILL, CHILL, CHILL!

FIELD HEAT

When picking in our warm summer days remember that everything you harvest has field heat. You must be careful not to pack large amounts together in a box. Items such as peas, beans, squash and corn will never cool if packed too deep in boxes. The NevadaGrown box or fruit boxes are ideal. Do not place boxes in the sun in the fields or leave filled boxes while you continue picking. It is important to protect the crops from our hot days from the moment they are harvested.

GREENS

Green require special care as they wilt very easily and quickly without proper handling. General Guidelines for all greens:

1) Pick in small batches and work up as you go
2) Don't every let green sit around in large amounts. They will wilt before you finish
3) Keep worked up product out of the sun
4) Greens will generally be packaged in ½ pound food quality bags secured by Lattin Farms. Some specialty greens may be delivered in ½ full for approximately 1/8# of product.

Lettuce(mixed cut lettuce)

Lettuce **must** be cut early in the morning. For food safety, please used knives that have been thoroughly washed for all greens. Please **do not** cut in the afternoon or evening. Field heat will keep it from cooling down overnight and our customers will receive limp lettuce. Use a fine spray to mist lettuce as it needs some moisture to retain crispness. Put in a plastic bag and tie. Put into boxes for storage. **Do not** let it sit around while working up the rest. Refrigerate overnight. Do not pick lettuce on the day of delivery.

Lettuce(Head)

Cut at bottom. Remove ugly outside leaves making a pretty, presentable head. Mist and bag. Keep out of the sun. If heads are small, please put two per bag to equal one large head.

Spinach/Mesclun

Treat as lettuce. Spinach can be cut and bagged loose. If you have an upright variety you may want to cut the whole plant and bunch several together and tie with a twist tie and bag. Mist & cool overnight.

Specialty Greens

Baby greens – cut, mist, bag and chill – treat like lettuce

Mature greens – bunch, tie, mist, bag and chill.

Arugula – Follow lettuce instructions. A little Arugula goes a long way – 1 bunch equals a fat fist full. You can twist tie them.

Swiss Chard/Kale – Baby – ½ to full bag loose leaves. Mature(big leaves) bunch 5-7 leaves together and twist tie. This should make a full bag.. Medium size – makre a large enoufh bunch to fill a bag and twist tie. Chard is a very tender green. Pick, mist twist tie, bag and chill. Do not let sit in Sun.

Note: Chard and kale both cook down to nothing. Make sure the bag is full.

Beets: 1 bunch equals 4 large beets(baseball size)
6-8 Medium beets(golf ball size)
8-12 small beets

Keep green on the beets. Wash dirt off. Bag, chill and bunch with twist tie if desired. Our customers have requested that we bunch like sizes together because it makes it easier to cook.

Leeks : 1 bunch equals 3-4 large, 5 medium or 6-8 small. Top, pull dirty parts off, wash, twist tie or rubberband together and bag. Chill. **If hard and woody,** please discard.

Celery Root: Baseball size or larger – 1/person; if smaller – 2/person. Wash – no need to bag.

Fennel: Clean up root, if green top is good do not remove. 2-3 bulbs if large; 3-4 bulbs if small.

Kohlrabi: If baseball size – 1/person, if smaller 2/person. Trim leaves, make sure they are not woody – no need to bag.

Radishes: Small bunch – 6-7; large bunch – 8-10. Size: diameter of a quarter – no smaller than a nickel. Please discard radished that are “punky”or “woody”.

Keep greens on, wash roots and twist tie or fubberband together. Store in a plastic bag to keep fresh.

Daikon: 1/person. Wash, eep crisp.

Green Garlic: bunch three stems together. Keep stems long – do not cut off. Twist tie together. Wash off dirt – pretty when washed.

Onions: Green(Scallion, pearl. Bunching – a good sized bunch like you would find in Raleys; wash, twist tie or rubberband together, bag and chill.

Salad onions: bunch 3-4 together and tie or rubberband. Golf ball size. Bag and chill.

Herbs

Must be bunched, twist tied or rubberbanded. Leafy herbs like dill, parsley, cilantro, cutting celery need to be a good large handful. Do not be stingy! The aromatic woody stemmed herbs like thyme and rosemary, bunch with 4-5 good sized stems. The leafy herbs such as basil, must be misted, bagged and chilled**.**

Basil: must be picked in the morning. Very lightly mist – do not drench. Bag and chill overnight. Early season – 1 bunch equals large handful; later in season – we need larger bunches for pesto.

*Try not to let basil go to flower and don't include a lot of woody stems. Keep plants cut so they continue to produce leafy bunches.

Turnips

1 bunch – twist tied – if used for just greens turnip size does not matter(early spring). A quarter-sized turnip is perfect. Make a large handful, wash, bag and chill. In the Fall we want golfball size or larger turnips. Bunch 4-5, tie, wash, bag and chill. Cut greens if they become ugly. Do not keep punky or woody turnips.

Cabbage

Outer leaves must be peeled. Make a clean pretty cabbage.

Tomatoes:

Tomatoes will be delivered in paper bags. Do not put too many per bag. The bottom will be mush by the time the customers receive their boxes. Pick fruit ripe but not splitting or cracking. Split or cracked tomatoes leak all over the box.

Cherry Tomatoes

Bag in plastic bags, clamshells or baskets with a cap or lid. They must be contained. Discard cracked tomatoes.

Potatoes

Early Season & summer: New potatoes are tender. Wash and bag in plastic

Fall potatoes: Do not wash – deliver in papers bags. Not washing allows our customers to store for the winter.

Zucchini – Sold by the pound. Keep size medium to small. Pick fresh and chill. Do not allow to sit in sun or heat while picking. Zucchini becomes limp easily. Bag in paper bags.

Onions

When first pulled in early season, keep tops one and wipe off dirt. Once onions are cured, deliver with tops off and cleaned. Pull away any loose, dirty skin.

Winter squash

Clean if muddy. Try to keep uniform sized fruit. Squash can have a few nicks but do not deliver squash with large cracks. When picking use caution that the tough stem ends

from one squash do not puncture others. Place squash in boxes individually and carefully. Keep box sizes small and trim stem ends if necessary. Check each squash for firmness as our customers will want to store them for winter use.

Peas

Snow peas are the most tender – some moisture is good to keep them crisp. Chill

Sugar Snap – Also tender some moisture & Chill

Shelling – Sturdier

*Please be harsh with peas. If they are TOUGH, WOOD, STRINGY, STARCHY, please discard them as you pick. Taste as you pick. Deliver only high quality peas. Deliver in ½ to 1 pound plastic bags, chilled. Use caution – peas retain field heat.

Berries

Pack in container with lid. Clam shells work great.

*Please sort out overripe fruit. In the summer it will turn to soup by the time the customers pick it up.

Carrots

1 bunch – 6-8 large carrots or 8-12 baby carrots. Keep tops on carrots if in good shape. Wash, bunch, twist tie, bag and chill. Discard woody carrots.