



Agri-Business Supplement

Zarai Taraqati Bank Limited.

GENETICALLY MODIFIED FOODS

What are Genetically Modified Foods?

According to the World Health Organization, Genetically Modified Organisms (GMOs) can be defined as "organisms (i.e. **plants**, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination".

GM foods are developed and marketed because there is some perceived advantage either to the producer or consumer of these foods. This is meant to translate into a product with a lower price, greater benefit (in terms of durability or nutritional value) or both. Initially, GM seed developers wanted their products to be accepted by producers and have concentrated on innovations that bring direct benefit to farmers (and the food industry generally).

One of the objectives for developing plants based on GM organisms is to improve crop protection. The GM crops currently, on the market are mainly aimed at an increased level of crop protection through the introduction of resistance against plant diseases caused by insects or viruses or through increased tolerance towards herbicides.

Benefits and Worries about GM Foods

The bulk of the science on GM safety points in one direction. David Zilberman, (a U.C. Berkeley agricultural and environmental economist and one of the few researchers considered credible by both agricultural chemical companies and their critics). He argues that the benefits of GM crops greatly outweigh the health risks, which so far remain theoretical. The use of GM crops "has lowered the price of food," Zilberman says. "It has increased farmer safety by allowing them to use less pesticide. It has raised the output of corn, cotton and soy by 20 to 30 percent, allowing some people to survive who would not have without it. If it were more widely adopted around the world, the price of food would go lower, and fewer people would die of hunger."

Despite such promise, much of the world has been busy banning, restricting and otherwise shunning GM foods. Nearly all the corn and soybeans grown in the U.S. are genetically modified, but only two GM crops, (Monsanto's MON810 maize and BASF's

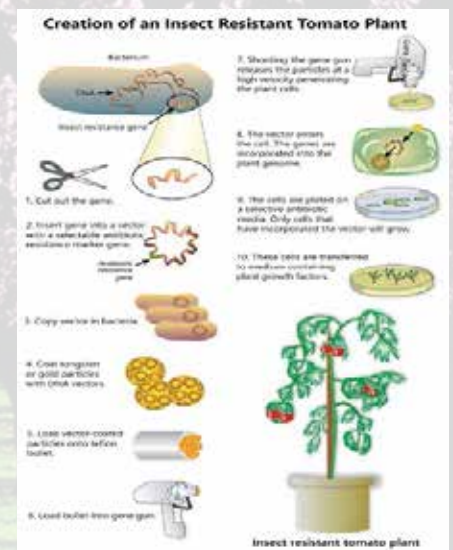
Amflora potato), are accepted in the European Union. Eight E.U. nations have banned GM crops outright. Throughout Asia, including in India and China, governments have yet to approve most GM crops, including an insect-resistant rice that produces higher yields with less pesticide. In Africa, where millions go hungry, several nations have refused to import GM foods in spite of their lower costs (the result of higher yields and a reduced need for water and pesticides). No country has definite plans to grow Golden Rice, a crop engineered to deliver more vitamin A than spinach (rice normally has no vitamin A), even though vitamin A deficiency causes more than one million deaths annually and half a million cases of irreversible blindness in the developing world. But as medical researchers know, nothing can really be "proved safe." One can only fail to turn up significant risk after trying hard to find it—as is the case with GM crops.

A Way Forward

There is a middle ground in this debate. Many moderate voices call for continuing the distribution of GM foods while maintaining or even stepping up safety testing on new GM crops. They advocate keeping a close eye on the health and environmental impact of existing ones. But they do not single out GM crops for special scrutiny.

Stepped-up testing would pose a burden for GM researchers, and it could slow down the introduction of new crops. That is a fair question, but with governments and consumers increasingly coming down against GM crops altogether,

additional testing may be the compromise that enables the human race to benefit from those crops' significant advantages.



Individual GM foods and their safety should be assessed on a case-by-case basis and that it is not possible to make general statements on the safety of all GM foods. The Codex Alimentarius Commission (Codex) is the joint FAO/WHO intergovernmental body responsible for developing the standards, codes of practice, guidelines and recommendations that constitute the Codex Alimentarius, meaning the international food code. Codex developed principles for the human health risk analysis of GM foods in 2003.

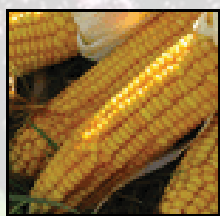
GM foods currently available on the international market have passed safety assessments and are not likely to present risks for human health. In addition, no effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved. Continuous application of safety assessments based on the Codex Alimentarius principles and, where appropriate, adequate post market monitoring, should form the basis for ensuring the safety of GM foods.

GM crops available on the international market today have been designed using one of three basic traits: i) Resistance to insect damage; ii) Resistance to viral infections; and iii) Tolerance towards certain herbicides. GM crops with higher nutrient content (e.g. soybeans increased oleic acid) have been also studied recently.

The Big Four GM Crops



Soybeans: Over half of the world's 2007 soybean crop (59%) was genetically modified, a higher percentage than for any other crop. Each year, the E.U. Member States import approximately 40 million tonnes of soy material, primarily used for feeding cattle, swine, and chickens. Soybeans are also used to produce many food additives.



Maize: Maize is the only GM crop that is currently being grown in the Europe. Maize is used primarily for animal feed and is also an important raw material for the starch industry. If GM maize production in Europe were to increase, it would most likely make its way into food products.

Rapeseed/Canola: Until recently, rapeseed was a relatively unimportant crop. Today rapeseed is grown not only as raw material for renewable resources, but

also as a source of oil that is used to produce margarine. There is no GM rapeseed currently being grown in Europe. In Canada, However, GM rapeseed has become widespread.



Cotton: Cotton is not only important as a source of fibre for textiles. The seeds make up an important part of food and animal feed. GM cotton is grown primarily in India, China and the United

States. China is currently expanding its production of GM cotton, which could allow for drastic reductions in pesticide use.

Role of Monsanto Company in GM Foods

Monsanto company is a publicly traded American multinational agrochemical and agricultural biotechnology corporation. It is headquartered in Creve Coeur, Greater St. Louis, Missouri. Monsanto is a leading producer of Genetically Engineered (GE) seed and Roundup, a glyphosate-based herbicide.

Monsanto was one of four groups to introduce genes into plants in the year 1983, and was among the first to conduct field trials of genetically modified crops in 1987. Monsanto was using techniques developed by biotech drug companies.

World Health Organization (WHO) and Evaluation of GM Foods

WHO has been taking an active role in relation to GM foods, primarily for two reasons:

- On the grounds that public health could benefit from the potential of biotechnology, for example, from an increase in the nutrient content of foods, decreased allergenicity and more efficient and/or sustainable food production; and
- Based on the need to examine the potential negative effects on human health of the consumption of food produced through genetic modification in order to protect public health. Modern technologies should be thoroughly evaluated if they are to constitute a true improvement in the way food is produced.

WHO, together with FAO, has convened several expert consultations on the evaluation of GM foods and provided technical advice for the Codex Alimentarius Commission which was fed into the Codex Guidelines on safety assessment of GM foods. WHO will keep paying due attention to the safety of GM foods from the view of public health protection,

in close collaboration with FAO and other international bodies.

Future of GM Foods

Future GM organisms are likely to include plants with improved resistance against plant disease or drought, crops with increased nutrient levels, fish species with enhanced growth characteristics. For non-food use, they may include plants or animals producing pharmaceutically important proteins such as new vaccines.

References

https://en.wikipedia.org/wiki/Genetically_modified_food

© 2017 by GMO Compass. All rights reserved. | Imprint | website created by webmotive

QUINOA CROP PRODUCTION TECHNOLOGY

Introduction

Quinoa (Keen-Wah)

Chenopodium quinoa is a new emerging crop. It is getting popular because of high contents of protein and unique amino acid composition which are not present in most of cereals. Quinoa crop is an important and new crop for agriculture, as it can not only provide nutritive and versatile food products for the humans. But also supply new raw material for industry. High contents of protein and unique amino acid Lysine differentiate it from others. Lysine is an essential amino acid that is almost not found in many grain crops. It has been used as a staple food/crop for thousands of years for the people inhabiting Andean mountains in South America.



The height of the plants varies from 1.5 to 6.5 ft, and colors range from white, yellow and pink to darker red, purple and black due to a resinous coating that contains two to six per cent saponin. The thick erect woody stalk of the plant may be branched or un-branched, alternately branched and has wide leaves. Young leaves are usually green but they turn yellow red, or purple as the plant matures. The tap root system makes the plants more resistant to drought. The plants mature in 90 to 125 days after planting. The seed is produced in clusters and is similar in size to millet (0.8 to 0.11 in. in diameter).

Quinoa is a herb containing small seeds called achenes. Seeds are small and similar in size to millet. Seeds color varies from white, yellow, red, purple to black depending upon the region. In food industry

yellow and white grains are used. Quinoa seeds are bitter, medium and sweet depending upon the ecology of the plant. Quinoa is also called as pseudo-cereal because the amino acid pattern is very similar to the combination of soybean and wheat. Therefore, it can be suitable as an alternative of these crops.

It is gluten free, easy to digest and good source of Magnesium, Calcium, Phosphorus Copper and Iron. It is rich in vitamin B1, vitamin B2, vitamin C and vitamin E. FAO reported that quinoa is closer to ideal protein balance than any other crop.

Quinoa has potential to overcome the world's food shortage because of excellent balance contents of protein and fat. Protein contents are 50% more than any other grain. Extra large germ portion gives quinoa its protein power. It has full range of amino acid which can easily be absorbed by body than any other grain. Quinoa is good source of Magnesium which relaxes blood vessels so provide cardio vascular health, protect against breast cancer and also acts as an anti oxidant.

Outer layer of seed contains a bitter compound called saponins, considered to be toxic. Saponins can be removed by rinsing the quinoa in cold alkaline water and mechanically rubbing the outer layer of seed. Through selective breeding, sweet and more palatable varieties can be made. The main producers of the quinoa in the world are Peru, Bolivia, Chilli, Argentina, USA, Ecuador and Peru while exporters are Chilly and Ecuador.

Current Scenario and Potential in Pakistan

This crop is very suitable for cultivation in Pakistan but unfortunately very fewer efforts have been made for the progress in the country. In Pakistan it has experimentally cultivated in Faisalabad, Chakwal and Bahawalpur regions. Four accessions were selected based on their performance under local conditions of Faisalabad, Lahore, Gujrat, RY Khan, Tandojam, Peshawar, DI Khan, and Hasilpur. Its yield potential is 80 monds/acre but in Pakistan is 28-32 monds/acre. Therefore there is need to concentrate on development of varieties possessing characteristics such as uniformity, early maturity, high yield and quality and low saponin contents aspects. The plant size should be short and un-branched to help in mechanical harvesting.



The crop has a good potential in the Northern Areas where conventional agriculture is difficult due to loss

of fertile soil and non-availability of suitable crops to improve the agricultural economy. Its adaptation to severe winter would help alleviate poverty in those areas by providing a profitable crop to growers of this region. It can also help to improve food production in western dry mountains of Balochistan where the degraded land and declining ground water resources severely hamper production of other staple crops.

Resistance against Saline Soils/Salinity

As many as 6.8 million hectares of land in the country is under the grip of salinity, raising the threat of food insecurity. The land can be cultivated with sowing of climate and saline resistance crops as a step towards increasing the production and to alleviate poverty.

Quinoa has resistance against the salinity and climate changes. It is also a gluten free food and help lower down the threat of increasing blood pressure in human beings. The demand of the gluten free food is increasing in the world. Therefore, the country has the potential to tap the international market by promoting its cultivation.

Resistance against Drought

The drought resistance of quinoa is attributed to morphological characters, such as an extensively ramified root system and presence of vesicles containing Calcium Oxalate that are hygroscopic in nature and reduce transpiration.

Climate Requirements

Its crop cultivars have high genetic variability by adapting sea level to higher levels of altitude and subtropical conditions, which enable us to select, adapt and breed cultivars for growth under our conditions. Its nutritional characteristics, growth requirements and adaptability to grow under wide range of conditions have raised its demand.

Agronomy of Quinoa

Soil Requirements

The plants are disease-free and drought-tolerant. They grow well on sandy-loam to loamy-sand soils but once established, produce abundant harvests under dry conditions. Optimum soil for the crop growth is well-drained loamy soils but it can grow well on poorly aerated soils with a wide pH range from 4.5 to 9.5. Under adequate moisture conditions, germination occurs within 24 hours after planting and seedlings emerge in three to five days. The seeds may not germinate under warm conditions and may require vernalisation to obtain adequate germination.

Seed Bed Preparation

The seed depth should be 1 to 2 cm and it varies among different types of soils and also depends on the available soil moisture. The dehydration or water logging may occur if the seed is planted too shallow or deep, due to small size of the seed. The minimum row to row distance should be 14 inches.

Time of Sowing and Seed rate

It is sown from 15 November to 15 December. The seed rate should be 2-3 kg per acre but may be doubled when growing conditions are not optimal. To obtain better germination rate, seeds should be planted in moist soil rather than dry soil. The pigweed is most related to quinoa so the grower must pay close attention to weeds.



Irrigation

It is a drought tolerant crop therefore it needs less water. However, 2 to 3 irrigations are required to mature crop. First irrigation should be late like wheat cultivation so that it can properly grow.

Pests and Diseases in Quinoa Farming

Tarnished plant bug, stem borer, flea beetles, aphids, leafhoppers, beet army worm are common pests found in quinoa farming.

While the fungal leaf spots, stalk rot, damping off, downy mildew, gray mold and bacterial blight are the common diseases found in quinoa cultivation. Apart from insect pests and diseases, birds are also a cause of loss in the crop.

Intercultural Operations in Quinoa Farming

If the quinoa crop is grown in wide row spacing then plants branch easily and their growth is hastened as well as the growth of weeds. Therefore, inter-row cultivation should be carried out. Usually, weeds should be removed mechanically in quinoa cultivation. When the plant reaches 20 to 25 cm, the first weeding is done, and also thinning if the seedlings are clustered or need to be moved to space with greater availability of water.

Manure and Fertilizer Requirements

Provide supplements in field in the shape of 20 to 30 tonnes of well rotten farm yard manure to enrich the soil during land preparation. Quinoa crop responds well to nitrogen (N₂) fertilizer. The crop requires chemical fertilizer of N:P:K in the ratio of 120Kg:50Kg:50Kg per one hectare of land.

Harvesting and Post Storage

Usually quinoa crop become ready for harvesting after 3 to 4 months of sowing depending on the variety. Quinoa crop is harvested when the plants reach at physiological maturity and laid in field for 35 to 45 days. Plants are usually harvested when they have turned pale yellow or red in colour, and leaves have dropped. The seed should thresh easily by hand. The quinoa crop can be harvested using either with standard header or sorghum harvester.

It is necessary to remove trash from the seed. The grain must be dry before storage. Quinoa stover contains little fiber and subsequently provides little crop residue. Rain during harvest can cause problems as it provides necessary moisture to mature seed to germinate within 24 hours and therefore results in post harvest losses.

Sources:

- Report on "New and Nutritious Crops on weak soils" by Dr. Shehzad Basra, Professor, Agronomy Deptt. FAU.Faislabad.
- M.A.Iqba.2015 An Assessment of Quinoa (*Chenopodium quinoa* Wild) Potential as a Grain Crop on Marginal lands in Pakistan.American-Eurasian J.Agric.& Environ.Sci., 15(1):16-23, 2015
- <http://www.hamariweb.com/articles/article.aspx?id=7494>
- <http://www.agrifarming.in/quinoa-farming-information-guide/>

AVOCADO FARMING

Classification

Scientific name: *Persea Americana*

Common Names: Avocado, alligator pear (English); Aguacate, Palta

(Spanish), Avokado (Afrikaans)

Family: Lauraceae

Origin and Distribution

Avocados may have originated in Southern Mexico but were cultivated from the Rio Grande to central Peru long before the arrival of Europeans. They were then carried to the West Indies and to nearly all parts of the tropical and subtropical regions with suitable environmental conditions. The distribution of avocado continued to the Philippines, to the Dutch East Indies by 1750 and Mauritius in 1780. Avocados were planted in Hawaii in 1825 and were common throughout the islands by 1910.

Vegetative propagation began in 1890 and stimulated the import of bud wood of various types, primarily to extend the fruiting season. It reached India in 1892 and was grown especially around Madras



Currently, avocados are commercially grown not only in the United States but throughout tropical America and the larger islands of the Caribbean. Other countries involved in cultivation of avocados are Polynesia, Philippines, Australia, New Zealand, Madagascar, Mauritius, Madeira, the Canary Islands, Algeria, Tropical Africa, South Africa, Southern Spain and Southern France..

Description of the Plant

Growth Habit

The avocado is a dense, evergreen tree, shedding many leaves in early spring. It is fast growing and can reach 24 m of length, although usually less, and generally branches to form a broad tree. Growth is in frequent flushes during warm weather in southern regions with only one long flush a year in cooler areas.

Foliage

Avocado leaves are alternate, glossy, elliptic and dark green with paler veins. They normally remain on the tree for 2 to 3 years. The leaves of West Indian varieties are scentless, while Guatemalan types are rarely anise-scented and have medicinal uses. The leaves of Mexican types have a pronounced anise scent when crushed. The leaves are high in oils and slow to compost and may collect in mounds beneath the trees.

Flowers

Avocado flowers appear in January to March before the first seasonal growth, in terminal panicles of 200 to 300 small yellow-green blooms. Each panicle will produce only one to three fruits. The flowers are perfect, but are either receptive to pollen in the morning or shed pollen the following afternoon (type A), or are receptive to pollen in the afternoon, and shed pollen the following morning (type B). About 5% of flowers are defective in form and sterile. Production is best with cross-pollination between types A and B. The flowers attract bees and hoverflies and pollination is usually good, except during cool weather. Off-season blooms may appear during the year and often set fruit. Some cultivars bloom and set fruit in alternate years.

Fruit

Guatemalan types produce medium, ovoid or pear-shaped pebbled green fruit that turn blackish green when ripe. The fruit of Mexican



varieties is small (170 g) with paper-thin skins that turn glossy green or black when ripe. The flesh of avocados is deep green near the skin, becoming yellowish nearer the single large, inedible ovoid seed. The flesh is hard when harvested but softens to a buttery texture later on. Wind-caused abrasion can scar the skin, forming cracks which extend into the flesh. "Cukes" are seedless, pickle shaped fruit.

Off-season fruit should not be harvested with the main crop, but left on the tree to mature. Seeds may sprout within an avocado when it is over matured, causing internal moulds and breakdown. High in mono-saturates, the oil content of avocados is second only to olives among fruit, and sometimes greater. Clinical feeding studies in humans have shown that avocado oil can reduce blood cholesterol.

Climatic Requirements

From climatological point of view, the best areas for commercial avocado production are therefore the cool, subtropical parts of Mpumalanga and KwaZulu-Natal situated at an altitude of 825 to 1 250 m, where the rainfall is fairly high and mist frequently occurs.

Temperature

Commercial avocado cultivars are best suited to cool, subtropical conditions with average daily temperatures between 20 and 25 °C. Light frost can be tolerated but not during flowering and fruit set (August to September). Average temperatures during flowering and fruit set should preferably be above 18 °C. The cultivars in increasing order of sensitivity to cold temperatures are: Edranol, Hass, Pinkerton, Fuerte and Ryan. For Fuerte, the daily mean temperature during flowering should preferably be above 18.5 °C, but definitely above 13 °C.

Rainfall

All avocado cultivars that are grown commercially in South Africa are known to be sensitive to water stress. A well distributed rainfall in excess of 1000 mm p.a. is desirable, although most avocado production regions experience a dry period during flowering. In the vast majority of cases, therefore, supplementary irrigation during this period is essential.

Humidity

High humidity is desirable, as it decreases stress conditions, (particularly high temperature) especially during flowering and fruit set. However, humidity at this time is usually at its lowest, indicating the need for irrigation at this time.

Cultivation Practices

Planting

Spacing is determined by the habit of the cultivar and the character of the soil. In light soil, 7.5 x 7.5 m may be sufficient. In deep, rich soil, the tree makes its maximum growth and a spacing of 9.1 or 10.7 m may be necessary.

If trees are planted so close that they will ultimately touch one other, the branches will die back. Some growers plant 3 to 4,5 m apart initially and remove every other tree at 7 to 8 years of age. If the surplus trees are not bulldozed but just cut down leaving a stump, application of herbicide may be needed to prevent re-growth. Ammonium sulphamate has been proven to be effective. In modernized plantings, space between rows is necessary for mechanical operations.

Holes at least 0,6 m deep and wide are prepared well in advance with enriched soil formed into a mound. After the young plant is put into place mulch is beneficial, weeds should be controlled, and watering is necessary until the roots are well established. Keeping the upper soil moist has been greatly facilitated by drip irrigation, which also may carry 80% of the fertilizer requirement.

Fertilization

Commence feeding of young trees after one year of growth, using a balanced fertilizer, four times a year. Older trees benefit from feeding with nitrogenous fertilizer applied in late winter and early summer. Generally, small quantities of fertilizer are given every 2 months with the quantity gradually increasing until fruiting begins. Bearing trees need, on the average, 1.5 to 2 kg three times a year, beginning when the tree is making vegetal growth. No fertilizer should be given at blooming time; one must wait until the fruit is firmly set. Nitrogen has the greatest influence on tree growth, its resistance to cold temperatures, and on fruit size and yield. Fertilizer mixtures vary greatly with the type of soil. Mineral deficiencies determined by leaf analysis, are usually remedied by foliar spraying. Yellowed leaves (chlorosis) indicate iron deficiency. This can usually be corrected by a chelated foliar spray of trace elements containing Iron. Mature trees often also show a Zinc deficiency.

Irrigation

Avocado trees may not need irrigation during the winter rainy season, but watch for prolonged midwinter dry spells. Over irrigation can induce root rot which is the most common cause of avocado failure. If it is moist, do not irrigate If it crumbles in

the hand, it may be watered. Watch soil moisture carefully at the end of the irrigating season. Never enter winter with wet soil. Avocados tolerate some salts, though they will show leaf tip burn and stunting of leaves. Deep irrigation will leach salt accumulation.

Pests and Diseases

Rats and squirrels will strip the fruit. Protect with tin trunk wraps. Leaf rolling caterpillars (*Tortrix* and *Amorbia*) may destroy branch terminals. Avocado brown mite can be controlled by powdered sulphur. Six-spotted mite is very harmful; even a small population can cause large scale leaf shedding. A miticide may be required if natural predators are absent.

Harvesting

Avocados will not ripe while they are still attached to the tree. As long as the fruit is on the tree, it remains hard. It becomes soft and edible only after it has been picked. Mature fruit ripen evenly. The edible part acquires a smooth, buttery texture and the peel shows no sign of shriveling. Immature fruit, that is the fruit picked too early, will not ripen properly and the skin will eventually become shriveled. The fruit that is regarded matured is the largest fruit on the tree and is picked first. If picked when fully grown and firm, avocados will ripen in 1 to 2 weeks at room temperature. If allowed to remain too long on the tree, the fruit may be blown down by wind and will be bruised or broken open by the fall.

Post Harvest Handling

Fruit should be taken one by one from the picking bag by hand and placed into the trays. Transport to the pack house must be undertaken with special care. The trays containing fruit and waiting for transport to the shed should be kept in the shade under the trees and if there is not enough shade, it should be covered with empty trays. Do not spread a tarpaulin over the trays. This would hamper ventilation and might cause the temperature underneath it to rise. The harvested fruit should be removed from the orchard as soon as possible. It is important to pack and dispatch the fruit to the market, or to place it in cold storage, on the day it is harvested.

Grading and Packing

During grading and packing, it is necessary to take precautions against bruising. All persons handling the fruit must wear gloves. The tables



on which the fruit is placed must be clean and smooth. Each fruit stem must be cut back with a knife to a length of 6 to 12 mm. At the same time the fruit is graded for export according to appearance. The avocados are suitable for export if they are virtually free of blemishes and have a regular shape. Avocados suitable for export are transferred to a different table. The avocados are then treated with a suitable post-harvest fungicide and after waxing, are packed with cellophane into a suitable box.

Avocado Production in Pakistan

In Pakistan, avocado is produced locally at Chhara pani (Marree) and the varieties grown are: i) California and ii) Seloan. This subtropical species needs a climate without frost and not too much wind. The plantlets of Avocado should be protected from frost for 3 years and soil in which it is grown should have good drainage system. California variety is planted in Zaed Khareef season and give fruit in August and the Seloan variety is planted in Khareef season and give fruit in October/November.

References

- Durand, B.J., 1971. Introduction to avocado growing in South Africa: Institute for subtropical and tropical crops.*
Malan, E.F. & Van der Meulen, a., Loest, F.C. & Stofberg F.J. Avocado culture in South Africa, bulletin no. 342.
Morgan, J.1987. Avocado.pp 91-102. In fruit of warm climate.
Morton, Julia. F. Morton, Miami, F.L.Schoeman, A.S. 2002. A guide to garden pests and diseases in south africa: struik publishers.P.110.

CELERY FARMING

Introduction

Celery is a cool-season crop half-hardy to frost and light freezes. Celery has a fairly long growing season, and has little tolerance for temperatures that are either too high or too low. It will not tolerate heat and can be hard to transplant. Summer crops in the north and winter crops in the south make celery a year-round producer. It is tricky to grow, some might say, the trickiest of all. Most gardeners grow celery purely for the challenge it presents in growing some in your back yard. All the work is worth it when you harvest crunchy, green stalks. Celery can be grown anywhere with a long/steady cool growing season with sufficient rainfall and moderate climate.



There are two basic types of celery: 1) Self-blanching and 2) Blanching. Self Blanching varieties are much easier to grow, as they can be grown in flat soil without trenches. Their harvest, however, is earlier and more limited.

For celery that needs blanching, (i) plant in the center of 18" wide trenches, (ii) remove suckers mid-season and wrap each stalk bunches with brown paper, newspaper, or cardboard to prevent soil from getting between the stalks, (iii) fill the trench with soil up to the bottom of the leaves 2 months before the harvest, and (iv) keep mounding the soil around the base of the plant every 3 weeks. Make sure the mound is sloped to help drainage.

Some consumers and gardeners prefer blanched celery. For those who want to experiment, select a few plants then wrap them from top to bottom with heavy paper, perhaps a brown paper bag from the grocery store cut to shape, and tied loosely with string. Only the top leaves should be allowed to shoot. Blanching should be done about 2 weeks before harvest. The resulting stalks will be markedly lighter in color (almost white) and are said to be sweeter and more tender after blanching.

Suitable Soil

More than climate, the soil quality will determine whether it is practical to grow celery. Farmers used to consider river-bottom muck soils "celery soil". That is what celery needs. Highly fertile soil well enriched with compost, well-rotted manure, and peat moss. The crop needs moisture consistently, as well as high quantities of nutrients for fast growth.

Planting Celery

Celery seed is usually started indoors about 10 weeks before it is time to set the plants outdoors - that is, after the soil is warm and the air temperature settled. The seed is minute and finicky, and is started in much the same manner as African violet seed, in closed containers to keep seedlings moist. Soak seeds overnight to help germination. A simpler method is to buy transplants. Transplant seedlings outside when they are 4-6 inches tall and night temperatures don't fall below 4.4 °C. Water plants before they are transplanted. Some gardeners who have a long frost-free autumn season can seed a late winter crop directly.

Care during Planting

Following things should be taken care of while planting the celery

- Celery is a heavy feeder. It also requires lots of water. Make sure to provide plenty of water during the entire growing season, especially during hot, dry weather.
- If celery does not get enough water, the stalks will be dry, and small.
- Add plenty of compost and mulch around the plants to retain moisture.
- Fertilize regularly.
- Add mulch as needed, to help retain soil moisture and add nutrients.
- Tie growing celery stalks together to keep them from sprawling.

Planting Celery in the Garden

Once the temperatures outside are consistently above 10 °C, you can plant your celery into your garden. Remember that celery is very temperature sensitive, so don't plant it out too early or you will kill or weaken the celery plant. Unless you live in a location that is ideal to grow celery plants, plant your celery where it will get six hours of sun, but preferably somewhere that the celery plant will be shaded for the hottest part of the day. Also, make sure that where you will be growing celery has rich soil. Celery needs lots of nutrients to grow well.



Cultivating Celery

When seedlings are set out they need a quick start, which is usually provided by watering the plants with a water-soluble, high-nitrogen fertilizer. Since the plants have fine, almost hair-like roots, use a heavy mulch to keep down weeds.

Harvesting and Storage

Celery should be ready for harvest approximately 3 months after transplants are set out; 4 months from the day the seed was started. Cut plants at the base, just beneath the crown, with a sharp knife and remove some of the outer leaves. Celery will easily keep for several weeks if stored in a cool, dark place. It will keep well in the refrigerator if cut up and covered in water. Celery will tolerate a light frost, but not consecutive frosts. The darker the stalks become, the more nutrients they will contain. Texture changes with color, dark green stalks will be tougher.



Celery Cultivation at ZTBL Farm

Cultivation of celery at ZTBL Farm, Islamabad takes place in winter season. It's nursery transplantation takes place at the start of September and ready to be harvest in the month of January. The variety which is being cultivated is called as "Green Leaf", because the leaves when mature turn out to be green in color. Another variety is called "Yellow leaf", as the leaves turns out to be yellow when get mature.

Health Benefits of Celery

Its health benefits include the following:

Reduced Blood Pressure Celery contains pthalides, which are organic chemical compounds that can lower the level of stress hormones in your blood. When blood pressure is reduced, it puts less stress on the entire cardiovascular system, and reduces the chances of developing atherosclerosis, or suffering from a heart attack or a stroke.

Reduced Cholesterol Eating celery every day may reduce artery-clogging cholesterol (called LDL or "bad" cholesterol). The pthalides in this herb also stimulates the secretion of bile juices, which works to reduce cholesterol levels. Less cholesterol means less plaque on the artery walls and a general improvement in heart health. The fiber that is found in celery also works to scrape the cholesterol out of the bloodstream and eliminate it from the body with regular bowel movements, further boosting cardiovascular health.

Antiseptic Celery seeds help in the elimination of uric acid because it is commonly used for its diuretic properties, meaning that it stimulates urination. Therefore, celery is good for people with bladder disorders, kidney problems, cystitis, and other similar conditions. Celery seeds also assist in preventing urinary tract infections in women.

Healthy Joints Celery is great for people suffering from arthritis, rheumatism and gout. It had anti-inflammatory properties that help to reduce swelling and pain around the joints. Celery sticks also act as a diuretic, which helps to remove uric acid crystals that build up around the body's joints that can add to the pain and discomfort of frequent joint use. It can also increase the re-growth of tissue in inflamed joints.

Prevents Cancer Celery contains pthalides, flavonoids, and polyacetylenes. These cancer-fighting components detoxify carcinogens. Celery also contains coumarins that enhance the activity of certain white blood cells, which can effectively stave off cancer as well. These antioxidant components seek out free radicals floating in the body and damaging

organs and neutralize them before they can result in the development of serious conditions like cancer.

Improved Immune System Celery is rich in vitamin C, which greatly boosts the strength of the immune system. Stimulated by the activity of other antioxidants in celery, it becomes more active and efficient. Because of the high content of vitamin C in celery, eating it regularly can reduce your risk of catching the common cold, as well as protecting you against a variety of other diseases.

Reduces Asthma Symptoms Vitamin-C prevents free radical damage and it also has anti-inflammatory properties that lessen the severity of inflammatory conditions like asthma.

Cardiovascular Health The notable presence of vitamin C, fiber, and other organic chemicals in the roots of celery promotes cardiovascular health.

Diuretic Activity Celery is rich in both sodium and potassium, and both of these minerals help to regulate the fluid balance in the body. Potassium also acts as a vasodilator, reducing blood pressure.

Relief from Migraines The presence of coumarins can provide relief from migraines. The exact mechanism isn't completely understood, but research points to a suppression of Nitric Oxide release in the brain which can cause headaches and migraines.

Diabetes Health Celery leaves are also eaten for treating diabetic conditions, particularly because they are high in fiber, which has been shown to help manage diabetic symptoms.

Relief from Ophthalmological Diseases Dripping celery tea drops on eyelids is good for certain ophthalmological conditions, and can improve your eye health, reduce your chances of developing cataracts, and protects you against macular degeneration.

Nerve Calming Properties Celery contains high calcium and due to this it is commonly used to calm the nerves.

Weight Loss Health benefits of celery include weight management. Regular drinking of celery juice before meals may help you to reduce your weight. This is because celery is very low in calories, but it is very filling because of the fiber content. Therefore, it can help reduce the tendency to overeat and help you keep the weight down without feeling hungry all the time!

References

<https://www.gardeningknowhow.com/edible/vegetables/celery/tip-9-steps-to-grow-celery.htm>

MANAGEMENT TIPS

CEOs rank culture as top priority for success

Culture is in front and center for leaders who want to increase performance and strategic alignment in 2017. “Culture is the X-factor,” said Noah Rabinowitz, senior partner and global head of Hay Group’s Leadership Development Practice. “It’s the invisible glue that holds an organization together and ultimately makes the difference between whether an organization is able to succeed in the market or not.” These are the findings of an extensive global study by the Hay Group division of Korn Ferry, which found that ‘driving culture change’ ranks among the top three global leadership development priorities, and suggests that leaders need to make culture change a more significant aspect of their development programs and overall leadership agenda.

Source: Michelle M. Smith, <http://blog.octanner.com/>

How to improve email open rates

An email marketing company, Campaigner (<http://campaigner.com/>), enumerated six (6) tips on getting your marketing emails opened.

Write to one person

An email is more likely to be opened and engaged with if it sounds like it’s been written directly to that specific subscriber. Personalize your copy and write as if you were writing to one person alone. This tactic will engage your readers and keep them opening your message in the future.

➤ **Slim down your subject line**

Make sure your subject lines under 30 characters. If your subjects line are too long, they will appear truncated since the average mobile screen can only fit four to seven words max.

➤ **Adjust your send frequency**

If you are overwhelming your customers with emails, they will delete your messages before opening the email. Test your list to determine how subscribers interact with your brand. Once you have collected the data you’ll be able to increase or decrease the frequency of your email messages based on customer interaction.

➤ **Standout with numbers**

Using numbers in your subject line can create urgency and can draw the eyes. Number will highlight your offer and compel your subscribers to open the email in a cluttered inbox.

➤ **Personalized your subject line.**

Adding personalization to your subject lines is another good way to make your emails standout. If you don’t want to use a subscriber’s first name in the subject line, you can use informal words (like you, your) that will make your customer feel special.



➤ **Segment on past purchases.**

Segmenting your contact lists based on your customer’s purchase history, makes your customer feel like you are paying attention to them and only them. Catering emails to fit your customer’s needs is a sure way to help boost your open rates.



Source: Laura Forer, Manager of Marketing Profs: Made to Order, Original Content Services (<https://www.marketingprofs.com>)

Culture is the Lifeblood of an Organization

Culture reflects the values, beliefs, and behaviors that determine how employees perform and interact with each other every day. Leadership development can play a vital role in helping to accelerate, reinforce and sustain culture, and culture is definitely born in the executive suite – when leaders change their behaviors, others do too. It’s leaders who need to define the culture, communicate it to all organizational levels, and act and behave in ways that reflect and reinforce their desired outcomes. Arvinder Dhesi, a Hay Group senior client partner, stated “we believe that talent, leadership and culture are intrinsically linked, and they are crucial to strategic execution. It’s a mistake for leaders to believe that culture is somehow separate from themselves or a separate project. Everything that leaders do contributes to the culture. There’s no cultureneutral behavior.”



Source: <http://betterboards.net/>

NATIONAL NEWS

Vegetable Growth Plan Finalized

Punjab government has finalised necessary arrangements for plan for launching "Vegetable Growth" in Punjab shortly. Sources in Agriculture department told *Business Recorder* here Sunday that the basic concept of this proposed programme was to provide fresh and quality vegetables to the consumers on reasonable rates.

The plan will be to enable the growers and brokers to earn suitable profit which will be supportive in improving the economic conditions of growers and brokers. Special steps would also be taken for improving the existing marketing system for resolving the problems. Under this programme, efforts will also be made for improving packing and grading system according to international standard.

Plan for Olive Oil Cultivation Chalked Out

Punjab government has chalked out a well-knitted-five-year plan for the promotion of Olive crop in the province. Under this plan, special attention will be accorded on scientific cultivation of olive crop for attaining yielding results.

The government will provide free of cost 2 million plants to the selected growers of Jhelum, Rawalpindi, Attock, Chakwal and Khushab.

Olive orchard cultivation throughout these potential areas of Punjab could produce much quantity of oil, which may certainly bring Pakistan's olive oil import share to zero.

According to the experts, the prevailing environment, in Sialkot, Narowal and Gujrat areas are exactly according to olive cultivation requirements and Punjab Agriculture department should consider these areas for cultivation of olive crop.

Current Rain Spell for Rabi Crops

The current rain spell has not created any issue for the Rabi crops, especially wheat and grams, as it has fulfilled the shortage of water being experienced in some parts of the province. Nevertheless, it may cause problems if the situation prolongs.

Director General Agriculture (Extension & AR) Dr Anjum Ali Buttar scribe said that the department was watching the crop situation, especially keeping in view the current rain spell and forecast issued by the Pakistan Meteorological Office that 3-4 weather systems are likely to pass across the country in the month of March which may result into slightly above-normal rainfall over upper KP, GB, AJK, Northern

parts of Punjab and normal rainfall in rest of the country.

He said if the temperature falls below normal during March it may cause more damage to gram crop as cooler nights are not good for its growth. It is pertinent to add that wheat had been sown over an area of 16.6 million acres of land in the province against the target of 16.9 million acres while grams had been sown over an area of 2.15 million acres against the target of 2.4 million acres. Wheat Growers Association Chairman Chaudhry Hamid Malhi said these rains were welcoming as lower temperature would help wheat grains get more weight

KP Government Urged To Open Milk And Meat Farms

Livestock farmers have urged Khyber Pakhtunkhwa government to open milk and meat farms and facilitate local people because they were facing shortage of quality in the province. This suggestion was given by the newly elected office bearers of Livestock Association KP at a press conference at Peshawar Press Club on Monday wherein farmers belonging to various parts of the province shared views.

The association provincial President Muhammad Asif Awan said that provincial government was least bothered to initiate serious work on dairy development and thus most of the animals farms run under milk & meat project were closed some five years ago and no steps afterwards taken to reopen them.

Pakistan to Join Hybrid Rice Seed Exporting Countries

Pakistan will join the hybrid rice seed exporting countries club in the year 2018 as a local agricultural seed production company has struck a deal with a Philippines company. "We are increasing our area under cultivation for production of hybrid seeds and hopefully we will be able to export 50 metric tons of hybrid seed to Philippines by next year," said Shahrukh Malik, Executive Seed Division of the Guard Agricultural Research and Services Private (Limited) while talking to a selected group of journalists on Thursday.

Rice Exporters Association of Pakistan (REAP) Senior Vice Chairman Shahjahan Malik and Head of the Company Shahzad Ali Malik were also present on this occasion. Shahrukh said they had already increased their area under production to 900 acres to meet both national and international demand.

ZTBL NEWS**Visit of Swiss Delegation at ZTBL**

A Swiss delegation from Blue Orchard Limited comprising of Mr. Thibaud Poncho (Investment Officer), Mr. Ernesto Coster (Co head private Equity) visited Zarai Taraqati Bank Limited, Head Office, Islamabad. The



delegation was accompanied by Mr. Ihsan-ul-Haq Qureshi (CEO- Asia Insurance) and Mr. Muhammad Ali Raza (CFO-Asia Insurance) along with Mr. Khawaja Suhail Ifitikhar (Director- Asia Insurance). The delegation deliberated upon various insurance profiles in agriculture financing and role of ZTBL for arranging Insurance for crop and livestock. Mr. Farhat Karim Hashmi, EVP (Planning, Research & Technology Division) briefed the delegation about crop and livestock insurance scheme of Zarai Taraqati Bank Limited. The delegation showed keen interest in the insurance program of the Bank.

ZTBL Arranged Free Medical Camp for Employees

ZTBL has always been providing its employees with enough incentives to maximize their productivity and to boost their morale.



In order to address needs of the employees, Medical

Services Department of the Bank arranged a free medical camp in collaboration with M/s Chughtai Labs at ZTBL, Head office, Islamabad.

The event was cordially inaugurated by Honorable President of the Bank, Syed Talat Mahmood, where free medical aids were provided and different health tests were conducted for all the employees of the Bank to ensure their good health.

Holding of an International Seminar

ADIFIMI-WB-ZTBL has jointly arranged a regional seminar on "Financial Inclusion Strategies in South Asia: Methodology and Perspectives". This seminar will be hosted by ZTBL on 28th and 29th March 2017 at Marriot Hotel in Islamabad where spokesperson from different countries of the region will present their country's strategy on financial inclusion. The event envisage to create awareness of the importance of financial inclusion, to review state of financial inclusion in South Asia and study good practices in Conventional and Islamic Microfinance and Micro Takaful application in South Asia Region.

Study Tour of Agriculture Training Institute, Peshawar

A group of 35 students from Agriculture Training Institute (ATI), Peshawar along with faculty members visited Zarai Taraqati Bank Limited (ZTBL) Farm, Islamabad. The guests were welcomed and briefed by SVP (Agriculture Technology Department) on various agricultural technologies, value addition and lending process of ZTBL. The students of Institute took keen interest in various machineries/technology items placed in Agri Tech Expo Hall of ZTBL Farm.

The Head of delegation, Mr. Fazal-i-Wahab, appreciated the efforts of ZTBL in development and promotion of the agriculture sector. He also added that such model farm can play a vital role in updating knowledge of students. The honorable guests thanked Agriculture Technology Department (ATD) administration for facilitation and assured to strengthen such mutual cooperation leading towards technology dissemination and agriculture development.

Editorial Board

Mr. Farhat Karim Hashmi, EVP (PR & TD)
Mr. Muhammad Rashid, SVP (P & RD)
Miss. Abida Razaq, VP (P&RD)
Editor: Ms. Amna Javaid, OG-I (P&RD)

Mr. Waheed Ahmad Khan, EVP (CD)
Mr. Muhammad Ikram-ul-Haq, SVP (ATD)
Mrs. Iqra Hammad, OG-III (P&RD)
Mr. Ahmed Hussain Khan, OG-III (P&RD)

Planning & Research Department, ZTBL Head Office, Islamabad. Ph: 051-9252024

Technology for Agriculture