

syngenta®

Vegetables
& Greens
Varieties
Handbook



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Crop Name	Botanical Crop Name	Scientific Name	Addition	Common Disease Name	Type of Organism	Commercial Abbreviation	Remark
Bean	Phaseolus Vulgaris	Pseudomonas savastanoi pv.		Haloblight	B	Psp 1,2	
		Phascolicola	Race 1,2				
Brassicas	Brassica spp.	Colletotrichum lindemuthianum	Race Alpha, Beta Delta, Gamma	Anthracoese	F	Cl1	
		Uromyces Appendiculatus	Lambda	Rust	F	(Ua)	
		Bean Common Mosaic Virus		Bean Common	V	BCMV	
		Albugo Candida		Mosaic			
		Fusarium oxysporum f.sp.	Race 1	White Blister	F	Ac	
		Conglutinans Mycosphaerella		Yellows Ring	F	Foc 1 (Foc1)	
		Brassicola Peronospora parasitica		Spot Downy	F	(Mb)	
		Plasmiodiophora brassicae		Mildew	F	Pp	
		Xanthomonas campestris pv.		Clubroot	F	(Pb)	
		Campestris		Black Rot	B	(Xcc)	
Carrot	Daucus Carota	Alternaria Dauci Cladosporium		Late Leaf Blight	F	(Ad)	
Cucumber	Cucumis Sativus	Cucumerium Corynespora		Scab And Gummosis	F	Ocu	
		Cassicola Erysiphe Cichoracearum		Corynespora Blight And Target Spot	F	Oca	
		Pseudoperonospora Cubensis		Powdery Mildew	F	(Ec)	
		Sphaerotheca Fuliginea Cucumber		Downy Mildew	F	(Pc)	
		Mosaic Virus Cucumber		Powdery Mildew	F	Sf (Sf)	
		Vain Yellowing Virus		Cucumber Mosaic	V	GMV (CMV)	
		Bremia Lactunae	Race 1-24	Cucumber Vain Yellowing	V	(CVYV)	
		Nasonovia Ribisnigri		Downy Mildew	F	Bl 1-24	
		Lettuce Mosaic Virus	Pathotype 2	Lettuce Leaf Aphid	I	Nr	
		Erysiphe Cichoracearum		Lettuce Mosaic	V	(LMW2)	
Melon	Cucumis Melo	Fusarium Oxysporum f.sp. Melonis	Race 0, 1, 2	Powdery Mildew	F	(Ec)	
		Fusarium Oxysporum F.Sp. Melonis	Race 1-2	Fusarium Wilt	F	Form 0-2	
		Sphaerotheca Fuliginea	Race 1, 2	Fusarium Wilt	F	(Form 1-2)	Root - Stock
		Alphis Gossypii		Powdery Mildew	F	(Sf 1, 2)	
		Melon Necrotic Spot Virus		Cotton Aphid	I	Ag	
Pea	Pisum Sativum	Erysiphe Pisi		Melon Necrotic Spot	V	MNSV	
		Fusarium Oxysporum f.sp.Pisi	Race 1	Powdery Mildew	F	Ep	
		Peronospora Viciae		Near Wilt	F	(Ep)	
		Pea Seedborne Mosaic Virus		Downy Mildew	F	Fop 1 (Fop1)	
				Pea Seedborne Mosaic Virus	V	Pv	
		Mosaic		PSbMV			

Introduction

Crop Name	Botanical Crop Name	Scientific Name	Addition	Common Disease Name	Type of Organism	Commercial Abbreviation	Remark	
Pepper	Capsicum Annuum	Xanthomonas Vesicatoria Levellula		Bacterial Spot	B	(Xv)		
		Taurica Phytophthora Capsici		Powdery Mildew	F	(Ll)		
		Pyrenochaeta Lycopersici		Buckeye Fruit and Root Rot	F	(Pc) (Pl)		
		Meloidogyne Arenaria, M. Incognita		Corky Root	F	(Pl)		
		Cucumber Mosaic Virus		Root - Knot	N	(MaMi)		
		Potato Virus Y		Cucumber	V	(GMV)		
		Tobacco Etch Virus		Mosaic Potato	V	(PVY 0-2) V		
		Tobamovirus (ToMV, TMV, PMMV)		Virus Y Tobbaco	V	(TEV)		
		Tobamovirus (ToMV, TMV, PMMV)		Pathotype P0	V			
		Tobamovirus (ToMV, TMV, PMMV)		Pathotype P0, P1, P1-2	V	Etch Tomato Mosaic	Tm 1	
		Tobamovirus (ToMV, TMV, PMMV)		Pathotype P0	V	Tobacco Mosaic	Tm 3	
		Tobamovirus (ToMV, TMV, PMMV)		Pathotype P0	V	Pepper Mild Mottle	Tm 4	
		Tomato Spotted Wilt Virus		P1, P1-2-3	V	Tomato Spotted	(TSWV) A	
						Wilt	(Sl)	
				Stip				
Radish	Raphanus Sativus	Fusarium Oxysporum f.sp. Raphani	Race 1	Yellows	F	For 1 (For 1)		
Spinach	Spinacea Oleracea	Peronospora Farinose f.sp. Spinaciae	Race 1-7	Downy Mildew	F	PlS 1-7		
Squash	Cucurbita spp.	Erysiphe cichoracearum		Powdery Mildew	F	(EC)		
		Sphaerotheca Fuliginea		Powdery Mildew	F	(Sl)		
		Cucumber Mosaic Virus Watermelon		Cucumber	V	(GMV)		
		Mosaic Virus		Mosaic				
Sweetcorn	Zea Mays	Zucchini Yellow Mosaic Virus		Watermelon Mosaic Zucchini Yellows	V	(ZYMV)		
		Pantorea Stewartii		Stewart's Disease (Bacterial Wilt)	B	(Pst)		
		Puccinia Sorghi		Common Rust	F	(Ps)		
		Exserohilum Turcicum		Northern Leaf Blight	F	(Et)		
Tomato	Lycopersicon Esculentum	Cladosporium Fulvum	Pseudomonas	Bacterial Speck	B			
		Fusarium Oxysporum f.sp. Lycopersici	Syringae pv.	Leaf Mold	F			
		Fusarium Oxysporum f.sp.	Tomato	Fusarium Wilt	F			
		Radicia - Lycopersici	Race 1-5 Race 1-2					
		Oidium Lycopersicum		Fusarium Crown and Root Rot	F			
		Pyrenochaeta Lycopersici						
		Stemphylium Botryosum f.sp.		Powdery Mildew	F			
		Lycopersici Verticillium Dahliae		Corky Root Rot	F			
		V.Albo - Atrum Meloidogyne Avenaria	Strain 0, 1, 1.2, 2	Gray Leaf Spot	F			
		M.Incognita, M.Javanica		Verticillium Wilt	F			

Crop Name	Botanical Crop Name	Scientific Name	Addition	Common Disease Name	Type of Organism	Commercial Abbreviation	Remark
Tomato	Lycopersicon Esculentum	Tomato Mosaic Virus					
		Tomato Spotted Wilt Virus		Root - Knot	N		
		Tomato Yellow Leaf Curl Virus		Tomato Mosaic	V		
				Spotted Wilt	V		
				Tomato Yellow Leaf Curl	V		
Watermelon	Citrus Lanatus	Colletotrichum Orbiculare	Race 1	Anthracoese	F	Co 1	
		Fusarium Oxysporum f.sp. Niveum	Race 0, 1	Fusarium Wilt	F	Fon 0, 1	
		Phomopsis Sclerotioidea Meloidogyne		Black Root Rot	F	Ps	Root - Stock
		Incognita		Root - Knot	N	(M)	Root - Stock

Key to Symbols: A = A-biotic, B = Bacterium, F = Fungus, I = Insect, N = Nematode, V = Virus Commercial abbreviation between brackets = Tolerance

Vegetable Sowing Guide

Vegetable Sowing Guide	Seeds / g	Mass per Hectare				Dis. In Row cm	Between Rows cm	Soil Temperature (OC) for Germination	
		Seed Tray	Seed Bed	Dir. Sow	Sow Depth mm			Minimum	Optimum
Beans Dwarf	2 - 5	-	-	50 - 100 kg	20	7	50	16	160 - 29
Beet	45 - 60	-	-	10 kg	10	7	20	4	10 - 29
Brijjal	215 - 250	140 - 200 g	500 g	2 kg		50	75	16	24 - 32
Broccoli	175 - 330	150 - 300 g	500 g	-		45	60	4	7 - 30
Brussels Sprouts	225 - 350	70 - 150 g	500 g	-		50	90	4	7 - 29
Cabbage	200 - 350	120 - 200 g	300 g	0,5 - 2 kg		35	60	4	18 - 35
Carrot	700 - 1250	-	-	3 kg	10	5	15	4	7 - 29
Cauliflower	200 - 400	120 - 200 g	500 g	0,5 - 1,5 kg		45	70	4	7 - 29
Cucumber	30 - 35	1 - 1,5 kg	-	2 kg		40	130	16	16 - 35
Leeks	280 - 400	0,7 - 1,5 kg	4 kg	8 kg	10	10	30	2	10 - 32
Lettuce	600 - 1200	300 - 500 g	50 g	1,5 - 3 kg		25	40	2	4 - 27
Melon	20 - 40	-	-	3 kg	15	25	150	16	24 - 35
Onion	225 - 300	2000 - 2500 g	3 - 5 kg	7 kg	10	8	20	2	10 - 35
Pepper	150 - 175	150 - 200 g	250 g	-		50	80	16	18 - 35
Peas	3 - 10	-	-	75 - 150 kg	20	7	60	4	4 - 24
Radish	75 - 110	-	-	10 kg	10	5	15	4	7 - 32
Spinach	100 - 140	-	-	10 kg	10	7	20	2	7 - 24
Squash	4 - 10	1 - 3 kg	-	2 - 3 kg	15	50	100	16	21 - 35
Sweetcorn	3 - 8	-	-	12 - 15 kg	20	25	75	5	20 - 30
Tomato	200 - 350	100 - 200 g	250 g	4 kg	8	45	120	10	16 - 35
Watermelon	12 - 20	-	-	5 - 4	15	50	175	16	21 - 35

Introduction

Between Rows cm	Number of Thousand Plants per Hectare at Following Distances Between Rows and Between Plants in the Rows														
	Between Plants cm														
	10	15	20	25	30	40	50	60	70	80	90	100	125	150	
2	5000,0	3 333,3	2 500,0	2 000,0	1 666,6	1 250,0	1 000,0	833,3	710,0	625,0	555,0	500,0	400,0	330,0	
5	2000,0	1 333,3	1 000,0	800,0	666,0	500,0	400,0	333,3	284,0	250,0	222,0	200,0	160,0	132,0	
10	1000,0	666,0	500,0	400,0	333,0	250,0	200,0	166,0	142,0	125,0	111,0	100,0	80,0	66,0	
15	666,0	443,6	333,0	266,4	221,8	166,5	133,2	110,6	94,6	83,3	73,9	66,6	53,3	43,4	
20	500,0	333,0	250,0	200,0	166,5	125,0	100,0	83,0	71,0	62,5	55,5	50,0	40,0	33,0	
25	400,0	266,4	200,0	160,0	133,2	100,0	80,0	66,4	56,8	50,0	44,4	40,0	32,0	26,4	
30	333,0	221,8	166,5	133,2	110,9	83,3	66,6	55,3	47,3	41,6	37,0	33,3	26,6	22,0	
35	285,0	189,8	142,5	114,0	94,9	71,3	57,0	47,3	40,5	36,6	31,6	28,5	22,8	18,8	
40	250,0	166,5	125,0	100,0	83,3	62,5	50,0	41,5	35,5	31,3	27,8	25,0	20,0	16,5	
45	222,0	147,9	111,0	88,8	73,9	55,5	44,4	36,8	31,5	27,8	24,6	22,2	17,8	14,6	
50	200,0	133,2	100,0	80,0	66,6	50,0	40,0	33,2	28,4	25,0	22,2	20,0	16,0	13,2	
55	181,0	120,5	90,5	72,4	60,3	45,3	36,2	30,1	25,7	22,6	20,1	18,1	14,5	11,9	
60	166,0	110,6	83,0	66,4	55,3	41,5	33,2	27,6	22,6	20,8	18,4	16,6	13,3	11,0	
65	153,0	101,9	76,5	61,2	50,9	38,3	30,6	25,4	21,7	19,1	16,9	15,3	12,2	10,1	
70	142,0	94,6	71,0	56,8	47,3	35,5	28,4	23,6	20,2	17,8	15,8	14,2	11,4	9,4	
75	133,0	88,6	66,5	53,2	44,3	33,3	26,6	22,1	18,9	16,6	14,8	13,3	10,6	8,8	
80	125,0	83,3	62,5	50,0	41,6	31,3	25,0	20,8	17,8	15,6	13,8	12,5	10,0	8,2	
85	117,0	77,9	58,5	46,3	38,9	29,3	23,4	19,4	16,6	14,6	13,0	11,7	9,4	7,7	
90	110,0	73,9	55,5	44,4	37,0	27,8	22,2	18,4	15,8	13,9	12,3	11,1	8,9	7,3	
95	105,0	69,9	52,2	42,0	35,0	26,3	21,0	17,4	14,9	13,1	11,6	10,5	8,4	6,9	
100	100,0	66,6	50,0	40,0	33,3	25,0	20,0	16,6	14,2	12,5	11,1	10,0	8,0	6,6	
120	83,0	55,3	41,5	33,2	27,7	20,8	16,6	13,8	11,8	10,4	9,2	8,3	6,7	5,5	
125	80,0	53,3	40,0	32,0	26,6	20,0	16,0	13,3	11,4	10,0	8,9	8,0	6,4	5,3	
150	66,0	44,0	33,0	26,4	22,0	16,5	13,2	11,0	9,4	8,3	7,3	6,6	5,3	4,4	
175	57,0	37,9	28,5	22,8	19,0	14,3	11,4	9,5	8,1	7,1	6,3	5,7	4,6	3,7	
200	50,0	33,3	25,0	20,0	16,0	13,3	10,0	8,0	6,6	5,7	5,0	4,4	4,0	3,3	
225	44,0	29,3	22,0	17,6	14,6	11,0	8,8	7,3	6,2	5,5	4,9	4,4	3,5	2,9	
250	40,0	26,6	20,0	16,0	13,3	10,0	8,0	6,6	5,7	5,0	4,4	4,0	3,2	2,6	
275	36,0	24,0	18,0	14,4	12,0	9,0	7,2	6,0	5,1	4,5	4,0	3,6	2,9	2,4	
300	33,0	22,0	16,5	13,2	11,0	8,3	6,6	5,5	4,7	4,1	3,7	3,3	2,6	2,2	

Glossary of Terms

Hybrid

The first generation of a cross; produced by combining two or more inbred parent lines.

Tolerance

Tolerance describes the ability of a plant variety to endure abiotic stress without serious consequences for growth, appearance and yield. Vegetable companies will continue to use tolerance for abiotic stress. Tolerance will be referred to in this catalogue by the abbreviation of the diseases / virus in brackets, e.g. (TSWV) = Tolerance to Tomato Spotted Wilt Virus where applicable.

Resistance

Resistance describes the ability of a plant variety to restrict the growth and development of a specified pest or pathogen and/or damage they cause when compared to susceptible plant varieties under similar environmental conditions and pest or pathogen pressure. Resistant varieties may exhibit some disease symptoms or damage under heavy pest or pathogen pressure.

Parthenocarpic

Refers to the tendency of a plant to set fruit without pollination. Variety Names* Varieties listed in this catalogue are listed on the South African Variety list and adhere to international UPOV standards. Some exceptions may however occur when varieties were included that have already been submitted for registration but the final feedback was still outstanding at the point of going to print. In such instances the variety name will be followed by an asterix (*) to indicate that it is still pending as it has not been accepted in the South Africa Variety list.

Growing Guidelines

In this catalogue several crops have growing guidelines. These should be seen only as additional information concerning the crop. Reference is made to techniques and or processes that are not necessarily the preferred way in South Africa and should only be seen more as informative. Also, in all cases where recommendations with regard to fertilizer and crop protection chemicals are concerned local law applies and information should be cleared with your AVCASA registered sales person.

Developing High Performance Seeds and Plants

Syngenta offers a range of vegetable seeds that are bred according to latest market needs. We draw on a wealth of expertise and genetic material to develop the right seeds. You can count on us for reliability, disease resistance and high yields.

We know that choosing the right seed varieties based on your growing conditions and market is important. We focus on quality germplasm so our seeds add value along the entire business chain, through to the consumer market. The methods used in the development and maintenance of those varieties are aimed at achieving high purity standards and avoiding the presence of off-types.

Seed production has been carried out in accordance with existing legal requirements related to marketing of varieties and seed production rules including stipulated isolation distances.

Resistance Statement

The relationship between a plant and a pest is very complex. The terms that describe the reaction of a plant variety to a pest are determined by tests under controlled environmental conditions with known and characterized biotypes, pathotypes, races or strains of the pest in question.

In practice however, the ability of a pest to cause disease in a plant depends on environmental conditions, the properties of the organism itself and the capacity of the plant to defend itself. Varieties within a plant species can differ in their ability to defend themselves. Under different conditions, such as age of the plant, pest pressure and virulence or adverse environmental conditions, the interaction between the same plant and pest may have different outcomes. Pests are known to develop and form new biotypes, pathotypes, races or strains that can cause damage to plants that remain unaffected by the original for of the pest.

Susceptibility

Is the inability of a plant variety to restrict the growth and development of a specified pest.

Resistance

Is the ability of a plant variety to restrict the growth and development of a specified pest and/or the damage they cause when compared to susceptible plant varieties under similar environmental conditions and pest pressure. Resistant varieties may exhibit some disease symptoms or damage under heavy pest pressure.

Developing High Performance Seeds and Plants

Two Levels of Resistance Are Defined

High Resistance (HR*)

Plant Varieties that highly restrict the growth and development of the specified pest under normal pest pressure when compared to susceptible varieties. These plant varieties may, however, exhibit some symptoms or damage under heavy pest pressure.

Intermediate Resistance (IR*)

Plant Varieties that restrict the growth and development of the specified pest but may exhibit a greater range of symptoms or damage compared to high resistant varieties. Intermediately resistant plant varieties will still show less severe symptoms or damage than susceptible plant varieties when grown under similar environmental conditions and/or pest pressure.

It is to be noted that if a resistance is claimed in a plant variety it is limited to the specified biotypes, pathotypes, races or strains of the pest.

If no biotypes, pathotypes, races or strains are specified in the resistance claim for the variety, it is because no generally accepted classification of the cited pest by biotype, pathotype, race or strain exists. New biotypes, pathotypes, races or strains that may emerge are not covered by the original resistance claim.

Immunity

Is when plant is not subject to attack or infection by a specified pest.

Definition of Pest

Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products. Pathogens (microorganisms such as bacteria, viruses and fungi that cause a disease) are, therefore, included in the term "pest".

Disclaimer

We have exercised the utmost care in compiling this information. The data should however be handled by the user in accordance with his own knowledge and experience of local circumstances. We therefore cannot accept any liability in connection with this information. The terms used here refer to the known and described physios of certain pathotypes. However, other unknown and/or non-described diseases physios may exist. We cannot, therefore, accept any liability for varieties listed in this leaflet turning out to be non-resistant or non-tolerant to such pathotypes, whatever the reason. In case of doubt we recommend carrying - out a small-scale trial production in order to test local growing.



syngenta®

Chapter I
Hybrid Tomato
Varieties



Powered by
Syngenta Vegetable Seeds

Tylka FI

An Indeterminate Hybrid for Fresh Market with Excellent Sweet Taste.

Technical Data	
Nursery Period	3 - 4 Weeks
Maturity	75 Days After Transplanting
Plant	Indeterminate, Very Vigorous, Good Cover and High Yielding
Fruit	Very Firm Elongated, Non-Green Back, Smooth and Firm Oval Fruits with an Average Weight of 120 - 130gm
Production / Yield	70 - 78T / Acre Under Good Agricultural Practices
Shelf Life	Over 21 Days
Resistance Summary	<ul style="list-style-type: none"> - Tomato Yellow Leaf Curl Virus (TYLCV) - Tomato Mosaic Virus (ToMV): 0 - 2 - Verticillium & Fusarium Wilt (Race 1 and 2)

Powered by
Syngenta Vegetable Seeds



Kilele FI

A Determinate Hybrid for Fresh Market with Excellent Sweet Taste.

Technical Data

Nursery Period	3 - 4 Weeks
Maturity	75 Days After Transplanting
Plant	Indeterminate, Very Vigorous, Good Cover and High Yielding
Fruit	Very Firm Elongated, Non-Green Back, Smooth and Firm Oval Fruits with an Average Weight of 120 - 130gm
Production / Yield	30 - 35T / Acre Long Harvest Under Good Agricultural Practices
Shelf Life	Over 21 Days
Resistance Summary	<ul style="list-style-type: none">- Tomato Yellow Leaf Curl Virus (TYLCV)- Tomato Mosaic Virus (ToMV): 0 - 2- Verticillium & Fusarium Wilt (Race 1 and 2)

Rafano FI

- A Superior Determinate Hybrid Suited for Use in the Fresh Market.
- Rafano is an Open Field Variety that Exhibits Good Hot Setting Capabilities Producing Fruits with a Good Uniform Size and Very Good Firmness. This Variety Has Good Tolerance to TYLCV and Bacteria Wilt.

Technical Data

Nursery Period	3 - 4 Weeks
Maturity	75 Days After Transplanting
Plant	Determinate, Very Vigorous, Good Cover and High Yielding
Fruit	Very Firm Elongated, Smooth and Firm Oval Fruits with an Average Weight of 120 - 130gm
Production / Yield	30 - 35T / Acre
Shelf Life	Over 21 Days
Resistance Summary	<ul style="list-style-type: none">- Verticillium & Fusarium Wilt (Race 1 and 2)- Tobacco Mosaic Virus (TMV: 0)- Tomato Mosaic Virus (ToMV: 0 - 2)- Tomato Yellow Leaf Curl Virus (TYLCV) and Bacterial Wilt (Rs)



New

Powered by Syngenta
Vegetable Seeds



Alston FI

- An Indeterminate Saladette Tomato with Suitable Bacterial Wilt Tolerance.
- The Variety Has High Vigour with Good Fruit Setting Capabilities Producing Beautiful Saladette Fruits Suited to the Fresh Market.

Technical Data

Shelf Life Days	More than 14 Days
Fruit Shape	Angular
Fruit Size	130 - 150 Grams
Growth Type	Indeterminate
Plant Vigour	High
Type of Culture	Active Greenhouse and Open Field
Setting	Medium

How to Grow Tomato

► Nursery Management

Seedlings are raised via two techniques; use of seed trays and use of normal ground. In the case of normal ground, the below procedure should be followed.

- Sowing should be done in a well-controlled & protected nursery;
- A nursery should be raised with a width of 1m. The soil should be well prepared into a fine tilth and sowing lines of 10cm and 2 - 3cm depth made.
- The seeds should be placed on the soil 2cm apart to take between 40 - 50 plants per sowing line.
- The seed bed can be covered by use of dry grass / gunny bags and watered gently to avoid splashes.
- Ensure watering is done very early in the morning and frequently after 4 days.



Normal Ground Method



Seed Tray Method

► Preparation

- The field is ploughed to a fine tilth by giving one to two ploughings. Consideration should be made on the type of irrigation.
- Furrows are then opened in the recommended spacing.
- Seedlings are transplanted in furrows in light soils and the side of the ridges in case of heavy soils.
- A pre-soaking irrigation is given 2 days prior to transplanting.
- Transplanting should preferably be done in the evening.
- Starter fertilizer is required during transplanting as a basal application (50% of total NPK required)
- Once transplanted, immediate irrigation is required as well as a control for early pests (cutworms).



Ridge Preparation

How to Grow Tomato

► Transplanting

- Transplant the seedling when it is 7.5 to 10cm in height or 4 - 5 weeks old or when it has attained 5 - 6 leaves
- Irrigate well before & during transplanting. Irrigation should be done early or mid-morning
- Standard spacing for green house is 60cm X 45cm and for open field is 60cm X 60cm
- Planting should be done on ridges and / or depending on farmers practice.
- Basal fertilizer is recommended during transplanting to aid the plant during the early phase

► Crop Support

- Staking is recommended for better growth, increased fruit bearing and improved fruit quality
- Staking also helps to ease cultural operations like spraying, weeding, fertilizer application, earthing up & picking
- Sowing time: as per regional practices and depending on the varieties
- Ideal plant population / acre: 6,000 to 8,000 in the green house and 8,000 to 10,000 in the open field
- Seedlings are transplanted on the side of the ridges in heavy soils and in the furrows in light soils
- Transplant healthy & stout seedlings with well-developed root system



Staking Tomatoes

How to Grow Tomato

► Fertilizer Requirement

- Whenever possible, fertilizer recommendation should be based on local soil analysis.
- If soil analysis is not available, Syngenta calculates following nutrient removal on tomato:

Nutrient Removal in Kg by 1T of Tomato Yield per ha and Acre
(For P&K Given as Atom and as Salt. Sources FAO, AVRDC, IPNI, Ifa, World Fertilizer Annual)

Yield / Area	N	P ₂ O ₅	P	K ₂ O	K
1T / ha	3	0.8	0.35	4.5	3.7
1T / acre or fd	1.25	0.33	0.15	1.9	1.5

Conversions:

P: $P_2O_5 \times 0.44 = P$; $P \times 2.29 = P_2O_5$ K: $K_2O \times 0.83 = K$; $K \times 1.21 = K_2O$

- The below use is based on the nutrient removal and takes into account the fertilizer efficiency, ending up with a ratio of 1:0,5:1,5 for N:P:K
- If farm manure or compost (10 - 20T / ha / 4 - 8T / acre) is given before crop start, inorganic fertilizer can be reduced by 20%

Syngenta Fertilizer Recommendation in Kg per Area to Produce 1T of Tomato per ha or Acre
(For P&K Given as Atom and as Salt)

Yield / Area	N	P ₂ O ₅	P	K ₂ O	K
1T / ha	4	4.5	2	7.3	6
1T / acre or fd	1.7	1.9	0.8	3	2.5

Example: Target yield of 80T / ha needs 320Kg / ha N, 160 Kg / ha P and 480Kg / ha K (or 20% less if manure is used)

- To get the right fruit quality, especially the ration N:K = 1:1.5 is important
- Ca: Not so much defined by yield / ha, but by soil pH. A rate of 100 - 200Kg Ca / ha is recommended, the lower the soil pH, the higher the rate



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Chapter II
Hybrid
Cabbage



Triperio FI

- Uniform, Bigger Head Size Cabbage with Excellent Head Coverage that Guarantees Freshness to the Market.
- Triperio is a Blue - Green Cabbage with a Compact Large Head.
- Has a Strong Stem Elevation Above Ground with Very High Uniformity in the Field.

Technical Data

Nursery Period	Exactly 3 Weeks
Maturity	90 Days After Transplanting
Plant	Excellent Head Cover and High Yielding
Shape	Round
Head Size	7 - 10 Kgs
Yield	70 - 90T / Acre
Earliness	Very Vigorous Plant Therefore is Ready for Transplant Earlier than Other Cabbage Seeds
Resistance Summary	- Strong Against Black Rot Disease and Thrips - High Resistance to Fusarium Yellows



Explorer FI

- A Fresh Market Cabbage Variety with a Dense and Compact Head.
- This Variety Exhibits Good Vigour During Development Producing 4 Kg Heads with Good Wrapper Leaves that Preserve the Head Quality.

Technical Data

Ecology	Open Field
Variety Usage	Fresh
Earliness	Early
Maturity	85 Days
Plant Vigour	High
Resistance Summary	HR: Foc: 1



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Escazu FI

A Fresh Market Cabbage for High Yield and Stronger Resistance Against Pests and Diseases.

Technical Data

Nursery Period	Exactly 3 Weeks
Maturity	70 - 75 Days
Plant	Uniform Head Cover and High Yielding
Shape	Round
Head Size	4 Kgs
Yield	60T / Acre
Earliness	<ul style="list-style-type: none">- Very Vigorous Plant and Therefore is Ready for Transplant Earlier than Other Cabbage Seeds- Escazu is an Early Maturing Variety
Resistance Summary	<ul style="list-style-type: none">- High Resistance to Fusarium Yellows- Field Tolerance to Black Rot

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Riva FI

- A Fresh Market Hybrid Red Cabbage Variety That Shows Exemplary Performance Throughout All Seasons.
- The Variety Exhibits Good Field Standing Ability and Ensures Production of Cabbage Heads with an Attractive Color.
- It is a Medium Maturing Variety with Round to High Round Head Shape.

Technical Data

Nursery Period	3 Weeks
Maturity	65 - 70 Days
Plant	Excellent Head Cover and High Yielding
Shape	Round
Head Size	2,5 - 3 Kgs
Yield	113 T / Ha
Earliness	Medium Early
Resistance Summary	High Resistance to Fusarium Yellows



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Zuri FI

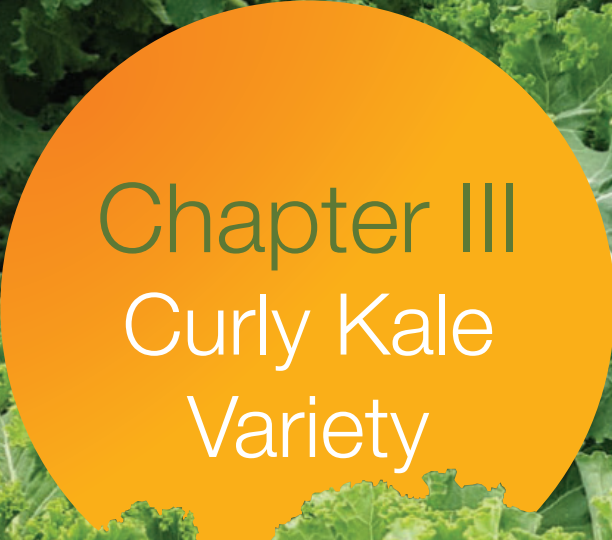
- A fresh market hybrid cabbage variety that is widely adaptable with excellent heat tolerance.
- The variety is round with grey-green heads and good internal quality as well as sweet flavor.
- The plant has good cover, good field holding and is very strong against splitting.

Technical Data


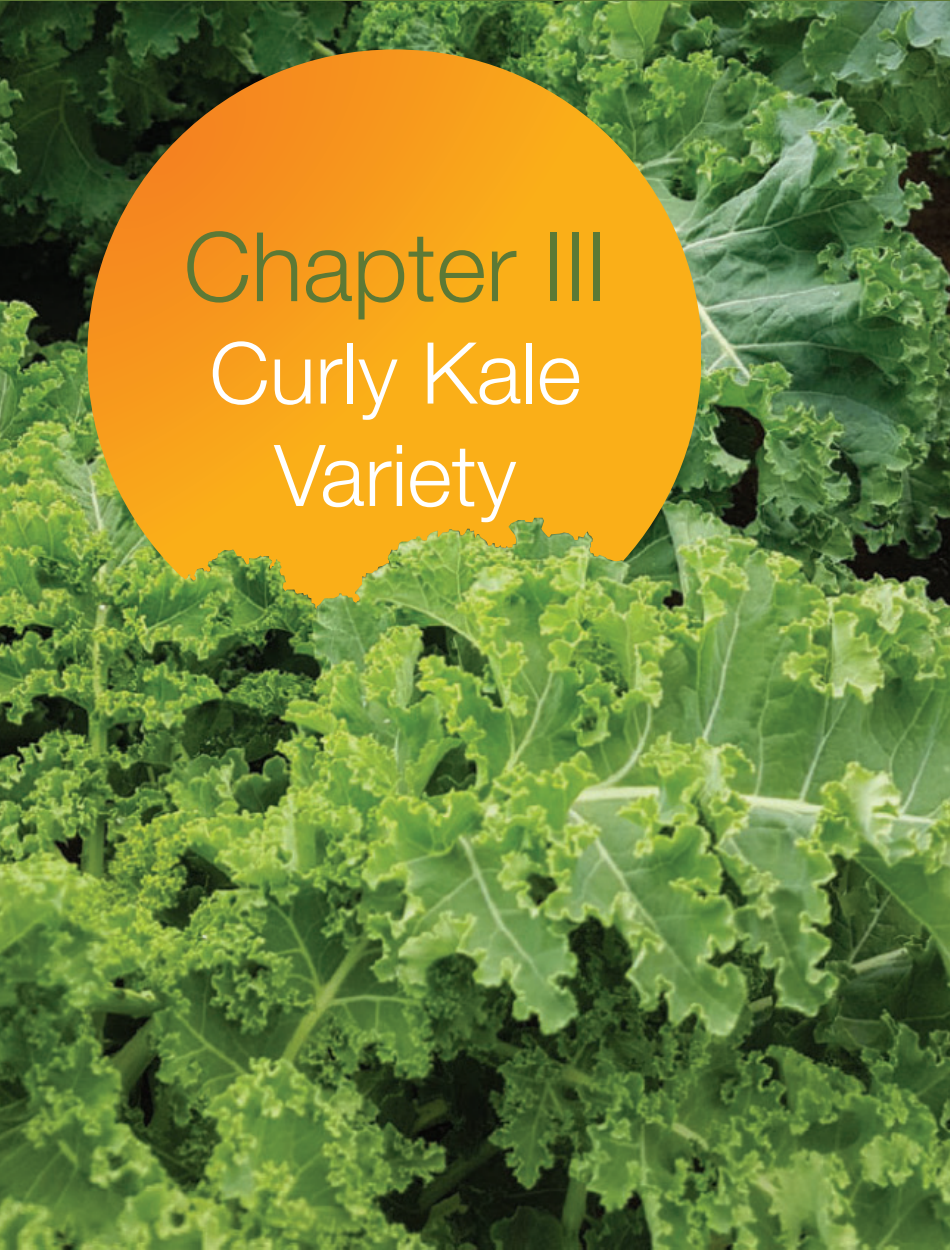
Nursery Period	3 Weeks
Maturity	70 - 80 Days After Transplanting
Plant	Medium to Large Plant Frame
Shape	Round
Head Size	4 Kgs
Yield	40 - 55T / Acre
Earliness	Medium Early
Resistance Summary	- High Resistance to Fusarium Yellows



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Chapter III
Curly Kale
Variety





Malkia Kale

- An Early Maturing Kale Variety that Produces Large Sized Leaves. Malkia Also Delivers Excellent Leaf Quality.
- The Variety is an Open Field of Plant that Produces High Quality Leaves with Attractive Green Color.
- The Variety is Also Known for High Yield. The Variety has Tender Leaves and is Great for the Consumer Taste.

Technical Data

Features / Benefits	- Excellent Yield Potential - Large Leaves - Tender Leaves for Consumption
Maturity	Early
Plant	Excellent Head Cover and High Yielding
Leaf Size	Big
Average Leaf Weight	39.2 gms / Leaf
Yield	60 T / Ha
Leaf Colour	Green
Ecology	Open Field
Variety Usage	Fresh

How to Grow Leafy / Brassica

► Nursery Management

Seedlings are raised via two main techniques; use of seed trays and use of normal ground. In the case of normal ground, the below procedure should be followed:

- Sowing should be done in a well-controlled & protected nursery raised with a width of 1m;
- The soil should be well prepared into a fine tilth and sowing lines of 10cm and 2 - 3cm depth made;
- The seeds should be placed on the soil 2cm apart to take between 40 - 50 plants per sowing line;
- The seedbed can be covered by use of dry grass / gunny bags and watered gently to avoid splashes;
- Ensure watering is done very early in the morning and frequently after 4 days.
- During nursery stage expect soil borne pests and diseases that you need to protect the seed from;
- Damping off is also a common issue that prevents development of seedlings;
- Expect infestation of cutworms after transplanting is done.

► Preparation

Factors to consider when choosing cabbage:

- Head Size
- Yield Potential
- Market Availability
- Head Weight
- Pest and Disease Tolerance / Resistance
- Preferences

How to Grow Leafy / Brassica

► Soil & Climate for Cabbage Production

- Well drained, fertile, sandy loam rich in organic matter with pH of 6.5 - 7.5 is ideal for cultivation;
- For early maturing crop, sandy loam soils are considered best. For late maturing crop clay loam soil / heavy soils are best;
- Optimum temperatures for seed germination are 25 - 30°C;
- Optimum temperatures for growth & head formation in cabbage are 15 - 20°C;
- Heat tolerant varieties of cabbage can form compact head under tropical conditions in day temperatures of 30 - 35°C.

► Soil Characteristics

- Well drained soils, with high organic matter that exhibit high water holding capacity are suitable.
- Soils with pH more than 6.8 should be adjusted by broadcasting hydrated lime 2 - 3 days prior to planting.



Nursery Bed Method



Seed Tray Method

How to Grow Leafy / Brassica

► Transplanting

- Transplant seedlings when 10 - 15cm tall or have 5 or 6 leaves;
- Water the bed the previous day before transplanting them to their permanent position;
- Transplant the cabbage plants in the evening to minimise shock. Keep as much soil around the roots as you can;
- Spacing can vary depending on market requirement but standard spacing of 60cm X 60cm is recommended;
- Apply 8 - 10MT / acre of well decomposed farm yard manure and mix well with the soil;
- Apply base fertilizers rich in phosphorus on the planting hole such as N:P:K at a rate of 10gms per hole;
- Top dress 3 - 4 weeks after transplanting with nitrogenous fertilizers;
- Irrigation should be done early-morning or mid-morning.

► Fertilizer Requirement

Fertilizer requirement will depend on the soil analysis done prior to planting. However the following is a guide 120 : 60 : 60kg NPK / acre

- Split applications are the most recommended. 1st split of CAN at 10gms per plant.
- First top dressing (15 - 20 days after transplanting); 50Kg of C.A.N / acre.
- 2nd split to be applied two weeks later at 5g per plant, avoid excessive nitrogen application as it causes split heads.
- Second top dressing (40 - 45 days after transplanting); 100Kg of Ammonium Sulphate / acre + 30Kg of MAP / acre.
- Top dressing should be applied in bands and after each application earthing up of plants is necessary.
- Cabbage has shallow root system and hence requires frequent & light irrigations especially during head formation.

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Chapter IV
Okra Varieties



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OH 102 FI

- A Dwarf Hybrid Okra Variety with Shorter Internodal Length.
- The Variety is Suited to the Open Field and Cultivated for the Fresh Market.
- OH102 Produces Pods with an Attractive Dark Green Colour, Excellent Quality and Long Shelf Life.
- It Exhibits High Yield and High Field Virus Tolerance Against YVMV as Well as OLCV. OH102 is also Known to have Drought Tolerance.

Technical Data

Ecology	Open Field
Variety Usage	Fresh
Earliness	Early
Pod Length	10 - 13 cm
Plant Vigour	High
Resistance Summary	HR: Yellow Vein Mosaic Virus (YVMV); Okra Leaf Curl Virus (OLCV)



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OH 2324 F1

- An okra variety with medium tall, vigorous and deep cut leaves suited to the open field and cultivated for the fresh market.
- OH 2324 F1 pods have an attractive dark green colour, excellent quality and long shelf life.
- The variety has good yield potential, is easy to pick and it is also characterised by good field tolerance to YVMV.

Technical Data	
Plant	Medium Tall, Vigorous, Deep Cut Leaves
Size	Tender 10 - 12 cm in Length
Color	Green, Smooth, and Uniform
Maturity	42 - 45 Days After Sowing
Pod	Green, Smooth, Uniform, Tender 10 - 12cm in Length
Resistance Summary	Good Field Tolerance to YVMV

How to Grow Okra

► Climate and Soil Requirement

Being a warm season crop it is susceptible to cold and frost. It thrives well during warm, moist season although it grows fairly well in the hottest summer. The seeds do not germinate below 17°C. Okra flowers drop at 42°C day temperature. Uniform day and night temperature levels is preferred by okra, wide difference between day and night temperature reduces the seed yield considerably well drained sandy to clay soils supplied with enough organic matter are good for okra cultivation. However, loose, friable and well-manured loam soils having the pH range between 6.0 to 6.8 are the best.

► Land Preparation

The soil is brought to desirable tilth by deep ploughing once and harrowing 2-3 times. Open the furrows as per the requirement against the slope of land.

► Seed Sowing

Seed should be sown when soil temperatures between 27-30°C to help in quick and better seedling emergence. Seeds will not germinate below soil temperatures of 17°C. Seeds should be soaked in clean water for 24 hours before sowing. Seeds which will not absorb water during imbibition should be discarded. Seeds to be sown in lines and in small hills.

► Spacing & Seed Rate

Spacing of 60 cm between lines and 30 cm between plants are to be maintained. 2/3 seeds should be sown per hill. Seed rate is 3 kg/ acre

► Manure and Fertilizer

Manures and fertilizers are applied at the rate of 15-20 ton compost, 150 kg Nitrogen, 100 kg phosphorus and 100 kg potash per hectare. The entire amount of compost, phosphorus and half of both urea and potash are applied during land preparation while the rest of the urea and potash are applied at three equal installments at 30, 45 and 60 days after sowing.

How to Grow Okra

Irrigation

- Irrigation is to be provided in dry season crop as and when required.
- In wet season crop, however, irrigation should only be given if there is no rain for a longer period.

► Inter Cultivation

Manual weeding can be performed as needed. Inter cultivation with bullocks is more beneficial in controlling the weeds as well as to loosen the soil and provides earthing-up operation.

► After Care

- Only one healthy plant should be allowed per hill.
- Land should be kept clean by weeding and mulching.
- Irrigation is to be provided in dry season crop as and when required.
- In wet season crop, however, irrigation should only be given if there is no rain for a longer period.
- Earthing up along the lines to be provided at the time of top-dressing urea.
- Plants affected by virus must be removed as soon as they are observed.

► Harvesting

Pods are harvested while still tender and immature and when pods reach optimal eating size of about 7 to 10 cm. The first pods are ready for harvest about 45-50 days after planting, but the plants will continue to bloom and produce pods if they are harvested continuously before they get too large. Most pods are ready for harvesting from four to six days after the bloom opens. Many people are sensitive to the small spines on okra and can get a rash or itch when picking the pods, so harvesters should wear gloves, use pod cutter, long-sleeved shirts, and long pants for protection. The plant continues to produce so long as pods are harvested continuously. Harvested pods stored at 10 C and high relative humidity (95%) to minimize respiration and prevent desiccation.

A close-up photograph of a broccoli plant, showing the green, textured florets and the large, dark green leaves with prominent veins. The background is dark, making the green of the plant stand out. The image is used as a background for the entire page, with a green gradient overlay on the right side.

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Chapter V
Broccoli
Variety



New

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Montop FI

- A Medium Early Hybrid for Production in Both Cool and Warm Weather.
- Montop is a Vigorous Hybrid for Fresh Market Consumption.
- The Plants are Very Uniform, Have a Good Vigour and Produce Dark Green, Dome-Shaped Heads of High Quality.
- Recommended Plant Density is 3 - 4 Plants / m².

Technical Data

Ecology	Open Field
Variety Usage	Fresh / Processing
Earliness	Medium Early
Maturity	60 Days
Plant Type	Medium, Vigorous, with Good Head Elevation
Head Size	Large Dome Shape With Fine Beads
Average Head Weight	400G +
Field Standing	Moderate
Plant Vigour	High
Culture	Sow in Spring and Early Summer for Harvest in Summer and Autumn

How to Grow Broccoli

► Introduction

Broccoli has amongst the highest concentration of magnesium, iron and calcium amongst all vegetables. Broccoli also has very high quantities of vitamin A and vitamin C.

► Climatic Requirements

The brassica family is quite cold resistant making them ideal cool season crops. They do require some cold to initiate flowering. Broccoli can withstand freezing temperatures for a short period and even tolerate light frosts.

- Optimum soil germination temperature 27 °C.
- Optimum growing temperature 15.0 - 22 °C.

Temperatures above 27°C will delay maturity and promote vegetative growth, whilst temperatures between 1.5°C and 10°C will hasten maturity. Extremely high or extremely low temperatures may induce bolting in Broccoli; this is when broccoli will prematurely produce an undesirable long flower stalk.

► Soil Requirements

Well drained loamy soils are preferred as they can drain easily, but retain capillary moisture creating conditions that can sustain the plant with water through the season but dry enough to limit the spread of clubroot. A rooting depth of approximately 450 - 600mm is recommended and pH 6.0 - 7.0.

► Planting Periods

Depending on geographical location, broccoli can be planted throughout the year. Heat tolerant varieties can be planted in the warmer periods. Planting should be avoided in areas susceptible to heavy frost as this can damage young seedlings.

How to Grow Broccoli

► Planting

Planting can be done by direct sowing or by transplanting seedling. Direct sowing has more risks with germination and uniformity of the final plant stand in addition to the fact that the plants are in the ground for 4 - 5 weeks longer.

Seedlings should be grown in a well-aerated medium, which has good water holding capacity and at a pH of around 6.5. The seed trays should be placed in a germination chamber, at 20 °C with high relative humidity.

Immediately upon germination the seedlings should be moved to the seedling tunnel. Here the seedlings are grown using frequent, fine misting irrigation for 3 - 4 weeks.

One week prior to transplanting the seedling trays can be moved outdoors to acclimatise and “harden” the seedlings for better success in the field.

The image features a close-up of several cauliflower heads, showing their characteristic white, bumpy texture and the surrounding green, wavy-edged leaves. The background is a solid light green color with a subtle, abstract leaf-like pattern on the right side.

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Chapter VI
Cauliflower
Variety



New

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Andromeda F1

- An early maturing fresh market variety that is a special type of Cauliflower.
- It produces curds that have a consistent white color which stays white even when the head is not covered by leaves.
- It has high plant vigour and high field holding capacity.

Technical Data

Ecology	Open Field
Variety Usage	Fresh
Earliness	Early
Maturity	65 - 70 Days
Plant Vigour	High

A close-up photograph of a green sweet pepper hanging from a plant stem. The pepper is large, smooth, and has a glossy surface. The stem and leaves are also visible, showing the natural growth of the plant. The background is slightly blurred, focusing attention on the pepper.

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Chapter VII
Sweet Pepper
Varieties



Admiral FI

- A blocky Hybrid Pepper Which Eventually Turns Yellow at Full Physiological Maturity.
- Admiral is a Medium Late to Late Variety Producing Blocky Fruits.
- The Fruits Have Large Deep Blocky Fruits with Thick Walls and an Excellent Quality. Admiral is Suitable for Greenhouse and Open Field Production.

Technical Data

Plant	Medium sized bush, strong vigour erect plants with good cover and fruit setting
Earliness Maturity	Medium 90 days after transplanting
Fruit	Large deep blocky 3 - 4 lobes, thick wall, average size 12.5 X 10cm. Medium dark green turning yellow at maturity
Average Fruit Weight	220gm
Yield	25 - 30T per acre open field and 50 - 60T in the green house. Yield per plant: 2Kgs for green and 4Kgs for yellow. - Harvest at 75 days for green market - Harvest at 90 - 120 days for yellow market - Harvest period: 10 weeks in the open field and 4 - 6 months in the green house
Resistance Summary	- Tobacco Mosaic Virus, Potato Mosaic Virus (Y), Bacterial Leaf Spot Race 1 - 3 & Pepper Mottle Virus

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Commandant F1

- A blocky Hybrid Pepper Which Eventually Turns Red at Full Physiological Maturity.
- Commandant is a Medium Late to Late Variety Producing Blocky Fruits.
- The Fruits Have Large Deep Blocky Fruits with Thick Walls and an Excellent Quality. Commandant is Suitable for Greenhouse and Open Field Production.

Technical Data

Plant	Medium sized bush, strong vigour erect plants with good cover and fruit setting
Earliness	Medium
Maturity	90 days after transplanting
Fruit	Large deep blocky 3 - 4 lobes, thick wall, average size 12.5 X 10cm. Medium dark green turning red at maturity
Average Fruit Weight	220gm
Yield	25 - 30T per acre open field and 50 - 60T in the green house. Yield per plant: 2Kgs for green and 4Kgs for red. - Harvest at 75 days for green market - Harvest at 90 - 120 days for red market - Harvest period: 10 weeks in the open field and 4 - 6 months in the green house
Resistance Summary	- Tobacco Mosaic Virus, Potato Mosaic Virus (Y), Bacterial Leaf Spot Race 1 - 3 & Pepper Mottle Virus



Indra FI

A Blocky Hybrid Pepper Which Eventually Turns Red at Full Physiological Maturity.

Technical Data

Plant	Medium sized bush, strong vigour erect plants with good cover and fruit setting
Earliness	Medium
Maturity	90 days after transplanting
Fruit	Large deep blocky 3 - 4 lobes, thick wall, average size 12.5 X 10cm. Medium dark green turning red at maturity
Average Fruit Weight	220gm
Yield	25 - 30T per acre open field and 50 - 60T in the green house. <ul style="list-style-type: none"> - Harvest at 75 days for green market - Harvest at 90 - 120 days for red market - Harvest period: 10 weeks in the open field and 4 - 6 months in the green house
Resistance Summary	- Potato Virus (Y), Tobacco Etch Virus, Tobacco Mosaic Virus

New

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Vegetable Seeds



Balta FI

- A Blocky Hybrid Pepper Turning Red at Maturity.
- Balta is a Strong, Open Growth Habit Plant with Good Foliage Cover.
- Continuous Fruit Setting and Production. Uniform Fruit Size and Shape.
- Fruit is Blocky, Green to Red with High Quality. Very Large - Sized Fruit.
- Thick Fruit Wall. Balta is Aimed at Areas Where Virus Pressure Might Be a Problem and Suited for Culture Under Plastic.

Technical Data

Earliness	Medium Late
Maturity	80 - 85 Days
Plant	- Strong Vigour - Good Cover - Medium Internodes & Good Continuous Setting
Fruit	- Large Deep Blocky, Average Size 11 X 10cm - Mostly 3 - 4 Lobed - Firm Thick Wall - Medium to Dark-Green Turning Red at Maturity Smooth Skin
Average Fruit Weight	> 230g
Resistance Summary	HR: PVY: 0, 1, 2 / Tm: 0 IR: CMV / Lt / TSWV: 0



Trifecta FI

A Variety for the Fresh Green and Red Market with a Good Disease Pack and Additional Resistance to TSWV.

Technical Data

Plant	Strong Plant, Good Canopy
Earliness	Medium
Fruit	Blocky and Thick - Walled Average Fruit Size is Extra - Large
Average Fruit Weight	250gm
Yield	35 - 40 tonnes per acre - Harvest at 75 - 90 Days for Green Market - Harvest at 90 - 120 Days for Red Market - Harvest Period: 10 Weeks in the Open Field and 4 - 6 Months in the Green House
Resistance Summary	TMV / TSWV: 0

How to Grow Pepper

► Nursery Management

It is recommended to raise seedlings in the nursery bed for 6 - 9 weeks before transplanting to the main field or green house.

► Preparation

Ensure crop is grown on fertile land. Use manure to enrich soil with nutrients or apply fertilizer at planting period such as N.P.K at 10gms per hole as general application.

Note: It is vital to confirm soil nutrients through soil analysis.

► Transplanting

Standard spacing: For green house is 60cm X 45cm and for open field is 60cm X 60cm

► Crop Support

- The crop can be grown as a bush or reduced to 2 - 3 main primary suckers. For bush culture the crop is not pruned but allowed to have more than three main branches.
- Under 2 - 6 primary main branches the crop need staking to support the stems particularly under greenhouse production.
- Under good support and good agronomic growing conditions greenhouse pepper can be harvested for a period of over six months in the green house and more than three months under open field production.

► Fertilizer Requirement

- Foliar fertilizers can be used to supplement Soil Applied Fertilizers especially during periods of crop stress.
- Top dress 6 - 4 weeks after transplanting with N.P.K (complete fertilizer) at 10gms per plant (confirm through soil nutrients analysis). Repeat three weeks later.

Most peppers are predominantly green in colour as they develop and change their colour upon reaching physiological maturity.

A close-up photograph of a red onion in a wire basket. The onion is the central focus, with its characteristic concentric rings visible in the cross-sections. The background is slightly blurred, showing other onions in the basket. The overall color palette is dominated by the deep reds and purples of the onion, with a green overlay on the right side.

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Chapter VIII
Onion
Variety



Africa Red FI

- A Short Day Onion with Uniform Red Coloured Bulbs.
- The Variety Produces Bulbs with a Suitable Flat Globe Shape and is Suited for the Fresh Market.

Technical Data

Bulb Colour	Uniform Red Colour
Bulb Shape	Globe
Bulb Size	3 - 6 cm Diameter Bulb (Based on Spacing)
Bulb Quality	Very Firm
Ecology	Suited for Open Field Planting in Warm Areas
Variety Usage	Fresh / Processing
Earliness	Medium - Early Variety
Potential Yield	25 Ton / Acre
Maturity	90 Days from Transplanting
Pungency	High
Storability	Up to 6 Months
Sprouting	Does Not Sprout
Skin Retention	Very Good
Bolting Tolerance	High

How to Grow Onions

► Nursery Management

- Onion seeds are the small and require a well prepared, fine and even seedbed.
- Well drained soils can be used for a successful nursery.
- We recommend use of trays and coco peat so that little or no seeds are loss during this process.
- If using a bed, carefully dig the soil around you preferred nursery area and make sure the soil is loose. Your bed should be alt least 1 metre wide and preferably 5 metres long.
- Apply goat or cow manure and mix well with the soil.
- Make lines accross the bed with a stick or any other object that are 6 inches apart
- Drop your seeds on the lines. Take care not to over crowd them.
- Cover the seeds with loose soil and water.
- Cover the bed with grass.
- Seedlings are ready within 6 - 8 weeks for transplanting, when the majority of the seedling necks are pencil size (65 - 80mm) in diameter, 13.5 - 30cm tall and have 4 to 5 leaves.
- Care should be taken to have irrigation systems ready, so that irrigation can commence immediatelly after transplanting to prevent losses of the plant population.

► Preparation

- Onions are very adaptable and will grow in almost any soil from sandy loams to heavy clay. Regardless of your soil type, always dig in a generous amount of compost before planting.
- Onions prefer a neutral to slightly acid soil pH. A soil pH of 6 - 7.5 is a great range for growing onions.
- Choose a site with at least 8 hours of full, direct sunlight each day.

How to Grow Onions

► Transplanting

- Soils are irrigated to field capacity in order to build up reserves in the soil for later use by the crop.
- Plough your land earlier by at least a month before transplanting.
- Apply manure and do fine some harrowing.
- Onions can be grown on ridges 4” high to 20” wide if drip irrigation will be applied or in basins for flood irrigation. They can also be planted on shallow rows for overhead / rain fed irrigation.
- After transplanting the soil is kept cool and moist with a daily irrigation of 3 - 5mm.
- Direct seeded onions produced under hot dry conditions may require two irrigation cycles per day.
- Water shortage at any stage during growth may result in decreasing yields.
- More frequent irrigation promotes good growth and helps keep the soil firm around the onion bulb.
- Cracks in soil and inconsistent soil pressure around the onion bulb, result in misshaped onions.
- Do not over irrigate as onion bulbs that are over watered tend to be soft with a poor shelf life.
- If leaves develop a yellow tinge, cut back on watering. The closer to harvest time, the greater the need of water. However, when the onion tops start falling over, stop watering and let the soil dry out before harvesting.

Spacing and Plant: 15cm - 20cm between rows and 5cm - 8cm plant to plant with a plant population of 330,000 plants per acre.

Wider spacing for bigger bulbs and closer spacing for smaller bulbs.

► Weeding

- Onions develop slower than other vegetable crops and are more susceptible to weed competition; especially during the early growth stages that can result in yield losses.
- Weeds can be controlled successfully through either pre-or-post-emergence herbicides. Ensure to use only registered products.
- Hand weeding is necessary during bulbing stage as soil is pushed away from the onions to facilitate good bulbing. Care should be taken to avoid damage to the bulbs.
- Mulching with a light layer of straw / grass will help control weeds and preserve moisture. Be sure to push the straw back when the plants start to bulb so they'll cure properly.

How to Grow Onions

► Fertilizer Requirement

- Fertilization requirements should be determined from a soil analysis.
- Most onion roots are in a 15cm radius from the stem and therefore are shallow feeders.
- If the soils pH is less than 6 or the available calcium is less than 920Kg / acre, apply and incorporate agricultural lime at the rate of 1000Kg / acre about 8 - 12 weeks prior to planting. Lime requires time to act with acid soils to raise the pH.
- For soils low in phosphorous apply and incorporate approximately 37.6Kg of phosphate / acre. Generally it is suggested that the phosphate be banded 6 - 8.5cm below and to both sides of rows where onions will be planted.
- Nitrogen applications are critical in terms of quantity and time of application. The quantity of nitrogen supplied depends on the soil analysis.
- Test soils for sufficient nutrients. Soils low in potassium require an application of 40Kg / acre before planting.
- Studies have shown that the best method to apply pre-plant fertilizers is to band them to 6 to 8cm below the seed or transplant, rather than broadcasting and incorporating.

Planting	DAP / TSP	75Kg / acre
Top Dress - 1 st Month	17:17:17	75Kg / acre
Top Dress - 2 nd Month	17:17:17	75Kg / acre

- Foliar feeds rich in phosphorus are necessary every 10 days.
- Hormones to stimulate growth are necessary to be tank mixed during foliar feed sprays.

Chapter IX

Cucurbits

Variety





Fahari FI

- An Early Maturing Jubilee Type of Watermelon that Produces Large Fruits with Sweet Tasting Red Flesh.
- The Fruits Have a Thin But Tough Rind that Offer Very Good Shelf Life and Keeping Quality to be Transported Over Long Distances. It Has a Short Cycle that Enables the Grower to Save On Production Costs and Also Reach the Market Right On Time. It Also Has Sufficient Plant Cover Hence Protecting Its Fruit from Heat Damage.
- The Variety Produces at Least Two to Three Uniform Fruits Per Plant, Meaning the Grower Has More Marketable Yield and the Broker is Able to Harvest All the Fruits at the Same Time.

Technical Data

Type	Jubilee Watermelon (Zebra Type)
Yield	75 - 85 T / Ha
Fruit Shape	Excellent Oblong to Oval Shape
Average Fruit Size	8 Kg
Fruit Quality	Deep Red Crispy Flesh with High Sugar Content
Variety Uniformity	Uniform Fruit Development
Ecology	Suited for Open Field Planting in Warm Areas
Variety Usage	Fresh Market
Earliness	Early Maturing Variety
Resistance Summary	Anthracoze C. orbiculare. sp. race 1; Fusarium F. oxysporum. F. sp.race1.

How to Grow Watermelon

► Nursery Management

- Deep ploughing is recommended.
- Beds are made 1.5m apart and 15 - 20cm high.
- Mostly direct planted but seeds can also be raised in the nursery and seedlings transplanted. this aid is uniformity.

► Preparation

- Requires relatively hot dry weather conditions and enough sunlight.
- Low humidity and little rains will increase brix levels.
- Crop performs well between 18°C and 38°C.
- High humidity and rainfall increases the occurrence of leaf diseases.
- Soils highly susceptible to Fusarium Wilt infection should be avoided.
- The crop is tolerant to high pH-range, Optimum pH 5.0 - 6.8 to ensure update of micronutrients.

► Transplanting

- Plant population varies with regard to the type of watermelon that is planted i.e. standard, icebox or seedless. The plants are spaced at 1.8 - 2.4m between rows and 60 - 90cm in the row.
- Higher populations are possible where drip irrigation and / or plastic mulches are used.

► Crop Management

- Watermelons require less water, as the crop has a well-formed root system.
- High amount of water is required during flowering and early fruit development.
- Reduce irrigation in mature crops to prevent fruit burst and to increase brix.
- Increased bee activity can increase pollination and fruit set.
- PEight visits to a flower results in a well formed and pollinated fruit.
- Avoid spraying pesticide mid-morning when bee activities is high.

How to Grow Watermelon

► Pest and Weet Management

- Various pests and diseases are found on watermelons and can be controlled successfully through registered products.
- Melon fly must be controlled on the onset to the end of flowering.
- Weeds are mostly controlled through mechanical weeding. Avoid damage to the roots system. Pre-and post-emergence herbicides can also be used.

► Fertilizer Requirement

- Soil analysis recommended before making a fertilizer program.
- Nitrogen is usually applied in two instalments, namely at the 2 - 4 leaf stage and the second when the vines start to develop. On sandy soils this could be spread over 3 - 4 instalments.
- Drip irrigation allows for easier application of fertilizers through the system (fertigation).

Fertilization Basic Per Acre	20 Kg N	Broadcast & Incorporate
	30 Kg P	
	20 Kg K	
Subsequent Fertilization	20 Kg N 20 Kg K	Top-Dress When Vines Start to Elongate
	12 Kg N 8 Kg K	When Flowering Begins, Particularly if Rains Have Occurred

► Harvesting and Handling

- Harvest as close to full-ripeness as possible; this is when the fruit surface touching the soil is light yellow or when the vine closest to the fruit is starting to wilt (spoon leaf indicator method).
- The peduncle is cut off to prevent the peduncle from ripping into the skin of other fruits, which can result in secondary soft rots.
- Avoid cracking or bursting during and after harvest due to rough handling. Watermelons should not be thrown, stepped on or stacked too high during handling.

New

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Vegetable Seeds



Afrodite F1

- A Medium - Dark Green Cylindrical Hybrid Traditional Variety for Open Field Cultivation. This is a Vigorous Variety, with Medium - Long Internodes. Its High Precocity Yielding Marketable Fruits and its High Productivity Rate Make it Ideal for Use in Open Fields, Leading to Excellent Yields, Even in a Short Growing Cycle.
- Medium - Dark Green Classic Fruit, with a Regular Cylindrical Shape, Even When Longer and Larger than Usual. Afrodite Continues to be a Variety that is Highly Appreciated Due to its Small Flower Scar, Excellent Post - Harvest Preservation Times, Resistance During Transport and Handling.

Technical Data

Earliness	Early
Maturity	45 - 50 Days
Plant Vigour	Erect Leaves, Open Plant, Productive
Fruit	Medium - Dark Green, Uniform Cylindrical Shape, Small and Neat Flower Scar, Attractive Quality, Good Shelf Life
Average Fruit Weight	Length: 10 - 20 cm Diameter: 3.5 to 4 cm
Resistance Summary	- IR: CMV / WMV / ZYMV

How to Grow Squash

► Introduction

Squashes are members of the cucurbit family, which also includes watermelon, sweet melon and pumpkin. All squashes are frost sensitive and cannot be produced under low temperature conditions without artificial heating.

Soil Requirements

Squashes will grow well in a range of soils, but will give best results with low salt content, high levels of organic matter and a slightly acidic pH. Drainage should be good, as water logging of the root system for any length of time will retard development. A sandy-loam type soil is ideal, but other types fulfilling the above criteria are also used successfully.

Planting

Most sowing is done directly into the soil. Seedlings are sometimes used early in the season to reduce the risk of frost damage and to come into production earlier than direct-sown plantings. Plant spacing in baby marrows is generally around 1m x 0.6m to give a population of 16,000 plants per hectare. The exact spacing will depend largely on the irrigation system in place and on each individual situation. Spacing will also depend on the market to be supplied.

Irrigation

For acceptable results with baby marrows irrigation is needed. Water must not be saline, as this will retard plant growth. The amount of water to be applied will depend on soil type, temperature, growth stage and rainfall. Effective fertilizer applications are only possible where a recent soil analysis is available. As a basic programme for baby marrows 600 Kg / ha of 2.3.4 at pre-plant is widely used.

Any microelements or other nutrients are given according to analysis. If heavy rainfall occurs during the growing period, topdressing with a Nitrogen source will boost the plant.

Poor Pollination leads to poor or irregular fruit development. Normal fruit development requires effective pollination and bees are the most effective agents of this.

How to Grow Squash

Squash flowers are not very attractive to bees and natural populations should be supplemented with 2 or 3 hives per hectare.

Hives should only be placed in the field at the onset of flowering. If they are in place earlier, the bees may establish foraging patterns in other, more attractive plants.

They will then ignore the squash when they start to flower. Bees are most active from sunrise until early afternoon. Insecticides should therefore be applied later in the day, taking care not to spray or allow drift near to the hives.

The ideal temperature for marrow production lies between 25°C and 32°C. The efficiency of pollination drops as temperatures rise above 30°C.

Harvesting

Baby marrows are harvested continually. During peak production one fruit per plant per day is usually picked. Peak production normally lasts about 3 - 4 weeks.

In cooler conditions, harvest interval will double. The yield achieved will depend on a number of factors, the level of virus infection is particularly important.

A good yield is in the region of 10 tons per hectare for baby marrows. It is important to handle baby marrow fruit carefully as they are easily marked and this reduces quality and hence margin.

If practically possible, harvest should be in the early part of the day in warmer weather to prevent the fruit being picked with high levels of field heat. Cooling of the harvested fruit will give a better shelf life.

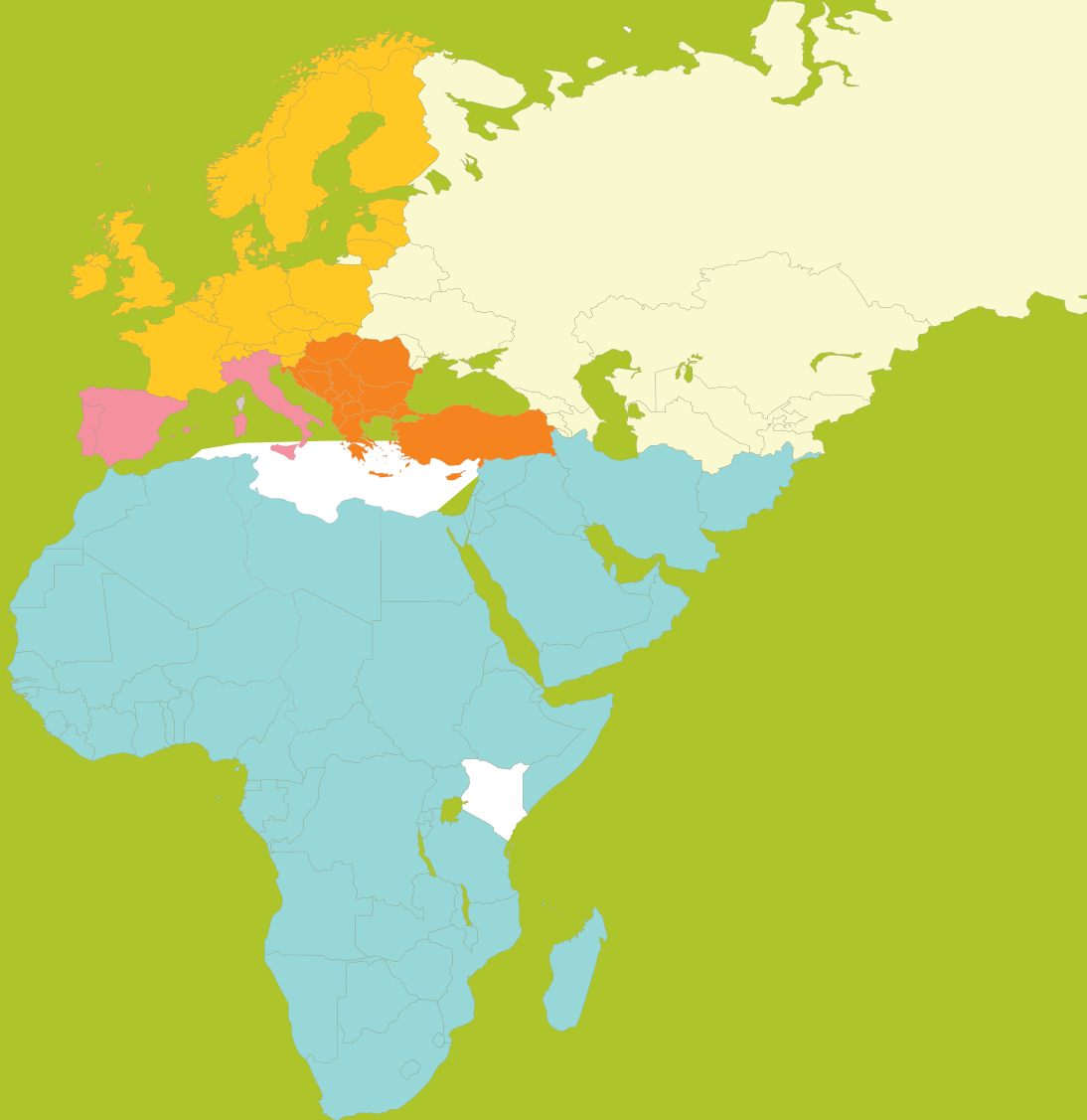
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