Letter Codes

A	Approximate germination rate as sold by seed companies. No known minimum legal germination rate. Can be higher or lower.
AA	Each "seed" contains about 3 seeds, of which half germinate.
AC	Harvest alfalfa and clover 2 to 4 inches above the growing crown (sheep shears work well for this), loosen the soil with a border fork, water the bed, and cover the growing area with shade netting cloth for 1 to 2 weeks.
B	In beds.
BB	Soak seeds overnight for best germination.
BC	Broadcast.
C	Centers.
c	Cups.
CA	Cantaloupe.
D	Do not know yet.
E	Spacing increases with warmth of climate.
EL	Extra-long-germinating seed (22 to 28 days).
F	In flats.
FA	Fall.
G	"Seed" is a seed packet of 2 to 6 seeds, of which approximately 1.62 germinate.
H	Honeydew.
I	Transplant into a 1- to 5-gallon container as appropriate. Raise sapling until 1 year old. Then transplant into soil.
J	Germination average in a laboratory.
K	Straw weight is generally 1 to 3+ times harvested and cleaned seed weight for GROW BIOINTENSIVEly grown grains, 1 to 2 times for grains grown with commercial agriculture (Roger Revelle, "The Resources Available for Agriculture," *Scientific American,* September 1976).
L	Long-germinating seed (8 to 21 days).
LG	Transplant seedling when larger—about 6 to 9 inches tall.
M	Cook to minimize oxalic acid, which ties up calcium.
N	Narrow bed (2 feet wide) will produce better yields due to improved pollination.
P	Perennial.
Q	Celery is pricked out into a third flat, 6 inches deep, on 2-inch centers, where it grows for a further 4 to 6 weeks until it is ready to be transplanted. The seedlings may be 4 inches tall. Overall, it takes 3 to 4 months from sowing until transplanting.
qt	Quarts.
R	Replant at points where germination fails. We call this "spotting."
S	Short-germinating seed (1 to 7 days).
SN	During hot weather, cover with shade netting cloth between approximately 10 a.m. and 5 p.m. for better results.
SP	Spring.
SU	Summer.
T	Tablespoon.
t	Teaspoon.
TO	18 inches for cherry tomatoes; 21 inches for regular tomatoes; 24 inches for large tomatoes. Sequential information in columns D, H, and I should be used according to spacing chosen.
U	One 1-pound loaf of bread requires $^2/_3$ pound flour ($2^1/_2$ cups).
V	Approximate minimum.
W	12 or 15 inches for midget varieties; 18 inches for 5- to 7-pound varieties; 21 inches for 10- to 15-pound varieties; 24 inches for largest varieties.
WI	Winter.
Y	Estimate.
Z	Based on Ecology Action experience, half of the garlic cloves are large enough to use, on the average.
*****	Digestible protein for animals.
******	Depending on variety selected.
—	Not applicable.
#	First set of figures: summer sowing in a shade netting house for fall set out, or winter sowing in areas with a less cold winter and in a greenhouse for spring set out. (A shade netting house is an area generally covered with 30% shade netting to provide a cooler, more humid area for the protected raising of fall seedlings during hot weather.) Second set of figures: winter sowing in a good greenhouse or a miniature greenhouse in areas with very cold winters for spring set out. Harden off for 2 days outside in flat before transplanting into bed.
##	If direct sowing on centers, rather than broadcasting, plant 2 seeds per center to compensate for low germination rate.
+	Yield may be significantly higher.
++	Given harvest time in column O.

Visit growbiointenive.org/footnotes for downloadable pdfs of this page and pages 177–179. If you print them doublesided and laminate them, the result is a Master Chart Bookmark set that can be used to quickly and easily access the codes and footnotes.

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
1 Artichoke, Jerusalem	Sprouted 2 oz tuber pieces	—	10.5 lbs / —	L	F/B—use 6" deep flat. Put tubers as close as possible.	Put tubers as close as possible.	3	3–4	—	—	—	—	15 (centers) 6 (depth)	84
2 Artichoke, Regular	From divided roots or seeds	Seeds: .70[A]	3 roots / —	L	Seeds: F Roots: B Seeds 1	Seeds 175	Small part of 1 flat	Seeds 3–4	6 / 2	60	Small part of flat	12–16	72	3
3 Asparagus	875–1,250	.70	.32 / 1 t or 159 roots	L	Seeds: F 1 Roots: B	175	0.9	D	6 / 2	60	2.65	D	12	159
4 Basil	12,000	.60	.09 / 1 t	L	F B C	175	4.1	1–2	3 / 1.5	111	5.6	3	6	621
5 Beans, Lima, Bush	Baby: 75–90 Regular: 25–38	.70	Regular: 35.5–23.3 / $6^3/_{16}$–$3^3/_4$ c	S	F 1	175	3.5	1–2	—	—	—	—	6	621
6 Beans, Lima, Pole[N]	Baby: 35–90 Regular: 25–38	.70	Regular: 18.3–12 / $3^3/_{16}$–2 c	S	F 1	175	1.8	1–2	—	—	—	—	8	320
7 Beans, Snap, Bush	100–125	.70	8.8–7.0 / $1^1/_2$–$1^1/_8$ c	S	F 1	175	3.5	1–2	—	—	—	—	6	621
8 Beans, Snap, Pole[N]	100–125	.70	8.8–7.0 / $1^1/_2$–$1^1/_8$ c	S	F 1	175	3.5	1–2	—	—	—	—	6	621
9 Beets, Cylindra	1,500–1,625	.65[G]	1.4–1.3 / 6 T[AA]	S	F/B[R] 1	162	7.6	3–4	—	—	—	—	4	1,343
10 Beets, Regular	1,500–1,625	.65[G]	1.4–1.3 / 6 T[AA]	S	F/B[R] 1	162	7.6	3–4	—	—	—	—	4	1,343

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
1 Artichoke, Jerusalem	Tubers: 100 / 206 / 460+ Biomass, air-dry: ~7.5 / ~15 / ~30	D	Tubers: 420+	17–26	—	SP	Plant tubers 1 week after last hard frost. Try 90-day varieties. Harvest after flowers die.	D	7.2	345	44	:Raw. 31% refuse. Used in alcohol production for gasohol. Good source of organic matter.
2 Artichoke, Regular	D	28.3	D	D, P	8	FA	Harvest artichokes when fully plump but before they become fibrous. Cut down stalks after they begin to dry. Resprouts from root.	D	5.3	213	93	:Raw.
3 Asparagus	9.5 / 19 / 38	7.3	8.7	Seeds: 4 yrs. Roots: 1 yr.	8	SP	Grow from roots or seed. From seed: Let plants go to seed without harvesting first and second year, so plants build strong roots; cut down dry stalks; harvest small shoots third year; harvest full-sized shoots fourth year. From roots: Let go to seed first year, harvest second year.	1.1 (fresh) .2 (canned) .1 (frozen)	6.4	104	56	:Raw. 44% refuse.
4 Basil	35 / 75 / 150	D	D	6–8	12	SU	Transplant when seedlings have 2 sets of true leaves and a third one coming; set down to cotyledons. After approx. 6 growth nodes appear on plant or when it begins to flower, cut back to 2 nodes. Cut branches back to 1 node.	D	12	123	385	
5 Beans, Lima, Bush	Dry: 11.5 / 17.2 / 23	5.9	23.0	9–11	12	SU	Transplant when seedlings have 2 true leaves but before seedlings reach 3–4 inches tall; bury up to half of stem up to cotyledons. Snap and shell beans: Harvest regularly (every other day) for higher yields. Some varieties produce all at once; others continue to produce over a longer period. Dry beans: pick when beans are bulging through pods so plants will set more beans.	"1.3"	92.5	1,533	327	:Dry seeds. (Lima beans contain a small amount of cyanide.)
6 Beans, Lima, Pole[N]	Dry: 23+ / 34.4+ / 46+	11.8+	23.0+	11–13	12	SU						
7 Beans, Snap, Bush	30 / 72 / 108	17.6	17.0	8	12	SP, SU		2.0 (fresh) 3.7 (canned) 1.9 (frozen)	7.6	141	124	:Raw. 12% refuse.
8 Beans, Snap, Pole[N]	30+ / 72+ / 108+	17.6+	29.7	8–9	12	SP, SU						
9 Beets, Cylindra	Roots: 110 / 220 / 540 Greens: 55 / 110 / 270	"68.0" D	30.6	8–9	4+	SP, SU, FA	Each seed produces 1–3 seedlings. Transplant only 1 seedling from a cluster to enhance genetic diversity. For optimum yield, harvest bulbs and greens when bulbs have reached maximum size without becoming fibrous and when greens are still succulent.	"1.9"	5.1	195	51	:Roots, raw. 33% refuse. Excellent tops often mean too much nitrogen fertilizer and poor root growth. Cylindra variety twice the weight of regular beets. :Greens, raw.
10 Beets, Regular	Roots: 55 / 110 / 270 Greens: 55 / 110 / 270	"34.0" D	30.6	8–9	4+	SP, SU, FA			5.6	100	302 M	

Letter codes on page 133, notes on pages 177–179

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate[5]**	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat[16]**	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat[14]**	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat[16]**	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet[7]**
11 Broccoli	9,000	.75	.01 / 1/24 t	S	F 1	187	0.45	2–3# 3–4	6 / 2	60	1.4	3–4# 5–6 LG	15	84
12 Brussels Sprouts	9,000	.70	.01 / 1/24 t	S	F 1	175	0.3	2–3# 3–4	6 / 2	60	0.9	3–4# 5–6 LG	18	53
13 Burdock	1,700	.60	1.3 / 4 T	S	F 1	150	8.9	3–4+	—	—	—	—	4	1,343
14 Cabbage, Chinese	9,000	.75	.03 / 1/8 t	S	F 1	187	1.1	2–3# 3–4	6 / 2	60	3.35	3–4# 5–6LG	10	201
15 Cabbage, Regular	9,000	.75	.023 / .012 / .007 / 1/24 t	S	F 1	187	0.85 / 0.45 / 0.3	2–3# 3–4	6 / 2	60	2.6 / 1.4 / 0.9	3–4# 5–6LG	12 / 15 / 18**	159 / 84 / 53
16 Carrots	18,750–25,000	.55	.2 / 1 1/4 t[BB]	S	F/B## B C	137	6.6	3–4	—	—	—	—	3	2,507
17 Cauliflower	9,000	.75	.01 / 1/24 t	S	F 1	187	0.45	2–3# 3–4	6 / 2	60	1.4	3–4# 5–6LG	15	84
18 Celery	72,000	.55	.016 / 1/4 t	L/EL	F B C	137	1.1	4–6	3 / 1	250	2.5	4–6Q	6	621
19 Chard, Swiss	1,500	.65G	.4 / 2 T[AA]	S	F 1	162	2	3–4	—	—	—	—	8	320
20 Collards, Annual & Perennial	9,000	.80	.022 / 1/8 t	S	F 1	200	0.8	2–3# 3–4	6 / 2	60	2.6	3–4# 5–6LG	12	159

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
11 Broccoli	Heads: 26 / 39 / 53 Leaves: 52+ / 78+ / 106+	33.9 D	5.5	8–9	4–6	SP, FA	See Cabbage for prick-out and transplanting. Heads grow very fast. Harvest before flowering begins. Can produce secondary heads for additional good harvest.	5.7 (fresh) 2.6 (frozen)	12.7 13.6	127 127	364 1,189	:Head, raw. 22% refuse. :Leaves, raw. Contain more nutrition than heads.
12 Brussels Sprouts	71 / 106 / 142	"36.7"	2.8	11–13	12	SP, FA	Does better in fertile soil. See Cabbage for prick-out and transplanting. When sprout node begins to bulge, remove leaf below it for best growth. Harvest when sprouts are at maximum plumpness, before outer leaves become fibrous and sprout becomes bitter.	".3"	20.4	195	150	:Raw. 8% refuse.
13 Burdock	75 / 150 / 300	D	D	Up to 42	8–12	FA	Harvest after about 10 months when roots have reached maximum size and before they become fibrous.	D	6.9	327	186	Sow Watanabe in spring for summer harvest and Takinogawa in spring or fall for late summer or following spring harvest.
14 Cabbage, Chinese	96 / 191 / 383	"69.4"	6.1	7–11**	—	SP, FA	Harvest at peak of size and succulence, before leaves begin to yellow and plants go to seed.	D	5.3	59	189	:Raw. 3% refuse.
15 Cabbage, Regular	96 / 191 / 383	"69.4"	3.6	9–16**	2–4+	SP, FA	For prick-out, set seedlings down to cotyledons. For transplant, set seedlings deep, leaving 1–3 leaves above the soil. Harvest heads before top turns yellow or top leaves begin to split.	7.5 (fresh) 1.1 (kraut)	5.3 8.2	113 113	200 171	:Green, raw. 10% refuse. :Red, raw. 10% refuse.
16 Carrots	Roots: 100 / 150 / 400+	Fresh: 72.5/ Processing: 97.2	17.8	9–11	4+	SP, SU, FA	Transplant when seedlings have 2 true leaves, a third one coming, and a good root not more than 3 inches long; be careful to keep the root straight. Harvest at maximum diameter while they are still sweet.	8.8 (fresh) 1.6 (canned) 1.5 (frozen)	4.1	195	134	:Raw, without tops. 18% refuse. Excellent tops often mean too much nitrogen fertilizer and poor root growth.
17 Cauliflower	44 / 100 / 291	38.5	1.0	8–12**	—	SP, FA	See Cabbage for prick-out and transplanting. Cauliflower head often develops in just a few days. Harvest at full size before it begins to yellow.	1.7 (fresh) .4 (frozen)	12.2	113	113	:Raw.
18 Celery	240 / 480 / 959+	160.7	9.9	12–16	3–4 to 26[52]	SP, FA	Transplant when seedlings are about 4 inches tall. For maximum yield, harvest outer stalks sequentially by pulling down and twisting while holding the plant; leave a minimum of 6–8 significant stalks per plant; outer stalks will get bigger as plants mature.	6.1	5.3	73	189	:25% refuse.
19 Chard, Swiss	200 / 405 / 810	D	29.0	7–8	44	SP, SU, FA	For transplanting, see Beets. Harvest sequentially as leaves mature, 1–2 outer stalks per plant; be sure to leave a minimum of 5 significant stalks per plant.	D	10.0	86	367 M	:Raw. 8% refuse. Good organic matter crop at high yields.
20 Collards, Annual & Perennial	96 / 191 / 383	D	D	12	24	SP, FA	For prick-out and transplanting, see Cabbage. Harvest sequentially as leaves mature, 1–2 leaves per plant; be sure to leave at least 5 significant leaves per plant/stem.	D	16.3	136	921	:Leaves and stems, raw.

Letter codes on page 133, notes on pages 177–179

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
21 Corn, Sweet	112–156	.75	1.0–.72 / 2–1 2/5 c	S	F 1	187	0.45	3–5 days	—	—	—	—	15	84
22 Cucumbers	938–1,000	.80	.2 / 1 1/4 T	S	F 2	48	3.3	2–3# 3–4	—	—	—	—	12	159
23 Eggplant	6,500	.60	.014 / 1/12 t	L / EL	F 1	150	0.35	2–3	6 / 2	60	0.9	3–4# 5–7[LG]	18	53
24 Garlic	Cloves: 12	.5[Z]	20 lbs / 10 qt bulbs	L	B	—	—	—	—	—	—	—	4	1,343
25 Horseradish	Live roots used	—	159 roots / —	L	B	—	—	—	—	—	—	—	12	159
26 Kale	9,000	.75	.01 / 1/24 t	S	F 1	187	0.45	1–2# 3–4	6 / 2	60	1.4	3–4# 5–6[LG]	15	84
27 Kohlrabi	9,000	.75	.20 / 1/16 t	S	F 1	187	7.2	2–3# 3–4	—	—	—	—	4	1,343
28 Leeks	12,500	.60	.1 / 3/8 t	S	F B C	150	2.1	6	6 / 1.5	111	5.6	—	6	621
29 Lettuce, Head	25,000	.80	.008 / 1/8 t	S	F B C	200	0.8	1–2	3 / 1.5	111	1.4	2–3	12	159
30 Lettuce, Leaf	25,000	.80	.016 / .012 / 1/4 t	S	F B C	200	1.6 / 1.24	1–(2)	3 / 1.5	111	2.9 / 2.2	2–3	8 WI / 9 SP–FA	320 / 248

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
21 Corn, Sweet	Shelled, wet: 17 / 34 / 68 Biomass, air-dry: 12 / 24 / 48	27.0 0	22.6	9–13**	—	SU	To check maturity, pull the husk open and pierce a kernel with a thumbnail. Harvest when the juice is halfway between clear and milky. Wait an additional 30 days to harvest plants for optimum compost pile biomass.	Shelled, wet: 9.7 (fresh), 9.0 (frozen), 8.3 (canned)	8.7	400	7	:Raw. 45% refuse (cob).
22 Cucumbers	158 / 316 / 581	Fresh: 39.3 Pickling: 25.0	4.1	7–10	7–14	SU	Transplant when seedlings have 3 large true leaves. Harvest when approx. 6–8 inches long; fruit should be smooth, with no ridges, just beginning to turn lighter green; cut stem about 1/2 inch from plant.	Reg: 6.1, Pickles: "4.4" (fresh) 3.6 (canned)	3.9	59	108	:Raw, whole. 5% refuse.
23 Eggplant	54 / 108 / 163	"55.1"	.6	10–11	13	SU	Transplant when seedlings are about 6 inches tall. Harvest when fruit is beginning to soften.	".5"	4.4	118	44	:Raw. 19% refuse.
24 Garlic	60 / 120 / 240+ • Hardneck: biomass, air-dry: 7.5 / 15 / 30+[54]	40.9	Bulbs: 240	17–44	—	SP, FA	Separate bulbs into cloves; plant only the largest cloves 1–2 inches below the soil. Most bulb growth occurs in last 45 days. Harvest when plants have 6–7 green leaves. Dry well in shade. Softneck: braid or cut off stems 2 inches from bulb. Hardneck: cut off stems 2 inches from bulb.	2.8	24.8	676	116	:12% refuse. Contains antibiotics. Amount of seed depends on size of bulbs and cloves.
25 Horseradish	D	D	D	26	—	SP, FA	Transplant root pieces after last hard frost. Dig up roots after 6 months or when leaves begin to die back. Perennial in warmer climates.	D	10.6	288	464	:Raw. 27% refuse.
26 Kale	76 / 114 / 153	"16.0"	3.8	8–9	17	SP, FA	For prick-out and transplanting, see Cabbage. For harvest, see Chard.	D	14.1	227	601	:Raw leaves and stems. 26% refuse. Good vitamin and mineral content.
27 Kohlrabi	67 / 135 / 270	D	20.1	7–8	4–8	SP, FA	For prick-out and transplanting, see Cabbage. Harvest as soon as leaves begin to become less green and dull and bulbs stop increasing in size.	D	6.6	122	136	:Raw. 27% refuse.
28 Leeks	240 / 480 / 960 biomass, air-dry: 7.5 / 15 / 30	"5.2"	9.8	19	4–8	SP, FA	Transplant after 8–12 weeks in flat, when seedlings are as big around as a No. 2 pencil. Harvest after approx. 5+ months.	D	5.2	277	123	:Raw. 25% refuse.
29 Lettuce, Head	75 / 150 / 300	85.8	1.2	11–13	1–3	SP, FA	Transplant when seedlings are about 2–3 inches tall. Harvest in very early morning for best taste, when outer leaves are still green and shiny.	21.4	3.9	59	86	:Raw. 5% refuse.
30 Lettuce, Leaf	135 / 202 / 540	56.1	4.0	6–12**[26]	1–3	SP, SU, FA, WI	Transplant when seedlings are about 2–3 inches tall. Harvest in very early morning for best taste, when plant is at maximum fullness and before it begins to bolt or become bitter. Winter growing in double-walled mini-greenhouse.	9.5	3.8	82	197	:Raw. 36% refuse.

Letter codes on page 133, notes on pages 177–179

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
31 Mangels	1,600	.65	.41 / 3 2/5 T[AA]	S	F 1	162	2.7	3–4+	—	—	—	—	7	432
32 Melons	1,000–1,250	.75	.1–.09 / 1/2 t	S	F 2	45	1.86	3–4[LG]	—	—	—	—	15	84
33 Mustard	15,000	.75	.055 / 1/4 t	S	F 2	187	3.3	3–4	—	—	—	—	6	621
34 Okra	500	.50	.64 / 3 1/2 t	L	F 1	125	1.3	6–8	6 / 2	60	2.6	3–4	12	159
35 Onions, Bunching	11,250–12,500	.70	.32–.29 / 3 3/4 T	S	F B C	175	7.7	6–8	—	—	—	—	3	2,507
36 Onions, Regular	8,125	.70	.2 / 2 1/2 T	S	F B C	175	3.8	6–8# 8–10	—	—	—	—	4	1,343
37 Onions, Torpedo	8,125	.70	.2 / 2 1/2 T	S	F B C	175	3.8	6–8# 8–10	—	—	—	—	4	1,343
38 Parsley	18,000	.60	.08 / 1 t	L / EL	F B C	150	2.8	2–3	6 / 2	60	13.9	6–8	5	833
39 Parsnips	4,900	.60	.47 / 1 2/3 c	L	F 1	150	9	3–4	—	—	—	—	4	1,343
40 Peas, Bush	94–156	.80	2–1.25 lbs / 2–1 1/4 c	S	F 1	200	12.5	1–2	—	—	—	—	3	2,507

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
31 Mangels	Roots: 200 / 400 / 800+ Greens: 100 / 200 / 400+	Roots: "68.0" Greens: D	20.0+	8–12+	4+	SP, SU, FA	See Beets.	D	D	D	D	See Beets.
32 Melons	50 / 72 / 145	51.9[H] 59.0[CA]	2.9	12–17**	13	SU	Transplant when seedlings have 3 large true leaves. Harvest when the outer skin begins to change color and the blossom end begins to soften.	10.8[CA] 2.2[H]	1.6 2.3	68 159	32 32	:Cantaloupe. 50% refuse. :Honeydew. 37% refuse.
33 Mustard	180 / 225 / 270	D	5.7	5–6	8–30	SP, FA	Transplant when seedlings have 3–4 good true leaves. Harvest outer leaves regularly, leaving 3 good leaves in the center.	D	9.5	118	73	:Raw. 30% refuse.
34 Okra	30 / 60 / 120	D	9.3	7–8	13	SU	Prick out when seedlings are 2 inches tall. Transplant when seedlings are about 6 inches tall. Harvest when the pods are succulent, before they become tough.	D	9.4	150	359	:Raw. 14% refuse.
35 Onions, Bunching	100 / 200 / 540	D	39.6	8–17	—	SP, SU, FA	Transplant when the seedlings are about the thickness of ordinary pencil lead. Harvest when the plants are slightly thicker than your little finger, or as desired. Root length for planting 1" (trim). Harvest when 1/8"–3/16" in diameter 1" above start of roots.	D	6.5 1.8	145 76	222 67	:Raw. Bulb and entire top. 4% refuse. :Raw. Bulb and white portion of top. 63% refuse.
36 Onions, Regular	100 / 200 / 540	101.4	10.3	14–17	—	SP, FA	Transplant when the seedlings are about the thickness of ordinary pencil lead. Harvest: when a significant number of tops have fallen down, push down the rest and continue to water for 1 week; stop watering and let onions begin to cure in the ground for 1–2 weeks; loosen the soil under the onions and lift them out. Put them in single layer in a shady, well-ventilated area to dry thoroughly. Eat first any onions that do not dry well. Root length for transplanting: trim to 2".	19.2	6.2	172	111	:Dry. Raw. 9% refuse.
37 Onions, Torpedo	200 / 400 / 800+	101.4	10.3	14–17	—	SP, FA		19.2	6.2	172	111	:Dry. Raw. 9% refuse.
38 Parsley	45 / 91 / 182 (4- to 6-mo. harvest)	D	24.8	10–13	17–26	SP, FA	Prick out when seedlings have 1 true leaf. Transplant when seedlings are about 3 inches tall. Plants are sensitive to inappropriate handling. Choose best seedlings to transplant: white forking roots, dark green leaves. Harvest outer stalks carefully, leaving 3–5 large stalks per plant; remove inedible stalks and compost them.	D	16.3	163	921	:Raw.
39 Parsnips	119 / 238 / 479	D	24.8	15	4–8+	SP, FA	Slow to germinate and grow. Transplant when seedlings have 3–4 good true leaves. Be patient! Harvest when mature or after frost for sweetest flavor.	D	6.6	340	193	:Raw. 15% refuse.
40 Peas, Bush	Fresh: 25 / 53 / 106 Dry: 4 / 10 / 24	Fresh: 9.2 Dry: "4.4"	24	8–10	12	SP, FA	Timing is important: transplant approx. 1 week after last hard frost or after last soft frost in areas with a cool growing season. Harvest when seeds are bulging in the pods. Pole peas in 2' wide beds generally yield better due to improved pollination.	"4.1" (fresh) 1.3 (canned) 1.9 (frozen)	10.9 109.4	367 1,542	45 290	:Green, without pods. 62% refuse (pods). :Dry. Try sugar snap edible variety.

Letter codes on page 133, notes on pages 177–179

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
41 Peas, Pole[N]	94–156	.80	1.1 lbs–10.7 oz / 1 1/10–2/3 c	S	F 1	200	6.7	1–2	—	—	—	—	4	1,343
42 Peppers, Cayenne	4,500	.55	.064 / 3/8 t	L / EL	F 1	137	1.2	2–3	6 / 2	60	2.6	3–4# 5–7[LG]	12	159
43 Peppers, Green	4,500	.55	.064 / 3/8 t	L / EL	F 1	137	1.2	2–3	6 / 2	60	2.6	3–4# 5–7[LG]	12	159
44 Potatoes, Irish	—	—	31–23.25 lbs / 16–12 qt	L	Note 31	—	—	—	—	—	—	—	9 centers 6 to 9 depth[49]	248
45 Potatoes, Sweet	—	—	12 lbs / 6 qt	L	Note 32	60	—	4–6	—	—	——	—	9 centers 6 to 9 depth[49]	248
46 Pumpkin	94–250	.75	.75–.07 / 1/10 T	S	F 2	45	1.2/0.3	3–4[LG]	—	—	—	—	18 / 30**	53 / 14
47 Radishes	2,500–3,125	.75	1.3–1 / 1 3/4 T	S	B	—	—	—	—	—	—	—	2	5,894
48 Rhubarb	1,700[Y]	.60[Y]	.025 / 2/3 t	L	Seeds: F 1 Roots: B	150	0.18	D	6 / 2	60	0.4	D	24	26
49 Rutabagas	9,375–11,875	.75	.09 / 1/4 t	S	F 1	187	3.3	3–4	—	—	—	—	6	621
50 Salsify	1,900	.75	1.7 / 1/2 c	S	F 1	187	3.2	3–4	—	—	—	—	3	2,507

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
41 Peas, Pole[N]	Fresh: 25+ / 53+ / 106+ Dry: 4 / 10 / 24	Fresh: 9.2 Dry: "4.4"	24	10–11	12	SP, FA	Timing is important: transplant approx. 1 week after last hard frost or after last soft frost in areas with a cool growing season. Harvest when seeds are bulging in the pods.	"4.1" (fresh) 1.3 (canned) 1.9 (frozen)	10.9 109.4	367 1,542	45 290	:Green, without pods. 62% refuse (pods). :Dry. Try sugar snap edible-pod variety.
42 Peppers, Cayenne	Dry: 5 / 10 / 20	D	.1	9–11	17	SU	Transplant when seedlings are about 6 inches tall and the soil is warm. Use a mini-greenhouse or a row cover in areas with a short growing season.	D	45	1,470	681	:Dry (including seeds). 4% refuse.
43 Peppers, Green	68 / 136 / 204	68.7	.3	9–12	17	SU	Harvest when fully mature and before fruit begins to discolor.	7.0	4.5 5.1	82 122	33 47	:Green. 18% refuse. :Red. 20% refuse.
44 Potatoes, Irish	100 / 200 / 780	84.2	Tubers: 780	9–17	—	SP, SU	See note 31. After tops die, stop watering, wait 2 weeks, dig up carefully. Put in single layer in shade to cure for 2–3 days. Store in a cool, dark, well-ventilated place.	47.2 (fresh) 57.2 (frozen)	7.7	349 avg. Red: 327 Russet: 358 White: 318	26	:Raw. 19% refuse. Green parts poisonous. See above. Δ
45 Potatoes, Sweet	82 / 164 / 492	39.5	Tubers: 492	13–17 (3-mo var.) 26–34 (6-mo var.)	—	SU	See note 32. It is also possible to buy slips to plant. Harvest when tops are dead.	4.7	6.6 6.2	375 430	118 118	:Jewel (firm). 19% refuse :Puerto Rican (soft). (peelings) See above. Δ
46 Pumpkin	Whole: 48 / 96 / 191 Seeds without hulls: 1 / 2 / 4	D	5.1	14–16	—	SU	For transplanting, see Cucumbers. For harvest, see Winter Squash.	".6"	3.2 131.5	118 2,454	67 231	:Raw fruit. 30% refuse. :Seeds. Hulls 30% of unhulled weight.
47 Radishes	Roots: 100 / 200 / 540	D	20.6	3–9**	1	SP, FA	Small radishes: Broadcast directly in bed (use seed amount in Col. D), or use chicken wire to space seeds 1 inch apart in the bed (will require 4 times the seed). Chop seeds in lightly with rake. Harvest after about 3–4 weeks in the ground and before the bulb becomes too hot and fibrous. Daikon: Sow on 1-inch centers in flat (seed needed per 100 square feet: .26 = .33 ounces). Transplant when seedlings have 3–4 good true leaves, about 2 weeks after sowing. To avoid bolting, transplant after June 21. Harvest after about 2½–3 months, before seed stalk begins to form.	D	4.1	91	122	:Raw, without tops. 10% refuse.
48 Rhubarb	Stalks: 70 / 140 / 280	D	D	Seeds: 3 yrs. Roots: 1 yr.	D	SP	Harvest stalks with hand-sized leaves every 5–10 days; be sure to keep 5–6 medium to medium-large shiny, newer leaves with some red on the stem on the plant.	".03"	2.3	95	374	:Raw, without leaves. 14% refuse. Green parts poisonous.
49 Rutabagas	200 / 400 / 800+	"68.0+"	5.4	13	4+	SP, FA	Transplant when seedlings are about 2–3 inches tall. Harvest when roots are mature (a "neck" will begin to form when the root has reached maximum size; quality will decline as neck elongates).	D	4.2	163	254	:Raw. 15% refuse. Very flavorful when grown using GROW BIOINTENSIVE methods.
50 Salsify	100 / 200 / 400+	D	27.7	17	4+	SP, FA	For transplanting, see Carrots. Harvest after 4–5 months in ground, before leaves become dull.	D	11.4	372	185	

Letter codes on page 133, notes on pages 177–179

Vegetable and Garden Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
51 Shallots	8[Y] (bulbs)	.75[Y]	14.0 / 7 qt (bulbs)	L	B	—	—	—	—	—	—	—	4	1,343
52 Spinach, New Zealand, Malabar	350	.40	1.14 / 6 T	L	F	24	6.6	3–4	—	—	—	—	12	159
53 Spinach, Regular	2,800	.60	.37 / 2 t	S	F	150	4.2	3–4	—	—	—	—	6	621
54 Squash, Crookneck	218–281	.75	.5–.4 / 2–1 1/2 T	S	F	45	1.9	3–4[LG]	—	—	—	—	15	84
55 Squash, Patty Pan	300	.75	.37 / 1 1/3 T	S	F	45	1.9	3–4[LG]	—	—	—	—	15	84
56 Squash, Winter	100–250+	.75	12" C: 2.12–.84 / 9 1/2–3 3/4 T 15" C: 1.12–.45 / 5–2 T 18" C: .71–.28 / 3 1/5–1 1/4 T	S	F	45	3.5 / 1.9 / 1.2	3–4[LG]	—	—	—	—	12 / 15** / 18	159 / 84 / 53
57 Squash, Zucchini	300	.75	.24 / 2 2/5 t	S	F	45	1.2	3–4[LG]	—	—	—	—	18	53
58 Tomatoes	10,000–12,000	.75	.006 / .004 / .003 / 1/16–1/32 t	S	F	187	0.3 / 0.2 / 0.14	4–6	6 / 2	60	0.9 / 0.6 / 0.4	3–4[LG]	18 / 21 / 24[TO]	53 / 35 / 26
59 Turnips	9,375–12,500	.80	.18–.13 / 2/3	S	F	200	6.7	2–3	—	—	—	—	4	1,343
60 Watermelon	Small seed: 500–625 Large seed: 187–312	.80	**Small seed:** 12"C: .45–.36 / 3–2 3/8 t • 18"C: .15–.12 / 11/8–3/4 t • 21"C: .10–.08 / 5/8–1/2 t • 24"C: .07–.06 / 7/16–3/8 t **Large seed:** 12"C: 1.2–.73 / 2 3/4 T • 18"C: .4–.24 / 2 5/8–1 5/8 t • 21"C: .27–.16 / 1 3/4–1 13/16 t • 24"C: .20–.12 / 1 3/8 –3/4 t	S	F	42	3.8 / 1.3 / 0.8	3–4[LG]	—	—	—	—	12 / 18 / 21 / 24[W]	159 / 53 / 35 / 26

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
51 Shallots	60 / 120 / 240+	D	Bulbs: 240	17–26	—	SP, FA	Separate bulbs; use larger bulbs for transplanting. When leaves become abundant, 10–20% can be cut for flavoring without decreasing yield of bulbs. For curing, see Onions.	D	10.0	357	148	:Raw. 12% refuse.
52 Spinach, New Zealand, Malabar	180 / 225 / 270	D	17.2	10	42	SP, SU. FA	New Zealand: see Regular Spinach, except harvest when leaves are fully mature. Malabar: see Regular Spinach.	D	10.0	64	263	:Raw.
53 Spinach, Regular	50 / 100 / 225	Fresh: 34.6 Processing: 39.0	10.8	6–7	—	SP, FA	Transplant when seedlings have 3 true leaves. Timing is crucial (see Peas). Harvest large leaves just before they become dull; leave 5 good leaves per plant.	1.7	10.5	100	304[M]	:Raw. 28% refuse.
54 Squash, Crookneck	35 / 75 / 150	D	6.1	10	17+	SU	For transplanting, see Cucumbers. Harvest before fruit becomes dark yellow and hard.	D	5.3	86	124	:Raw. 2% refuse.
55 Squash, Patty Pan	75 / 150 / 307	D	6.1	7	17+	SU	For transplanting, see Cucumbers. White variety: harvest when bone-white with only a tinge of green left. Colored varieties: harvest before fruit becomes dark and hard.	D	4.0	82	124	:Raw. 2% refuse.
56 Squash, Winter	50 / 100 / 350	D	5.7	11–17**	4+	SU	For transplanting, see Cucumbers. Support squash on smooth rocks to keep them off the damp soil. Harvest when stem is dry and hard; cut off with 2 inches of stem.	D	5.2 4.4 4.2	152 171 117	107 102 57	:Acorn, raw. 24% refuse. :Butternut, raw. 30% refuse. :Hubbard, raw. 34% refuse.
57 Squash, Zucchini	160 / 319 / 478+	D	6.1	7–9	26	SU	For transplanting, see Cucumbers. Lightly tap open female flowers on new zucchini to push them off; if they do not come off easily, do not force them. Harvest preferably when approx. 8–10 inches long, 12–20 ounces; remove irregular and/or deformed fruit from plant.	D	5.2	64	121	:Raw. 5% refuse.
58 Tomatoes	100 / 194 / 418	Fresh: 67.0 Processing: 153.4	5.5	8–13	17+	SU	Transplant when seedlings are about 6 inches tall; set plants deeper than in flat. Harvest at full color and when fruit comes off easily.	Canned: 69.6 Fresh: 18.1	5.0	95	59	:Raw.
59 Turnips	Roots: 100 / 200 / 360 Greens: 100 / 200 / 360	D	14.7	5–10**	4+	SP, FA	See Rutabaga.	D	3.9 13.6	122 127	152 1,116	:Roots, raw. :Greens, raw.
60 Watermelon	50 / 100 / 320	58.7	2.6	10–13	13	SU	For transplanting, see Cucumbers. Harvest when the watermelon says "Plunk!" when you tap it with a knuckle; if it says "Plink!" or "Plank!" it is not yet mature enough.	13.8	1.0	145	15	:Raw. 54% refuse.

Letter codes on page 133, notes on pages 177–179

Calorie, Grain, Protein Source, and Vegetable Oil Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
For protein, also see: Beans, Lima; Buckwheat; Collards; Corn, Sweet; Garlic; Peas; Potatoes, Irish and Sweet	**Approx. No. Seeds per Ounce[4]** (Range: larger–smaller seed)	**Minimum Legal Germination Rate[5]**	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat[16]**	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat[14]**	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat[16]**	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet[7]**
1 Amaranth, Grain & Leaf	25,000–53,400	.70[A]	.035–.017 / 1/3 –1/6 t .009–.004 / 1/40 –1/80 t	S	F	175	0.9 0.25	1	3 / 1.5	111	5.6 2.6	3	Greens: 6 Seed: 12	621 159
2 Barley	500 hulled	.70[A]	2.4 / 6 1/3 T	S	F	175	2.4	1–2	—	—	—	—	5	833
3 Beans, Fava, Cold-Weather	15–70	.75	28.4–6.1 / 7 1/2–15/8 c	S	F / B[R]	187	1.7	2	—	—	—	—	8	320
4 Beans, Fava, Hot-Weather	15–70	.75	55.2–11.8 / 14 1/2–3 c	S	F / B[R]	187	3.3	2	—	—	—	—	6	621
5 Beans, Kidney	50	.70[A]	17.7 / 1 9/10 c	S	F	175	3.5	1–2	—	—	—	—	6	621
6 Beans, Mung	500	.70[A]	3.8 / 7 5/8 T	S	F	175	7.7	1–2	—	—	—	—	4	1,343
7 Beans, Pinto	70	.70[A]	12.7 / 2 c	S	F	175	3.5	1–2	—	—	—	—	6	621
8 Beans, Red Mexican & Black	50–100	.70[A]	17.7–8.9 / 2 1/10–1 1/10 c	S	F	175	3.5	1–2	—	—	—	—	6	621
9 Beans, White	90–180	.70[A]	9.9–4.9 / 1 3/4 –5/6 c	S	F	175	3.5	1–2	—	—	—	—	6	621
10 Cassava (Manioc/ Yuca) (manihot esculenta)	—	—	D	—	B	—	—	—	—	—	—	—	36	18

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES	
	O	P	Q	R	S	T	U	V	W	X	Y	Z	
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]		
1 Amaranth, Grain & Leaf	Edible greens-type: 68 / 136 / 272+ Seed: 4 / 8 / 16+ Biomass, air-dry (stalks): 12 / 24 / 48 Biomass, wet: 53 / 132 / 317	Seed: "4" Biomass, air-dry: "6"	16+	Greens: 6 Seed: 12	Greens: 4+ Seed: —	SU	Prick out when cotyledons have emerged and before first leaf emerges. Transplant when 2–3 inches tall and strong. For grain: harvest when seeds are mature and dry enough to rub out of head easily; be alert for birds. For leaves: harvest when they are large, green, and shiny and before they begin to lose their maximum green.	D	11.1 65.4	104 1,696	973 693	:Greens. Good calcium source. :Seed.	
2 Barley	Seed: 5 / 10 / 24[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 6.5 Biomass, dry: est. 9.7	24	9–10 to 34[47]	—	SP, FA	Transplant when seedlings are about 1.5–2 inches tall, before roots become unmanageable. Harvest when entire plant is 85% golden; be alert for birds.	.7	37.2 43.5 3.2*	1,583 1,579 224	73 154 145	:Light. :Pearled or scotch. :Straw and chaff, dry. Hulling of regular varieties difficult. Use hull-less varieties.	
3 Beans, Fava, Cold-Weather	Dry seed: 5 / 9 / 18 Biomass, air-dry: 18 / 36 / 72 Biomass, wet: 90 / 180 / 360	D	18	17–43	—	SP, FA	Transplant when seedlings are about 1 inch tall, before roots become unmanageable. For biomass, harvest when plants are at ~50% flower. For beans, harvest all pods when first pods begin to turn black, before they shatter.	D	13.0 113.9	162 1,547	42 463	:In pods. 66% refuse. :Dry beans.	Excellent organic matter crop. Fixes up to .16+ lb nitrogen (for summer varieties) and .34 lb (for winter varieties) per 100 sq ft per year. Caution: Beans can be toxic to some people.
4 Beans, Fava, Hot-Weather	Dry seed: 2 / 3 / 6 Biomass, air-dry: 6 / 12 / 24 Biomass, wet: 30 / 60 / 120	D	6	13–17	—	SP		D	13.0 113.9	162 1,547	42 463	:In pods. 66% refuse. :Dry beans.	
5 Beans, Kidney	Seed: 4 / 10 / 24	"4.0"	24	12	8	SU	Transplant when seedlings have 2 true leaves but before seedlings reach 3–4 inches tall; bury up to half of stem up to cotyledons. Dry beans: pick when beans are bulging through pods so plants will set more beans. Beans may shatter (fall to the ground) if left on plant too long. Fixes up to .27 lb nitrogen per 100 sq ft per year. Pinto beans: habit is often halfway between bush and pole. Ready to harvest when pods have delicate red pattern.	All edible dry beans: "13.5"	102.1	1,510	499		:Dry seeds, raw.
6 Beans, Mung	Seed: 4 / 10 / 24	3.8	24	12	8	SU			109.8	1,574	535		
7 Beans, Pinto	Seed: 4 / 10 / 24	3.8	24	12	8	SU			103.9	1,542	612		
8 Beans, Red Mexican & Black	Seed: 4 / 10 / 24	3.8	24	12	8	SU			103.9 102.1	1,583 1,538	612 499	:Red Mexican. :Black.	
9 Beans, White	Seed: 4 / 10 / 24	3.8	24	12	8	SU			101.2	1,538	653		
10 Cassava (Manioc/ Yuca) (manihot esculenta)	Root: 30 / 60 / 120	D	D	26–52	D	—	Transplant stem cuttings 12–18 inches long and 1–1.5 inches in diameter at beginning of rains.	D	5.5	726	309	:Raw. Some varieties take 104 weeks to mature.	

Letter codes on page 133, notes on pages 177–179

Calorie, Grain, Protein Source, and Vegetable Oil Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
For protein, also see: Beans, Lima; Buckwheat; Collards; Corn, Sweet; Garlic; Peas; Potatoes, Irish and Sweet	**Approx. No. Seeds per Ounce**[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
11 Chickpeas (Garbanzo)	50	.70[A]	38.4 / 6 c	S	F	175	7.7	1–2	—	—	—	—	4	1,343
12 Corn, Flour or Fodder, Dry	100–200	.70[A]	1.2–.6 / 3–2 T	S	F	175	0.5	3–5 days	—	—	—	—	15	84
13 Cowpeas	150	.75	1.5 / .25 / .17 3 1/2–1 1/4 T	S	F	187	0.9 / 0.14	2	—	—	—	—	12 / 24	159 / 26
14 Lentils	600	.70[A]	3.2 / 6 1/2 T	S	F	175	7.7	1–2	—	—	—	—	4	1,343
15 Millet, Japanese	10,000	.70[A]	.06 / 3/4 t	S	F	175	1.2	2–4	—	—	—	—	7	432
16 Millet, Pearl	2,200 unhulled	.70[A]	.3 / D	S	F	175	1.2	2–3	—	—	—	—	7	432
17 Millet, Proso	5,000 unhulled	.70[A]	.12 / 2/5 T	S	F	175	1.2	2–4	—	—	—	—	7	432
18 Oats	950 hulled	.70[A]	1.25 / 3 T	S	F	175	2.4	1–2	—	—	—	—	5	833

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
11 Chickpeas (Garbanzo)	Seed: 4 / 10 / 24	D	24	9	8	SU	See Beans.	D	93.0	1,651	680	:Dry seeds, raw.
12 Corn, Flour or Fodder, Dry	Seed: 11 / 17 / 23+ Biomass, air-dry: 24 / 48 / 96 Biomass, wet: 107 / 214 / 428	Seed: 18.2	23+	11–16[53] to 43	—	SP	Transplant when seedlings are 1 inch tall, before roots become too long. Harvest ears as husks dry out. To speed up drying, open up husks without removing. Remove husks for final drying. Remove grain from ear when thoroughly dry, or store ears with grain and shell as needed.	25.1 (food) 86.1 (sugar and starch)	40.4	1,656	100	:Dry seeds, raw. Also produces a lot of organic matter.
13 Cowpeas	Seed: 2.4 / 4.5 / 9 Green hay: 91 / 183 / 366	D	9	9–12	8	SU	See Beans. Can harvest up to 1/3 of leaves from 21–30 days until flowering.	D	103.4	1,556	336	:Dry.
14 Lentils	Seed: 4 / 6 / 8+	"2.8"	8+	12	8	SP, SU	See Beans.	—	112.0	1,569	538	:Dry seeds, raw.
15 Millet, Japanese	Seed: 3 / 7 / 13+[K] Biomass, air-dry: 12 / 30 / 72	Seed: "3.4"	13+	6–8	—	SU	Use 45- to 60-day varieties. Transplant when ~1.5 inches tall. Harvest when plants are 85% golden. Difficult to thresh.	D	D	1,544	D	
16 Millet, Pearl	Seed: 3 / 6 / 12 Biomass, air-dry: 15 / 40 / 75 Biomass, wet: 70 / 185 / 350	D	12	17–21	—	SU	Transplant when ~1.5 inches tall. Harvest when plants are 85% golden; be alert for shattering and birds.	D	19.0*	1,522	D	:Dry. Seeds form in about 45 days when days become shorter. Yields can be 3 times higher in hot climate and good soil.
17 Millet, Proso	Seed: 3 / 6 / 12+[K] Biomass, air-dry: 6 / 15 / 36	Seed: 7.1	12+	10–13 to 38[47]	—	SU	Finger millet calories: 1,509 Foxtail millet calories: 1,550	D	44.9	1,715	91	:Dry. High in iron.
18 Oats	Seed: 3 / 7 / 13+[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 4.8 Biomass, dry: est. 7.2	13+	13–17 to 38[47]	—	SP, FA	See Barley.	4.5	64.4 3.2*	1,764 233	240 86	:Grain, dry. :Straw and chaff, dry. Hulling of regular varieties difficult. Use hull-less varieties.

Letter codes on page 133, notes on pages 177–179

Calorie, Grain, Protein Source, and Vegetable Oil Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
For protein, also see: Beans, Lima; Buckwheat; Collards; Corn, Sweet; Garlic; Peas; Potatoes, Irish and Sweet	**Approx. No. Seeds per Ounce**[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
19 Peanuts	20–70 unshelled 30–90 shelled	.70[A]	11.8–3.9 / 4 3/8–1 1/2 c shelled	S	F	42	5.9	2–4	—	—	—	—	9	248
20 Pigeon Peas	D	.70[A]	D	S	F	175	0.02	2–3	—	—	—	—	60	4
21 Quinoa	10,000	.70[A]	.023 / 1/6 t	S	F	175	0.23	1	3 / 1.5	111	—	0.36	12	159
22 Rapeseed (Canola)	8,000	.70[A]	.04 / 2 t	S	F	175	0.7	1–2	—	—	—	—	9	248
23 Rice	1,100 unhulled	.70[A]	1.7 / 3 3/5 T	S	F	175	3.8	2	—	—	—	—	4	1,343
24 Rye, Cereal	500 hulled	.70[A]	2.4 / 5 2/5 T	S	F	175	2.4	1–2	—	—	—	—	5	833
25 Safflower	640 unhulled	.70[A]	1.8 / 2 3/5 c	S	F	175	2.4	2–3	—	—	—	—	5	833
26 Sesame	11,000	.70[A]	.08 / 1/5 T	L	F	175	4.8	3	—	—	—	—	6	621

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
19 Peanuts	Seed: 4 / 10 / 24	7.2	24	17	—	SU	Transplant when ~1.5 inches tall. Harvest when leaves begin to lose their green color and become dull; check maturity by digging up a few peanuts.	".64"	117.9	2,572	313	:Shelled, raw. Shells 27% of unshelled weight. Can be carcinogenic if not stored properly.
20 Pigeon Peas	Seed: 2 / 4 / 16+	D	16+	22	26+	SU	—	D	92.5	1,556	485	:Dry. Hulls 61% of unhulled weight. Short-lived perennial in tropical climates.
21 Quinoa	Seed: 6 / 13 / 26 Biomass, air-dry: 18 / 39 / 78	D	26	16	—	SU	Prick out when cotyledons have emerged and before first leaf emerges. Transplant when 2–3 inches tall and strong. Harvest when seeds are mature and dry enough to rub out of head easily.	D	73.5	1,600	640	:Dry.
22 Rapeseed (Canola)	Seed: 5 / 12 / 20	7.2	20	D	D	SP, SU, FA	Transplant when seedlings are ~1.5–2 inches tall. Harvest for seed when plants are ~85% golden; be alert for birds and/or shattering. For biomass, see Fava Beans.	D	D	1,960	D	:Dry. Helps eradicate weeds.
23 Rice	Seed: 8 / 16 / 32[K, U] Biomass, air-dry: 24 / 54 / 96	Seed: 15.3 Biomass, dry: est. 23.0	24	17	—	SU	Transplant when seedlings are about ~2 inches tall. Harvest when plants are ~85% golden; be alert for shattering and birds.	22.3	34.0 30.4 2.7*	1,642 1,656 D	145 109 86	:Brown. :White. :Straw and chaff, dry.
24 Rye, Cereal	Seed: 4 / 10 / 24[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 3.5 Biomass, dry: est. 5.2	24	17 to 38[47]	—	FA	See Barley.	.4	54.9 D	1,520 90	172 118	:Dry, whole grain. :Straw and chaff, dry. 15% in wheat bread buffers phytates that otherwise tie up iron.
25 Safflower	Seed: 4 / 9 / 17+ Biomass, air-dry: 5 / 10 / 20	Seed: 3.0	17+	17	—	SU	Transplant when seedlings are ~1.5–2 inches tall. Harvest carefully after plant has begun to dry, when 98–100% of heads are dry, and before seeds begin to shatter.	Oil: "1.0"	86.6	2,345	D	:Dry, hulled. Source of organic matter and vegetable oil. Hulls 49% of unhulled weight.
26 Sesame	Seed: 1.5 / 3 / 6+	D	6+	13–17	8	SU	Transplant when seedlings are ~1.5 inches tall and strong. Harvest when pods are full and plants begin losing green color, and before seeds shatter.	D	84.4	2,599	5,262	:Dry. Very high in calcium. Seed = 40% oil.

Letter codes on page 133, notes on pages 177–179

Calorie, Grain, Protein Source, and Vegetable Oil Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
For protein, also see: Beans, Lima; Buckwheat; Collards; Corn, Sweet; Garlic; Peas; Potatoes, Irish and Sweet	**Approx. No. Seeds per Ounce**[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
27 Sorghum	1,000	.65[A]	Reg. type: .66 / 1 2/3 T Broom type: 1.9 / 6 4/5 T	S	F	162	1.3 4.1	2–3	—	—	—	—	Reg. type: 7 Broom type: 4	432 1,343
28 Soybeans	100–250	.75	8.2–3.3 / 1 1/8–1/2 c	S	F	187	3.3	2	—	—	—	—	6	621
29 Sunflowers	650 in shell[Y]	.50+[Y]	.08 / .76 / 3–1/3 T	S	F	125+	0.2 0.07	2–3	—	—	—	—	24 / 9**	26 / 248
30 Wheat, Durum	500 hulled	.70[A]	2.4 / D	S	F	175	2.4	1–2	—	—	—	—	5	833
31 Wheat, Early Stone Age	800 unhulled	.70[A]	1.5 / D	L	F	175	2.4	2–3	—	—	—	—	5	833
32 Wheat, Hard Red Spring	500 hulled	.70[A]	2.4 / 6 1/3 T	S	F	175	2.4	1–2	—	—	—	—	5	833
33 Wheat, Red Winter	500 hulled	.70[A]	2.4 / 6 1/3 T	S	F	175	2.4	1–2	—	—	—	—	5	833
34 Wheat, White	500 hulled	.70[A]	2.4 / 6 1/3 T	S	F	175	2.4	1–2	—	—	—	—	5	833

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
27 Sorghum	Seed: 8 / 16 / 24 Biomass, air-dry: 25 / 50 / 100+ Biomass, wet: 88 / 175 / 350+	Seed: 6.8 Biomass, wet: 52.3	24	13	—	SU	See Pearl Millet.	D	49.9 15.0*	1,538 351	127 154	:Grain, dry. :Fodder, dry. 1 gallon of sorghum syrup can be obtained from 100 sq ft from some varieties.
28 Soybeans	Dry seed: 4 / 8 / 14+	4.6	14	Green: 8–9 Dry: 16–17	2–4	SU	See Beans.	All purposes: "467.4"	49.9 154.7	608 1,887	304 1,025	:Green. :Hulled, dry.
29 Sunflowers	Seed, hulled: 24"C: 2.5 / 5 / 10 Stalks, air-dry: 9"C: 20 / 40 / 80	Seed, hulled: 3.5	10	12	—	SU	Transplant when seedlings have 2 true leaves, and a third one coming. If possible, set deep enough so cotyledons are at soil surface; for leggy seedlings, set so that true leaves are 1 inch above soil surface. Harvest for seeds when "fuzz" is dry and black. May need to be protected from birds.	D	108.9	2,585	544	:Dry seeds without hulls. Hulls 46% of unhulled weight. Seed = approx. 20% oil. ~.33 lb seeds required to produce 1T of oil.
30 Wheat, Durum	Seed: 4 / 10 / 26[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 4.6 Biomass, dry: est. 6.9	26	16–18 to 38[47]	—	FA	See Barley.	See Wheat, Hard Red Spring	57.6 1.3*	1,538 100	168 95	:Grain, dry. :Straw and chaff, dry.
31 Wheat, Early Stone Age	Seed: 4 / 10 / 17[K, U] Biomass, air-dry: 12 / 30 / 51	D	17+	16–20 to 42[47]	—	FA	See Barley.	D	83.0 D	D D	D D	:Grain, dry. :Straw and chaff, dry. *Triticum monococcum* var. *Hornemanii*. Variety up to 12,500 years old. More difficult to thresh than other wheat.
32 Wheat, Hard Red Spring	Seed: 4 / 10 / 26[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 5.4 Biomass, dry: est. 8.1	26	16–18 to 38[47]	—	FA	See Barley.	All purposes: 140.7	63.5 1.3*	1,492 100	163 95	:Grain, dry. :Straw and chaff, dry.
33 Wheat, Red Winter	Seed: 4 / 10 / 26[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: 6.4 Biomass, dry: est. 9.6	26	16–18 to 38[47]	—	FA	See Barley.		55.8 46.3 1.3*	1,483 1,483 100	209 191 95	:Grain, dry, hard variety. :Grain, dry, soft variety. :Straw and chaff, dry.
34 Wheat, White	Seed: 4 / 10 / 24[K, U] Biomass, air-dry: 12 / 30 / 72	Seed: "3.7" Biomass, dry: est. 5.6	26	16–18 to 38[47]	—	FA	See Barley.		42.6 1.3*	1,551 100	163 95	:Grain, dry. :Straw and chaff, dry. For milder, wetter climate, like the Pacific Northwest. Not widely used.

Letter codes on page 133, notes on pages 177–179

Compost, Carbon, Organic Matter, Fodder, and Cover Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Organic matter, also see: Artichoke, Jerusalem; Beans, Fava; Garlic	**Approx. No. Seeds per Ounce**[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
1 Alfalfa	14,000	.70[A]	.085 / 1/4 T	S	F	175	1.2	8	—	—	—	—	5	833
2 Buckwheat	1,000	.70[A]	2.6 / 1/2 c	S	B	—	—	—	—	—	—	—	Broad-cast	D
3 Cardoon	688	.60	.04 / 1 1/2 t	S	F	150	0.12	2–3	6 / 2	60	0.3	3–4	36	18
4 Clover, Alsike	44,875	.70[A]	.55+–.3 / 1/6 t	S	F	175	1.2	8	—	—	—	—	5	833
5 Clover, Crimson	7,000	.70[A]	.6+ / 1 1/4 t	S	F	175	1.2	8	—	—	—	—	5	833
6 Clover, Medium Red	14,500	.70[A]	.08 for hay / .72 for green manure / 2 T / 1 1/10 c	S	F	175	1.2	8	—	—	—	—	5	833
7 Clover, Sweet, Hubam	11,400	.70[A]	1.1 / 2/3 t	S	F	175	1.2	8	—	—	—	—	5	833
8 Clover, White	45,750	.70[A]	.03 / 1/4 t	S	F	175	1.2	8	—	—	—	—	5	833

CROP	YIELD			TIMING			CROP PROCEDURES		PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U		V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)			Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
1 Alfalfa	Biomass, air-dry: 37 / 69 / 103 Biomass, wet: 148 / 275 / 412, 5–6 cuttings	Biomass, air-dry: 14.9; Biomass, wet: 49.9	1.8+	12 to first cutting, 5–9 thereafter	3–50+ years	SP	Grown as a perennial. Transplant when seedling is 2–3 months old. Can last up to 25+ years. Harvest at 10–50% flower or when leaves are dull/gray, stems are falling over, or leaves have holes. Cut back to 2 inches above growing crown. AC		"611.9"	Air-dry: 53.1*	411	667	:Air dry at 10% bloom point. Fixes .35–.57 lb nitrogen/100 sq ft/year.
2 Buckwheat	Biomass, air-dry: 2 / 4 / 6 Grain: 4 / 8 / 16+	D	16+	9–13	—	SP, mid-SU	Japanese variety may produce more dry biomass.		D	53.1	1,520	517	:Dry grain. Hulling difficult. Good honeybee plant. 1/2 lb honey/100 sq ft.
3 Cardoon	Biomass, air-dry: 20 / 40 / 80	D	D	Harvest when stalks mature	1 harvest	SP	Perennial. Harvest flowers for income just as the blue is beginning to appear or for biomass before seeds begin to disperse. Harvest stalks for biomass when they become woody and the upper leaves wither.		D	—	—	—	Flower market potential. Can become a noxious weed; do not allow seeds to disperse.
4 Clover, Alsike	Biomass, air-dry: 12 / 25 / 38 (6-mo. yield)	Biomass, air-dry: "4.3"	2.2+	17–26	1 cutting	SP		See Voisin books in the bibliography (under "Compost Crops") for ways to increase grazing yields significantly. Try 3–5 times the seeding rate for hay if growing crop seed. Roots can equal biomass weight above ground.		36.7*	436	522	:Dry. Fixes up to .27 lb nitrogen/ 100 sq ft/year.
5 Clover, Crimson	Biomass, air-dry: 15 / 30 / 45 Biomass, wet: 60 / 120 / 180 (6-mo. yield)	Biomass, air-dry: "4.3"		17–26	1 cutting	SP	Annual. For harvest, see Alfalfa.		"547.5"	44.5*	391	558	:Dry. Fixes up to .21 lb nitrogen/ 100 sq ft/year.
6 Clover, Medium Red	Biomass, air-dry: 18 / 36 / 54 Biomass, wet: 90 / 180 / 270 (6-mo. yield)	Biomass, air-dry: "8.7"		17 to first cutting, 5–9 thereafter	2–3 years	SP				51.3*	450	767	:Dry. Before bloom. Fixes up to .23–.3 lb nitrogen/ 100 sq ft/year.
7 Clover, Sweet, Hubam	Biomass, air-dry: 15 / 30 / 45 Biomass, wet: 68 / 136 / 204 (6-mo. yield)	Biomass, air-dry: "4.3"		17–26	1 cutting	SP	Short-lived perennial. For harvest, see Alfalfa. More productive than other clovers.			42.6	355	567	:Dry.
8 Clover, White	Biomass, air-dry: 10 / 25 / 38 Biomass, wet: 50 / 100 / 150 (6-mo. yield)	Biomass, air-dry: "4.3"		17–26	3–5 years	SP	Short-lived perennial. For harvest, see Alfalfa.			42.6*	355	567	:Dry. Fixes up to .23–.3 lb nitrogen/ 100 sq ft/year.

Letter codes on page 133, notes on pages 177–179

Compost, Carbon, Organic Matter, Fodder, and Cover Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Organic matter, also see: Artichoke, Jerusalem; Beans, Fava; Garlic	**Approx. No. Seeds per Ounce[4]** (Range: larger–smaller seed)	**Minimum Legal Germination Rate[5]**	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat[16]**	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat[14]**	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat[16]**	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet[7]**
9 Comfrey, Russian	—	—	53 roots	S	B	—	—	—	—	—	—	—	12	159
10 Grass, Rye, Italian	16,875	.70[A]	3.6 / 1 1/3 c	S	B	—	—	—	—	—	—	—	Broadcast	D
11 Kudzu	2,000	.70[A]	D / D	Propagated by seeds, cuttings, and roots. More research needs to be performed. For some information see *The Book of Kudzu*, by Bill Shurtleff, in the bibliography.										
12 Roots, General	An important hidden compost crop beneath the ground. Root matter in the soil can range from 45–120% of aboveground biomass at the end of the growing season (Brady and Weil, *The Nature and Properties of Soils*, 12th ed., p. 423).													
13 Sainfoin	In pods: 1,560 Cleaned: 2,040	.50[A]	.82 hulled / D	S	F	125	3.3	8	—	—	—	—	5	833
14 Sunn hemp, Giant	3,000	.70[A]	.2 / 1 1/2 t	S	F	175	2.5	2–3	—	—	—	—	7	432
15 Teosinte	440	.70[A]	.11 / 2/3 T	S	F	175	0.2	2–3	—	—	—	—	21	35
16 Timothy	82,500	.70[A]	.01 / 1/8 t	S	F	175	1.2	8	—	—	—	—	5	833
17 Vetch, Purple, Hairy, or Woolly Pod[BB]	800	.70[A]	5.5 (.63 if interplanted) / 3/4 c (1 1/2 T)	S	B	—	—	—	—	—	—	—	Broadcast	D

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
9 Comfrey, Russian	Biomass, air-dry: 10 / 20 / 30 Biomass, wet: 92 / 184 / 276 (6-mo. yield)	Biomass, air-dry: "62.6" world high (12-mo. season)	D	12–17 to first cutting	Years	SP	Perennial. Divide roots and plant. Harvest for biomass when plants begin to flower; cut back to 2 inches.	D	3.4	D	D	
10 Grass, Rye, Italian	D	D	6.9+	D	D	SP		D	15.4*	D	—	Not good for soil. Use cereal rye to build soil and for food.
11 Kudzu	Biomass, air-dry: 13 / 26 / 53 Biomass, wet: 53 / 105 / 211					D			13.3 11.3	D D	D D	:Dried root. :Cured hay. Plus cloth can be made from the root. Can be invasive.
12 Roots, General						—			—	—	—	
13 Sainfoin	Biomass, air-dry: 10 / 20 / 30 (6-mo. yield)	D	.46+	17 to first cutting, 9 thereafter	D	SP		D	34.0*	D	—	:Dry. Does best in slightly dry climate. Significantly less productive than alfalfa.
14 Sunn hemp, Giant	Biomass, air-dry: 18 / 44 / 108 Biomass, wet: 79 / 198 / 475	D	D	17+	D	SU	For harvest, see Alfalfa. Or allow to grow, and harvest seeds before they shatter.	D	D	D	D	Grain legume.
15 Teosinte	Grain: 2 / 4 / 6 Biomass, air-dry: 17 / 34 / 68 Biomass, wet: 88 / 166 / 232	D	D	D	D	SU	Harvest grain before it shatters.	D	22.2*	D	D	Less productive of biomass and significantly less productive of grain than corn, but produces an extensive root system.
16 Timothy	Biomass, air-dry: 18 / 35 / 51 Biomass, wet: 45 / 87 / 127 (6-mo. yield)	Biomass, air-dry: "4.3"	.46+	17	D	SP	Perennial. Harvest when earliest heads are straw-colored for highest biomass yield.	D	18.6*	D	186	:Dry, early bloom.
17 Vetch, Purple, Hairy, or Woolly Pod[BB]	Biomass, air-dry: 5 / 9 / 18 Biomass, wet: 24 / 45 / 90 planted alone	D	1.1+	D	D	SP, FA	For better germination, soak seeds overnight in warm water; mix with dry sand or soil to minimize clumping; chop seed in very lightly with rake. Harvest at 10%–50% flower. Can become weedy if seeds disperse.	D	69.0*	D	513	:Dry. Fixes up to .25 lb nitrogen/100 sq ft/year.

Letter codes on page 133, notes on pages 177–179

Energy, Fiber, Paper, and Other Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (Inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (Inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
1 Bamboo, Paper	Under research						—				—			
2 Bamboo, Regular	Under research						—				—			
3 Beets, Sugar	1,600	.65[A]	.4[AA] / 2 T	L	F	162	2.7	3–4	—	—	—	—	7	432
4 Cheese	Approx. 1 lb per gallon of milk. Heat milk to 180°F. Add 1/2 cup vinegar per gallon of milk. Stir. Let sit for 5 minutes. Pour through cheesecloth lining a colander. Let drain until excess moisture is gone. Result: soft cheese.													
5 Cotton, Regular	300	.70[A]	.76 / varies	L	F	175	0.9	3–4	—	—	—	—	12	159
6 Cotton, Tree	An African perennial variety. Under research.						—				—			
7 Eggs, Chicken	See Ecology Action's *Backyard Homestead, Mini-Farm and Garden Log Book*.						—				—			
8 Flax	6,000	.70[A]	Seed: .2 / 1/2 t Fiber: .6 / 1 2/3 t	S	F	175	14.3	2–3	—	—	—	—	Seed: 5 Fiber: 3	833 2,507

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) [454 g per pound][25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
1 Bamboo, Paper	Under research	General: "27.5"				—		All paper and paperboard: "699"	—	—	—	Probably any abundant local species, reasonably priced, may be used. Better grades of paper are made from young and still leafless culms; older, mature culms are too lignified for easy processing but can be used for coarse, dark-fibered paper. 40% paper yield. For wrapping paper, newsprint, and book-quality paper. Paper can also be made from many fibrous plants, including cabbage.
2 Bamboo, Regular	Under research					—	Use clumping bamboo to minimize spreading; roots may need to be restrained. For building, furniture, and pipeline, harvest after 3 years of growth.		—	—	—	Building materials, piping.
3 Beets, Sugar	91 / 182 / 364	104.7	"30.6"	12	—	SP, SU, FA		All sugars: "67.1 lbs" All syrups: "10+ gal"	D	1,746	D	~5.2 lb of sugar beets are required to produce 1 T of sugar.
4 Cheese						—			36.3	1,696	281	:Cream cheese. Add parsley, dill seeds, chives for flavor.
5 Cotton, Regular	1.2 / 2.4 / 4.8+	1.7	22.7	17–26	—	SU	Harvest when seeds are fully developed.	D	—	—	—	Minimum clothes replacement rate per year: 2.5 lbs. Thousands of years ago in India, people placed a mineral in the soil with the cotton plants, and colored fibers resulted!
6 Cotton, Tree	Under research					SU			—	—	—	
7 Eggs, Chicken						—		Eggs: "240 (30 lb)"	52.1	658	218	:11% refuse.
8 Flax	seed: 2 / 4 / 8 biomass, air-dry: 4 / 8 / 16+	"1.4"	D	12–14	—	SP	For seed, harvest before seeds shatter. For fiber, harvest when seeds are beginning to turn color from green to brown and bottom of plant is beginning to turn yellow.	D	89	2,419	1,115	

Letter codes on page 133, notes on pages 177–179

Energy, Fiber, Paper, and Other Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	**Minimum Legal Germination Rate**[5]	**Ounces / Volume Seed per 100 Square Feet** (adj. for germ. rate, offset spacing, and curv. surf.)[6, 7, 8]	**Short/Long/Extra-Long Germination Time**	**Plant Initially in Flats/Beds; Space in First Flat** (in order of preference)	**Approx. No. of Plants per Flat** (adj. for germ. rate)[14]	**No. First Flat(s) per 100 Sq Ft**	**Approx. No. Weeks in First Flat**[16]	**Depth of Second Flat and Spacing (inches)**	**No. Plants in Second Flat**[14]	**No. Second Flats per 100 Sq Ft**	**Approx. No. Weeks in Second Flat**[16]	**In-Bed Spacing (inches)**	**MAXIMUM No. Plants per 100 Square Feet**[7]
9 Gopher Plant	For automotive oil. Under research. Also, a toxic plant for gopher control. Not to be used around young children.						—							
10 Gourds	150	.70[A]	.5 / varies	S	F	42	1.25	3–4	—	—	—	—	18	53
11 Guayule	For rubber. Under research.						—							
12 Jojoba	50	D	For oil. Under research.				—							
13 Kenaf	For newsprint, toilet paper, fiber, twine, rope. Grows up to 18 ft high. 8–10 tons of fiber yield per acre possible annually (5 times the pulp per acre compared with wood).													
14 Milk, Cow	See Ecology Action's *Backyard Homestead, Mini-Farm and Garden Log Book*. A cow requires about twice the fodder as a goat and produces about twice the milk.						—							
15 Milk, Goat							—							
16 Sprouts, Alfalfa	To be developed. Nutritious, but a large area is required for the production of the seed.						—							
17 Sprouts, Wheat														

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per 100-Square-Foot Planting[9]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. of Weeks to Maturity in Ground[17]	Approx. No. Weeks in Harvesting Period	Time of Year to Plant (SP, SU, FA, WI)		Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) [454 g per pound][25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
9 Gopher Plant	For automotive oil. Under research. Also, a toxic plant for gopher control. Not to be used around young children.		D			SP		—	—	—	—	
10 Gourds	D	D	D	16	—	SU	For transplanting, see Cucumbers. Support gourds on smooth rocks to keep them off the damp soil. Harvest when stem is dry and hard; cut off with 2 inches of stem.	D	—	—	—	
11 Guayule	For rubber. Under research.											
12 Jojoba	For rubber. Under research.											
13 Kenaf												For more information on kenaf, write to the American Kenaf Society, PMB 440, 1001 South 10th Street, Ste G, McAllen, TX 78501.
14 Milk, Cow						—		Fluid milk and cream: 207.0 lbs (25.9 gal)	15.9	299	531	:3.7% fat.
15 Milk, Goat						—		D	14.5	304	585	Has only 1/3 the vitamin B_{12} that cow's milk has.
16 Sprouts, Alfalfa						All year			Nutritive amounts given for sprouts differ.			
17 Sprouts, Wheat						All year						

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
1 Almond	12–15	D	160	L	4 / I	D	Minimal	D	—	—	—	D	16.5	272
2 Apple, Dwarf	600–1,000	D	681	EL	2 / I	D	Minimal	D	—	—	—	D	8	64
3 Apple, Regular	600–1,000	.65[A]	27	EL	2 / I	39	Minimal	D	—	—	—	D	40	1,600
4 Apple, Semidwarf	600–1,000	D	194	EL	2 / I	D	Minimal	D	—	—	—	D	15	225
5 Apricot, Dwarf	18–20	D	681	L	4 / I	D	Minimal	D	—	—	—	D	8	64
6 Apricot, Regular	18–20	.90[A]	70	L	4 / I	14	Minimal	D	—	—	—	D	25	625
7 Apricot, Semidwarf	18–20	D	303	L	4 / I	D	Minimal	D	—	—	—	D	12	144
8 Avocado, Tall Dwarf	D	D	302–193 681	D	4 / I	D	Minimal	D	—	—	—	D	12–15 8	144–225 64
9 Banana, Tall Dwarf	—	D	302–193 681	D	4 / I	D	Minimal	D	—	—	—	D	12–15 8	144–225 64
10 Blackberries	10,000	—	2,723	D	6 / I	D	4 / 1	D	6 / 4	1.5	6.7 / 1	D	1–4	1–16

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
1 Almond	Shelled: 1.4 / 2.8 / 4.2+	7.2	In shell: 8.4	3–4 / D	D / D	Early SP	HPW, DW.	".4"	84.4	2,713	1,061	:Shelled. Shells 49% of unshelled weight.
2 Apple, Dwarf	50 / 75 / 100	51.4	D	3 / D	D / D	Early SP	(1) Harvest according to varietal maturation time. Also, harvest before first frost, before significant drop occurs, and before or as bird damage begins to occur. Optimum harvest time will vary from year to year depending on climatic conditions. (2) Consider grafting several varieties on 1 tree for harvest during a significant part of the growing season, depending on climate. (3) Note that one full-sized tree at maturity can produce approximately 3 lb of apples per day, at intermediate yields. You do not need many fruit trees to have enough fruit. Consider doing a few trees well. It takes less time! 1.5 gallons of apple cider or apple cider vinegar can be obtained per 100 sq ft.	"16.0"	.8	242	29	:Raw. 8% refuse. Spur-type yields higher. Thin to 6 to 8 in.
3 Apple, Regular	50 / 75 / 100	51.4	D	5 / 10	D / 35–50	Early SP			.8	242	29	:Raw. 8% refuse. Thin to 6 to 8 in.
4 Apple, Semidwarf	50 / 75 / 100	51.4	D	4 / 10	D / D	Early SP			.8	242	29	:Raw. 8% refuse. Thin to 6 to 8 in.
5 Apricot, Dwarf	25 / 50 / 100	25.1	D	2 / D	D / D	Early SP	See (1) and (2) under Apples. HPW, DW.	".17"	4.3	217	72	:Raw. 6% refuse. A fall-yielding variety also exists.
6 Apricot, Regular	25 / 50 / 100	25.1	D	3 / D	D / D	Early SP			4.3	217	72	:Raw. 6% refuse. 30 ft high.
7 Apricot, Semidwarf	25 / 50 / 100	25.1	D	3 / D	D / D	Early SP			4.3	217	72	:Raw. 6% refuse.
8 Avocado, Tall Dwarf	9 / 18 / 36	16.0	D	D / D	D / D	Early SP	HPW	"1.3"	7.1	568	34	:25% refuse.
9 Banana, Tall Dwarf	27 / 60 / 92+	38.3	—	D / D	D / D	Early SP	HPW	D	3.4 3.7	262 278	25 31	:Yellow. :Red. 32% refuse
10 Blackberries	24 / 36 / 48+	15.0	—	2 / D	D / 6–25	Early SP	Propagated by cuttings. Beds 2–3 ft wide. Some people use 2-ft centers. See (1) under Apples. HPW.	D	5.3	264	145	:Raw.

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
11 Blueberries, Low Bush, High Bush	—	—	10,890 2,723	D	— —	D	8.5 / 1	D	—	D	—	D	2 4	4 16
12 Boysenberries	—	—	681	D	F I	D	4 / 1	D	I	—	—	D	1–8	64
13 Cherry, Sour, Bush	D	D	4,840	L	3 I	D	1	D	I	—	—	D	3	9
14 Cherry, Sour, Dwarf	200–250	.80[A]	681	L	3 I	22	0.3	D	I	—	—	D	8	64
15 Cherry, Sour, Regular	200–250	D	1,089	L	3 I	D	Minimal	D	I	—	—	D	20	400
16 Cherry, Sweet, Bush	D	D	4,840	L	3 I	D	1	D	I	—	—	D	3	9
17 Cherry, Sweet, Dwarf	150–160	D	681	L	3 I	D	0.3	D	I	—	—	D	8	64
18 Cherry, Sweet, Regular	150–160	.75[A]	481	L	3 I	20	Minimal	D	I	—	—	D	30	900
19 Chestnut	1	.72[A]	27	D	6 1	5	Minimal	D	I	—	—	D	40	1,600

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) [454 g per pound][25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
11 Blueberries, Low Bush, High Bush	19 / 37 / 75	D	—	3–4 / D	6–7 / 10–15	Early SP	Propagated by cuttings in late SP. Remove blossoms for first 2 years. Use bird netting. See (1) under Apples. HPW, DW.	".12"	2.9	259	63	:Raw. 8% refuse.
12 Boysenberries	26 / 39 / 52+	"25.7"	—	2 / D	D / 6–10	Early SP	Propagated by cuttings. 2-ft-wide beds. 4–8 canes/ center. See Blackberries.	D	3.2	163	86	:Canned. 8% refuse. Bearing season: Logan (midsummer); Young (midsummer); Olallie (late summer).
13 Cherry, Sour, Bush	8 / 17 / 34	D	D	3 / D	D / D	Early SP	See (1) under Apples. HPW, DW.	".62"	5.0	242	92	:Raw. 8% refuse.
14 Cherry, Sour, Dwarf	17 / 34 / 51	14.0	D	3 / D	D / D	Early SP			5.0	242	92	:Raw. 8% refuse.
15 Cherry, Sour, Regular	17 / 34 / 51	14.0	D	4 / 10–20	D / D	Early SP			5.0	242	92	:Raw. 8% refuse.
16 Cherry, Sweet, Bush	8 / 17 / 34	D	D	3 / D	D / D	Early SP			3.6	195	68	:Canned, without pits.
17 Cherry, Sweet, Dwarf	17 / 34 / 51	15.0	D	3 / D	D / D	Early SP			3.6	195	68	:Canned, without pits. One self-pollinating variety exists.
18 Cherry, Sweet, Regular	17 / 34 / 51	15.0	D	4 / 10–20	D / D	Early SP			3.6	195	68	:Canned, without pits.
19 Chestnut	In shell: 3.5 / 7 / 15	D	In shell: 15.0	D / D	D / D	Early SP	HPW, DW.	D	30.4	1,710	236	:Dried and shelled: 18% of unshelled weight. Problems with blight.

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
20 Coconut	—	D	48	D	4 / I	D	Minimal	D	—	—	—	D	30	900
21 Currants, Black	—	—	2,723	D	6 / I	D	4 / 1	D	—	—	—	D	1–4	16
22 Dates	40	—	48	D	9 / I	D	Minimal	D	—	—	—	D	30	900
23 Fig	—	—	194	D	9 / I	D	Minimal	D	—	—	—	D	15	225
24 Filbert	10–20	—	194	D	9 / I	D	Minimal	D	—	—	—	D	15 (18–25)	225
25 Grapefruit	150–200	D	76	L	3 / I	D	Minimal	D	—	—	—	D	24	576
26 Grapes, Raisin	—	—	681	D	6 / I	D	0.3	D	—	—	—	D	8	64
27 Grapes, Table	—	—	681	D	6 / I	D	0.3	D	—	—	—	D	8	64
28 Grapes, Wine	—	—	681	D	6 / I	D	0.3	D	—	—	—	D	8	64
29 Guava	D	D	303	D	2 / I	D	Minimal	D	—	—	—	D	12	144

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) [454 g per pound][25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
20 Coconut	3 / 6 / 13	D	D	D / D	D / D	Early SP	D	D	8.3 15.9	816 1,569	31 59	:Fresh. 48% refuse :Meat
21 Currants, Black	D	D	—	3 / D	D / D	Early SP	2-foot-wide beds. See (1) under Apples. HPW. Propagated by cuttings.	D	7.6	240	267	:Raw. 2% refuse.
22 Dates	23 / 46 / 70	14.2	D	5–6 / 10–15	D / D	Early SP	1 male to 100 female plants for pollination. Propagated by cuttings.	D	10.0	1,243	268	:Dry and pitted. Pits: 13% of dried weight.
23 Fig	Raw: 12 / 24 / 36++	17.1	D	D / D	D / 17	Early SP	See (1) under Apples. HPW, DW. Propagated by cuttings.	D	5.4 19.5	363 1,243	159 572	:Raw. Drying ratio 3:1. :Dried. 23% moisture.
24 Filbert	Shelled: 7 / 15 / 30	6.2	In shell: 55.0	D / D	D / D	Early SP	See (1) under Apples. HPW, DW. Propagated by cuttings.	".07"	57.2	2,876	948	:Shelled: 54% of unshelled weight. 46% refuse.
25 Grapefruit	63 / 95 / 126	73.7	D	3 / D	D / D	Early SP	HPC	"6.7"	1.0	84	33	:Raw. 55% refuse.
26 Grapes, Raisin	Fresh, for drying: 45 / 67 / 90	"45.4"	D	3 / D	D / D	Early SP	See (1) under Apples. HPW, DW. Propagated by cuttings.	Dry: "2.0"	11.3	1,311	281	:Dry. 18% moisture. Drying ratio 4.3:1.
27 Grapes, Table	45 / 67 / 90	31.2	D	3 / D	D / D	Early SP	Propagated by cuttings.	"4.6"	2.4	270	48	:Raw. 11% refuse.
28 Grapes, Wine	32 / 48 / 64	"31.6"	D	3 / D	D / D	Early SP	Propagated by cuttings.	"20.4"	3.7	197	46	:Raw. 37% refuse.
29 Guava	D	28.9	D	D / D	D / D	Early SP	HPW	D	3.5	273	101	:Raw. 35% refuse. 15 ft high.

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
30 Hickory	1–5 depends on variety	.55–.80 [J] depends on variety	27	D	4 / I	8–12	Minimal	D	—	—	—	D	40	1,600
31 Honey Locust	180	.50 [J]	27	D	4 / I	8	Minimal	D	—	—	—	D	40	1,600
32 Lemon	200–300	D	76	D	2 / I	D	Minimal	D	—	—	—	D	24	576
33 Lime	300–400	D	194	D	2 / I	D	Minimal	D	—	—	—	D	15	225
34 Mango	D	D	48	D	2 / I	D	Minimal	D	—	—	—	D	30	900
35 Mesquite	D	D	109	D	2 / I	D	Minimal	D	—	—	—	D	20	400
36 Nectarine, Dwarf	D	D	681	D	—	—	Minimal	—	—	—	—	D	8	64
37 Nectarine, Regular	D	D	194	D	4 / I	D	Minimal	D	—	—	—	D	15	225
38 Olive	D	D	27	D	2 / I	D	Minimal	D	—	—	—	D	40	1,600

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
30 Hickory	D	D	D	D / D	D / 25–350	Early SP	See (1) under Apples.	D	59.9	3,053	Trace	:Shelled: 65% of unshelled weight.
31 Honey Locust	Pods and beans: 6 / 13 / 26+	D	In shell: 13.0	D / D	D / 10–100	Early SP	See *Forest Farming*, by J. Sholto Douglas and Rebecca Hart and/or *Tree Crops*, by J. Russell Smith (in Bibliography under Trees).	D	72	D	D	Can make a flour from the beans. Pods and beans a good fodder. A very important tree. *Gleditsia trianconti*.
32 Lemon	75 / 112 / 150	76.2	D	3 / D	D / 50+	Early SP	HPW, HPC.	"3.8"	3.3	82	79	:33% refuse.
33 Lime	D	"32.3"	D	3 / D	D / D	Early SP	HPW, HPC.	".3"	2.7	107	126	:16% refuse.
34 Mango	D	"68.8"	D	D / D	D / D	D	HPW. Propagated by seed or grafting.	".02"	2.3	294	45.7	:33% refuse. 90 ft high at maturity.
35 Mesquite	Seeds: D Pods: D	D	D	D / D	D / D	Early SP		D	17.0 76.2	D D	260 D	:Seed. :Pod.
36 Nectarine, Dwarf	40 / 60 / 80	"29.0"	D	3–4 / 8–12	D / D	Early SP	See (1) under Apples. HPW, DW.	"1.8"	2.5	267	263	:8% refuse. 8 ft high. Thin to 6 to 8 in (10 in for early varieties).
37 Nectarine, Regular	40 / 60 / 80	"29.0"	D	D / D	D / D	Early SP			2.5	267	263	:8% refuse. 25 ft high. Thin to 6 to 8 in (10 in for early varieties).
38 Olive	8 / 17 / 35	15.0	D	D / D	D / D	Early SP		D	5.3 8.0	442 1,227	232 —	:Green. 16% refuse. :Ripe. 20% refuse. Pasquale, up to 40% oil. All others, 16.5–21.8% oil.

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
39 Orange, Sweet	200–300	D	97 76	D	2 / I	D	Minimal	D	—	—	—	D	22 24	484 576
40 Peach, Dwarf	610	D	681	D	—	—	Minimal	—	—	—	—	D	8	64
41 Peach, Regular	610	D	194	D	4 / I	D	Minimal	D	—	—	—	D	15	225
42 Pear, Dwarf	750	D	681	D	—	D	Minimal	D	—	—	—	D	8	64
43 Pear, Regular	750	D	170	EL	1 / I	D	Minimal	D	—	—	—	D	16 (–20)	256
44 Pecan	6	.50[J]	27	L	4 / I	8	Minimal	D	—	—	—	D	40 (–70)	1,600
45 Persimmon	74	D	134	D	1 / I	D	Minimal	D	—	—	—	D	18	324
46 Pistachio	In shell: 28	D	109	D	2 / I	D	Minimal	D	—	—	—	D	20	400
47 Plum, Bush	D	D	4,840	D	—	—	2	—	—	—	—	D	3	9

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) (454 g per pound)[25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
39 Orange, Sweet	Navel: 32 / 48 / 64 Valencia: 42 / 63 / 84	67.0	D	3 / D	D / 50+	Early SP	HPW, HPC.	"17.2"	4.0 4.1	157 174	123 136	:Navels (winter-bearing). 32% refuse. :Valencia (summer-bearing). 25% refuse.
40 Peach, Dwarf	Clingstone: 60 / 90 / 120	"60.3"	D	3 / D	D / D	Early SP	See (1) under Apples. HPW, DW.	"2.6"	2.4	150	36	:13% refuse. 8 ft high. Thin to 6 to 10 in (10 in for early varieties).
41 Peach, Regular	Clingstone: 60 / 90 / 120 Freestone: 39 / 59 / 78	"53.4" 39.7	D	3–4 / 8–12	D / 8–12	Early SP			2.4	150	36	:13% refuse. 25 ft high. Thin to 6 to 10 in (10 in for early varieties).
42 Pear, Dwarf	36 / 72 / 108	66.6	D	3 / D	D / D	Early SP	See (1) under Apples. HPW, DW.	"3.4"	2.9	252	33	:9% refuse. 8 ft high.
43 Pear, Regular	36 / 72 / 108	66.6	D	4 / D	D / 50–75	Early SP		"3.4"	2.9	252	33	:9% refuse. 30–40 ft high.
44 Pecan	In shell: 6 / 12 / 25+	D	In shell: 25.0+	D / D	D / 150	Early SP	See (1) under Apples. HPW, DW.	".4"	41.7	3,116	331	:Shelled. 47% of unshelled weight.
45 Persimmon	8 / 16 / 32+	D	D	2–3 / D	D / 20–300	Early SP	See (1) under Apples. HPW, DW.	D	2.6	286	22	:18% refuse. 30 ft high.
46 Pistachio	D	3.1	D	D / D	D / 30–50	Early SP	See (1) under Apples. HPW, DW.	D	87.5	2,694	594	:Shelled. 50% of unshelled weight. 30 ft high.
47 Plum, Bush	9.5 / 19 / 38	D	D	3 / D	D / D	Early SP	See (1) under Apples. HPW, DW.	"2.0"	2.1	272	74	:9% refuse. 3 ft high. Thin to 4 to 6 in.

Letter codes on page 133, notes on pages 177–179

Tree and Cane Crops

CROP	SEED				PLANTING	FLATS							BEDS	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Approx. No. Seeds per Ounce[4] (Range: larger–smaller seed)	Minimum Legal Germination Rate[5]	Aprpox. No. Plants per Acre	Short/Long/Extra-Long Germination Time	Flat spacing for First Flat and Second Flat (inches)	No. Plants in First Flat (adj. for germ. rate)[14]	No. First Flat(s) per 100 Sq Ft	Approx. No. Weeks in First Flat[16]	Depth of Second Flat and Spacing (inches)	No. Plants in Second Flat[14]	No. Second Flats per 100 Sq Ft	Approx. No. Weeks in Second Flat[16]	In-Bed Spacing (feet)	Square Feet Required per Plant
48 Plum, Regular	50–55	D	134	D	4 / I	D	Minimal	—	—	—	—	D	18 (–24)	324
49 Pomegranate	D	D	435	D	2 / I	D	Minimal	D	—	D	—	D	10	100
50 Raspberries	—	—	2,723	D	6 / I	D	4 1	D	I	—	—	D	1–4	16
51 Strawberries	40,000	D	43,560	D	1 / I	—	10	D	I	60	—	D	1	1
52 Tangelo	200–300	D	109	D	1 / I	D	Minimal	D	—	—	—	D	20	400
53 Tangerine	300–400	D	109	D	1 / I	D	Minimal	D	—	—	—	D	20	400
54 Walnut, Eastern, Black	3	.50[A]	27	EL	4 / I	6	Minimal	D	—	—	—	D	40	1,600
55 Walnut, English (Persian)	2	.80[A]	27	L	4 / I	12	Minimal	D	—	—	—	D	40	1,600
56 Walnut, No. Calif. Black	3	.40[A]	27	EL	4 / I	8	Minimal	D	—	—	—	D	40	1,600

CROP	YIELD			TIMING			CROP PROCEDURES	PLANNING	NUTRITION			NOTES
	O	P	Q	R	S	T	U	V	W	X	Y	Z
	Possible GROW BIOINTENSIVE Yield in Pounds per Plant[10, 11]	Average U.S. Yield in Pounds per 100 Square Feet[12, 13]	Approx. Maximum Pounds Seed Yield per 100 Square Feet[19]	Approx. No. Years to Bearing and Approx. No. Years to Max Bearing	Approx. No. Weeks in Harvesting Period and Possible Bearing Years	Time of Year to Plant (SP, SU, FA, WI)	For varietal and other information, see (HPW) *Western Fruit, Berries and Nuts: How to Select, Grow and Enjoy*, by Lance Walheim and Robert L. Stebbins (under Fruits, Berries, and Nuts in Bibliography), and/or (DW) Dave Wilson Nursery catalog (under Seed Catalogs in Bibliography), or (HPC) *Citrus: How to Select, Grow and Enjoy*, by Richard Ray and Lance Walheim (under Fruits, Berries, and Nuts in Bibliography).	Pounds Consumed per Year by Average Person in U.S.[13, 18]	Protein Content per Pound in Grams (g) [454 g per pound][25]	Calorie Content per Pound[25, 50]	Calcium Content per Pound in Milligrams (mg)[25]	
48 Plum, Regular	Regular: 19 / 38 / 57 Dry prune: 18 / 36 / 72	26.7 36.8	D	4 / D	D / 20–25	Early SP		"2.0"	2.1 3.4	272 320	74 51	:Damson. 9% refuse. :Prune. 6% refuse. Thin to 4 to 6 in.
49 Pomegranate	50 / 75 / 100	D	D	D / D	D / D	Early SP	HPW, DW.	D	1.3	160	8	:44% refuse.
50 Raspberries	Berries: 12 / 18 / 24 Biomass, air-dry: 5 / 10 / 25	"12.3"	—	2 / D	D / 6–10	Early SP	Prune to 2–8 canes/ft of row. Beds 2–3 ft wide. Some people plant on 2-ft centers. See (1) under Apples. HPW. Propagated by cuttings.	D	6.6 5.3	321 251	132 97	:Black. :Red. Also yellow and purple varieties. 3% refuse.
51 Strawberries	40 / 80 / 160	102.4	D	2 / D	D / 4	Early SP	Use new plants on end of runners to renew bed by fifth year. Plant initially in fall for a better first-year crop. Usually propagated by runner rather than seed, except for Alpine variety. See (1) under Apples. HPW.	"3.3"	3.0	161	91	:4% refuse. Bear well second through fourth year.
52 Tangelo	D	53.3	D	3 / D	D / D	Early SP	HPW, HPC.	".34"	1.3	104	D	:44% refuse. 30 ft high.
53 Tangerine	D	47.9	D	3 / D	D / D	Early SP	HPW, HPC.	".7"	2.7	154	134	:26% refuse. 30 ft high.
54 Walnut, Eastern, Black	In shell: 5 / 7.5 / 10+	7.0	In shell: 10.0+	D / D	D / D	Early SP		"4.6"	67.1	2,953	Trace	:Shelled. 78% refuse. Up to 150 ft high. A good tree to plant for your great-great-grandchildren!
55 Walnut, English (Persian)	In shell: 5 / 7.5 / 10+	7.0	In shell: 10.0+	D / D	D / D	Early SP			93.0	2,849	449	:Shelled. 55% refuse. Up to 60 ft high.
56 Walnut, No. Calif. Black	In shell: 5 / 7.5 / 10+	7.0	In shell: 10.0+	D / D	D / D	Early SP	See (1) under Apples. HPW, DW.		D	D	D	30–60 ft high.

Letter codes on page 133, notes on pages 177–179

Flower Spacing Chart

Spacings vary for flowers depending on the variety and how the flowers are used. The following will help you start out with the most common flowers.

ANNUALS—REPLANT EACH YEAR IN SPRING FROM SEED			PERENNIALS—NEED A PERMANENT SPACE IN THE GARDEN		
	Height	**Inches Apart***		**Height**	**Inches Apart***
African daisy	4-6"	12	**Alyssum (*Lobularia maritime*)****	4–6"	10–12
Aster	1-3'	10-12	**Aubrieta**	Trailing	12–15
Calendula***	1 1/2–2'	12	**Baby's breath**	3–4'	14–16
California poppy***	9–12"	12	**Bachelor's button**	2'	12
Columbine	2-3'	12	**Carnation**	1'	12
Cosmos***	2-3'	12–18	**Chrysanthemum**	2–3'	18–24
Echinacea	1'	18–24	**Coral bells (*Heuchera sanguinea*)****	2'	12
Flowering tobacco	2–3'	18–24	**Coreopsis**	2'	9–18
Hollyhock***	4–6'	12	**Delphinium**	1–5'	24
Marigold, African	2–4'	12-24	**Foxglove**	3'	12
Marigold, French	6–18"	8–12	**Gaillardia**	2–3'	12
Nasturtium, climbing***	Trailing	10	**Gazania**	6–12"	10
Nasturtium, dwarf***	1'	8	**Iceland poppy**	1'	12
Pansy	6-9"	8-10	**Jacob's ladder (*Polemonium caeruleum*)****	6"–3'	12–15
Petunia	12–16"	12	**Marguerite**	2 1/2–3"	18–24
Phlox (*Phlox drummondii*)**	6–18"	9	**Oriental poppy**	2 1/2–3"	12–14
Portulaca	6"	6–9	**Painted daisy**	3'	12
Scarlet sage (*Salvia splendens*)**	1–1 1/2'	12	**Peony**	2'	14–16
Schizanthus	1 1/2–2'	12–18	**Pinks (*Dianthus*)****	1'	12
Shirley poppy	1 1/2–2'	12–18	**Scabiosa**	2'	12
Snapdragons	1 1/2–3'	12	**Sea pink (*Armeria*)****	4–6"	10–12
Stocks	1–2 1/2'	12	**Shasta daisy**	2 1/2–3'	12
Strawflower	2–3'	12–18	**Sweet William**	1–2'	12
Sweet peas	Climbing	12	Note: Most flowers have long-germinating seeds (8 to 21 days). * Spacings for standard-sized plants. For smaller varieties, reduce the spacings in proportion to the reduced plant size. ** Botanical Latin names prevent possible confusion. *** Reseed themselves easily by dropping many seeds on the ground.		
Zinnia	1-3'	12–18			

Herb Spacing Chart

ANNUALS—PLANT SEED IN SPRING FOR LATE SUMMER HARVEST						
		Height	Inches Apart*		Height	Inches Apart*
Anise		2'	8	**Coriander**	1–1½'	6
Basil, sweet		1–2'	6	**Cumin**	1'	18
Borage		1–1½'	15	**Dill**	2½'	8
Caraway		2½'	6	**Fennel**	3–5'	12
Chamomile (*Matricaria recutita*)		2½'	6–10	**Parsley**	2½'	5
Chervil		1–1½'	4	**Savory, summer**	1–1½'	6
Cilantro		1-1½'	5			
PERENNIALS††—NEED A PERMANENT SPACE IN THE GARDEN						
		Height	**Inches Apart***		**Height**	**Inches Apart***
Angelica		4–6'	36	**Marjoram**	1'	12
Bee balm†		3'	30	**Oregano†**	2'	18–24
Burnet		15'	15	**Peppermint**	2½'	12#
Catnip		2–3'	15#	**Pineapple sage†**	4'	24–36
Chamomile, Roman (*Chamaemelum nobile*)†		3–12'	12	**Rosemary**	3–4'	18–24
Chives		10–24"	5	**Rue**	3'	18
Comfrey†		15–36"	12	**Sage**	2'	18
Costmary		2–6'	12	**Santolina**	2'	30
Feverfew		1–3'	10–15	**Savory, winter**	1'	12
Geraniums, scented†	**Apple**	10"	18	**Southernwood**	3–5'	30
	Coconut	8–12"	18	**Spearmint†**	2–3'	15#
	Lemon	2–3'	##	**Stevia**	1–1½'	12
	Lime	2'	18	**Stinging nettle**	4–6'	24#
	Peppermint	2'	48	**St. Johns wort**	2'	8
	Rose	3'	30	**Tansy**	4'	30
Good King Henry		1'	16	**Tarragon**	2'	12–18
Horehound		2'	9#	**Thyme**	1'	6
Hyssop		2'	12	**Valerian**	4'	18
Lavender		3'	18	**Woodruff†**	6–10"	8–12#
Lemon balm		3'	12#	**Wormwood**	3–5'	12–24
Lemon verbena		10'	24	**Yarrow, common (*Achillea millefolium*)**	3–5'	12–18
Lovage		6'	3	**Yarrow, white-, red-, or pink-flowered†**	2½–3'	12

Note: Many herbs have extra-long-germinating seeds (22 to 28 days). † Generally based on our experience. Others are from the Herb Chart by Evelyn Gregg, Biodynamic Farming and Gardening Association, Wyoming, Rhode Island. †† Normally started from cuttings or root divisions, they often take 1 to 4 years to reach full size from seed. # Spreads underground; keep it contained or plant where it can keep going. ## Unknown.

Planning Sheet							
CROP	FOOD NEEDED	MATERIALS NEEDED				YIELDS	
	AA	BB	CC	DD	EE	FF	GG
	Pounds You Select	Approx. No. Plants You Need[20]	Approx. Square Feet You Need[21]	Approx. No. Flats You Need[22]	Approx. Ounces/ Volume Seeds You Need[23]	Your Actual Yield per 100 Square Feet	Your Actual Yield Compared with U.S. Average[24]
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							