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PALESTINIAN PLANTS, THEIR BIOLOGY, DISEASES AND CRYPTOGAMIC INHABITANTS.

2. *Ficus sycomorus* L.

(entered 22.V. 1936).

1. NAME.

The Hebrew name of this tree is „Shikmah", plural „Shikmim" or „Shikmoth". It is mentioned quite often in the Old and New Testament and in other ancient Hebrew Scriptures, the Mishnah, Talmud, the different Medrashim etc.

I was unable to trace the origin of the Hebrew name, in Arabic there is a species of palm called „Shakam", the greek and latin names (sycomorus) resemble the Hebrew one, facts, which might possibly point at its ancienteness. The scientific name is *Ficus sycomorus* L. (*Sycomorus antiquorum* Gasp.). Its Arabic name in use in Palestine is „Djumeiz", a form which appears also in the Hebrew Mishnah as „Gimzioth", „Gamzuz", „Gamzaja" and alike. In the Arabic of other countries there appears also the Hebrew name „Shikmah" under different forms.

2. DISPERSION.

The original country of this tree is according to Warburg (1) the bordering regions of Abyssinia, but it became very early naturalized in the land of the Nile, where its illustrations are found as early as the fifth Dynasty B. C. It is now to be found in a large number of species all over Tropical

Africa and reaches as far as the Cape region. Many of those succeed even in the arid regions of Africa. It is to be found now all over the Semitic Orient. It came to our country in ancient times from Egypt and in the time of the Bible it was already very common here. It should be understood that we are here on its Northern border of dispersion, as it is not to be found in the Northern part of our country, nor in its mountains. In the Mishnah times it served as a distinguishing mark between moutains and valleys and wherever it grew was called valley. In the valleys it reaches as far as Zor, Zidon, Beyruth and Tripoli. It is to be found now in our country in alleys along the ancient roads, in small groups as well as single specimens within the different settlements or in their nearest vicinity; especially around Lud and in the Southern part of our country, where it is still planted to some extend by the Arabs; it is hoped that it will play a great part in the rebuilding of the South of Palestine. Part of the Rothshild avenue at Tel-Aviv was lately planted by this tree.

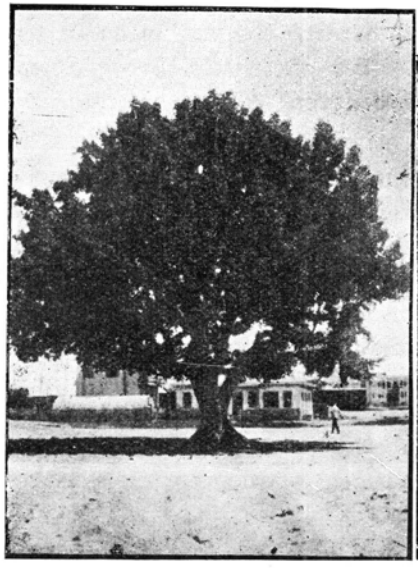

Fig. 18.

Ficus sycomorus L. at Tel-Aviv, Palestine.

Fig. 19.

Ficus sycomorus L. (the same as in figure 18) defoliated.

3. DESCRIPTION.

This extremely nice tree (fig. 18 and 19) has a mighty trunk branching low near the ground and giving rise to a large number of heavy limbs reaching out far from the tree and supporting a huge evergreen foliage dropping only in very seldom cases; it reaches the height of 12—15 meters and is 5—6 meters broad, in some cases even 10 or more. The trunk is of a gray brownish color, which turns a little green in the active period of the tree, the branches being at that time green altogether. Its bark pulls of in small pieces

Fig. 20.

Young leaves; natural size.

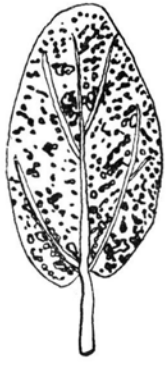

Fig. 21.

Fully developped leaf; natural size.

which are retained for some time at their place by a special kind of protuberances located at their inner side. The wood of the tree is of a fleshy pink, when wounded, an abundant flow of a white resin is obtained which hardens soon and turns dark brown. It is deep rooted and our ancients believed its roots to reach the waters of the abyss, sometimes they are laid bare if growing on moving sand dunes at a depth of some meters, the foliage of the trees themselves is markedly bent in such places to the East owing to the ravaging winds prevailing there.

The entire and ovate leaves of the plant (fig. 20 and 21) are alternate and petioled; red when young, glabrous except for their sparingly hirtulous nerves on the lower surface.

The flowers are inserted in special inflorescences which form fleshy, globular or pyriform hollow receptacles closed

all around except for a narrow open mouth at the apex; they grow out of special tortuous, leafless twigs on the trunk and older branches (fig. 22).

The receptacles are of three kinds according to their generations. The first generation, the *Profici* are to be found on the trees during August, September and October. The second generation, the *Mammae* (fig. 23) are to be found during

Fig. 22.
Fruiting branch; one half natural size.

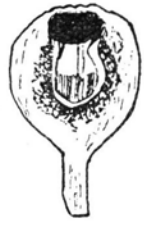

Fig. 23.
Longitudinal section of a Mammae fruit; natural size.

Fig. 24.
Longitudinal section of a Mammoni fruit; natural size.

November up to the first half of June, and the third one, the *Mammoni* (fig. 24) („Mustafot" in Hebrew) during the second half of June and July. In some cases there were observed large individual discrepancies among the different trees which amounted as much as some 30 days. The figs of the first two generations are full with degenerated pistillate flowers, the third one includes in addition to the fully developped pistillate flowers also some 20—30 staminate ones located at

the opening of the receptacle; a number of large 3-lobed scales (fig. 25) block the opening of all fruits. The male flower (fig. 26) is two-staminated and has two sepals; the female flower (fig. 27) is single styled, its ovary is one-celled and the perigonium 5-fid.

Fig. 25.
Fruit scale. × 5.

Fig. 26.
Staminate flower × 5.

Fig. 27.
Pistillate flower × 5.

The fruits develop after the receptacles become juicy and fleshy, the ones of the first two generations being smaller in size of about 2 by 1,5 cm and of a gray or gray brown colour; the Mammoni being larger reaching as much as 3,5 by 3,5 cm approximately and of the same colour, but many of them ripen on the tree and become pinkish red; those are larger than even the figs of the fig-tree, and are the most tasty ones, and sometimes even sold on the market as edible fruits. The ancient Hebrews and Egyptians knew well to distinguish between the different kinds of the fruits of the Sycomore and we find them figured on the Egyptian monuments in two ways: golden colored fruit with a red rim and yellow brown colored. The trees are very proliferous and large numbers of them drop to the ground, especially the ones of the first two generations.

4. LIFE HISTORY.

The *Ficus sycomorus* shows two different periods in its life activity during the year: the one is more active and goes on during the summer months, starting with May and ending with September, and the other one is of a more slowed down activity during the winter months, starting with October and ending with April. This difference is to be seen in a very marked way in all life activities of the tree. The

milky resinous liquid dripping from the rosy flesh of the wounded tree is much more abundant and sticky during summer than winter. The red flush of new growth is to be seen in May — June; July — August; and September — October; twice during summer and only once in winter, although it may happen once in a while that new growth shall start to a very little extent in January—February, but it is soon suppressed by adverse climatic conditions. The position of flowers and fruits was discussed previously and they too schow two generations during summer and only one during winter. The leaves are, as might be supposed, the most sensitif to changes in climatic conditions, after which comes the fruit and at last the trunk. The tree does not stop its activity in our country during the entire year, it is only slowed down in the winter months. It retains usually through the entire year its green foliage and only unprotected specimens happen to be denudated in cold and very stormy winters. The fruit is seedless, the Mammoni being infected by a wasp, *Sycophaga sycomori* Hass, which deposits its eggs in the ovaries of the female flowers and forms galls; its interesting life history is fully described by the author and the late Dr. D. Scheinkin in the „Bulletin de la Société Royale Entomologique d'Egypte" (2). There might also be found descriptions of *Asterolecanium pustulans* var. *sambuci*, forming circular galls on the bark of the stem and branches of the tree as well as of two *Pauropsylla* species forming galls on the leaves of the tree.

5. INTERNAL ANATOMY.

The internal anatomy might be well seen from figures 28 — 33; fig. 28 being a cross-section of a one-year old branch; fig. 29 being a cross-section of a two-year old branch; fig. 30 being a cross-section of a petiole of a leaf; fig. 31 being a cross-section of a fruiting branch; fig. 32 being a cross-section of a fruit stalk and fig. 33 being a cross-section of the leaf; it seems that no additional explanations are necessary. It should be pointed out here that te milky ducts (the dark points to be seen in the figures) which are very abundant in this plant are more numerous in one year old branches than in two year old ones

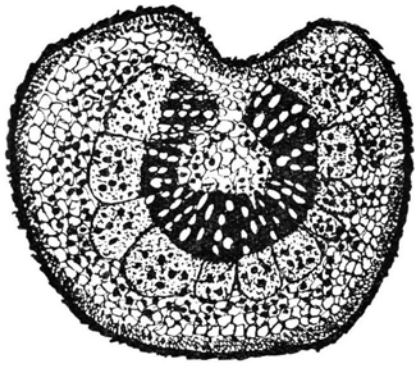

Fig. 28.
Cross — section of a one year old branch × 20.

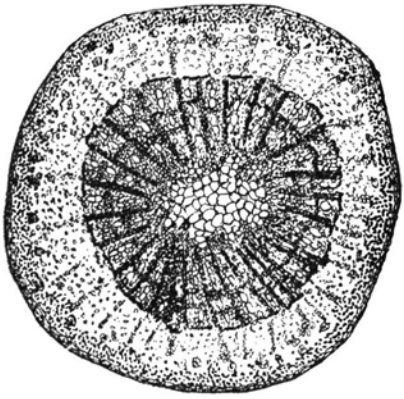

Fig. 29.
Cross — section of a two years old branch × 10.

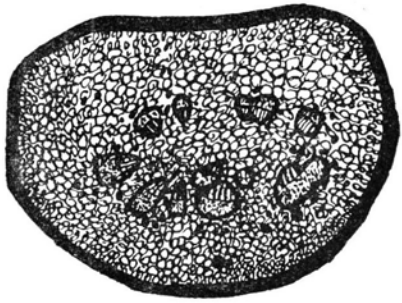

Fig. 30.
Cross — section of a leaf petiole × 20.

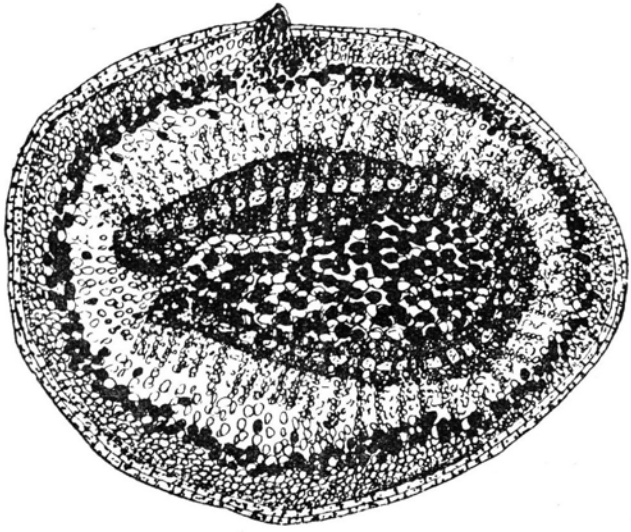

Fig. 31.
Cross — section of a fruiting branch × 15.

and poor in the leaf petioles as compared with fruit branches and stalks. It should also be interesting to find out the chromosomal make—up and behaviour of the sexual cells as the tree never forms seeds in our country, as stated previously, and according to Strassburger (3) there occurs no maturation division in *Ficus hirsuta* and Condit (4) states the same for *F. carica*, *F. pseudo-carica*, *F. palmata*, *F. elastica*, *F. religiosa*, *F. erecta* and *F. glomerata*.

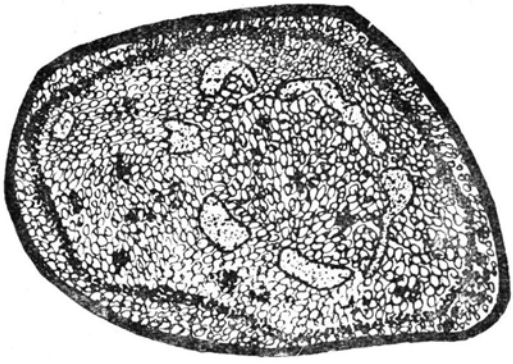

Fig. 32.
Cross — section of a fruit stalk × 15.

Fig. 33.
Cross—section of a leaf × 50.

6. USE AND CULTURE.

The sycomore is propagated by cuttings taken from young growth; they should be of a length of 25—30 cm and may be put in the ground at distances of 15 — 18 meters directly in the place, where the trees are supposed to grow, or they might be put first in a nursery at distances of 60 by 100 cms; when planted in deep sand on the sea shore branches, one and a half or even two meters long are taken and suitable holes dug. It is cultivated today in Palestine to a very limited extent only; there is at Tel-Aviv a small alley planted recently, the Arabs plant some of them in the Southern part of our country, but it will no doubt be planted in greater numbers as soon as there will be proceeded to the rebuilding of the Southern regions of Palestine owing to its manifold uses and the fact that it is almost the only tree succeeding well on poor sandy soils in the nearest vicinity of the sea. It gives a very nice shade, its wood is firm and very long lived; the ancient Egyptians were preparing out

of it sarcophags, after soaking it for some time in water. The first Jewish settlers at Gdera were making out of them shafts for their carts and only a short time ago it served the natives to some extent for the erecting of their dwellings; it is of excellent service in the chicken yard for its excellent shade and the food its fruits provide, which by the way is also eaten willingly by the natives and even sold from time to time on the markets; sheep and goats delight and fruit-eating bats and birds as well.

The tree was very common in ancient Palestine, especially in the surroundings of Lud, Jeriho, the Negev and other valleys and reached up to the hills, as might be seen from numerous mentionings in our ancient literature; the ancient name of Haifa was Shikmona, from the Hebrew name of this tree. It was planted for its wood, which was priced as high as the one of the olive tree, but its fruit was of no great esteem and could be taken by anybody. It used to be planted along the roads for its shade and some of these alleys are still to be found in different parts of our country. The young tree was trimmed, of a meter high from the ground the cut covered by earth and the growing out shoots discarded or simply pulled of by hand. It served also of some kind of an an idol to the ancient Hebrews and was so till lately to the Beduins wandering in the Southern part of our country. It was sacred to the ancient Egyptians and looked upon as the symbol of life and the goddess Isis. The man approaching his death prays, as is told in numerous egyptian inscriptions „to wander under the sycomore and to delight its lovely shade"; the fruits had also some use in the ancient medicine of this country.

7. CRYPTOGAMIC INHABITANTS AND DISEASES.

On the trunk of the sycomore is to be found a Lichen, *Callopisma aurantiaca* Lightf. (Mass) (fig. 34 — 36). It is circular and knob-like protruding, of a diameter of one mm approximately and surrounded by white grayish margins; it is green when young and turns latter on yellowish brown. The Alga dwelling in it is a globular *Pleurococcus* of a diameter of 0,002 mm, the fungus treads being much thinner

than that. The Alga grows over the Fungus and covers it entirely, it seems to do well on the bark of the sycomore all alone and some of the green color of the branches of the tree should probably be attributed to it.

Fig. 34.
Piece of tree bark with Lichenes on it; natural size.

Fig. 35.
Callopisma aurantiaca ×10.

Fig. 36.
Callopisma aurantiaca ×50 (the circles are the *Pleurococcus*).

There is also another Lichen to be found once in a while on the bark, *Leptogium cyanescens* Kbr, but as it is much more abundant on the Fig tree it will be described there; the same will also be done with a number of diseases attacking it and common to both of them.

ACKNOWLEDGEMENT.

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SUMMARY.

1. The different names of the Fig. tree, especially in Hebrew and Arabic, are taken up.

2. It came to Palestine from Abyssinia, its original country, through Egypt. In Palestine it is to be found now in its Southern plains and sea shore valleys where it reaches its Northern border of dispersion.
3. Its morphology and anatomy are fully taken up, described and figured.
4. It shows two well defined periods of activity in our country: the one starting in May up to September, the more active one, and the other one, from October up to April.
5. The uses of the plant as shade tree, its value for wood and in the chicken yard as well as the ancient methods of its culture and its place in ancient times are all taken up in detail.
6. The fruit has three generations during the year; the first one, the *Profici* during August, September and October; the second one, the *Mammae* during November and the first half of June and the third one, the *Mammoni* during the last half of June and July. The third one is infected by a wasp, *Sycophaga sycomori,* depositing its eggs in the ovules of the female flowers.
7. A Lichen to be found on the bark of the tree, *Callopisma aurantiaca* Lightf. (Mass) is described; an other one, *Leptogium cyanescens* Kbr is mentioned.