



S&G SQUASH



S&G A passion for innovation

S&G is the name of Syngenta's brand for vegetable seeds in Europe, Africa, the Middle East and Asia, and for seeds and young flowering plants throughout the world.

Syngenta is committed to developing sustainable agriculture, implementing intensive and highly innovative research combined with the use of avant-garde technologies. This is why the company invests over 10% of its turnover in Research & Development.

The Product Development Centres are located in major production areas, in order to ensure quality, increase security and in this way achieve Syngenta's key objective: to fully satisfy each operator all the way along the chain, from farmers to consumers.

S&G has teams of professionals dedicated to squash, providing extensive in-house knowledge and individual know-how in the following areas:

- Product Development
- Seed Production
- Marketing
- Sales



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Green

Classic type of zucchini, the best known throughout Italy. The pigmentation can vary from medium green, mainly found in Central/Southern Italy, to dark green, consumed everywhere, and to very dark green, typical of the area around Milan.

Roberta

Early hybrid, extremely flexible and suited to different forms of cultivation, in open fields and greenhouses/tunnels. It is a balanced, open and erect plant with high apex dominance. Very high yield potential, excellent response to forcing and rapid production levels with marketable fruit.

Medium green coloured fruit, approx. 20-22 cm in length, regular and slightly squared, made more luminous and shiny by small white freckles.

The quality and long life of the flower make the variety suitable for the market both with and without flowers.

Intermediate /Average Resistance (IR): ZYMV

Medium Green

Benefits

GROWER - INTEGRATED PRODUCER

- Quality of fruit and earliness

GROWING GUIDELINES

- Open field in springtime, summer and autumn
- Protected cultivation in spring and autumn





CV2832

new
variety for
testing only

Compact plant of medium vigour with open and semi-erect habit. Variety characterised by good earliness and a shiny medium green coloured fruit.

Good genetic resistance to a wide range of viruses, as well as powdery mildew, guarantees excellent results mainly in the summer and autumn period, when plant diseases can more seriously affect cultivation.

Intermediate /Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Yield and health

GROWING GUIDELINES

- Open field in spring and mainly summer and autumn



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Mastil

Vigorous plant, very productive, healthy and **particularly rustic.**

It can adapt to cultivation in humid conditions and rainy seasons. It maintains consistent productivity through the entire cycle and enjoys excellent health, thanks to its genetic resistance to viruses and powdery mildew. High yield and easy harvest due to the open and semi-erect habit of the plant.

Fruits are a medium green colour, shiny and uniformly shaped, cylindrical even when longer and larger in size.

Intermediate/Average Resistance (IR): Gc / Px / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Rusticity and health

GROWING GUIDELINES

- Open field in spring, but particularly in the summer cycle and autumn





Cronos (CV3097)

new

Early variety, with a good balance between vegetative and reproductive parts.
“Ideal” plant: its open and erect habit makes it simple to manage in tunnels/greenhouses and easy to harvest; good **resistance to powdery mildew**.
High potential yield that is best exploited with early September planting.
Cylindrical fruit with a shiny, fairly dark green colour.
Harvested fruits are very long-lasting – Long Shelf Life (LSL)

Intermediate/Average Resistance (IR): Gc / Px / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Yield and resistance to Powdery mildew

GROWING GUIDELINES

- Autumn tunnels in Sicily



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Dark - Green/Medium - Dark (open field cultivation)

Afrodite

Traditional variety for open field cultivation. Vigorous, with medium-long internodes.

Its **high precocity yielding marketable fruits** and its high productivity rate make it ideal for use in open fields with spring seed sowing and lead 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 by the food industries, due to its small flower scar, excellent post-harvest preservation times, resistance during transport and handling, and low water content.

Intermediate/Average Resistance (IR): CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Earliness & yield

GROWING GUIDELINES

- Spring open field cultivation





Xsara

For many years this has been the leading variety on the Italian market in the open field dark green zucchini category. The agronomic merits of the plant, together with the excellent commercial qualities of the fruit, are key to the success of Xsara. An early variety of ideal habit. Balanced, erect and open plant with very short internodes. High yield, with production of numerous cylindrical fruits, which are appealing due to their regular shape and shiny dark green colour. From a commercial point of view, it is one of the most attractive fruits on the market and very popular with producers, wholesalers and retailers.

Intermediate/Average Resistance (IR): CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Quality of fruit

GROWING GUIDELINES

- Open field cultivation in spring and summer





Quine

Balanced plant with an airy, open habit, very short internodes and a long fruit stem: characteristics that facilitate harvesting, even if this is manual.

Shiny dark green fruit that are regular and cylindrical.

The wide range of genetic resistance (viruses & powdery mildew) makes this variety particularly suitable for cultivation in open fields, especially in the summer.

Very high production potential.

The fruit maintains its regular cylindrical shape even when very elongated. Thanks to this characteristic, combined with its constant productivity, ease of harvesting and fruit texture, this variety is **highly appreciated, not only by the fresh food market, but also by the food industry in general.**

Intermediate /Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Yield

GROWING GUIDELINES

- Spring, summer and autumn open field cultivation





Mikonos

A fairly vigorous variety, with semi-erect and open habit. This voluminous plant, with expansive leaves, requires thorough watering and feeding in order to attain its high yield potential.

Regular, cylindrical fruit, slightly multifaceted, shiny medium-dark green in colour, specifically chosen and ordered by many market operators.

Resistance to a wide range of viruses and powdery mildew makes this variety very effective, especially when planted in summer and autumn.

Intermediate/Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Fruit Quality

GROWING GUIDELINES

- Open field in spring, summer and autumn





Naxos

Vigorous plant with wide leaf lamina and excellent health and rusticity features.

Ideal for open field cultivation at the end of summer and autumn, even in areas subject to strong viral pressure and powdery mildew, where it currently offers the best genetic solution.

The dark green fruit is evenly cylindrical and has an elegant, shiny colour with small freckles, making it highly appreciated commercially.

Intermediate/Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV



Benefits

GROWER - INTEGRATED PRODUCER

- Plant Health

GROWING GUIDELINES

- Open field, end of summer and autumn





Syros

The latest commercial variety for the dark green sector, it is characteristically a small-sized plant with a good balance between vegetative and reproductive parts. It needs appropriate staking and training during the early growing phases, especially in poor soil. The open and erect habit is due to the short internodes and makes the fruits, which have a good peduncle, very easy to pick.

Thanks to its excellent genetic resistance, it is a very healthy plant with a long harvesting period.

Early marketable fruits and **very high yield levels.**

The fruits are elegant, evenly shaped and a shiny dark green in colour.

Intermediate/Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Yield

GROWING GUIDELINES

- Spring, summer and autumn cycle in open fields





CV3376

new
variety for
testing only

Over the last two years CV3376 has shown **outstanding reliability and productive performance** in Italy. The plant has a very well-balanced and open habit, and it has consistently high productivity rates.

The fruit is shiny dark green, with freckles that have a lightening effect, resulting in higher qualitative merit.

Intermediate/Average Resistance (IR): Gc / Px / CMV / WMV / ZYMV

Benefits

GROWER - INTEGRATED PRODUCER

- Yield

GROWING GUIDELINES

- Open field





Very dark green

Raven

Historic variety in the S&G range, ideal for satisfying demand for the “**Scurissimo di Milano**” type (Darkest Milan). A well-balanced plant of medium vigour and a shiny uniform dark green in colour, which produces high-quality fruits.

Benefits

GROWER - INTEGRATED PRODUCER

- Fruit quality

GROWING GUIDELINES

- Open field in spring, summer and autumn



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Useful advice for the protection of your harvest

The concept of protection is to use all available tools at our disposal: a mix of genetic, chemical and biological elements and good prevention is the starting point for successful results.

Today, in the cultivation of zucchini, the synergy between innovation and know-how, which represents the cornerstone of Syngenta's strategy, enables us to optimise harvests, respecting good agricultural practices, guaranteeing safe products to consumers and encouraging sustainable agriculture.

However, correct observation of the cultivar and the decisions made regarding it are still critical factors for professional growers.

Therefore, our recommendations aim to provide useful guidelines, although they cannot determine the end result.



Physiology of the plant

- Plants for temperate-warm climates prefer light, heat and good soil humidity without water stagnation.
- Temperatures under 10° C rapidly block the physiological activity of the plant, including processes such as germination, pollen production and flowering. On average, germination in open fields takes about a week with air and soil temperatures of around 15° C. Temperatures under 4-5° C inflict severe cold damage and can even kill off the plant.
- Plants must adapt well to various types of soil, which should preferably be deep, of medium texture, rich in organic substances and drain well.
- Plants tolerate high levels of salinity compared with other fruit-producing plants, but they are not suited to alkaline soil with pH levels higher than 7.
- Together with temperature, the photoperiod affects vegetative growth and sexual differentiation, increasing the tendency towards branching and bunching, elongation of the internodes and development of male flowers.
- The branching of the plant, with the formation of large numbers of sprouts, is influenced by climatic conditions and by excessively fertile soil. (see Excess of nitrates or organic substances).
- Due to the plant's characteristics and root structure, zucchini can be heavily damaged by wind: different varieties behave differently in terms of their wind resistance, depending on their habit, vigour and tissue elasticity.
- Insect pollination is mainly performed by insects (bees and bombus); however, the genetic capacity to induce partial parthenocarpy can reduce the use of plant feed during the cooler months.



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Cultivation Management

- Rotation is always advisable, rather than re-planting zucchini or implementing crop succession with other cucurbitaceous varieties.
- Direct sowing and transplanting (generally with seedlings with 2-3 real leaves) are equally common, according to the cycle and type of cultivation.
- The most rational technique involves the use of mulch, which increases the soil temperature, forces cultivation, helps to control weeds and leads to a more compact habit, making harvesting phases easier and reducing the soiling of the fruit. Reflective mulch also tends to repel insects.
- Localised drop irrigation has taken over in recent years in comparison with aspersion or running water irrigation, as it requires smaller volumes of water to maintain excellent humidity levels, limiting the development of weeds and allowing for fertigation.
- Fertirrigation is the ideal way of administering nutrients to a plant in continuous harvesting like zucchini.
- For every ton of fruit harvested, the most significant removals are: nitrogen (3.8 kg), phosphorus (1.6 kg), potassium (9 kg) and magnesium (1 kg). (Source: Siviero e Trentini, 2006).
- It is, however, difficult and misleading to indicate an optimal fertilisation formula, since this varies according to the type of soil, the type of cultivation and the length of the productive cycle.
- Adding manure or organic substances is very useful in sustaining the plant and yield, but exaggerated amounts lead to excessive and undesired luxuriant vegetative growth and branching.
- Nitrogen is fundamental in all phases to ground the plant and guarantee continued productivity, but it needs to be balanced by phosphorus and potassium in order to avoid an imbalance in favour of leaves that reduces the yield.
- During fertilisation it is essential to add potassium, which also helps to improve the quality of the fruit.
- The temporary use of NWF covering can be useful as protection in low temperatures to achieve an early harvest and create an obstacle for aphids and insects.
- The use of training stakes/wires in protected cultivation can increase density of planting, accentuating the erect habit of plants and making cultivation and harvest operations easier.



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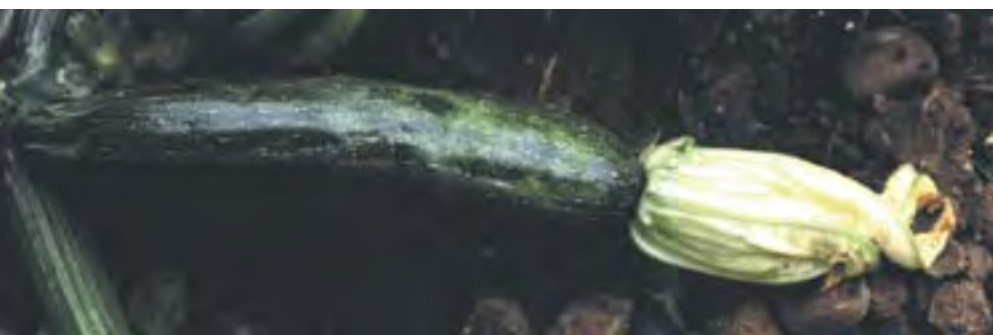
Harvest and shelf life



- Harvesting can be performed manually or by knife, leaving a peduncle of 2-3 cm on the fruit. The commercial length and size of fruit vary according to the type of fruit, the variety and the end market.
- On average a plant can produce 1.5-3.5 kg of fruit in open fields and 2-6 kg with protection.
- Harvesting with flowers still on the fruit is traditional for some types of products (mainly grey, speckled, “Fiorentino” and “Romanesco”) and is positively valued as proof of freshness in many markets. The longevity of the flower is genetically based and distinguishes the different hybrids.
- The additional harvest of the male flower, generally marketed on trays, can be performed on all cultivation, with variations according to the period and type.
- The ability of the fruit to withstand handling varies especially according to the type and varietal characteristics (the green type is generally less delicate). The addition of calcium via the leaves helps to make the fruit cuticles stronger for harvesting and handling, and makes them last longer in the post-harvest stage.
- The shelf life of zucchini varies according to the storage temperature and humidity. The control of temperature and humidity, together with good ventilation, is essential. For example, the quality of green types of fruit remains at its best for no more than 10 days at a temperature of 10-12° C and UR above 90%. Low temperatures damage the appearance and consistency. At under 8° C conservation is already endangered. Considering its vulnerability to ethylene, zucchini should not be stored in refrigerators with other fruit. The differences in post harvest shelf life (LSL) are significant from one variety to the next, regardless of type. Work on genetic improvement in recent years has also focused on this aspect.
- The fruit is easily digestible. It has a water content of over 90% and a very low calorie count: less than 20 calories per 100 grams of fresh edible product.

Protection


- The major problem consists in the possible presence of viruses: at present, CMV (Cucumber Mosaic Virus), WMV (Watermelon Mosaic Virus 1 and 2) and ZYMV (Zucchini Yellow Mosaic Virus) are the most widespread zucchini viruses in Italy and they are all transmitted by aphids (generally *Myzus persicae* and *Aphis gossypii*). During recent years, in addition to some particularly aggressive strains of these viruses, the MWMV (Moroccan Watermelon Mosaic Virus) has arrived, reaching the area around Latina and causing extensive damage to crops.
- All viruses generate serious symptoms on the leaves and fruits, with changes, decolouration and deformation of the organs, and progressive elimination of commercial fruit production.
- The risk of viruses varies according to the area and is generally higher in the case of open field cultivation during summer.





- To reduce the risk of viruses, it is advisable to use resistant varieties (at present, we only have the IR variety, with intermediate/average resistance) and carry out regular anti-aphid treatments, not only using chemical products.
Effective weed control reduces the presence of aphids and whitefly, whilst the use of anti-insect mesh is useful with protected cultivation.
 - It is important to remove and eliminate plants affected by viruses in order to prevent the disease from spreading; it is also recommended to try rotation for one year with another species in cases where residues of seriously infected plants are buried in the ground.
 - Other than spreading viruses, aphids such as mites and whitefly can directly damage cultivation, causing the plant to wither and lose a significant amount of production. Elaterid larva and noctuids can inflict damage, especially in the early phases of development.
 - The fungal diseases most frequently found in zucchini are, in order of frequency:
 - Mildew (*Pseudoperonospora cubensis*)
 - Powdery mildew (*Golovinomyces chioracearum* ex *Erysiphe chioracearum* *Podosphaeria xanthii* ex *Sphaerotheca fuliginea*)
 - Cladosporiosis (*Cladosporium cucumerinum*)
 - Sclerotinia (*Sclerotinia sclerotiorum*)
 - Botrytis or grey mould (*Botrytis cinerea*)
- Defence with agrochemicals and relevant active ingredients normally leads to rational control of fungal diseases. The intermediate/average resistance (IR) of some varieties to powdery mildew makes it easier to restrict the proliferation of this fungus.
- The most common bacteria infections are *Erwinia Carotovora* (most frequent in greenhouses, this starts as growths and rots the tissues, especially around the collar) and *Pseudomonas syringae* (which leaves necrotic stains on leaves and fruits).



Problem	Stage	Transplant	Vegetative development	Harvest	Harvest	
Powdery mildew				TIOVIT JET / TOPAS / ORTIVA		
Pseudoperonospora				ORTIVA		
Botryte/Sclerotinia				SWITCH		
Cladosporiosis				ORTIVA		
Aphids		ACTARA 25 WG in the soil		ACTARA 25 WG / PLENUM 50 wg		
Aleurodidae		ACTARA 25 WG in the soil		ACTARA 25 WG / PLENUM 50 wg		
Noctuids		FORCE				
Nutrition			SEQUESTRENE NK 138 Fe / SEQUESTRENE LIFE			



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Zucchini range S&G 2008-2009

	Variety	Fruit	Length in cm	Positioning	Marketed with flowers
White Very Light	Otto	Cylindrical	18-20	open field + protected cult.	
	Albifio	Cylindrical	14-18	open field	YES
	Carisma	Cylindrical	13-15	open field	
	Tulsa	Cylindrical	12-13	open field	
	Shorouq • New	Club	12-13	open field	
Speckled - Grey	Altea	Ribbed/striped	20-22	open field + protected cult.	YES
	Isotta	Striped	18-20	open field + protected cult.	YES
	Lipari	Cylindrical/striped	14-20	open field	YES
	Ortano	Cylindrical/striped	14-20	open field + protected cult.	YES
	Rigas	Grey	14-16	open field	YES
	RM2361 • New - Variety for testing only	Fiorentino	18-20	open field	YES
RM2379 • New - Variety for testing only	Romanesco	18-20	open field	YES	
Round	Brice • New	Round	8-9 (diameter)	open field	
Medium Green	Roberta	Cylindrical	18-22	open field + protected cult.	YES
	Velvia	Cylindrical	18-20	open field + protected cult.	
	CV2832 • New - Variety for testing only	Cylindrical	18-20	open field	
	Mastil	Cylindrical	18-20	open field	
Dark - Medium Dark Green	Alister	Cylindrical	18-20	tunnel autumn	
	Cronos (CV3097) • New	Cylindrical	18-20	tunnel autumn	
	Afrodite	Cylindrical	18-20	open field	
	Xsara	Cylindrical	18-20	open field	
	Quine	Cylindrical	18-20	open field	
	Mikonos	Cylindrical	18-20	open field	
	Naxos	Cylindrical	17-19	open field	
	Syros	Cylindrical	17-19	open field	
	CV3376 • New - Variety for testing only	Cylindrical	18-20	open field	
Very Dark Green	Raven	Cylindrical	17-19	open field	

Explanation of the terms and abbreviations used in this publication

Gc	[IR]	Golovinomyces cichoracearum (ex <i>Erysiphe cichoracearum</i>)
Px	[IR]	Podosphaeria xanthii (ex <i>Sphaerotheca fuliginea</i>)
CMV	[IR]	Cucumber Mosaic Virus
WMV	[IR]	Watermelon Mosaic Virus
ZYMV	[IR]	Zucchini Yellow Mosaic Virus

Definition of resistance

Resistance = capacity of a plant variety to limit the growth and development of a specific parasite or pathogen and/or the damage it causes, compared to a variety which has been raised under the same conditions and the same pressures of infectious disease or parasite. However, the resistant variety may show some symptoms of the disease or damage if the parasite or pathogen pressure is very high.

High / Standard Resistance (HR) = capacity of a plant variety to substantially limit the growth and development of a specific parasite or pathogen under normal conditions of infectious pressure in comparison to more susceptible varieties. These plant varieties might, however, show some symptoms or damage under conditions of high pressure from parasites or pathogens

Intermediate / Average Resistance (IR) = capacity of a plant variety to limit the growth and development of specific parasites or pathogens; however, this group shows a larger range of damage if compared with the HR variety. The variety with IR resistance will show less damage or symptoms compared to a susceptible variety, if they are grown in similar conditions and/or under the same parasite or pathogen pressure.

Tolerance (T) = capacity of a plant variety to cope with abiotic stress without serious consequences for development, appearance and productive yield.

Syngenta Seeds Vegetables has exercised reasonable care and skill in compiling this brochure. All resistances quoted refer only to races or pathotypes indicated at the varieties. Other pathogen races or pest biotypes capable of overcoming the resistance may exist or emerge. Syngenta Seeds Vegetables uses highly elaborate analytical methods to verify specific variety resistances. Specificity of pests or pathogens may vary over time and space and depends on environmental factors. In order to maximize the efficiency of a resistance, it is highly recommended to mix different ways of control such as growing conditions, plant protection products and genetic resistance as part of an integrated crop management. All data in this brochure are intended for general guidance only and the user should apply it in accordance with his own knowledge and experience of local conditions. In case of doubt we recommend that a small scale trial production be carried out to determine how local conditions may affect the variety.



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