

What the Roman emperor Tiberius grew in his greenhouses

H.S. Paris^{1*} and J. Janick²

¹ Department of Vegetable Crops & Plant Genetics, Agricultural Research Organization, Newe Ya'ar Research Center, P. O. Box 1021, Ramat Yishay 30-095, Israel

² Department of Horticulture & Landscape Architecture, Purdue University, 625 Agriculture Mall Drive, West Lafayette, IN 47907-2010, USA

* Corresponding author e-mail: hsparis@agri.gov.il

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Abstract

A number of cucurbits are mentioned and described in Mediterranean writings of the first and second centuries CE, including Dioscorides' *De Materia Medica*, Columella's *De Re Rustica*, Pliny's *Historia Naturalis*, and the codices of Jewish law known as the *Mishna* and *Tosefta*. Images of cucurbits from the same region pre-dating, contemporary, or somewhat later than these writings appear to represent the same cucurbit taxa. Based on a reconciling of these texts and images it is clear that the *cucumis* described by Columella and Pliny and grown in proto-greenhouses of the Roman Emperor Tiberius was the same as the *qishu'in* mentioned in the codices of Jewish law and are here identified taxonomically as *Cucumis melo* subsp. *melo* Flexuosus Group, known today as snake melon, vegetable melon, and faqqous. We found no evidence, descriptive or illustrative, for the presence of cucumber, *Cucumis sativus*, in Mediterranean cultures during this time period, despite the repeated translations of *cucumis* and *sikyos hemeros* as cucumber by translators of these ancient documents.

INTRODUCTION

In the first century CE, two Roman agricultural writers, Lucius Junius Moderatus Columella and Gaius Plinius Secundus (Pliny the Elder), referred to proto-greenhouses (*specularia*) constructed for the Emperor Tiberius (42 BCE–37 CE) (Fig. 1), presumably adjacent to his palace, the Villa Jovis on the Isle of Capri, which is still visited by tourists to that magical isle. Pliny wrote (Book 19, 23: 64) that *the specularia consisted of beds mounted on wheels which they moved out into the sun and then on wintry days withdrew under the cover of frames glazed with transparent stone* (lapis specularis or mica). Apparently the *specularia* were built to provide, in Pliny's words, *a delicacy for which the Emperor Tiberius had a remarkable partiality; in fact there was never a day on which he was not supplied with it*. Herein, we consider the long-held assumption, endlessly copied throughout nearly two millennia, that the emperor's delicacy, referred to by Columella and Pliny as *cucumis*, was cucumber, *Cucumis sativus* L. Our goal was to re-examine this assumption and ascertain if there really is any evidence for the presence of *Cucumis sativus* around the Mediterranean, previous to or during Roman times.

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Figure 1. Emperor Tiberius of Rome.
Source: Louvre Museum.

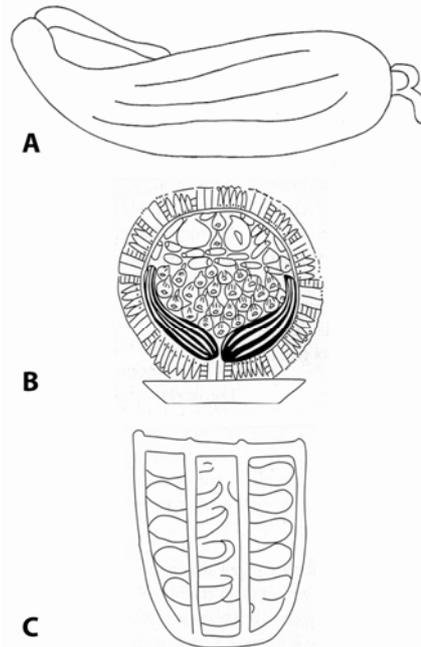


Figure 2. Images of *Cucumis melo* from ancient Egyptian Theban tombs, 18th dynasty, 1550–1300 BCE: (A) melon with attached peduncle and corolla; (B) basket with melons, figs, and dates; (C) basket with melons (Manniche 1989).

ANCIENT TEXTS

We have considered carefully the references to cucurbits in three ancient sourcebooks of agriculture and medicine: Dioscorides *De Materia Medica* (Gunther 1959; Beck 2005), Columella's *De Re Rustica* (Ash 1941; Forster and Heffner 1955), and Pliny's *Historia Naturalis* (Rackham 1950; Jones 1951). We have done the same with regard to the *Mishna* and *Tosefta* (Mechon Mamre 2008), which are compilations of scholarly commentaries on Jewish law derived from the same epoch (Janick et al. 2007).

Dioscorides

The writings of Dioscorides, rich in medical uses, contain five epithets for cucurbits but without sufficient description to allow us to determine precisely the species referred to, since the original manuscript was not illustrated. However, aided by three images in the *Juliana Anicia Codex* (Der Wiener Dioskurides 1998, 1999), a famous illustrated manuscript dating from 512 CE, three cucurbit taxa were identified: bryony (*Bryonia alba* L.), colocynth [*Citrullus colocynthis* (L.) Schrader], and squirting cucumber [*Ecballium elaterium* (L.) Rich.] (Janick et al. 2007; Renner 2008). Of the two un-illustrated cucurbits, one was named *pepon*, which probably can be applied to watermelon, *Citrullus lanatus* (Thunb.) Matsum. & Nakai (Stol 1987). The other, named *sikyos hemeros*, was identified as cucumber, *C. sativus*, by Gerard (1597) and the various other translators of *De Materia Medica*, including John

Goodyer in 1633 (Gunther 1959) and Beck (2005). Although the English word *cucumber* and French word *concombre* are derived from *cucumis*, we did not locate any supporting evidence, descriptive or illustrative, to attribute *sikyos hemeros* to *Cucumis sativus*.

Columella

Columella, in his Book 10, described the *cucumis* as follows: *But bluish cucumis with swollen womb, hairy and like a snake with knotted grass covered, which on its curving belly lies forever coiled.* This description fits perfectly the immature fruits of snake melon, *Cucumis melo* L. subsp. *melo* Flexuosus Group (Pitrat et al. 2000), but not cucumber, *C. sativus*, the fruits of which are not hirsute, but instead glabrous except for their tubercles and spines. The *cucumis* was not fit for eating as a mature fruit, however: *Foul is its juice and with fat seeds 'tis stuffed.*

Columella described the *cucurbita* as follows: *And the swelling cucurbita sometimes from arbours hang, sometimes, like snakes beneath the summer sun, through the cool shadow of the grass do creep. Nor have they all one form: now, if you desire the longer shape which hangs from slender top, then from the narrow neck select your seeds; but if a cucurbita of globelike form you seek, which vastly swells with ample maw, then choose a seed from the mid-belly, bearing fruit which makes a vessel for Narycian pitch or Attic honey from Hymettus' mount, or handy water-pail or flask for wine; 'twill also teach the boys in pools to swim.* Hence, there were at least two distinctly shaped forms of *cucurbita* that were cultivated. One was long-fruited and for eating, hence *this certainly commands a better price than any other* (Book 11). The other was broader and *quite suitable for use as vessels, like the Alexandrian gourds, when they have been thoroughly dried.* This description fits perfectly the calabash or bottle gourd, *Lagenaria siceraria* (Mol.) Standl., which to the present has narrow, long-fruited cultivars that are grown for eating the young fruits and broad, shorter-fruited (round, oblate, pyriform, bottle-shaped, flask-shaped, etc.) cultivars that are grown for the use of the mature fruits for various purposes, but not for eating.

The *cucumis* and *cucurbita* were translated as cucumber and gourd, respectively, by Forster and Heffner (1955). Nonetheless, other than the obvious derivation and similarity of the English word *cucumber* with the Latin *cucumis*, there is nothing in Columella's description to indicate that *cucumis* is the taxon *C. sativus*. The English word *gourd*, which is derived from the Latin *cucurbita*, is generic, synonymous with the word *cucurbit*. The translation does not specifically indicate *L. siceraria*.

Pliny

Pliny, in his Book 19, wrote that the *cucumis* and the *cucurbita* had similar cultural requirements. Both were viney plants that tended to climb if given the opportunity. They were heat-loving, sensitive to cold weather, and sown in early spring on well-irrigated, fertile soil. Pliny clearly defined the difference between *cucumis* (pliable skin or cartilage and flesh) and *cucurbita* (rind and cartilage). The former fits both cucumbers and melons whilst the latter fits bottle gourd.

Pliny described the *cucumis* as being variable in size, shape, and color and that the *cucumis* was also *covered with white down*. This remark fits young fruits of *C. melo*, which are hirsute, but not those of *C. sativus*, which are glabrous except for

tubercles and spines. Pliny also referred to a new type of *cucumis*, called *melopepo*, which was nearly round, quince-like, and which abscised from the plant. The separation of the fruits from the plant indicates that the *melopepo* was a mature melon, *C. melo*. This round *melopepo*, although more agreeable when mature than the long *cucumis*, was probably not very sweet, as are the muskmelons, cantaloupes, and casabas of today. As de Candolle (1886) remarked: *It was probably of an indifferent quality, to judge from the silence or the faint praise of writers in a country where gourmets were not wanting.* This, indeed, does contrast with the public sensation caused by the introduction of sweet melons into Europe near the close of the 15th century (Naudin 1859; Goldman 2002).

Pliny noted, as did Columella, that there was also much variation in the shape of fruits of *cucurbita* and that shape was related to usage: *There are a larger number of ways of using gourds...gourds have recently come to be used instead of jugs in bathrooms, and they have long been actually employed as jars for storing wine... The longer and thinner gourds are the more agreeable they are for food, and consequently those which have been left to grow hanging are more wholesome; and this kind contains fewest seeds, the hardness of which limits their agreeableness as an article of diet.*

Again, Pliny did not describe any cucurbit which could be identified as cucumber. We suggest that the warty skin of cucumber, if observed by Pliny, is unlikely to have been ignored.

Mishna and Tosefta, the rabbinical commentary of the 1st and 2nd centuries

Of the three cucurbits mentioned in the Hebrew Bible, the *qishu'im* (Numbers 11: 5) were probably the most important for use as food. No later than by the time of the first temple in Jerusalem (10th through early 6th centuries BCE), their cultivation in Judea must have been common, as there was a special word in Hebrew for a field of them, *miqsha* (Isaiah 1: 8). Moreover, these *qishu'im* or *qishu'in*, or in the singular form, *qishut*, are the most frequently mentioned cucurbit in the Jewish commentary, reflecting their relative importance and widespread culture in the Israel of Roman times. The possibility of growing the plants in a pot or receptacle (*Mishna*, 'Oqazin 2: 10) is reminiscent of Pliny's description of out-of-season production of *cucumis*. Indeed, reminiscent of the Roman Emperor Tiberius with his *cucumis*, Rabbi Yehuda the President, who lived in the 2nd century and compiled the *Mishna*, was said to have had *qishu'in* on his table throughout the year, according to the 7th-century compilation of Jewish law derived from the *Mishna*, the *Babylonian Talmud* (*Berakhot* 57b) (Mechon Mamre 2008). The *qishu'in* had a very short shelf life, as they were fit for contribution for only one day after harvest (*Tosefta*, *Terumot* 4: 5). They were so obviously and densely hairy that, in a play on words, the hairs collectively were referred to as *keshut shel qishut* (down of *qishut*) (*Mishna*, 'Oqazin 2: 1). The downiness of the fruits is consistent with young melons, *C. melo*, but not with cucumbers, *C. sativus*. The Greek *pekos*, meaning fine hairs or removal of such hairs, is the likely source for the special Hebrew word for the removal of the down prior to the use of the fruits in culinary preparation, *piqqus* (*Mishna*, *Ma'asrot* 1: 5) (Lieberman 1993). This *piqqus* was probably accomplished by vigorously rubbing the fruit or perhaps by dipping the fruits in boiling water (Feliks 2005). The modern Arabic epithet *faqqous* is used for the long-fruited snake melons, *C. melo* Flexuosus

Group. Whilst Feliks (1967) and Zohary (1982) concurred that the *qishu'im* of Biblical times were chate melons (Pitrat et al. 2000), it seems that the *qishu'im* of the *Mishna* and *Tosefta* were considerably longer, and referred mostly to snake melons (Kislev 2000b).

The *melafefonot*, or in the singular form, *melafefon*, were also an article of food and thus subject to tithing, which would take place after removal of the hairs by dipping in boiling water (*Tosefta*, *Ma'asrot* 1: 3–5). One of the sages, Rabbi Yishma'el, is on record, however, as exempting the immature fruits from tithing, prior to their becoming “bald,” an indication of the strong preference for consuming these fruits after they became glabrous, close to or at their maturity (Lieberman 1993). The linguistic origin of the Hebrew *melafefon* is obviously from the Greek *melopepo*, the name Pliny used in describing a round, quince-like fruit. Hence, the *melafefonot* were quite likely round and used at maturity, same as the *melopepo* of the Romans. As more mature fruits, the *melafefonot* would be expected to have had a longer shelf life than the *qishu'in*, and indeed they were considered as being fit for contribution for as much as three days after harvest (*Tosefta*, *Terumot* 4: 5). For the purpose of tithing, most of the rabbis considered the *melafefon* and *qishut* as interchangeable (*Mishna*, *Terumot* 2: 6) and most agreed that it was permissible to plant them close to one another (*Mishna*, *Kil'ayim* 1: 2). Feliks (1967, 2005) and Kislev (2000b) identified the *melafefonot* as melons, *C. melo*.

Another edible cucurbit from the *Mishna* and *Tosefta* is the *delu'im* or *delu'in*, or the singular form *dela'at*. By the time of the *Mishna* and *Tosefta*, the *delu'im* must have been commonly grown, as a field of them had a specific name in Hebrew, *midla'* (*Mishna*, *Shevi'it* 2: 1, 2; *Tosefta*, *Oholot* 17: 11). The *delu'in* are most often mentioned in connection with the *qishu'in*, and it was permissible to plant them in the same field with other vegetables but they had to be given adequate spacing, especially if planted next to the *qishu'in*, so as not to interfere or intermingle with them (*Mishna*, *Kil'ayim* 3: 4, 6–7), suggesting that both these crops had viney plants. The *delu'in* were hairy fruits and, as with the *qishu'in*, they had to undergo *piqqus* prior to the use of the fruits in culinary preparation (*Mishna*, *Ma'asrot* 1: 5). The shelf life of the *delu'in* was as short as that of the *qishu'in*, only one day (*Tosefta*, *Terumot* 4: 5). Löw (1928), Feliks (1967, 2005) and Zohary (1982) identified the *delu'in* as bottle gourds, *L. siceraria*. Three distinct types of *delu'in* were grown, the Greek, the Egyptian, and the *ramoza* (*Mishna*, *Kil'ayim* 1: 5). There is also reference to an Aramean cultigen (*Tosefta*, *Kil'ayim* 1: 4), but it was regarded as synonymous with the Egyptian by Feliks (1967). The *ramoza* differed from the others by the bitterness of its fruits, which could be eliminated by roasting them in hot embers. The Greek cultigen was not to be intermingled with the others together in the field (*Mishna*, *Kil'ayim* 1: 5) or at least not with the *ramoza* (*Tosefta*, *Kil'ayim* 1: 4) (Kislev, 2000a). Given the genetic bitterness of the *ramoza*, it certainly would have been ill-advised to save seeds from edible-fruited *L. siceraria* growing next to it. For a person who vowed to abstain from *delu'in*, the prohibition applied to the Greek cultigen only (*Tosefta*, *Kil'ayim* 1: 4), suggesting that its fruits were used for culinary purposes. This could also account for the observation that the Greek cultigen required more space in the field than the others (Feliks 1979). Maturing fruits and seeds slow vegetative growth but continual removal of immature fruits for use as food allows cucurbit plants to

sustain rampant growth. Hence, as was the case for the Romans, in Israel there were bottle gourds grown as food and there were bottle gourds grown for other purposes.

IMAGES

A wealth of cucurbit images has been discovered among archeological finds of ancient Egypt, although the taxonomical attribution of the images has been subject to error among various writers. Most frequently found among the images are representations of *C. melo*, especially of the Chate Group (Loret, 1892). Keimer (1924) presented over 20 tracings of images from ancient Egypt of fruits of *C. melo*, mostly of this cultivar-group as well as some noticeably longer, almost serpentine forms, thus of the Flexuosus Group. Keimer also presented an image he identified as of a *L. siceraria* fruit.

A surprising number of cucurbit images have been located from Mediterranean cultures antedating and contemporary with the Roman Empire, and a few of them can be viewed in Janick et al. (2007). Here we display representative examples of *C. melo* and *L. siceraria*. A wall painting from ca. 1500 BCE (Fig. 2A) depicts an elongate fruit, together with attached peduncle and clinging corolla, having longitudinal striations which appear to represent shallow furrows, a common feature of *C. melo* fruits but not of either *C. sativus* or *L. siceraria*. Another painting (Fig. 2B) shows two large, elongate, striped fruits of *C. melo* in a basket together with figs and dates. A crude wall painting (Fig. 2C) from a Theban tomb of the 18th dynasty in the New Kingdom (ca. 1500 BCE) shows a basket containing ten elongate cucurbit fruits, narrower near their peduncular than stylar ends, which appear to be *Cucumis melo* but *Lagenaria siceraria* cannot be ruled out. A 4th-century Roman mosaic (Fig. 3) depicts round-fruited melons. A 2nd-century mosaic from Tunisia (Fig. 4) depicts elongate *L. siceraria*, the *cocuzzi*, which are used as a vegetable.



Figure 3. Mosaic depicting round-fruited melons, *Cucumis melo*, 4th century, Torre de' Schiavi, Rome (Balmelle et al. 1990). Figure 4. Mosaic depicting bottle gourds, *Lagenaria siceraria*, late 2nd century, Tunisia (Balmelle et al. 1990).

DISCUSSION

The descriptions of Columella and Pliny, the Jewish writings, and the artistic legacy from around the Mediterranean Sea are consistent with the growing and food use of *C. melo* (melon) and *L. siceraria* (bottle gourd) in this region in Roman times. The long-fruited forms of *C. melo*, known today as vegetable melons, snake melons or faqqous, were the most widely grown cucurbit and the fruits, when young, must have been highly esteemed in Rome and in Israel, as the respective leaders of their peoples were said to have them available throughout the year. The round-fruited melons, of lesser importance, were consumed when ripe and had a pleasant flavor but were not sweet, at least not by modern standards. *L. siceraria* was also widely grown, the immature fruits of long-fruited forms were appreciated as a vegetable and mature, dried fruits of the round and bottle-shaped forms as vessels or utensils. We did not find any evidence, descriptive or illustrative, for the existence of *C. sativus* (cucumber) around the Mediterranean previous to or during Roman times. We believe the almost universal association of cucumber with the *cucumis* of Pliny and Columella, the *sikyos hemeros* of Dioscorides, and the *qishu'im* of Hebrew scripture and commentary results from mistranslations, misattributions, and wrong assumptions. We therefore confirm the prescient comments of Dalby (2003) and hope this paper will help set the record straight.

The first image of cucumber in Europe (Fig. 5) known to us dates from the latter part of the Medieval Period, specifically to the manuscript, *Manfred de Monte Imperiali*, from Pisa, Italy, ca. 1335, viewable on-line at the website of the Bibliothèque Nationale de France (ms. Latin 6823). Although it is possible that *C. sativus* arrived in Europe earlier in the Medieval Period, we have not found, at least not yet, any pictorial evidence to indicate the continuous presence of this taxon in Europe prior to the 14th century, suggesting the possibility that cucumber was introduced overland into Europe from the east following the Mongol conquests, which began with Genghis Khan in the early 13th century. The fruits depicted in the Manfred image are quite similar to those depicted in the ceramic sculptures of Luca Della Robbia (1399–1482), some paintings by Carlo Creveli (1430–1495), and festoons of the Villa Farnesina (Janick and Paris 2006), all being relatively short (low length-to-width ratio) and prominently tuberculate, characteristics of the cultivar-group or market type referred to today as American Pickling. The genetic diversity of cucumbers in Europe during the late Medieval and early Renaissance Periods thus appears to have been quite low, suggesting that cucumbers were a recent introduction from elsewhere and were not as yet well-appreciated by Europeans.



Figure 5. *C. sativus* (cucumber) left, and *C. lanatus* (watermelon) right, from the Manfred de Monte Imperiali, Pisa, Italy (ca. 1335). Source: Bibliothèque Nationale de France (ms. *Latin* 6823).

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