Kootenay Local Agricultural Society

2011
Vegetable
Growing Guide for the Kootenays

List of Vegetables covered

	Common name	Scientific name	Cross reference
A	Amaranth (Grain)	Amaranthus cruentus	
	Amaranth (Vegetable)	Amaranthus tricolor	
	Armenian cucumber	Cucumis melo Flexuosus group	
	Artichoke	Cynara cardunculus C. scolymus	
	Arugula	Eruca sativa	
	Asparagus	Asparagus officinalis	
	Aubergine	*Solanum melongena*	*See Eggplant*
B	Bean - Azuki	Vigna angularis	
	Bean - Broad	*Vicia faba*	*See Bean - Fava*
	Bean - Bush	Phaseolus vulgaris	
	Bean - Climbing	*Phaseolus vulgaris*	*See Bean - Pole*
	Bean - Dwarf	*Phaseolus vulgaris*	*See Bean - Bush*
	Bean - Fava	Vicia faba	
	Bean - Green	*Phaseolus vulgaris*	*See Bean - Bush*
	Bean - Lima	Phaseolus lunatus	
	Bean - Mung	Vigna radiata	
	Bean - Pole	Phaseolus vulgaris	
	Bean - Runner	Phaseolus coccineus	
	Bean - Soy	Glycine max	
	Bean - Winged	Psophocarpus tetragonolobus	
	Bean - Yardlong	Vigna unguiculata subsp. sesquipedalis	
	Beet greens	*Beta vulgaris subsp. vulgaris*	*See Beetroot*
	Beetroot	Beta vulgaris subsp. vulgaris	
	Bell pepper	Capsicum annuum	
	Bitter melon	Momordica charantia	
	Bok choy	Brassica rapa Chinensis group	
	Broccoli	Brassica oleracea	
	Broccoli Rabe	Brassica rapa subsp. rapa	
	Brussels sprout	Brassica oleracea Gemmifera group	
	Burdock	Arctium lappa	
C	Cabbage - Fall	Brassica oleracea Capitata group	
	Cabbage - Red	Brassica oleracea Capitata group	
	Cabbage - Savoy	Brassica oleracea Capitata group	
	Cabbage - Summer	Brassica oleracea Capitata group	
	Cabbage - Winter storage	Brassica oleracea Capitata group	
	Calabrese	*Brassica oleracea*	*See Broccoli*
	Cape Gooseberry	Physalis peruviana	
	Capsicum	*Capsicum annuum*	*See Sweet Pepper*
	Cardoon	Cynara cardunculus	
	Carrot	Daucus carota	
	Cauliflower	Brassica oleracea	
	Cayenne pepper	*Capsicum frutescens*	*See Sweet Pepper*

	Common name	Scientific name	Cross reference
C	Celeriac	Apium graveolens var. rapaceum	
	Celery	Apium graveolens	
	Celtuce	Lactuca sativa var. asparagina	
	Ceylon spinach	Basella alba	
	Chard	Beta vulgaris var. cicla	
	Chickpea	Cicer arietinum	
	Chicory	Cichorium intybus	
	Chili pepper	*Capsicum annuum Longum group*	*See Sweet Pepper*
	Chinese artichoke	Stachys affinis	
	Chinese cabbage	Brassica rapa Pekinensis group	
	Chinese Mallow	Malva verticillata	
	Chrysanthemum leaves	Chrysanthemum coronarium	
	Collard greens	Brassica oleracea	
	Corn	*Zea mays*	*see Sweet corn*
	Corn salad	Valerianella locusta	
	Courgette	*Cucurbita pepo*	*see Zucchini*
	Cress	Lepidium sativum	
	Cucumber	Cucumis sativus	
D	Daikon	Raphanus sativus Longipinnatus group	
	Dandelion	Taraxacum officinale	
E	Eggplant	Solanum melongena	
	Elephant Garlic	Allium ampeloprasum var. ampeloprasum	
	Endive	Cichorium endivia	
F	Florence fennel	Foeniculum vulgare var. dulce	
G	Garden Rocket	Eruca sativa	
	Garlic	Allium sativum	
	Good King Henry	Chenopodium bonus-henricus	
H	Hamburg parsley	Petroselinum crispum var. tuberosum	
J	Jerusalem artichoke	Helianthus tuberosus	
K	Kai-lan	Brassica rapa Alboglabra group	
	Kale	Brassica oleracea Acephala group	
	Kohlrabi	Brassica oleracea Gongylodes group	
	Komatsuna	Brassica rapa Pervidis or Komatsuna group	
L	Land cress	Barbarea verna	
	Leek	Allium porrum	
	Lentil	Lens culinaris	
	Lettuce - Head	Lactuca sativa	
	Lettuce - Leaf	Lactuca sativa	
	Lettuce - Romaine	Lactuca sativa	
	Lettuce -Butterhead	Lactuca sativa	
	Luffa	Luffa acutangula Luffa aegyptiaca	
M	*Maize*	*Zea mays*	*see Sweet corn*

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	Common name	Scientific name	Cross reference
M	*Marrow*	*Cucurbita pepo*	*see Zucchini*
	Mizuna greens	Brassica rapa Nipposinica group	
	Mustard	Sinapis alba	
	Mustard - Green	*Sinapis alba*	*See Mustard*
	Mustard - Japanese	*Sinapis alba*	*See Mustard*
	Mustard - Osaka	*Sinapis alba*	*See Mustard*
	Mustard - Red	*Sinapis alba*	*See Mustard*
N	New Zealand Spinach	Tetragonia tetragonioides	
O	Okra	Abelmoschus esculentus	
	Onion	Allium cepa	
	Onion - Bunching	*Allium fistulosum*	*See onion - Salad*
	Onion - Green	*Allium cepa*	*See Onion*
	Onion - Salad	*Allium fistulosum*	
	Orach	Atriplex hortensis	
P	Pac choy	Brassica rapa Chinensis group	
	Parsnip	Pastinaca sativa	
	Pea - Asparagus	Tetragonolobus purpurea	
	Pea - Black-eyed	Vigna unguiculata subsp. unguiculata	
	Pea - English	Pisum sativum	
	Pea - Pod	*Pisum sativum*	*See Pea - English*
	Pea - Snap	*Pisum sativum*	*See Pea - English*
	Pea - Sprouts/leaves	*Pisum sativum*	*See Pea - English*
	Peanut	Arachis hypogaea	
	Potato	Solanum tuberosum	
	Pumpkin	Cucurbita maxima	
R	Radicchio	Cichorium intybus	
	Radish	Raphanus sativus	
	Rutabaga	Brassica napus Napobrassica group	
S	Salsify	Tragopogon porrifolius	
	Scorzonera	Scorzonera hispanica	
	Sea beet	Beta vulgaris subsp. maritima	
	Seakale	Crambe maritima	
	Shallot	Allium cepa Aggregatum group	
	Skirret	Sium sisarum	
	Snake gourd	Trichosanthes cucumerina	
	Sorrel	Rumex acetosa	
	Spinach	Spinacia oleracea	
	Squash - Acorn	*Cucurbita pepo*	*see Squash - Winter*
	Squash - Butternut	*Cucurbita pepo*	*see Squash - Winter*
	Squash - Patty pan	*Cucurbita pepo*	*see Zucchini*
	Squash - Summer	*Cucurbita pepo*	*see Zucchini*
	Squash - Winter	*Cucurbita pepo*	
S	*Squash blossoms*	*Cucurbita spp.*	*see Zucchini*
	Swede	*Brassica napus Napobrassica group*	*See Rutabaga*
	Sweet corn	Zea mays	
	Sweet pepper	Capsicum annuum Grossum group	
	Sweet Potato	Ipomoea batatas	
	Swiss chard	*Beta vulgaris subsp. cicla var. flavescens*	*See Chard*
T	Tatsoi	Brassica rapa Rosularis group	
	Tomatillo	Physalis philadelphica	
T	Tomato	Lycopersicon esculentum var	
	Turnip	Brassica rapa Rapifera group	
	Turnip greens	*Brassica rapa Rapifera group*	*See Turnip*
W	Watercress	Nasturtium officinale	
	Welsh onion	Allium fistulosum	
	West Indian gherkin	Cucumis anguria	
	Winter melon	Benincasa hispida	
Z	Zucchini	Cucurbita pepo	

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Growing in the Kootenays - Explanation of the growing chart

Explanation of Frost Free Dates:
The approximate LAST and FIRST frost dates are an average, taken over the last 10 years. It is important to note that in a given area, local topography , elevation and weather will effect these dates. Because these are average dates - there is still a chance of having frosts during the frost free period.

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month / Day	Feb 06	Feb 13	Feb 20	Feb 27	Mar 06	Mar 13	Mar 20	Mar 27	Apr 03	Apr 10	Apr 17	Apr 24	May 01	May 08	May 15	May 22	May 29
Daikon																	
Grow in Greenhouse X																	
Grow outside under row cover															S	S	S
Grow outside																	S
Dandelion - Italian																	
Grow in Greenhouse					O	O	O	O	T	T	T	T		H	H	H	H
Grow outside under row cover								O	O	O	O	T	T	T	T		H
Grow outside											O	O	O	O	T	T	T
Eggplant																	
Grow in Greenhouse			O	O	O	O							T	T	T	T	
ver				O	O									T	T		
							O	O									T

Month / Day	Jun 05	Jun 12	Jun 19	Jun 26	Jul 03	Jul 10	Jul 17	Jul 24	Jul 31	Aug 07	Aug 14	Aug 21	Aug 28
Daikon													
Grow in Greenhouse X													
Grow outside under row cover	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	H	H
Grow outside	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H
Dandelion - Italian													
Grow in Greenhouse	H	H	H	H	H	H	Note 1						
Grow outside under row cover	H	H	H	H	H	H	H	H	H	H	H	H	H
Grow outside	T		H	H	H	H	H	H	H	H	H	H	H
Eggplant													
Grow in Greenhouse						H	H	H	H	H	H	H	H
ver							H	H	H	H	H	H	H
	T												

Month / Day	Sep 04	Sep 11	Sep 18	Sep 25	Oct 02	Oct 09	Oct 16	Oct 23	Oct 30	Nov 06	Nov 13	Nov 20	Nov 27	Dec 04	Dec 11	Dec 18	Dec 25
Daikon																	
Grow in Greenhouse X																	
Grow outside under row cover	H	H	H	H	H												
Grow outside	H	H	H	H	H	H	H										
Dandelion - Italian																	
Grow in Greenhouse																	
Grow outside under row cover	H	H	H	H	H	H											
Grow outside	H	H	H	H	H	H	H										
Eggplant																	
Grow in Greenhouse	H	H	H	H	*H*	*H*	*H*										
ver	H	H	H	H	*H*	*H*	*H*										

Note 1: Will be too hot in the greenhouse to continue harvesting.

Notes:
Special notes relating to a specific crop will be shown as above. Crop specific notes relating to growing in the area will be shown on the notes page on the main menu.

Explanation of symbols:
O Sow in seed trays, plug packs or pots
S Sow directly into the prepared ground
T Transplant to garden or field when plants are a suitable size
H Harvest produce - Timing is based on having had reasonable weather
H Crops would not normally be harvestable due to insufficient light to maintain growth
X We do not recommend that plants are grown in this manner, They would not be expected to produce a crop.

Extended frost free period in Greenhouse or under row covers
A greenhouse will extend the season by about 6 weeks at the beginning of the season and about 4 weeks at the end of the season - assuming normal / average weather.
Row covers can extend the season by about 3 weeks at either end of the season . They provide about 5 degrees C protection from frost. However, on very hot days, the temperature under the covers can rise quickly, so vigilance is required.

How to read the table:
O S The first **O** or **S** denotes when the first seeding should be made. There is always one **T** for each weekly O seeding date.
If you use the first **O** seeding date, then your transplanting week will be the first **T**, if you use the second **O** seeding date, then your transplanting week will be the second **T**, and so on.
Delaying transplanting beyond the period shown will result in poor or stunted plants and reduced harvests.
Your first expected harvest week **H** will also vary according to the **O** or **S** seeding date and the **T** transplanting date.

Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

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Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16); Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Amaranth (Grain)																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																		S	S	S	S															H	H	H										
Amaranth (Vegetable)																																																
Grow in Greenhouse														S	S	S	S			H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H											
Grow outside under row cover																S	S	S	S			H	H	H	H	H	H	H	H	H	H	H	H	H	H	H												
Grow outside																		S	S	S	S				H	H	H	H	H	H	H	H	H	H	H													
Armenian Cucumber																																																
Grow in Greenhouse										O	O	O	O T	O T	T	T	T					H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*												
Grow outside under row cover													O	O	O	O T	O T	T	T	T					H	H	H	H	H	H	H	H	H	H														
Grow outside																O	O	O	O T	O T	T	T	T					H	H	H	H	H	H															
Artichoke																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside						O	O	O								T	T	T											H	H	H	H	H	H	H													

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Frost Free Period - 15th May to 15th October

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Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Arugula																																																
Grow in Greenhouse										S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H								
Grow outside under row cover													S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H									
Grow outside						H	H	H								S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S								
Asparagus																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside	Sow 10th Jan										Year 3			Year 1 H	H	T H	T H	T H	H	H	H	H																										
Bean - Azuki																																																
Grow in Greenhouse												S	S	S	S	S													H	H	H	H	H	H	H	H	H	H	H	H								
Grow outside under row cover															S	S	S	S	S												H	H	H	H	H	H	H	H	H								
Grow outside																	S	S	S	S	S													H	H	H	H	H	H	H								
Bean - Bush																																																
Grow in Greenhouse												S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H										
Grow outside under row cover															S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H										
Grow outside																	S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

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Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Bean - Fava																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside												S	S	S	S	S	S						H	H	H	H	H	H	H	H																		
Bean - Lima																																																
Grow in Greenhouse											S	S	S	S	S	S	S	S	S	S	S	S	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H											
Grow outside under row cover													S	S	S	S	S	S	S	S	S	S	S	S	H	H	H	H	H	H	H	H	H	H	H	H	H											
Grow outside																S	S	S	S	S	S	S	S					H	H	H	H	H	H	H	H	H	H											
Bean - Mung																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																	S	S	S	S														H	H	H	H	H										
Bean - Pole																																																
Grow in Greenhouse							O	O	O		T	T	T								H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H									
Grow outside under row cover	X																																															
Grow outside																S	S	S	S								H	H	H	H	H	H	H	H	H	H	H	H										

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Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 06)

		Febuary				March				April				May					June				July					August				September				October					November				December				Month
		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	Day
Bean - Runner																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside																S	S	S	S										H	H	H	H	H	H	H	H	H	H											
Bean - Soy																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside																S	S	S	S	S												H	H	H	H	H	H	H											
Bean - Winged																																																	
Grow in Greenhouse																					S	S												H	H	H	H	H	H	H									
Grow outside under row cover	X																																																
Grow outside	X																																																
Bean - Yardlong																																																	
Grow in Greenhouse																		O	O			T	T											H	H	H	H	H	H	H									
Grow outside under row cover	X																																																
Grow outside	X																																																

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Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Beetroot																																															
Grow in Greenhouse									S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H	H						
Grow outside under row cover												S	S	S						H	H	H	H	H																							
Grow outside													S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H	H						
Bell pepper																																															
Grow in Greenhouse							O	O	O	O	O T	O T	O T	O T	T	T	T	T	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*										
Grow outside under row cover										O	O	O	O	O T	O T	O T	O T	T	T	T	T	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*										
Grow outside													O	O	O		T	T	T						H	H	H	H	H	H	H	H	H	H	H	*H*	*H*										
Bitter melon																																															
Grow in Greenhouse									O	O				T	T									H	H	H	H	H	H	H	H	H	H	H	H												
Grow outside under row cover												O	O				T	T									H	H	H	H	H	H	H	H	H												
Grow outside															O	O				T	T									H	H	H	H	H	H												
Bok choy																																															
Grow in Greenhouse							O	O	O	O	O T	O T	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	H	H	H	H	H						
Grow outside under row cover										O	O	O	O	O T	O T	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	T H	H	H	H	H							
Grow outside													O	O	O	O	O T	O T	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	T H	H	H	H	H									

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May				
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29
Broccoli																		
Grow in Greenhouse	X																	
Grow outside under row cover					O	O	O	O					T	T	T	T		
Grow outside									O	O	O	O					T	T
Broccoli Rabe																		
Grow in Greenhouse										S	S	S	S	S	S	S H	S H	S H
Grow outside under row cover													S	S	S	S	S	S
Grow outside																S	S	S
Brussels sprouts																		
Grow in Greenhouse	X																	
Grow outside under row cover	X									O	O	O	O	O	O	O	O	T
Grow outside																		
Burdock																		
Grow in Greenhouse	X																	
Grow outside under row cover	X																	
Grow outside																S	S	S

Month	June				July					August			
Day	05	12	19	26	03	10	17	24	31	07	14	21	28
Broccoli													
Grow in Greenhouse													
Grow outside under row cover					H	H	H	H					
Grow outside	T	O T	O	O	O				H	T H	T H	T H	T
Broccoli Rabe													
Grow in Greenhouse	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H
Grow outside under row cover	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H
Grow outside	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H
Brussels sprouts													
Grow in Greenhouse													
Grow outside under row cover	T	T	T	T	T	T	T						
Grow outside													
Burdock													
Grow in Greenhouse													
Grow outside under row cover													
Grow outside													

Month	September				October					November				December			
Day	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Broccoli																	
Grow in Greenhouse																	
Grow outside under row cover																	
Grow outside							H	H	H	H							
Broccoli Rabe																	
Grow in Greenhouse	S H	S H	S H	S H	H	H	H	H	H	H	H						
Grow outside under row cover	S H	S H	S H	H	H	H	H	H	H	H							
Grow outside	H	H	H	H	H	H	H										
Brussels sprouts																	
Grow in Greenhouse																	
Grow outside under row cover							H	H	H	H	H	H	H	H			
Grow outside																	
Burdock																	
Grow in Greenhouse																	
Grow outside under row cover																	
Grow outside							H	H	H	H	H	H	H	H			

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight: Febuary 20 – November 06

Frost Free Period: May 15 – October 09

Extended frost free Period under row cover or greenhouse: April 03 – November 20

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Cabbage - Fall																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T							H	H	H	H	H	H	H	H	H	H							
Cabbage - Red																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T	H	H	H	H	H	H	H	H	H	H	H	H											
Cabbage - Savoy																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T			H	H	H	H	H	H	H	H	H	H	H	H									
Cabbage - Summer																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T	H	H	H	H	H	H	H	H	H	H													

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

O Sow in seed trays
S Direct sow seed
T Transplant
H Harvest
H May not be enough light to harvest
X Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Cabbage - Winter storage																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T							H	H	H	H	H	H	H	H	H	H	H	H					
Cape Gooseberry																																																
Grow in Greenhouse		O	O	O	O					T	T	T	T								H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*						
Grow outside under row cover					O	O	O	O					T	T	T	T								H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*							
Grow outside								O	O	O	O					T	T	T	T								H	H	H	H	H	H	H	H	H	H	H	H										
Cardoon																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside									O	O	O					T	T	T																	H	H	H	H										
Carrot																																																
Grow in Greenhouse		H	H	H	H	H	H	H		S	S	S	S	S	S			H	H	H	H	H	H	H	H	H						S	S	S	S	S	S	S	S	S	S	S H	H	H	H	H	H	H
Grow outside under row cover													S	S	S	S	S	S			H	H	H	H	H	H	H	H	H																			
Grow outside														S	S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H	H						

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 09)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month		Febuary				March				April				May					June			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26
Cauliflower																						
Grow in Greenhouse	X																					
Grow outside under row cover	X																					
Grow outside														O	O	O	O	O	O T	O T	O T	O T
Celeriac																						
Grow in Greenhouse	X																					
Grow outside under row cover	X																					
Grow outside							O	O	O	O	O	O						T	T	T	T	T
Celery																						
Grow in Greenhouse	X																					
Grow outside under row cover	X																					
Grow outside							O	O	O	O	O	O	O	O	O			T	T	T	T	T
Celtuce																						
Grow in Greenhouse		O	O	O	O	O				T	T	T	T	T								
Grow outside under row cover					O	O	O	O	O				T	T	T	T	T					
Grow outside								O	O	O	O	O				T	T	T	T	T		

Month	July					August				September				October					November				December			
Day	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Cauliflower																										
Grow in Greenhouse																										
Grow outside under row cover																										
Grow outside	O T	T	T	T	T	T	H	H	H	H	H	H	H	H	H	H										
Celeriac																										
Grow in Greenhouse																										
Grow outside under row cover																										
Grow outside	T										H	H	H	H	H	H										
Celery																										
Grow in Greenhouse																										
Grow outside under row cover																										
Grow outside	T	T	T	T				H	H	H	H	H	H	H	H	H										
Celtuce																										
Grow in Greenhouse	H	H	H	H	H	H	H	H																		
Grow outside under row cover				H	H	H	H	H	H	H	H															
Grow outside							H	H	H	H	H	H	H	H												

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight: Febuary 20 – October 30

Frost Free Period: May 15 – October 09

Extended frost free Period under row cover or greenhouse: April 03 – November 13

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Ceylon Spinach																																																
Grow in Greenhouse											O	O	O					T	T	T							H	H	H	H	H	H																
Grow outside under row cover											O	O	O					T	T	T							H	H	H	H	H	H																
Grow outside											O	O	O					T	T	T							H	H	H	H	H	H																
Chard																																																
Grow in Greenhouse					O	O	O	O				T	T	T	T						H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*						
Grow outside under row cover							O	O	O	O				T	T	T	T						H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*							
Grow outside									O	O	O	O				T	T	T	T						H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*								
Chickpea																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside														S	S														H	H	H	H																
Chicory																																																
Grow in Greenhouse		O	O	O	O	O					T	T	T	T	T		H	H	H	H	H	H	O	O	O	O						T	T	T	T				H	H	H	H						
Grow outside under row cover				O	O	O	O	O					T	T	T	T	T		H	H	H	O H	O H	O H	O						T	T	T	T				H	H	H	H							
Grow outside							O	O	O	O	O					T	T	T	O T	O T	O	O H	H	H	H	H	H	T	T	T	T				H	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Chinese Artichoke																																															
Grow in Greenhouse								S	Pots only																																	H	H	H			
Grow outside under row cover								S	Pots only																																	H	H	H			
Grow outside								S	Pots only																																	H	H	H			
Cninese Mallow																																															
Grow in Greenhouse							O	O	O	O	T	T	T	T					H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*						
Grow outside under row cover										O	O	O	O	T	T	T	T					H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*							
Grow outside													S	S	S	S							H	H	H	H	H	H	H	H	H	H	H	H	H	H	H										
Chrysanthemum leaves																																															
Grow in Greenhouse									S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	*H*	*H*	*H*	*H*						
Grow outside under row cover												S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	*H*	*H*	*H*							
Grow outside															S	S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H										
Collard Greens																																															
Grow in Greenhouse X																																															
Grow outside under row cover X																																															
Grow outside										O	O	O	O	O	T	T	T	T	T				H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*							

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Crop	Month	Febuary				March				April				May					June				July					August				September				October					November				December			
	Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Corn Salad	Grow in Greenhouse		H	H	H	H	H																									S	S	S	S	S	S	S	S	S					H	H	H	H
	Grow outside under row cover (X)																																															
	Grow outside				H	H	H	H	H	H																											S	S	S	S	S	S						
Cress	Grow in Greenhouse									S	S	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	*H*	*H*	*H*	*H*						
	Grow outside under row cover												S	S	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	*H*	*H*	*H*							
	Grow outside															S	S	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	S / H	H	H	H										
Cucumber	Grow in Greenhouse						O	O	O		T	T	T					H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*											
	Grow outside under row cover									O	O	O		T	T	T						H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*											
	Grow outside												O	O	O		T	T	T					H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*	*H*											
Daikon	Grow in Greenhouse (X)																																															
	Grow outside under row cover															S	S	S	S	S	S	S	S / H	S / H	S / H	S / H	S / H	S / H	S / H	H	H	H	H	H	H	H												
	Grow outside																	S	S	S	S	S	S	S	S / H	S / H	S / H	S / H	S / H	S / H	S / H	H	H	H	H	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight: Febuary 20 – October 30

Frost Free Period: May 15 – October 09

Extended frost free Period under row cover or greenhouse: April 03 – May 08 and October 16 – November 13

	Febuary				March				April				May					June				July					August				September				October					November				December				Month
	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	Day
Dandelion - Italian																																																
Grow in Greenhouse					O	O	O	O	T	T	T	T		H	H	H	H	H	H	H	H	H	H	Note 1																								
Grow outside under row cover								O	O	O	O	T	T	T	T		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H											
Grow outside											O	O	O	O	T	T	T	T		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H											
Note 1: Will be too hot in the greenhouse to continue harvesting.																																																
Eggplant																																																
Grow in Greenhouse			O	O	O	O							T	T	T	T							H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*											
Grow outside under row cover				O	O									T	T									H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*											
Grow outside							O	O									T	T									H	H	H	H	H	H	H	H	*H*	*H*	*H*											
Elephant Garlic																																																
Grow in Greenhouse **X**																																																
Grow outside under row cover **X**																																																
Grow outside																												H	H	H	H									T	T	Plant before freeze up						
Endive																																																
Grow in Greenhouse					O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	*H*	*H*							
Grow outside under row cover								O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H	*H*								
Grow outside											O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T	O T	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H	H											

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 06)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Florence Fennel																																																
Grow in Greenhouse											O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T	O T	T H	T H	T H	T H	H	H	H	H	H	H	H	H	H												
Grow outside under row cover													O	O	O	O	O T	O T	O T	O T	O T	O T	O T	T	T	T H	T H	H	H	H	H	H	H	H	H	H												
Grow outside																S	S	S	S	S	S	S	S	S	S		H	H	H	H	H	H	H	H	H	H												
Garden Rocket																																																
Grow in Greenhouse										S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	*H*	*H*								
Grow outside under row cover													S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	*H*									
Grow outside						H	H	H								S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	*S* *H*	*S*								
Garlic																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																															H	H	H	H	H	H	H		*S*	*S*	*S*	*S*	*S*	*S*	*S*			
Good King Henry																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside														H	H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	*H*	*H*	*H*							

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Hamburg Parsley																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside													O	O	O	O	O	O	T	T	T	T	T	T												H	H	H	H	H	H	H						
Jerusalem Artichokes																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside		H	H	H	H	S H	S	S	S	S	S	S	S																				H	H	H	S H	S H	S H	*S* H	H	H	H	H	H	H	H	H	H
Land Cress																																																
Grow in Greenhouse										S	S	S	S	S	S	S	H	H	H	H	H	H	H	Note 1																								
Grow outside under row cover													S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	*H*	*H*	*H*							
Grow outside																S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	*H*	*H*								
Leek - Summer																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside							O	O	O	O	O	O T	T	T	T	T	T					H	H	H	H	H	H																					

Jerusalem Artichokes: Can be harvested for as long as the soil is workable - if left in the ground over winter can be harvested in the spring.

Land Cress: Note 1: Will be too hot in the greenhouse to continue harvesting.

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight: Feb 20 – Oct 30

Frost Free Period: May 15 – Oct 09

Extended frost free Period under row cover or greenhouse: Apr 03 – May 08 and Oct 16 – Nov 13

Leek - Fall / Winter

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside							O	O	O	O	O	O T	O T	O T	O T	O T	T	T	T	T	T											H	H	H	H	H	H	H	H	H	H	H	H					

Lentil

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																	S	S	S	S	S	Note 1						H	H	H	H	H																

Note 1: Ensure that the weather is stable and warm before planting.

Lettuce - Head

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse		O	O	O	O	O	O	O	O	O T	T	T	T	T	T	T	T		H	H	H	H	H	H	H	H	Note 1																					
Grow outside under row cover					O	O	O	O	O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	T H	T H	T H	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H	H							
Grow outside								O	O	O	O	O	O	O	O	O T	O T	O T	O T	O T	O T	T	T	T	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H	H										

Note 1: It will be to hot in the greenhouse in a normal year to harvest after this point.

Lettuce - Leaf

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse		O	O	O	O	O	O	O	O	O T	T	T	T	T	T	T	T	H	H	H	H	H	H	H	H	Note 1																						
Grow outside under row cover					O	O	O	O	O	O	O	O	O T	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	O T H	T H	T H	T H	T H	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H							
Grow outside								O	O	O	O	O	O	O	O	O T	O T	O T	O T	O T	O T	T	T	T	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H	H										

Note 1: It will be to hot in the greenhouse in a normal year to harvest after this point.

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 09)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Lettuce - Romaine

Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse	O	O	O	O	O	O	O	O	O																																						
									T	T	T	T	T	T	T	T																															
																		H	H	H	H	H	H	H	H	Note 1																					
Grow outside under row cover				O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O																								
												T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T																
																					H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H							
Grow outside							O	O	O	O	O	O	O	O	O	O	O	O	O	O																											
															T	T	T	T	T	T	T	T	T	T	T	T	T	T																			
																							H	H	H	H	H	H	H	H	H	H	H	H	H	H										

Note 1: It will be to hot in the greenhouse in a normal year to harvest after this point.

Lettuce - Butterhead

Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse	O	O	O	O	O	O	O	O	O																																						
									T	T	T	T	T	T	T	T																															
																		H	H	H	H	H	H	H	H	Note 1																					
Grow outside under row cover				O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O																								
												T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T																
																					H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H							
Grow outside							O	O	O	O	O	O	O	O	O	O	O	O	O	O																											
															T	T	T	T	T	T	T	T	T	T	T	T	T	T																			
																							H	H	H	H	H	H	H	H	H	H	H	H	H	H										

Note 1: It will be to hot in the greenhouse in a normal year to harvest after this point.

Luffa

Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse X																																															
Grow outside under row cover X																																															
Grow outside														O	O	O																															
																		T	T	T	Note 1																										
																										H	H	H	H	H																

Note 1: Ensure that the weather is stable and warm before transplanting.

Mizuna

Month	Febuary				March				April				May					June				July					August				September				October					November				December			
Day	06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Grow in Greenhouse						O	O	O	O	O	O	O	O											O	O	O	O	O	O	O	O																
									T	T	T	T	T	T	T	T											T	T	T	T	T	T	T	T													
																H	H	H	H	H	H	H	H											H	H	H	H	H	H	H	H						
Grow outside under row cover									O	O	O	O	O	O	O	O							O	O	O	O	O	O	O																		
												T	T	T	T	T	T	T	T								T	T	T	T	T	T	T														
																				H	H	H	H	H	H	H	H							H	H	H	H	H	H	H							
Grow outside												O	O	O	O	O																															
															T	T	T	T	T																												
																						H	H	H	H	H																				

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Mustard																																																
Grow in Greenhouse					O	O	O	O				T	T	T	T						H	O H	O H	O H	O H				T	T	T	T						H	H	H	H	H						
Grow outside under row cover						O	O	O	O				T	T	T	T				O	O	O H	O H	H	H	H	T	T	T	T						H	H	H	H	H	H							
Grow outside									O	O	O	O				T	T	T	T						H	H	H	H	H																			
New Zealand Spinach																																																
Grow in Greenhouse											O	O	O	O T	O T	O T	T	T	T				H	H	H	H	H	H	H	H	H	H	H	H														
Grow outside under row cover												O	O	O	O T	O T	O T	T	T	T				H	H	H	H	H	H	H	H	H	H															
Grow outside															O	O	O	T	T	T							H	H	H	H	H	H	H															
Okra																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																O	O	O	O	T	T	T	T					H	H	H	H	H	H															
Onion																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside					O	O	O	O	O	O				T	T	T	T	T	T							H	H	H	H	H	H	H	H	H	H	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

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O Sow in seed trays
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T Transplant
H Harvest
H May not be enough light to harvest
X Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month / Day		Feb 06	Feb 13	Feb 20	Feb 27	Mar 06	Mar 13	Mar 20	Mar 27	Apr 03	Apr 10	Apr 17	Apr 24	May 01	May 08	May 15	May 22	May 29	Jun 05	Jun 12	Jun 19	Jun 26
Onion - Salad																						
Grow in Greenhouse										S	S	S	S	S	S	S	S	S	S H	S H	S H	S H
Grow outside under row cover													S	S	S	S	S	S	S	S	S	S H
Grow outside																S	S	S	S	S	S	S
Orach																						
Grow in Greenhouse	X																					
Grow outside under row cover								O	O	O	O	O	O T	T	T	T	T	T	H	H	H	H
Grow outside																S	S	S	S			H
Pac Choi																						
Grow in Greenhouse										O	O	O	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	O T H
Grow outside under row cover													O	O	O	O T	O T	O T	O T	O T	O T	O T H
Grow outside																O	O	O	O T	O T	O T	O T
Parsnip																						
Grow in Greenhouse	X																					
Grow outside under row cover	X																					
Grow outside													S	S	S	S	S	S				

Month / Day	Jul 03	Jul 10	Jul 17	Jul 24	Jul 31	Aug 07	Aug 14	Aug 21	Aug 28	Sep 04	Sep 11	Sep 18	Sep 25	Oct 02	Oct 09	Oct 16	Oct 23	Oct 30	Nov 06	Nov 13	Nov 20	Nov 27	Dec 04	Dec 11	Dec 18	Dec 25
Onion - Salad																										
Grow in Greenhouse	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H						
Grow outside under row cover	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H							
Grow outside	S	S	S H	S H	S H	S H	S H	H	H	H	H	H	H	H	H	H										
Orach																										
Grow in Greenhouse																										
Grow outside under row cover	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H										
Grow outside	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H										
Pac Choi																										
Grow in Greenhouse	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	H	H	H	H	H	H						
Grow outside under row cover	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	H	H	H							
Grow outside	O T	O T	O T H	O T H	O T H	O T H	O T H	O T H	O T H	O T H	T H	T H	T H	H	H	H										
Parsnip																										
Grow in Greenhouse																										
Grow outside under row cover																										
Grow outside								H	H	H	H	H	H	H	H	H	H	H	H	H	H					

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

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- **O** Sow in seed trays
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- **H** Harvest
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Weeks of 10 hours or greater daylight: Feb 20 – Nov 06

Frost Free Period: May 15 – Oct 16

Extended frost free Period under row cover or greenhouse: Apr 03 – Nov 13

		Febuary				March				April				May					June				July					August				September				October					November				December				Month
		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	Day
Peas - Asparagus																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside											O	O	O	O	O	O T	T	T	T	T	T					H	H	H	H	H	H	H	H	H	H	H													
Pea - Black eyed																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside																S	S	S												H	H	H	H	H	H	H													
Peas - English																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside								S	S	S	S	S	S	S	S	H	H	H	H	H	H	H	S H	S	S	S	S Note 1	S	S	S	H	H	H	H	H	H	H	H											

Note 1: Very poor crops during this hot period.

		Febuary				March				April				May					June				July					August				September				October					November				December				Month
		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	Day
Peanut - Spanish																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover											O	O	O	O	T	T	T	T																		H	H	H	H										
Grow outside												O	O			T	T																				H	H											

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Frost Free Period - 15th May to 15th October

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- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month			Febuary				March				April			
Day			06	13	20	27	06	13	20	27	03	10	17	24
Potato	Grow in Greenhouse	X												
Potato	Grow outside under row cover										S	S	S	S
Potato	Grow outside													S
Pumpkin	Grow in Greenhouse	X												
Pumpkin	Grow outside under row cover										O	O	O	O
Pumpkin	Grow outside													O
Radicchio	Grow in Greenhouse		O	O	O	O	O	O	O	O	O T	T	T	T
Radicchio	Grow outside under row cover					O	O	O	O	O	O	O	O	O T
Radicchio	Grow outside								O	O	O	O	O	O
Radish	Grow in Greenhouse					S	S	S	S	S	S H	H	H	H
Radish	Grow outside under row cover								S	S	S	S	S	S H
Radish	Grow outside												S	S

Month		May					June				July				
Day		01	08	15	22	29	05	12	19	26	03	10	17	24	31
Potato	Grow in Greenhouse														
Potato	Grow outside under row cover	S	S	S	S	S	S	S H	S H	S H	H	H	H	H	H
Potato	Grow outside	S	S	S	S	S	S	S	S	S	S H	S H	S H	H	H
Pumpkin	Grow in Greenhouse														
Pumpkin	Grow outside under row cover	T	T	S T	S T	S	S							H	H
Pumpkin	Grow outside	O	O	O	T	T	S T	S T	S	S					
Radicchio	Grow in Greenhouse	T	T	T	T		H	H	H	H	H	H	H	H	Note 1
Radicchio	Grow outside under row cover	O T	O T	O T	O T	O T	O T	O T	O T	O T H	O T H	O T H	T H	T H	T H
Radicchio	Grow outside	O	O	O T	O T	O T	O T	O T	O T	T	T	T	T H	T H	T H
Radish	Grow in Greenhouse	H	H												
Radish	Grow outside under row cover	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H
Radish	Grow outside	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H

Month		August				September				October				
Day		07	14	21	28	04	11	18	25	02	09	16	23	30
Potato	Grow in Greenhouse													
Potato	Grow outside under row cover	H	H	H	H	H	H	H	H	H	H	H	H	H
Potato	Grow outside	H	H	H	H	H	H	H	H	H	H	H	H	H
Pumpkin	Grow in Greenhouse													
Pumpkin	Grow outside under row cover	H	H	H	H	H	H	H	H	H	H	H		
Pumpkin	Grow outside		H	H	H	H	H	H	H	H	H	H		
Radicchio	Grow in Greenhouse													
Radicchio	Grow outside under row cover	T H	T H	T H	T H	T H	H	H	H	H	H	H	H	H
Radicchio	Grow outside	T H	T H	H	H	H	H	H	H	H	H	H		
Radish	Grow in Greenhouse					S	S	S	S	S	S H	H	H	H
Radish	Grow outside under row cover	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H	H
Radish	Grow outside	S H	S H	S H	S H	S H	S H	H	H	H	H	H		

Month		November				December			
Day		06	13	20	27	04	11	18	25
Potato	Grow in Greenhouse								
Potato	Grow outside under row cover	H							
Potato	Grow outside	H							
Pumpkin	Grow in Greenhouse								
Pumpkin	Grow outside under row cover								
Pumpkin	Grow outside								
Radicchio	Grow in Greenhouse								
Radicchio	Grow outside under row cover	H							
Radicchio	Grow outside								
Radish	Grow in Greenhouse	H	H						
Radish	Grow outside under row cover	H							
Radish	Grow outside								

Note 1: It will be to hot in the greenhouse in a normal year to harvest after this point.

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight: Feb 20 – Oct 30

Frost Free Period: May 15 – Oct 16

Extended frost free Period under row cover or greenhouse: Apr 03 – Nov 13

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Rutabaga																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																					S	S	S	S	S									H	H	H	H	H	H	H	H							
Salsify																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																S	S	S	S	S	S												H	H	H	H	H	H										
Scorzonera																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																S	S	S	S	S	S	S	S	S	S	S	H	H	H	H	H	H	H	H	H	H	H	H										
Seabeet																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside										O	O	O	O		T	T	T	T				H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

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- **O** Sow in seed trays
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- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – May 08 and Oct 23 – Nov 13)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Seakale																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside								H	H	H	O H	O H	O H	O H	O H	O T H	T H	T Harvest the following spring	T	T	T																											
Shallot - Seed																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside											O	O	O	O	O	O T	O T	O T	O T	O T	O T	O T	T	T	T	T	T H	H	H	H	H	H	H	H	H	H	H	H										
Shallot - Set																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																S	S	S	S	S	S	S	S	S	S	S		H	H	H	H	H	H	H	H	H	H	H										
Skirret																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside								O	O	O	O					T	T	T	T														H	H	H	H												

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
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- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Snake gourd																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside															O	O			T	T									H	H	H	H	H	H														
Sorrel																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside												O	O	O	O	T	T	T	T							H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H						
Spinach																																																
Grow in Greenhouse			S	S	S	S				H	H	H	H	H	H	H	H	H	H	H									S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S *H*					
																																			These are sown to over winter												
Grow outside under row cover						S	S	S	S				H	H	H	H	H	H	H	H								S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S *H*						
																																	These are sown to over winter														
Grow outside									S	S	S	S			H	H	H	H	H	H							S	S	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S *H*							
																																	These are sown to over winter														
Squash - Butternut																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside												O	O	O	O	T	T	T	T												H	H	H	H														

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Frost Free Period - 15th May to 15th October

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- **O** Sow in seed trays
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- **H** Harvest
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Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 16)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Squash - Winter																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside												O	O	O	O	T	T	T	T									H	H	H	H	H	H	H														
Sweet corn																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside																	S	S	S	S	S	S							H	H	H	H	H	H	H	H	*H*											
Sweet pepper																																																
Grow in Greenhouse									O	O	O	O	T	T	T	T									H	H	H	H	H	H	H	H	H	H	H	*H*												
Grow outside under row cover												O	O	O	O	T	T	T	T									H	H	H	H	H	H	H	H	*H*												
Grow outside														O	O	O	O	T	T	T	T									H	H	H	H	H	H	*H*												
Sweet potato																																																
Grow in Greenhouse	X																																															
Grow outside under row cover																S	S	Grow from slips only																H	H	H	H											
Grow outside	X																																															

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight

Frost Free Period

Extended frost free Period under row cover or greenhouse

Month		Febuary				March				April				May				
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29
Tatsoi																		
Grow in Greenhouse									O	O	O	O T	O T	O T	O T	O T	T H	T H
Grow outside under row cover												O	O	O	O T	O T	O T	O T
Grow outside													O	O	O	O T	O T	O T
Tomatillo																		
Grow in Greenhouse	X						O	O	O	O		T	T	T	T			
Grow outside under row cover	X									O	O	O	O		T	T	T	T
Grow outside													O	O	O	O		T
Tomato																		
Grow in Greenhouse					O	O	O	O			T	T	T	T				
Grow outside under row cover								O	O	O	O			T	T	T	T	
Grow outside											O	O	O	O			T	T
Turnip																		
Grow in Greenhouse										S	S	S	S	S	S	S	S H	H
Grow outside under row cover													S	S	S	S	S	S
Grow outside																S	S	S

Month	June				July					August				September			
Day	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25
Tatsoi																	
Grow in Greenhouse	T H	H	H	H	H	H							O	O	O	O T	O T
Grow outside under row cover	O T	T H	T H	T H	H	H	H	H	H								
Grow outside	O T	O T	T H	T H	T H	H	H	H	H	H							
Tomatillo																	
Grow in Greenhouse				H	H	H	H	H	H	H	H	H	H	H	H	H	
Grow outside under row cover							H	H	H	H	H	H	H	H	H	H	
Grow outside	T	T	T							H	H	H	H	H	H	H	
Tomato																	
Grow in Greenhouse				H	H	H	H	H	H	H	H	H	H	H	H	H	H
Grow outside under row cover							H	H	H	H	H	H	H	H	H	H	H
Grow outside	T	T								H	H	H	H	H	H	H	H
Turnip																	
Grow in Greenhouse	H	H	H	H	H	H				S	S	S	S	S	S	S	S H
Grow outside under row cover	S	S H	H	H	H	H	H	H	S H	S	S	S	S	S	S	S H	H
Grow outside	S	S	S	S	S H	S H	S H	S H	S H	S H	S H	S H	S H	S H	H	H	H

Month	October					November				December			
Day	02	09	16	23	30	06	13	20	27	04	11	18	25
Tatsoi													
Grow in Greenhouse	O T	O T	O T	T H	T H	T H	T H	H	H	H	H	H	H
Grow outside under row cover													
Grow outside													
Tomatillo													
Grow in Greenhouse													
Grow outside under row cover													
Grow outside													
Tomato													
Grow in Greenhouse													
Grow outside under row cover													
Grow outside													
Turnip													
Grow in Greenhouse	H	H	H	H	H	H	H						
Grow outside under row cover	H	H	H	H	H	H							
Grow outside	H	H	H										

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 13 – Oct 30)

Frost Free Period (May 15 – Oct 09)

Extended frost free Period under row cover or greenhouse (Apr 03 – Nov 13)

		Febuary				March				April				May					June				July					August				September				October					November				December				Month
		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25	Day
Watercress																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside												S	S	S	S	T	T	T	T								H	H	H	H	H	H	H	H	H	H	H												
Welsh onion																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside									O	O	O	O				T	T	T	T						H	H	H	H	H	H	H	H	H	H	H	H	H												
West Indian Gherkin																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside														O	O	O	O	T	T	T	T					H	H	H	H	H	H	H	H																
Winter Melon																																																	
Grow in Greenhouse	X																																																
Grow outside under row cover	X																																																
Grow outside												O	O	O		T	T	T																		H	H	H											

Watercress, Grow outside: Plant to pots from supermarket plants; Transplant to wet cool shady area

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Frost Free Period - 15th May to 15th October

Approximate last frost date: 15-May

Approximate first frost date is: 15-Oct

- **O** Sow in seed trays
- **S** Direct sow seed
- **T** Transplant
- **H** Harvest
- ***H*** May not be enough light to harvest
- **X** Not recomended to grow in this way

Weeks of 10 hours or greater daylight (Feb 20 – Oct 30)

Frost Free Period (May 15 – Oct 09)

Extended frost free Period under row cover or greenhouse (Apr 03 – Oct 30)

Month		Febuary				March				April				May					June				July					August				September				October					November				December			
Day		06	13	20	27	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04	11	18	25
Zuchinni																																																
Grow in Greenhouse	X																																															
Grow outside under row cover	X																																															
Grow outside												O	O	O	O	T	T	O T	O T	O	O	T	Note 1 T	T H	T H	H	H	H	H	H	H	H	H	H	H	H												

Note 1: 2 plantings are required for whole season production.

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Crop notes

A

Amaranth (Grain)

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	65 - 75 °F	18 - 24 °C
Days to transplant from seeding:	Direct seed only	
Transplant distance:	-	
Total days to harvest from direct seed:	85 - 105 days	
Total days to harvest from transplant:	-	

Specific advice

1. Sow ¼" deep, 1½ - 2 foot in rows.
2. Thin to 18" apart.

Amaranth (Vegetable)

Basic Facts		
Germination time:	3 - 7 days	
Germination temperature:	70 - 80 °F	21 - 27 °C
Days to transplant from seeding:	21 days	
Transplant distance:	6"	
Total days to harvest from direct seed:	52 days	
Total days to harvest from transplant:	73 days	

Specific advice

Armenian cucumber

Basic Facts		
Germination time:	3 - 7 days	
Germination temperature:	70 - 80 °F	21 - 27 °C
Days to transplant from seeding:	21 days	
Transplant distance:	1 ft	
Total days to harvest from direct seed:	60 days	
Total days to harvest from transplant:	75 days	

Specific advice

1. The cucumbers will grow to around 3 ft., they taste best and produce the most when picked at 12 - 18 inches.

Artichoke

Basic Facts		
Germination time:	3 - 7 days	
Germination temperature:	70 - 80 °F	21 - 27 °C
Days to transplant from seeding:	70 days	
Transplant distance:	3 ft	
Total days to harvest from direct seed:	155 days	
Total days to harvest from transplant:	85 days	

Specific advice

1. Plants need a cool period in the spring of around 8 days of 50 °F / 10 °C to induce flowering, move seedlings outside before transplanting to get this. Do not allow plants to frost.
2. Tender buds require a lot of water. Be prepared to water at least every 3 days.
3. Lifting roots and storing then over winter will allow bigger and better crops the next year.
4. Feed well and constanly - plants are heavy feeders.

Arugula

Basic Facts		
Germination time:	3 - 7 days	
Germination temperature:	70 - 80 °F	21 - 27 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	35 - 45 days	
Total days to harvest from transplant:	-	

Specific advice

1. A September / October planting can over winter in the field for an early spring crop.
2. Frost covers will protect the plants from early frosts that will discolour leaves.

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Crop notes

Asparagus	Basic Facts			Specific advice
	Germination time:	3 - 7 days		1. Consider using frost covers to protect spears from late spring frosts.
	Germination temperature:	75 - 80 °F	23 - 27 °C	2. Asparagus beetle can devestate your crops - attention to pest control is needed.
	Days to transplant from seeding:	100 days		
	Transplant distance:	1 ft		
	Total days to harvest from direct seed:	3 years		
	Total days to harvest from crowns:	1 - 2 years		

B

Bean - Azuki	Basic Facts			Specific advice
	Germination time:	3 - 5 days		1. Innoculate seed to increase yield by around 30%.
	Germination temperature:	70 - 90 °F	21 - 32 °C	
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	120 days		
	Total days to harvest from transplant:	-		

Bean - Bush	Basic Facts			Specific advice
	Germination time:	3 - 5 days		1. Innoculate seed to increase yield by around 30%.
	Germination temperature:	70 - 90 °F	21 - 32 °C	
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	55 days		
	Total days to harvest from transplant:	-		

Bean - Fava	Basic Facts			Specific advice
	Germination time:	5 - 15 days		1. Innoculate seed to increase yield by around 30%. Use Pea / vetch innoculant.
	Germination temperature:	50 - 75 °F	10 - 24 °C	2. Requires a suprisong amount of water - keep soil moist and spray plants on hot, dry days
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	75+ days		
	Total days to harvest from transplant:	-		

Bean - Lima	Basic Facts			Specific advice
	Germination time:	3 - 5 days		1. Innoculate seed to increase yield by around 30%.
	Germination temperature:	75 - 90 °F	24 - 32 °C	2. Plant in the warmest spot
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	85 days		
	Total days to harvest from transplant:	-		

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Crop notes

Bean - Mung

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	70 - 90 °F	21 - 32 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	110 days	
Total days to harvest from transplant:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.

Bean - Pole

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	70 - 90 °F	21 - 32 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	65 days	
Total days to harvest from crowns:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.

Bean - Runner

Basic Facts		
Germination time:	8 - 14 days	
Germination temperature:	68 - 75 °F	20 - 24 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	80 days	
Total days to harvest from transplant:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.
2. Roots need to be mulched during the summer to keep them cool
3. In a cool summer, these will out produce any other bean.
4. Benefits from afternoon shade.

Bean - Soy

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	70 - 90 °F	21 - 32 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	85 - 110 days	
Total days to harvest from transplant:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.

Bean - Winged

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	75 - 90 °F	24 - 32 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	85 days	
Total days to harvest from transplant:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.
2. Whole plant is edible - tuberous roots, stems, leaves, flowers and beans.
3. Soak seed for 2 days prior to planting in moist soil
4. Will not produce beans untill daylength is below 12 hours

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Crop notes

Bean - Yardlong

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	70 - 90 °F	21 - 32 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	85 days	
Total days to harvest from transplant:	-	

Specific advice

1. Innoculate seed to increase yield by around 30%.
2. Needs a very tall trellis
3. For our region, choose only a day neutral variety such as Gita or Liana.

Beetroot

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	70 - 90 °F	21 - 32 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	3"	
Total days to harvest from direct seed:	45 - 60 days	
Total days to harvest from transplant:	30 - 35 days	

Specific advice

1. Most soils need Boron to counter internal browning
2. Keep seeds and plants moist

Bell pepper

Basic Facts		
Germination time:		
Germination temperature:	80 - 90 °F	27 - 32 °C
Days to transplant from seeding:	56 days	
Transplant distance:	18"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	75 days	

Specific advice

1. Transplant under row covers to keep warm and stabise temperature
2. Drip irrigate only to prevent bacterial spot and phytopthora

Bitter melon

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	86 - 95 °F	30 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	70 days	

Specific advice

1. Can be grown on a trellis on on the ground, we recomend growing on the ground under row cover utill plants flower, then removing the cover.

Bok choy

Basic Facts		
Germination time:	2 - 5 days	
Germination temperature:	60 - 86 °F	15 - 30 °C
Days to transplant from seeding:	25 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	45 - 50 days	
Total days to harvest from transplant:	30 days	

Specific advice

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Crop notes

Broccoli

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	60 - 77 °F	15 - 25 °C
Days to transplant from seeding:	35 days	
Transplant distance:	18"	
Total days to harvest from direct seed:	80 - 90 days	
Total days to harvest from transplant:	60 - 70 days	

Specific advice

Broccoli Rabe

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	60 - 77 °F	15 - 25 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	35 - 45 days	
Total days to harvest from transplant:	-	

Specific advice

Brussels sprouts

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	68 - 75 °F	20 - 24 °C
Days to transplant from seeding:	35 days	
Transplant distance:	18"	
Total days to harvest from direct seed:	120 days	
Total days to harvest from transplant:	100 days	

Specific advice

Burdock

Basic Facts		
Germination time:	5 - 15 days	
Germination temperature:	50 - 70 °F	10 - 21 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	120 days	
Total days to harvest from crowns:	-	

Specific advice

1. Can be left in the ground and harvested in early spring

C

Cabbage - Fall

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	24" - 36" apart	
Total days to harvest from direct seed:	110 days	
Total days to harvest from transplant:	95 days	

Specific advice

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Crop notes

Cabbage - Red

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	18" -24" apart	
Total days to harvest from direct seed:	85 days	
Total days to harvest from transplant:	72 days	

Specific advice

Cabbage - Savoy

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	18" -24" apart	
Total days to harvest from direct seed:	100 days	
Total days to harvest from transplant:	85 days	

Specific advice

Cabbage - Summer

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	80 days	
Total days to harvest from transplant:	65 days	

Specific advice

Cabbage - Winter storage

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	24" - 36" apart	
Total days to harvest from direct seed:	110 days	
Total days to harvest from transplant:	95 days	

Specific advice

Cape Gooseberry

Basic Facts		
Germination time:	10 - 17 days	
Germination temperature:	75 - 90 °F	24 - 32 °C
Days to transplant from seeding:	50 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	75 days	

Specific advice

1. Will bear fruit untill a heavy frost kill the plant.

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Crop notes

Cardoon

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	70 - 75 °F	21 - 24 °C
Days to transplant from seeding:	45 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	120 days	

Specific advice

1. Blanch plants for 3 weeks prior to harvest by wrapping in butchers paper or hessian to exclude light. This is essential otherwise it is to bitter to eat.

Carrot

Basic Facts		
Germination time:	7 - 21 days	
Germination temperature:	40 - 77 °F	5 - 25 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	55 - 70 days	
Total days to harvest from transplant:	-	

Specific advice

1. Do not let soil dry out before seedings emerge - keep soil damp at all times.
2. Use of shade cloth or hessian to protect soil during planting in hot weather is

Cauliflower

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 days	
Transplant distance:	18" apart	
Total days to harvest from direct seed:	85 days	
Total days to harvest from transplant:	65 days	

Specific advice

1. Needs a lot of water to produce good heads - do not let the plants dry out
2. The sun can be very intense in the Kootenays, once the heads start to form, bend leaves over the heads to provide shade and prevent sunburn.

Celeriac

Basic Facts		
Germination time:	14 - 30 days	
Germination temperature:	70 - 75 °F	21 - 24 °C
Days to transplant from seeding:	75 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	100 days	

Specific advice

1. Plants need very high fertility to grow well.
2. Soil must be kept wet at all times whilst the crop is growing.
3. Exposure to plants for 10 days below 55° F - 13 °C will cause the plants to bolt.
4. Roots can be stored like carrots all winter.

Celery

Basic Facts		
Germination time:	14 - 30 days	
Germination temperature:	70 - 75 °F	21 - 24 °C
Days to transplant from seeding:	75 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	80 days	

Specific advice

1. Plants need very high fertility to grow well.
2. Soil must be kept wet at all times whilst the crop is growing.
3. Exposure to plants for 10 days below 55° F - 13 °C will cause the plants to bolt. Do not plant to early.

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Crop notes

Celtuce

Basic Facts

Germination time:	3 - 7 days	
Germination temperature:	40 -65 °F	4 - 18 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	90 days	

Specific advice

1. Harvest when stems are about 12" tall.

Ceylon spinach

Basic Facts

Germination time:	14 - 21 days	
Germination temperature:	65 - 75 °F	18 - 24 °C
Days to transplant from seeding:	45 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	60 days	

Specific advice

1 . Requires consistent moisture to keep from flowering, which causes bitterness in leaves.
2. Requires trellis or other support for twining vine. Can follow peas up the same trellis.

Chard

Basic Facts

Germination time:	5 - 7 days	
Germination temperature:	40 - 95 °F	4 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	65 days	
Total days to harvest from transplant:	60 days	

Specific advice

1. Requires plenty of water when leaves are large otherwise they will scorch in the hot sun of summer.

Chickpea

Basic Facts

Germination time:	5 - 7 days	
Germination temperature:	65 - 75 °F	18 - 24 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	100 days	
Total days to harvest from transplant:	-	

Specific advice

1. Diect sow 2 weeks before last frost date.
2. Overhead watering when plant is in flower will cause flowers to drop off.

Chicory

Basic Facts

Germination time:	3 - 7 days	
Germination temperature:	40 - 77 °F	5 - 25 °C
Days to transplant from seeding:	28 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	45 days	

Specific advice

1. To blanch, cover plant with 6" cardboard disk 3 days prior to harvest.

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Crop notes

Chinese artichoke

Basic Facts

Germination time:	Grown from tuber
Germination temperature:	
Days to transplant from seeding:	
Transplant distance:	
Total days to harvest from direct seed:	
Total days to harvest from transplant:	Full season

Specific advice

1. Grow in 3 gallon pot, 3 tubers per pot.
2. Use fertile soil and keep moist.
3. Crop is rampant, spreading widely if not grown in pots.
4. Harvest by emptying pot onto a tarp and collecting the tubers - keep some for next year.

Chinese cabbage

Basic Facts

Germination time:	3 - 5 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	30 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	80 days	
Total days to harvest from transplant:	60 days	

Specific advice

1. Will bolt if exposed to cool temperatures (< 50 °F)when young (less than 10 leaves)

Chinese mallow

Basic Facts

Germination time:	10 - 14 days	
Germination temperature:	65 - 75 °F	18 - 24 °C
Days to transplant from seeding:	28 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	65 days	
Total days to harvest from transplant:	55 days	

Specific advice

1. The variety 'Crispa' does well in this area.

Chrysanthemum leaves

Basic Facts

Germination time:	3 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	21 days	
Transplant distance:	4"	
Total days to harvest from direct seed:	45 days	
Total days to harvest from transplant:	30 days	

Specific advice

1. Start harvesting when leaves are small - stop when plants flower.

Collard greens

Basic Facts

Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	75 days	
Total days to harvest from transplant:	60 days	

Specific advice

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Crop notes

Corn salad

Basic Facts		
Germination time:	10 - 14 days	
Germination temperature:	40 - 86 °F	4 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	At least 90 days	
Total days to harvest from transplant:	-	

Specific advice

1. Plants September / October for spring crop.

Cress

Basic Facts		
Germination time:	2 - 4 days	
Germination temperature:	40 - 75 °F	4 - 24 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	10 - 30 days	
Total days to harvest from transplant:	-	

Specific advice

Cucumber

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	68 - 86 °F	20 - 30 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	60 days	
Total days to harvest from transplant:	50 days	

Specific advice

D

Daikon

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	50 days	
Total days to harvest from transplant:	-	

Specific advice

1. Direct sow only 6 - 8" apart.
2. Choose varieties carefully as plants will bolt if planted out of season.

Dandelion - Italian

Basic Facts		
Germination time:	3 - 10 days	
Germination temperature:	41 - 95 °F	5 - 35 °C
Days to transplant from seeding:	30 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	50 days	
Total days to harvest from transplant:	65 days	

Specific advice

1. Remove flowers as they appear.

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Crop notes

E

Eggplant

Basic Facts		
Germination time:	5 - 10 days	
Germination temperature:	59 - 86 °F	15 - 30 °C
Days to transplant from seeding:	70 days	
Transplant distance:	18 - 24" apart	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	70 days	

Specific advice

Elephant Garlic

Basic Facts		
Germination time:	From bulb	
Germination temperature:	-	-
Days to transplant from seeding:	-	
Transplant distance:	8"`	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	-	

Specific advice

Endive

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	65 days	

Specific advice

F

Florence Fennel

Basic Facts		
Germination time:	5 - 15 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	30 days	
Transplant distance:	24" - 36" apart	
Total days to harvest from direct seed:	80 days	
Total days to harvest from transplant:	65 days	

Specific advice

1. Be careful in transplanting - root disturbance causes bolting.

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Crop notes

G

Garden Rocket

Basic Facts		
Germination time:	3 - 7 days	
Germination temperature:	70 - 80 °F	21 - 27 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	35 - 45 days	
Total days to harvest from transplant:	-	

Specific advice

1. A September / October planting can over winter in the field for an early spring crop.
2. Frost covers will protect the plants from early frosts that will discolour leaves.

Garlic

Basic Facts		
Germination time:	-	
Germination temperature:	From Bulb	
Days to transplant from seeding:	-	
Plantingt distance:	4" x4" or 6" x 6"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	-	

Specific advice

1. Plant bulbs before the ground freezes but after a heavy frost.
2. Plants are heavy feeders so fertilize well befor planting.

Good King Henry

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	41 - 95 °F	5 - 35 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	240	
Total days to harvest from transplant:	-	

Specific advice

1. Sow at ¼" deep maximum where it is to grow - it will not transplant, thin to 12" apart.
2. Plant is a perenial, and needs to be grown out side.

H

Hamburg Parsley

Basic Facts		
Germination time:	14 - 30 days	
Germination temperature:	59 - 86 °F	15 - 30 °C
Days to transplant from seeding:		
Transplant distance:	12"	
Total days to harvest from direct seed:	120 days	
Total days to harvest from transplant:	95 days	

Specific advice

1. Flavour and sweetness is improved if harvested after a light frost.

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Crop notes

J

Jerusalem artichokes

Basic Facts		
Germination time:	-	
Germination temperature:	-	
Days to transplant from seeding:	-	
Planting distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from planting:	180 days	

Specific advice

1. Can be planted in spring or fall, if planting in fall, plant in October.

K

Kai-Lan

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	21 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	50 days	
Total days to harvest from transplant:	45 days	

Specific advice

Kale

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	75 days	
Total days to harvest from transplant:	60 days	

Specific advice

1. Requires a very rich soil to grow well and keep producing leaves.

Kohlrabi

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 - 42 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	65 days	
Total days to harvest from transplant:	45 days	

Specific advice

1. Requires a very rich soil to grow well.

Komatsuma

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	21 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	55 days	
Total days to harvest from transplant:	45 days	

Specific advice

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Crop notes

L

Land Cress	Basic Facts			Specific advice
	Germination time:	3 - 5 days		
	Germination temperature:	55 - 64 °F	13 - 18 °C	
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	50 days		
	Total days to harvest from transplant:	-		

Leek	Basic Facts			Specific advice
	Germination time:	3 - 10 days		
	Germination temperature:	41 - 95 °F	5 - 35 °C	
	Days to transplant from seeding:	30 days		
	Transplant distance:	8"		
	Total days to harvest from direct seed:	65 days		
	Total days to harvest from transplant:	75 days		

Lentil	Basic Facts			Specific advice
	Germination time:	3 - 5 days		
	Germination temperature:	55 - 64 °F	13 - 18 °C	
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	75 days		
	Total days to harvest from transplant:	-		

Lettuce - Head	Basic Facts			Specific advice
	Germination time:	3 - 10 days		
	Germination temperature:	55 - 64 °F	13 - 18 °C	
	Days to transplant from seeding:	30 days		
	Transplant distance:	8"		
	Total days to harvest from direct seed:	50 days		
	Total days to harvest from transplant:	65 days		

Lettuce - Leaf	Basic Facts			Specific advice
	Germination time:	3 - 5 days		
	Germination temperature:	55 - 64 °F	13 - 18 °C	
	Days to transplant from seeding:	30 days		
	Transplant distance:	8"		
	Total days to harvest from direct seed:	50 days		
	Total days to harvest from transplant:	60 days		

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Crop notes

Lettuce - Romaine	Basic Facts			Specific advice
	Germination time:	3 - 10 days		
	Germination temperature:	41 - 95 °F	5 - 35 °C	
	Days to transplant from seeding:	30 days		
	Transplant distance:	8"		
	Total days to harvest from direct seed:	50 days		
	Total days to harvest from transplant:	65 days		

Lettuce - Butterhead	Basic Facts			Specific advice
	Germination time:	3 - 5 days		
	Germination temperature:	55 - 64 °F	13 - 18 °C	
	Days to transplant from seeding:	-		
	Transplant distance:	-		
	Total days to harvest from direct seed:	50 days		
	Total days to harvest from transplant:	65 days		

Luffa	Basic Facts			Specific advice
	Germination time:	3 - 10 days		
	Germination temperature:	55 - 95 °F	13 - 35 °C	
	Days to transplant from seeding:	30 days		
	Transplant distance:	8"		
	Total days to harvest from direct seed:	-		
	Total days to harvest from transplant:	65 days		

M

Mizuna	Basic Facts			Specific advice
	Germination time:	5 - 10 days		1. Regrows after cutting if cut above the heart of the plant.
	Germination temperature:	59 - 86 °F	15 - 30 °C	
	Days to transplant from seeding:	21 days		
	Transplant distance:	12" apart		
	Total days to harvest from direct seed:	55 days		
	Total days to harvest from transplant:	60 days		

Mustard	Basic Facts			Specific advice
	Germination time:	5 - 10 days		
	Germination temperature:	59 - 86 °F	15 - 30 °C	
	Days to transplant from seeding:	21 days		
	Transplant distance:	8" apart		
	Total days to harvest from direct seed:	45 days		
	Total days to harvest from transplant:	60 days		

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Crop notes

N

New Zealand Spinach

Basic Facts		
Germination time:	14 - 21 days	
Germination temperature:	65 - 86 °F	13 - 30 °C
Days to transplant from seeding:	21 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	60 days	
Total days to harvest from transplant:	65 days	

Specific advice

1. This a warm season plant - it has no frost resistance.
2. Keeps evenly moist otherwise taste declines rapidly.

O

Okra

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	80 - 90 °F	27 - 32 °C
Days to transplant from seeding:	35 days	
Transplant distance:	24" - 36" apart	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	55 days	

Specific advice

1. Transplant no earlier than mid June.

Onion

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	41 - 86 °F	5 - 30 °C
Days to transplant from seeding:	60 days	
Transplant distance:	6" apart	
Total days to harvest from direct seed:	90 - 110 days	
Total days to harvest from transplant:	80 - 100 days	

Specific advice

Onion - Salad

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	41 - 86 °F	5 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	65 days	
Total days to harvest from transplant:	-	

Specific advice

1. Plant early spring for summer use and July / August for fall harvest.

Onion - Sets

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	41 - 86 °F	5 - 30 °C
Days to transplant from seeding:	21 days	
Transplant distance:	6"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	90 days	

Specific advice

Establishing onion sets in 72 cell packs, and transplanting out from the cells can double the size of onions harvested.
It will also cut down the number of plants that are lost due to birds pulling up the sets and cut down the number of plants that go to seed without forming a bulb.

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Crop notes

Orach

Basic Facts

Germination time:	7 - 10 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	35 days	
Transplant distance:	24" apart	
Total days to harvest from direct seed:	60 days	
Total days to harvest from transplant:	45 days	

Specific advice

P

Pac Choy

Basic Facts

Germination time:	5 - 10 days	
Germination temperature:	59 - 86 °F	15 - 30 °C
Days to transplant from seeding:	21 days	
Transplant distance:	8" - 12" apart	
Total days to harvest from direct seed:	55 days	
Total days to harvest from transplant:	40 days	

Specific advice

1. Planting early in the spring will result in the plants going to seed. Generally night temperatures below 10C for 5 or more days will be enough to trigger it.

Parsnip

Basic Facts

Germination time:	21 days minimum	
Germination temperature:	50 - 77 °F	10 - 25 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	120 days	
Total days to harvest from transplants:	-	

Specific advice

Pea - Asparagus

Basic Facts

Germination time:	7 - 10 days	
Germination temperature:	59 - 86 °F	15 - 30 °C
Days to transplant from seeding:	35 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	65 days	

Specific advice

1. Pre soak seed in warm water for 24 hours prior to seeding.
2. Harvest when pods are 1" or less in length otherwise they become tough.

Pea - Black eyed

Basic Facts

Germination time:	3 - 7 days	
Germination temperature:	68 - 86 °F	20 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	100 days	
Total days to harvest from transplant:	-	

Specific advice

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Crop notes

Pea - English

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	50 -77 °F	10 - 25 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	50 - 60 days	
Total days to harvest from transplant:	-	

Specific advice

1. Plant as soon as the soil can be worked in the spring in a well drained place.
2. For a Fall crop, plant 10 weeks prior to expected frosts.

Peanut - Spanish

Basic Facts		
Germination time:	5 - 10 days	
Germination temperature:	68 - 86 °F	20 - 30 °C
Days to transplant from seeding:	30 days	
Transplant distance:	6" apart	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	150 days	

Specific advice

Potato

Basic Facts		
Germination time:	-	
Germination temperature:	-	
Days to transplant from seeding:	-	
Transplant distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from planting:	70 - 120 days	

Specific advice

1 . Chit tubers prior to planting to allow faster growth and to reduce disease.
2. Hill plants when they are about 12" tall.
3. Keep evenly moist at all times - especially during the heat of the summer.
4. Days to harvest is completely dependent on the variety planted.

Pumpkin

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	68 - 86 °F	20 - 30 °C
Days to transplant from seeding:	28 days	
Transplant distance:	24" - 36" apart	
Total days to harvest from direct seed:	About 100 days	
Total days to harvest from transplants:	About 85 days	

Specific advice

1. Growing under row covers will enhance early growth.

R

Radicchio

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	30 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	50 days	
Total days to harvest from transplant:	65 days	

Specific advice

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Crop notes

Radish

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	25 - 30 days	
Total days to harvest from transplant:	-	

Specific advice

Rutabaga

Basic Facts		
Germination time:	3 - 20 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	90 - 110 days	
Total days to harvest from transplant:	-	

Specific advice

S

Salsify

Basic Facts		
Germination time:	7 - 21 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	120 days	
Total days to harvest from transplant:	-	

Specific advice

Scorzonera

Basic Facts		
Germination time:	7 - 18 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	80 days	
Total days to harvest from transplant:	-	

Specific advice

Sea beet

Basic Facts		
Germination time:	7 - 21 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	30 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	55 days	
Total days to harvest from transplant:	45 days	

Specific advice

1. Best time to plant is early May.
2. Harvest leaves only.

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Crop notes

Seakale

Basic Facts

Germination time:	10 - 60 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	35 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	Harvest next spring	
Total days to harvest from transplant:	Harvest next spring	

Specific advice

1. Removal of the corky coating from the seeds is required for quick germination otherwise the seed can take up to 3 years to germinate.
2. In spring force growth by covering with a black bucket for soft succulent growth.

Shallot - Seed

Basic Facts

Germination time:	7 - 21 days	
Germination temperature:	50 - 86 °F	10 - 86 °C
Days to transplant from seeding:	35 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	100 days	
Total days to harvest from transplant:	80 days	

Specific advice

1. Use 98 size cell trays for generating transplants

Shallot - Set

Basic Facts

Germination time:	-	
Germination temperature:	-	
Days to transplant from seeding:	-	
Planting distance:	6"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	80 days	

Specific advice

Establishing Shallot sets in 72 cell packs, and transplanting out from the cells can double the amount of shallots harvested.
It will also cut down the number of plants that are lost due to birds pulling up the sets and cut down the number of plants that go to seed without forming a bulb.

Skirret

Basic Facts

Germination time:	14 - 21 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	56 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	120 days	
Total days to harvest from transplants:	100 days	

Specific advice

1. Seed 8 weeks prior to last frost.

Snake gourd

Basic Facts

Germination time:	5 - 7 days	
Germination temperature:	68 - 95 °F	20 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	65 days	

Specific advice

1. Harvest from 4" to 24" length.
2. Grow up a treelis for straight fruit.
3. If the plant gets anywhere near frost levels - it will die.
4. Do not even think of planting out to 1st week June.

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Crop notes

Sorrel

Basic Facts		
Germination time:	5 - 14 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	30 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	65 days	
Total days to harvest from transplant:	30 days	

Specific advice

1. Extremely hardy perenial.

Spinach

Basic Facts		
Germination time:	5 - 10 days	
Germination temperature:	50 - 68 °F	10 - 20 °C
Days to transplant from seeding:	35 days	
Transplant distance:	4"	
Total days to harvest from direct seed:	45 days	
Total days to harvest from transplant:	35 days	

Specific advice

1. Can be direct sown as soon as the soil can be worked.
2. Seed 1st week August to September for fall crops
3. Seed September to freeze up for an early crop in the spring.

Squash - Butternut

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	59 - 95 °F	15 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	24"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	100 days	

Specific advice

1. Harden off plants prior to transplanting.
2. Protection of transplants with row covers will result in bigger plants and better yields.
3. Allow fruit to rippen on plant but remove before a frost is expected.

Squash - winter

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	59 - 95 °F	15 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	18"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	85 - 90 days	

Specific advice

1. Harden off plants prior to transplanting.
2. Protection of transplants with row covers will result in bigger plants and better yields.

Sweet corn

Basic Facts		
Germination time:	4 - 10 days	
Germination temperature:	60 - 95 °F	18 - 35 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	Around 85 days	
Total days to harvest from transplants:	-	

Specific advice

1. Do not be in a hurry to plant - planting when the soil is at least 60 °F will result in better plants and better yields.
2 . Corn needs a lot of water and a lot of fertility in the soil. Do not skimp on either.

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Crop notes

Sweet pepper

Basic Facts		
Germination time:	5 - 10 days	
Germination temperature:	68 - 95 °F	20 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	18"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	80 days	

Specific advice

1. This crop needs a lot of phosphorus and calcium - start preparing the soil when you sow the seeds.
2. Use row covers to protect plants for about 2 weeks after transplanting.

Sweet Potato

Basic Facts		
Germination time:	Grow from slips only	
Germination temperature:	-	
Days to transplant from seeding:	-	
Transplant distance:	12"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	120 days	

Specific advice

Refer to detailed instructions given in the Kootenay Local Agricultural Society data sheet on growing Sweet Potatoes in the Kootenays.

T

Tatsoi

Basic Facts		
Germination time:	5 - 10 days	
Germination temperature:	59 - 86 °F	15 - 30 °C
Days to transplant from seeding:	21 days	
Transplant distance:	8"	
Total days to harvest from direct seed:	55 days	
Total days to harvest from transplant:	40 days	

Specific advice

1. Planting early in the spring will result in the plants going to seed. Generally night temperatures below 10C for 5 or more days will be enough to trigger it.
2. When past the 8 leaf stage the plant will withstand temperatures down to -10 °F/ -23 °C so given protection it will overwinter and be harvestable at all times.

Tomatillo

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	55 - 95 °F	13 - 35 °C
Days to transplant from seeding:	35 days	
Transplant distance:	36"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	65 days	

Specific advice

Tomato

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	59 - 95 °F	15 - 35 °C
Days to transplant from seeding:	42 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	Average 75 days	

Specific advice

1. Transplant when nighttime temperatures are above and will remain above 45°F / 7°C.

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Crop notes

Turnip

Basic Facts		
Germination time:	5 - 7 days	
Germination temperature:	50 - 86 °F	10 - 30 °C
Days to transplant from seeding:	-	
Transplant distance:	-	
Total days to harvest from direct seed:	45 days average	
Total days to harvest from transplant:	-	

Specific advice

W

Watercress

Basic Facts		
Germination time:	7 - 21 days	
Germination temperature:	55 - 64 °F	13 - 18 °C
Days to transplant from seeding:	21 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	90 days	
Total days to harvest from transplant:	80 days	

Specific advice

1. The easiest way is to buy a bunch of plants from the supermarket, root them in water, pot up into wet soil and plant to damp shady area 3 weeks later.

Wesh onion

Basic Facts		
Germination time:	7 - 10 days	
Germination temperature:	41 - 86 °F	5 - 30 °C
Days to transplant from seeding:	45 days	
Transplant distance:	8" for clumps	
Total days to harvest from direct seed:	105 days	
Total days to harvest from transplant:	65 days	

Specific advice

1. This is a perennial onion, similar to green or bunching onion. If left in the ground, it will form clumps that can be split for harvest and replanting.

West Indian Gherkin

Basic Facts		
Germination time:	3 - 5 days	
Germination temperature:	68 - 86 °F	20 - 30 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12"	
Total days to harvest from direct seed:	60 days	
Total days to harvest from transplant:	50 days	

Specific advice

1. Pick at 3"-4" for pickling.

Winter Melon

Basic Facts		
Germination time:	4 - 7 days	
Germination temperature:	68 - 95 °F	20 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12" - 18" apart	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	120 days	

Specific advice

1. Quite a hungry crop - feed with fish fertilizer every week untill flowers appear,

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Crop notes

Z

Zuchinni

Basic Facts

Germination time:	3 - 7 days	
Germination temperature:	59 - 95 °F	15 - 35 °C
Days to transplant from seeding:	28 days	
Transplant distance:	12 - 18"	
Total days to harvest from direct seed:	-	
Total days to harvest from transplant:	50 days	

Specific advice

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Fall Planting Schedule

26-Aug

Expected first frost date: 26th August

Week commencing date	6-May	13-May	20-May	27-May	3-Jun	10-Jun	17-Jun	24-Jun	1-Jul	8-Jul	15-Jul	22-Jul	29-Jul	5-Aug	12-Aug	19-Aug	26-Aug	2-Sep	9-Sep	16-Sep	23-Sep
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

5-Sep

Expected first frost date: 5th September

Week commencing date	16-May	23-May	30-May	6-Jun	13-Jun	20-Jun	27-Jun	4-Jul	11-Jul	18-Jul	25-Jul	1-Aug	8-Aug	15-Aug	22-Aug	29-Aug	5-Sep	12-Sep	19-Sep	26-Sep	3-Oct
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

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Fall Planting Schedule

15-Sep

Expected first frost date: 15th September

Week commencing date	26-May	2-Jun	9-Jun	16-Jun	23-Jun	30-Jun	7-Jul	14-Jul	21-Jul	28-Jul	4-Aug	11-Aug	18-Aug	25-Aug	1-Sep	8-Sep	15-Sep	22-Sep	29-Sep	6-Oct	13-Oct
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

25-Sep

Expected first frost date: 25th September

Week commencing date	5-Jun	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug	4-Sep	11-Sep	18-Sep	25-Sep	2-Oct	9-Oct	16-Oct	23-Oct
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

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Fall Planting Schedule

5-Oct

Expected first frost date: 5th October

Week commencing date	15-Jun	22-Jun	29-Jun	6-Jul	13-Jul	20-Jul	27-Jul	3-Aug	10-Aug	17-Aug	24-Aug	31-Aug	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct	19-Oct	26-Oct	2-Nov
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

15-Oct

Expected first frost date: 15th October

Week commencing date	25-Jun	2-Jul	9-Jul	16-Jul	23-Jul	30-Jul	6-Aug	13-Aug	20-Aug	27-Aug	3-Sep	10-Sep	17-Sep	24-Sep	1-Oct	8-Oct	15-Oct	22-Oct	29-Oct	5-Nov	12-Nov
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

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Fall Planting Schedule

25-Oct

Expected first frost date: 25th October

Week commencing date	5-Jul	12-Jul	19-Jul	26-Jul	2-Aug	9-Aug	16-Aug	23-Aug	30-Aug	6-Sep	13-Sep	20-Sep	27-Sep	4-Oct	11-Oct	18-Oct	25-Oct	1-Nov	8-Nov	15-Nov	22-Nov
Weeks before or after expected frost date	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
Broccoli	O							T									H	H	H	H	H
Cabbage	O							T									H	H	H	H	H
Cauliflower			O						T								H	H			
Carrots						S										H	H	H	H		
Peas							S										H	H	H		
Beets									S								H	H			
Lettuce - Leaf										O			T				H	H	H		
Spinach										S							H	H	H		
Radishes													S				H	H			

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Transplant Growing Chart

Vegetable Crop	Start Weeks Before Spring Set out Date	Set Out Weeks Before Frost Date	Set Out Weeks After Frost Date	Minimum Soil Temp.	Preferred Air Temp.	Length of Season in days	Start Weeks Before Fall Frost Date	Frost Tolerance
Beans, runner	n/a	n/a	1-2	60 F	70-80 F	65-85	15	tender
Beans, shelling	n/a	n/a	1-2	60 F	70-80 F	85-115	15	tender
Beans, snap	n/a	n/a	1-2	60 F	70-80 F	40-55	15	tender
Beets	n/a	4	2-4	40 F	60-65 F	55-80	14	half-hardy
Broccoli	4-6	4	2-3	40 F	60 F	55-85	15	hardy
Cabbage	4-6	5	2-3	20 F	60 F	60-110	15	hardy
Carrots	n/a	4	2-4	45-85 F	60-65 F	60-80	15	half-hardy
Cauliflower	2-4	4	2	60 F	60-65 F	55-110	15	half-hardy
Celery	2-4	4	2	60 F	60-65 F	90-140	15	half-hardy
Collards	4-6	4	2	40 F	60-65 F	70-80	15	hardy
Corn	n/a	n/a	2-3	60 F	60-75 F	70-100	16	tender
Cucumber	2-3	1	2	60 F	65-85 F	50-75	16	very tender
Eggplant	8-10	n/a	2-3	65 F	70-85 F	65-80	15	very tender
Kale	4-6	5	2	40 F	60-65 F	65-75	15	hardy
Leeks	4-6	5	2	65-75 F	55-75 F	85-150	15	hardy
Lettuce	2-6	2	3	40 F	60-65 F	45-100	13	half-hardy
Luffa	4-6	n/a	2-4	70-95 F	65-75 F	120	18	very tender
Melon	2-4	n/a	2-3	50 F	80-100 F	80-125	16	very tender
Mustard	2-4	5	2	45 F	60-65 F	30-50	15	half-hardy
Okra	n/a	n/a	3-4	60 F	70-85 F	50-60	16	tender
Onion (seed)	4-6	6	2	40 F	55-75 F	92-130	20	hardy
Parsnips	2-4	4	3-4	50 F	40-70 F	80-120	15	half-hardy
Peanuts	n/a	n/a	2	60 F	65-85 F	120	16	very tender
Peas	n/a	4	2-3	40-55 F	60-65 F	55-75	16	hardy
Peppers	6-8	n/a	2-3	60 F	55-90 F	60-80	16	very tender
Potatoes	n/a	2-4	2-4	40 F	60-65 F	100-115	16	half-hardy
Pumpkins	3	n/a	2-3	40 F	65-75 F	90-120	16	very tender
Radishes	2-4	4-6	2-4	40 F	60-65 F	25-50	8	half-hardy
Spinach	4-6	3-6	4	40 F	35-75 F	60-65	8	hardy
Squash, summer	4	n/a	3-4	60 F	65-75 F	45-75	16	very tender
Squash, winter	4	n/a	3-4	60 F	65-75 F	70-120	18	very tender
Sweet Potatoes	6-8	n/a	2-3	65 F	70-85 F	150-170	18	very tender
Swiss Chard	2-4	3-4	4	50 F	40-85 F	50-60	15	half-hardy
Tomatoes	6-10	n/a	4	60 F	70-85 F	65-85	15	tender
Turnips	4	4	2	50 F	60-65 F	35-50	13	hardy

Home Gardening Guide

To be a successful gardener requires following a few basic rules and making practical decisions.

Garden Site

Although many urban gardeners have little choice, selecting a garden site is extremely important. An area exposed to full or near-full sunlight, with deep, well-drained, fertile soil is ideal. The location should be near a water outlet and free of competition from existing shrubs or trees. By modifying certain cultural practices and crop selections, almost any site can become a highly productive garden.

Crop Selections

As a home gardener, one of your first major decisions is deciding what vegetables to grow. Table 1 lists crops suitable for small and large gardens. Raise vegetables which return a good portion of nutritious food for the time and space required. Vine crops such as watermelons, cantaloupes, winter squash and cucumbers require large amounts of space. Locating the garden near a fence or trellis may allow for growing vine crops in less space. Plant according to family needs and resist over planting any particular vegetable, although surpluses may be preserved.

Proper variety selection is an important key to successful gardening. The wrong variety may not produce satisfactory yields regardless of subsequent care and attention. Have a look at the vegetable pages of this site for some ideas.Try new varieties and hybrids, but limit plantings.

If your garden is not in an area receiving full or near-full sunlight, try leafy crops such as leaf lettuce, mustard, and parsley. **Table 2** indicates vegetable crops which do well in full sunlight and those that tolerate partial shade.

Garden Plan

A gardener needs a plan just as an architect does. Careful planning lessens gardening work and increases returns on labour.

Long-term crops require a long growing period. Plant them where they won't interfere with care and harvesting of short-term crops. Plant tall-growing crops where they will not shade or interfere with growth of smaller crops. Plant vegetables such as okra, staked tomatoes, pole beans, and sweet corn on the garden's north side to avoid shading lower-growing crops such as radishes, leaf lettuce, onions, and bush beans. Group crops according to the rate of maturity. Table 3 indicates the relative maturity rate of various vegetable crops. By grouping vegetables according to maturity rate, one crop can be planted to take the place of another as soon as it is removed. Try to plant crops totally unrelated to the previous crop. For example, follow early beans with beets, bush squash, or bell peppers. Crop rotation helps prevent diseases and insect buildups. (**Table 3.)**

When to Plant

Consult the tables on the vegetable pages for information regarding recommended spring and fall planting times for home vegetable gardens in your area. Usually home gardens can be planted 10 days to 2 weeks earlier than commercial fields because of the protection offered by existing buildings, trees, and shrubs. Proper planting time is important if maximum quality and production are expected.

Soil Preparation

Many garden sites do not have deep, well-drained, fertile soil which is ideal for vegetable growing. Thus, soils must be altered to provide good drainage and aeration. If the soil is heavy clay, the addition of organic matter or sand may be highly advantageous.

Apply 1 to 2 inches of good sand and 2 to 3 inches of organic matter to the garden site surface and turn under in late winter or early spring to improve the soil's physical quality. Work on the soil's physical condition over a period of time rather than trying to develop desirable soil in a season or two. Make periodic additions of organic matter in the form of composted materials, leaves, manures, grass clippings, or other organic matter. Turn the soil to a depth of 8 to 10 inches -- the deeper the better. Gypsum improves soil structure and drainage. Add gypsum at the rate of 6 to 8 pounds per 100 square feet where the soil is tight, heavy clay.

Never work wet garden soil. Soils containing a high degree of organic matter can be worked at a higher moisture content than heavy clay soils. To determine if the soil is suitable for working, squeeze together a small handful of soil. If it sticks together in a ball and does not readily crumble under slight pressure by the thumb and finger, it is too wet for working.

Seeds germinate more readily in well-prepared soil than in coarse, lumpy soil. Thorough preparation greatly reduces the work of planting and caring for the crop. It is possible, however, to overdo preparation of some soils. An ideal soil for planting is granular, not powdery fine.

Fertilization

Proper fertilization is another important key to successful vegetable gardening. The amount of fertilizer needed depends upon soil type and crops. Kootenay soils vary from deep sands to fertile, well-drained soils to heavy, dark clays underlaid by layers of rock. Crops grown on sandy soils usually respond to liberal amounts of potassium, whereas crops grown on clay soils do not.

Heavy clay soils can be fertilized considerably heavier at planting than can sandy soils. Heavy clay soils and those high in organic matter can safely absorb and store fertilizer at three to four times the rate of sandy soils. Poor thin, sandy soils, which need fertilizer the most, unfortunately cannot be fed as heavily and still maintain plant safety. The solution is to feed poor thin soils more often in lighter doses. For accurate recommendations regarding fertilizer rates, have a soil test done and ask for recommendations with the results.

In general, if your garden is located on deep, sandy soil, apply a complete preplant fertilizer such as 5-10-10 or 6-12-12 at the rate of 1 to 2 pounds per 100 square feet. If your garden consists of a soil type with a high percentage of clay, a fertilizer such as 10-20-10 or 12-24-12 at 1 to 2 pounds per 100 square feet should be suitable.

After determining the proper amount of fertilizer for a preplant application, apply the fertilizer a few days before planting. Spade the garden plot, spread the fertilizer by hand or with a fertilizer distributor and then work the soil one or two times to properly mix the fertilizer with the soil. After the fertilizer is well mixed with the soil, bed the garden in preparation for planting.

Take care to avoid banding nitrogen material directly beneath the row. Death of the seed or severe burning of the plants could result. Apply additional nitrogen as a furrow or sidedress application later in the season. For most soils, 3 to 5 pounds of Gaia's Vegetative mix per 100 linear feet of row, applied in the furrow and watered in, is adequate. Apply at first fruit set for crops such as tomatoes, peppers, and squash. Sidedress leafy crops such as cabbage and lettuce when they develop several sets of character leaves.

Planting

Plant your garden as early as possible in the spring and fall so the vegetables

Table 1. Home Garden Vegetables			
Small Garden Vegetables		Large Garden Vegetables	
Beets Broccoli Bush squash Cabbage Carrots Eggplant English peas Garlic	Green beans Lettuce Onions Parsley Peppers Radishes Spinach Tomatoes	Cantaloupes Cauliflower Collards Cucumbers Mustard Okra	Potatoes Pumpkins Southern peas Sweet corn Sweet potatoes Watermelon

Table 2. Light Requirements of Common Plants		
Require Bright Sunlight		
Beans Broccoli Cantaloupes Cauliflower Cucumbers	Eggplant Okra Onions Peas Peppers	Potatoes Pumpkin Squash Tomatoes Watermelons
Tolerate Partial Shade		
Beets Brussels sprouts Cabbage Carrots	Collards Kale Lettuce Mustard	Parsley Radish Spinach Turnips

Table 3. Maturity Rate		
Quick (30-60 Days)		
Beets Bush Beans Leaf lettuce	Mustard Radishes Spinach	Summer squash Turnips Turnip greens
Moderate (60-80 Days)		
Broccoli Cabbage, Chinese Carrots Cucumbers	Green onions Kohlrabi Lima beans, bush Okra	Parsley Peppers Tomatoes, cherry
Slow (80 Days or More)		
Brussels sprouts Bulb onions Cabbage Cantaloupes	Cauliflower Eggplant Garlic Irish potatoes	Pumpkins Sweet potatoes Tomatoes Watermelon

will grow and mature during ideal conditions.

Transplanting vegetable crops wherever possible allows earlier harvesting and extends the productive period of many vegetable crops. Where transplanting is not practical or convenient, seed directly. A general rule of thumb for planting is to cover the seed 2 to 3 times its widest measurement. This is especially true for big-seeded crops such as green beans, sweet corn, cucumbers, cantaloupes, and watermelons. For smaller-seeded crops such as carrots, lettuce, or onions, an average planting depth of 1/2 inch usually is adequate. Seed the plants fairly thick with the intention of thinning to an optimum stand at a later date. Avoid allowing the soil to over-dry or crust during germination, but do not over water. **Table 4** indicates the number of days from planting to expected emergence when properly planted.

Avoid transplanting too deep or too shallow, especially if plants are in containers such as peat pots. Deep planting often causes developed roots to abort, and planting too shallow exposes containers to the surface and causes root death from excessive drying.

Some crops are easily transplanted bare-root while others are best transplanted in containers, as indicated in **Table 5.** When transplanting plants such as tomatoes or peppers, use a starter solution. Starter solutions may be purchased at local nurseries or can be made at home by mixing 3 to 2 cup of fertilizer such as 10-20-10 in 5 gallons of water. Use the lower rate on light, sandy soils. Apply 2 to 1 pint of starter solution, depending upon plant size, into each transplant hole before planting. This prevents the plants from drying out and provides adequate sources of fertility for young, growing plants.

Common Garden Problems		
Symptoms	Possible Causes	Corrective Measures
Plants stunted in growth; sickly, yellow color	Lack of soil fertility or soil pH abnormal	Use fertilizer and correct pH according to soil test. Use 2 to 3 pounds of complete fertilizer per 100 square feet in absence of soil test
	Plants growing in compacted, poorly-drained soil	Modify soil with organic matter or coarse sand.
	Insect or disease damage	Use a regular spray or dust program.
	Iron deficiency	Apply iron to soil or foliage.
Plants stunted in growth; sickly, purplish color	Low temperature	Plant at proper time. Don't use light-colored mulch too early in the season.
	Low available phospate	Apply sufficient phosphate at planting.
Holes in leaves; leaves yellowish and droping, or distorted in shape	Damage by insects	Use recommended insecticides at regular intervals.
Plant leaves with spots; dead, dried areas; or powdery or rusty areas	Plant disease	Use resistant varieties, remove diseased plants when they are noticed and use a regular spray program.
Plants wilt even though sufficient water is present	Soluble salts too high or root system damage	Have soil tested. Use and resistant varieties.
	Poor drainage and aeration	Use organic matter or sand in soil.
	Insect or nematode damages	Use recommended varieties and soil insecticides or nematocides.
Plants tall, spindly, and unproductive	Excessive shade	Relocate to sunny area. Keep down weeds.
	Excessive nitrogen	Reduce applications of nitrogen
Blossom drop (tomatoes)	Hot dry periods	Use mulch and water. Plant heat tolerant varieties.
	Minor element deficiencies	Use fertilizer containing zinc, iron, and manganese.
Failure to set fruit (vine crops)	Poor pollination	Avoid spraying when bees are present.
Leathery, dry, brown blemish on the blossom end of tomatoes, peppers, and watermelons	Blossom end rot	Maintain a uniform soil moisture supply. Avoid over-watering and excessive nitrogen.

Table 4. Days from Planting to Emergence Under Good Growing Conditions			
Beans	5-10 days	Onion	7-10 days
Beets	7-10 days	Peas	6-10 days
Broccoli	5-10 days	Parsley	15-21 days
Cabbage	5-10 days	Pepper	9-14 days
Carrots	12-18 days	Radish	3-6 days
Cauliflower	5-10 days	Spinach	7-12 days
Corn	5-8 days	Squash	4-6 days
Cucumber	6-10 days	Tomato	6-12 days
Eggplant	6-10 days	Turnip	4-8 days
Lettuce	6-8 days	Watermelon	6-8 days

Watering

Apply enough water to penetrate the soil to a depth of at least 6 inches. For best production, most gardens require a moisture supply equivalent to 1 inch of rain a week during the growing season. Light sandy soils generally require more frequent watering than heavier dark soils. If sprinklers are used, water in the morning to allow plant foliage to dry before night. This practice helps prevent foliage diseases, since humidity and cool temperatures encourage disease development on most vegetable crops.

The use of drip irrigation to supply water is also beneficial in this regard. Additionally, this system of irrigation is the most water-use efficient available and is ideally suited for use with mulches.

Weed Control

A long-handled hoe is the best tool for control of undesirable plants in vegetable gardens. Chemical weed control usually is undesirable and unsatisfactory because of the selective nature of weed control chemicals - apart from the fact that all these chemicals are poisonous.. The wide variety of vegetable crops normally planted in a small area prohibits use of such chemicals anyway.

Cultivate and hoe shallowly to avoid injury to vegetable roots lying near the soil surface. Control weeds in the seedling stage to prevent them from seeding and re-inoculating the garden area. The use of mulch is also an effective means of weed control.

Mulching

Mulching will increase yields, conserve moisture, prevent weed growth, regulate soil temperature, and lessen losses caused by ground rot of many vegetable crops. Organic mulches can be made of straw, leaves, grass, bark, compost, sawdust, or peat moss. Organic mulches incorporated into the soil will improve the soil tilth, aeration, and drainage. The amount of organic mulch to use depends upon the type, but 1 to 2 inches of organic material applied to the garden surface around growing plants is adequate.

Table 5. Ease of Transplanting		
Easily Transplanted		
Beets Broccoli Cabbage	Cauliflower Chard Lettuce	Onion Tomatoes
Require Care		
Carrots Celery	Eggplant Okra	Pepper Spinach
Very Difficult Without Using Containers		
Beans Cantaloupe Corn	Cucumber Peas Squash	Turnip Watermelon

In turning organic mulches under for subsequent crops, add additional fertilizer at the rate of about 1 pound per 100 square feet to help soil organisms break down the additional organic matter.

Harvesting

For the greatest enjoyment of your home vegetable garden, harvest vegetables when they are mature. A vegetable's full flavour develops only at peak maturity, resulting in the excellent taste of vine-ripened tomatoes, tender green beans, and crisp, flavourful lettuce. For maximum flavour and nutritional content, harvest the crop the day it is to be canned, frozen, or eaten.

GROWING BY DEGREES

April showers bring May flowers: the old folk-saying goes. But more truthfully, May warmth brings May flowers...and peas and beans, spinach and lettuce.

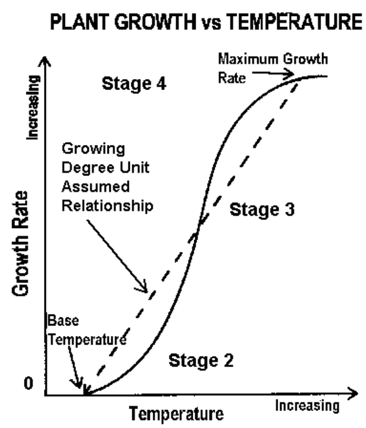
Unless stressed by other environmental factors — lack of soil moisture being the most common — the development rate from emergence to maturity for many plants depends upon the daily air temperature. Similar thermal effects also occur in annual plants such as shrubs and trees. Cool temperatures slow the progress toward maturity or bio-matter accumulation, while warm temperatures hasten it.

Watching the temperature in May and following months can be crucial to those growing plants for food or specific ornamental uses. That is why most of my examples here refer to agricultural plants. Growing commercially-valuable plants often requires attention to details in the crop's life cycle to ensure an economically viable harvest. Thus, there arises a need for farming "by the numbers" — that is, using scientific models and environmental observations in cultivation practices.

For some plants, life cycle patterns change direction when specific environmental temperature levels are reached. For example, Boston lettuce (as well as other lettuce cultivars) forms full leafy heads when the daily growing temperature is in the 10 to 15 °C (50-60 °F) range. However, should the temperature rises for an extended period above 18-27 °C (64-80 °F), the plants will bolt, putting their growth energy into stem elongation and flower formation at the expense of additional leaf growth.

The rate of growth variation with temperature for most plants (and many "cold-blooded" animals) follows what is commonly called an S-curve because of its shape. There are several stages on this rate-limiting growth curve:

- the initial stage where no activity (growth) occurs below a specific base temperature;
- a stage (2) of rapidly increasing growth with temperature;
- a stage (3) of optimal growth increasing linearly with temperature;
- a stage (4) beginning at the maximum tolerable temperature where growth rate remains constant or declines with increasing temperature.



Above a crucial temperature, growth stops, usually with the organism's death. The temperature values of these critical change points on the curve vary with species and often between varieties.

The following table gives some critical temperature values for several common vegetables.

Critical Temperatures for Selected Crops			
Crop	Minimum Growth Temperature (C/F)	Optimum Growth Temperature (C/F)	Maximum Growth Temperature (C/F)
Cool Season Grains	0-4 / 32-40	24-29 / 75-85	32-38 / 90-100
Corn	10 /50	29-32 / 85-90	43-46 / 110-115
Cucumbers	9-10 / 4850	24-27 / 75-80	35-46 / 95-115
Melons	15-18 / 59-65	30-37 / 86-98	43-49 / 110-120
Peas	3-6 / 38-42	10-16 / 50-60	21-24 / 70-75
Potatoes	6-7 / 43-45	10-16 / 50-60	27-32 / 80-90
Snap Beans	10 / 50	27-32 / 80-90	38-43 / 100-110
Tomatoes (growth)	10-13 / 50-55	16-27 / 60-80	29-35 / 85-95
Tomatoes (for fruit set)	13-14 5 / 5-58	15-20 / 59-68	22 / 72

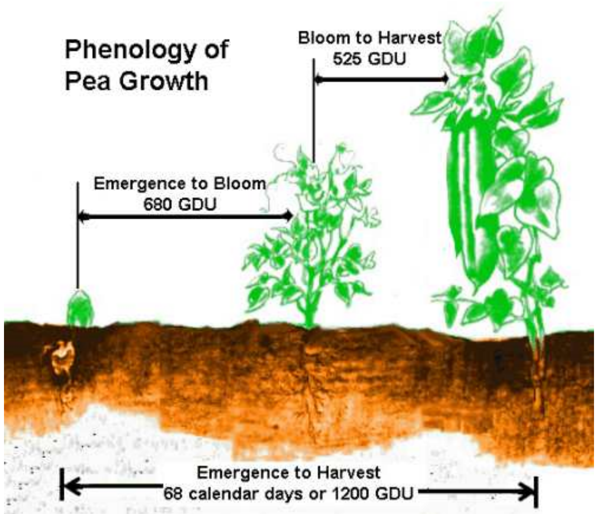
Days to Maturity

Before widespread scientific research looked into the growth patterns of plants, farmers and gardeners watched their plants and kept a diary of botanical and weather events. The earliest studies observed the progress of plant growth from emergence to maturity, or some other stages of development, and counted the days that passed.

When averaged over a number of years, these simple phenological observations produced good rule-of-thumb estimates of growth progression that could be used in subsequent years. I recall one folk saying from the US Corn Belt that illustrates this point: "corn knee-high by the Fourth of July." This means that if the general stalk height in a corn field has grown knee-high by early July, then the crop is progressing as expected, and harvest should occur at its usual time.

Phenology of Pea Growth

Green peas, for example, take about 68 days from seedling emergence to pod harvest. Such information, summarized in tables and maps for commonly planted species/varieties, is widely published in books and pamphlets. Pick up any seed catalogue or seed packet and you will likely see an indication of "days to maturity" alongside the variety (cultivar) description.



We can use also use days to maturity as a guideline to produce crops that become ready for harvest at different times. One method is to plant different crop varieties which have different "days to maturity at the same time," say one plot of green peas that mature in 60 days and another of peas that mature in 68 days. The crops should, in theory, be ready for harvest about a week apart.

Alternatively, we could wait a couple weeks and plant a second bed with 60-day peas, a practice known as staggered planting. In some years, however, a cool start to the growing season can result in both plots maturing at the same time. This strategy is not always the best for either the farmer or the home gardener, so more precise methods of determining crop progression with weather conditions have been sought.

Growing Degree Units

A more precise index for determining plant progress than counting days is the growing degree unit (GDU). In the past, this has been called the growing degree day (GDD). (I use the newer term because I find it less confusing.) Growing degrees (GDs) is defined as the number of temperature degrees above a certain threshold base temperature (Tbase), which varies among crop species. The base temperature is that temperature below which plant growth is zero. The GDU concept assumes that growth is a linear function of temperature from the base temperature to the maximum tolerable temperature (the dashed straight line on the S-curve shown above). For most basic applications, this is not a bad assumption.

Corn Growing Degree UnitsGDs are calculated for each day using the observed maximum (Tmax) and minimum (Tmin) daily temperatures and the base temperature (Tbase) for the plant of interest by:

GDs = ½ (Tmax + Tmin) - Tbase.

Since ½ (Tmax + Tmin) is the daily mean temperature (Tmean), it can be used if Tmax and Tmin are not available, thus,

GDs = Tmean - Tbase.

If the calculated GDs value for a given day is negative (the mean temperature is less than the base temperature), then it is assumed no growth occurs, and a value of zero GDs is assigned for the day.

GDUs are accumulated by adding each day's GDs contribution as the season progresses from planting, emergence, or some other predetermined start date. The concept asserts that certain stages of the crop's development are reached when the cumulative GDUs pass the value specific for that crop species/variety.

GDUs have many practical applications; for example, they can be used to:

* Assess the suitability of a region for production of a particular crop;
* Estimate the growth-stages of crops, weeds or even life stages of insects;
* Predict maturity and cutting dates of forage crops;
* Predict best timing of fertilizer or pesticide application;
* Estimate the heat stress on crops;
* Plan spacing of planting dates to produce separate harvest dates.

The above figure shows the GDUs for peas needed to grow from emergence to bloom and bloom to harvest.

Crop Heat Units

I will mention one improvement on the growing degree unit concept.

GDUs assume a linear relationship between growth and temperature based on a daily mean temperature. While relatively easy to calculate, accumulated GDUs might not be as exacting as some growers would like. In agrobusiness, exactly-timed application of resources can often make the difference between profit and loss. For example, knowing a precise date for the most effective pesticide application rather than applying the pesticide continuously over a set calendar period can often save on materials (and thus expense) and reduce unwanted collateral ecological impacts.

As a result, agroclimatologists developed alternate indices that employ separate equations for the influence of the daily minimum (nighttime) and the maximum (daytime) temperatures on growth. Professor Murray Brown, at the University of Guelph developed the first of these indices for corn, which he named the corn heat unit. Subsequent research has shown the basic procedure applicable to other crops and the technique is now referred to as crop heat unit (CHU).

The relationships for corn expressed in Celsius degrees are:

Night time: CHUnight = 9/5(Tmin - 4.4)

Day time: CHUday = 3.33 (Tmax - 10) - 0.084 (Tmax - 10)2

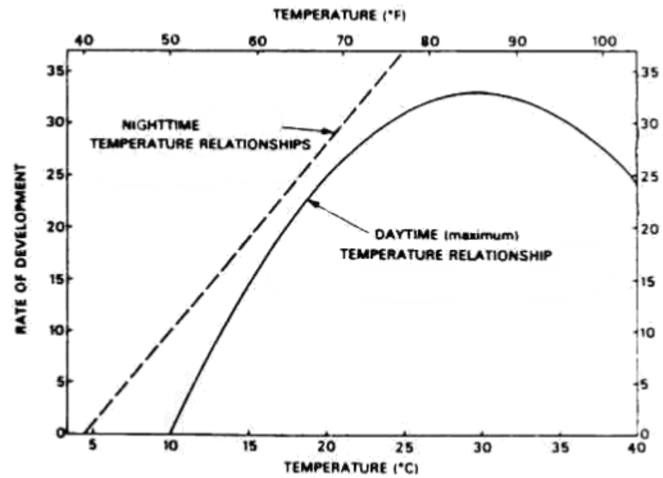
Daily: CHUdaily = ½ [CHUday + CHUnight].

Daily crop heat units are calculated and accumulated through the season, similar to growing degree units.

For corn, the daytime relationship uses 10 °C as the base temperature and 30 °C as the optimum temperatures. Corn growth and development does not progress when daytime temperatures fall below 10 °C, and they are fastest at about 30 °C. The nighttime relationship uses 4.4 °C as the base temperature and does not specify an optimum temperature because nighttime minimum temperatures very seldom exceed 25 °C in Ontario where Brown developed the initial corn heat unit index. Extension of the research to warmer areas in the United States has added a term to account for higher nighttime temperature effects.

Base Temperatures for Selected Crops and Insects			
Crop or Insect	Base Temperature (° C)	Crop or Insect	Base Temperature (° C)
Spinach	2.2	Lettuce	4.4
General Plant Growth	5.0	Peas and Asparagus	5.5
Cabbage Maggot	6.0	Variegated Cutworm	7.0
Corn and Beans	10.0	Grasshoppers, Corn Borers	10.0
Pumpkins and Tomatoes	13.0	General Insect Development, House flies	15.0

Concepts such as crop heat units and growing degree days are not only practical measures for current crop production, they can also be used climatologically to determine the best cultivars or crops for given agricultural areas. Provincial agriculture agencies produce maps of expected annual accumulations for these indices. Seed companies producing new cultivars advertise their CHU requirements in their catalogues along with other cultivar characteristics.Given a wide choice of cultivars with differing heat requirements to choose from and the availability of long-range, seasonal temperature forecasts, growers can sow a more productive cultivar (yield or price per bushel) under the forecast growing-season conditions, or perhaps hedge their bets by mixing cultivars among their acreages.



The Environment and Plants

Plants grow in response to their environment. Plants are cultivated from many areas of the world. Each has a different set of environmental conditions to which the plant has become adapted. Much of horticulture is concerned with modifying plant environments to enhance growth. This section covers several of the major environmental factors that influence plant growth and the influence of climatic variations on plants.

Climate

Climate is the combined effects of temperature, light and elements of moisture such as clouds, rain, hail, snow and wind. Climate usually refers to long term weather patterns in a region or as it is often called, macroclimate.

Temperatures are greatest at the earth's surface near the equator where the sun's rays strike directly. As you move north or south from the equator it gradually becomes cooler. Altitude also influences temperatures with cooler temperatures occurring at higher altitudes. Climatic patterns are also altered by large bodies of water nearby. More energy is required to raise the temperature of water than air. Water releases this energy as it cools. Thus, water acts as a buffer for nearby land areas and reduces temperature extremes. Inland areas of the our region lack the protection of large bodies of water and experience high summer temperatures and cold, arctic fronts in the winter and it why areas around our lakes have a milder climate and more stable weather.

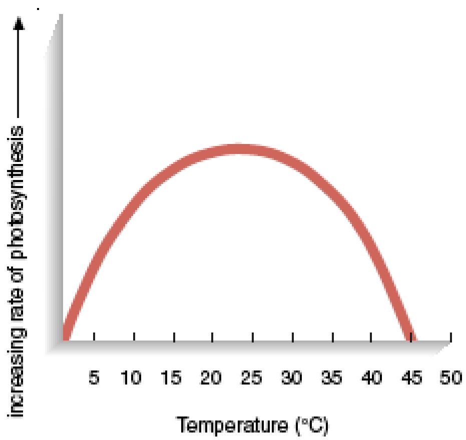
Mountains also alter climate by blocking natural wind and moisture movement. Several areas of the region have wet, rainy areas on the west side of mountains and dry areas on the east side. Vegetation also influences climate. Forested areas have a higher relative humidity. This and additional evaporation of water from tree leaves has a cooling effect.

Human activities also influence climate. Large reservoirs and lakes have been constructed in many areas. Metropolitan areas are warmed by combustion used in heating and by buildings, streets and other structures absorbing and holding heat. Dust, environmental pollutants and smoke also alter the climate. All of these macroclimates differences have an effect on plant species growing in an area and may cause climatic variations.

Microclimate refers to the climate in a small area such as near a plant or in a yard or garden. Cold air is heavier than warm air and tends to settle in low areas creating a temperature inversion. Temperatures in low areas can be several degrees cooler than surrounding hillsides. These pockets of cold air are called frost pockets. Orchards are generally located on hillsides to avoid areas likely to damage flowers in early spring. Selecting a home site on a sloping area can also avoid low temperature injury to ornamentals in the fall and spring. Carefully locating plants around a home can take advantage of microclimate differences. Shade loving plants can be grown on north or east exposures and plants can be protected from the blast of west or north winds by planting them on the protected side of the house. Gardeners need to be aware of the influence of climate in a particular area, both macroclimates and microclimates. Selection and growth of plants is directly influenced by climate.

Temperature

Temperature largely determines what can be grown in a particular area. Photosynthesis (the conversion of solar energy for use by the plant) and respiration (the using of stored energy compounds in the plant for growth and development) are regulated by temperature. With most biological reactions each 10°C (18°F) increase in temperature doubles the rate of the reaction. Therefore, we expect the rate of growth at 68°F to be twice as fast as at 50°F. This relationship is known as **Q10**. Each plant has an optimum temperature for growth and development. There is a maximum temperature where plant growth stops and permanent injury to the plant occurs. Likewise, there is a minimum temperature where plant growth stops and freezing or chilling injury occurs.



Cool Season Plants

Depending on their area of native adaptation, plants prefer cooler or warmer temperatures. Cool loving plants tolerate temperatures slightly below the 32°F. Growth is poor at warmer temperatures. Examples of cool season plants include vegetables (cabbage, broccoli, lettuce, radishes, peas), flowers (crocus, daffodil, tulips, violets), fruits (apples, pears, plums, American grapes) and shrubs (forsythia, lilac, spirea, honeysuckle). Cool season plants prefer average daily temperatures below 70°F. Premature seed stalk formation or bolting of biennial vegetables is a problem for cool season crops. Cool temperatures following planting compresses their natural growth cycle and seed stalks often form later in the season.

Warm Season Plants

Some plants prefer temperatures above 70°F and are usually injured by freezing temperatures. Sometimes these plants are called non-hardy or tender plants, while those that can withstand freezing temperatures are called hardy plants. Examples of warm season crops are vegetables (beans, tomatoes, sweet corn, melons), flowers (roses, lilies, tropical foliage plants) and fruits (peaches, apricots, sweet cherries).

Freezing Injury

When the temperature drops below 32°F there is a chance of injury to some plants. This is frequently called frost injury. Frost is ice formation on a surface while plant injury occurs only when ice forms within the plant. Generally, the period just before dawn is the time when the temperature reaches the lowest point and freezing injury occurs. Freezing injury results in immediate water soaked blackened appearance that quickly turns brown and dies. It is a common practice to cover plants with insulating materials or sprinkle plants with water to prevent freezing temperatures from occurring within the plant. While water from a sprinkler may feel very cold it has some heat energy that is passed on to the plant. There is a lot of current research on treatments to allow plants to be exposed to lower temperatures without injury and to understand the mechanism of freezing injury to plant tissues.

Chilling Injury

Injury can occur to warm season plants or products exposed to low temperatures. This low temperature injury is called chilling injury and results from a malfunction in the normal plant growth processes rather than the freezing of water within the plant. Crops such as cucumbers, tomatoes, tropical fruits and most tropical foliage plants, are subject to chilling injury. The development of chilling injury usually results in rapid respiration, the development of rots and molds, bitter or "off flavors" and abnormal colors. Chilling injury may occur at temperatures below 45-50°F in many plants or products. You see it when a banana turns black after being placed in a refrigerator.

Rest Period

There are periods when a plant or seed does not grow despite favourable conditions. These periods are called rest periods. They usually coincide with the natural period of dormancy for perennial plants during the winter. During this time deciduous plants lose their leaves and herbaceous plants are frozen back to the ground. Buds of woody plants do not grow due to physiological and biochemical processes. Following a period of cold, the buds break (end) their rest period and continue growth. The temperature and hours needed to break dormancy has been determined for many plants. Fruit varieties are grouped by their requirement of hours at or below a critical temperature (usually 40°F) to break the rest period. Desirable environmental conditions are necessary to resume growth following the breaking of the rest period.

Many temperate plants produce seeds with a natural rest period following ripening. This rest period can only be broken by exposure to cold temperatures for a period of time. This process is called stratification. We can artificially stratify seeds by storing them in a moist medium such as peat moss or sand at near freezing temperatures (usually 40°F) for a number of weeks. This breaks the normal rest period and allows the seeds to germinate uniformly.

Woody Plant Survival

An example of hardiness has already been provided for annual plants tolerant to low temperatures. Woody plants can also tolerate low temperatures to varying degrees. Native plants have, through the years, adapted to withstand low temperatures and are said to be hardy to the area where they evolved. The level of low winter temperatures that a particular type of plant can withstand has been determined for most woody plant species. The Canada is divided into areas called plant hardiness zones. The zones are numbered 1-10 from colder to warmer areas.

Woody ornamental plants survive average normal low winter temperatures in these areas and plants can be characterized by their adaptation to these climatic zones. It must be remembered that these zones are based on the average of all of the lowest winter temperatures recorded over a 50 year period. In certain extreme years, such as in January 1994, severe damage to plant material occurred because the temperatures were so much colder than normally would be expected. Damage also frequently occurs to normally hardy plants when an unusually early frost or freeze hits plants before they are fully dormant or in the spring after they have begun to lose dormancy.

Modifying Temperatures

Growing plants in a managed environment like a greenhouse was developed to provide a favourable temperature during adverse periods. There are other examples of treatments gardeners use to modify temperature. These including the use of mulches, black or clear plastic absorbs heat and transfers it to the soil encouraging earlier plant growth in the spring. Hotcaps or hot-tents - paper or plastic covers also serve as miniature greenhouses to modify the microclimate around transplants in the spring.

Sheets of fibreglass or porous plastic are frequently placed over rows of plants to warm them in the spring. This type of structure is called a cloche (pronounced klosh) or row cover. Another example or a specialized plant growing structure is a hotbed or cold frame used to start seedling plants. Water mist is frequently used as a means of reducing freezing temperature injury. The protection provided by water mist is based on the principle that as water freezes it gives off heat. Thus, as the water freezes it gives off enough heat to protect plants for a few degrees. Other examples of frost protection include smudge pots, stoves and air turbulators used in orchards to force warmer air around plant surfaces. Gardeners and farmers continue to study ways to understand the mechanisms of temperature injury, ways of improving the adaptation of plants to temperature extremes and ways of altering the temperature around horticultural plants to improve their growth.

Water

Water constitutes an important part of plants. Living plants need a constant flow of water from the roots to leaves to continue their life processes. Water in plant cells provides pressure on cell walls, called turgor pressure, keeping the plant rigid. Water is an important constituent of photosynthesis. Water flows from the root, up the stem and into the leaves in specialized conducting cells called xylem cells. Movement of nutrients and other constituents flow in water in the plant as well. Pressure from water in the cell enables cells to enlarge and expand. Water not used by plant cells evaporates and moves out of the leaf through small pores or openings in the leaf surface called stomata. Evaporation of water from the leaf is called transpiration. Evaporation of water from the leaf has a cooling effect and reduces temperatures in the surrounding environment.

Water moves into root cells from the soil. Soils differ in the amount of water that they can hold. Sandy soils hold less water than loam or clay soils. Water available to a plant from a particular soil is called the soil water potential. Some water is held so tightly by the soil that the plant cannot extract it. Water that the plant can extract from the soil is called available water. The root system develops in the soil to obtain water for the plant. Sudden flooding of the soil cuts off oxygen to the root system and causes root death. Plants in flooded locations can die quickly from such injury. Too much water can be as serious a problem as not enough water. For this reason, a greenhouse manager must carefully monitor the water level in containers to provide the proper amount of water to meet the crop's needs. In field situations, drainage tiles or pipes are often installed to allow excess water to be removed. Water is lost from soils by evaporation from the soil surface. Evaporation of water from soil combined with loss of water through the plant (transpiration) is referred to by the combined word evapotranspiration, or loss of water by plant and soil combined.

Applying Water to Plants

The best crop production has developed where water is abundant. Applying water to supplement rainfall is a standard practice for many horticultural crops. Irrigation should replace water removed by plants. Considerations in irrigation amounts and frequency depend on the needs of the crop, the depth of roots and the ability of the soil to absorb water. A certain portion of the water is lost to evaporation before it reaches the soil. On a windy day a sprinkler system putting out a fine mist may lose 25-30% of the water applied before it reaches the soil. Drip or trickle irrigation allows small amounts of water to be applied frequently to a portion of the root zone. This reduces the amount of water needed to grow a crop.

Effects of Limited Water Availability

For many horticultural plants there is a period of critical water need when water may not be available. For most plants this is during the period of flowering and fruit development. A symptom of water need is wilting of the foliage. Plants are affected by stress before the external symptom of wilting occurs. Emphasis on water levels necessary to support plant growth and scheduling irrigation to minimize water use is important. Water needs can be predicted from climatic factors such as temperature, humidity, wind and solar radiation combined with particular characteristics of the crop and soil type. Fluctuations in water available can cause sudden splitting of cherries, tomatoes and cabbage. Uniform water supplies are necessary to prevent these problems.

Light

Light is essential for photosynthesis. Green plants are the original solar collectors. They transfer energy from the sun to a usable form of energy for the plant. Light varies in intensity, quality and duration or photoperiod.

Intensity

The intensity or amount of light available has a direct influence on the amount of photosynthesis that can occur. Some plants have adapted to growing in areas of low light availability such as a jungle floor. This is why tropical foliage plants grow well in limited indoor light. Grasses are native to the open plains and require high light intensity for growth. When light intensity is lowered, the rate of photosynthesis is reduced. When the level of photosynthesis equals respiration, it is referred to as the compensation point. Below compensation point growth ceases.

Sudden exposure to high light intensity can cause leaf scorch or sun burning. The symptoms are large, brown, dead areas on leaves. Plants growing in low light have a thinner layer of wax on leaf surfaces. This helps the leaf to capture more light. However, moving it suddenly into bright light results in rapid water loss. High light intensity can also cause fading of flowers, especially in hot summer weather

Light Quality

Light quality refers to the "color" of the light or the portion of the light spectrum. The biochemical constituents of chlorophyll, the compound responsible for photosynthesis, absorb only light from particular portions of the light spectrum. Artificial lights supply light of particular portions of the spectrum. Light absorbed by plants is from the blue-violet and orange-red parts of the spectrum. Specialized lamps have been developed to provide light rich in wavelengths from this part of the spectrum. These lamps have the additional benefit of creating dark green foliage and a deep, intense flower color. Excellent plant growth can be achieved with ordinary fluorescent bulbs. Other portions of the spectrum such as ultraviolet light are important in the coloration of some fruits and the development of autumn color in leaves.

Photoperiod

The daily duration of light is important for many plants. The lengths of light and dark period in a 24 hour cycle influences the blooming response of many plants. Some plants form flowers with shorter day lengths (usually less than 12 hours). These plants are called short-day plants and grow without blooming during days with long photoperiods. Other plants are long-day plants and form flowers during longer days (usually 14 hours or longer). The most common examples of short-day plants are poinsettia and chrysanthemum that flower during the shorter days of autumn. Examples of long-day plants include many of our summer flowering annuals. Greenhouse producers must know the photoperiod requirements of plants and alter the day length to induce flowering at the proper time. Days are shortened by covering greenhouse benches with dark shade cloth. Day length is extended by artificial lights over the benches. Many plants are day neutral. These plants are not influenced by the number of hours of light. A common example is the tomato that blooms and fruits with favourable temperatures during any day length.

While we speak of day length, it is important to remember that it is really the length of the dark period that makes the difference. To keep a short day plant from flowering naturally in the fall we only have to break up the dark period into two shorter segments. For some plants as little as five minutes of light in the middle of the night will keep it from flowering.

Relative Humidity and Wind

Relative humidity is the amount of water vapour in the air. It is closely related to temperature. As the temperature goes down, relative humidity goes up. Relative humidity is measured as a percent. When it reaches 100% we have rain, snow, fog, or sleet. This is why it rains as a cold front goes through.

As the relative humidity drops, evaporation increases. Plants leaves give off more water at 40% than 80% relative humidity. This water loss increases if the wind is blowing. Tropical foliage plants are native of humid, jungle environments and often suffer in the dry, indoor air in winter. Grouping plants together and placing plants on a layer of pebbles in standing water helps increase relative humidity. Lowering the interior temperature of homes is beneficial in reducing some of the low humidity problems with plants.

Humidity is often related to the development of certain plant diseases. Warm, damp conditions are ideal to encourage the growth of fungi. Many fungal spores must have water to begin growing. Damping off is a common problem for seedlings. It results from fungi rotting small plants at the soil line. Increasing air circulation to lower humidity and reducing watering can generally stop the problem.

Wind is a problem with plant production in some areas. In addition to blowing away valuable soil, wind can also cause injury to tender plant stems by sandblasting the stems at the soil line. New transplants and newly planted trees are often shaded as a protection from hot sun and wind. Strong winds in storms damage many trees and shrubs each year. Wind damage is especially severe when it is in combination with ice.

Interrelationships

Plants are influenced simultaneously by all segments of their environment. As light intensity increases, temperature generally increases with a corresponding increase in photosynthesis and water loss by the plant. Many times gardeners and farmers must alter one environmental factor as another changes. When light levels are reduced, a greenhouse manager will often lower temperatures. Without the temperature reduction, plants become tall and spindly. The reduction in temperature limits the problem. Although a lot is known about environment factors that influence plants, much is still to be learned. Urban conditions influence plants in both positive and negative ways. Learning to compensate for these negative influences will become more important in the future.

Plant Nutrition

In early agricultural societies, it was observed that crop yields could be increased by adding animal manures or plant debris to soil. We continue this practice today with regular additions of organic matter. We have also learned that this simple practice provides a steady source of nutrients for plants, improves soil structure and tilth or looseness. Chemical sources through fertilizers have also been used to supply nutrients needed for plant growth and development.

Elements Required By Plants

Research has shown that a minimum of 17 elements are necessary for most plants to grow and develop properly. Nine elements are used in relatively large quantities and they are referred to as major elements or macronutrients. The nine major elements are:

Carbon (C)

Hydrogen (H)

Oxygen (O)

Nitrogen (N)

Phosphorus (P)

Potassium (K)

Calcium (C)

Magnesium (Mg)

Sulphur (S)

The eight remaining researched elements are used by plants in small quantities and are called trace elements, minor elements, or micronutrients. Even though these minor elements are needed in small quantities, they are equally essential to plant growth and development. The micronutrients are:

Boron (B)

Zinc (Zn)

Manganese (Mn)

Copper (Cu)

Molybdenum (Mo)

Chlorine (Cl)

Iron (Fe)

Cobalt (Co)

Carbon, hydrogen and oxygen are the three elements used in the largest amounts and are the building blocks for plant growth, forming carbohydrates (sugars and starches) and oxygen forming carbon dioxide and water. Carbon, hydrogen and oxygen are obtained mainly from the air and water. Nitrogen, phosphorus and potassium are considered the primary macronutrients. Calcium, magnesium and sulphur are classified as secondary macronutrients.

Nitrogen gives plants their dark green color and increases leaf and stem growth. The crispness and quality of leafy vegetables such as lettuce and spinach is influenced by nitrogen levels. Plants deficient in nitrogen have light green to yellow leaves and appear stunted.

Phosphorus encourages root growth and establishment. Phosphorus is also crucial for plant flowering and fruiting, especially seed production. Most of the internal plant chemical reactions are dependent on phosphorus. Poor flowering and fruiting may be signs of the lack of phosphorus. Some plants, including corn and tomatoes, may exhibit red or purple leaves. Cold soils can prevent phosphorus uptake, even though the element is present.

Potassium or potash increases the plant's vigour, winter hardiness and resistance to diseases. Stems and stalks are stiffer. Plant seed or fruit yield is improved. Reduced vigour, susceptibility to diseases and thin skinned or small fruit may be signs of potassium deficiency.

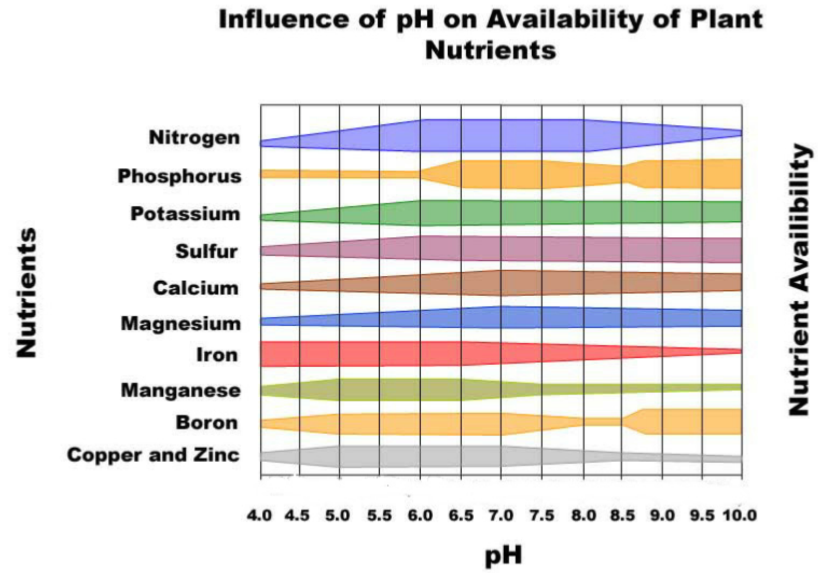
Any material, organic or chemical, that provides any one or more of the 17 essential elements could be called a fertilizer. The definition of a fertilizer is a legal one. Even though a substance like compost provides most of the essential nutrients a plant needs, it cannot legally be sold as a fertilizer. It is however the only source of nutrients in some third world countries.

While organic fertilizers usually release their nutrients more slowly than chemical sources, once the elements are released they are available for uptake by the roots. Nutrients are not absorbed directly into the roots, but absorbed in a water solution. Therefore, there is no preference of organic fertilizers over chemical fertilizers on the basis of ability of plants to use released elements. However, inorganic sources usually provide a faster plant growth response.

Fertilizers can be purchased as slow-release or conventional. Slow-release fertilizers require fewer applications and have less of a chance to burn the plant. Release rates can vary depending on the particular type. However, slow-release fertilizers usually cost more and are harder to find. The nutrient release rate is usually dependent on environmental conditions and not on plant need.

Burning occurs to plant roots and other plant parts that may come in contact with conventional fertilizers. Fertilizer elements are often in the form of salts. Like sugar and table salt, these materials are hygroscopic. This means that they will absorb moisture. This is why a salt shaker will clump up on a rainy day. If the level of salts, regardless of whether it is deicing salt or fertilizer salts, becomes too high in the soil, water is unable to enter the root. If the amount of salts in the soil continues to increase water is pulled out of the plant into the soil. Even though the soil feels moist, water is unable to enter the plant.

Conventional fertilizers are fast acting and relatively inexpensive. The nitrogen leaches more readily. The fertilizer can form clumps in the bag, making application tougher.



Organic sources of fertilizer such as manure, cottonseed or soybean meal, dried blood or bone meal, are slower acting and have a relatively low plant burn potential. These sources usually have some micronutrients available. Organic sources (manures and compost) can condition the soil as they break down further. Organic fertilizers and composts feed the soil rather than the plant directly, and thus are safer to use and create far less problems than conventional fertilizers.

When we discuss the need to apply elements, generally we refer to major elements because they are used in greater quantity and may need to be replaced more frequently. Nitrogen, phosphorus and potassium, for example, are applied to lawns and gardens one or more times each season. When sources for nitrogen, phosphorus and potassium are packaged together to be applied in a single application, the fertilizer is called a complete fertilizer. An incomplete fertilizer lacks one or two of the primary micronutrients. Examples include ammonium nitrate (33-0-0), urea (46-0-0), triple superphosphate (0-45-0) or muriate of potash (0-0-60).

In most areas of the North America., minor elements are present in native soils in quantities sufficient for most plants. Applications of trace elements is usually not necessary in these areas.

However in the Kootenays, nearly all soils are deficient in both major and minor nutrients e.g. Boron, Calcium, Magnesium, Sulphur, Zinc, Manganese, Copper, Molybdenum, Chlorine and Cobalt. A good soil test is really worthwhile.

Soil ph

Soil pH refers to the acidity or alkalinity of a soil. pH is the logarithm of the negative hydrogen ion concentration. A 14-point scale is used to measure pH. 1.0 is as acid as something can get, 7.0 is neutral. Anything below 7 is classified as acidic and anything above 7 is basic or alkaline.

Sometimes people will refer to acid soils as "sour" and basic soils as "sweet."

Most plants grow best in a slightly acid soil. At pH 6.5, the 17 essential elements can be taken up by plants if they are present in the soil. If the pH rises (becomes more basic) or lowers (becomes more acid), some elements become less available for plant uptake. Other elements become so readily available that they become toxic to plants. Therefore, it is possible for plant nutrients to be present in the soil, but unavailable for plant use because of an improper soil pH. Low pH soils are neutralized or brought up to 6.5 range by adding limestone (calcium carbonate) to the soil. Some limestone, such as dolomitic limestone, also contains magnesium (Mg). For all horticultural uses, agricultural ground limestone or ground dolomitic limestone is recommended.

High pH soils can be neutralized by adding an acid forming material such as finely ground sulfur (S), peat moss, or by using an acid forming fertilizer to the soil. When correcting soil pH, it is important to remember that pH is measured on a logarithmic scale. On a logarithmic scale everything moves in multiples of 10. For example, if it takes a pound of sulfur to lower the pH of a "pile" of soil from 7.0 to 6.0, then, in theory it will take 11 pounds to lower it from 7.0 to 5.0 (1 pound to get it to 6.0 plus 10 pounds to get it from 6.0 to 5.0). If we lower the pH from 7.0 to 4.0 it theoretically will take 111 pounds (1 pound plus 10 pounds plus 100 pounds). In reality, it is difficult or impossible to correct soil pH more than one unit (i.e. 7.0 to 6.0). Many soils are well buffered making them more difficult to adjust than other soils.

It is not possible to look at a soil and determine the pH. Soil test kits are available to get at least an approximate pH reading. For a reliable test, soils should be sent to a commercial testing laboratory. Not only will the laboratory give you the pH of the soil, the report will probably also include information on the amounts of other elements in the soil and how much fertilizer, limestone, etc. should be applied to the soil.

It is certainly worthwhile to invest the time and small amount of money to have a soil test made at least every three years. Basic soil testing usually gives pH, phosphorus and potassium levels. Nitrogen readings are seldom accurate due to the potential for leaching during testing.

In recent years, leaf analysis, petiole analysis and tissue analysis has been used to detect nutrient deficiencies. These tests are particularly helpful in detecting micronutrient deficiencies. The tissue should be collected in midseason and representative leaves and/or petioles should be taken from the midshoot region. The laboratory doing the tests will provide specific sampling procedures. This test is commonly used on fruit crops since a nutrient imbalance can prevent maximum flowering and/or fruit development.

Nutrient Holding Capacity of Soils

Soil particles, even sand, can attract small quantities of elements and hold them by surface attraction; however, elements or nutrients are held tighter and in much larger quantities by clay particles and humus. Humus is well broken down organic matter. Soils with moderate to large quantities of clay and soils rich in organic matter have higher nutrient holding capacities.

Benefits of Organic Matter

Organic matter provides some nutrients for plants as it decomposes, increasing the nutrient holding capacity of the soil significantly. After it completely decomposes, it "glues" soil particles together. This aggregation of particles results in a soil with improved soil structure, one that is loose, crumbly and not compacted. A soil with good structure allows water and air to move more freely through the root zone resulting in improved root and plant growth.

What Is in the Fertilizer Bag?

You have seen many different brands and kinds of fertilizers at garden centers, nurseries and other retail stores. By law they all have three numbers boldly listed on the front of the fertilizer bag (e.g. 10-6-4, 5-10-5, 38-0-0). These numbers represent the percentage by weight of nitrogen, phosphorus (as P_2O_5) and potassium (as K_2O) in a bag. The order (N, P and K) is always the same. So with a 50 pound bag of 10-6-4, we know that 5 pounds (10% of 50 pounds) is N, 3 pounds is P2O5 and 2 pounds is K2O. So there is a total of 10 pounds of plant nutrients in this 50 pound bag (5 lbs N + 3 lbs P2O5 + 2 lbs K2O). The remaining 40 pounds is filler such as ground corn cobs, sawdust, talc, vermiculite, or clay which makes it easier for you to apply the product evenly over your lawn or garden.

In most instances, fertilizer applications are made on the basis of the nitrogen required. Frequently, it is one pound of actual nitrogen per 1000 sq feet (square feet) or 43 pounds of N per acre. (There are 43,560 sq feet in an acre) How much of the following fertilizers are required to place one pound of nitrogen on a garden that is 1000 sq feet?

- 10-6-4 (10%N) to calculate divide 1 pound nitrogen by the percent nitrogen in the fertilizer:
- 1/.10 = 10 lbs of 10-6-4 per 1000 sq feet
- 5-10-5 (5% N)

  1/.05 = 20 lbs of 5-10-5 per 1000 sq feet
- 20-10-10 (20% N)

  1/.20 = 5 lbs of 20-10-10 per 1000 sq feet

Application rates of fertilizers are important. Excessive amounts may damage plants by burning roots or foliage or may prevent another element from being absorbed from the soil. Insufficient amounts may lower the potential crop yield or cause the plant not to grow or develop and complete its life cycle properly. It is especially important to be careful when applying micronutrients since they are applied in relatively small quantities. How would you apply one teaspoon per 1000 sq feet? Perhaps you could mix the nutrient thoroughly in a bucket of soil or sand and then apply the material evenly over the 1000 sq feet. In this case, the bucket of soil becomes the filler to allow for easier, more accurate application.

Soil Particle Size Comparison

Soil is a natural body composed of organic and mineral materials. Every soil is made up of mineral matter, organic materials, air and water. The mineral portion is made up of various particle sizes called sand, silt and clay . Sand and silt particles are the result of breakdown of larger rocks, a process known as weathering. During this weathering process, the elements which make up the larger materials are released and made available for plant uptake. Clay particles have been synthesized or put together by physical and chemical processes over a long period of time. These clay particles are in plate-like layers and have internal spaces between the layers that allow the clay particles to hold more nutrients.

Heavy clay soil structures can be modified by the addition of organic matter that increases the soil tilth or looseness. Gypsum is sometimes used to break apart the clay structure; however, soil chemistry is usually altered negatively. Organic matter such as compost, leaf mould, or peat moss added to sandy soils helps retain water.

Approximately 50% of a soil is made up of solids (45% mineral and 5% organic matter) and the other 50 percent is pore space. The pore space is made up of the spaces between particles. If the soil particles are aggregated or glued together with broken down organic matter, about 50% of the soil volume will be pore space. On the average, half of the space should be occupied by water and half by air. In order to achieve this balance between air and water, the water level will fluctuate from a saturated level to a fairly dry level.

When all of the pore space is filled with water, the soil is saturated and a poor environment for plant growth results because of insufficient air in the root zone. Roots rot, nutrients are not absorbed due to a lack of oxygen and loss of nitrogen into the air can occur. After several hours, gravity will carry excess water down through the soil; this water is referred to as gravitational water. Plant nutrients such as nitrogen are water soluble and carried away or leached with this gravitational water. Gravitational water also carries away excess fertilizers that may damage plants. This flushing is one way to minimize winter salt damage to plants. Not all elements are carried off easily with gravitational water. Calcium and phosphorus, for example, are quite immobile in the soil.

The amount of water remaining in the pore space after the force of gravity has drawn off the excess is called field capacity. At this point, considerably more than 25 percent of the pore space is occupied by water. As water is used by plants and evaporates from the soil surface, the pore space has less and less water until it gets so dry that plants cannot absorb any more water from it. At this point, most of the pore space is occupied by air. At this point moisture in the soil is referred to as being at the wilting point.

Between field capacity and the wilting point, the water available for plant use is referred to as available or capillary water. Research shows that moisture within this available range is equally available to plants, so there is no advantage to keeping the water level in the soil high. In fact this would be detrimental to plants since too little air would be in the pore space.

On many hot summer afternoons in the Kootenays, with our hot temperatures and low humidity, plants wilt. However, this condition is not usually related to low soil moisture (wilting point) but rather to a situation where the plant is using (losing) water more rapidly than the roots can absorb it and transport it to the leaves.

If soils dry below the wilting point, a level is reached called hygroscopic water. Hygroscopic water is not available to plants and is held so tightly by soil particles (especially clay) that it can only be removed by heating.

COLUMBIA BASIN TRUST
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KOOTENAY LOCAL AGRICULTURAL SOCIETY

1911 Irving Road, Tarrys, Castlegar, V1N 4N6, British Columbia, Canada

Tel: (250) 399 4809 Email: klasociety@shaw.ca Web: www.klasociety.org