

for many years. The fruit is sold through a roadside stand built by the owners mainly for marketing this fruit. Small plantings of Cavendish may be found throughout the area. Lady Fingers may be found around Apopka and Horse bananas in the Winter Park and Maitland areas as well as in other protected locations on the moister soils of Central Florida.

Loquats—Loquats are popular trees in Central Florida and may be found in dooryards and gardens throughout the area. They stand most of the winters here very well and are not uncommon even in the Ocala area. Fruit quality is quite variable because most trees in the area are seedlings.

Surinam cherry—Surinam cherry does well in the area and is widely planted as an ornamental hedge. The plant is quite resistant to cold. The fruit, which is eaten out of hand or made into jellies and sherbets, is of variable quality because of seedling variation.

Mysore—The Mysore or tropical black raspberry, is only now being planted in Central Florida. To my knowledge there are no plantings old enough upon which we could base an opinion as to its cold tolerance, fruiting habits or other characteristics in the area. Several young plantings have been made in the Orlando area.

White Sapotes—White Sapotes may be found here and there throughout Central Florida. A peculiar leaf pattern, similar to what might be caused by a mineral deficiency of some sort, mars the appearance of trees in many locations. Specimens of the woolly-leaved white sapote, which is similar to the common white sapote except in foliage, has not been observed to exhibit this foliage symptom. It produces somewhat larger fruit than the common sapote.

Sugar Apple—The sugar apple is not widely grown in Central Florida, although specimens can be found here and there. I know of several trees in a planting at Eustis that have

been fruiting for over ten years. They are growing in an area protected by a large lake and a good slope. Sugar apples are the only members of the Annona group that I know of in the area.

Pomegranate—Pomegranate trees may be found in rather widely scattered parts of Central Florida. The trees usually fruit quite well in this part of the State, although the fruit is subject to fungal attack unless sprayed with bordeaux. Pomegranate is grown only to a very limited extent.

Feijoa—Feijoa, or Pineapple Guava, is more widely grown in Central Florida as an ornamental than as fruit tree. It tolerates low temperatures and produces a fruit of good quality which is used much like that of the common guava. Some trees bloom well but fail to fruit. This is thought to be due to faulty pollination.

Canistel—Canistel, or Egg-fruit (so called because the fruit resembles an egg yolk) is not widely grown in Central Florida. There is a tree on the USDA Subtropical Fruit Experiment Station at Orlando. No doubt the tree could be grown more generally in the better protected locations of the area.

Downey Myrtle—Downey Myrtle or Hill Gooseberry is rather widely grown in Central Florida. The fruit makes good pies and jams. The bush is used as an attractive ornamental in dooryard plantings in Central Florida.

Jaboticaba—The jaboticaba is a low tree producing a grape like fruit and which may be found growing to a very limited extent in Central Florida. Trees are fruiting at Orlando and this plant probably deserves wider use in the entire area in protected places. They apparently have about the same temperature limitations as the lychee.

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SUB-TROPICAL FRUIT INDUSTRY IN EGYPT

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Grapes, dates, pomegranates, apricots, olives, and figs have been well-known fruits

since the Pharaohs. The tide of such industry has been closely associated with nation's stability and prosperity. From 1920 to 1933 the industry developed commercially from 35,000 to 53,000 acres and reached 98,000 in 1949. The acreages and distribution through-

out the country of the most important fruits are shown in the following table.

The three sections are not closely alike in their climatic features; a condition which has deeply influenced the distribution of different fruit trees all over the country. The first section "Lower Egypt" represented by the city

Dry varieties of dates require a large amount of heat to ripen which can hardly be fulfilled outside Upper Egypt, the Oases, and the Sudan. The well-known varieties are El-Abrimy, El-Gondela, and El Shamia.

The most important Iraquian soft varieties, Halawy, El Khadrawy, and the semi-dry date

Section	Citrus	Grapes	Figs	Guavas	Apricots	Mangos	Bananas	Olives	Plums	Apples	Peaches	Pomegranates	Custard Apple	Pears	Miscel.
Lower Egypt	38,746	13,742	1,904	1,832	744	5,537	5,732	179	183	36	822	77	87	249	1,288
Middle Egypt	10,549	1,702	546	371	700	2,339	1,312	1,005	84	342	106	1,212	33	51	2,079
Upper Egypt	2,135	1,071	113	80	7	113	62	45	—	53	137	472	—	—	663
Totals	51,430	16,515	2,563	2,283	1,451	7,989	7,106	1,229	267	431	1,065	1,761	120	300	4,030
Total—98,560 Acres*															

* Date Palm acreages are not included. About five million trees are in Egypt.

of Alexandria, has a mean maximum temperature, from May to October of 83.8° F. and a mean minimum winter temperature of 51.1° F., with a rain fall average of 7.24 inches a year. The second section "Middle Egypt" is represented by Cairo with a maximum temperature average of 92.7° F. and a minimum average of 45.7° F., and rain fall average of only 1.02 inches a year. Dakhla oasis represents the third section "Upper Egypt" with the highest maximum average of 99.4° F., the lowest minimum of 40.6° F., and the poorest rainfall average of 0.04 inches a year.

Characteristics of the most important fruits, excluding the citrus, will follow.

The date palm grows successfully in any arable land from Alexandria to Asswan and extends to Kartum on the River Nile. In the first section, the summation of maximum daily temperatures, above 65° F., from just before blossoming to complete maturation will not exceed 2100° F. units mostly. This condition suits the soft date varieties such as El-Hayany, Bint Isha, El-Amhat, Samani, and Zaglol. However, the last two have their best flavor when grown along the Mediterranean coast.

Semi-dry dates are common in the eastern side of the Delta in its sandy soils which are characterized by its low relative humidity. Among the well known varieties are El-Amry and El Aglany. The former has been exported successfully to the European markets for several years. The latter is mainly considered for local consumption. El Sewi (Saidy) is the most important soft variety in the second section.

Deglet Noor, were imported and planted in the second and third sections but they have not been able to extend commercially.

Such a plant with its wide capability of success under such a wide range of soils and climatic conditions, accompanied by its heavy production of a popular fruit, has bright chances.

In 1825, several budded mango trees, imported from Bombay, established the mango industry. Since then, it has been spreading in the first section mostly in loamy or sandy well-drained soils.

Young mangos, either in the nursery or in the grove, require protection during cold winter nights and hot dry summer days. However, a mature tree does not require any protection.

Most mango varieties are of Indian origin. Of the nucellar seedling varieties Hindi Bicennara and Long are well-known for shipping while the late ones Zibdah and Misk are mainly for local consumption. Among the grafted varieties Dabsha and Mabroka are fit for shipping while Alphonse and Pairi are consumed locally. Actually, there are dozens of different varieties in mango groves.

From Java the varieties Golk, Aromance. Sigarist, Malangi, and Mado were imported and they are still in the experimental stage.

The mango tree does not grow successfully, in the open, in the Mediterranean countries except Egypt. Such a fact may bring up better chances in the near future. However, the long time required for the tree to reach full bearing and the expensive cost of the land, ac-

accompanied by the numerous varieties which confuse the consumer everywhere, are the main objections for mango growing industry.

The Bananas have been in the country for a long time. Mostly, they are of the dwarf variety, Cavendish, but some Gros Michel bananas are grown around Alexandria. A well-drained loamy soil is considered the best for bananas.

Its industry was built, mainly, for internal consumption. In reality, it cannot match the other nations' industry in the international market. However, the industry is booming because of high tariff protection and the internal demand for bananas.

The olive trees are mostly in middle Egypt, the Oases, and along the Mediterranean coast from Alexandria to Lybia. Generally, the old varieties are poor in their oil percentages and they are incapable of meeting pickling requirements.

Cuccos, Ascolano and El-Shehlali were imported because of their high oil contents. Mission, Manzanillo, Frantoio, and Sevillano were imported for building a pickling industry. The most remarkable success among all these importations has been that of the Shehlali. When it is planted along the coast its oil content will be from 20 to 25% and of good quality, but in interior areas both its oil percentage and its quality are low.

The figs with their numerous varieties are scattered all over the country. In the third section Abiad Asswan, El Abbody, and El-Sultany thrive. In the delta, El Addsy and El Abbody are the most successful varieties. El-Fayom Province grows El Sultany mostly. None of these varieties require pollination for fruit setting and all are used for fresh consumption.

Some new varieties were imported such as Mission, Adriatic, Kadota, White Geneo, Sidi Gama, and Smyrna figs. All these have established themselves at the experimental stage in lower Egypt except Smyrna figs, these were incapable of fruit setting without caprification, and the Blastophago wasp has failed to reproduce under Egyptian conditions.

Solid plantations of pomegranate trees are mostly in Middle Egypt, where it can meet its requirements of warm dry climate and deep loamy soil. The most important varieties are El-Banaty, El-Araby, El-Mallisy, and El-Manphaloty. While popular with the natives, very

few Europeans care for it, and consequently, its industry has limited chances.

The guava reached Egypt in 1830 through India. Since then, it has been a popular fruit for fresh consumption mainly. Numerous varieties have been developed through seed reproduction. Selected varieties, budded or veneer grafted, began to invade guava groves recently. From India, a seedless variety was imported and has become well known.

It grows in almost any arable land and it thrives under a wide range of relative humidity. However, its best flavor is found in dry climate areas.

The sugar-apple has hardly been successful because of its very poor fruit setting. Recently, the trouble was identified as lack of pollination. Through carrying out artificial pollination a considerable improvement has been noticed and thinning may be required. Moreover, the fruit will gain better shape.

The cherimoya, another species of the Annonaceae family, has less opportunities for extension. Along the Mediterranean coast, both the cherimoya and the Finney (a hybrid) grow successfully on sugar-apple rootstocks. Very poor growth has been noticed in the interior valley.

The Sycamore fig, El-Gemmeze "*Ficus Sycamorus*" is an old well-known tree. It is an evergreen with spreading branches and fig-like leaves. Its spurs are efficient in bearing fruits for several years. The fruit, much like the common fig, has a long ripening season (From April to Oct.).

For good setting, the tree requires annual ringing. A primitive practice has been carried out to meet such a requirement for several thousands of years. Like the Smyrna fig, it cannot set fruit without the aid of a certain wasp, *Sycophaga crassipes*. It lays its eggs in the ovaries. The stimulus causes a fluid to flow which fills almost one fourth of the fruit cavity. Just before the young wasps' migration, the fluid will be absorbed by the fruit wall.

If such wasps were prevented from carrying out this practice, the fruitlet would shrink and drop. The nature of such a stimulative action has not been studied. In addition to the wasp stimulation the fruit should be scratched to be edible. Usually, this is done with a sharp knife four or five days before maturation. That practice helps the fluid to dry rapidly to form a solid black layer which

prevents any further oviposition. Moreover, the sugar content increases within a few days.

In addition to its seedless popular fruits, it furnishes a good shade and its lumber stands water decay efficiently. Stem cuttings are the common method for its propagation.

Several tropical and sub-tropical fruit-trees grow well in the experiment stations of the second and third sections, but they are not known commercially such as the oriental persimmon *Diospyros kaki*, feijoa, pine-apple, sapodilla, white sapote, carissa, avocado, pecan, tamarind, and loquat.

Excluding the grapes, the deciduous fruits of the temperate zone such as apples, pears, plums, cherries, etc. have little chance for any further extension. In reality, the future of the Egyptian fruit industry is mainly in the sub-tropical fruits.

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HIGH HUMIDITY TREATMENT FOR AIR LAYERS OF LYCHEE

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Considerable progress has been made in the last few years by horticulturists in the propagation of plants by cuttings through the use of various types of water spray nozzles for maintaining a high humidity environment around the exposed portion of the cutting during the rooting process. This makes possible the retention of most of the leaves on the cutting and probably allows for some carbohydrate and hormone synthesis. It is very unlikely that photosynthesis in cuttings is able to proceed to a great extent without the intake of other nutrients in addition to CO_2 and water. However, apparently photosynthesis takes place to a sufficient extent for the stimulation of root production.

Extensive work has been reported from Trinidad by Evans (1951) on the rooting of cacao cuttings in open beds under constant water spraying and the subsequent hardening-off of the potted plants in a high humidity environment. Evans states that the rooting procedure was first attempted at the Imperial College of Tropical Agriculture, Trinidad, by Spencer (1936). Philbis continued this work in Trinidad (1949) and Bowman in Costa Rica (1948) also attempted to use this method. Rooting apparently was fairly successful but severe losses occurred in the attempts at hardening the rooted plants. Evans and Constable (1951) were successful in the hardening-off of cacao cuttings by use of sev-

eral means of maintaining near saturation of the atmosphere in the chambers where the plants were placed after potting. The high humidity was maintained until the root system had enlarged and was capable of balancing the transpiration requirements of the plant. After this phase was accomplished the young plants were gradually acclimatized to a less saturated atmosphere and finally to the growing area until the planting in the field.

Ochse (1949) and Ochse and Reark (1950) of the University of Miami reported successful rooting of several species of subtropical plants by the use of continuous water spray in open beds under full sunlight. They state that a rooting media providing good drainage should be used and as much leaf surface as possible should be left on the cutting for maximum photosynthetic effect. Dijkman (1950) of the University of Miami reported successful rooting of Haden mango leafbud cuttings under water spray.

Success in the hardening of air layers depends, almost to the same extent as that of cuttings, on a highly humid environment for preventing dehydration of the immature plant. At the time of removal from the parent tree the root system of the air layer is inadequate to perform the function of absorption at the rate needed to replace the moisture given off by the leaves. This necessitates either severe pruning back, or if leaves are retained, saturation of the air surrounding the leaves with moisture is necessary.

Trials at the University of Miami Experimental Farm with various kinds of nozzles indicated that many were inferior for providing