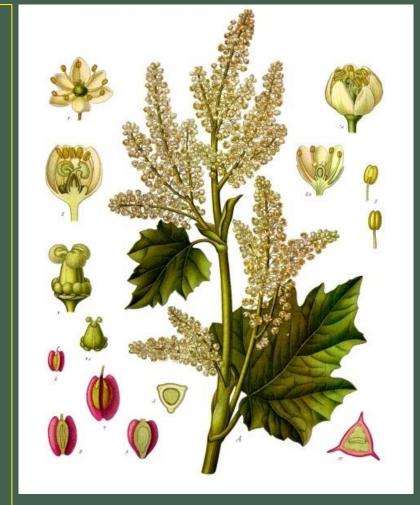
Rhubarb (Rheum spp.)

- Buckwheat family: Polygonaceae
- 50-60 extant species in Genus Rheum
- Rheum officinale = medicinal rhubarb
- Rheum x hybridum = culinary rhubarb

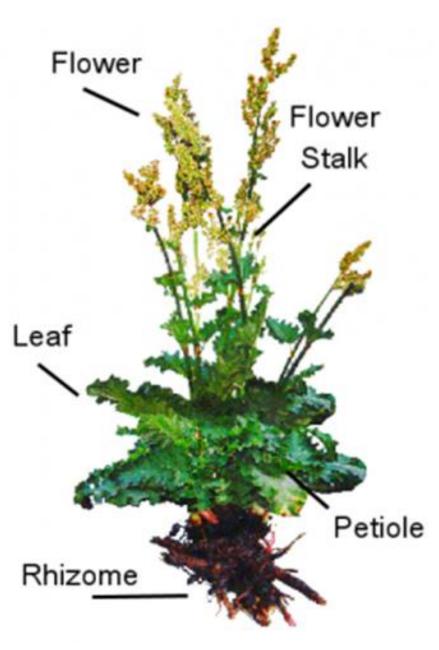
R. officinale root = ref in China 2700 yrs ago Medieval Europe trade = Silk Road = more value than cinnamon, opium or saffron, Cultivated along the Volga R in Russia

Rheum x hybridum developed late 1700s:

Grown in Scotland 1786, in US in the 1820s



Rheum officinale – from Kohler's Medizinal-Pflantzen (1898)



leaf stalk (petiole) = culinary rhubarb

Vit A, C, B-complex, Ca, K, Mg,

- -malic acid (sour),
- -flavonoids (bitter, astringent) = anthocyanin & lycopene (red-blue)
- -oxalic acid (sour, acidic),
- -low fat & low calories

root (rhizome) = medicinal rhubarb

anthraquinones (laxative),

oxalates (nephrotoxin)

PARTS OF THE RHUBARB PLANT

Rhubarb (Rheum x hybridum)

- 1) Petioles are red green, Leaves are toxic (oxalic acid)
- 2) Red color is from anthocyanins & lycopenes
- 3) Commonly available "varieties" in US (sold as "crowns" or seeds): Crimson Red/Cherry/Wine, Victoria, Canada Red, Valentine,
 - Glaskin's Perpetual, Timperley Early ...others are harder to find in US....



Rhubarb (Rheum x hybridum)

- 1) Petioles are red green, Leaves are toxic (oxalic acid)
- 2) Red color is from anthocyanins
- 3) Available "varieties" in US (sold as "crowns"): Crimson Red/Cherry/Wine, Victoria, Canada Red, Glaskin's Perpetual, Timperley Early
- 4) Cool Season/winter hardy
- 5) Most rhubarb in US produced in Pierce County, WA
- 6) Best grown from crown, seeds are not true to type
- 7) Split ~every 5 yrs, plant in spring before leaves develop
- 8) Divide split crowns = 2 healthy buds w/min 2-inch cross-section
- 9) Pest & Diseases: rhubarb curculio weevil, egg laying sites/gummosis Botritis- leaf, crown, stem rot; bacteria, fungus, virus

Cultivation of Rhubarb

- 1) well-drained, composted, high-organic, loamy soil in site with full sun
- 2) acceptable soil pH 5.0-6.8, best temps 40-75°F
- 3) Perennial prep. soil well prior to planting, harvest delayed 2-3 yrs
- 4) amend entire rhubarb patch as deeply as possible = no limits for roots
- 5) space crowns 3-4 ft apart in rows 3-5 ft apart; 'eyes' 1" below surface
- 6) water well!... longer, less frequent watering will saturate soil deeper, plants fairly drought tolerant when established
- 7) optional side-dress w/ compost, N:P:K = 120:80:100 lbs per acre
- 8) apply fertilizers around outside of stalks
- 9) cut/break off flower stalks
- 10) harvest 2nd-3rd season = twist/pull from stem base, patch ~20 yrs
- 11) Do not harvest more than ½ of stalks from any individual plant

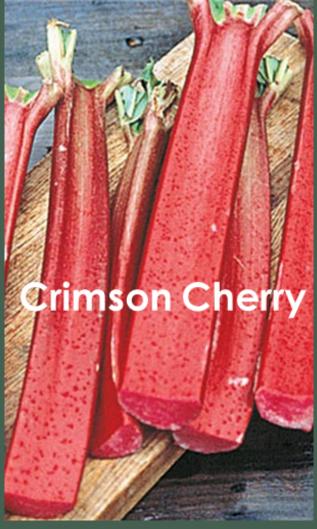


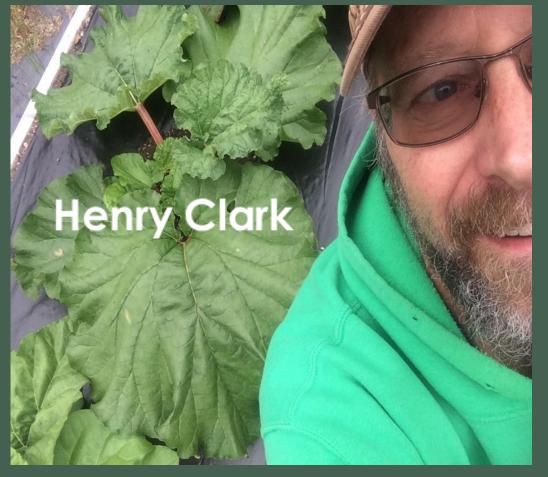
Henry Clark – photo courtesy Klondike Gold Rush National Historic Park

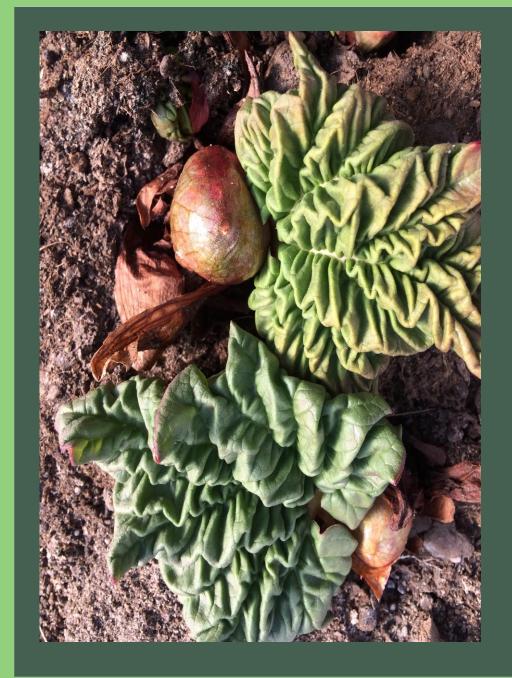
Rhubarb Specialty Crop Grant – Southeast Alaska

Unique and Flavorful





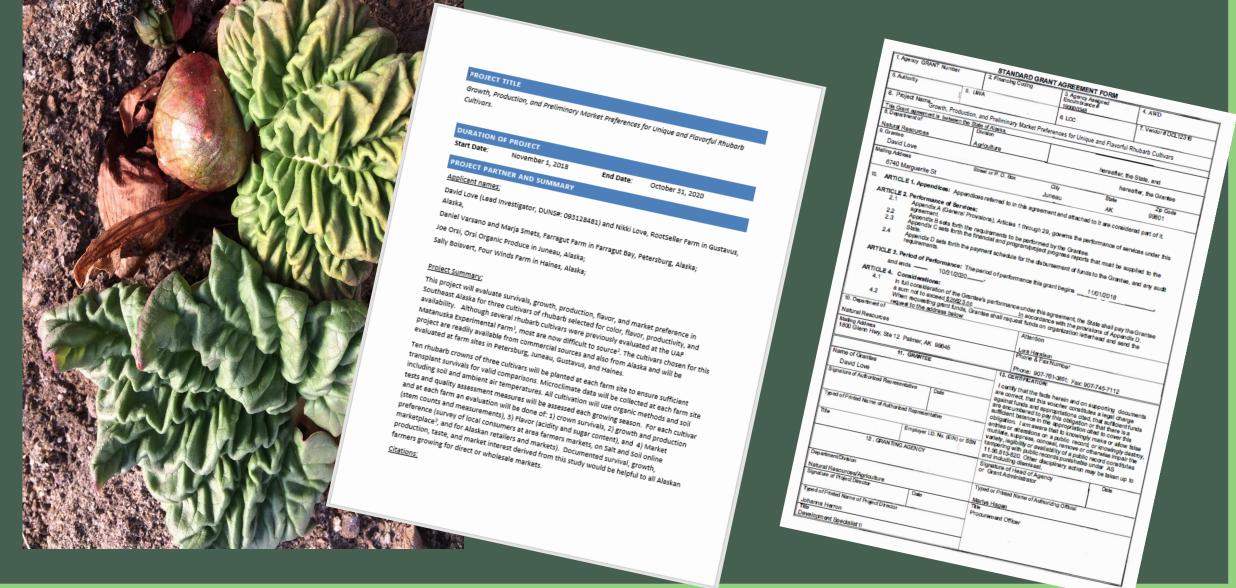




Why Study Rhubarb in Alaska?:

- Long history in Alaska -Russians, stampeders, homesteaders, gardeners...
- Grows well in Alaska, few diseases
- Perennial, ease of cultivation
- Robust; ships, stores and preserves well
- Nutritious, tasty and versatile
- Potential for sales, fresh or value-added

AK Div. of Agriculture Specialty Crop Grant # 190000348



thus began the saga of...
...the RHUBARB WRANGLERS...





Rhubarb Wranglers Websites: >>>SHAMELESS PLUG<<<



Farragut Farm: Bo Varsano & Marja Smets https://www.facebook.com/FarragutFarmLLC/

Orsi Organic Produce: Joe and Julie Orsi https://www.orsiorganicproduce.com/

Root Seller Farm: *Nikki and David Love* www.rootsellerfarm.com

Four Winds Farm: Sally Boisvert & family https://www.facebook.com/Four-Winds-Farm-590182111015361/

>>>SHAMELESS PLUG<<< for previous research

Garlic Studies conducted in 2012/2013 with Joe Orsi, Ed Buyarsky, Andy Piston, & David Love

Available through Ak Div of Agriculture & at www.RootSellerFarm.com

Specialty Crop Competitive Grant: Garlic Production Trials, Preliminary Storage Trials, and Simple Market Analysis-Southeast Alaska

Final Report 11/28/14



Contact Information: David and Nikki Love 6740 Marguerite St Juneau, AK 99801 Email: pandalid@vahoo.com

Phone: 907-789-6833



OBJECTIVES of 'Unique and Flavorful Rhubarb' STUDY:

- Compare 3 Varieties & Different Growing Conditions (4 farms):
 - Survivals, Growth, Stem Production
 - Soil Temps, Air Temps & Rainfall, Cultivation Methods
 - Market Preference & Consumer/Retail Surveys

Cultivation Methods:

Soil amendments: alfalfa meal, greensand, CalPhos, KMg, various composts, fish bone meal, feather meal, Bio-Fish, seaweed, worm castings, peat moss, pre-formulated fertilizers, tilled-in cover crops

Weed Block & Row Cover: landscape fabric, Eco Fabric, Typar, Agribon

<u>Foliar Spray & side-dressing</u>: Maxicrop & Neptune's Harvest, compost, pre-formulated fertilizers, none

Crown spacing: 3' on center, E-W bed orientation, single row & "patch"

Watering: initial watering-in, some in-season watering, some did not

Days before planting: 5-27 depending on whether soils were frozen

Survivals:

Crimson Cherry: 40-100% Survival (4-farm Avg = 80%)

Victoria: 70-100% Survival (4-farm Avg = 83%)

Henry Clark: 100% Survival all farms

(Important: length of time between purchase and planting, size & quality of crowns)

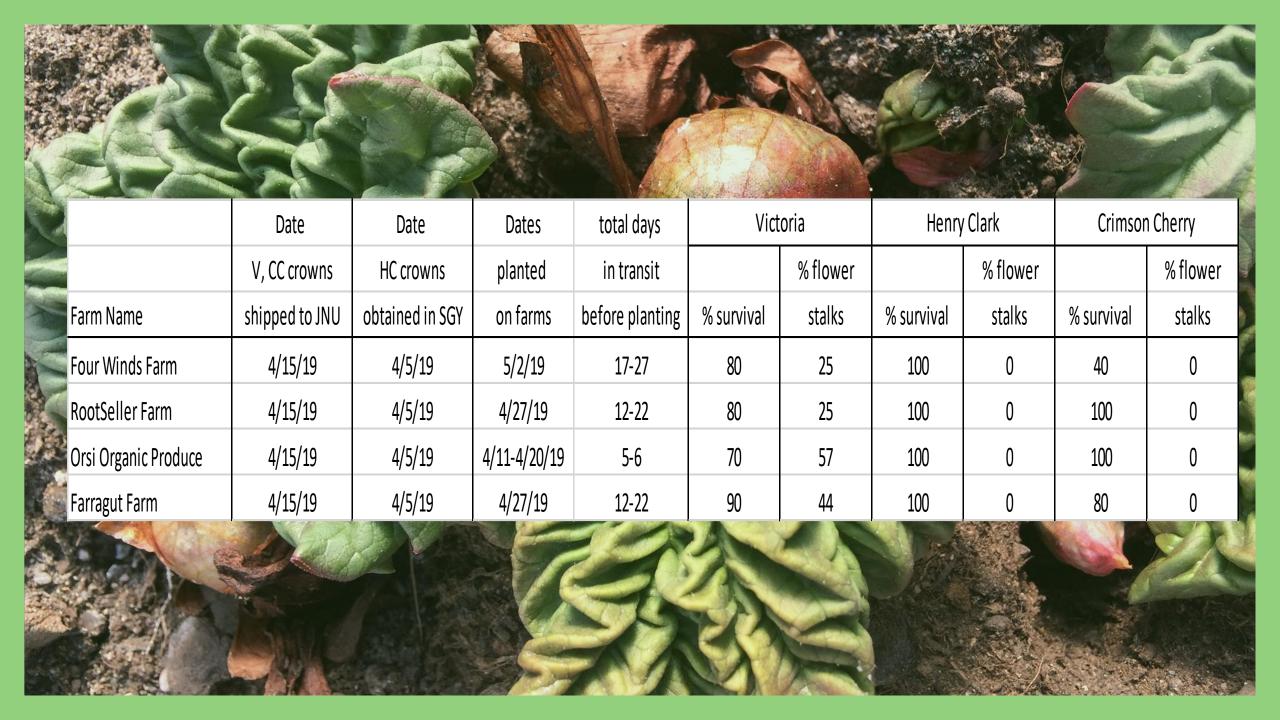
<u>Growth Rates:</u> highest —————— lowest

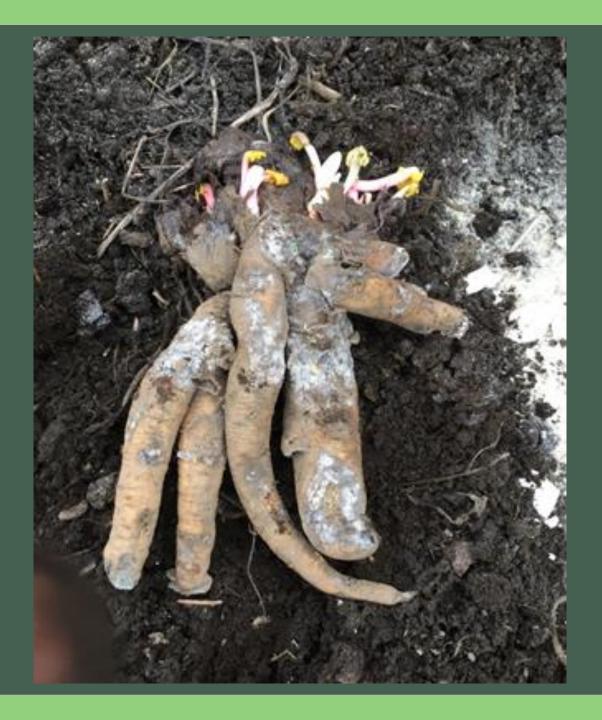
Henry Clark-----Victoria-----Crimson Cherry

Average Stem Counts:

highest ———lowest

Henry Clark(43)--Victoria(40)--Crimson Cherry(24)





Mold on Victoria crown...

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Growth Rates: highest — lowest Henry Clark-----Victoria-----Crimson Cherry

Average Stem Counts:

highest ———lowest

Henry Clark(43)--Victoria(40)--Crimson Cherry(24)

Photomonitoring: Henry Clark (HC5) RootSeller Farm



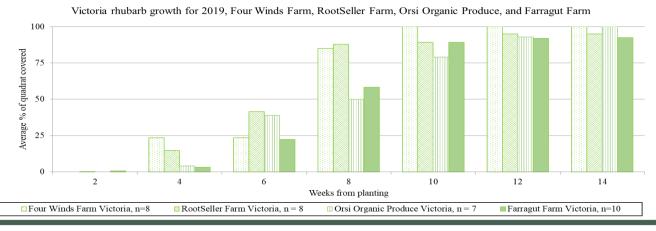


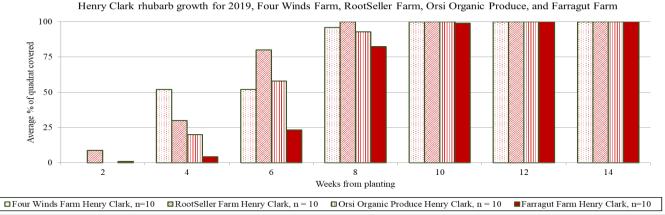


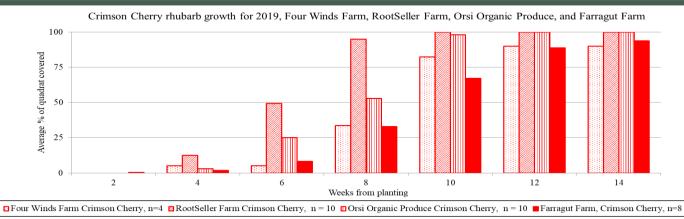


...Photos by Iris White...

Photomonitoring grow-out results







Survivals:

Crimson Cherry: 40-100% Survival (4-farm Avg = 80%)

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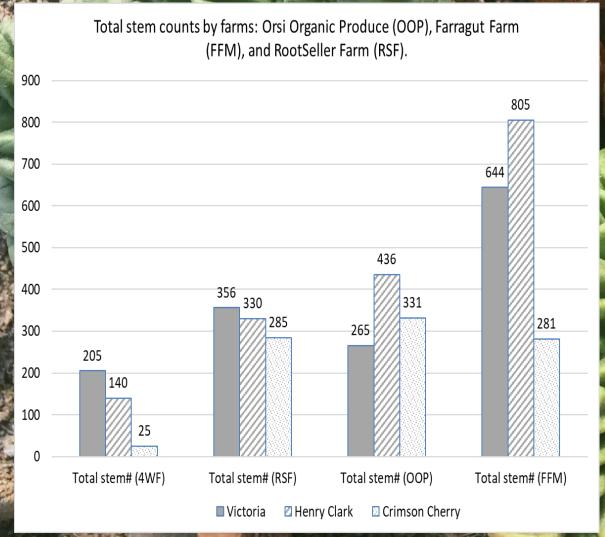
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Average Stem Counts:

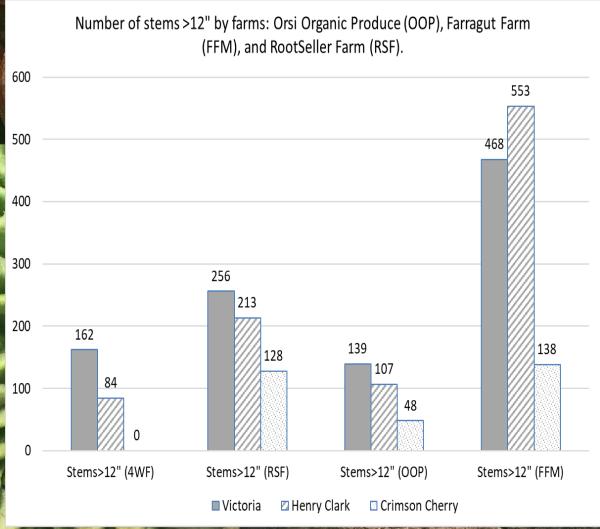
highest ———— lowest

Henry Clark(43)--Victoria(40)--Crimson Cherry(24)

Total Stem Counts



Number of Stems > 12"



1. Foliar Spray Experiment: 'Big Red' at Orsi Farm

2. Stem Weight vs. Rhubarb Volume:

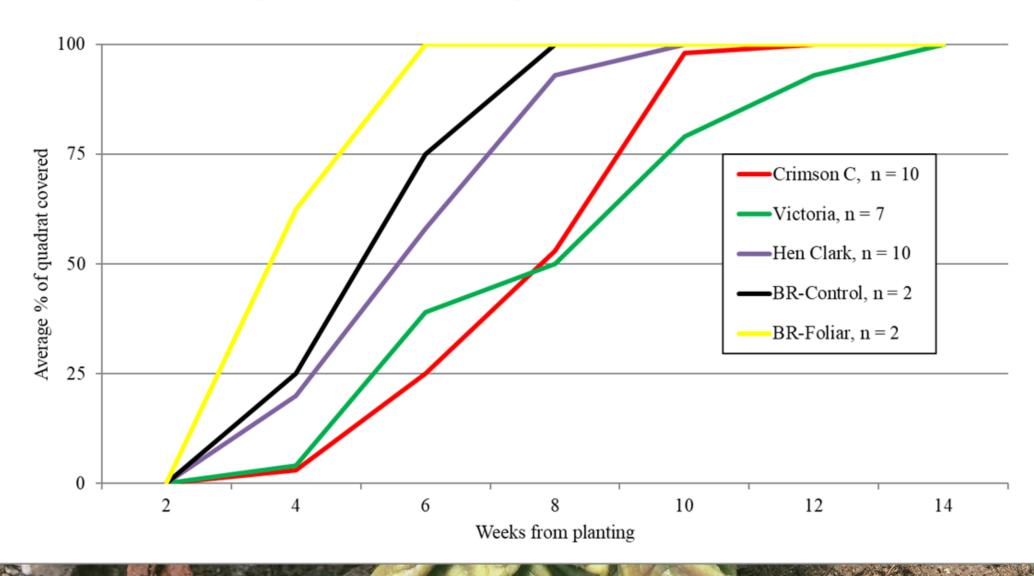
Measurements taken at Orsi Farm and RootSeller Farm

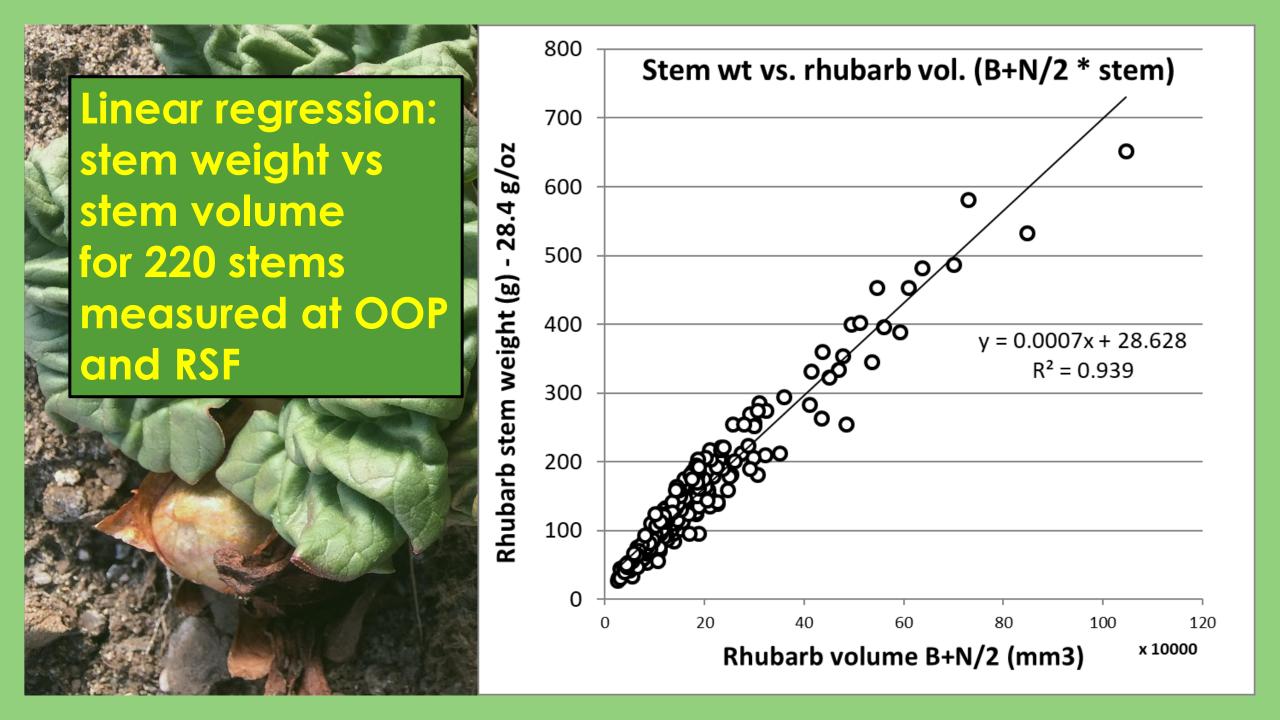
3. Soil Temperature Loggers and Air Temp/Rainfall: Data still being collected from all 4 farm sites...

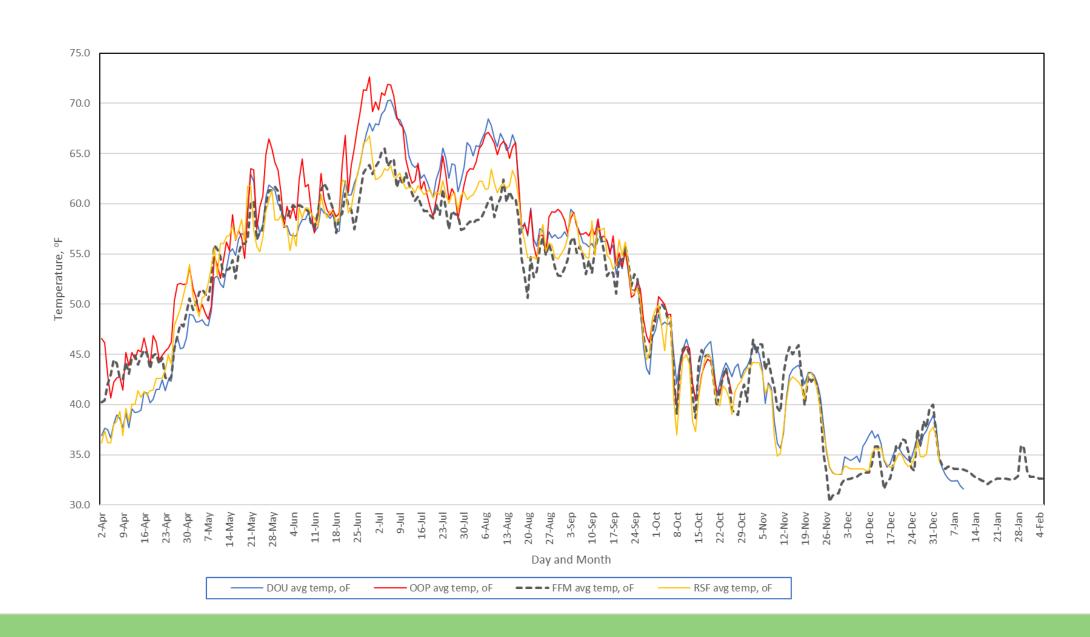
4. Soil Sample Analysis Spring and Fall:

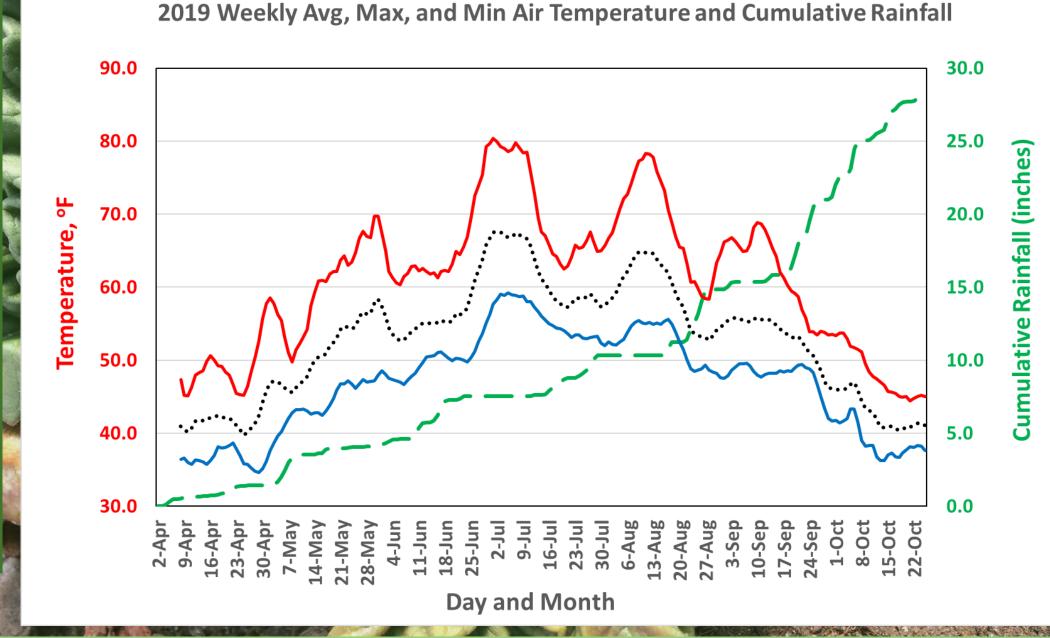
Samples collected 2019 and to be taken from all 4 farm sites...

Rhubarb growth as % filling standard 2'x2' PVC-pipe quadrat, showing faster growth of foliar-sprayed Big Red variety compared to control and other varieties









Spring soil samples, 2019 for 4 farms growing 3 varieties of rhubarb				SPRING		
	Soil sample		Organic Matter	Nitrogen	Phosphorus	Potassium
Farm Name	date	рН	%	ppm	ppm	ppm
4 Winds Farm	5/7/2019 ¹⁾	6.2	13.95	39.0	46	95
RootSeller Farm (N bed)	4/9/2019 ²⁾	7.0	7.53	14.7	73	115
(S & C beds)	4/9/2019 ²⁾	7.2	4.02	15.2	29	91
Orsi Organic Produce	4/1/2019 ¹⁾	5.7	6.63	25.9	139	112
Farragut Farm	4/28/2019 ³⁾	6.3	9.64	140.0	68	467
Spring soil samples, 2019 for 4	I farms growing 3 va	arieties of rhubarb				
	Soil sample		Organic Matter	Nitrogen	Phosphorus	Potassium
Farm Name	date	рН	%	ppm	ppm	ppm
4 Winds Farm	5/7/2019	6.2	13.95	very high	very low/low	low
RootSeller Farm (N bed)	4/9/2019	7.0	7.53	low	low	low
(S & C beds)	4/9/2019	7.2	4.02	low	very low	low
Orsi Organic Produce	4/1/2019	5.7	6.63	medium	medium	low
Farragut Farm	4/28/2019	6.3	9.64	very high	low	very high

Fall soil samples, 2019 for 4 fa	rms growing 3 vari	eties of rhubarb				-FALL -
	Soil sample		Organic Matter	Nitrogen	Phosphorus	Potassium
Farm Name	date	рН	%	ppm	ppm	ppm
4 Winds Farm	10/15/2019 ¹⁾	5.9	18.94	30.4	98	75
RootSeller Farm (N, S, & C beds combined)	10/5/2019 ¹⁾	7.2	16.09	7.6	195	243
Orsi Organic Produce	11/16/2019 ¹⁾	6.4	7.49	5.2	234	214
Farragut Farm	10/1/2019 ²⁾	6.7	9.85	9.0	58	169
Fall soil samples, 2019 for 4 far	rms growing 3 vari	eties of rhubarb				
	Soil sample		Organic Matter	Nitrogen	Phosphorus	Potassium
Farm Name	date	рН	%	ppm	ppm	ppm
4 Winds Farm	10/15/2019	5.9	18.94	high	medium	low/very low
RootSeller Farm (N, S, & C beds combined)	10/5/2019	7.2	16.09	low/very low	high	medium
Orsi Organic Produce	10/1/2019	6.4	7.49	very low	very high	medium
	, .		_		, ,	
Farragut Farm	11/16/2019	6.7	9.85	(low/very low)	low	medium

Rhubarb Questionnaire Results (n=59):

- 1) Most growers grow for home use (81%)
- 2) Home growers typically grow an avg of 5-25 lbs
- 3) Commercial growers average 85 lbs with a range of 5-100
- 4) Rhubarb is only for sale in larger communities
- 5) All buyers preferred red to green stems, fresh then frozen chunks
- 6) Most buyers bought less than 5 lbs once per year
- 7) Farmer's markets and local grocers provided most sales
- 8) Consumers typically paid between \$3-\$4/ lb with a range of \$2-\$5/lb
- 9) More people would pay 15-20% more for chemical/pesticide free than locally grown or Alaska grown at 10-15% more
- 10) No preference on stem color among retailers, with variable demand, price/lb, amount purchased, and preference for chem free/local/Ak grown

Rhubarb Questionnaire >>>SHAMELESS PLUG<<<

...Available on the Master Gardener's Website & Zoom chat...



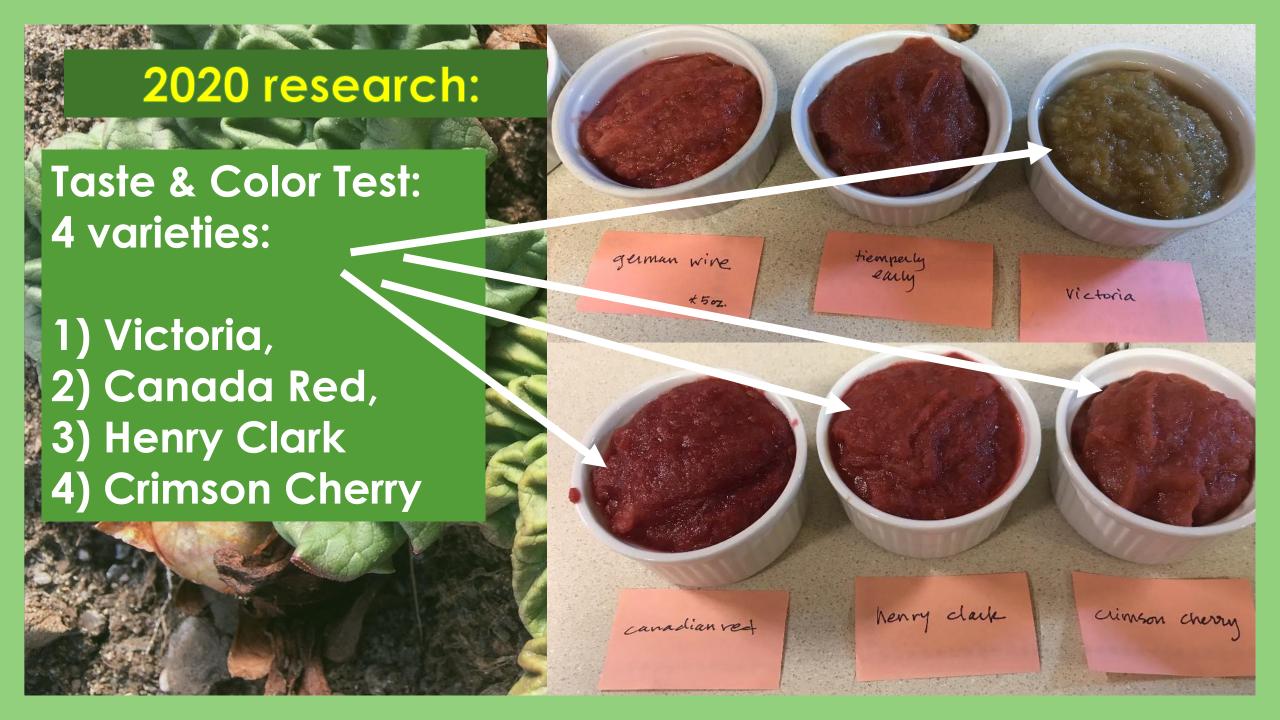
Rhubarb Retail Preference Questionnaire

Please answer all questions that apply whether you are a home grower or commercial grower, a consumer or resale business. Please provide your name, e-mail contact information, and today's date below (all information will be kept confidential and is voluntary):

Name:	Date
Email address:	_
1) What Southeast Alaska community/town do you live in?	
2) Is there locally produced rhubarb available for sale in your SouYesNo	theast community?
3) Do you grow rhubarb?YesNo	
4) If you grow rhubarb, are you a home gardener or comme	rcial grower?
5) How much rhubarb (pounds of stems) do you grow each year? less than 5 lbs 5-25 lbs 26-100 lbs	
5) If you purchase rhubarb, are you a consumer, or a groc	er/resale business
a) When purchasing, do you prefer green stems, red ste b) When purchasing, is flavor important?Yes	
 What product type do you prefer to use? Rank the following or nighest to 4 lowest) fresh stems frozen chunks 	
3) How much rhubarb do you purchase each year? (check one be	elow)

	2 lb 3 lb 4 lb	5 lbs or more	
10) How often d	o you purchase rhubarb f	or home use per year?	(check one below)
1 time	2-5 times	6-10 times	over 10 times per yea
11) Where do yo	u typically purchase rhub	arb in your Southeast	community? (check all that
	ace2 nd Saturday N		permarket Salt & Soil au) Southeast Annual
12) If you are a g	rocer/resale business, wh	nere do you obtain you	ur rhubarb from? (check all th
A local Sout	heast Alaska producer	From the lower 4	8From another area is
Alaska other tha	n Southeast		
43) 11			took oo a totood
•	o you typically spend on i		
<\$2/16 _	\$2-3/10 \$3-4	1/IB \$4-5/IB	\$5-6/lb>\$6/
	ng to pay more for Alaska		
	ng to pay more for locally	-	
	ng to pay more for rhuba	_	use of chemical fertilizers,
	ides, and herbicides,?	YesNo If so, I	now much more?
16) Are you willing		_	-

Project Title: Growth, Production and Preliminary Market Preferences for Unique and Flavorful Rhubarb Cultivars



Taste Descriptions, Color Choices, pH, Brix of 4 cultivars

-inted T

Acerbic is anything sour, bitter or opposite flavor would be mild, sw Acid or Acidic food can be sharp Acrid taste can be considered p

bitter, vitriolic, mordant, tren
Aftertaste is the trace, hint,
Ambrosia is the food of the
gastronomical delight, som

Appealing food is attract
glamorous. It is never re
Appetizing is everythin

repulsive, unappetizi

Astringent is biting

gentle.

Biting taste mea balmy, or sooth

Bitter is acrid

Brackish me

opposite :

Fruity wine

Harsh, unpleasant to the taste, abrasive, coarse, acerbic, astringent, biting, bitter, caustic, cutting, dry, mordant, nasty, sharp, stinging, vitriolic. Definitely not smooth. Honey, honeyed and let us say sweet, sugar, sweetened, sugarcoated, syrupy, candied. Never harsh, acerbic $\textbf{Juicy food is succulent, luscious, thirst quenching, moist, ripe, usually flavorful, many times fascinating. Dry$ and bland don't apply. Lush would be a rich, lavish, opulent meal; sumptuous, luxurious, certainly abundant. You would not be presented with sparse food, a scanty meal or a thin plate. $\textbf{Mellow flavor is smooth, rich, full, soft, or melodious; usually a pleasant, fully developed flavor reached after the property of the prop$ an adequate aging period. In this sense of matured, softened, developed flavor, is often used when writing about cheese or wine. But it could be used perfectly for preserved or canned food, or to describe a particularly rich dish. Mellow is opposite to harsh. Pungent can be seen as strong, spicy, hot, heady, overpowering, sharp, biting, a penetrating taste or smell; or you could take it by the forceful, biting, cutting, caustic, acerbic side. Forget about bland or mild Rancid food is bad, stale, rotten, completely off, the opposite of fresh food. Rank means pungent but in the fetid, smelly, foul, stale, rancid, definitely bad way, offensive to the smell or Rich food is full, heavy, dripping, full-bodied, robust; a rich table is plentiful, abundant, loaded, ample, copious, stuffed. None of them is lacking or plain. Saccharine is another way to say sugary, syrupy, maybe treadly; certainly it's overly sweet and opposite to Saline or salty could almost be used without distinction or they could be substituted by briny or brackish because both contain salt. Salty food is sure to be savory. Remember, salty is one of the basic tastes.

See is another way to say medium dry, un-sweet. This word is borrowed from wine world.

Sharp incisive, harsh, sour, tangy, acid, pungent, tart, bitter, it could be acerbic or astringent, not bland.

Sour is one of the basic tastes. It is acid, lemon-like or vinegary, tart, bitter, acerbic. Sour food has a sharp

biting taste and, certainly, is not sweet



Preliminary Report for 2019...Final will be available 2021

Project Title: Growth, Production, and Preliminary Market Preferences for Unique and Flavorful Rhubarb Cultivars grown in Southeast Alaska: 2019 results and 2020 study plan.



Study Participants from four Southeast Alaska farms. From top left clockwise: Colleen McGuire, farm foreman of Four Winds Farm (Haines), David and Nikki Love of RootSeller Farm (Gustavus), Bo Varsano of Farragut Farm (Petersburg), and Joe Orsi of Orsi Organic Produce (Juneau)

Forced Rhubarb, January/February



Hot House Rhubarb: February/March









Useful Websites for Rhubarb:

https://www.uaf.edu/ces/districts/juneau/ UAF Cooperative Extension

https://alaskamastergardener.community.uaf.edu/ Master Gardeners Blog

https://s3.wp.wsu.edu/uploads/sites/2076/2017/06/C119-Rhubarb-15.pdf Washington State

University

https://extension.umn.edu/vegetables/growing-rhubarb University of Minnesota Extension

https://wimastergardener.org/article/rhubarb-rheum-rhabarbarum/ University of Wisconsin-Madison

https://extension.umaine.edu/publications/2514e/ University of Maine

https://www.rhubarbinfo.com/ Rhubarb Compendium

https://www.rhubarb-central.com/ Rhubarb Central

https://en.wikipedia.org/wiki/Rhubarb Wikipedia

Raspberry-Rhubarb Crisp

Total Time

Yield

1 Hour 30 Mins

Makes 6 to 8 servings

By CAROLYN WEIL, SAN FRANCISCO, CALIFORNIA July 2002

SUNSET

The irresistible buttery, spiced oat topping and perfect balance of sweet to tart in the fruity filling make this a recipe we reach for every summer. Carolyn Beth Weil, author of Williams-Sonoma Pie & Tart (Simon & Schuster, 2003), created it for Sunset years

QUESTIONS?

1/2 cup all-purpose flour

1/2 cup finely chopped walnuts (2 1/2 oz.)

1/2 cup packed light brown sugar

1/2 teaspoon ground cinnamon

1/2 teaspoon ground ginger

1/8 teaspoon salt

1/2 cup (1/4 lb.) cold butter, cut into chunks

3/4 cup granulated sugar

2 tablespoons cornstarch

1 qt. raspberries, rinsed and drained (18 oz.)

3 cups sliced rhubarb (cut ½ in. thick; about 12 oz.)

ow to Make It

ep 1 Preheat oven to 350°. Combine oats, flour, walnuts, brown sugar, cinnamon, ginger, and salt in a large bowl. With your fingers, rub butter into oat mixture until blended and coarse lumps form. Cover and chill.

Step 2 Combine granulated sugar and cornstarch in another large bowl. Add raspberries and rhubarb and toss gently to combine with cornstarch mixture. Pour into a shallow 2- to 3-qt. baking dish and sprinkle evenly with topping.

Step 3 Bake crisp until topping is golden brown and fruit is bubbling, about 45 minutes. Serve warm or at room temperature, with ice cream.

Chef's Notes

Make ahead: The topping, up to 1 day, chilled airtight.

https://www.myrecipes.com/recipe/raspberry-rhubarb-crisp

