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Food Plant Production
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FPP-01

Guam Crop Charts

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Guam has a long history of crop cultivation ranging from subsistence agroforestry to conventional/commercial farm systems. Food crop production is particularly important because it feeds the people of Guam. There are numerous benefits to producing your own fruits and vegetables on Guam, including:

- Improved overall health by consuming more and fresher fruits and vegetables.
- Reduced food costs.
- Reduced environmental impacts with proper management practices.
- Additional exercise opportunities with activities such as planting, weeding, watering, and harvesting.
- Enhanced and sustained food security by reducing dependency on imported fruits and vegetables.

While food crop production can be a rewarding endeavor, it can also be challenging and it is important to be persistent and resilient, and knowledgeable. Major factors that effect crop production include irrigation, temperature, sunlight, plant nutrition, and pests and diseases. This publication contains advice on some of that knowledge: seed selection, plant spacing, and nutrient needs.

Nutrient (fertilizer) application to crops, from both organic and inorganic sources, for example, is essential for successful crop production. Nutrients must be applied appropriately in order to produce healthy crops that will result in quality produce. Producers should understand the nutrient requirements of specific crops, available nutrients in the soil, nutrient compositions of store-bought fertilizers, and the compositions of other nutrient sources such as animal waste, fish waste, and recycled organic materials such as compost. Both inadequate and excess application of nutrients will likely hinder growth, development, and productivity of a plant. When applied inappropriately, excess nutrients can also be detrimental to the environment, particularly to drinking and recreational water sources, and it also wastes money. Proper nutrient application is dependent on timing, placement, methods of applying nutrients, and the overall balance of plant nutrient requirements during the crop cycle. Proper management of plant nutrients is the key to successful crop production and minimizing environmental problems. See page 11 for more on nutrients.

Other information found in this publication is about recommended varieties of seeds, seed sources, and plant spacing. These are just suggestions and you are encouraged to explore different options for your own property and production characteristics.

The Cooperative Extension & Outreach of the College of Natural & Applied Sciences of the University of Guam (CNAS-E&O) produced this basic guide to the proper production of fruits and vegetables grown in the region. CNAS-E&O also provides technical assistance and advice to the general public for crop production issues. Personnel can help develop nutrient management plans for desired plants. It is advisable to have your soils tested prior to planting in order for personnel to provide the most efficient and effective plant nutrient recommendations. Contact us at 735-2080 or visit us at www.CNAS-RE.uog.edu for additional assistance.

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Recommended Crop Spacing and Estimated Yields

Crop Name	Chamorro Name	Recommended Distance (in.) btw. Hills	Recommended No. of Plants Per Hill/Bed Hill*	Recommended Distance (in.) btw. Rows	No. of Plants per 100 ft Row/Bed*	No. of Plants per Acre	Number of 100 ft rows/beds* per Acre	Days Before Harvest	Days During Harvest	Per Plant Expected Yield (lbs)	100 ft. Row Expected Yield (lbs)	Per Acre Expected Yield (lbs)
Bean, yam (jicama)	hikamas	8 - 12	1	36 - 60	101 - 151	8,888 - 22,046	88 - 146	90-180 days	5 weeks	1.50	151 - 226	13,332 - 33,069
Beans, bush, pole	abuchuelas	8 - 12	1	36 - 60	101 - 151	8,888 - 22,046	88 - 146	50-60 days	3 weeks	2.00	202 - 302	17,776 - 44,092
Beans, wing	sigidiyas	10 - 18	1	48 - 120	68 - 121	3,060 - 13,310	45 - 110	Apr. - Oct.	Nov.- Mar.	2.00	136 - 242	6,120 - 26,620
Beans, yardlong	friholis	8 - 12	1	36 - 60	101 - 151	8,888 - 22,046	88 - 146	55-60 days	4 weeks	3.00	303 - 453	26,664 - 66,138
Broccoli	broccoli	12 - 24	1	18 - 36	51 - 101	7,446 - 29,391	146 - 291	55-60 days	2 weeks	2.00	102 - 202	14,892 - 58,782
Cabbage, Chinese*	nappa', pechai	12	4	48	404	44,440	110	45-60 days	2 weeks	2.00	808	88,880
Cabbage, head	rapoyu	12 - 24	1	24 - 36	51 - 101	7,446 - 29,391	146 - 219	75-86 days	2 weeks	3.00	153 - 303	22,338 - 88,173
Cassava	mendioka	30 - 40	1	36 - 48	31 - 41	3,410 - 5,986	110 - 146	3-4 months	once	5.00	155 - 205	17,050 - 29,930
Corn, field	ilotes, mai'es	8 - 12	1	30 - 42	101 - 151	12,625 - 26,425	125 - 175	60-70 days	2 weeks	0.50	50 - 75	6,133 - 13,213
Corn, sweet	ilotes, mai'es	8 - 12	1	30 - 42	101 - 151	12,625 - 26,425	125 - 175	60-70 days	2 weeks	0.33	33 - 49	4,166 - 8,720
Cucumber	kåmba	10 - 18	1	36 - 72	68 - 121	5,032 - 17,666	74 - 146	35-45 days	3 weeks	10.00	680 - 1,210	50,320 - 176,660
Eggplant - long	biringhenas	36 - 48	1	48 - 72	26 - 34	1,924 - 3,740	74 - 110	55-65 days	12 weeks	8.00	208 - 272	15,392 - 29,920
Eggplant - round	biringhenas	36 - 48	1	48 - 72	26 - 34	1,924 - 3,740	74 - 110	65-70 days	10 weeks	8.00	208 - 272	15,392 - 29,920
Gourd, bittermelon	atmagosu	48 - 60	1	120 - 180	21 - 26	630 - 1,170	30 - 45	60-80 days	8 weeks	8.00	168 - 208	5,040 - 9,360
Gourd, bottled	kalabåsa, upo, tagua	48 - 60	1	120 - 180	21 - 26	630 - 1,170	30 - 45	60-80 days	8 weeks	14.00	294 - 364	8,820 - 16,380
Gourd, chayote	chaiote	48 - 60	1	120 - 180	21 - 26	630 - 1,170	30 - 45	60-80 days	4 weeks	6.00	126 - 156	3,780 - 7,020
Gourd, wax	kondot	48 - 60	1	120 - 180	21 - 26	630 - 1,170	30 - 45	60-80 days	8 weeks	16.00	336 - 416	10,080 - 18,720
Kale	kale	18 - 24	1	24 - 36	51 - 68	7,446 - 14,892	146 - 219	45-80 days	6-8 weeks	0.75	38 - 51	5,585 - 11,169
Leafy green lettuce*	leafy greens	12	4	48	404	44,440	110	30-50 days	once	0.60	242	26,664
Melon, cantaloupe, musk	mellon-båstos	24 - 48	1	96 - 180	26 - 51	780 - 2,805	30 - 55	70-85 days	3 weeks	10.00	260 - 510	7,800 - 28,050
Melon, honeydew	mellon-fino	24 - 48	1	96 - 180	26 - 51	780 - 2,805	30 - 55	80-85 days	2 weeks	7.00	182 - 357	5,460 - 19,635
Melon, pepino	pipino	24 - 48	1	96 - 180	26 - 51	780 - 2,805	30 - 55	70-85 days	4 weeks	6.00	156 - 306	4,680 - 16,830
Melon, watermelon	chandiha	24 - 48	1	96 - 180	26 - 51	780 - 2,805	30 - 55	60-70 days	2 weeks	35.00	910 - 1,785	27,300 - 70,125
Mustard (greens)*	mustard	12	4	48	404	44,440	110	35-60 days	6-8 weeks	0.60	242	26,664
Okra	okra	36 - 48	1	72 - 120	26 - 34	1,924 - 3,740	45 - 74	60-70 days	8 weeks	4.00	104 - 136	7,696 - 14,960
Onions, green, bunching*	siboyas Chamorro	6	8	48	1608	176,880	110	30-50 days	once	0.10	161	17,688
Pepper, bell/sweet	donne' mames	18 - 36	1	48 - 72	34 - 68	2,516 - 7,480	74 - 110	50-60 days	8 weeks	4.00	136 - 272	10,064 - 29,920
Pepper, chili/hot	donne' pika	18 - 36	1	48 - 72	34 - 68	2,516 - 7,480	74 - 110	50-60 days	12 weeks	3.00	102 - 204	7,548 - 22,440
Pineapple	piña	10 - 18	1	30 - 36	68 - 121	5,032 - 21,175	146 - 175	18-24 months	once	3.00	204 - 363	15,096 - 63,525
Potato, sweet	kamuti	12 - 18	1	48 - 72	68 - 101	5,032 - 11,110	74 - 110	3-4 months	1 week	3.00	204 - 303	15,096 - 33,330
Pumpkin	kalamasa	24 - 48	1	96 - 180	26 - 51	780 - 2,805	30 - 55	90-110 days	4 weeks	40.00	1,040 - 2,040	31,200 - 112,200
Radish, daikon*	daikon	12	4	48	404	44,440	110	50-60 days	2 weeks	1.00	404	44,440
Radish, red*	radish agaga'	12	4	48	404	44,440	110	18-22 days	2 weeks	0.10	40	4,444
Squash, zucchini	zucchini, squash	24 - 36	1	48 - 60	34 - 51	2,992 - 5,610	88 - 110	55-60 days	2 weeks	6.00	204 - 306	17,952 - 33,630
Taro, red (*Colocasia*)	sunen agaga', bisåya	24 - 36	1	48 - 60	34 - 51	2,992 - 5,610	88 - 110	6-10 months	once	2.00	68 - 102	5,984 - 11,220
Taro, swamp	sunen ba'ba'	36 - 48	1	48 - 60	26 - 34	2,288 - 3,740	88 - 110	6-10 months	once	35.00	910 - 1,190	80,080 - 130,900
Taro, white, coco yam	sunen honolulu	36 - 48	1	48 - 60	26 - 34	2,288 - 3,740	88 - 110	6-10 months	once	4.00	104 - 136	9,152 - 14,960
Tomato, cherry	tumåtes	18 - 48	1	48 - 60	26 - 68	2,288 - 7,480	88 - 110	60-70 days	5 weeks	8.00	208 - 544	18,304 - 59,264
Tomato, standard	tumåtes	18 - 48	1	48 - 60	26 - 68	2,288 - 7,480	88 - 110	60-70 days	4 weeks	11.00	286 - 748	25,168 - 82,280
Yam, round-stem	dågu	36 - 48	1	72 - 96	26 - 34	2,288 - 3,740	55 - 74	10-12 months	once	20.00	520 - 680	45,760 - 74,800
Yam, spiny, wild	nika, gaddo' (spiny)	36 - 48	1	72 - 96	26 - 34	2,288 - 3,740	55 - 74	10-12 months	once	5.00	130 - 170	11,440 - 18,700
Yam, winged-stem	dågu	36 - 48	1	72 - 96	26 - 34	2,288 - 3,740	55 - 74	10-12 months	once	10.00	260 - 340	22,880 - 37,400

* Bed, Beds, Bed Rows
Radishes, Chinese Cabbage, Mustard, Leafy Greens - 4 rows per bed at 1 ft apart with beds at 6 ft wide. 4 plants per bed hill means 1 plant per hill within a row bed.
Green, Bunching Onions - 8 rows per bed at 1 ft apart with beds at 6 ft wide. 8 plants per bed hill means 1 plant per hill within a row bed.

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Nutrient Requirements of Crops

		Pounds Per Acre Recommendations					
		Nitrogen (Ammonium, Nitrate)			Phosphorus (Phosphate)		
Crops	**Chamorro Name**	**Low**	**Average**	**High**	**Low**	**Average**	**High**
Bean, yam (jicama)	hikamas	70	90	110	70	90	110
Beans, bush, pole	abuchuelas	100	125	150	100	150	200
Beans, wing	sigidiyas	100	125	150	100	150	200
Beans, yardlong	friholis	125	150	175	100	150	200
Broccoli	broccoli	150	163	175	150	200	250
Cabbage, Chinese *	nappa', pechai	75	163	150	100	125	150
Cabbage, head	rapoyu	125	163	180	150	200	250
Cassava	mendioka	75	100	125	150	200	250
Corn, sweet	ilotes, mai'es	150	175	200	150	200	250
Corn, field	ilotes, mai'es	150	175	200	150	200	250
Cucumber	kåmba	180	215	250	150	200	250
Eggplant - long	biringhenas	150	200	250	150	225	300
Eggplant - round	biringhenas	150	200	250	150	225	300
Gourd, bittermelon	atmagosu	180	215	250	150	225	300
Gourd, chayote	chaiote	150	175	200	150	200	250
Gourd, wax	kondot	150	175	200	150	200	250
Gourd, bottled	kalabåsa, upo, tagua	150	175	200	150	200	250
Kale	kale	100	125	150	50	75	100
Leafy green lettuce *	leafy greens	100	125	150	50	75	100
Melon, cantaloupe, musk	mellon-båstos	180	215	250	150	200	250
Melon, honeydew	mellon-fino	180	215	250	150	200	250
Melon, pepino	pipino	180	215	250	150	200	250
Mustard (greens) *	mustard	100	125	150	50	75	100
Okra	okra	100	125	150	150	200	250
Onions, green, bunching *	siboyas Chamorro	100	125	150	100	150	200
Pepper, bell/sweet	donne' mames	150	175	200	150	200	250
Pepper, chili/hot	donne' pika	150	175	200	150	200	250
Potato, sweet	kamuti	75	88	100	150	200	250
Pumpkin	kalamasa	150	175	200	150	200	250
Radish, daikon *	daikon	150	163	175	100	125	150
Radish, red *	radish agaga'	150	163	175	100	125	150
Squash, zucchini	zucchini, squash	150	175	200	150	200	250
Taro, red (*Colocasia*)	sunen agaga', bisåya	150	175	200	150	200	250
Taro, white, coco yam	sunen ba'ba'	100	125	150	150	200	250
Taro, swamp	sunen honolulu	100	125	150	150	200	250
Tomato, cherry	tumåtes	150	175	200	200	250	300
Tomato, standard	tumåtes	150	175	200	200	250	300
Watermelon	chandiha	150	200	250	150	200	250
Yam, spiny, wild	nika, gaddo' (spiny)	100	125	150	150	200	250
Yam, winged-stem	dågu	100	125	150	150	200	250
Yam, round-stem	dågu	100	125	150	150	200	250

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			Pounds Per 100 Foot Row Recommendations								
Potassium (Potash)			Nitrogen (Ammonium, Nitrate)			Phosphorus (Phosphate)			Potassium (Potash)		
Low	**Average**	**High**	**Low**	**Average**	**High**	**Low**	**Average**	**High**	**Low**	**Average**	**High**
160	180	200	0.64	0.83	1.01	0.64	0.83	1.01	1.47	1.65	1.84
150	175	200	0.92	1.15	1.38	0.92	1.38	1.84	1.38	1.61	1.84
150	175	200	1.84	2.30	2.75	1.84	2.75	3.67	2.75	3.21	3.67
150	175	200	1.15	1.38	1.61	0.92	1.38	1.84	1.38	1.61	1.84
150	185	220	1.03	1.12	1.21	1.03	1.38	1.72	1.03	1.27	1.52
100	125	150	0.69	1.03	1.38	0.92	1.15	1.38	0.92	1.15	1.38
150	185	220	0.86	1.05	1.24	1.03	1.38	1.72	1.03	1.27	1.52
150	185	220	1.03	1.38	1.72	2.07	2.75	3.44	2.07	2.55	3.03
120	170	220	1.38	1.61	1.84	1.38	1.84	2.30	1.10	1.56	2.02
120	170	220	1.38	1.61	1.84	1.38	1.84	2.30	1.10	1.56	2.02
200	225	250	2.07	2.47	2.87	1.72	2.30	2.87	2.30	2.58	2.87
150	200	250	2.07	2.75	3.44	2.07	3.10	4.13	2.07	2.75	3.44
150	200	250	2.07	2.75	3.44	2.07	3.10	4.13	2.07	2.75	3.44
150	185	220	4.13	4.94	5.74	3.44	5.17	6.89	3.44	4.25	5.05
150	200	250	3.44	4.02	4.59	3.44	4.59	5.74	3.44	4.59	5.74
150	200	250	3.44	4.02	4.59	3.44	4.59	5.74	3.44	4.59	5.74
150	200	250	3.44	4.02	4.59	3.44	4.59	5.74	3.44	4.59	5.74
75	100	125	0.69	0.86	1.03	0.34	0.52	0.69	0.52	0.69	0.86
75	100	125	0.92	1.15	1.38	0.46	0.69	0.92	0.69	0.92	1.15
200	225	250	2.48	2.96	3.44	2.07	2.75	3.44	2.75	3.10	3.44
200	225	250	2.48	2.96	3.44	2.07	2.75	3.44	2.75	3.10	3.44
200	225	250	2.48	2.96	3.44	2.07	2.75	3.44	2.75	3.10	3.44
75	100	125	0.92	1.15	1.38	0.46	0.69	0.92	0.69	0.92	1.15
120	160	200	1.15	1.43	1.72	1.72	2.30	2.87	1.38	1.84	2.30
100	125	150	0.92	1.15	1.38	0.92	1.38	1.84	0.92	1.15	1.38
150	200	250	1.38	1.61	1.84	1.38	1.84	2.30	1.38	1.84	2.30
150	200	250	1.38	1.61	1.84	1.38	1.84	2.30	1.38	1.84	2.30
150	185	220	0.69	0.80	0.92	1.38	1.84	2.30	1.38	1.70	2.02
150	185	220	2.75	3.21	3.67	2.75	3.67	4.59	2.75	3.40	4.04
150	178	205	1.38	1.49	1.61	0.92	1.15	1.38	1.38	1.63	1.88
150	178	205	1.38	1.49	1.61	0.92	1.15	1.38	1.38	1.63	1.88
150	175	200	1.72	2.01	2.30	1.72	2.30	2.87	1.72	2.01	2.30
150	200	250	1.72	2.01	2.30	1.72	2.30	2.87	1.72	2.30	2.87
150	200	250	1.38	1.72	2.07	2.07	2.75	3.44	2.07	2.75	3.44
150	200	250	1.38	1.72	2.07	2.07	2.75	3.44	2.07	2.75	3.44
150	200	250	2.07	2.41	2.75	2.75	3.44	4.13	2.07	2.75	3.44
150	200	250	2.07	2.41	2.75	2.75	3.44	4.13	2.07	2.75	3.44
150	200	250	2.75	3.67	4.59	2.75	3.67	4.59	2.75	3.67	4.59
150	200	250	1.84	2.30	2.75	2.75	3.67	4.59	2.75	3.67	4.59
150	200	250	1.84	2.30	2.75	2.75	3.67	4.59	2.75	3.67	4.59
150	200	250	1.84	2.30	2.75	2.75	3.67	4.59	2.75	3.67	4.59

Guide For Crops Grown in Guam

Truck Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Bean, yam (jicama)	*Pachyrhizus erosus*	hikamas	Local selection	*	Anytime of the year
Beans, bush, pole	*Phaseolus vulgaris*	abuchuelas	Early bush	G	(Sept. - Apr.)
			Kentucky wonder	C	
			Dade	H	
			Contender	C	
Beans, wing	*Psophocarpus tetragonolobus*	sigidiyas	Local selection	*	(Sept.- Dec.)
Beans, yardlong	*Vigna unguiculata var. sesquipedalis*	friholis	Local selection	*	(Sept. - Apr.)
			Green arrow	G	(Oct. - Apr.)
			Green pod kaohsiung	G	
Cabbage, Chinese	*Brassica spp.*	nappa', pechai	Gracious	G	(Oct. - Apr.)
			Green brisk	G	
			Ching chang	G	
			Speedy	G	
			Show jean	G	
Cabbage, head	*Brassica oleracea*	rapoyu	Scorpio	M	(Oct. - Apr.)
			Pacifica	N	
			KK cross	R	
Cassava	*Manihot esculenta*	mendioka	Local selections	*	Anytime of the year
Corn, sweet	*Zea mays*	ilotes, mai'es	Hawaiian super sweet	K	(Sept. - Apr.)
			Peaches and cream	C	
Corn, field	*Zea mays*	ilotes, mai'es	Local selections	*	(Sept. - Apr.)
Cucumber	*Cucumis sativus*	kåmba	Blessing	G	(Sept. - Apr.)
			Richmond	G	
			Fountain	G	
			Summer dance	C	
			Summer top	F	
			Tasty green	C	
			Soarer	F	
Eggplant - long	*Solanum melongena*	biringhenas	Money maker 2	J	Anytime of the year
			Millionaire	J	
			Black shine	J	
			Charming	G	
			Fond may	G	
			Pintung long	G	
			Waimanalo	K	
			Kurume	F	
			Local green	D	
			Local little tom	D	
Eggplant - round	*Solanum melongena*	biringhenas	Black beauty	J	Anytime of the year
			Black bell	J	
Gourd, bittermelon	*Momordica charantia*	atmagosu	Local selection	*	Anytime of the year
			KY Green	G	
Gourd, chayote	*Sechium edule*	chaiote	Local selection	*	Anytime of the year
Gourd, wax	*Benincasa hispida*	kondot	Cheerer	G	Anytime of the year

Truck Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Gourd, bottled	*Lagenaria siceraria*	kalabåsa, upo, tagua	Local selection	*	Anytime of the year
			Long Life	G	
			Ever Rich	G	
Kale	*Brassica oleracea*	kale	Dwarf blue curled vates	C	Anytime of the year
			Red Russian	C	
			Ripbor	E	
			Siberian	E	
			Biera	E	
Leafy green lettuce	*Lactuca sativa*	leafy greens	Tropicana	E	Anytime of the year
			Cherokee	E	
			Nevada	E	
			Green Star	E	
			Tango	E	
Melon, cantaloupe, musk	*Cucumis melo*	mellon-båstos	Infinite Gold	M	(Oct. - Mar.)
			Timeless Gold	M	
Melon, honeydew	*Cucumis melo*	mellon-fino	Tamdew	A	(Oct. - Mar.)
Melon, pepino	*Cucumis melo*	pipino	White and yellow varieties	G	(Oct. - Mar.)
Melon, watermelon	*Citrullus lanatus*	chandiha	Sugar baby	A	(Oct. - Mar.)
			Empire II	G	
			China baby	G	
Mustard (greens)	*Brassica spp.*	mustard	Southern gian curled	E	Anytime of the year
			Green garland	F	
Okra	*Abelmoschus esculentus*	okra	Local selection	*	Anytime of the year
			Clemson spineless	C	
Onions, green, bunching	*Allium fistulosum*	siboyas Chamorro	Local selection	*	Anytime of the year
			Tokyo long white	G	
			Fragrant	G	
			Evergreen long white	C	
Pepper, bell/sweet	*Capsicum annuum*	donne' mames	Big star	G	(Oct. - Apr.)
			Blue star	G	
			California wonder	C	
			Big bertha	C	
			Bell boy	H	
Pepper, chili/hot	*Capsicum annuum, Capsicum frutescens*	donne' pika	Local ti'ao	*	Anytime of the year
			Local såli	*	
			Local månu	*	
			Local batunes	*	
			Ascent	G	
			Hot beauty	G	
			Red air	G	
			Ghost	A	
			Reaper	L	
			Scorpion	A	
			Habanero	E	

Truck Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Potato, sweet	*Ipomoea batatas*	kamuti	Local selection	*	Anytime of the year
Pumpkin	*Cucurbita moschata*	kalamasa	Local selection	*	Anytime of the year
Radish, daikon	*Raphanus sativus var. longipinnatus*	daikon	Ming-Ho	G	(Oct. - Jun.)
			Forward	G	
			Sinews	G	
Radish, red	*Raphanus sativus*	radish agaga'	Cherry belle	C	(Oct. - Jun.)
			Rover hybrid	C	
Squash, zucchini	*Cucurbita pepo*		Jewel	G	(Oct. - Apr.)
Taro, red	*Colocasia esculenta*	sunen agaga', bisåya	Micronesian local selection	*	Anytime of the year
Taro, white, coco yam	*Xanthosoma violaceum*	sunen Honolulu	Micronesian local selection	*	Anytime of the year
Taro, swamp	*Cyrtosperma edule*	sunen ba'ba'	Local selection	V	Anytime of the year
			Palau (local)	*	Anytime of the year
Tomato, cherry	*Lycopersicon esculentum var. cerasiforme*	tumåtes	Juliete	G	(Oct. - May)
			Precious	G	
			Season red	G	
			Felicity	P	
			Olivia	Q	
			Ornela	Q	
			Carmine	Q	
			Super sweet	J	
Tomato, standard	*Lycopersicon esculentum var. commune*	tumåtes	N-5, N-63	K	(Oct. - May)
			Heat wave II	C	
			Tasti-lee	C	
			Spring giant	L	
			Solar fire	B	
Yam, spiny, wild	*Dioscorea esculenta*	nika, gaddo' (spiny)	Local gaddo' selection	*	(Nov. - Feb.)
			Local nika selection	*	
Yam, winged-stem	*Dioscorea alata*	dågu	Local dågun lulok	*	
			Local dågun håya	*	
			Local dågun agaga'	*	
Yam, sound-stem	*Dioscorea rotundata*	dågu	Local dågun å'paka'	*	(Nov. - Feb.)

Orchard Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Avocado	*Persea americana*	alageta	Long purple, Round purple,	*	Anytime of the year
			Long green, Round green	*	
Banana, cooking	*Musa spp.*	chotda (tree and young fruit), aga' (ripe fruit)	Tanduki	*	Anytime of the year
			Galayan	*	
			Long	*	
			Palau (Sabå)	*	

Orchard Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Banana, eating	*Musa spp.*	chotda (tree and young fruit), aga' (ripe fruit)	Manila (apple)	*	Anytime of the year
			Fiji	*	
			Macao	*	
			Williams hybrid	*	
			Lacatan	*	
			Guahu	*	
			Blue java	*	
Breadfruit (seedless)	*Artocarpus atilis*	lemmai (seedless)	Palada	*	Anytime of the year
			Bastos	*	
			Mahlos	*	
			Ruk	*	
			Palau	*	
			Ma'afala	*	
Breadfruit (seeded)	*Artocarpus marianensis*	dokdok (seeded)	Local selection	*	Anytime of the year
Citrus, pomelo	*Citrus grandis*	kahet ma'gas	Sour	*	Anytime of the year
Citrus, lemon	*Citrus limon*	lemmon	Local selections, Myer's	*	Anytime of the year
Citrus, lime, key-lime	*Citrus aurantifolia*	lemmon china, ademelong, kannu'on	China lime, Key lime	*	Anytime of the year
Citrus, tangerine	*Citrus reticulata*	lalanghita	Manderin, Local selection	*	Anytime of the year
Coconut	*Cocos nucifera*	niyok	3-year dwarf (Tres åños)	*	Anytime of the year
			Kannu'on	*	
			Agaga'	*	
			Other Local selection	*	
Guava	*Psidium guajava*	åbas	Local selection	*	Anytime of the year
Mango	*Mangifera indica*	mångga	Karabao	*	Anytime of the year
			Hayden type, Indian	*	
			Piku	*	
			Saipan	*	
			Edward's	*	
Jackfruit	*Artocarpus heterophyllus*	långka'	Local selection	*	Anytime of the year
Papaya	*Carica papaya*	papåya	Solo varieties	K	Anytime of the year
			Local dåggua	*	
			Red ady	G	
			Tainung 2	G	
Pineapple	*Ananas comosus*	piña	Local variety, Smooth Cayenne	*	Anytime of the year
Pomegranate	*Punica granatum*	granåda	Local selection	*	Anytime of the year
Soursop	*Annona muricata*	laguanå	Local selection	*	Anytime of the year
Spanish plum	*Spondias purpurea*	siniguelas	Local - Green to yellow, Green to purple-red	*	Anytime of the year

Orchard Crops	Scientific Name	Chamorro Name	Variety	Seed Sources (see key)	Recommended Planting Months
Star apple	*Chrysophyllum cainito*	kainito	Purple skin, Green skin	*	Anytime of the year
Sugar apple	*Annona reticulata*	annonas	Local selection	*	Anytime of the year
Citrus, sour orange	*Citrus x aurantium*	kåhet	Local sour	*	Anytime of the year
Sweetsop	*Annona squamosa*	åtes	Local selection	*	Anytime of the year
Starfruit	*Averrhoa carambola*	bilembines	Local selection	*	Anytime of the year
Tahitian gooseberry	*Phyllanthus acidus*	iba'	Local selection	*	Anytime of the year

Seed Sources Key	Seed Company	Website	Telephone
A	Baker Creek Heirloom Seeds (Rare Seed)	http://www.rareseeds.com/	1-417-924-8917
B	Bonnieplants	https://bonnieplants.com/	1-334-738-3104
C	Burpee	http://www.burpee.com/	1-800-888-1447
D	Guam Department of Agriculture		1-671-300-7974
E	Johnny's Selected Seeds	http://www.johnnyseeds.com/	1-877-564-6697
F	Kitazawa	http://www.kitazawaseed.com/	1-510-595-1198
G	Known-You Seed Co.	http://www.knownyou.com/	Guam Home Center 1-671-632-4442
H	Park Seed	http://parkseed.com/	1-800-8450-3369
I	Tomato Growers	http://www.tomatogrowers.com/	1-888-478-7333
J	Twilley Seed	http://twilleyseed.com/Home.html	1-800-622-7333
K	University of Hawaii Seed Lab	http://www.ctahr.hawaii.edu/seed/	1-808-956-7890/6706
L	Whatcom Seed Company	http://seedrack.com/	1 541-338-4001
M	Sakata	http://www.sakatavegetables.com/index.cfm/fuseaction/home.home/index.htm	1-408-778-7758
N	Terranova Seeds	http://www.terranovaseeds.co.nz/site/	09-275-1919
O	BallSeed	http://www.ballseed.com/	1-800-879-2255
P	Paramount Seeds Inc.	http://paramountseeds.com/	64-772-221-0653
Q	Lefroy Valley	http://www.lefroyvalley.co.nz/about/	09-238-3593
R	Honeymoon Acres	http://www.honeymoonacres.com/index.htm	1-920-898-4490
*	Local Growers - These varieties may be obtained from local growers. It is important to ensure that local selections of plant material obtained from local producers are disease-free.		

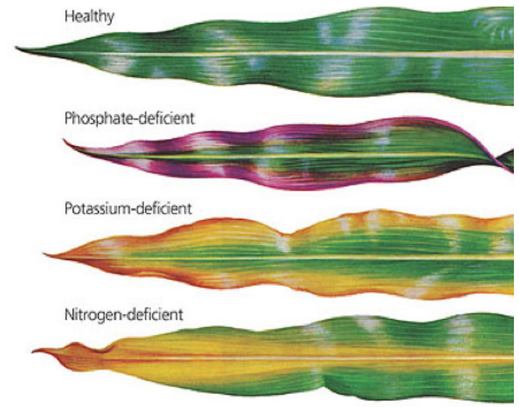
NOTES

1. Ordering seeds from off-island may require special permits and fees. Contact the biosecurity division of the Guam Department of Agriculture (671-475-1426/27) before ordering seeds online.
   Many varieties can be found from other off-island seed companies.
2. Letters such as V, F, and N on seed packages usually indicate a varietie's resistance to V = Verticillium wilt resistant, F = Fusarium wilt resistant, and N = Nematode resistant.
3. Seed packages may also indicate resistance to diseases by text and pictures.
4. All crops can be grown anytime of the year. Recommended planting months are targeted for optimum growing conditions.

More Details on Plant Nutrients

There are 17 essential nutrients that plants need to grow, develop, and reach its full potential of production. Nutrient application for most plants focuses on the methods and timing of applications of three primary plant nutrients. These primary plant nutrients are nitrogen (N), phosphorus (P) and potassium (K). N, P, and K nutrient sources represent the largest costs to plant producers, and they also pose the greatest risk to the environment.

Common fertilizers available on Guam primarily consist of complete fertilizers, usually with the label clearly stating numbers like 16-16-16 and 10-20-20. These numbers represent the percent of Nitrogen-Phosphorus-Potassium (N-P-K) contained in commonly available fertilizer bags. For example, a 100 pound bag of 16-16-16 contains 16 pounds each of N, P, and K. Organic material like compost and non-composted livestock manure also contain N, P, and K, in which amounts can be tested for in soil laboratories.



http://www.bio.miami.edu/dana/pix/deficiency.jpg

Nitrogen

Nitrogen is essential to plants for healthy vegetative (plant leaves) growth as plants develop.

Nitrogen Deficiency

When plants are deficient in nitrogen, over all plant growth and development is hindered. Apparent symptoms of lack of nitrogen include yellowing of leaves, particularly in the lower, older leaves of plants, and the rest of plant may appear light green.

Nitrogen deficiency in citrus. Credits: M. Zekri.

Nitrogen Excess

Too much nitrogen in plants results in excess leaf and stem growth, which delays plant maturity, and reduces flowering and fruiting. Excess nitrogen also hinders plant absorption of other important nutrients like sulfur, calcium, and magnesium. The two forms of nitrogen that plants use are ammonium and nitrate. Excess nitrate can easily leach into ground water and also runoff with soil and water into surface waters. High levels of nitrate in drinking water sources can be hazardous to public health, particularly for infants. Ammonium and nitrate can run-off with soil water into surface water sources posing threat to drinking water sources and coral reef health. Run off of nitrogen contributes to undesirable levels of algal blooms in surface water which negatively impacts coral reef systems and marine life that depend on healthy coral reef systems.

Phosphorous

Phosphorus is essential to plants for establishment (healthy root system), and helps plant with vigorous growth development of flowers, fruits, and seeds.

Phosphorus Deficiency

Plants lacking phosphorus results in reduced plant growth and development, particularly negatively impacting pollination and the reproductive process. Symptoms usually include purpling of leaves and burnt leaf tips. Phosphorus deficiency also hinders the availability of other nutrients to plants, and reduces the plant's ability to uptake other nutrients.

Phosphorus deficiency on tomato leaf. Photo credit: Robert Kosinski, Clemson University

Phosphorus Excess

Too much phosphorus will cause plants to mature too quickly. Excess phosphorus in plants also hinders the availability of other nutrients to plants, and reduces the plant's ability to uptake other nutrients. In most soils a large portion of the phosphorus is tied up chemically and thus is not available to plants. Since phosphorus is bound by soil particles, it is not subject to leaching or runoff with water. Phosphorus does runoff with soil when soils erode. Elevated levels of P in surface waters encourage the undesired growth of algae.

Potassium

Postassium is essential for overall plant health by strengthening a plant's resistance to disease. Potassium is also essential in fruit production and quality.

Potassium Deficiency

Plants lacking potassium results in slow growth and vigor of plants. Symptoms include wilted older leaves and burnt leaf margins.

Potassium deficiency. http://aggie-horticulture.tamu.edu/vegetable/problem-solvers/cucurbit-problem-solver/leaf-disorders/potassium-deficiency/

Potassium Excess

Too much potassium in plants results in poor fertilizer efficiency. Excess potassium in plants hinder the plant uptake of other nutrients. When compared to nitrogen and phosphorus, potassium presents little problems for the environment. It does not leach quickly through soils as nitrogen does, but will move with soil when soil is eroded. Unlike nitrogen and phosphorus, elevated levels of potassium in surface waters do not promote the growth of algae. Commercial fertilizer forms of potassium are salts. If they (salts) are applied too close to plant roots or seeds, water will likely be drawn out of plants, which cause serious plant injury.

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